

**HP 3000
Series 900
Computers**

**Performing System
Management Tasks**

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900 Series HP 3000 Computer Systems

Performing System Management Tasks



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Printing History

The following table lists the printings of this document, together with the respective release dates for each edition. The software version indicates the version of the software product at the time this document was issued. Many product releases do not require changes to the document. Therefore, do not expect a one-to-one correspondence between product releases and document editions.

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Preface

MPE/iX, Multiprogramming Executive with Integrated POSIX, is the latest in a series of forward-compatible operating systems for the HP 3000 line of computers.

In HP documentation and in talking with HP 3000 users, you will encounter references to MPE XL, the direct predecessor of MPE/iX. MPE/iX is a superset of MPE XL. All programs written for MPE XL will run without change under MPE/iX. You can continue to use MPE XL system documentation, although it may not refer to features added to the operating system to support POSIX (for example, hierarchical directories).

Finally, you may encounter references to MPE V, which is the operating system for HP 3000s, not based on the PA-RISC architecture. MPE V software can be run on the PA-RISC (Series 900) HP 3000s in what is known as *compatibility mode*.

The *Performing System Management Tasks* manual is an introduction to managing the 900 Series HP 3000 computer systems. It explains procedures and processes that the system manager uses to perform daily tasks.

Defining Hardware to the System

The system manager is typically the person who puts together the computer hardware to make it an operational unit or system. This person is responsible for defining peripheral units (printers, tape drives, disk drives, and terminals) to the operating system software, which then controls and operates the hardware.

The system manager uses two software products to define peripherals:

- The system generator (SYSGEN)
- The network manager (NMMGR)

Both of these products are delivered with your computer system.

Tasks and Procedures

This manual is written in a task format. To perform a task, simply look it up in the table of contents or in the index, turn to that section, read the introduction and follow the steps and examples.

How to Get Started

This manual is a companion to the *Performing System Operations Tasks* manual. You should review the Table of Contents in that manual to familiarize yourself with system operations and understand the relationship between operations and system management.

In This Book

This manual is your guide to the system manager tasks for the 900 Series HP 3000.

Chapter 1 *Starting the System* explains the different ways to start your computer, how to install a new operating system, and how to use the initial system loader's standalone utilities.

Chapter 2 *Getting Started Defining Your System* explains how to use SYSGEN to configure your system and introduces the other configurators (which are fully explained in the chapters that follow.)

Chapter 3 *Defining Input/Output Devices to the System* explains how to use the IO configurator to get information about the current configuration and how to add devices to the system.

Chapter 4 *Defining Events to be Recorded* explains how to use the LOG configurator to set which system and user activities your computer records.

Chapter 5 *Changing System Libraries, Programs, and Message Catalogs* explains how to use the SYSFILE configurator to add or delete items on the system load tape.

Chapter 6 *Defining Miscellaneous System Resources* explains how to use the MISC configurator to define limits on system resources, jobs and sessions.

Chapter 7 *Using Threshold Manager* explains how to use the Threshold Manager utility, which alerts the system manager when certain internal operating system resources reach critical levels of utilization that can lead to a system abort.

Chapter 8 *Allowing Access to the System* describes MPE's account structure and explains how to create new accounts, groups and users, and how to secure disk files.

Chapter 9 *Managing Disks* describes disk management tasks for a 900 Series HP 3000 computer system. It explains the procedures for creating master or member volumes, setting limits on permanent and transient disk storage, and determining the amount of free disk space.

Chapter 10 *Planning Your Backup Strategy* discusses how to choose a backup strategy including which type of backup to use and when to use it.

Chapter 11 *Shutting Down the System* tells you when to shut down your system and gives you a step-by-step shutdown sequence.

Chapter 12 *System Hardware Descriptions* presents an overview of the hardware of the 900 Series HP 3000 computer.

Glossary defines the important terms introduced in system management. **Index** is an alphabetical listing of subjects, cross-referenced with their location in the manual.

This manual contains information subject to change without notice.

Conventions

UPPERCASE	In a syntax statement, commands and keywords are shown in uppercase characters. The characters must be entered in the order shown; however, you can enter the characters in either uppercase or lowercase. For example: COMMAND can be entered as any of the following: command Command COMMAND It cannot, however, be entered as: comm com_mand comamnd
<i>italics</i>	In a syntax statement or an example, a word in italics represents a parameter or argument that you must replace with the actual value. In the following example, you must replace <i>filename</i> with the name of the file: COMMAND <i>filename</i>
<i>bold italics</i>	In a syntax statement, a word in bold italics represents a parameter that you must replace with the actual value. In the following example, you must replace <i>filename</i> with the name of the file: COMMAND(<i>filename</i>)
punctuation	In a syntax statement, punctuation characters (other than brackets, braces, vertical bars, and ellipses) must be entered exactly as shown. In the following example, the parentheses and colon must be entered: (filename):(filename)
<u>underlining</u>	Within an example that contains interactive dialog, user input and user responses to prompts are indicated by underlining. In the following example, <u>yes</u> is the user's response to the prompt: Do you want to continue? >> <u>yes</u>
{ }	In a syntax statement, braces enclose required elements. When several elements are stacked within braces, you must select one. In the following example, you must select either ON or OFF : COMMAND { ON } { OFF }
[]	In a syntax statement, brackets enclose optional elements. In the following example, OPTION can be omitted: COMMAND filename [OPTION] When several elements are stacked within brackets, you can select one or none of the elements. In the following example, you can select OPTION or <i>parameter</i> or neither. The elements cannot be repeated. COMMAND filename [OPTION parameter]

Conventions (continued)

[...]

In a syntax statement, horizontal ellipses enclosed in brackets indicate that you can repeatedly select the element(s) that appear within the immediately preceding pair of brackets or braces. In the example below, you can select *parameter* zero or more times. Each instance of *parameter* must be preceded by a comma:

[, *parameter*] [...]

In the example below, you only use the comma as a delimiter if *parameter* is repeated; no comma is used before the first occurrence of *parameter*:

[*parameter*] [, ...]

| ... |

In a syntax statement, horizontal ellipses enclosed in vertical bars indicate that you can select more than one element within the immediately preceding pair of brackets or braces. However, each particular element can only be selected once. In the following example, you must select **A**, **AB**, **BA**, or **B**. The elements cannot be repeated.

$\left\{ \begin{array}{c} \mathbf{A} \\ \mathbf{B} \end{array} \right\} | \dots |$

...

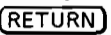
In an example, horizontal or vertical ellipses indicate where portions of an example have been omitted.

Δ

In a syntax statement, the space symbol Δ shows a required blank. In the following example, *parameter* and *parameter* must be separated with a blank:

(*parameter*) Δ (*parameter*)



The symbol  indicates a key on the keyboard. For example,  represents the carriage return key or  represents the shift key.

 character

 character indicates a control character. For example, Y means that you press the control key and the Y key simultaneously.

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Starting the System

System startup refers to the procedure for starting the computer operating system and other programs. It does not refer to physically installing the hardware, loading the fundamental operating system (FOS), or to turning on the power to the computer, disk drives, tape drives, printers, or the system console. (Normally, computer hardware remains powered on.)

As the system manager, you need to know when to start the system and when and why to shut it down. In general, you are not the person who performs the actual procedures.

In this chapter, you can find the following topics:

- deciding when to start the system
- saving main memory to tape
- changing to a different version of the operating system
- using initial system loader (ISL) commands
- using the standalone initial system loader (ISL) utilities
- enabling the access port (AP)

Starting the System

There are four occasions when you are required to start your system:

- after your system has failed and you have saved main memory to tape
- after you have updated or changed the system
- before and after installation of the operating system and configuration
- after you have shut down the system

To save main memory to tape

Use the **DUMP** utility to perform a memory dump after a system failure or hang, for a recurring system problem, or when the system fails to boot properly. Have the tape analyzed by your Hewlett-Packard applications engineer or the Hewlett-Packard Response Center.

To dump memory to tape, perform the following steps:

1. Press **CTRL** B to put the system in control mode.
2. Enter TC and press **Return** to soft reset the system.
3. Press any key to override the autoboot.
4. Enter Y for "Boot from primary boot path (Y or N)?"
5. Enter Y for "Interact with IPL (Y/N)?"
6. Mount a blank or scratch tape on the tape drive.
7. At the ISL prompt, enter the **DUMP** command to save the current state of the system's main memory and secondary storage to tape.
 - To dump main memory and data swapped to disk, enter **DUMP SUBSET=ALL**. This is the default.
 - To dump only main memory to tape, enter **DUMP SUBSET=MEMORY**.
8. Enter the user identification string (typically a name and the date) for this dump. For example:

```
ISL>TEST DUMP 1/9/94
```

After the dump is done, the system boots.

9. At the ISL prompt, enter the **START** command and logon. (If autoboot is enabled and you have an autoboot file, you don't need to enter the **START** command because the system starts automatically.)

Using Initial System Loader (ISL) Commands

You use Initial System Loader (ISL) commands to display or change boot path information or to initiate the ISL utilities. The commands are listed and briefly explained in the following table. To issue one of them, enter the command at the ISL prompt (ISL>).

Parameter	Definition
HELP or HE or ?	Lists ISL commands and definitions, along with the ISL utilities available through the selected boot media.
LISTF or LS	Lists the ISL utilities available through the selected boot media.
AUTOBOOT	Sets or clears the autoboot flag in stable storage. (Stable storage is memory that retains its information until overwritten or subjected to a power loss.)
AUTOSEARCH	Sets or clears the autosearch flag in stable storage.
PRIMPATH	Modifies the primary boot path in stable storage.
ALTPATH	Modifies the alternate boot path in stable storage.
CONSPATH	Modifies the system console boot path in stable storage.
DISPLAY or DI	Displays the current paths in stable storage for the primary, alternate, and the console boot paths. DISPLAY also shows the status of the autoboot and autosearch flags.
LISTAUTOFL or LSAUTOFL	Lists the contents of the current AUTOBOOT file.
FASTSIZE	Sets or displays FASTSIZE.
SUPPORT	Boots the support tape from the boot device.
READNVM	Displays the contents of one word (four bytes) of nonvolatile memory (NVM). (NVM is memory that retains its information, in standard hexadecimal format, until overwritten.) Specify the word address in either decimal or hexadecimal.
READSS	Displays the contents of one word (four bytes) of stable storage. Specify the word address in either decimal or hexadecimal. The display is in standard hexadecimal format.

Using the Standalone ISL Utilities

A standalone utility, as the name implies, works on its own without information or help from any other utility. The three utilities listed below are the standalone ISL utilities. Each of them is explained in the following sections.

Parameter	Definition
CLKUTIL	Reads or sets the date and time of the hardware clock. The time should remain set at Greenwich Mean Time (GMT).
IOMAP	Identifies the actual hardware configuration of the system and its paths and devices.
DISCUTIL	Performs various disk operations and displays information about the volumes.

You may also see additional utilities at the ISL prompt.

To set or change the system clock

The ISL utility CLKUTIL reads and sets the hardware clock, which is maintained either by a Battery Backup Unit (BBU) or an Uninterruptible Power Supply (UPS), depending on the system. This clock maintains Greenwich Mean Time (GMT) independently of the software clock that is displayed when you enter the ISL START utility or any of the other ISL utilities that support the software clock. Therefore, CLKUTIL reads the date and time previously set with CLKUTIL, but it does not itself reflect the changes that you might make while in any other ISL utility.

1. To enter the clock utility, enter the CLKUTIL command at the ISL prompt:

```
ISL> CLKUTIL
```

The system responds with a banner:

```
SYSTEM FOR ISL STAND ALONE UTILITIES. [IHO, SPU LAB]
Version 1.0

***** clock utility ***** ver 1.0 ***** 11/6/86
enter command : (r) read clock, (s) set clock >
```

2. To read the clock, enter R at the CLKUTIL prompt. The system responds by displaying the day, the date and the current time.

3. To set the clock, enter **S** at the **CLKUTIL** prompt, and at the prompt, enter the date in the correct format.
 - **mm** is a two-digit number, 01 through 12, representing the month
 - **dd** is a two-digit number, 01 through 31, representing the day of the month
 - **yyyy** is a four-digit number representing the year. (You may also simply enter the last two digits for the year.)
4. When the system prompts you for the time, enter Greenwich Mean Time using a 24-hour format.
5. The system asks you to verify the adjusted date and time by issuing a message similar to the following:

THU, JAN 18, 1990, 11:17:00 PM
ok (y/n)?

Enter **Y** to set the clock. Enter **N** to return to the **enter date** prompt.
6. Press **(Return)** at the **enter command** prompt to return to the **ISL** prompt.

Note

There are two new CI commands, **SETCLOCK** and **SHOWCLOCK**, that help you display information about and manage the system clock. They allow you to change the system time and time zone without rebooting the system and using the **ISL** utility **CLKUTIL**.

- **SHOWCLOCK** displays the system time in the **hh:mm:ss** format, the current time correction and the time zone.
- **SETCLOCK** changes the system time by introducing a time correction into the system that is gradually consumed. By doing so, it allows for negative time corrections (i.e. "setting the clock back"), that do not adversely affect system accounting, database logging and recovery systems and other user applications that rely on the forward progression of time.

For more information about the **SETCLOCK** and **SHOWCLOCK** commands, refer to *MPE/iX Commands Reference Manual Volumes 1 and 2* (32650-90003 and 32650-90364).

To list system hardware

You can use the **IOMAP** utility, which you start from **ISL**, to get complete information about the system hardware. Once initiated, **IOMAP** displays a user interface that is divided into input and output sections so that you can configure **IOMAP** and selectively control how it operates.

To start **IOMAP**, do the following at the system console:

1. Halt system activity and shut the system down. At the **MPE** prompt, enter:

```
CTRL A  
=SHUTDOWN
```

2. Once the system issues the final shutdown message, transfer control by entering:

```
CTRL B  
CM>TC
```

If this reply does not work, initiate a hard reset by entering:

```
CM>RS
```

3. At the **ISL** prompt (**ISL>**), enter the **IOMAP** command. (If autoboot is enabled, press any key to interrupt it and display the **ISL** prompt, and then enter the command.)
4. To exit the **IOMAP** utility, enter **Y** at the prompt:

Do you want to exit this program and return to **ISL**?

Below is an example of an IOMAP listing for a Series 935:

IOMAP revision 2807 February 19, 1988

IOMAP Running: ce81

This program has the capability to identify the configuration of the system and its I/O paths and devices. Many of the components of the I/O system can be tested with self-test and loopback diagnostics.

Without changing any parameters, this program will map all existing I/O components in the system, but does not perform any other diagnostics.

You may enter break mode by pressing control-C or control-Y.

You may press control-X to erase what you just typed in.

Do you wish to modify any program parameters? [y,n] (n): N

Identify: Loop 1: All I/O components are being identified...

Processor Identification:

Hardware Model: AH (A1002A), Revision: 0

Hardware ID: xxxxxxxxH, Software ID: xxxxxxxxH

Processor Board Revisions:

CPU - CPU Chip:	3
SIU - System Interface Unit:	1
CCU - Cache Control Unit:	2
TCU - TLB Control Unit:	2
MIU - Math Interface Unit:	2
PDH - Processor Dependent Hardware:	2
PDC - Processor Dependent Code:	9

Cache and TLB Sizes:

Instruction Cache:	128 K bytes,	Instruction TLB:	2 K entries
Data Cache:	128 K bytes,	Data TLB:	2 K entries

Co-processors:

Floating Point Co-processor is installed

Main Memory: 48 M bytes

I/O Configuration:

Path	Component Name	Type ID	SW Mod	Revisions Hdwr	Tests Firm Avail
0	Native Processor	0H	0H	0	0
4	CIO Channel Adapter	8H	10H	0	0
4.1	HP-IB card	2H	-	6	2733 ST LB
4.1.0	7937H disc drive	214H	-	-	-
4.1.1	7937H disc drive	214H	-	-	-
4.1.2	7937H disc drive	214H	-	-	-
4.1.3	7937H disc drive	214H	-	-	-
4.1.4	7937H disc drive	214H	-	-	-
4.2	Console Device Adapter				
4.3	LAN card	6H	-	1	2531 ST
4.4	LAN card	6H	-	2	2620 ST
24	Memory Controller	1H	8H	4	0 LB
28	Memory Controller	1H	8H	4	0 LB
32	Memory Controller	1H	8H	4	0 LB
36	CIO Channel Adapter	8H	10H	0	0
36.5	HP-IB card	2H		6	2733 ST LB
36.5.0	7978A/B mag tape unit	178H	-	-	-

Identify Loop 1 (1H) complete.

Do you want to exit this program and return to ISL? [y,n] (n): Y
IOMAP Exiting.

To recover corrupted disk files

DISCUTIL is a *standalone* utility that lets you perform various disk operations without the operating system. For example, you can move files to tape from disks on a system that has directory damage and is, therefore, logically inoperable.

You start DISCUTIL at the initial system load prompt (ISL) on the system console. When DISCUTIL is loaded and running, the operating system is *not* available.

Below is a list of the commands available to you in DISCUTIL and a brief explanation of each one.

Command	Definition
CONFIGURE	Configures additional devices.
DISMOUNT	Dismounts a disk volume making it inaccessible to DISCUTIL.
DO	Re-executes a command from the command history stack after allowing you to make changes to it.
DSTAT	Displays information about each mounted volume.
EXIT	Terminates DISCUTIL.
HELP	Lists available commands.
LISTREDO	Displays the command line history stack/queue, ordered from the least to the most recent command with absolute command reference numbers preceding each command.
MOUNT	Mounts a disk volume making it accessible to DISCUTIL.
PDEV	Lists the disk currently configured and mounted.
REDO	Modifies and re-executes a command in the command history stack.
SAVE	Saves user-specified files from disks to tape.
SHOWDEV	Displays information about each configured device.
TAPE	Displays and selects the current tape LDEV.
UNCONFIG	Unconfigures currently configured devices.

To enter DISCUTIL, do the following:

1. Halt system activity and shut the system down by entering:

CTRL A SHUTDOWN

2. After the system issues the final shutdown message, enter TC to soft reset the system. For example:

Shutdown of operating system complete. (Shut 6)
user>TC

3. Press any key to override autoboot.
4. When you see the message Interact with IPL (Y or N)?, enter Y.
5. At the ISL prompt, enter the DISCUTIL command.

ISL>DISCUTIL

The DISCUTIL banner appears followed by the prompt:

discutil>

The following examples show you how to issue some of the DISCUTIL commands. Although they may appear similar to the MPE commands or the commands used in other utilities, these are solely a function of DISCUTIL. For further information, read *Volume Management Reference Manual* (32650-90045).

- To get information about all DISCUTIL commands, enter **HELP**. To get information about one of the commands, enter **HELP** followed by the command name. For example, to get help with the **MOUNT** command, enter:

HELP MOUNT

- To display the command line history stack, enter **LISTREDO**. To modify and re-execute one of the commands, use the **REDO** command. To simply re-execute the command, use **DO**.

For example, to modify and re-execute the fifth command you entered, enter:

discutil>REDO 5

To modify and re-execute the last command entered, enter:

discutil>REDO

To reissue the fifth command without editing it, enter:

discutil>DO 5

- To configure a device, use the **CONFIGURE** command followed by the LDEV number, device class and path. For example, to configure a disk drive as LDEV 21, enter:

discutil>CONFIGURE 21 DISC 6/4.0.0

- To unconfigure a currently configured device, use the **UNCONFIG** command followed by the LDEV number of the device. For example, to take LDEV 14 out of the configuration, enter:

discutil>UNCONFIG 14

- To list the disks currently configured and mounted, their volume set names, volume numbers and paths, enter the **PDEV** command. (You can also get configuration information with the **SHOWDEV** command.)
- To dismount a disk volume, enter the **DISMOUNT** command and the LDEV number of the volume. For example, to dismount LDEV 4, enter:

discutil>DISMOUNT 4

- To mount a disk volume and make it accessible, enter **MOUNT** and the volume's LDEV number. For example, to mount volume 4 enter:

discutil>MOUNT 4

- To display the current tape drive, enter the **TAPE** command. To assign a logical device as the *current* tape drive, enter the command followed by the LDEV number. For example, to configure LDEV 7 as the current tape drive, enter:

discutil>TAPE 7

- To invoke **SAVE**, enter **SAVE** at the **discutil** prompt and respond with the appropriate information. (For a detailed explanation of **SAVE**, read the next section.)

To recover files with **SAVE**

To recover files with the **SAVE** command, perform the following steps:

1. Enter:

```
discutil>SAVE
```

2. At the **ENTER FILE SET TO BE SAVED:** prompt, enter information in the following format:

```
[filename[.groupname[.acctname]]]
```

Indicate the file(s) that you want copied to tape. The file(s) must reside on a disk defined during startup of **DISCUTIL** or with the **CONFIGURE** command.

You can replace the *filename*, *groupname*, and *acctname* parameters by @ to indicate *all* members of the set.

The prompt repeats after the file set is saved. To terminate **SAVE**, press **RETURN**.

3. To save files from a specific device enter the **LDEV** number and press **RETURN** at the **ENTER THE LDEV:** prompt. **SAVE** searches only the specified disk's label table for the file(s) that you want. To search all disks, press **RETURN** without entering anything.

The logical device number entered must be known to **DISCUTIL**. Use the **PDEV** command to determine which **LDEVs** are valid.

4. At the **ENTER THE VOLUME SET NAME:** prompt, you may enter *vsname* (volume set name).

This prompt appears only if you did not specify an **LDEV** at the previous prompt. If desired, enter a volume set name to have **SAVE** search for the target file(s) on a specific volume set. The volume set name must be known to **DISCUTIL**, so use the **PDEV** command to determine which names are valid. For the default, press **RETURN** to indicate that you want **SAVE** to search all disks for the file(s).

5. At the **ENTER THE MODIFICATION DATE (MM/DD/YYYY):** prompt, you may specify a retrieval date.
6. Enter a valid tape drive **LDEV** at the **ENTER THE TAPE LDEV:** prompt.

DISCUTIL saves the disk files to the tape mounted on the LDEV specified at this prompt. It repeats the prompt until you enter a valid LDEV.

DISCUTIL searches the label tables of all LDEVs specified for the indicated file(s). Each time it finds a file, and each time it successfully writes a file to tape, it prints a message. DISCUTIL also reports errors and prompts you to mount new tapes as necessary. Once it has written all the specified files to tape, DISCUTIL prompts you to enter another file set for saving.

7. To end the SAVE command, press **RETURN** without entering a file name.

Below is a short example of the interaction between user and DISCUTIL during SAVE:

```
discutil>SAVE

ENTER FILE SET TO BE SAVED: MYFILE.JOHN.SMITH

ENTER THE LDEV: 3

ENTER THE MODIFICATION DATE(MM/DD/YYYY):06/25/1990

ENTER THE TAPE LDEV: 7

MYFILE .JOHN .SMITH - LDEV 3 - ADDR $0002CA0 - FOUND
MYFILE .JOHN .SMITH - LDEV 3 - ADDR $0002CA0 - SAVED

ENTER FILE SET TO BE SAVED:
```

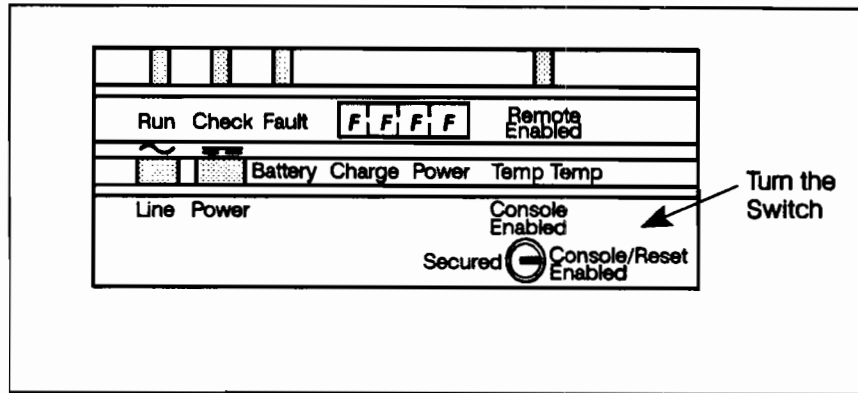
To enable the access port (AP)

The access port allows you to use **CTRL** B commands. To activate it, you turn the keyswitch on the control panel to the console enabled position. If you are using a remote console, you can enter **CTRL** B ER to activate the access port.

The mode determines the duration of remote access:

Single mode	Disables remote access when the remote console disconnects.
Multiple mode	Remote access remains enabled until you enter the DR command.

The figure below shows the key switch on Series 925 through 949 systems with the exception of the Series 932 system.



LG200130_031

Figure 1-1. Enabling the Access Port

For further information regarding the access port, refer to the *System Startup, Configuration, and Shutdown Reference Manual* (32650-90042).

To use the access port

The commands you use to control activity of the access port are listed below:

Command	Definition
CA	Configures the system's remote support modem port.
CO	Returns the console from control mode to console mode.
DI	Disconnects the line to a remote console.
DR	Disables access to the system by a remote console.
DS	Disables the display of the system status line during console mode.
ER	Enables access by a remote console.
ES	Enables the display of the system status line during console mode.
HE	Displays the help screen.
RS	Stops all processing, initiates SPU self-test, and loads software from the load device if enabled for autoboot.
SE	Transfers the remote terminal from console or control mode to session mode.
TA	Initiates the access port self-test.
TC	Transfers processor execution to an operating system specific routine. Initiates a system soft reset.
TE	Sends messages (up to 80 characters) between local and remote consoles.

Getting Started Defining Your System

As system manager, your responsibilities include configuring your system when it is initially installed and adding or changing devices as time goes on.

When your system is delivered, it includes a tape with default configuration information. To modify the system configuration, you use the system generator (SYSGEN) and either copy the changes to a system load tape (SLT), or copy them to disk in a configuration group. You must have system manager (SM) capability to make and keep changes with SYSGEN. Users with system supervisor (OP) capability can use SYSGEN to view the system configuration and make system load tapes.

NMMGR is a menu-driven utility that produces a configuration file used by data communications products to determine their operating characteristics. It configures the network interface and the DTS link. Information about **NMMGR** and the DTS link are contained in *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001).

In this chapter, you can find the following topics:

- accessing SYSGEN
- using online help
- confirming potentially serious actions
- accessing other modules and configurators
- creating system load tapes
- holding and saving configuration changes
- clearing configuration changes
- entering an MPE command from any configurator
- cross-validating **NMCONFIG.PUB.SYS** with SYSGEN
- introducing the SPU configurator

Configuring Your System with SYSGEN

As system manager, you use the system generator (SYSGEN) to make changes to the configuration of your computer system.

The configuration of a system is like a map; it tells the computer what peripherals are attached to it and where they are attached. Any device that is not configured, or configured incorrectly, cannot communicate with the system.

To access SYSGEN

To start SYSGEN and use any of the first-level commands available to you, do the following:

1. At the MPE prompt, enter:

SYSGEN

or enter:

RUN SYSGEN.PUB.SYS

2. At the SYSGEN prompt, enter one of the first-level commands shown on the screen (and displayed in example 2-1, below).

For example, to use the Sysfile configurator, enter **sysfile** or the abbreviated version **sy** at the SYSGEN prompt.

```
:SYSGEN
```

```
SYSGEN version D.00.00: catalog version D.00.00  FRI, JAN 11,1994 10:10 AM  
Copyright 1987 Hewlett-Packard Co.  All Rights Reserved
```

```
  ** First level command **
```

```
io                log (lo)          misc (mi)          spu (sp)  
sysfile (sy)
```

```
basegroup (ba)    keep (ke)         permyes (pe)       show (sh)  
tape (ta)
```

```
clear (cl)(c)     exit (ex)(e)   help (he)(h)      oclose (oc)  
redo
```

```
sysgen>
```

Example 2-1. Entering SYSGEN

To confirm potentially serious actions

SYSGEN is initially set to have you confirm potentially serious actions. For example, if you make configuration changes and forget to save them before you exit, SYSGEN prompts you to do so. This feature (**PERMYES OFF**) can help prevent time-consuming mistakes.

You have the option of enabling **PERMYES** so that SYSGEN will automatically answer YES to any prompt. You may want to do so, for example, when you are initiating a job. All SYSGEN command files should begin with **PERMYES ON**.

To enable **PERMYES**, enter the following at the SYSGEN prompt:

```
sysgen>PERMYES ON
```

When you are making and keeping configuration changes, it is a good idea to disable **PERMYES** so that SYSGEN does not reply YES to all prompts. To do so, enter the following:

```
sysgen>PERMYES OFF
```

Example 2-2 shows how SYSGEN overrides user input with **PERMYES** enabled:

```
sysgen>PERMYES ON
sysgen>SYSFILE

    ** SYSFILE configurator commands **

aauto (aa)      aboot (ab)      acmsl (ac)      asprog (as)
cmsl (cm)       dauto (da)      dboot (db)      dcmsl (dc)
dsprog (ds)     lcmsl (cl)      rauto (ra)      rboot (rb)
rcat (rc)       rcmsl (rcm)     rdcc (rd)       ripl (ri)
rnhlib (rn)     rsprog (rs)     show (sh)

clear (cl)(c)   exit (ex)(e)     help (he)(h)    hold (ho)
sysfile>
sysfile>ASPROG FCOPY.PUB.SYS FCOPY.PUB.SYS ** Add FCOPY to SYSGEN tape **
sysfile>E          *** Exit without saving ***

configuration changes are not kept yet!
still want to exit (yes/no) ?Automatic yes
sysgen>
```

Example 2-2. PERMYES ON Action

To access other configurators

Configurators are other system generation modules which you use to further define your system. To access a configurator, you enter one of the following commands at the **sysgen>** prompt: **IO**, **LOG**, **MISC**, **SPU**, or **SYSFILE**. The prompt changes and you see a menu screen which includes a list of the commands that you can use in that configurator.

The following table lists the **SYSGEN** commands you use to access a configurator and briefly explains each one.

Table 2-1. The Configurator Commands

SYSGEN Command	Definition
IO	Starts the input/output configurator, which you use to define the local devices for a host or target system.
LOG	Starts the LOG configurator, which you use to define which system and user events are recorded.
MISC	Starts the MISC configurator, which you use to define miscellaneous system elements such as job- and session-related processes, system resource allocation, spool parameters, stack and heap sizes, and other information.
SPU	Starts the SPU switchover configurator, which you use to define the system processing unit (SPU) pairs that will back each other up (i.e. take over processing) in the event of a failure.
SYSFILE	Starts the SYSFILE configurator, which you use to define system libraries, programs and the system message catalog and determine which files go on the SLT.

For example, to access the IO configurator, at the **sysgen>** prompt enter:

```
sysgen>IO
```

When you do, you see this screen:

```
sysgen>IO
```

```
  ** IO configurator commands **
```

```
aclass (ac)      adev (ad)      apath (ap)      avol (av)
dclass (dc)      ddev (dd)      dpath (dp)      dvol (dv)
lclass (lc)      ldev (ld)      lpath (lp)      lvol (lv)
maddress (ma)    mclass (mc)    mdev (md)      mpath (mp)
mvol (mv)
```

```
clear (cl)(c)    exit (ex)(e)    help (he)(h)    hold (ho)
oclose (oc)      redo
```

```
io>
```

Example 2-3. Activating the IO Configurator

To use online help

You can get help with any of SYSGEN's first-level commands and, when you are using a configurator, with any of the configurator commands. The amount of information you get depends on your current level (SYSGEN or configurator) and what parameters you enter with the HELP command.

- Enter **HELP** or **HELP ALL** to display all the commands available to you at the current level. For example, when you type **HELP** at the IO configurator prompt, you see a list of IO configurator commands.
- Enter **HELP command** to display the syntax of *command*

For example, to display detailed information and syntax of the SYSGEN **KEEP** command, enter:

```
sysgen>HELP KEEP
```

Or, to display the syntax for the IO configurator command **ADEV**, start the IO configurator and enter:

```
io>HELP ADEV
```

To show the state of the configurators

Use the **SHOW** command to display the current state of global SYSGEN information. For example, use **SHOW** to find out the version you are using or what the status of the **PERMYES** option is. You can also display a combined listing of configurator information.

SHOW has the following parameters:

$$\text{SHOW (SH)} \left[\text{[TYPE =]} \left\{ \begin{array}{l} \text{BASEGROUP} \\ \text{NEWGROUP} \\ \text{VERSION} \\ \text{PERMYES} \\ \text{CONFIGURATOR} \\ \text{ALL} \end{array} \right\} \right] \left[\text{[DEST =] OFFLINE} \right]$$

To display one kind of information, use the **TYPE** parameter to specify what you want. For example, to find out the base group, enter:

```
sysgen>SHOW TYPE=BASEGROUP
```

To display a combined listing of configuration information, enter:

```
sysgen>SHOW
```

or

```
sysgen>SHOW ALL
```

To print the output of the **SHOW** command, use the **OFFLINE** parameter to send the output to SYSGEN's listing file **SYSGLIST** and then enter the **OCLOSE** command or exit SYSGEN to close **SYSGLIST** and print the file. For example, to print a list of all configuration information and exit SYSGEN, enter:

```
sysgen>SHOW DEST=OFFLINE  
sysgen>EXIT
```

To hold and save configuration changes

You must perform two separate steps to keep any changes you make from within a configurator:

- Hold the changes before leaving the configurator.
- Keep the changes before leaving SYSGEN.

Keeping changes makes them permanent on disk, but you should also save them by creating a system load tape (SLT). Changes to the configuration only take effect when you restart the system with the **START NORECOVERY** option. Other changes take effect only when you perform an update with the system load tape (SLT).

To make changes in a configurator, hold and then keep the changes, follow these steps:

1. At the console, log on as **MANAGER.SYS** by entering:

HELLO MANAGER[/userpass].SYS[/acctpass]

2. Start **SYSGEN** and access the configuration group that you plan to store on the system load tape (SLT). The default is the name of the group used in the most recent system boot, usually **CONFIG**.
3. Access the **IO**, **LOG**, **MISC**, **SYSFILE**, or **SPU** configurators and make the changes you want.
4. Enter the **HOLD** command to save the changes to a temporary file.
5. Enter the **EXIT** command to leave the configurator and return to the **sysgen>** prompt.
6. Keep the new configuration information by entering the **KEEP** command. For example:

sysgen>keep nuconfig

Once you have kept the new configuration information, you can enter another configurator to make additional changes or you can create a system load tape. To learn how to create a tape, read the next section. For more information about reconfiguring your system, refer to chapters 3 through 6 of this book.

To clear configuration changes

Until you use the **KEEP** command from within **SYSGEN** to save configuration changes, you have the option of clearing them. You can clear changes in one configurator or you can clear all the changes you have made since the last **KEEP** command.

To clear all configuration changes made in all configurators, enter the **CLEAR** command at the **sysgen>** prompt. For example:

sysgen>CLEAR

To clear all the changes you made within a particular configurator, enter the **CLEAR** command at the configurator prompt. For example, to clear all **IO** configurator changes, enter:

io>CLEAR

Once you enter the **KEEP** command, the changes become permanent and **CLEAR** does not remove them.

To create system load tapes

You use the TAPE command (abbreviated TA) to generate a boot or system load tape (SLT) from system configuration information. SYSGEN writes the configuration to the CONFIG group of the SYS account on the tape. Tapes created with the TAPE command do not contain the system directory.

TAPE has the following syntax:

```

TAPE [ [MODE =] { VERBOSE
                  NOCHANGE
                  NOCONFIG
                  NODIAG
                  NOLOGNUM
                  LOGNUM
                } ] [STORE = fileset ]
      [ [DEST =] OFFLINE ]

```

Table 2-2. TAPE Command Parameters

Parameter	Definition
VERBOSE	Lists the number of nonuser files to be saved and the name of each file as it is saved to the boot tape.
NOCHANGE	Prevents SYSGEN from changing the names in the SYSFILE configuration as it makes the boot tape.
NOCONFIG	Prevents SYSGEN from dumping the current configuration file as it makes the tape.
NODIAG	Prevents SYSGEN from saving the diagnostic files to tape as it makes the tape. Using this parameter creates a tape that does not contain a complete system. Installing from this tape may not produce a bootable system.
NOLOGNUM	Resets the system and datacom log numbers to zero (0).
LOGNUM	Is the default. It specifies that SYSGEN should carry forward the system and datacom log numbers and not reset to zero (0).
OFFLINE	Directs the listing created by VERBOSE to SYSGEN's listing file, SYSGLIST. Either enter the OCLOSE command or exit SYSGEN to close "SYSGLIST" and print the file.
STORE	Instructs SYSGEN to use the STORE utility to append user files specified in <i>files</i> et to the end of the system load tape. Allows users to create a combined SLT/STORE tape set. Any files set valid for STORE is allowed in the STORE option. You may not specify other STORE parameters such as DIRECTORY and SHOW unless you include them in an indirect file and then specify the indirect file with the STORE parameter of the TAPE command.

To create a system load tape with the new information:

1. Make and hold all necessary changes to the configuration.
2. Enter the **EXIT** command to exit the configurator and return to the SYSGEN prompt.
3. Enter the **KEEP** command, followed by *groupname* to store all changes to a set of permanent disk files.

The parameter, *groupname* is the group in the SYS account that contains the configuration data file set to be used. SYSGEN keeps track of the current configuration group, whether it is the default group with which you booted the system, a group specified by the *basegroup* parameter on the initial SYSGEN command line, or a group switched to, by the **BASEGROUP** global configurator command. If you do not specify a base group, SYSGEN uses the current working base group to save the configuration changes.

4. Mount a write-enabled tape on the tape drive. You'll see a message on the console similar to the one below.

```
10:15/10/Vol (unlabeled) mounted on LDEV# 7
```

5. Enter the **TAPE** command to create the tape.

The system responds by issuing a console message similar to the following:

```
?10:15/#92/46/LDEV# FOR "SYSGTAPE" ON TAPE (NUM)
```

6. Reply to the tape mount message. For example, to reply to the sample system response in the previous step, where 46 is the PIN and 7 is the LDEV number of your tape drive, enter:

```
reply 46,7
```

The system issues a message indicating that it has completed the tape:

```
**Boot tape is successfully built**'
```

7. Remove the reel from the tape drive and write-protect it. Label the tape and store it in a secure location with any other backup materials.

To enter an MPE command from any configurator

Use the colon (:) to introduce an MPE command while in any configurator. To issue an MPE command from the IO configurator, enter the colon (:) followed by the command. For example, to display the correct time from the IO configurator, enter:

```
io>:SHOWTIME
```

```
THU, JAN 10, 1990, 2:55PM  
io>
```

Cross-Validating NMCONFIG. PUB.SYS with SYSGEN

One of the system manager's jobs is to configure terminals, printers, the local area network (LAN) and all Uninterruptible Power Supply (UPS) units that are not hard-wired on your system. To do so, you use the node management services network manager program, or NMMGR.

After you are finished running NMMGR and have validated the configuration file you created, you must cross-validate it with the configuration file you created with SYSGEN. Cross-validation ensures that there are no conflicts between the network configuration file (NMCONFIG.PUB.SYS) and the system configuration file generated with SYSGEN.

To use NMMGR to cross-validate the network management configuration file and the system configuration file, do the following:

1. Create the network configuration file NMCONFIG.PUB.SYS.
2. Log into the SYS account and run NMMGR.PUB.SYS.
3. Enter any required identification information and define your network configuration.
4. At the command prompt at the top of the NMMGR screen, enter:

`command: ?>validate`

5. At the Validate screen, press the **Validate DTS/Link** softkey.

NMMGR prints the total number of errors found and any error messages. Once validation is complete, it starts SYSGEN for you and automatically begins cross-validating the configuration files. You'll see this message:

Starting cross validation with SYSGEN

NMMGR automatically keeps the configuration information to the group CONFIG.SYS and exits SYSGEN.

6. After validation and cross-validation are successfully complete, exit NMMGR.

Note

For complete information about using NMMGR to configure your system, Refer to *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001).

Introducing the SPU Configurator

The SPU Switchover/XL is designed to increase data availability. SPU Switchover/XL enables one SPU to take over processing for another SPU upon request. This allows processing to continue while a down or failed SPU is being updated or repaired. It also allows you to balance the processing load between SPUs.

To configure SPU pairs, use the SPU configurator in SYSGEN. Information about the SPU Switchover XL product and how to configure SPU pairs is contained in the *SPU Switchover/XL User's Guide* (36378-90001).

Defining Input/Output Devices

You use the IO configurator to find out information about the input and output devices configured on a system and to change the configuration as necessary. Once you keep the changes, you activate the new configuration on the system by rebooting with **START NORECOVERY**. You can also keep the changes and generate a new system load tape (SLT) to update or install another system.

In this chapter, you can find the following topics:

- entering the IO configurator
- getting current configuration information
- defining (or configuring) devices
- configure UPS devices and using UPS Monitor/iX software
- changing configurations

Getting Information from the I/O Configurator

Use the IO configurator to display information about your system configuration including paths, volumes, class names, logical device names and logical device numbers (LDEVs). Once you know the current configuration, you can make any necessary changes.

There are two kinds of information you can get once you have started the IO configurator:

- helpful information about any of the IO configurator commands
- information about the current configuration, either displayed on screen or printed, using the LCLASS, LDEV, LPATH, and LVOL commands

Command	Definition
LCLASS	Lists the specified class names and the devices assigned to each one.
LDEV	Lists the attributes of the specified logical devices.
LPATH	Lists the attributes of the specified paths.
LVOL	Lists the attributes of the specified volume set member.

To access the IO configurator

You make all changes to the I/O configuration from within the IO configurator, which is one of the SYSGEN modules. To access the IO configurator, do the following:

1. At the MPE prompt, start SYSGEN by entering:

:SYSGEN

2. At the SYSGEN prompt (**sysgen>**), enter:

sysgen>I0

When you first access the IO configurator, you see a list of the commands available to you. To issue a command, you can enter either the full command name or the abbreviation shown in parentheses.

```
sysgen>io
```

Computer
Museum

```
** IO configurator commands **
```

```
aclass (ac)      adev (ad)      apath (ap)      avol (av)
dclass (dc)      ddev (dd)      dpath (dp)      dvol (dv)
lclass (lc)      ldev (ld)      lpath (lp)      lvol (lv)
maddress (ma)    mclass (mc)    mdev (md)      mpath (mp)
mvol (mv)
```

```
clear (cl)(c)    exit (ex)(e)  help (he)(h)    hold (ho)
oclose (oc)      redo
```

```
io>
```

Example 3-1. Entering the IO Configurator

To use online help

You can display helpful information about any of the IO configurator commands on the screen. To do so, enter the **HELP** command at the **io>** prompt in one of two forms:

- To get help for a specific command, type **HELP** and then the command name. For example, to display a description, the syntax, and examples of the **APATH** command, enter:

```
io>HELP APATH
```

- To see a list of all the IO configurator commands with a brief description of each one, simply enter **HELP** or **H**.

To list classes

A class name is an identifier to which numerous devices can be assigned. Unlike logical device numbers, device class names are not unique to each device. For example, all of your system's printers could be assigned the class name **LP**, which stands for "line printer."

To list a class name, at the IO configurator prompt (**io>**), enter:

```
io>LCLASS parameters
```

LCLASS has the following parameters:

```
LCLASS (LC) [ [CLASS =] classname ] [ [DEST =] OFFLINE ]
```

To list all classes

To list all class names, class modes, and the devices associated with the classes in the I/O configuration, enter:

```
io>LCLASS
```

Example 3-2 shows you the kind of output you will see.

```
io>LC
```

CLASSNAME	MODE	MIN MODE	DCC MODE	#DCC	LDEV
-----	-----	-----	-----	----	-----
DISC	default	random		0	1,2,3,21,22,
SPOOL	default	random		0	1,2,3,21,22,
LP	default	out		0	6,
TAPE	default	ncio		0	7,
DDUMP	default	ncio		0	7,
JOBTAPE	default	ncio		0	10,
EPOC	default	out		0	19,
CONSOLE	default	cio		0	20,
BONSAI	default	out		0	38,39,

```
io>
```

Example 3-2. Listing System Classes

To list specific classes

To list the logical devices (LDEVs) that belong to a particular device class, enter `LCLASS classname` at the IO configurator prompt. For example, to see all LDEVs in the device class DISC, enter:

```
io>LCLASS DISC
```

To list multiple classes

To list multiple classes, enclose each class name in parentheses and separate them with commas. For example, to list the assigned LDEV numbers of combined classes DISC and LP, enter:

```
io>LCLASS (DISC,LP)
```

To list devices

Each configured logical device (LDEV) is assigned a unique LDEV number. The LDEV number identifies a physical device associated with a system.

Use the LDEV command (abbreviated LD) to list the characteristics of the I/O devices configured for your system. You can list all devices, a subset of them, or a specific device.

To list the devices on your system, at the IO configurator prompt (io>), enter:

```
io>LDEV parameters
```

The LDEV command has the following parameters:

```
LDEV (LD) [ [ LDEV = ] devicerange ] [ [ ID = ] productnumber ]  
[ [ TYPE = ] devicetype ] [ [ CLASS = ] classname,... ]  
[ [ DEST = ] OFFLINE ]
```

To list all devices

To list the characteristics of all of the I/O devices currently configured, enter the LDEV command without any parameters. For example:

```
io>LDEV
```

To list specific devices

To list specific devices, enter the LDEV parameter followed by the number or numbers of the devices you want to see. For example, to list LDEV 38 and LDEV 39, enter:

```
io>LDEV LDEV=38,39
```

To list a range of devices

You can list a range of devices by entering the first device number and the last device number separated by a slash. For example, to list devices 4 through 9, enter:

```
io>LDEV 4/9
```

To list a nonconsecutive range of devices, separate each range with a command and enclose them in parentheses. For example:

```
io>LDEV (4/9,11/14)
```

To list multiple devices

You can list all devices within a particular class or a set of classes. For example, to list all line printers (the class LP) and disk drives (the class DISC) on your system, enter:

```
io>LDEV CLASS=(LP,DISC)
```

To list devices by product identification number

To list all devices on your system that have a particular product ID, use the ID parameter and the product number. For example:

```
io>LDEV ID=HP2566A
```

To list devices by type

To list all devices of a particular type, use the TYPE parameter and the type name. For example, to see DISC devices, enter:

```
io>LDEV TYPE=DISC
```

Note

SYSGEN displays only the LDEV number for NMMGR devices. An asterisk (*) after the LDEV number means the path conflicts with NMMGR. Refer to *System Startup, Configuration, and Shutdown Reference Manual* (32650-90042) for more information on conflicts between NMMGR and SYSGEN.

To list paths

Use the LPATH command to display information about the adapters and I/O devices on a specified path level. LPATH lists the configured I/O paths according to their path, hierarchy level, or associated I/O manager.

To display I/O path information, at the IO configurator prompt (io>), enter:

```
io>LPATH parameters
```

LPATH has the following parameters:

```
LPATH (LP) [ [PATH =] path ] [ [LEVEL =] # ]  
[ [MANAGER =] managername,... ] [ [DEST =] OFFLINE ]
```

To list all paths

Enter LPATH without any parameters to display all configured paths:

```
io>LPATH
```

You will see all of the device-dependent information associated with a given I/O path which includes:

- the ID of the device assigned to that path level
- the logical and physical manager names
- the device type

Example 3-3 shows you output from the LPATH command for Series 925 through 949 systems and a Series 958 system.

```
io>LPATH

PATH: 4                                LDEV:
  ID: HP19744A                        TYPE: CA
PMGR: SPECTRUM_CIO_CAM                PMGRPRI: 6
LMGR:                                MAXIOS: 0

PATH: 4.1                              LDEV:
  ID: HP27113A                        TYPE: DA
PMGR: HP1B_DAM                        PMGRPRI: 6
LMGR:                                MAXIOS: 0

PATH: 4.1.0                            LDEV: 1
  ID: HP7937A                        TYPE: DISC
PMGR: CS80_DISC_DM                  PMGRPRI: 8
LMGR: LOGICAL_DEVICE_MANAGER        MAXIOS: 0
.
.
.

PATH: 4.2                              LDEV:
  ID: HP27140A                        TYPE: DA
PMGR: TMUX_DAM_ME                   PMGRPRI: 6
LMGR:                                MAXIOS: 0

PATH: 4.2.0                            LDEV: 20
  ID: HP2392A                        TYPE: TERM
PMGR: TMUX_DAM_ME                   PMGRPRI: 9
LMGR: LOGICAL_DEVICE_MANAGER        MAXIOS: 0
.
.
.
```

Example 3-3. Sample LPATH Display

To list a specific path

To list information for a specific path use the PATH parameter followed by the path number. For example, to see path 4, enter:

```
io>LPATH PATH=4
```

Note

If you are using a Series 950 through Series 980 system, you must use a slash (/) to separate the bus converter number from the rest of the path identification. Otherwise, SYSGEN issues a message.

****warning**** The correct delimiter at this level is a "/"
Path (up to this level) changed to 6/

To list level paths

Use the **LEVEL** parameter to list I/O paths at a given level. The **LEVEL** parameter, when assigned a value, displays the devices at that level. For example, to see the devices at level 1, enter:

```
io>LPATH,1
```

Note

To list the I/O channel adapters on Series 925 through Series 949 systems and Series 958 systems and the bus converters on Series 950 through Series 980 systems, use **LPATH,1**.

Table 3-1 shows the level and the information it displays for midrange systems (HP 3000 Series 925 through Series 949 systems, and Series 958 systems) and for high-end systems (Series 950 through Series 980 systems).

Table 3-1. Paths Displayed by Levels

Level	Series 925-949, 958	Series 950-980
1	channel adapter	bus converter
2	device adapter	channel adapter
3	device	device adapter
4		device

The level number used in the **LEVEL** parameter corresponds to the number of delimited digits in the path displayed. For the Series 950 through Series 980 systems, the path 6/4.3.0 has 6 as the bus converter, 4 as the channel adapter, 3 as the device adapter, and 0 as the device. For the Series 925 through Series 949 systems, the path 4.2.0 has 4 as the channel adapter, 2 as the device adapter, and 0 as the device.

If you are working with a Series 922 or Series 932 system, including the LX and RX models, refer to *HP 3000 Series 922 Family Computer Systems/Operator Handbook* (A1027-90019).

To list a manager's path

To list the I/O paths associated with a specific device manager under the heading PMGR or LMGR, use the **MANAGER** parameter. For example:

```
io>LPATH MANAGER=CIPER_DM
```

If the manager you specify in the LPATH command doesn't exist, SYSGEN issues a warning.

The examples below shows the output from this command for some midrange and high-end systems.

```
io>LPATH MANAGER=CIPER_DM
```

PATH:	4.5.4	LDEV:	6
ID:	HP2566A	TYPE:	LP
PMGR:	CIPER_DM	PMGRPRI:	10
LMGR:	LOGICAL_DEVICE_MANAGER	MAXIOS:	0

Example 3-4. Listing Paths: Series 925 Systems

```
io>LPATH MANAGER=CIPER_DM
```

PATH:	6/4.3.6	LDEV:	6
ID:	HP2566A	TYPE:	LP
PMGR:	CIPER_DM	PMGRPRI:	10
LMGR:	LOGICAL_DEVICE_MANAGER	MAXIOS:	0

Example 3-5. Listing Paths: Series 950 through 980 Systems

To list volumes

A volume is one disk pack. Each volume is a member of a volume set and contains a volume label, a label table, and a free space map. To list volumes, at the IO configurator prompt (io>), enter:

```
io>LVOL
```

LVOL has the following parameters:

```
LVOL (LV) [ [VNAME =] volumename, [volumename] [ ... ] ]  
[ [DEST =] 'OFFLINE' ]
```

To list all volumes

To list volume information for all volumes, enter the LVOL command without any parameters. For example:

```
io>LVOL
```

To list a specific volume

To list information about a member volume, enter LVOL with the volume name. SYSGEN displays the LDEV number of each device, the amount of transient and permanent space, the class status, and the volume class. For example, to see information about the volume MEMBER1, enter

```
io>LVOL MEMBER1
```

To print configuration information

Each of the commands that you use to list configuration information has a DEST=OFFLINE parameter that allows you to print the information instead of displaying it on the console. This parameter is useful when you need to compare one configuration to another or, for example, when you want to enclose a printed copy of the configuration with the system load tape (SLT).

To print configuration data, enter one of the list commands (LCLASS, LDEV, LPATH or LVOL), any additional parameters you need, followed by the parameter OFFLINE. This sends the listing to the file SYSGLIST. To close and print the list, you use the OCLOSE command or exit the IO configurator.

For example, to print information about all devices with device class DISC and LP on your system, do the following:

1. At the IO configurator prompt (>io) enter:

```
io>LCLASS (DISC,LP) DEST=OFFLINE
```

Or, you can enter the command this way:

```
io>LCLASS (DISC,LP) OFFLINE
```

2. To close the file SYSGLIST and print the information, enter

```
io>OCLOSE
```

Configuring Devices

There are two general categories of devices that you configure on your computer system, local and non-local devices.

- Local devices are “hard-wired” or connected via parallel cables to your computer. These include tape and disk drives and some printers. You configure local devices with SYSGEN’s IO configurator utility.
- Non-local devices are connected via Datacommunication and Terminal Controllers, or DTCs. These include terminals, PCs in terminal emulation mode, serial printers and Uninterruptible Power Supply (UPS) units. You configure non-local devices with the Node Management Services Configuration Manager (NMMGR) program.

This section explains how to configure local devices. It also explains how to configure UPS devices (which are non-local devices) and how to use the UPS Monitor/iX software. For more information about using NMMGR to configure all other non-local devices, read *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001).

To identify local devices to the system

There are certain attributes of local devices that you are required to configure because they identify the device to the system. These include the device identification number (ID), the I/O path, and the logical device number (LDEV). Each of these attributes is introduced below.

- The device identification is the product identification number (for example HP7978B or HP2563A) of the device you are adding. The file `IODFAULT.PUB.SYS` contains configuration information for all devices supported by Hewlett-Packard. If your product ID number is not listed in this file, you may wish to contact your customer engineer. For nonsupported devices, the ID is always `USER` and you must specify all attributes except class, class mode and device name.
- An I/O path is the system address assigned to the device interface hardware and software and the physical path used to reach an I/O device. To add, change, or delete a path, you must correctly identify the applicable device adapter interfaces and their associated I/O devices.

At system power ON or RESET, the processor-dependent code (PDC) and I/O-dependent code (IODC) hardware routines read and initialize the I/O paths to boot or reboot the system. The I/O paths that the system uses to load itself from disk or tape are referred to as *boot paths*.

For more information about I/O paths, refer to the *System Startup, Configuration, and Shutdown Reference Manual* (32650-90042).

- Each configured device is identified by a unique logical device number, or LDEV. You assign logical device numbers to all system devices except LDEV 1 (which is always the system master disk) and LDEV 20 (which is always the console).

To configure default device attributes

There are additional attributes for local devices that you can or must leave set to the default. They include device type, associated output device, device mode and device class, which are described next. A number of other attributes that you can configure are explained throughout this chapter.

- A logical device is identified by its type, which you cannot change. Device types names are standardized, and each logical device may be only one type. Be careful not to confuse *type* with *class*.

Standard device types are:

DISC	disk drives
TAPE	tape drives
TERM	terminals
LP	line printers
PP	page printers
AC	autochanger

- The output device tells where output from a device goes. It is either a logical device (LDEV) number or a device class. Only devices that can accept HELLO, JOB or DATA logons require an output device.

For the console and terminals, the output device is the same as its LDEV. All terminals are both input and output devices and are referred to by one LDEV number. For the job tape (or streams device), the output device is usually LP. For printers and disks, the output device is zero.

- An I/O device may operate in one or more modes such as JOB (which means it accepts job and session logons) or INPUT (which means that input to the device is spooled).
- The device class is a name used to identify a group of devices by location (for example, BLDG2) or ownership (for example, FINANCE). They can also be used to call for a device when you do not know an LDEV number or when it is okay to use any device in that class. (For example, you can specify the printer class BONSAI if you want a report printed on any HP 2688A printer.)

A device can simultaneously belong to as many as eight classes. If you specify a class name that does not exist, it is assigned default characteristics. Some functions require a device in specific classes.

Adding Objects

There are four IO configurator commands that you use to add objects to the system: **AClass**, **ADEV**, **APATH** and **AVOL**. They are defined in the table below and explained in the following sections.

Command	Definition
AClass	Creates a new class name and associates devices to the new class.
ADEV	Adds an I/O device to the system.
APATH	Defines the I/O path to an adapter. The path must not have already been defined.
AVOL	Adds a new volume to the system volume set configuration.

Note

You use the NMMGR program to add non-local devices such as terminals, serial printers, UPS hardware and other objects to a system. To learn how to configure UPS devices, read "Introducing the UPS and UPS Monitor/iX Software" later in this chapter. To learn how to use NMMGR to configure other devices, read *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001).

To add a class name

Use the **AClass** command (abbreviated **AC**) to add a class name designation to a configured device. You must use the **ADEV** command to add the device path and designate the **LDEV** number before using the **AClass** command. To add a class name, at the IO configurator prompt (**io>**), enter:

```
io>AClass classname ldev parameter
```

AClass has the following parameters:

```
AClass (AC) { [CLASS =] classname } { [LDEV =] #/#,#,... }  
[MODE = ] {  
    IN  
    OUT  
    CIO  
    NCIO  
    RANDOM  
    DEFAULT  
}
```

The **CLASS** and **LDEV** parameters are required. *Classname* is a standard class name of up to eight characters, such as **EPDC** or **SP00L**. If the specified class name already exists when you attempt to add it, **SYSGEN** issues an error message.

The modes are defined in the following table.

Mode	Definition
JOB	Accepts HELLO and JOB logons.
IN	Input only device
OUT	Output only device
CIO	Concurrent I/O
NCIO	Nonconcurrent I/O
RANDOM	Direct-access device (for example, disk)
DEFAULT	Assigned at system initialization

To add one class name

To add a class name, enter the **AClass** command, the class name, and the LDEV associated with it. For example, to add the class name EPOC and associate it with LDEV 19, enter:

```
io>AClass EPOC 19
```

To assign a mode

You can assign a mode to the device or accept the default mode assigned by SYSGEN. To assign a mode, enter the **AClass** command, the class name, the LDEVs, and the keyword or positional **MODE** parameter. For example, to assign the mode **RANDOM** to logical devices 31 through 34 (using keyword parameters), enter:

```
io>AClass PLATES 31/34 MODE=RANDOM
```

To assign the same mode using positional parameters enter:

```
io>AClass PLATES 31/34 RANDOM
```

To add devices

Each device configured on your system must have a unique LDEV number. Although you, as system manager, assign LDEV numbers to system devices at your discretion, certain devices must be assigned specific numbers. For example, to boot the operating system from disk, you must mount the system master volume on LDEV 1 and the system console is always LDEV 20.

Use the **ADEV** command (abbreviated **AD**) to add a device to an existing I/O path that is configured to the device adapter level. At a minimum, you must specify the LDEV, the path, and ID number. You can enter other information either using keywords or positional parameters.

To add a device, at the IO configurator prompt (io>), enter:

io>ADEV ldev pathid otherparameters

ADEV has the following parameters:

```
ADEV (AD) { [ LDEV = ] #/#,#,... }
{ [ PATH = ] devicepath } { [ ID = ] productid }
[ [ RSIZE = ] recordsize ] [ [ OUTDEV = ] outputdevice ]

[ [ MODE = ] {
    JOB
    DATA
    INTERACTIVE
    DUPLICATIVE
    INPUT
    OUTPUT
    AUTOREPLY
    NLIO
    NONE
} ] [ [ CLASS = ] classname ]

[ [ CMODE = ] {
    IN
    OUT
    CIO
    NCIO
    RANDOM
    DEFAULT
} ] [ [ PMGR = ] physicalmanagername ]

[ [ LMGR = ] logicalmanagername ]
[ [ PMGRPRI = ] physicalmanager priority ]
[ [ MPETYPE = ] compmodetype ]
[ [ MPESUBTYPE = ] compmodesubtype ]
[ [ DEVNAME = ] devicename ]
```

Below are two examples of adding LDEV 30 to the Series 925 through Series 935 systems. The first example uses keyword parameters, the second uses positional parameters:

io>ADEV LDEV=30 PATH=4.5.9 ID=HP2688A

io>ADEV 30 4.5.9 HP2688A

Below are two examples of adding LDEV 30 to the Series 950 through 980 systems. The first example uses keyword parameters, the second uses positional parameters:

io>ADEV LDEV=40 PATH=2/8.1.4 ID=HP7935H

io>ADEV 40 2/8.1.4 HP7935H

To specify the LDEV, PATH, and ID

When you issue the ADEV command, you must specify the LDEV, PATH, and ID parameters.

- Use LDEV to specify the logical device number for the device you are adding.
- Use PATH to specify the physical path to reach a device.
- Use ID to specify the device you are adding.

For example, to add an HP2688A printer as LDEV 17 (using keyword parameters), enter:

```
io>ADEV LDEV=17 PATH=4.3.2 ID=HP2688A
```

Or, to add an HP7978B disk drive as LDEV 30 (using positional parameters), enter:

```
io>ADEV 30 2/8.1.4 HP7978B
```

If a specified LDEV already exists, SYSGEN issues an error message. If you specify a set of devices, the device number in the PATH parameter increases automatically.

You can add either a Hewlett-Packard supported device or a device of another kind.

- If you are adding a Hewlett-Packard-supported device, enter the product ID (for example, HP7978A) as the ID parameter value. For a complete list of Hewlett-Packard supported devices, read the file IODFAULT.PUB.SYS.
- If you are adding a device that is not supported by Hewlett-Packard, enter USER as the product ID. For non-supported devices, you must specify all of the device attributes except class, class mode (CMODE), and device name, which are optional. For example, to configure a nonsupported device as LDEV 40, enter:

```
io>AD 40 36.1.4 USER 132 10 OUTPUT LP DEFAULT&
```

```
USER_PHYS_MGR USER_LOGICAL_MANAGER PMGRPRI=8&
```

```
MPETYPE=value MPESUBTYPE=value
```

To specify the RSIZE

The RSIZE parameter specifies the record size (in 16-bit words) of the device you are adding. For example, to add an HP7978B as LDEV 8 with the path 2/4.2.1 and a record size of 264 characters, enter:

```
io>ADEV 8 PATH=2/4.2.1 ID=HP7978B RSIZE=132
```

If you do not specify the record size parameter, SYSGEN uses the default.

To specify the OUTDEV

The OUTDEV parameter specifies the output device associated with the device you are adding. For example, to add an HP2688A printer as LDEV 19 on path 4.1.7 with a record size of 132 characters and LP as the output device, enter:

```
io>ADEV 19 4.1.7 HP2688A 66 OUTDEV=LP
```

The OUTDEV can be either a device number or a device class. If you do not enter this parameter, SYSGEN assigns 0 as the output device for all peripherals except terminals, which are assigned the input device number.

To create a streams device

The streams device is the device that accepts batch jobs. To configure the streams device, you must issue the ADEV command once with a specific set of options: MODE=(JOB,DATA) and OUTDEV={an output device or class}. For example, if you choose class LP for OUTDEV, enter:

```
io>ADEV 10 2/4.2.3 HP7978B MODE=(JOB,DATA) OUTDEV=LP&  
RSIZE=128 CLASS=JOBTAPE
```

Note

You can also use the intrinsic HPDEVCREATE to create a streams file. The parameters you enter, such as device file type, LDEV, major number, minor number and link name, define the file. For more information, read *MPE/iX Intrinsic Reference Manual* (32650-90028).

To specify the MODE

The MODE parameter specifies the device operation mode. Your choices for mode and their meanings are defined below:

Value	Definition
JOB	Accepts HELLO and JOB logons.
DATA	Accepts DATA logons.
INTERACTIVE	Refer to the FRELATE intrinsic explanation.
DUPLICATIVE	Refer to the FRELATE intrinsic explanation.
INPUT	Input spooled.
OUTPUT	Output spooled.
AUTOREPLY	Automatically replies to tapes (also called autoallocation).
NLIO	This device is capable of native language I/O.
NONE	None of the above apply.

Most devices have a default device mode listed in the ASCII file `IODFAULT.PUB.SYS`, which you can read. To override the default, you can specify `NONE` as the mode.

Certain devices can have one or more modes only. For example, an HP 7978B tape drive can have the modes: `JOB`, `DATA`, `INPUT`, `OUTPUT`, `AUTOREPLY`, and `NONE`.

Since `MODE` is a repeated parameter, you can specify multiple modes by using parentheses and separating the modes with commas or spaces. For example, to assign two modes, `AUTOREPLY` and `INPUT` to an HP7978B tape drive, enter:

```
io>ADEV 40 4.1.7 HP7978B MODE=(AUTOREPLY,INPUT)
```

If you assign an improper mode to a device, `SYSGEN` issues an error message. For example, you cannot assign a printer the device mode `AUTOREPLY`.

To specify the CLASS

The `CLASS` parameter associates a group of devices (which are usually related logically or physically) to a class name. For example, to specify the class `TAPE` for an HP7978B tape drive, enter:

```
io>ADEV 40 4.1.7 HP7978B MODE=AUTOREPLY CLASS=TAPE
```

A device can simultaneously belong to as many as eight classes. Class names may not exceed eight characters and must begin with an alphabetic character.

If a specified class name does not exist, `SYSGEN` assigns it the device access characteristics of `DEFAULT`, which you can override using the `CMODE` parameter, described below.

To assign no class to a device, specify `CLASS=NONE`.

To specify the CMODE

The `CMODE` parameter overrides the default class mode for a device. For example, to make all HP7978B tape drives that you are adding to your system output devices only, enter:

```
io>ADEV 40 4.1.7 HP7978B CLASS=TAPE CMODE=OUT
```

If the class already exists, the `CMODE` entry is ignored.

The values for the **CMODE** parameter are defined in the table below.

Value	Definition
IN	Input only device
OUT	Output only device
CIO	Concurrent I/O
NCIO	Nonconcurrent I/O
RANDOM	Direct access device (for example, disk)
DEFAULT	Assign at system initialization

To specify the **PMGR**

The **PMGR** parameter associates the physical device manager with a specified I/O path. The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline (_) characters. If you do not enter this parameter, SYSGEN uses the default.

For example, to specify **BUS_CONV_MGR** as the physical device manager, enter:

```
io>ADEV 40 4.1.7 HP7978B CLASS=TAPE PMGR=BUS_CONV_MGR
```

To specify the **LMGR**

LMGR is the name of the logical device manager associated with the specified I/O path. Not all devices have logical device managers. The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline (_) characters. If you do not enter this parameter, SYSGEN uses the default.

For example, to specify **LOGICAL_DEVICE_MANAGER** as the logical device manager, enter:

```
io>ADEV 40 4.1.7 HP7978B CLASS=TAPE&  
LMGR=LOGICAL_DEVICE_MANAGER
```

To specify the **PMGRPRI**

The **PMGRPRI** parameter specifies the priority level at which the physical device manager executes. The priority can range from 1 (the lowest level) to 15 (the highest.) If you don't specify a priority, SYSGEN uses the default.

For example, to specify a priority level of 5 for logical device 40, enter:

```
io>ADEV 40 4.1.7 HP7978B CLASS=TAPE PMGRPRI=5
```

To specify the MPETYPE and MPESUBTYPE

The MPETYPE and MPESUBTYPE parameters specify values for compatibility mode type and subtype. You use them when you are adding a nonsupported device to your configuration. For example, to add a non-Hewlett-Packard printer as LDEV 40, enter:

```
io>AD 40 36.1.4 USER 132 10 OUTPUT LP DEFAULT&
```

```
USER_PHYS_MGR USER_LOGICAL_MANAGER PMGRPRI=8&
```

```
MPETYPE=value MPESUBTYPE=value
```

To specify the DEVNAME

The DEVNAME associates a device name with a particular LDEV number, which allows a user to specify the device by name instead of by number. When choosing device names, remember the following rules:

- A device name must begin with a letter.
- You cannot use a device name of exactly eight characters that begins with the letter "D" followed immediately by one or more digits.
- You cannot use the name "VTERM."
- No two logical devices may have the same device name.
- All device names and class names must be mutually exclusive.

For example, to specify the device name TAPEDRIVE for an HP7978B, enter:

```
io>ADEV 40 4.1.7 HP7978B DEVNAME=TAPEDRIVE
```

To create device link files

A device link is, essentially, a permanent, named :FILE command that associates a name with an LDEV. Once created, device links are represented as files and are visible in directories. Device link files give the MPE/iX shell, the UNIX-like command shell and utilities introduced with Version 4.5 of the operating system, access to devices such as tape drives and printers so that it does not have to know MPE access semantics. As a result, MPE/iX shell utilities such as **tar** work like their UNIX counterparts.

To create a device link file, you can use the **MKNOD** utility. For example, to create a device link file called **tape7** in the current directory, enter:

```
:mknod "tape7,c,0,7"
```

In this example, the first parameter is the device link file name (**tape7**), the second two parameters (**c 0**) are required to create device link files, and the fourth parameter (**7**) is the **LDEV** number for which you are creating the device link file.

To list the device link file you have created, use the **LISTFILE** command. For example, to list information about **tape7**, enter:

```
:LISTFILE tape7,2
```

MPE/iX will respond with something like the following information. In the **TYP** column, **BBd** indicates that the device link file is a byte stream format, binary access device file.

```
:listfile tape7,2
ACCOUNT=  SYS          GROUP=  PUB

FILENAME  CODE  -----LOGICAL RECORD-----  ---SPACE---
          SIZE  TYP          EOF          LIMIT R/B  SECTORS #X MX
TAPE7          128W  BBd          0          1  1          0  0  *
:
```

The file name that you enter follows MPE-escaped syntax rules. So, to create a device link file in a directory other than the current working directory, include the path in the file name. For example, to create the device link file **tape7** in the **dev** directory, enter:

```
:"/dev/tape7/c,0,7"
```

Note

You may also use three other methods to create device link files: the **mknod** POSIX C-library function, the **HPDEVCREATE** intrinsic, or the MPE/iX shell utility **mknod**.

To configure tape drives for ejection and data compression

A new utility, DEVCTRL, allows you to dynamically configure 1/2 inch and DDS tape devices to eject the media following an application rewind or close. In addition, if you have an HPC1504B or HPC1521B DDS drive, you can enable or disable data compression so that the tapes can be created and shared with non-compressing DDS devices. (Note that the compression option does not apply to 1/2 inch tape.)

Once you use DEVCTRL to configure the drive, it remains configured in that way until you change it with DEVCTRL again. A powerfail or changes in device ownership do not reset the configuration.

DEVCTRL has the following parameters:

```
DEVCTRL { [LDEV =] ### }
{ [COMPRESSION =] enable/disable/nochange }
{ [EJECT =] enable/disable/nochange }
```

For example, to enable data compression and the eject feature for LDEV 50, enter:

```
user>DEVCTRL 50 compression=enable eject=enable
```

Or, to enable compression but disable the eject feature (using positional parameters), enter:

```
user>DEVCTRL 50 enable disable
```

To add paths

Use the APATH command (abbreviated AP) to add an I/O path to the system configuration. (To add device level paths, you use the ADEV command. For more information on hardware paths, refer to chapter 12.)

To add an I/O path, at the IO configurator prompt (io>), enter:

```
io>APATH devicepath productid additional parameters
```

APATH has the following parameters:

```
APATH (AP) { [PATH =] devicepath }
{ [ID =] productid } [ [PMGR =] physicalmgrname ]
[ [LMGR =] logicalmgrname ] [ [PMGRPRI =] physicalmgrpri ]
[ [MAXIOS =] maxconcurrentchannelIOs ]
```

To specify the PATH and ID

You must specify the PATH and ID parameters with the APATH command. If you specify a path that already exists, an error occurs. The product ID is either the Hewlett-Packard product number or a mnemonic name that designates different uses of the same product.

For Series 925 through Series 949 systems and for Series 958 systems, you describe the path as follows:

- the channel adapter
- the channel adapter and device adapter separated by a period (such as 4.2)

For the Series 950 through Series 980 systems, you describe the path this way:

- just the bus converter
- just the channel adapter
- the bus converter and channel adapter separated by a slash (such as 2/8)
- the bus converter and channel adapter separated by a slash and the device adapter separated by a period (such as 2/8.2)

To specify the **PATH** and **ID** parameters using keywords and positional parameters, respectively, enter:

```
io>APATH PATH=4.2 ID=HP27113A
```

or

```
io>APATH 4.2 HP27113A
```

To specify the **PMGR**

The **PMGR** parameter is the name of the physical device manager associated with the specified I/O path. For example, to specify **BUS_CONV_MGR** as the physical device manager, enter:

```
io>APATH PATH=4.2 ID=HP27113A PMGR=BUS_CONV_MGR
```

The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline (_) characters. If you do not enter this parameter, **SYSGEN** supplies the default.

To specify the **LMGR**

LMGR is the name of the logical device manager associated with the specified I/O path. Not all devices have logical device managers. For example, to specify **LOGICAL_DEVICE_MGR** as the logical device manager using a combination of keywords and positional parameters, enter:

```
io>APATH 2/8.2 HP27113A LMGR=LOGICAL_DEVICE_MGR
```

The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline (_) characters. If you do not enter this parameter, **SYSGEN** supplies the default.

To specify the PMGRPRI

PMGRPRI is the priority level at which the physical device manager executes and can be between 1 (low) and 15 (high), inclusive. For example, to specify a PMGRPRI of 8, enter:

```
io>APATH PATH=8.2 ID=HP27113A PMGRPRI=8
```

The I/O default file supplies this parameter if you do not.

To specify the MAXIOS

MAXIOS tells the device manager how many concurrent IOs to expect. For example, to specify 20 concurrent I/O devices, enter:

```
io>APATH PATH=4.2 ID=HP27113A PMGRPRI=5 MAXIOS=20
```

Normally, you do not specify this value. Instead, the I/O default file usually specifies zero, which allows the manager to set itself to its default.

To add volumes

Use the AVOL command (abbreviated AV) to add a new volume to the system volume set configuration. To add a volume, at the IO configurator prompt (io>), enter:

```
io>AVOL volumemembername ldev additional parameters
```

AVOL has the following parameters:

```
AVOL (AV) { [VNAME =] volumemembername }  
{ [LDEV =] # } [ [TRANSIENT =] %discfortransobj ]  
[ [PERMANENT =] %discforpermobj ] { [VCLASS =] volumeclass }
```

Note

You cannot modify the system master volume, MEMBER1, in any way.

To specify the VNAME, LDEV, and VCLASS

The VNAME parameter specifies the unique name you give to each volume member, LDEV specifies the logical device number, and VCLASS specifies the volume class(es) that the identified volume(s) belong to. The volume member name and the volume class must be 32 characters or less. After the first character, which must be alphabetic, numbers, letters, and underline characters are allowed. You may specify up to eight volume classes.

For example, to specify MEMBER2 as logical device 4 in the volume class PROD, enter:

```
io>AVOL VNAME=MEMBER2 LDEV=4 VCLASS=PROD
```

To specify the transient/permanent disk space

TRANSIENT is the amount of disk space that is reserved for temporary processes such as stacks and operating system data structures. **PERMANENT** is the amount of disk space that is reserved for permanent structures such as files, the label table, a tape drive, a disk drive, or a printer. You enter both values as a percentage.

For example, to specify the amount of disk space reserved for transient and permanent objects as 50 percent each, enter:

```
io>AVOL VNAME=MEMBER2 LDEV=4 TRANSIENT=50 PERMANENT=50 VCLASS=PROD
```

The total percentage for **TRANSIENT** and **PERMANENT** must be at least 100 percent. It can be as high as 200 percent, although this is *not* recommended.

Changing Configurations

There are five IO configurator commands that you can use to modify objects on your system: **MADDRESS**, **MCLASS**, **MDEV**, **MPATH**, and **MVOL**. They are defined in the table below and explained in the following sections.

Parameter	Definition
MADDRESS	Modifies the I/O path from one that exists to a new path that does not already exist.
MCLASS	Changes I/O class information.
MDEV	Changes the attributes of a configured device.
MPATH	Changes the attributes of an I/O path.
MVOL	Modifies the attributes of a volume set member.

To modify paths

An address is an I/O path identifying a specific I/O device. Use the **MADDRESS** command (abbreviated **MA**) to change SYSGEN's view of the physical location of channel adapters, device adapters, and devices. To modify a path, at the IO configurator prompt (**io>**), enter:

```
io>MADDRESS fromdevicepath todevicepath
```

MADDRESS has the following parameters:

$$\text{MADDRESS (MA)} \left\{ \begin{array}{l} [\text{FROM} =] \text{fromdevicepath} \\ [\text{TO} =] \text{todevicepath} \end{array} \right\}$$

The **FROM** and **TO** parameters are standard I/O path specifications. If the **FROM** path does not exist, or if both I/O paths do not have the same number of levels, SYSGEN issues an error.

To change a path

To change an existing I/O path to a new I/O path that is not configured, enter **MADDRESS FROM=***devicepath* **TO=***devicepath*. For example, to change the path from 4.1.2 to 4.1.3 on a Series 925 or Series 935 system, enter:

```
io>MADDRESS 4.1.2 4.1.3
```

and to change the path from 2/4.0.2 to 6/4.0.3 on Series 950 through Series 980 systems, enter:

```
io>MADDRESS 2/4.0.2 6/4.0.3
```

MADDRESS works at the device-adapter level as well as the device level. In fact, this use is probably more common, because it allows you to move a device-adapter card and all of its devices in one command. For example, if path 4.2 describes an HP-IB adapter with four disks (LDEVs 2, 4, 9, 15), you can move the adapter to slot 3 (4.3) in one step:

```
io>MADDRESS 4.2 4.3
```

To modify an address, you must change the **TO** address to the higher or previous level with the **APATH** command; otherwise, **SYSGEN** issues an error. All paths used in the **MADDRESS** command line must be at the same level.

To modify classes

Use the **MCLASS** command (abbreviated **MC**) to change I/O class information including class mode, class name, and the devices associated with the class. To modify a class, at the IO configurator prompt (**io>**), enter:

```
io>MCLASS classname newclassname additionalparameters
```

MCLASS has the following parameters:

```
MCLASS (MC) { [ CLASS ] = classname }  
[ [ NEWCLASS = ] newclassname ]  
[ [ ALDEV = ] devicerange[,devicerange] [...] ]  
[ [ DLDEV = ] devicerange[,devicerange] [...] ]  
[ [ MODE = ] { IN  
               OUT  
               CIO  
               NCIO  
               RANDOM  
               DEFAULT } ] ]
```

You must enter the **CLASS** parameter and at least one other parameter.

Parameter	Definition												
NEWCLASS	Changes the name of the class. The new name must not exist prior to using NEWCLASS .												
ALDEV	Adds the specified devices to the class. If a device does not exist (is not configured), SYSGEN issues a warning.												
DLDEV	Removes the specified devices from the class. If a device does not exist, SYSGEN issues a warning.												
MODE	Changes the mode of the class. The mode remains unchanged if MODE is omitted from the MCLASS command line. The modes are defined as follows: <table> <tr> <td>IN</td><td>Input only device</td></tr> <tr> <td>OUT</td><td>Output only device</td></tr> <tr> <td>CIO</td><td>Concurrent I/O</td></tr> <tr> <td>NCIO</td><td>Nonconcurrent I/O</td></tr> <tr> <td>RANDOM</td><td>Direct access device (for example, disk)</td></tr> <tr> <td>DEFAULT</td><td>Assign at system initialization</td></tr> </table>	IN	Input only device	OUT	Output only device	CIO	Concurrent I/O	NCIO	Nonconcurrent I/O	RANDOM	Direct access device (for example, disk)	DEFAULT	Assign at system initialization
IN	Input only device												
OUT	Output only device												
CIO	Concurrent I/O												
NCIO	Nonconcurrent I/O												
RANDOM	Direct access device (for example, disk)												
DEFAULT	Assign at system initialization												

To change a class

To change a class, you enter the class name and at least one additional parameter. For example, to change the class name from LP to BIGPRN and specify BIGPRN as an output device (using keyword parameters), enter:

```
io>MCLASS CLASS=LP NEWCLASS=BIGPRN MODE=OUT
```

To change the BONSAI class to SMALLPRN and add two more devices to it (using positional parameters), enter:

```
io>MCLASS BONSAI SMALLPRN 28/29
```

To modify devices

Use the **MDEV** command (abbreviated **MD**) to modify the attributes of a device. You enter the command, the LDEV number of the device you want to change, and at least one other parameter. You cannot use the **MDEV** command to change a Hewlett-Packard supported device to a **USER** (unsupported) device.

To modify a device, at the IO configurator prompt (**io>**), enter:

```
io>MDEV ldev otherparameters
```

MDEV has the following parameters:

```
MDEV (MD) { [ LDEV = ] logicaldevice # }  
[ [ NEWLDEV = ] newlogicaldevice# ] [ [ ID = ] deviceid ]  
[ [ PATH = ] devicepath ] [ [ CLASS = ] classname ]  
[ [ MODE = ] {  
    JOB  
    DATA  
    INTERACTIVE  
    DUPLICATIVE  
    INPUT  
    OUTPUT  
    AUTOREPLY  
    NLIO  
    NONE  
} ] [ [ OUTDEV = ] outputdevice ]  
[ [ RSIZE = ] devrecsize ] [ [ PMGR = ] physicalmgrname ]  
[ [ LMGR = ] logicalmgrname ] [ [ PMGRPRI = ] physmgrpri ]  
[ [ MPETYPE = ] cmttype ] [ [ MPESUBTYPE = ] cmsubtype ]  
[ [ DEVNAME = ] devicename ]
```

For example, to use the **MDEV** command to change logical device 8 to 18, the device identification to HP7978H, the path to 4.3.0, and the mode to **JOB**, enter:

```
io>MDEV 8 18 HP7978H 4.3.0 MODE=JOB
```

Parameter	Definition
LDEV	Specifies which devices to modify. If a specified device number does not exist, SYSGEN issues a warning.
NEWLDEV	Gives the new device numbers associated with the specified devices. The number of devices given must match the number of devices specified in the LDEV parameter.
ID	Changes the product ID associated with the devices. Changing the product ID changes other parameters, such as record size and device mode, to those found in the I/O defaults file unless you explicitly specify the parameters in the MDEV command. If you give an invalid product ID, SYSGEN issues an error message.
PATH	Defines the path for the system to take to reach this LDEV. If the new path already exists, SYSGEN issues an error message.
CLASS	Changes classes associated with given devices. If you do not enter this parameter and change the product ID with the ID parameter, SYSGEN uses the default classes for the device.
MODE	Changes the device mode of the given devices. The mode must be within the maximum allowed modes given in the I/O default file. If you do not give this parameter and change the product ID with the ID parameter, SYSGEN uses the default mode for the device.
OUTDEV	Specifies the new output device for the devices being modified. If you do not specify this parameter, it does not change unless the device is a terminal or you change the product ID.
RSIZE	Changes the record size of the devices being modified. If you do not give this parameter and change the product ID with the ID parameter, SYSGEN uses the default record size for the device.
PMGR and LMGR	Is the name of the physical or logical device manager to be associated with the specified I/O path. The manager name has a maximum length of 32 characters and may contain numeric, alphabetic, and underline characters (_). If you change the ID and do not specify the PMGR or LMGR parameter, SYSGEN uses the default. Not all devices have logical device managers.
PMGRPRI	Is the priority level at which the physical device manager executes. If you change the ID and do not specify the PMGRPRI parameter, SYSGEN uses the default.
MPETYPE and MPESUBTYPE	Are allowed for only USER devices. If you do not give any of these parameters and you change the product ID with the ID parameter, SYSGEN uses the default values.
DEVNAME	Allows the user to specify a device name which can be used in place of the LDEV number of this I/O device. A device name must begin with a letter. A device name of exactly eight characters that begins with the letter "D" followed immediately by one or more digits is invalid. The name "VTERM" is reserved and is flagged as an error if specified for any LDEV. No two LDEVs may have the same device name, and all device names and class names must be mutually exclusive.

To change a device to the streams device

The streams device accepts batch jobs. It requires a specific mode (JOB and DATA) and you must assign an output device. Also, you must make these changes in one step, that is, by issuing a single MDEV command.

For example, to make LDEV 10 the streams device with LP as the output device, enter:

```
io>MDEV 10 MODE=(JOB,DATA) OUTDEV=LP
```

To modify I/O paths

Use the MPATH command (abbreviated MP) to modify the attributes associated with an I/O path. To modify a path, at the IO configurator prompt (io>), enter:

```
io>MPATH devicepath additional parameters
```

MPATH has the following parameters:

```
MPATH (MP) { [PATH =] IOPath } [ [ID =] productid ]
[ [PMGR =] physicalmgrname ] [ [LMGR =] logicalmgrname ]
[ [PMGRPRI =] mgrpri ] [ [MAXIOS =] maxconcurrentchannelIOs ]
```

Parameter	Definition
PATH	Indicates the path that you want to modify. If you do not specify PATH, SYSGEN issues an error message. Although you are not required to use other parameters, you must specify at least one for the command to function properly.
ID	Changes the product ID associated with this path. Changing the product ID changes all of the other parameters to defaults unless you explicitly override them.
PMGR	Is the name of the physical manager associated with the specified I/O path. The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline characters. If you change the ID and do not give this parameter, SYSGEN uses the default.
LMGR	Is the name of the logical manager associated with the specified I/O path. Not all devices have logical device managers. The manager name has a maximum length of 32 characters and may contain numbers, letters, and underline characters. If you change the ID and do not give this parameter, SYSGEN uses the default.
PMGRPRI	Is the priority level at which the physical device manager executes. If you change the ID and do not give this parameter, SYSGEN uses the default.
MAXIOS	Tells the device manager how many concurrent I/O operations to expect. Normally, you do not specify MAXIOS. The default is zero, which allows the device manager to set its own default.

To change a product ID

The ID parameter changes a product identification number. For example, to change the ID on a Series 925 through 949 system or a Series 958 system, enter:

```
io>MPATH 4.1 HP27113A
```

Or, to change an ID on a Series 950 through 980 system, enter:

```
io>MPATH 2/4.3 HP27113A
```

To change the name of the physical device manager

To change the name of the physical device manager, use the **MPATH** command followed by the **PMGR** parameter and the new name. For example, to rename the device manager on a Series 925 through 949 system or a Series 958 system, enter:

```
io>MP 4.1 PMGR=HPIB_DAM
```

Or, to rename the device manager on a Series 950 through 980 system, enter:

```
io>MPATH 2/4.3 PMGR=HPIB_DAM
```

If you change the ID parameter and do not use the **PMGR** parameter, **SYSGEN** uses the default.

To modify volumes

Use the **MVOL** command (abbreviated **MV**) to modify the attributes of a volume set member. Changes made with this command take effect only if you do an **INSTALL** with a tape containing the changes. To modify a volume set member, at the IO configurator prompt (**io>**), enter:

```
io>MVOL volumename otherparameters
```

MVOL has the following parameters:

```
MVOL (MV) { [ VNAME = ] volumename }  
[ [ NEWVNAME = ] newvolumename ] [ [ LDEV = ] logicaldevice# ]  
[ [ TRANSIENT = ] %diskfortransobj ]  
[ [ PERMANENT = ] %diskforpermobj ] [ [ VCLASS = ] volumeclasse ]
```

You cannot modify the system master volume, **MEMBER1**, in any way.

The parameters are defined below. Refer to the “To add volumes” section of this chapter for examples of their use.

Parameter	Definition
VNAME	Indicates the existing volume member name. Each member must have a unique name. The volume member name is currently 16 characters or less, with numbers, letters, and underline characters allowed. The first character must be a letter. If the volume member does not exist, an error occurs.
NEWVNAME	Specifies a new volume name to replace the name of the volume member identified.
LDEV	Specifies the logical device number to be treated as the volume member.
TRANSIENT	Is the amount of disk space that is reserved for transient objects and is given as a percentage.
PERMANENT	Is the amount of disk space that is reserved for permanent objects. The total percentage given by TRANSIENT and PERMANENT must be at least 100 percent and can be as high as 200 percent, although this is not recommended.
VCLASS	Specifies the volume class(es) that the identified volume belongs to. Up to eight classes may be specified, with the same restrictions as VNAME except that it can be 32 characters long.

Deleting Classes, Devices, Paths, and Volumes

There are four IO configurator commands that you use to delete objects from the configuration: DCLASS, DDEV, DPATH, and DVOL. They are defined in the table below and explained in the following sections.

Parameter	Definition
DCLASS	Removes one or more class names from the system.
DDEV	Removes a specific device, range of devices, all products of a given product identification, all devices of a given type, or all devices of a given class name.
DPATH	Deletes an I/O path and all the I/O paths below it in the configuration.
DVOL	Deletes a volume member from the system configuration.

To delete classes

Use the DCLASS command (abbreviated DC) to delete class names from the configuration. To delete a class, at the IO configurator prompt (**io>**), enter:

```
io>DCLASS classname
```

DCLASS has the following parameter:

```
DCLASS (DC) { [ CLASS = ] classname }
```

CLASS is a repeated parameter that identifies device class names. Class names are limited to eight characters and the first must be a letter. You cannot delete the DISC, CONSOLE, or TAPE classes.

To delete a class

To delete a class name, enter DCLASS and the class name. For example, to delete EPOC, enter:

```
io>DCLASS EPOC
```

To delete multiple classes

Specify multiple classes by enclosing them with parentheses and separating each class with commas or spaces. To delete EPOC and FASTLP, enter:

```
io>DCLASS (EPOC,FASTLP)
```

If the class does not exist, SYSGEN displays an error message.

To delete devices

Use the DDEV command (abbreviated DD) to delete a device. You cannot delete the system disk (LDEV 1) or the system console (LDEV 20).

1. Start SYSGEN and at the prompt (**sysgen>**), enter:

```
sysgen>I/O
```

2. At the IO configurator prompt (**io>**), enter:

```
io>DDEV parameters
```

DDEV has the following parameters:

$$\text{DDEV (DD) } \left\{ \begin{array}{l} \left[\text{LDEV} = \right] \#/\#,\#,\dots \\ \left[\text{ID} = \right] \textit{deviceid} \\ \left[\text{TYPE} = \right] \textit{devicetype} \\ \left[\text{CLASS} = \right] \textit{classname} \end{array} \right\}$$

You must enter at least one parameter and the specified device must exist in the current configuration or SYSGEN will issue a warning. Other errors that occur are typically due to improper entry of a logical device, a range, or improper value for a positional parameter.

To delete devices by LDEV number

You can use the LDEV parameter to delete one device or a range of devices. For example, to delete logical device 123, enter:

```
io>DDEV LDEV=123
```

Or, to delete devices 10, 11, 12, and 13, enter:

```
io>DDEV LDEV=10/13
```

To delete devices by product ID

You can use the ID parameter to delete all devices with a given product identification number. If no devices meet the criteria, SYSGEN issues a warning.

For example, to delete all products with the product ID HP2932A, enter:

```
io>DDEV ID=HP2932A
```

To delete devices by type

You can use the TYPE parameter to delete all devices of a given type, either those supported by Hewlett-Packard or unsupported devices.

To delete all devices not supported by Hewlett-Packard, enter:

```
io>DDEV TYPE=USER
```

If you specify a Hewlett-Packard-supported device, SYSGEN removes all devices of that type.

To delete devices by class

You can use the CLASS parameter to delete all devices with the given class name as well as the class name itself. If the class you specify does not exist, SYSGEN issues a warning.

For example, to delete all LP devices and the device class LP, enter:

```
io>DDEV CLASS=LP
```

CLASS is a repeated parameter.

To delete paths

Use the DPATH command (abbreviated DP) to delete an I/O path and, optionally, all I/O paths below it from the configuration. If there are I/O paths below the one you are deleting, SYSGEN prompts you before deleting them with this question:

I/O path specified has pending devices,
want to delete all of them (yes/no)?

If an I/O path is currently used by a configured device, SYSGEN issues an error and does not delete the path.

1. Start SYSGEN and at the prompt (**sysgen>**), enter:

```
sysgen>io
```

2. At the IO configurator prompt (**io>**), enter:

```
io>DPATH devicepath
```

DPATH has the following parameter:

```
DPATH (DP) { [PATH =] devicepath }
```

To delete a configured path with no associated devices, enter DPATH and the path. For example, to delete a path on a Series 925 through 949 or a Series 958 system, enter:

```
io>DPATH 4.2
```

To delete a path on a Series 950 through 980 system, enter:

```
io>DPATH 2/8.2
```

To delete volumes

Use the DVOL command (abbreviated DV) to remove a volume from the configuration. To implement the change, you must create a system load tape with the configuration and then use it to do an INSTALL. To delete a volume, at the IO configurator prompt (**io>**), enter:

```
io>DVOL volumemembername
```

DVOL has the following parameters:

```
DVOL (DV) { [VNAME =] volumemembername }
```

To delete the volume named **MEMBER2** from the list of volumes, enter:

```
io>DVOL MEMBER2
```

Adding an HP-IB Disk Drive

The master disk on any system, which is LDEV 1, should not be smaller than 400 megabytes. A disk this size or smaller is too small to run the operating system and its subsystems. However, you can use disks of this size to store application programs and user files.

Once you use the IO configurator to add an HP-IB disk drive, you must keep the changes, create a new SLT, and reboot the system for the addition to take effect.

To add an HP-IB disk drive to your system, perform the following steps:

1. Start SYSGEN.
2. If you intend to modify a default configuration group, use the **KEEP** command to make a copy of the group with a new name. (In steps 8, 9, and 10 you will modify the copy in order to preserve an uncorrupted version of the current configuration.)
3. Enter the **BASEGROUP** command to activate the base group you want to modify. For example, to modify a base group named **CONFIG935**, enter:

```
sysgen>BASEGROUP CONFIG935
```

In general, you use a group like **CONFIG935** once when the system is first installed and then never again. SYSGEN's default action of using the group that was used to boot the system is correct most of the time.

4. Enter **I/O** at the **sysgen>** prompt to start the IO configurator.
5. Use the **LCLASS**, **LDEV**, and **LPATH** IO configurator commands (with the **OFFLINE** parameter) to get current I/O configuration information. For example:

```
io>LCLASS DEST=OFFLINE
```

```
io>LDEV DEST=OFFLINE
```

```
io>LPATH DEST=OFFLINE
```

6. Enter the **OCLOSE** command to close and print the configuration lists.
7. Review the **LDEV** listing and choose an unused **LDEV** for the HP-IB drive you are adding.
8. Review the **LCLASS** listing and choose a class for the HP-IB drive. If your system has a **DISC** class, use that. (You may also enter other class names; each device can simultaneously belong to up to eight classes.) If you use a name that does not exist, SYSGEN creates a class for you. Class names may not exceed eight characters and must begin with an alphabetic character.

9. Use the **APATH** command to define the path to the device-adapter level.

For example, suppose your customer engineer installed a new HP-IB card (ID number, HP27113A) in the CIO expander (CA 36) on channel adapter 2 in device adapter slot 2. To define the path, enter:

```
io>APATH 36.2 HP27113A
```

10. Use the **ADEV** command to add the drive to the path you specified. Be sure to include the device address.

For example, to add the drive as LDEV 4, enter:

```
io>ADEV LDEV=4 PATH=36.2.0 ID=HP7937H CLASS=DISC
```

11. Enter the **HOLD** command to hold all changes.
12. Enter the **EXIT** command to exit the IO configurator.
13. At the **sysgen>** prompt, enter the **KEEP** command and a group name to save changes in a permanent file.
14. Create a system load tape (SLT), store it in a secure location with any other backup materials, and reboot the system. Read "To create system load tapes" in Chapter 2 for more information. Refer to Chapter 1 for rebooting instructions.

Introducing the UPS and UPS Monitor/iX Software

A new method of power failure protection is available on the HP 3000 Series 9X8 and the Series 991 and 995 computer systems. Instead of battery backup units, they will have one or more HP model A2998A PowerTrust UPS (Uninterruptible Power Supply) devices.

Like the battery backup method of power failure, the UPS devices protect the HP 3000 system against the loss of work in progress in cases of utility AC power failures of up to fifteen minutes in duration. Furthermore, they have been designed to appear similar to the battery backup method which minimizes their effect on system operation and management procedures.

UPS devices offer two principal advantages over the battery backup method:

- In a minimal UPS-based system, the degree of power failure protection is equivalent to that provided by the battery backup unit. You can, however, add more UPS devices to the system and provide reserve power to selected peripherals. Depending upon how much of the system is provided with UPS power, it can run a partial or full workload non-stop through limited periods of AC power failure.

- The UPS contains a serial I/O communications interface that, in conjunction with UPS Monitor/iX software, notifies the system operator of any problems. Like the battery backup hardware that the UPS devices replace, a system-wide power failure recovery message is broadcast to all active user terminals and to the console upon the return of power following a failure. In addition to console messages, the UPS Monitor/iX software also posts a variety of status and warning messages to the system log files which you can review and analyze to evaluate system performance.

To configure a UPS

You can use one of two configuration methods to add UPS devices to a Series 9X8 systems. For the first or only UPS, which is attached to the third serial port on the system's LAN/Console I/O interface card, you do most of the configuration with SYSGEN. For additional UPS devices, which are attached to a DTC serial I/O port, you add them to the configuration primarily using the NMMGR program. (As the final step in this second method, you will cross-validate the configuration files with SYSGEN.)

On a Series 991 or 995, all UPS devices are attached to the system via a DTC serial I/O port. As a result, you use NMMGR to configure them and then, as a final step in the process, cross-validate the configuration files with SYSGEN. (If you have configured user terminals on a DTC, the method will be very familiar.)

To configure the first UPS on a Series 9X8

The first UPS device on a Series 9X8 system is attached to the third port on the LAN/Console I/O interface card. To perform most of the configuration, you use SYSGEN's IO configurator. Once you have done so, you use NMMGR to set the baud rate (which you cannot do in SYSGEN) and then cross-validate the configuration.

To configure the first UPS on a Series 9X8, do the following:

1. Boot the system using the default configuration group.

You will see a series of status messages about the current I/O configuration, including a **Configuration file open error** because the **NMCONFIG** file does not yet exist. You can ignore it.

2. At the MPE prompt, start the NMMGR program. Enter:

```
:RUN NMMGR.PUB.SYS
```

3. Press the **Open Config** softkey twice and wait while NMMGR opens a configuration file.
4. Enter the node name and press **Save Data**.
5. Press **Go to DTS** to display the DTS configuration screen. Tab to the third field and enter the physical path of the LAN/Console card and press **Save Data**.

(If you don't know the physical path, use SYSGEN's I/O configurator module to find out.)

6. Press the **Go to UPS Port** softkey and at the UPS Port screen, verify that the LDEV number is correct, the Parity Checking option is set to **none**, and the baud rate to **1200**.
7. Press the **Save Data** softkey to save your UPS Port configuration. (Note that when you have done this, you will see **Data:Y** in the upper-right corner of the screen.)
8. At the top of the NMMGR screen, enter **validate** at the **command:** prompt to display the Validate Screen.
9. Press the **Validate Link/DTS** softkey to cross-validate the DTC configuration with the SYSGEN configuration, then exit NMMGR.
10. Reboot the system to make the new configuration effective.

Note

Each UPS device, and only a UPS device, **MUST** have its device class name set to **HPUPSDEV** during I/O configuration. Otherwise, the UPS Monitor software will not be able to initialize and communicate with the UPS device(s) correctly.

To configure a UPS connected via a DTC port

On a Series 9X8 system, all UPS devices other than the first one are connected to your computer system via a DTC port. On a Series 991 and 995 system, all UPS devices (including the first one) are connected via a DTC port. In both cases, you use the NMMGR program to add them to your system configuration. (If you have configured user terminals on a DTC, the method will be very familiar.)

To configure a UPS connected via a DTC, do the following:

1. At the MPE prompt, start the NMMGR program by entering:
:RUN NMMGR.PUB.SYS
2. Press the **Open Config** softkey and then press **DTS** to display the DTS configurator.
3. Press **Go to DTC** and choose the appropriate DTC configurator for the system (DTC16ix, DTC16MX, DTC16, DTC48, etc.).
4. Fill in the required information and press **Save Data**.
5. Choose an available LDEV number for the UPS you are configuring, and determine which DTC port (DTC card number and port number) the UPS is connected to.
6. Press the **Config Card** softkey to enter the DTC card configurator.
7. Add the UPS by entering its logical device number in the Ldev field and **UP10D12** in the Profile Name field. When you have added all UPS devices, press the **Save Data** softkey.

8. At the top of the NMMGR screen, enter **validate** at the **command:** prompt to display the Validate Screen.
9. Press the **Validate Link/DTS** softkey to cross-validate the DTC configuration with the SYSGEN configuration, then exit NMMGR.

If you see a message that the **NETXPORT** subsystem is not validated, ignore it and continue.
10. Shut down the system.
11. Turn power to the DTC hardware off and then on again to download the correct baud rate for the UPS port to the DTC hardware. (On some systems, cycling the power to a DTC may require you to unplug it and plug it in again.)
12. Reboot the system to make the new configuration effective.

To use UPS Monitor/iX software

Once you have configured UPS devices on the system, they will automatically be monitored by the UPS Monitor/iX software. This software causes the UPS devices to emulate the traditional battery backup method of system powerfail handling and recovery and, in addition, provides system console messages and system log file entries describing UPS hardware conditions.

The UPS Monitor/iX process behaves in one of two ways, depending on the system on which Release 5.0 of MPE/iX has been installed:

- When installed on a system that has been configured with UPS devices, UPS Monitor/iX runs continually while the system is up to monitor all of the UPS devices for power failure and any other hardware status conditions. It reports these conditions to the system operator's console via console messages and records them in the system log file.
- When installed on an old system that does not use UPS devices, UPS Monitor/iX is launched at startup, discovers that there are no UPS devices on the system, and terminates itself. In this case, the system uses the existing battery backup method of system power failure protection.

Note

UPS monitoring is event number 148 in the system log files. The default is ON (i.e. UPS hardware conditions are recorded in the files) regardless of whether the system has UPS power fail protection or not. In the latter case, when no UPS devices have been configured, the system log files will receive and record two UPS-related messages each time the system starts: one indicating that the UPS Monitor/iX process has been launched and a second message which says that no UPS devices are found in the I/O configuration.

System behavior when AC power fails

Whenever input AC power to any UPS device fails, the UPS hardware switches to internal battery operation to continue to deliver output AC power to the computer equipment. No actual power failure occurs at the computer equipment itself and, as a result, the SPU continues to operate. However, the actual behavior of the system will vary depending on how much of the system equipment is provided with UPS power.

In the minimal case, where only the SPU and any Remote Busses receive UPS power (and assuming that disks are external to the SPU), the system is most likely to appear to be dormant (like a traditional battery backup method system) because the system can not make progress once the disks lose power and spin down. The system will simply enter its "idle loop", waiting for disk I/O operations to complete, and that won't happen until AC power returns and the disks spin up again.

But in expanded UPS coverage systems, where some or all of the disks receive UPS power, the system may continue to run to some extent. Again, it depends on what resources the system needs to perform its workload. Batch jobs that only need CPU, memory, and disk I/O can continue to run undisturbed. Processing that requires tape or printer or terminal I/O will be blocked if those peripherals do not have UPS power.

UPS Monitor/iX issues a warning message to the system console to notify the operator that the particular UPS (identified by its LDEV number) has reported to the system that its input AC power has failed. In the following example, UPS Monitor/iX reports and power failure and a recovery shortly thereafter:

```
:showtime
FRI, AUG 13, 1993, 11:27 AM
:
:11:27/50/UPS LDEV 102 reports loss of AC input power. (UPSERR 0033)

**RECOVERY FROM POWER FAIL**

11:27/50/UPS LDEV 102 reports AC input power restored. (UPSWRN 0036)
:
```

Example 3-6. Sample Console Messages from UPS Monitor/iX

UPS Monitor/iX also writes a system log file entry that denotes the input power loss to the UPS device. Read "To enable logging of UPS activity" and "To review UPS activity recorded in the system log file", later in this chapter for more information.

System Behavior When AC Power Returns

The behavior of the system when AC input power returns to the UPS is very similar to that of the battery backup method systems. One of two things will happen: a recovery from power failure (if AC power returns before the UPS battery that backs up the SPU becomes exhausted) or a system crash.

If AC power returns before the UPS battery becomes exhausted (up to fifteen minutes when starting with fully charged UPS batteries; less if the batteries were already partially discharged), then the system recovers from the AC power failure and resumes normal operation. In this case, UPS Monitor/iX displays a message on the system console, posts an entry in the system log files, and broadcasts the following message to all active user terminals:

**** RECOVERY FROM POWERFAIL ****

If the UPS battery that powers the SPU becomes exhausted before AC input power returns, then the system really does lose AC power and crashes. In this case, when AC power does return and the UPS turns on again, the system reboots just as if it used battery backup.

To enable logging of UPS activity

The UPS Monitor/iX program posts UPS status and alarm messages to the system log files. If system logging for the UPS Monitor/iX (which is event number 148) is turned on, you can review the messages to troubleshoot your system configuration and evaluate system performance.

As the default, event 148 is ON. To verify that it is or, if necessary, to turn it on, do the following:

1. At the MPE prompt, start SYSGEN by entering:

:SYSGEN

2. At the **sysgen>** prompt, start the LOG configurator by entering:

sysgen>LOG

3. To display which system logging events are enabled or disabled, enter:

log>SHOW SLOG

4. To turn UPS Monitor/iX logging on (if it is currently listed as OFF), enter:

log>SLOG ON=148

5. To exit the LOG configurator and SYSGEN, enter the **EXIT** command twice. You will see the MPE prompt displayed on your screen.

To review UPS activity recorded in the system log file

UPS Monitor/iX status and alarm messages are recorded in the system log files as event number 148. You can use the LOGTOOL utility to review entries in the system log file about the performance and condition of UPS devices on your system. To do so, follow these steps:

1. List the names of the log files currently on your system. At the MPE prompt, enter:

```
:LISTFILE LOG@.PUB.SYS
```

Note the number of the last numbered log file in the list. You will use it in step 5.

2. Start the system diagnostic utility. At the MPE prompt, enter:

```
:SYSDIAG
```

3. Run the LOGTOOL utility. Enter:

```
DUI >RUN LOGTOOL
```

4. To review the current log file, use the SWITCHLOG command to close the current logfile and open a new one. (You need to close the current log file before reviewing it to ensure that it is brought up-to-date.)

```
DUI >SWITCHLOG
```

5. List the UPS-related messages (which are recorded as system log event number 148) in the log file that you just closed. This will be the last numbered log file (such as LOG0017) listed on your screen in step 1, incremented by one (that is, LOG0018). For example, enter:

```
DUI >LIST LOG=17;TYPE=148
```

In a moment, you will see the contents of the system log files for event 148, which stores UPS-related messages. If event 148 was disabled, you will be informed that no messages were found.

Defining Events to Be Recorded

One of your tasks as system manager is to use the SYSGEN LOG configurator to establish which system and user events are recorded in log files.

System logging records certain system resource usage information by accounts, groups, and users on a job or session basis. For example you might decide to log failed attempts to enter passwords for the purpose of monitoring system security.

User logging records additions and modifications to databases and other files used in application programs by users and subsystems. You determine the maximum number of logging processes and the maximum number of users per logging process.

In this chapter, you can find the following tasks:

- entering the LOG configurator
- using online help
- showing current information about logging
- controlling system logging
- controlling user logging
- printing a log file

Using the LOG Configurator

You use the LOG configurator to display information about system and user logging, print log files, and choose which events the system will record.

To enter the LOG configurator

You make all system and user logging changes from with the LOG configurator, which is one of the SYSGEN modules. To enter the LOG configurator, do as follows:

1. At the MPE prompt, start SYSGEN by entering:

SYSGEN

2. At the SYSGEN prompt (**sysgen>**), start the LOG configurator by entering:

sysgen>LOG

You will see a list of the commands available to you in the LOG configurator. (See the example below.) To issue a command, you can either enter the full name or you can enter the abbreviated version shown in parentheses.

```
sysgen>LOG
```

```
  ** LOG configurator commands **
```

```
show (sh)          slog (sl)          ulog (ul)
```

```
clear (cl)(c)      exit (ex)(e)      help (he)(h)      hold (ho)
```

```
oclose (oc)        redo
```

Example 4-1. Activating the LOG Configurator

To display on-line help

Use the **HELP** command to get information about the commands available to you in the LOG configurator.

- To display a complete list of commands and a brief explanation of each one, at the **log>** prompt enter:

log>HELP

- To display information about one of the LOG configurator commands, at the **log>** prompt enter **HELP** followed by the command name. For example, to get help on the **SLOG** command, enter:

log>HELP SLOG

To show current LOG values

Use the LOG configurator's **SHOW** command to display current LOG values on the system console or to print them offline. At the LOG prompt (**log>**), enter:

```
log>SHOW parameters
```

SHOW has the following parameters:

$$\text{SHOW} \left[\left[\text{COMMAND} = \left\{ \begin{array}{l} \text{SLOG} \\ \text{ULOG} \\ \text{ALL} \end{array} \right\} \right] \right] \left[\left[\text{DEST} = \right] \text{OFFLINE} \right]$$

Parameter	Definition
SLOG	Lists the state of the system logging events.
ULOG	Lists the number of user logging processes and users per logging process currently configured.
ALL	Lists all the information associated with the LOG configurator. This is the default parameter.
OFFLINE	Redirects the output of the SHOW command to the SYSGEN listing file, SYSGLIST . Using OFFLINE does not immediately generate a printout. The information is sent to SYSGLIST until you either enter the OCLOSE command or exit the configurator. Exiting SYSGEN or using OCLOSE closes SYSGLIST and prints the file.

To see partial logging information

You can use the **SHOW** command to see only the values for system logging or user logging (instead of for both). For example, to display the current status of user logging processes, enter:

```
log>SHOW ULOG
```

The LOG configurator displays the minimum, maximum, current, and default values for your system. (See the example below.)

```
log>SHOW ULOG
configurable item      max      min      current
-----
# of user logging processes      64       2       64
# users per logging process    1024      1      128
```

Example 4-2. Showing User Logging Processes

To see all logging information

To display all currently configured values, you can enter:

```
log>SHOW
```

Or, you can enter:

```
log>SHOW ALL
```

The LOG Configurator displays the minimum, maximum and current value for user log events and the name, number and status (OFF or ON) of system log events.

To print current logging information

Instead of displaying logging information on the console, you can print it offline. To do so, add the **DEST=OFFLINE** parameter to the end of the command line. For example, to print a copy of system logging data, follow these steps:

1. Send the output of the **SHOW** command to the file **SYSGLIST** by entering:

```
log>SHOW SLOG DEST=OFFLINE
```

2. Close the file **SYSGLIST** and print the information by entering:

```
log>OCLOSE
```

Note that you can also exit the LOG Configurator to close and print **SYSGLIST**.

To log system events

System logging keeps a running log of certain resources so that you can monitor their use by accounts, groups and users. You can use system logging for billing purposes or simply to see an overview of system use. To determine which events are logged, you use the **SLOG** command to turn them on or off.

SLOG has the following parameters:

```
SLOG (SL) [ [ ON = ] event#,... ] [ [ OFF = ] event#,... ]
```

Note

You can turn off all events except the following three which are always on: system up record (event 101), I/O record (event 111), and diagnostic information record (event 150).

Before you change the system logging configuration, enter the **SHOW SLOG** command to see which events are currently ON or OFF. Your console will display something like the example on the next page.

log>SHOW SLOG

system log events	event #	status
System logging enabled	100	OFF
System up record	101	ON
Job initiation record	102	OFF
Job termination record	103	OFF
Process termination record	104	OFF
NM file close record	105	OFF
System shutdown record	106	ON
Power failure record	107	ON
I/O error record	111	ON
Physical mount/dismount	112	OFF
Logical mount/dismount	113	OFF
Tape labels record	114	OFF
Console log record	115	ON
Program file event	116	ON
NCS spooling log record	120	ON
Architected interface record	130	ON
Password changes	134	ON
System logging configuration	135	ON
Restore logging	136	ON
Printer access failure	137	ON
ACD changes	138	ON
Stream initiation	139	ON
User logging	140	ON
Process creation	141	ON
Chgroup record	143	ON
File open record	144	ON
Maintenance request log	146	OFF
UPS Monitor Event Logging	148	OFF
Diagnostic Information	150	ON
High Priority Machine Check	151	ON
Low Priority Machine Check	152	ON
Directory Open/Close Logging	155	OFF
CM File Close	160	OFF
Chdir	161	OFF
Process Adoption	162	OFF
File Owner Change	163	OFF

log>

Example 4-3. Sample Configured Values

To enable an event

For any of the system log event are listed as OFF when you issue the SHOW command, you can quickly enabled them. To do so, note the number of the event that you want to enable and use the "SLOG" command.

For example, to enable stream initiation (event 139), at the log> prompt enter:

```
log>SLOG 139
```

Or, you can enter:

```
log>SLOG ON=139
```

Suppose that you have enabled event 139 (stream initiation), and a user JOHN in the group DOE of the PAYROLL account logs on with the session name JREPORT. If he streams the job file JTEST.TESTGP.TESTACCT that was logged on as #J12, the system logs the following information:

USER:	JOHN	GROUP:	DOE
ACCOUNT:	PAYROLL	JSNAME:	JREPORT
INPUT LDEV:	21	DEV NAME:	TERM
JOB FILE NAME:	JTEST.TESTGP.TESTACCT		
LOGON J/S TYPE:	JOB	LOGON J/S NAME:	12

To disable an event

To disable an event, you enter the SLOG command with the OFF parameter, followed by the number of the event you want to disable. For example, to disable the console log record (event 115), enter:

```
log>SLOG OFF=115
```

To disable all system logging

To disable all system logging (except those events always monitored by MPE, which you cannot turn off), specify event 100. For example:

```
log>SLOG OFF=100
```

To review one event recorded in the system log file

You can use the LOGTOOL utility to review entries in the system log file for a particular event. To do so, follow these steps:

1. List the names of the log files currently on your system. At the MPE prompt, enter:

```
:LISTFILE LOG@.PUB.SYS
```

Note the number of the last log file in the list (other than LOGDCC). You will use it in step 5.

2. Start the system diagnostic utility. At the MPE prompt, enter:

```
:SYSDIAG
```

3. Run the LOGTOOL utility. Enter:

```
DUI >RUN LOGTOOL
```

4. To review the current logfile, use the SWITCHLOG command to close it and open a new one.

```
DUI >SWITCHLOG
```

5. List the information for a specific event in the log file that you want to review. For example, if the last log file displayed with the LISTFILE command was LOG00017 and you want information about event 139, enter:

```
DUI >LIST LOG=17;TYPE=139
```

Or, if the last log file was LOG00017 and you then issued the SWITCHLOG command, to see the most recent log file you would enter:

```
DUI >LIST LOG=18;TYPE=139
```

In a moment, you will see the contents of the system log files for event 139. If event 139 was disabled, you are informed that no messages are found.

To control user logging

User logging provides a means for system users and subsystems to record additions and modifications to databases and other files that use application programs. As system manager, you determine the maximum number of logging processes and the maximum number of users per logging process.

Use the ULOG command to configure the user logging process parameters. ULOG has the following parameters:

$$\text{ULOG (UL)} \left\{ \begin{array}{l} [\text{NLOGPROCS} =] \text{number processes allowed} \\ [\text{USERSPERPROC} =] \text{users per logging process} \end{array} \right\}$$

Parameter	Definition
NLOGPROCS	Controls the user logging ID (LID) table size. The minimum number of processes is 2 and the maximum is 64. The changes take effect when you perform an UPDATE CONFIG or an INSTALL with a system load tape that contains the new table size. If you lower NLOGPROCS , the system will not record any of the current logging ID information onto the system load tape. If you increase NLOGPROCS or leave it unchanged, the current information is copied to tape.
USERSPERPROC	Controls the maximum number of users assigned to each configured logging process. The minimum number of users per logging process is 1 and the maximum is 1024.

For example, to set the number of logging processes to 40, enter:

```
log>ULOG 40
```

Or you can enter:

```
log>ULOG NLOGPROCS=40
```

To set the number of users per process to 40, enter:

```
log>ULOG USERSPERPROC=40
```

Or, you can enter:

```
log>ULOG ,40
```

To print a log

To read and analyze your logs, you must print your log files. To do this, you use the LOGTOOL utility program in the following set of steps:

1. At the MPE prompt, enter the SYSDIAG command.
2. At the diagnostic user interface prompt (DUI>), enter

```
DUI>RUN LOGTOOL
```
3. Check the status of all system log files by entering:

```
LOGTOOL>STATUS
```
4. Choose a file to print and enter the LIST command followed by the log number and the OUTFILE parameter. For example, to print log 27 (which appears as LOG00027 in the list), enter:

```
LOGTOOL>LIST LOG=27 OUTFILE=LP
```
5. Exit LOGTOOL by entering EXIT at the LOGTOOL> prompt.
6. Exit the diagnostic user interface by entering EXIT at the DUI> prompt.

Note

If you do not specify the `OUTFILE` parameter, the log prints on your terminal screen. Typically this report is very long and ties up your terminal for quite some time. If this happens, you can enter `CTRL` `Y` to break the process. Refer to the *Online Diagnostic Subsystem Utilities Manual* (09740-90021) for more information about `LOGTOOL`.

Changing System Libraries, Programs, and Message Catalogs

You use the SYSFILE configurator to display information about system libraries, programs, and the system message catalog and to make any necessary changes. To make the SYSFILE configurator changes permanent, you must generate a system load tape (SLT) and then update or install the system with the newly created SLT to implement the changes.

When you issue a SYSFILE command to add, delete, or replace an object in one of the system files, SYSGEN verifies that the file's group and account exist in MPEXLDIR.PUB.SYS. If not, you will get an error.

In this chapter, you can find the following topics:

- accessing the SYSFILE configurator
- using online help
- using SYSFILE configurator commands
- displaying current file information
- adding objects to the SLT
- deleting objects from the SLT
- replacing objects on the SLT
- using a segmented library file as a compatibility mode segmented library (CMSL)
- listing CMSL contents

Using the SYSFILE Configurator

Use the SYSFILE configurator to display current information about system libraries, system programs, and the system message catalog and to make changes to the file system information.

To access the SYSFILE configurator

You make all changes to system files from within the SYSFILE configurator, which is one of the SYSGEN modules. To access the SYSFILE configurator, do the following:

1. At the MPE prompt, enter:

SYSGEN

2. At the SYSGEN prompt (**sysgen>**), enter:

sysgen>SY

When you first enter the SYSFILE configurator, you will see a list of the commands available to you. To issue a command, either enter the full command name or the abbreviation shown in parentheses.

```
sysgen>SY
```

```
  ** SYSFILE configurator commands **
```

aauto (aa)	aboot (ab)	acmsl (ac)	asprog (as)
cmsl (cm)	dauto (da)	dboot (db)	dcmsl (dc)
dsprog (ds)	lcmsl (lc)	rauto (ra)	rboot (rb)
rcat (rc)	rcmsl (rcm)	rdcc (rd)	ripl (ri)
rnmlib (rn)	rsprog (rs)	show (sh)	
clear (cl)(c)	exit (ex)(e)	help (he)(h)	hold (ho)
oclose (oc)	redo		

Example 4-1. Activating the SYSFILE Configurator

You use most of the SYSFILE configurator commands to add, delete, replace, list, or specify eight system file objects. Table 5-1 summarizes these actions. It lists the objects from top to bottom and shows the corresponding actions from left to right.

Table 5-1. SYSFILE Configurator Command Matrix

	Add	Delete	Replace	List	Specify
Autoboot Image	AAUTO	DAUTO	RAUTO		
Boot Image	ABOOT	DBOOT	RBOOT		
CMSL Segment	ACMSL	DCMSL	RCMSL	LCMSL	CMSL
System Program	ASPROG	DSPROG	RSPROG		
System Catalog			RCAT		
Network Config			RDCC		
IPL Image			RIPL		
NM Library			RNMLIB		

To use online help

You can display helpful information about any of the SYSFILE configurator commands on the screen. To do so, enter the **HELP** command at the **sysfile>** prompt in one of two forms:

- To get help for a specific command, type **HELP** and then the command name. For example, to display a description, the syntax, and examples of the **RCMSL** command, enter:

```
sysfile:HELP RCMSL
```

- To see a list of all the SYSFILE configurator commands with a brief description of each one, simply enter **HELP** or **H**.

To display current file information

Use the **SHOW** command (abbreviated **SH**) to display current file information. The syntax of the **SHOW** command is:

```
SHOW (SH) [ FILE = { AUTO
                     BOOT
                     CATALOG
                     CMSL
                     DCC
                     IPL
                     NMLIB
                     SPROG
                     ALL } ] [ [ DEST = ] OFFLINE ]
```

Parameter	Definition
AUTO	Shows the autoboot images in use.
BOOT	Shows the boot images currently configured.
CATALOG	Shows the system catalog in use.
CMSL	Shows the compatibility mode segmented library in use.
DCC	Shows the network configuration file in use.
IPL	Shows the initial program loader image in use.
NMLIB	Shows the native mode library in use.
SPROG	Shows the specified system program names in use.
ALL	Shows all of the above information.
OFFLINE	Redirects the output of the SHOW command to SYSGEN's listing file, <code>SYSGLIST</code> . To print the file, you enter either the <code>OCLOSE</code> command or exit SYSGEN.

To display information about one or all system file objects, at the `sysfile>` prompt, enter:

```
sysfile>SHOW parameters
```

For example, to list current file information for the native mode library, enter:

```
sysfile>SH NMLIB
```

To show current information for all objects you control with the `SYSDFILE` configurator including system libraries, programs, and the message catalog, enter:

```
sysfile>SHOW
```

Or you can enter:

```
sysfile>SHOW ALL
```

To add objects to the SLT

Use the add commands (`AAUTO`, `ABOOT`, `ACMSL`, and `ASPROG`) to add objects to the list of files dumped onto the system load tape (SLT). The commands are summarized below and explained in the remainder of this section.

Parameter	Definition
AAUTO	Adds an autoboot file to the list of files.
ABOOT	Adds a boot image to the list of files.
ACMSL	Adds a segment to a temporary copy of the CMSL, which SYSGEN automatically manages.
ASPROG	Adds a system program or other file to the list of files.

To add autoboot files

Use the **AAUTO** command (abbreviated **AA**) to add an autoboot file to the list of files dumped onto the system load tape. Your system can have only one disk autoboot file (known as **AUTOBOOT.MPEXL.SYS**) and one tape autoboot file (known as **TAPEAUTO.MPEXL.SYS**). However, neither is required.

The syntax of the **AAUTO** command is:

$$\text{AAUTO (AA) } \{ \text{ [FILE =] } \textit{autobootfilename} \} \\ \left[\text{ [TYPE =] } \left\{ \begin{array}{l} \text{DISC} \\ \text{TAPE} \\ \text{BOTH} \end{array} \right\} \right]$$

Parameter	Definition
FILE	The file that contains autoboot commands. If you do not enter the group and account name, it defaults to the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
TYPE	The type of boot image to add, which can be any of the following: DISC The file can only be used in a disk boot. TAPE The file can only be used in a tape boot. BOTH The file can be used in both a disk boot and a tape boot.

For example, to add the autoboot file **IOMAP2.UTIL.SYS**, which is both a disk and tape file, enter:

```
sysfile>AAUTO FILE=IOMAP2.UTIL.SYS TYPE=BOTH
```

To add boot files

Use the **ABOOT** command (abbreviated **AB**) to add a boot image to the system file configuration. The syntax of the command is:

$$\text{ABOOT (AB) } \{ \text{ [IMAGE =] } \textit{bootimagename} \} \{ \text{ [FILE =] } \textit{filename} \} \\ \left\{ \text{ [TYPE =] } \left\{ \begin{array}{l} \text{DISC} \\ \text{TAPE} \\ \text{BOTH} \end{array} \right\} \right\}$$

Parameter	Definition
IMAGE	The name of a boot image. If the specified boot image already exists, an error occurs.
FILE	The name of the boot image file. If you do not enter the group and account name, it defaults to the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
TYPE	The type of boot image to add, which can be any of the following: DISC The file can only be used in a disk boot. TAPE The file can only be used in a tape boot. BOTH The file can be used in both a disk boot and a tape boot.

For example, to add file information for the boot image ISL.MPEXL.SYS, enter:

```
sysfile>ABOOT IMAGE=ISL.MPEXL.SYS FILE=ISL.MPEXL.SYS&
TYPE=DISC
```

To add a segment to the CMSL

Use the ACMSL command (abbreviated AC) to add a segment to the compatibility mode segmented library (CMSL). The syntax of the command is:

```
ACMSL (AC) { [ SEG = ] segmentname } { [ FILE = ] filename }
[ [ MODE = ] { P
S
C
U } ]
```



Parameter	Definition
SEG	The name of a new segment, which can be a maximum of eight characters. If you enter an existing segment name, you will get an error.
FILE	The name of the file you want added to the CMSL. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
MODE	Where the added SL segment is to reside, which must be one of the following four options: P A permanently allocated user segment. This parameter performs the same function as the ALLOCATE command. S A permanently allocated system intrinsic segment in virtual memory. C A core-resident system intrinsic segment. U A regular user segment. This is the default.

For example, to add the new segment name SDCUTIL1 to the CMSL as a regular user segment, enter:

```
sysfile>ACMSL SEG=SDCUTIL1 FILE=USLNEW.PUB.SYS MODE=U
```

To add file names to save to tape

Use the ASPROG command (abbreviated AS) to add a system program or other file to the list of files to be saved on tape. The syntax of the command is:

```
ASPROG (AS) { [PROG =] program name } { [FILE =] filename }
```

Parameter	Definition
PROG	The name of a new system program. If program name you enter already exists in the system program list, you will get an error.
FILE	The name of the file to be used as the system program. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)

For example, to add FCOPY.PUB.SYS to the system load tape, using the same name, enter:

```
sysfile>ASPROG PROG=FCOPY.PUB.SYS FILE=FCOPY.PUB.SYS
```

To delete objects from the SLT

Use the delete commands (DAUTO, DBOOT, DCMSL, and DSPROG) to delete objects from the list of files dumped to the system load tape. The commands are summarized below and explained in the remainder of this section.

Parameter	Definition
DAUTO	Deletes the specified autoboot type from the list of files.
DBOOT	Deletes boot images from the list of files.
DCMSL	Deletes segments from the CMSL.
DSPROG	Removes system programs or files from the list of files.

To delete autoboot images

Use the DAUTO command (abbreviated DA) to delete the specified autoboot type from the list of files dumped onto the system load tape. The syntax of the command is:

$$\text{DAUTO} \left\{ \left[\text{TYPE} = \right] \left\{ \begin{array}{l} \text{DISC} \\ \text{TAPE} \\ \text{BOTH} \end{array} \right\} \right\}$$

Parameter	Definition
TYPE	The type of boot image to delete, which must be one of the following: DISC The file can only be used in a disk boot. TAPE The file can only be used in a tape boot. BOTH The file can be used in both a disk boot and a tape boot.

For example, to delete type TAPE, enter:

```
sysfile>DAUTO TYPE=TAPE
```

To delete boot images

Use the DBOOT command (abbreviated DB) to delete a boot image file name. The syntax of the command is:

$$\text{DBOOT (DB)} \left\{ \left[\text{IMAGE} = \right] \left[\text{bootimagename} \right] \left[, \dots \right] \right\}$$

IMAGE is a repeated parameter that you use to specify one or more boot images to delete. If you enter a boot image name that does not exist, you will get a warning. (To display a list of valid boot image file names, use the SHOW command.)

For example, to remove the image file SAT.MPEXL.SYS, enter:

```
sysfile>DBOOT IMAGE=SAT.MPEXL.SYS
```

To delete compatibility mode segments

Use the DCMSL command (abbreviated DC) to delete segments from the compatibility mode segmented library (CMSL). The syntax of the command is:

```
DCMSL (DC) { [ SEG = ] [ segmentname ] [ , ... ] }
```

SEG is a repeated parameter that you use to specify one or more segments currently in the CMSL. If you enter the name of a segment that doesn't exist, you will get an error. (To list the contents of the CMSL, use the LCMSL command.)

For example, to delete the segments SDCUTIL5 and SDCUTIL6 from the system load tape, enter:

```
sysfile>DCMSL SEG=SDCUTIL5,SDCUTIL6
```

To delete system programs

Use the DSPROG command (abbreviated DS) to delete system programs or files from the system configuration. The syntax of the command is:

DSPROG has the following parameter:

```
DSPROG (DS) { [ PROG = ] [ programname ] [ , ... ] }
```

PROG is a repeated parameter that you use to specify one or more the system programs to delete. If you enter a program name that doesn't exist, you will get an error. (To see what program names are currently in use, use the SHOW SPROG command.)

For example to remove FCOPY.PUB.SYS from the system configuration, enter:

```
sysfile>DSPROG PROG=FCOPY.PUB.SYS
```

To replace objects on the SLT

Use the replace commands (RAUTO, RBOOT, RCAT, RCMSL, RDCC, RIPL, RNMLIB, and RSPROG) to replace or modify information in the list files dumped to the system load tape. The commands are summarized below and explained in the following sections.

Parameter	Definition
RAUTO	Replaces an existing autoboot image or modifies the autoboot type.
RBOOT	Replaces an existing boot image or modifies the boot type.
RCAT	Replaces the message catalog.
RCMSL	Replaces a segment in the temporary copy of the CMSL.
RDCC	Defines network configuration file dumped to the SLT.
RIPL	Replaces an existing IPL image.
RNMLIB	Replaces a native mode (NM) library.
RSPROG	Replaces an existing system program or other file.

To replace autoboot images

Use the RAUTO command (abbreviated RA) to replace an existing autoboot image in the list of files dumped to the system load tape. The syntax of the command is:

```
RAUTO (RA) { [ FILE = ] autobootfilename }
           { [ TYPE = ] { DISC
                        TAPE
                        BOTH } }
```

Parameter	Definition
FILE	The file to replace the designated autoboot image. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
TYPE	The boot image type, which must be one of the following: DISC TAPE BOTH The file can only be used in a disk boot. The file can only be used in a tape boot. The file can be used in both a disk boot and a tape boot.

To display the autoboot image file names maintained by the system, use the SHOW command. To replace a file, select one from the list. For example, to replace the autoboot image file **AIMAGE.MPEXL.SYS**, enter:

```
sysfile>RAUTO FILE=AIMAGE.MPEXL.SYS TYPE=TAPE
```

To replace boot images

Use the RBOOT command (abbreviated RB) to modify the boot type of an existing boot image file name or to replace the boot image file name with another boot image file name. The syntax of the command is:

```
RBOOT (RB) { [ IMAGE = ] bootimagename } { [ FILE = ] filename }  
           { [ TYPE = ] { DISC  
                       TAPE  
                       BOTH } }
```

Parameter	Definition
IMAGE	The name of the existing boot image that you want to modify or replace. If you enter a file name that does not exist, you will get an error.
FILE	The name of the file that replaces the designated boot image. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
TYPE	The boot image type, which must be one of the following: DISC The file can only be used in a disk boot. TAPE The file can only be used in a tape boot. BOTH The file can be used in both a disk boot and a tape boot.

To display the boot image file names maintained by the system, use the SHOW command. To replace a file, select it from the list. For example, to modify the file START.MPEXL.SYS, enter:

```
sysfile>RBOOT FILE=START.MPEXL.SYS&  
FILE=START.MPEXL.SYS TYPE=DISC
```

To configure a message catalog

The system message catalog contains all the system and subsystem messages and is kept in a file named CATALOG.PUB.SYS. Use the RCAT command (abbreviated RC) to specify which message catalog you want used on the system. The syntax of the command is:

```
RCAT (RC) { [ NAME = ] filename }
```

If you do not enter the group and account name as part of the *filename* parameter, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.) If you specify a message catalog file that has not been created, you will get an error.

For example, to replace the default catalog name CATALOG.PUB.SYS with the new catalog STARCAT.PUB.SYS, enter:

```
sysfile>RCAT NAME=STARCAT.PUB.SYS
```

Note

With the introduction of MPE/iX release 4.5, all error message text is now mixed case, rather than in all uppercase characters as in the past. The changes affect set 2 of CATALOG.PUB.SYS, (lines numbered 2100 to 13006.01). The content of logfiles and console messages are not affected by this change.

In the unlikely event that the mixed-case error messages create a problem for one of your applications, you can edit CATALOG.PUB.SYS to upshift the message text in set 2 and install the edited version of the message catalog.

For information on how to modify an existing message catalog, refer to *Message Catalogs Programmer's Guide* (32650-90021).

To replace a CMSL segment

Use the RCMSL command (abbreviated RCM) to replace a segment in the CMSL. The syntax of the command is:

```
RCMSL (RCM) { [SEG =] segmentname } { [FILE =] filename }
               [ MODE = { P
                        S
                        C
                        U } ] ]
```

Parameter	Definition
SEG	The name of a new segment, which can be a maximum eight characters. If you specify a segment that does not exist, you will get an error.
FILE	The name of the file you want to add to the CMSL. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)
MODE	Where the added SL segment is to reside, which must be one of the four options listed below: P A permanently allocated user segment. This parameter requests the same function as the ALLOCATE command. S A permanently allocated system intrinsic segment (in virtual memory). C A core-resident system intrinsic segment. U A regular user segment. This is the default.

To display the segments maintained in the CMSL, use the LCMSL command. To replace a segment, select one from the list. For example, to replace the regular user segment SDCUTIL1, enter:

```
sysfile>RCMSL SEG=SDCUTIL5 FILE=USLNEW.PUB.SYS MODE=P
```

To replace or define a network configuration file

Use the RDCC command (abbreviated RD) to specify a new or replacement network configuration file and to check for conflicts between the network configuration and SYSGEN's I/O configuration.

The syntax of the RDCC command is:

```
RDCC (RD) { [ FILE = ]filename }
```

If you do not enter a fully qualified file name, it defaults to the current group and account. If you do not enter the **FILE** parameter, SYSGEN uses the default network configuration file NMCONFIG.PUB.SYS.

To add the network configuration file information to the current SYSGEN configuration and cross validate, do the following:

1. Specify the network configuration file by entering:

```
sysfile>RDCC FILE=filename
```

2. Cross validate the file by entering the following sequence of commands:

```
sysfile>HOLD
```

```
sysfile>EXIT
```

```
sysgen>IO
```

```
:
```

```
sysgen>KEEP NETWORK
```

3. Create a system load tape and use it to update the system with the new network configuration.

Note

For more information on remote configurations, refer to the *NS3000/XL Network Manager's Reference Manual* (36920-90002) and to Chapter 2.

To replace an IPL image

Use the RIPL command (abbreviated RI) to replace an existing IPL image in the list of files dumped onto the system load tape. There can be only one disk and one tape IPL, each of which is replaced by its image name. Both IPL files must reside on the tape. The syntax of the command is:

```
RIPL (RI) { [ IMAGE = ] imagename } { [ FILE = ] filename }
```

Parameter	Definition
IMAGE	The existing IPL image that you want to modify or replace. If you specify an image that does not exist, you will get an error.
FILE	The file that replaces the specified IPL image. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)

For example, to replace the image ISL2.MPEXL.SYS, enter:

```
sysfile>RIPL IMAGE=ISL2.MPEXL.SYS FILE=IPL2.MPEXL.SYS
```

To replace the native mode library

Use the RNMLIB command (abbreviated RN) to replace the system native mode library in NL.PUB.SYS. The syntax of the RNMLIB command is:

```
RNMLIB (RN) { [ FILE = ] filename }
```

If you do not enter the group and account name as part of the *filename* parameter, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)

For example, to replace NL.PUB.SYS with MYNL.PUB.SYS, enter:

```
sysfile>RNMLIB FILE=mynl.PUB.SYS
```

To replace a system program

Use the RSPROG command (abbreviated RS) to replace an existing system program. The syntax of the command is:

RSPROG (RS) { [PROG =] *programname* } { [FILE =] *filename* }

Parameter	Definition
PROG	The name of an existing system program. If you specify a file that does not exist, you will get an error.
FILE	The name of the file replacing the specified system program. If you do not enter the group and account name, it defaults the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the files.)

For example, to replace the file JOB in the PUB group of the SYS account with a program of the same name, enter:

```
sysfile>RSPROG PROG=JOB.PUB.SYS FILE=JOB.PUB.SYS
```

To use a segmented library file as CMSL

Use the CMSL command (abbreviated CM) to specify the segmented library file you want used as the compatibility mode segmented library (CMSL). The syntax of the CMSL command is:

CMSL (CM) { [SL =] *sname* }

If you do not enter the group and account name as part of the *sname* parameter, it defaults to the current group and account. (If you then run SYSGEN from a different group and account to create the system load tape, SYSGEN will not be able to find the file.) If you do not specify a segmented library, SYSGEN uses the default SL.PUB.SYS.

For example, To change the default SL.PUB.SYS to NEWSL.PUB.SYS, enter:

```
sysfile>CMSL SL=NEWSL.PUB.SYS
```

To list CMSL contents

Use the LCMSL command (abbreviated LCMSL) to list the contents of the compatibility mode segmented library (CMSL) or a single segment in the CMSL. The syntax of the LCMSL command is:

```
LCMSL (LC) { [ SEG = ] segmentname }
```

The *segmentname* parameter specifies the name of the segment you want to review. If you don't specify a segment, SYSGEN lists the entire contents of the CMSL.

For example, to list the contents of the segment IPCSEG, enter:

```
sysfile>LCMSL SEG=IPCSEG
```

Note

When you issue the LCMSL command, the system may appear to be down or programs will stop processing because the command locks whichever SL it is listing. If the CMSL is SL.PUB.SYS and you have made no changes to it (which force a temporary SL to be created), any program that uses the SL stops.

Defining Miscellaneous System Resources

You use the Miscellaneous (MISC) configurator to configure various types of file information that are difficult to categorize elsewhere. The MISC configurator handles changes to job-related and session-related items, processes, system resource allocations, spool parameters, stack and heap sizes, and other information.

In this chapter, you can find the following topics:

- entering the MISC configurator
- using the MISC configurator help facility
- showing current values
- configuring job related limits
- displaying local resource identification numbers (RINs)
- setting resource allocations
- setting session-related limits
- setting sizes of native mode and compatibility mode stacks
- setting strings and string parameters

Using the Miscellaneous Configurator

Use the MISC configurator to change miscellaneous system resources, such as resource identification numbers, job-related limits, session-related limits and the stack and heap sizes.

To access the MISC configurator

You make all miscellaneous system configuration changes from within the MISC configurator, which is one of the SYSGEN modules. To access the MISC configurator, do the following:

1. At the MPE prompt, enter:

SYSGEN

2. At the SYSGEN prompt (**sysgen>**), enter:

sysgen>MISC

When you first access the MISC configurator, you see a list of the commands available to you. To issue a command, you can either enter the full command name or the abbreviation shown in parentheses.

```
sysgen>MISC
```

```
  ** MISC configurator commands **
```

```
drin (dr)      io      job (jo)      lrin (lr)
resource (re)  session (se) show(sh)  stack (st)
system (sy)
```

```
clear (cl)(c)  exit (ex)(e)  help (he)(h)  hold (ho)
oclose (oc)    redo
```

```
misc>
```

Example 6-1. Accessing the MISC Configurator

To use online help

You can display helpful information about any of the MISC configurator commands on the screen. To do so, enter the **HELP** command at the **misc>** prompt in one of two forms:

- To get help for a specific command, type **HELP** and then the command name. For example, to display a description, the syntax, and examples of the **LRIN** command, enter:

misc:HELP LRIN

- To see a list of all the MISC configurator commands with a brief description of each one, simply enter **HELP** or **H**.

To show current values

Use the **SHOW** command (abbreviated **SH**) to display one or all of the items you can configure with the **MISC** configurator. The syntax of the **SHOW** command is:

$$\begin{array}{l} \text{SHOW (SH)} \left\{ \begin{array}{l} \text{[COMMAND =]} \left\{ \begin{array}{l} \text{IO} \\ \text{JOB} \\ \text{RESOURCE} \\ \text{SESSION} \\ \text{STACK} \\ \text{SYSTEM} \\ \text{ALL} \end{array} \right\} \end{array} \right\} \\ \text{[[DEST =] OFFLINE]} \end{array}$$

Parameter	Definition
IO	Displays the number of devices to reserve for dynamic configuration.
JOB	Displays the job-related limits and default operating points.
RESOURCE	Displays system resource allocation values.
SESSION	Displays the session-related limits of the system and the default operating points.
STACK	Displays the size of the NM stack, CM stack, and the heap.
SYSTEM	Displays the settings of various system resource values, the system ID, and logon and command interpreter prompts.
ALL	Lists all of the information described above.
OFFLINE	Redirects the output of the SHOW command to the SYSGEN listing file, SYSGLIST . Using OFFLINE does not immediately generate a print out. The information is sent to SYSGLIST until you either enter the OCLOSE command or exit SYSGEN . Exiting SYSGEN or using OCLOSE closes SYSGLIST and prints the file.

You can display one item or all items on screen, or you can print the information.

- To display all items, at the **misc>** prompt enter the **SHOW** command without any parameters or enter the command this way:

```
misc>SHOW ALL
```

- To display one item, at the MISC prompt (`misc>`), enter the `SHOW` command followed by the item you want to see. For example, to display job-related limits, enter:

```
misc>SHOW JOB
```

Below is an example of the kind of output you can expect.

misc>SHOW JOB				
JOB command	parameter	MAX	MIN	CURRENT
-----	-----	-----	-----	-----
DEFAULT CPU LIMIT	<code>cputime</code>	32767	0	0
MAXIMUM LIMIT	<code>maxlimit</code>	999	0	60
POOL SIZE	<code>pool</code>	200	1	1

Example 6-2. MISC Configurator SHOW Output

To print current values

Instead of displaying miscellaneous configuration information on screen, you can print it. To do so, add the `OFFLINE` parameter to the `SHOW` command. For example, to print information about the stacks, enter:

```
misc>SHOW STACK OFFLINE
```

To configure I/O-related parameters

The I/O-related parameters *mazdyninput* and *mazdynoutput* parameters are currently not used. Network Services uses the *mazdynio* parameter; you can change it only under the direction of Hewlett-Packard.

To configure job-related limits

Use the `JOB` command (abbreviated `J0`) to configure job-related limits and default operating modes. The syntax of the command is:

```
JOB (J0) [ [ CPUTIME = ] secondcount ]
          [ [ MAXLIMIT = ] maximumjoblimit ] [ [ POOL = ] poolsize ]
```

Parameter	Definition
<code>CPUTIME</code>	Sets the default CPU time limit for batch jobs.
<code>MAXLIMIT</code>	Sets the maximum job limit that may be set through the <code>LIMIT</code> command.
<code>POOL</code>	Is the number of pre-created JSMAIN processes ready to be used when someone logs on.

Table 6-1. Values for JOB Parameters

Parameter	Minimum	Maximum
CPUTIME	0	32767
MAXLIMIT	0	999
POOL	1	200

For example, to change the parameter CPUTIME to 600 (using keyword parameters), enter:

```
misc>JOB CPUTIME=600
```

Or, to change all parameters, enter:

```
misc>JOB CPUTIME=500 MAXLIMIT=10 POOL=150
```

To enter the same command using positional parameters, enter:

```
misc>JOB 500 10 150
```

To display resource identification numbers (RINs)

Use the LRIN command (abbreviated LR) to display RIN ownership. You can either display the information on screen or use the OFFLINE parameter to print it.

- To display the information on screen, at the misc> prompt, enter:

```
misc>LRIN
```

- To print the information, at the misc> prompt enter:

```
misc>LRIN OFFLINE
```

```
misc>OCLOSE
```

The OFFLINE parameter redirects the output to the file SYSGLIST; the OCLOSE command closes SYSGLIST and prints the information.

The resource ownership information you see depends on your system, but it will look similar to this:

```
rin      username
-----
3        MANAGER .SYS
148      MANAGER .QASYS
149      MANAGER .QASYS
150      MANAGER .QASYS
```

To delete RINs

Use the DRIN command (abbreviated D) to delete one or more global resource identification numbers. Any changes you make take effect only if you create a system load tape and use it to update the configuration with UPDATE CONFIG or to install the system with INSTALL. The syntax of the DRIN command is:

```
DRIN (DR) [ [ GLOBAL = ] globalrinnumber ]
```

You can delete either one RIN or a group of RINs:

- To delete a single RIN, enter the DRIN command and the global number. For example, to delete RIN 4, enter:

```
misc>DRIN 4
```

- To delete a group of RINs, enter the DRIN command and the RIN numbers enclosed in parentheses and separated by commas. For example, to delete RINs 1,2,3,4,15, and 84, enter:

```
misc>DRIN (1,2,3,4,15,84)
```

To set resource allocations

Use the RESOURCE command (abbreviated RE) to allocate system resources. Any changes you make take effect only if you create a system load tape and use it to update the configuration with UPDATE CONFIG or to install the system with INSTALL.

The syntax of the RESOURCE command is:

```
RESOURCE (RE) [ [ GRINS = ] globalrinallocation ]  
[ [ RINS = ] totalrinallocation ] [ [ IOMONT = ] iomonitortablesize ]  
[ [ MAXCMCODE = ] cmcodesegmentsize ]  
[ [ CMSEGS = ] cmcodesegsperproc ]  
[ [ MAXXDATA = ] maxsizeofxdataseg ]  
[ [ XDATAPERPROC = ] maxdatasegs/proc ]
```

Parameter	Definition
GRINS	Sets the number of global RINs to be allocated.
RINS	Sets the total number of global and local RINs to be allocated.
IOMONT	Sets the size of the I/O monitor area.
MAXCMCODE	Sets the maximum CM code segment size allowed for any given process.
MAXXDATA	Sets the maximum extra data segment size allowed.
XDATAPERPROC	Sets the maximum number of extra data segments for any given process.

Table 6-2. Values for RESOURCE Parameters

Parameter	Minimum	Maximum
GRINS	1	1365
RINS	5	5459
IOMONT	10	100
MAXCMCODE	1024	16384
CMSEGS	1	255
MAXXDATA	0	32764
XDATAPERPROC	0	255

For example, to allocate 100 global RINS, at the `misc>` prompt enter:

```
misc>RESOURCE GRINS=100
```

Or, to allocate 40 global RINs and set the IO monitor area to 80 (using keyword parameters), enter:

```
misc>RESOURCE GRINS=40 IOMONT=80
```

To allocate the same resources (using positional parameters), enter:

```
misc>RE,,80 1024
```

To set session-related limits

Use the `SESSION` command (abbreviated `SE`) to configure session-related limits and default operating points. The syntax of the `SESSION` command is:

$$\text{SESSION (SE)} \left\{ \begin{array}{l} \text{[MAXLIMIT =] } \textit{maximumsessionlimit} \\ \text{[LOGONTIMEOUT =] } \textit{timeinseconds} \\ \text{[CITIMEOUT =] } \textit{timeinminutes} \\ \text{[POOL =] } \textit{poolsize} \end{array} \right\}$$

Parameter	Definition
MAXLIMIT	Sets the maximum session limit.
LOGONTIMEOUT	Sets the number of seconds a user has to log on to the system.
CITIMEOUT	Sets the number of minutes a user may be inactive at the terminal before being automatically logged off the system. A value of zero prevents automatic log off.
POOL	Is the number of precreated JSMAIN processes ready to be used when someone logs on.

Table 6-3. Values for SESSION Parameters

Parameter	Minimum	Maximum
MAXLIMIT	1	2700
LOGONTIMEOUT	10	2700
CITIMEOUT	0	546
POOL	1	200

For example, to change the **MAXLIMIT** to 200 and the **LOGONTIMEOUT** to 150 (using keyword parameters), enter:

```
misc>SE MAXLIMIT=200 LOGONTIMEOUT=150
```

To set the same limits using positional parameters, enter:

```
misc>SE 200 150
```

To set sizes of NM and CM stacks

Use the **STACK** command (abbreviated **ST**) to configure the default sizes of the native mode (NM) and compatability mode (CM) stacks and of the heap.

The syntax of the **STACK** command is:

STACK (ST) $\left\{ \begin{array}{l} [\text{NM} =] \text{defaultnmstacksize} \\ [\text{MAXNM} =] \text{maxsizeofnmstacksize} \\ [\text{CM} =] \text{defaultcmstacksize} \\ [\text{MAXCM} =] \text{maxsizecmstack} \\ [\text{HEAP} =] \text{defaultnmheapsize} \\ [\text{MAXHEAP} =] \text{maxsizeofnmheap} \end{array} \right\}$

Parameter	Definition
NM	Sets the default NM stack size, which is expressed in bytes. The NM value must be less than the value of MAXNM (see below).
MAXNM	Sets the maximum NM stack size, which is expressed in bytes.
CM	Sets the default CM stack size, which is expressed in CM words (16 bits in length). The value set for the CM parameter must be less than the value set for the MAXCM parameter (see below).
MAXCM	Sets the maximum allowable CM stack size.
HEAP	Sets the default heap size, which is expressed in bytes. The value must not exceed MAXHEAP (see below).
MAXHEAP	Sets the maximum heap size, which is expressed in bytes.

Table 6-4. Values for STACK Parameters

Parameter	Minimum	Maximum
NM	262144	MAXNM
MAXNM	262144	1068498944
CM	256	4096
MAXCM	256	31232
HEAP	524288	MAXHEAP
MAXHEAP	524288	1068498944

For example, to change the HEAP parameter to 600000, enter:

```
misc>STACK HEAP=600000
```

Or, to change the stack and heap sizes (using keyword parameters), enter:

```
misc>STACK NM=262144 MAXNM=262144 HEAP=600000
```

To make the same changes (using positional parameters), enter:

```
misc>STACK 262144 262144,,600000
```

To set strings and string parameters

Use the SYSTEM command (abbreviated SY) to set the logon prompt string, the command interpreter prompt string, and to set the version. The syntax of the SYSTEM command is:

$$\text{SYSTEM (SY)} \left\{ \begin{array}{l} \text{USERVERSION} =]x.yy.zz \\ \text{LOGONPROMPT} =]promptstring \\ \text{CIPROMPT} =]promptstring \end{array} \right\}$$

Parameter	Definition
USERVERSION	Allows the system manager to identify the system with a version meaningful to your environment. This might identify some combination of third-party products.
LOGONPROMPT	Sets the system prompt.
CIPROMPT	Sets the default prompt used by the command interpreter.

For example, to change the user version to A.A1.35, enter:

```
misc>SYSTEM USERVERSION=A.A1.35
```

Note

If you change the user version, you must save it to something other than the CONFIG group in the SYS account or it will be lost. The changed USERVERSION takes effect only if you create a system load tape containing the changes and use it to update the system.

To change the command interpreter prompt from the default (:) to BORG, enter:

```
misc>SY CIPROMPT=BORG
```

To include special characters in either the logon prompt or the command interpreter prompt, enclose them in single or double single quotes. For example:

```
misc>SY LOGONPROMPT='DOUG''S' CIPROMPT='FRED''S'
```

Using Threshold Manager

You use the Threshold Manager utility to monitor the internal operating system resources that can lead to a system abort when they reach critical levels of utilization. Threshold Manager can simply notify you whenever a monitored resource exceeds user-defined levels (allowing you to choose a course of action), or, it can prevent new job and session logons when the system reaches the critical level.

This chapter teaches you how to use Threshold Manager. It includes the following topics:

- starting (entering) and exiting Threshold Manager
- enabling and disabling Threshold Manager
- using online help
- resetting the configuration
- turning global notifications on and off
- displaying the configuration as a list and graphically
- printing current configuration information
- turning resource monitoring on and off
- adding, deleting and modifying a threshold
- modifying the interval time of an operation cycle
- monitoring Threshold Manager with OpenView Manager and personalizing the OVC icon

Threshold Manager runs on any Hewlett-Packard Precision Architecture HP 3000 system that has been updated to MPE/iX version C.50.00 (release 5.0 or later). No additional hardware is needed.

Getting Started with Threshold Manager

This section teaches you how to access the Threshold Manager utility and display the **Thmgr:** prompt. You learn how to enable (turn on) and disable (turn off) threshold management. This section includes a sample global configuration display that is similar to what you see on your system console. Finally, you learn how to exit the Threshold Manager utility.

To access Threshold Manager

Before you can enable or disable threshold management, or execute any of the other Threshold Manager commands available to you, you must access the Threshold Manager utility. To do so, enter the following command at the MPE prompt:

```
:RUN THMGR.PUB.SYS
```

You will see the following prompt:

```
Thmgr:
```

You can enter any of the Threshold Manager commands at the **Thmgr:** prompt. For an overview of the commands, read “Using Threshold Manager Commands” later in this chapter.

To enable Threshold Manager

To turn on (enable) Threshold Manager, enter the following command at the **Thmgr:** prompt:

```
Thmgr: ENABLEMANAGER
```

If this is the first time you have enabled Threshold Manager, it uses the *default* configuration installed at the factory. If not, and you have made any configuration changes while Threshold Manager was disabled, they will now take effect.

To study resource usage on your system, enter the following command at the **Thmgr:** prompt:

```
Thmgr: SHOW
```

Read the **CV%** column in the global configuration display. An example of this display appears on the next page, with the figure callouts described on the page that follows.

Note

If you prefer, you can also observe current resource usage as a graph by entering the **DISPLAY** command at the Threshold Manager prompt. To see resource usage as a graph, Threshold Manager must be enabled.

Threshold Manager Global Configuration Display											
Threshold Manager:			Global Notification:						Interval:		
Enabled			Enabled						120		
(E/D)	Resource Name	CV%	Th V%	Notf	Ctrl	Th V%	Notf	Ctrl			
E	ACCESS_RIGHTS	25	45	X							
E	CM_CODE_SEGMENTS	15	40	X		90	X	X			
E	CM_DATA_SEGMENTS	30	50	X		70	X				
E	CM_PHYSICAL_CODE_SEGMENTS	41	50	X		70	X				
E	CM_PORTS_COMPLETION	27	50	X							
E	CM_PORTS	25	50	X		70	X				
E	FILE_DESCRIPTOR	32	50	X		70	X				
E	FILE_EXTENTS	20	50	X							
D	I/O_NOTIFICATIONS										
E	I/O_REQUESTS	15	50	X		88	X				
E	LOCALITY_LIST_ENTRIES	23	50	X							
E	MEMORY_INFORMATION_BLOCKS	15	50	X		70	X				
E	PROCESS_INFORMATION_BLOCKS	18	50	X		70	X				
E	SHARED_GLOBAL_SPACE	27	50	X		70	X	X			
E	SYS_VOL_SET_PERMANENT_SPACE	33	50	X	X	70	X				
E	SYS_VOL_SET_TRANSIENT_SPACE	31	50	X		70	X				
E	TIMER_REQ_LIST	20	50	X							
E	TIMERS	15	50	X		70	X				
E	VIRTUAL_SPACE_CACHE	35	50			70					
E	VIRTUAL_SPACE_OBJECTS	40	50	X		70	X				
E	VIRTUAL_STORAGE	10	50	X		70	X				

The numbered elements of the Threshold Manager Global Configuration Display shown on the previous page are described below.

1. Indicates if Threshold Manager is enabled or disabled.
2. Indicates if notifications are enabled or disabled at the global level.
3. Indicates the time elapsed (in seconds) between each Threshold Manager operating cycle.
4. Indicates if monitoring of an individual resource is enabled or disabled.
5. Indicates the names of the resources monitored by Threshold Manager.
6. Indicates the current consumption of a resource. The current value is indicated as a percentage (%) of the total resource. It takes one time interval to refresh the current value. When Threshold Manager is initially enabled, zeroes appear in this column until the first operating cycle is complete.
7. Indicates the level at which the first (or only) threshold has been set. The value is indicated as a percentage (%) of the total resource.
8. An X in this column indicates a notification has been set for a specific resource at this threshold level.
9. Indicates the level at which the second threshold (if present), has been set. The value is indicated as a percentage (%) of the total resource.
10. An X in this column indicates a notification has been set for a specific resource at this second threshold level.
11. An X in this column indicates if a control has been set for a specific resource at this second threshold level.

To disable Threshold Manager

Use the **DISABLEMANAGER** command to turn off, or disable, threshold management on your system. Once you execute this command, the effects of the controls that have been executed are reversed or nullified, the system no longer monitors resources and returns to its normal state.

To turn off Threshold Manager, at the **Thmgr:** prompt enter:

Thmgr: DISABLEMANAGER

To exit Threshold Manager

To exit Threshold Manager, enter the following command at the `Thmgr:` prompt:

`Thmgr: EXIT`

You will see the MPE prompt displayed on the screen.

This command does not stop the Threshold Manager program. If Threshold Manager is active, it will remain active after you issue the `EXIT` command.

Using Threshold Manager Commands

This section introduces you to Threshold Manager commands and teaches you how to get helpful information about them. You also learn how to review the command line history stack and to reissue a command you have previously entered, either as is or with modifications.

Overview of Threshold Manager commands

The Threshold Manager commands have the following major functions:

- to control the Threshold Manager tool
- to control monitoring of system resources
- to set threshold configuration

When you enter a command at the `Thmgr:` prompt, Threshold Manager validates it, posts it directly to the configuration file, and sends the command to the Threshold Manager process if it is active. If it is not active, the command is saved in the configuration file until you enable Threshold Manager, at which point it is sent to the process.

Note

All threshold commands are case-insensitive. All parameters are positional.

The table on the next page briefly explains the commands you can execute at the Threshold Manager prompt. You can enter the full command (for example, `EXIT`) or use the short version shown in parentheses following the command name (for example, `E` in place of `EXIT`).

Table 7-1. Threshold Manager Commands

Name	Description
ADDTHRESHOLD (AT)	Adds a threshold to one of the resources.
DELETETHRESHOLD (DT)	Deletes a threshold from a resource.
DISABLEMANAGER (DM)	Turns off (disables) Threshold Manager.
DISABLENOTIFY (DN)	Suppresses messages at the global level.
DISABLERESOURCE (DR)	Tells Threshold Manager to ignore a resource and its associated threshold values.
DISPLAY (DP)	Shows the current usage of each resource and the associated threshold values in a graphic mode.
DO	Allows user to re-execute any command still retained in the command line history stack.
ENABLEMANAGER (EM)	Turns on (enables) Threshold Manager.
ENABLENOTIFY (EN)	Allows (enables) all notification messages to be sent to the system console.
ENABLERESOURCE (ER)	Activates the monitoring of a resource.
EXIT (E)	Takes you back to the MPE/iX prompt.
HELP (H)	Provides on-line help about each command.
LISTREDO	Displays the contents of the command line history stack.
MODIFYINTERVAL (MI)	Changes the time interval between each operation cycle.
MODIFYTHRESHOLD (MT)	Allows changes on a threshold value, a control or notification associated with a resource.
REDO	Allows the user to edit and reexecute any command still retained in the command line history stack.
RESET (RS)	Changes all threshold values to the initial configuration as delivered with the product.
SHOW (SH)	Displays the configuration file or the configuration for an individual resource.
USE	Executes a specified file until EOF.

To use online help

You can display helpful information about any of the Threshold Manager commands on the screen. To do so, enter the **HELP** command at the **Thmgr:** prompt in one of two ways:

- To get help for a specific command, type **HELP** and then the command name. For example, to display a description, the syntax, and examples of the **ADDTHRESHOLD** command, enter:

Thmgr:HELP ADDTHRESHOLD

- To see a list of all the Threshold Manager commands with a brief description of each one, simply enter **HELP** or **H**.

To reissue a command using DO

Use the **DO** command to edit and reissue a command held in the command line history stack. This command functions like the **MPE/iX** commands of the same name.

You use the **DO** and **REDO** commands for the same purpose. The difference between them is that **REDO** allows interactive editing of the command whereas **DO** requires that you enter the changes to the command once, as the parameter *editstring*.

The syntax is shown below:

DO [CMD=*cmdid*] [;EDIT=*editstring*]

Parameter	Definition
<i>cmdid</i>	The command to re-execute. You may specify the command by its relative or absolute order in the command line history stack, or by name (as a string) in whole or in part. The default is -1, the most recent command. Threshold Manager detects an error if <i>cmdid</i> does not exist in the command line history stack.
<i>editstring</i>	The editing you want performed on <i>cmdid</i> before Threshold Manager reissues it. If you specify <i>editstring</i> , it must appear, character for character, and space for space, exactly as it would if you were using the REDO command in interactive mode. If you omit <i>editstring</i> , Threshold Manager re-executes the command immediately, with no changes.

You must surround *cmdid* and *editstring* by quotation marks (either " or ') if they contain any delimiters such as ; " ' [,], =, or a space.

To reissue a command using REDO

Use the REDO command to edit and reissue a command held in the command line history stack. This command functions like the MPE/iX command of the same name.

You use the DO and REDO commands for the same purpose. The difference between them is that REDO allows interactive editing of the command that you want to reissue and DO does not.

The syntax is:

```
REDO [ [ CMD= ] cmdid ] [ [ ;EDIT= ] editstring ]
```

Parameter	Definition
<i>cmdid</i>	The command to execute. You may specify the command by its relative or absolute order in the stack, or by name (as a string). The default is -1, the most recent command.
<i>editstring</i>	A string specifying the first of one or more editing changes to <i>cmdid</i> before the system displays it on your terminal. You must surround the edit string by quotation marks (" ") if it contains any scanner/parser delimiters such as: , ; " ' [] or = or spaces. After the edited command is displayed, you may continue to make further changes. When it looks the way you want, enter Return to execute the command. If you omit <i>editstring</i>, you can edit the command line interactively and then reissue the command.

For example, to edit the most recent command beginning with the string "PAS", you enter REDO MOD. Or, to edit the second-to-last command on the stack (one command before the most recent), you enter REDO -2.

To review the command line history stack

Use the LISTREDO command to display the contents of the command line history stack along with an index to each command. By default, the display order is from the earliest command to the most recent command. This command functions like the MPE/iX command of the same name.

You can issue this command at the Thmgr: prompt or from a job. The syntax is:

```
LISTREDO [ START=m ] [ ;END=n ] [ ;OUT=outfile ] [ ; { ABS  
REL  
UNN } ]
```

Parameter	Definition
START or END	Specifies the range of commands to be displayed.
OUT	Sends the listing to a disk file named <i>outfile</i> instead of to a terminal. New disk files are created TEMP . File equations are ignored, unless <i>outfile</i> is preceded by an asterisk (*). You must use a file equation to overwrite a permanent file.
ABS	Displays the commands in their absolute order (the order in which they were entered). ABS is the default.
REL	Displays the commands in their relative sequence (from -m to -1), where -1 denotes the most recent command in the stack.
UNN	Suppresses numbering of the commands during display.

For example, if there are three commands in the history stack and the third command is LISTREDO, you will see:

- 1) COMMANDONE
- 2) COMMANDTWO
- 3) LISTREDO

To execute a file from Threshold Manager

Use the USE command to execute each line of a specified file until it reaches the end (EOF). The syntax is:

USE { *FileName* }

You must specify *FileName*, which can be the name of any valid file that you want to execute and to which you have **READ** access. For example, to execute a file named *myfile*, enter:

Thmgr: USE myfile

Controlling Threshold Management at the Global Level

This section explains how to control resource monitoring, the timing of operation cycles, and how to display information in a variety of ways with Threshold Manager. Specifically, you learn to:

- turn on and off the display of notifications, which are messages that Threshold Manager sends to the system console
- display configuration information on screen as a list or graphically
- print a list of configuration information
- turn on and off monitoring of individual resources
- reset the configuration to the initial values
- change the time interval between Threshold Manager's operation cycles
- use Threshold Manager with OpenView System Manager

To control global notifications

You use two Threshold Manager commands, **ENABLENOTIFY** and **DISABLENOTIFY**, to control the display of global notifications on the system console. **ENABLENOTIFY** displays information and **DISABLENOTIFY** prevents the display of information about system resource usage.

You can enter either command at the Threshold Manager prompt or from a job. There are no parameters for the commands.

- To enable global notifications, at the **Thmgr:** prompt enter **ENABLENOTIFY** or type **EN**.
- To disable global notifications, at the **Thmgr:** prompt enter **DISABLENOTIFY** or type **DN**.

Using these commands does not affect the configuration of an individual resource. You must set notification to **YES** for a resource with the **MODIFYTHRESHOLD** command to see information about that resource. Or, to suppress information about some, but not all, resources, use the **MODIFYTHRESHOLD** command to disable notification for the individual resources that you want to ignore. (For more information, read “To Modify a Threshold” later in this chapter.)

To display the configuration

You can display information about the Threshold Manager configuration as a list or graphically.

- To display a complete list of configuration information, at the **Thmgr:** prompt enter **SHOW** (or type **SH**).
- To display the configuration for an individual resource, enter the **SHOW** command followed by the name of the resource you want to view. For example, to display the configuration for the *File_Extents* resource, at the **Thmgr:** prompt enter:

Thmgr: **SHOW File_Extents**

- To see a graphic display of the configuration, at the **Thmgr:** prompt enter **DISPLAY** (or type **DP**). The display remains on the screen until you type **EXIT** (or **E**).

Note

You can only use the **DISPLAY** command interactively; you cannot issue the command from a job.

To print the configuration display

Instead of displaying the configuration on screen, you can print a list of configuration information. To do so, you redirect the output to a file and then print it by following these steps:

1. At the MPE prompt, create a file equation by entering:
:FILE THMGROUT;REC=-80,,F,ASCII;DISC=5000
2. Type RUN THMGR.PUB.SYS to access the Threshold Manager.
3. At the **Thmgr:** prompt, type the SHOW command.
4. Type EXIT to exit Threshold Manager.
5. Print the THMGROUT file

To enable monitoring of a resource

Use the ENABLERESOURCE command to turn on monitoring of a resource. Once you enable monitoring, Threshold Manager monitors the thresholds associated with the resource and, depending upon how it is configured, displays messages on the console and/or controls job and session logons.

You can issue the ENABLERESOURCE command at the **Thmgr:** prompt or from a job. The syntax of the command is:

ENABLERESOURCE (ER) [RESOURCE=]{ *ResourceName* }

The only parameter, *ResourceName*, must be any of the resources listed when you issue the SHOW command. For example, to enable monitoring of the resource *Timers*, at the **Thmgr:** prompt enter:

Thmgr: ENABLERESOURCE Timers

To disable monitoring of a resource

Use the DISABLERESOURCE command to turn off monitoring of a resource. Once you disable monitoring, Threshold Manager no longer monitors the thresholds associated with the resource and does not display messages on the console or control job and session logons.

You can issue the DISABLERESOURCE command at the Threshold Manager prompt or from a job. The syntax of the command is:

DISABLERESOURCE (DR) [RESOURCE=]{ *ResourceName* }

The only parameter, *ResourceName*, must be any of the resources listed when you issue the SHOW command. For example, to disable monitoring of the *IO_Requests* resource, at the **Thmgr:** prompt enter:

Thmgr: DISABLERESOURCE IO_Requests

Once you have disabled monitoring of a resource, the global configuration display shows the resource name with a D (for disabled) in the left column; all other columns for that resource remain empty.

Note

DISABLERESOURCE is one of three commands that you can use to disable monitoring with Threshold Manager. Each one works at a different level. You can disable Threshold Manager at the global level (DISABLEMANAGER), at the resource level (with this command, DISABLERESOURCE), and at the threshold level (DELETETHRESHOLD).

To reset the configuration

Use the RESET command to overwrite all changes to the configuration file and restore it to the preset factory values. This command lets you return to a known starting point when you need to create a customized configuration that best suits your site.

You can issue this command at the Threshold Manager prompt or from a job.

To reset the configuration, at the **Thmgr:** prompt, enter RESET or type RS.

To modify the time interval of the operation cycle

Use the MODIFYINTERVAL command to change the time interval between Threshold Manager's operation cycles.

The syntax for the MODIFYINTERVAL command is:

```
MODIFYINTERVAL (MI) [ INTERVAL= ] { intervaltime }
```

The interval is an integer representing the number of seconds between cycles. You can enter any value between 25 and 3600 seconds. If you modify the interval when the factory-provided (default) configuration is active, Threshold Manager does not save the value when you reboot.

For example, to change the time interval from 120 seconds to 60 seconds, at the **Thmgr:** prompt enter:

```
Thmgr: MODIFYINTERVAL 60
```

To monitor Threshold Manager with OpenView System Manager

HP OpenView System Manager is an HP OpenView Windows application that provides a single integrated console to manage multiple HP 3000 computers in a network.

HP OpenView System Manager is shipped with a sample systems oriented map, configured for one system, which can be used as a starting point for customizing your systems oriented operation's environment. The task map contains an icon labelled MPE/iX. By default, you manage Threshold Manager through this icon.

We recommend that you create a customized icon for Threshold Manager. This will allow you to monitor Threshold Manager notifications without the clutter created by messages from other applications and peripherals monitored through the MPE/iX icon. To create a customized icon for Threshold Manager, please refer to *HP OpenView System Manager Manager's Guide (36936-61002)*. In chapter 1, *Introduction to HP OpenView System Manager*, you will find a list of icons available for customization. Chapter 1 also contains information on customizing your OpenView environment. You will need the Threshold Manager identification number for HP OpenView System Manager, which is 216, to customize an icon.

Note

For detailed information on how to use OpenView System Manager, please refer to *HP OpenView System Manager Manager's Guide (36936-61002)*

Configuring a Threshold

You use three commands to configure thresholds on your system.

- To add a threshold, use the **ADDTHRESHOLD** command
- To delete a threshold, use the **DELETETHRESHOLD** command
- To change the configuration of a threshold, use the **MODIFYTHRESHOLD** command

Before you change a threshold in any way, you may want to issue the **SHOW** command for the resource to see the current settings. For example, to display the state of the *File_Extents* resource, at the **Thmgr:** prompt enter:

Thmgr: SHOW File_Extents

To add a threshold

Use the **ADDTHRESHOLD** command to add a maximum of two thresholds to a resource monitored by Threshold Manager. If this is the first time you are adding a threshold to a resource, you can also enter your choices for notification and control. (Later, if you need to change any of the parameters for the threshold, you can do so with the **MODIFYTHRESHOLD** command.)

You can issue the **ADDTHRESHOLD** command at the **Thmgr:** prompt or from a job. The syntax is:

```
ADDTHRESHOLD (AT) [ RESOURCE= ] { ResourceName }  
[ THRESHOLD= ] { ThresholdValue }  
[ NOTIFY= ] { YES  
              NO } [ CONTROL= ] { JOB_SESSION_CONTROL  
                                  NULL_CONTROL }
```

Parameter	Definition
RESOURCE	One of the list of valid resource names displayed when you issue the SHOW command.
THRESHOLD	An integer value that indicates the resource limit expressed as a percentage. For example, a value of 80 indicates that the threshold is set at 80% of capacity.
NOTIFY	One of two responses, YES , which enables notification (i.e., displays messages on the system console when this resource exceeds the threshold) or NO , which disables notification. The default is YES .
CONTROL	One of two responses, JOB_SESSION_CONTROL , which limits job and session logons if the threshold is crossed, and NULL_CONTROL , which does not limit job and session logons. The default is NULL_CONTROL .

For example, to add an 80% utilization level threshold to the *locality_list_entries* resource, enter:

Thmgr: ADDTHRESHOLD Locality_List_Entries 80 YES JOB_SESSION_CONTROL

In this example, the last two parameters, **YES** and **JOB_SESSION_CONTROL** indicate the type of resource control for *Locality_List_Entries*. If this resource exceeds 80% utilization, then:

- a message will appear on the console (unless notifications have been disabled globally, in which case no threshold information appears on the console)
- no new users or jobs will be able to log onto the system

The default for notification is **YES**; the default for control is **NULL_CONTROL** (which means that Threshold Manager does not prohibit new jobs and sessions when a threshold has been crossed). To add a new threshold that uses these defaults, it isn't necessary to specify the parameters. So, for example, to add a 60% utilization threshold to the *CM_Ports* resource, at the **Thmgr:** prompt enter:

Thmgr: ADDTHRESHOLD CM_Ports 60

In this example, when the *CM_Ports* resource exceeds the 60% utilization level, the system displays a message to that effect but continues to permit job and session logons.

Note

Before you configure Threshold Manager, it is important to understand the effect on the system when the **JOB_SESSION_CONTROL** is associated with a threshold. When such a threshold is exceeded, no users can log onto the system. To quickly override this control, enter the **DISABLEMANAGER (DM)** command.

To delete a threshold

Use the **DELETETHRESHOLD** command to delete a threshold from a resource and to cancel all notification and control options associated with the resource.

You can enter the command at the **Thmgr:** prompt or from a job. The syntax is:

```
DELETETHRESHOLD (DT) [RESOURCE=] { ResourceName }  
[THRESHOLD=] { ThresholdValue }
```

Parameter	Definition
RESOURCE	One of the list of valid resource names displayed when you issue the SHOW command.
THRESHOLD	An integer value that indicates the resource limit expressed as a percentage. For example, a value of 80 indicates that the threshold is set at 80% of capacity.

For example, to delete an 80% threshold from the *Shared_Global_Space* resource, enter:

```
Thmgr: DELETETHRESHOLD Shared_Global_Space 80
```

To modify a threshold

Use the **MODIFYTHRESHOLD** command to modify any of the system resources controlled by Threshold Manager. You can change any or all of the following:

- one of the threshold values for the resource
- the control, so that Threshold Manager either does, or does not, permit new jobs and sessions to log on once the threshold is exceeded
- the notification, so that Threshold Manager either displays or suppresses notifications about the threshold.

You can enter the **MODIFYTHRESHOLD** command at the **Thmgr:** prompt or from a job. The syntax is:

```
MODIFYTHRESHOLD (MT) [RESOURCE=] { ResourceName }  
  
[OLDTHRESHOLD=] { OldThresholdvalue } [NEWTTHRESHOLD=]  
{ NewThresholdvalue } [NOTIFY=] { YES } [CONTROL=]  
{ JOB_SESSION_CONTROL }  
{ NULL_CONTROL }
```

Parameter	Definition
RESOURCE	One of the list of valid resource names displayed when you issue the SHOW command.
OLDTHRESHOLD	The existing threshold for this resource, which is a percentage value expressed as an integer. This is a required parameter.
NEWTTHRESHOLD	The new threshold for this resource, which is a percentage value expressed as an integer. If you do not want to modify the threshold, but want to modify control or notification, enter positional commas for this parameter.
NOTIFY	One of two responses, YES , which enables notification (i.e., displays messages on the system console when this resource exceeds the threshold) or NO , which disables notification. The default is YES .
CONTROL	One of two responses, JOB_SESSION_CONTROL , which limits job and session logons if the threshold is crossed, and NULL_CONTROL , which does not limit job and session logons. The default is NULL_CONTROL .

For example, to change the utilization threshold for the *File_Descriptors* resource from the 80% to the 85% level, enter:

Thmgr: MODIFYTHRESHOLD *File_Descriptors* 80 85

Or, for example, to change the control for the *Virtual_Storage* resource from off to on, enter:

Thmgr: MODIFYTHRESHOLD *Virtual_Storage* 80 80 ,,JOB_SESSION_CONTROL

Since all parameters are positional, you can choose how to enter multiple parameters for a Threshold Manager command. For example, to change notification for the *Virtual_Space_Cache* resource from off to on, you can specify each parameter explicitly (including those values you are not changing) by entering:

Thmgr: MODIFYTHRESHOLD *Virtual_Space_Cache* 80 80 YESNULL_CONTROL

Or, you can use commas for the parameters that you are not going to modify, and enter this instead:

Thmgr: MT *Virtual_Space_Cache* 80 ,, YES

Note

Before you configure Threshold Manager, it is important to understand the effect on the system when the **JOB_SESSION_CONTROL** is associated with a threshold. When such a threshold is exceeded, no users can log onto the system. To quickly override this control, enter the **DISABLEMANAGER (DM)** command.

Allowing Access to the System

An important part of your job as system manager is to choose how to organize the information on your computer system. Traditionally, MPE systems used accounts, groups and users to structure and allow access to information. With release 4.5 of the operating system, MPE/iX enhancements now implement features of POSIX, the IEEE portable operating system interface standard. One such feature is the Hierarchical File System, or HFS, which organizes accounts, groups and users under a single root directory and allows the creation of additional directories to implement a multi-level file system.

This chapter introduces you to the Hierarchical File System and other features of POSIX that you need to know to organize and allow access to the information on your computer system. It also gives you information on the following topics:

- creating accounts, groups, and users
- creating and working with directories
- changing passwords
- assigning capabilities, user IDs and group IDs
- limiting accounts and groups
- setting file space limit for the HPSP00L account
- specifying file access permissions
- securing disk files
- changing security defaults

Introducing POSIX

POSIX, or Portable Operating System Interface, is a set of standards describing the functions of an operating system interface. Initially, MPE/iX is implementing two of the standards to maximize the software portability of applications: C language application programming interfaces (also called POSIX.1) and a command interpreter (shell) and utilities (called POSIX.2).

The initial implementation of POSIX.1 makes MPE/iX POSIX compatible. That is, it supports most of the key POSIX features and introduces important changes into the MPE/iX operating system, including:

- A hierarchical file system (HFS) which allows you to create multilevel data hierarchies.
- An expanded file-naming syntax that allows for longer names, mixed case alphabetic characters and special characters.
- A new user environment, the MPE/iX shell, that provides a set of commands and utilities in a UNIX-like environment. The shell is an addition to the MPE/iX command interpreter, not a replacement for it.
- Enhancements to the accounting and security systems including user and group IDs, file ownership, and four new ACD access modes.
- The ability to rename and move files across account boundaries and have a greater measure of control over files and directories on the system.

When MPE/iX Release 4.5 (or later) is installed, you automatically have access to POSIX functionality. No additional configuration is required for you to use many of the POSIX features.

The following sections introduce the POSIX changes affecting system management. For a more complete discussion of the new features, read *New Features of MPE/iX: Using the Hierarchical File System* (32650-90351).

The Hierarchical File System (HFS)

Before Release 4.5, the MPE/iX file system was limited to three levels: accounts, groups, and files. Figure 8-1 is a simple example of the traditional file system structure.

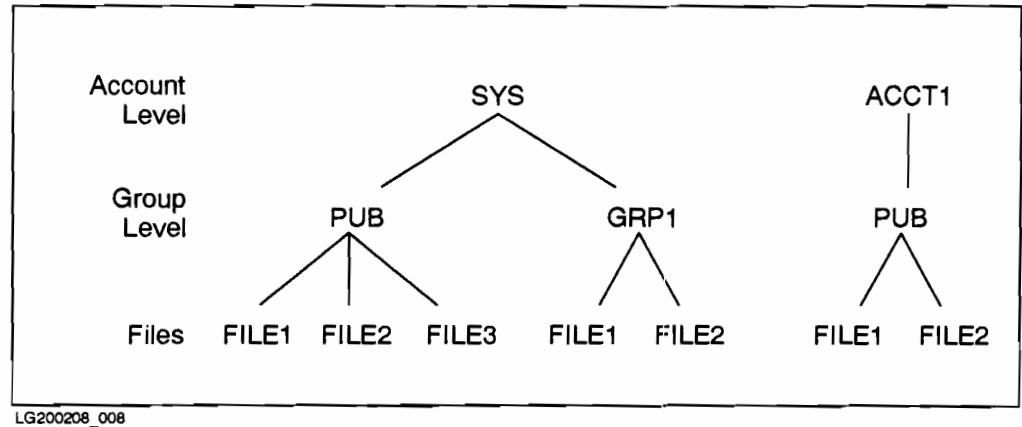


Figure 8-1. MPE/iX File System (Prior to Release 4.5)

Beginning with MPE/iX Release 4.5, a hierarchical directory structure was integrated with the traditional file system. In this system, all components exist under one root directory, designated as **/**. Additional directories, which contain files and other directories, can exist anywhere in the file system.

MPE/iX accounts and groups are considered to be special directories that, while they fit into the hierarchical scheme, continue to serve as traditional MPE accounts and groups. To ensure that the classic MPE file system view still exists, accounts can only be created under the root directory, and groups can only be created under accounts.

Figure 8-2 shows the MPE/iX hierarchical file system structure. The boxed portion shows how the traditional account, group, and file system structure fits into the HFS structure. Hierarchical directories and HFS files can now fall under traditional MPE groups. For example, the figure shows **lowercase_file** as being located in the **PUB** group of the **ACCT1** account. Also notice that the directory **dir3** falls under the **GRP1** group in the **SYS** account.

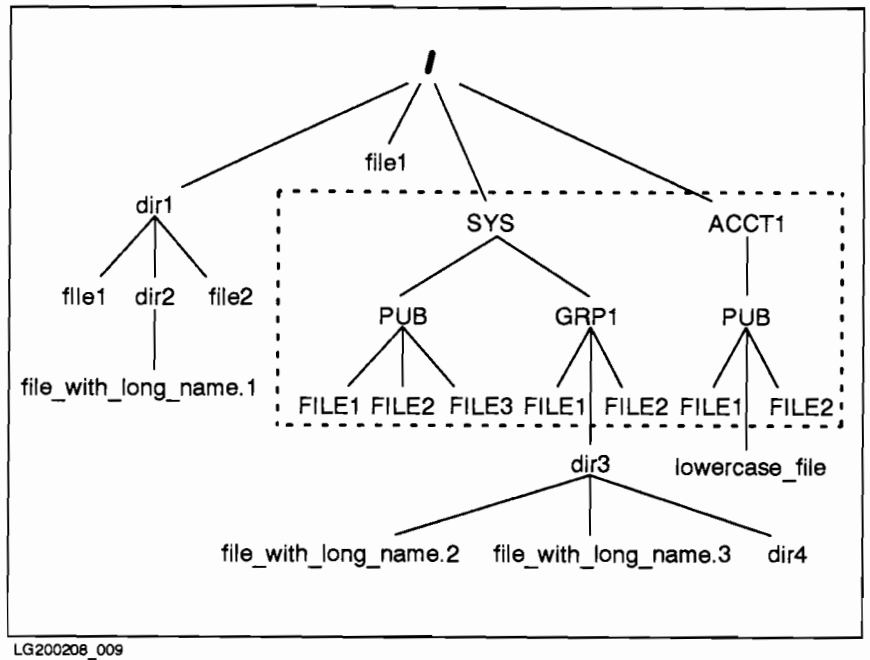


Figure 8-2. MPE/iX File System (Release 4.5 and Later)

Expanded File Naming Syntax

MPE/iX provides an expanded file naming syntax so you can refer to files, groups, accounts, and directories existing at all levels within the hierarchical file system. You can still name accounts, groups, and files by using the familiar MPE syntax. However, you'll need to use the HFS naming syntax to refer to files or directories existing outside the traditional file system structure.

HFS syntax consists of two parts: a path descriptor and a file name. Together, these components are called a **pathname**. The syntax describes files by referencing the path or location leading to the file. For example, the file name `/SYS/PUB/CI` in HFS syntax is the same as `CI.PUB.SYS` in MPE syntax.

All names beginning with `.` or `/` in the MPE command interpreter (CI) or intrinsics are interpreted according to HFS syntax conventions.

HFS syntax operates as follows:

- HFS file or directory names can include alphanumeric characters (A-Z, a-z, 0-9) and the special characters dot (`.`), underscore (`_`), and hyphen (`-`).
- File or directory names cannot begin with a hyphen (`-`).
- HFS syntax is **case sensitive**. So, HFS file or directory names can be in uppercase, lowercase, or mixed case.
- HFS file or directory names are specified in the CI and in intrinsics by preceding them with a `.` or `/`.

- HFS file or directory names can be specified in the shell without having to precede the names with a `.` or `/`.
- HFS directory or file names that are directly under the root or directly under a group must be less than or equal to 16 characters.
- HFS directory or file names under HFS directories can be up to 255 characters long.

You can refer to traditional MPE file names using HFS syntax but you must specify the name in uppercase characters. For example, if a file named `BILLING` exists in the `PUB` group of the `MKTG` account (`BILLING.PUB.MKTG`), you can refer to it using HFS syntax as `./BILLING` if you are in the `PUB` group. You can also refer to it as `/MKTG/PUB/BILLING`. If you refer to the file as `./billing`, MPE/iX would not locate the file.

HFS files are referenced using pathnames. Each component in a valid pathname refers to a directory, except for the last component, which may be either a directory or a file. The pathname's series of name components describes a path through the file system hierarchy.

HFS pathnames differ from MPE pathnames in the following ways:

- Names are separated with forward slashes (`/`), rather than dots.
- The order of the file name, group name, and account name are presented in reverse order compared to MPE syntax (`/ACCT/GROUP/FILE` versus `FILE.GROUP.ACCT`).
- **Slash** (`/`) at the beginning of a pathname indicates the root directory.
- **Dot-slash** (`./`) at the beginning of a pathname indicates the current working directory (CWD). The CWD is the directory in which you are currently working.
- Pathnames can be up to 1023 characters whereas traditional MPE names must be less than or equal to 26 characters (names can be up to 35 characters if a lockword is used).

Using these conventions, the format of the MPE pathname `MYFILE.PAYROLL.FINANCE` appears as follows in HFS syntax:

`/FINANCE/PAYROLL/MYFILE`

Files can be referenced using either absolute or relative pathnames. An **absolute pathname** begins with a forward slash (`/`) and is interpreted starting from the root directory. A **relative pathname** begins with a dot-slash (`./`) and is interpreted starting from your current working directory. When working in the MPE/iX shell, relative pathnames need not begin with a dot-slash (`./`).

MPE/iX Shell and Utilities

The MPE/iX shell provides a set of commands and utilities in a UNIX®-like environment on MPE/iX. You can invoke the shell from the CI by typing **SH** (the system-provided UDCs must be activated) or by executing **SH.HPBIN.SYS -L**. Type **exit** to exit the shell and return to the CI.

Table 8-1 lists some tasks and associated MPE/iX shell commands and the comparable MPE commands, utilities, or features. Not all of the shell commands operate in the same way as the MPE command or feature; some are rough equivalents. For example, the shell command **grep** can search through a set of files for a text string. You use a text editor to search for text strings one file at a time in MPE/iX.

Table 8-1. Selected MPE/iX Shell Commands

Task	Shell Command	Comparable MPE/iX Feature
Shorten command names using an alias	alias	command files or UDCs
Change working area	cd	CHDIR
Copy files	cp	COPY, FCOPY, DSCOPY
Display all or part of text files	cat, more, tail	PRINT
Determine disk usage	du	DISKUSE, REPORT
Search for text patterns in a file	grep, egrep, fgrep	Search commands in text editors
Terminate a process or job that's running	kill	ABORTJOB, ABORT
Rename files	mv	RENAME
Display current working directory	pwd	SHOWVAR HPCWD
Delete files	rm	PURGE
Delete directories	rmdir	PURGEDIR
Sort information	sort	Sort/Merge utility
Edit text or program files	vi, ed, ex	EDIT/3000
Display a list of who's logged on the system	who	SHOWJOB, SHOWPROC

Refer to the *MPE/iX Shell and Utilities Reference Manual* (36431-90001) for complete information about all of the shell commands provided by the MPE/iX shell.

Setting Up Accounts, Groups, and Users

Users on HP 3000 computer systems have traditionally been identified by a *user.account* string such as **MANAGER.PAYROLL**. The *user.account* associated with a job or session did not change for the life of the job or session, nor did the user and his or her files reside outside of the account boundary. Users could copy files from another account, but could not rename them across account boundaries.

As of Release 4.5, MPE/iX identifies each user by a unique user ID (UID) as well as a *user.account* string. Users are arranged into groups and are identified by a group ID (GID). Users that share one account will share the same GID. Owners of files on MPE/iX are identified by the file creator field.

The data associated with the user is stored in separate user and group databases. This means that on MPE/iX, users with proper security permissions can move outside of account boundaries and work in different directories within the hierarchical file system.

Note

The term **group** in this context is distinct from an **MPE group** and may be independent of the directory structure. To clarify, this chapter refers to groups under accounts as MPE groups.

File Ownership

Before Release 4.5, MPE has used the creator name, an unqualified user name, to track file ownership. The system only recorded file creators (not the creators of accounts or groups). As of Release 4.5, files and HFS directories can be created outside the logon account if the user has the appropriate access to do so. Therefore, unqualified user names are no longer sufficient for indicating object ownership.

As of Release 4.5, file ownership for all newly created files or renamed files is indicated by a fully qualified user name. The fully qualified user name is called the **file owner** or the UID. The concept of the file owner is similar to the file creator. Note however that the file creator could never be changed for a file whereas the file owner can be changed.

The Group and User Databases

Two databases, one for UIDs and one for GIDs, are a required part of any operating system that implements POSIX standards.

- The User ID database (UID) maps numerical user IDs to login names in the file called **HPUID.PUB.SYS**.
- The Group ID database (GID) maps numerical group IDs to POSIX.1 group names in the file **HPGID.PUB.SYS**.

The databases are privileged files whose contents are not visible, but you need to be aware of their existence. They are automatically created when you install or update to MPE/iX Release 4.5 or later. Furthermore, they are automatically modified when you add, modify, or purge users, groups, and accounts.

When a user logs on, MPE/iX uses the authenticated *user.account* to query the databases for the UID and GID. If none are found, MPE/iX checks whether the user has SM capability. If the user does not have an ID, the user cannot log on to the system without SM capability. When you add, modify, or purge users, groups, and accounts, the user and group databases are modified accordingly.

A utility called PXUTIL exists to provide version information and backdating capabilities. To learn how to use PXUTIL, read the *MPE/iX Shell and Utilities Reference Manual* (36431-90001).

To create accounts

To set up an account, use the **NEWACCT** command and its options. You must specify the account name and identify an account manager. You also have the option of specifying a user ID number and group ID number, or the operating system will assign unique numbers automatically. If you specify user and group ID numbers, you should assign numbers over 100. MPE/iX reserves numbers less than 100 for system-defined IDs.

For example, to create a new account called **PAYROLL** for the payroll department, enter:

```
:NEWACCT PAYROLL,MANAGER;PASS=PAYUS2;UID=150;GID=120;
```

The new account, **PAYROLL**, contains one user (**MANAGER**), who is the account manager. The password for the account is **PAYUS2**. The user ID of 150 identifies the account manager **MANAGER.PAYROLL**. The group ID of 120 identifies the payroll account. Also, the account automatically contains one group: **PUB**.

If you omit the **UID** and **GID** parameters, MPE assigns a unique **UID** to the account manager, **MANAGER**, and a unique **GID** to the account, **PAYROLL**.

If you assign a **UID** or **GID** that is already in use, an error message is displayed.

Note

While you are setting up your account structure, you can get helpful information about any MPE command.

- To get help for a particular command, enter **HELP** followed by a command name at the MPE prompt. For example, to display the syntax for the command **NEWACCT**, enter:

```
HELP NEWACCT
```

- To display information about the parameters for the same command, enter:

```
HELP NEWACCT PARMS
```

For more information on these commands refer to the *MPE/iX Commands Reference Manual Volumes 1 and 2* (32650-90003 and 32650-90364).

To create MPE groups

You can create groups within an account. To do so, use the **NEWGROUP** command followed by the name of the account or directory and, optionally, the password you want assigned to the group. For example, to create a group **SALES** in the **MKTG** account and assign it a password **KEEPOUT**, enter:

```
:NEWGROUP SALES.MKTG;PASS=KEEPOUT
```

When you are creating or moving files into a group, it is important to know that the following types of files can be located only within MPE groups (and not within HFS directories):

- UDC files
- Databases
- Compatibility mode files (for example, CIR, KSAM, RIO)

To create users

To add a user to an account, use the **NEWUSER** command and its options. Only the system manager or the account manager for the account can add new users. You must include a user name. If you do not include an account name, the user is added to the account that you are currently in.

For example, to create a user called **BANKS** in the **PAYROLL** account with a home group **SALES** and a user ID of 120, enter:

```
:NEWUSER BANKS.PAYROLL;PASS=ALEX;HOME=SALES;UID=120
```

To create accounts using a command file

MKACCT is a command file that helps you establish user names, groups, accounts, and passwords. **MKACCT** is interactive, and if you make a mistake, it prompts you for the correct response.

You may verify the results of **MKACCT** with the **LISTACCT**, **LISTGROUP**, and **LISTUSER** commands. You may override anything accomplished by **MKACCT** with the **ALTUSER**, **ALTGROUP**, and **ALTACCT** commands. For more information on these commands, use online help or read the *MPE/iX Commands Reference Manual Volumes 1 and 2* (32650-90003 and 32650-90364) or the *Using Your System - HP 3000 Series 9X7LX* (A1707-92002).

Note

The command **PASSWORD** allows all users to change their own passwords. For information on the **PASSWORD** command, use online help or read the *MPE/iX Commands Reference Manual Volumes 1 and 2* (32650-90003 and 32650-90364).

Assigning capabilities

Capabilities are privileges that can be assigned to users, accounts, groups, and programs. Capabilities specify what users can do on the system by implementing four types of control: user control, file control, program control, and resource control. These categories of control are not mutually exclusive. For example, DI is a capability to run certain diagnostic programs on the system. Although classified as a user-control capability, it also deals with program control.

The system manager or account manager has the capability to assign these privileges or to take them away. The system manager can assign any privileges to anyone on the system. The account manager (the person accessing an account with account manager (AM) capability), can assign capabilities, not exceeding their own, to anyone in the account.

The table below summarizes capabilities. The A, G, U, and P columns indicate capabilities that can be allowed to the account (A), group (G), user (U), and program (P) entities.

Table 8-2. Capabilities

Capability	Type of Control	A	G	U	P	Description
AL	User	x		x		Account librarian allows access to files within the user's account.
AM	User	x		x		Account manager allows access to all files, groups, and user information within the account.
BA	User/ Program	x	x	x	x	Batch access allows logon with the JOB command.
CS	File/ Device	x		x		Communications subsystems allows exclusive access to a communications device.
CV	File/ Device	x		x		Create volumes is needed to create, alter, and delete mountable volume sets.
DI	User	x		x		Diagnostician allows a user to run certain device and CPU diagnostics or verification programs.
DS	Program	x	x	x	x	Data segments lets users and programs create and manage extra data segments.
GL	User	x		x		Group librarian allows access to all files within the user's group.
IA	User/ Program	x	x	x	x	Interactive access allows a user to log on with HELLO.
LG	User	x		x		User logging allows enabling of the logging facility.
UV	File/Device	x		x		Use volumes allows access to nonsystem domain volumes.
MR	Program	x	x	x	x	Multiple RINs lets a user or program acquire more than one resource identification number (RIN) for a single process.
NA	User	x		x		Network administrator allows use of NMMGR.PUB.SYS to configure NS and LAN and to administer the resulting network.

Capabilities (continued)

Capability	Type of Control	A	G	U	P	Description
ND	File/ device	x		x		Nonshareable devices allows use of nonshareable devices such as the tape drive.
NM	User	x		x		Node manager allows the use of MMMGR.PUB.SYS to configure and manage nodes in a LAN.
OP	User	x		x		Operator allows access to files, groups, user information, and support functions and commands.
PH	Program	x	x	x	x	Process handling allows direct creation of other processes by executing the user process, so that a program can have a number of concurrently running processes.
PM	User/ Program	x	x	x	x	Privileged mode gives a user or program access to all resources.
PS	User/ Program	x		x		Programmatic sessions allows use of the STARTSESS command and the STARTSESS intrinsic.
SF	File/ device	x		x		Save files allows users to save files permanently.
SM	User	x		x		System manager allows complete access to the system.

When you create accounts, groups, and users, they each receive certain default capabilities:

- Accounts are assigned AL, AM, BA, GL, IA, ND, SF capability
- Groups and programs are assigned BA and IA capability
- Users are assigned BA, IA, ND and SF capability

You may assign accounts and users all of the capabilities, but you can assign groups and programs only BA, DS, IA, MR, PH, and PM capability.

To assign capabilities

To assign capabilities to accounts, groups, users, and programs, use the **NEWACCT**, **NEWGROUP**, and **NEWUSER** commands. For example, if you are the system manager or the account manager of the **PAYROLL** account, enter the following to assign capabilities to a new user named **GEORGE**:

```
NEWUSER GEORGE.PAYROLL;CAP=IA,BA,ND,SF,
```

To alter capabilities

Alter capabilities for existing accounts, groups, and users with the ALTACCT, ALTGROUP, and ALTUSER commands.

For example, to add the group librarian (GL) and account manager (AM) capabilities to your new user named GEORGE in the PAYROLL account, enter:

```
ALTUSER GEORGE.PAYROLL;CAP=IA,BA,ND,SF,GL,AM,OP,PM,DI
```

Or, you can add the GL and AM capabilities to his account by entering the command this way:

```
ALTUSER GEORGE.PAYROLL;CAP= +GL
```

To limit accounts and groups

The NEWACCT, ALTACCT, NEWGROUP, and ALTGROUP commands have parameters that offer additional control over system resources.

The following list defines the parameters for these commands:

Parameter	Definition
FILES	Sets a limit on disk space. The space is expressed in sectors. (One sector = 256 bytes.)
CPU	Limits the number of CPU seconds allowed to any particular group and account.
CONNECT	Limits the connect time in CPU minutes. This parameter is usually put into job streams.
ACCESS	Changes the security matrix for groups or accounts.

For example, to limit the disk space the PAYROLL account can use, enter

```
ALTACCT PAYROLL;FILES=50000
```

Note

You should never limit accounts or groups used by the operating system such as the SYS account or any group in the SYS account.

To keep track of user events

You can have MPE/iX keep track of user events in a log file. A new log file begins automatically every time you reboot, but you can also start a new log file as necessary.

To keep a certain type of log, you use the LOG configurator in SYSGEN to change its status to "ON". For more information, read chapter 5 of this manual.

Managing Directories

A **directory** is a special kind of file that contains entries that point to other files and directories. Directories, like MPE groups, help applications and users to organize files in a logical manner on the system. A directory contained within another directory is also called a **subdirectory**. A directory that contains other directories is called a **parent directory**. Directories, subdirectories, and files form a structure for the file system. A **directory entry** associates a file name with a file.

MPE/iX has four types of directories:

- root directory
- MPE groups
- accounts
- hierarchical directories

The overall directory structure has a common root. The root of the directory is called the parent directory. A slash (/) separates each part of a pathname. The maximum pathname length is 1023 characters. Although pathnames can be 1023 characters, other system limits restrict pathname length. For example, the command interpreter limits the number of characters you can type in a command to 511 characters.

When the pathname begins at the root directory, it is called an *absolute pathname*. An example of an absolute pathname is:

`/SYS/MYGRP/dir1/2file`

The example describes the location of the file **2file**. It is in the directory **dir1**, which is a subdirectory of the **MYGRP** group; **MYGRP** is in the **SYS** account, which is a subdirectory of the root directory (/).

An absolute pathname is similar to a fully qualified MPE file name in that the names of all the components are listed. The fully qualified MPE file name **TDP.PUB.SYS** translates to the absolute pathname **/SYS/PUB/TDP**.

Other pathnames are relative to a process's current working directory. (The current working directory is the directory where you are working.) So if you specify the name **./jvance/spook**, MPE looks for a subdirectory called **jvance** in your current working directory, then for a file called **spook** in that directory.

To create directories

You can create directories in any directory, group, or account to which you have CD access. You must have the following privileges to create directories directly under an MPE group:

- Create directory entries (CD) access for the parent directory
- Save files (SF) capability
- Traverse directory entries (TD) access to the parent directory

To create a directory in your current working directory, use the **NEWDIR** command. For example, to create a new directory called **CPROGS** in your current working directory, enter:

```
:NEWDIR CPROGS
```

To create a directory in a group other than your logon group, use the full pathname of the directory in the **NEWDIR** command line. For example, to create a new directory called **cprogs** in the group called **BOB** in the **PRG** account, enter:

```
:NEWDIR /PRG/BOB/cprogs
```

If you typed the name in lowercase and did not preface it with a **./** or **/**, MPE/iX converts it to uppercase. If you want to use HFS syntax for naming a directory, you need to preface the name with **./** or **/**. For example, to create a directory with a lowercase name, enter:

```
:NEWDIR ./cprogs
```

Note

MPE group-level accounting does not extend to directories residing outside of accounts.

To control access to directories

You can use access control definitions (ACDs) to grant the following accesses to directories:

CD - Create directory entries
DD - Delete directory entries
RD - Read directory entries
TD - Traverse directory entries
RACD - Read ACD
NONE - No access

By default, directories allow Read ACD privilege to all users on the system (RACD:@.@). You can use the **LISTFILE** command to display directory ACDs. You assign or change directory ACDs using the **ALTSEC** command. Read the *MPE/iX Commands Reference Manual, Vol. I* (32650-90003) for detailed syntax and descriptions of **ALTSEC** and **LISTFILE**.

The root directory, accounts, and groups cannot be assigned ACDs. However, all users are granted access equivalent to read directory entries (RD) access and traverse directory entries (TD) access to root, all accounts, and all MPE groups.

Initially, only you as the system manager have create directory entries (CD) and delete directory entries (DD) access to root. CD and DD access are governed by the appropriate privileges. Save access for an MPE group implies CD and DD permission. A user can create or delete a directory in an MPE group if the group grants Save access to the user.

To list directories

The LISTFILE command traverses hierarchical directories and accepts pathnames. Because MPE/iX file names can be long, the output format displays any names with the HFS syntax as the last item, wrapping the ends of long file names onto the next line, if necessary.

To list only the directories that are within the current working directory, use the LISTDIR system-provided UDC. The LISTDIR UDC invokes the LISTFILE command. You can also use LISTDIR to show directories anywhere on the system:

```
LISTDIR dir@
```

To list files in directories

Use the LISTFILE command to list files in directories. For example, to list all of the files and any directories (which are distinguished from files by a trailing slash) in the current working directory, enter:

```
:listfile ./@
```

To list only files named using MPE syntax:

```
:LISTFILE @
```

To delete directories

Use the PURGEDIR command to delete a hierarchical directory. You need to begin the name with (.) or (/) otherwise the name is interpreted using MPE syntax rather than HFS syntax.

You cannot use PURGEDIR to delete an account, an MPE group, the root directory, or a file. You will receive an error message if you try. Although you can specify (.) and (..) in the PURGEDIR command, you cannot delete these directories.

You must have traverse directory entries (TD) access to the directory you want to delete and any other directories referenced in the pathname. You must have delete directory entries (DD) access to the parent directory of the directory you are deleting.

Note

If the directory that you are trying to delete is not empty, you receive an error message and it is not deleted. Use the PURGEDIR command with the TREE option, or specify a pathname ending in /. For example:

```
:purgedir /MYACCT/MYGRP/dir1 ;TREE
```

or

```
:purgedir /MYACCT/MYGRP/dir1/
```

If any of the files in the directory (or directories) are open when you execute the command, you receive an **IN USE** warning message. All opened files and the directory path(s) to those files are not deleted. All other files and directories are deleted.

To delete directories using wildcards

You can also use wildcards to delete directories and the files or directories they contain. For example, to delete all empty directories in the current working directory with **TMP** in their name, enter:

```
:purgedir @TMP@
```

Or, to delete all directories under the CWD with names beginning with **TMP**, and all objects below these directories, enter:

```
:purgedir TMP@; TREE
```

To move between directories

Use the **CHDIR** command to move from one directory to another or to return to your logon directory.

For example, if you created a directory called **memos** in your logon group (**ALEXB**) in your account (**FOX**) and your current working directory is **/FOX/ALEXB**, you can move to it as follows:

```
:chdir ./memos
```

The name **./memos** is a relative pathname. MPE interprets it relative to the current working directory. You can move back up to the MPE group level by specifying the full pathname:

```
:chdir /FOX/ALEXB
```

Or, if **ALEXB** is your logon group, simply enter **CHDIR**.



To Show the current working directory

MPE/iX provides a CI variable called **HPCWD** that keeps track of your current working directory (CWD). As you move around in the file system, it is useful to display your current location.

To find out your current working directory, showing the path from the root, enter:

```
:showvar hpcwd
```

You can change your prompt so that it shows your current working directory at all times by including the variable in the prompt. To do so, at the MPE prompt, type:

```
:setvar save_prompt hpprompt  
:setvar hpprompt "!!HPCWD:"
```

To list the space used by directories

Use the `DISKUSE` command to display the amount of disk space used by a directory. Each column contains information about the directory you're reviewing.

<code>TREE</code>	contains the total number of sectors used by the directory listed. This includes space used by the directory itself, all files in the directory, and all space used by subdirectories and files in the subtree below the directory.
<code>LEVEL BELOW</code>	shows the number of sectors allocated to all files and directories one level below the named directory. It does not include the space used by the directory itself or by the subtree.
<code>DIRECTORY</code>	displays the name of the directory in HFS format (for example, <code>/MYACCT/MYGROUP</code>).

Sometimes the number of sectors under the `TREE` column are followed by a plus sign. This means that the amount refers to directories that are one level below the target directory.

You can also report the disk space used by a directory and all subtrees below it. If you specify a directory ending with a `/` and use HFS syntax or use the `TREE` option, the command reports the amount of space used by it and all directories in it.

Note

The `REPORT` command does not provide detailed line items for directories below groups. It shows groups below accounts but not any directories below accounts.

Securing Disk Files

File security addresses the question, "Who has what types of access to which files?" The security system you implement depends on the particular system, its location, and its applications. At a minimum, you choose which types of users have access to an account, an MPE group, or a file and what kind of access they have. For example, you may decide that any user can read files in an account, but only certain users can execute its program files.

To identify a user's file access

To identify a user's file access, use the `LISTACCT` or `LISTGROUP` commands. For example, to display the security of a particular account, enter:

`LISTACCT accountname`

Or, to display the security of a particular group, enter:

`LISTGROUP groupname.accountname`

File access modes describes what kind of access a user has to a file. The following table defines these modes:

Table 8-3. File Access Modes

Code	Descriptions
R	Read access allows users to read files only.
L	Lock access permits a user to lock a file or prevent concurrent access to it.
A	Append access allows users to add or append information to files, but prohibits altering information already written. Implies lock access mode.
W	Write access allows users to add, delete, or change information in files. Also allows users to purge files. Implicitly allows lock and append access modes.
S	Save access allows users to declare files within a group as permanent. Pertains only to group level.
X	Execute access allows users to execute or run program files.

To define a user's file access

Security is established for a file, group, and account by specifying which types of users have each specific access type. For example, to allow anyone to run (execute) a program, specify X:ANY.

The following table lists user types available to the file access modes.

Table 8-4. User Types

User Type	Description of User
ANY	Anyone on the system. Includes all types below.
AC	Any user in the account. Includes all AL, GU, and CR users in the account.
AL	Account librarian. A user who can manage certain files within the account, which may include more than one group.
CR	The creator of the file.
GU	Group user. Any users allowed access to this group as the logon or home group, including all GL users applicable to the group.
GL	Group librarian. A user who manages certain files within a home group only.

To establish security for a file, group, or account

To establish security for a file, group, or account, use the **NEWACCT**, **ALTACCT**, **NEWGROUP**, and **ALTGROUP** commands with the **ACCESS** parameter. The following examples illustrate how to establish security with these commands:

```
NEWACCT PAYROLL,MGR;PASS=MONEY;ACCESS=(R,X:ANY;W,A,L,:CR)
```

```
NEWGROUP INCOME.PAYROLL;ACCESS=(R,X,W,A,L,:ANY)
```

```
ALTACCT PAYROLL;ACCESS=(R,X,:AC;W,A,L,:CR)
```

```
ALTGROUP INCOME.PAYROLL;ACCESS=(R,X,W,A,L,:GU)
```

To access a file, a user must have capability at the most restrictive level of security applied to the file (account, group, or file). If someone fails to meet access criteria for any one of the three levels of security, that user cannot access the file.

File-access restrictions for an account or group are set when you or the account manager creates them. The system assigns the following defaults for file access when they are not explicitly defined:

Table 8-5. Default File Access for Accounts

Account	Access Modes	User Types
SYS	R, X	Any
	A, W, L	AC
All other accounts	R, A, W, L, X	AC

Table 8-6. Default File Access for Groups

Group	Access Modes	User Types
non-PUB group	R, A, W, S, L, X	GU
PUB group	R, X	Any
	A, L, S, W	AL, GU

File-level values default to (R, A, W, L, X: Any).

Controlling File Access with ACDs

ACDs are ordered lists of pairs (access permissions and user specification) that specify access to objects. An ACD takes precedence over certain other security features, such as lockwords and the file security matrix.

Files located outside of MPE groups and HFS directories are automatically assigned ACDs when they are created. By default, RACD (read ACD) is assigned to all users and only the owner can access the file or directory. The ACD can be modified using the ALTSEC command but the ACD cannot be deleted.

When files are renamed to a group outside the original account, they are automatically assigned ACDs. When a file located in an MPE group has its group ID (GID) changed to the GID of another account, an ACD is automatically assigned. The ACD can be modified using the ALTSEC command but it cannot be deleted.

Access modes

ACD pairs control the access and manipulation of HFS directories and the files within them. MPE/iX has enhanced ACDs to support four new ACD **access modes**. The ACD access modes are as follows:

Permissions common to files and directories

RACD Copy or read the ACD.

NONE Deny access.

File permissions

R Read a file.

W Write to a file.

L Lock a file.

A Append to a file.

X Execute a file.

Directory permissions

CD Create directory entries.

DD Delete directory entries.

RD Read directory entries.

TD Traverse directory entries.

User specifications

The following new ACD user specifications are provided:

- **\$OWNER** specifies users whose UID matches the UID of the object. **\$OWNER** enables file owners to voluntarily limit their access to an object. For example, file owners can grant themselves read-only access to a file to guard against accidentally modifying the file. The **\$OWNER** user specification is the only way for file owners to limit their access to an object. If omitted, an owner has all access to hierarchical files.
- **\$GROUP** specifies users whose GID matches the current group ID of the object. **\$GROUP** permits dynamic reference to the GID of an object. This is useful because GIDs of files and directories can be changed programmatically, using **chown** in the MPE/iX shell, or use the **:ALTFILE** command. When the GID of a file is changed, it is not necessary to modify an ACD to correct file sharing.
- **\$GROUP_MASK** restricts the access granted by ACD entries other than **\$OWNER** and **@.@**. When an ACD contains a **\$GROUP_MASK** entry, a user is granted a specific access mode only if it is listed in the ACD entry the user matches (in the form *user.account*, *@.account*, and **\$GROUP**) and in the **\$GROUP_MASK** entry.

You can use traditional user specifications to describe individuals or groups of users:

- *username.accountname* specifies a single user
- *@.accountname* specifies all users associated with the *accountname* account.

Capabilities

SM and AM capability are checked before ACDs or the file access matrix. Users with SM capability have unrestricted access to all file system objects.

Users with SM capability can create files outside of the logon account/group structure because they have implied CD access. Those without SM capability can only create files in directories where they explicitly have CD permission. Users must also have SF capability to save files in directories and SAVE access to save files in an MPE group.

Account managers may not have complete access to all objects in their account. Having AM capability enables a process to access file system objects if the GID of an object (GID represented by an account name) matches the GID (logon account) of the process. As a result, there may be cases where the GID of a file or directory within an account has been changed (programmatically, using **chown()** in the MPE/iX shell, or with the **:ALTFILE** command) so that an account manager for that account cannot access it. An account manager also may not have access to a file or directory in the account if it was created by a user with a different GID.

Lockwords

A file's creator can assign or remove a file lockword. Lockwords can only be assigned to files, not to directories. Lockwords can only be assigned to files in MPE groups.

All users are required to supply lockwords for files protected by active lockwords. You can embed lockwords in MPE syntax file names or you can type them in response to lockword prompting.

There is no way to specify a lockword using HFS syntax. Any attempt to open a file with a lockword using HFS syntax results in a lockword violation. The user is not prompted for the lockword.

Although system managers can assign ACDs to any file or directory in the system, they must supply the lockword for any lockword-protected files before they can assign an ACD. Once the file has an ACD, the ACD supersedes the lockword.

**Restricting Access to
/tmp**

Because any user can build files in `/tmp`, you can restrict access by using the ALTSEC command.

Managing Disks

Managing your system and non-system disks provides several key benefits. Disk management can reduce downtime caused by system installation, system failure, or disk failure. With proper disk management, if you need to install a new system, you need to reload only the system volume set. Similarly, if the system fails for any reason, you may move removable disk packs to another system where processing can continue.

Disk management also provides greater data availability (via data partitioning) and more efficient use of limited resources. And finally, disk management can improve data security. If you use removable disk packs, you can take sensitive data offline and place it in a secure location. Or, you can use special capabilities to protect data on nonsystem volumes.

In this chapter, you can find the following topics:

- managing master and member volumes
- creating a nonsystem volume set
- creating the account structure
- managing permanent and transient storage
- determining free disk space
- re-initializing a volume

Managing Types of Volume Sets

Disk management includes knowing types of volume sets, system and nonsystem, and being able to create volume set account structures. With disk management, you can manage disk space to maximize efficiency and be able to reinitialize a disk volume when it becomes obsolete.

The operating system requires the presence of the system volume set **MPEXL_SYSTEM_VOLUME_SET** to boot and run the system. You may also define other volume sets, called *nonsystem volume sets*. You can boot the system and use it even when nonsystem volume sets have been removed.

Some differences between the system and nonsystem volume sets are important to remember.

Table 9-1. System and Nonsystem Volume Sets

System Volume Set	Nonsystem Volume Set
Name must be MPEXL_SYSTEM_VOLUME_SET	Name can be whatever you wish, 32 or fewer alphanumeric characters.
Always mounted when the system is running. May be partially mounted.	Does not need to be mounted when the system is running.
Allows permanent and transient storage.	Allows permanent storage only.
Master contains system image and configuration.	Partitions user data into separate entities.
Master must be present to boot the system.	Requires the master to be present to use the set.
Master contains XM log file.	Master contains XM log file.

It is also helpful to remember these features of volume sets:

- Every volume set has a master volume, which is the only volume needed to define a volume set. It contains the configuration data, the root directory, a free space map, file label table, and a volume label with a unique volume set ID for the volume set.
- Nonsystem volume sets are sometimes called *mountable* volume sets since they are not required for the system to run.
- Transient storage is disk space used by the operating system.
- Permanent storage is disk space reserved for user and operating system files and programs. Nonsystem volumes should only have permanent storage. No percentage of the volume should be allocated to transient storage.
- You may use **VOLUTIL** to add additional system and nonsystem volumes while the system is running. Refer to the *Volume Management Reference Manual* (32650-90045) for more information.

To manage master and member volumes

The definition of a volume set is stored on the master volume rather than in a system table on the system volume set; the system only has information about mounted volume sets. The master volume of a volume set must be mounted before you can access files on other volumes in the set.

Figure 9-1 shows a master volume with two member volumes in the volume set named PROD.

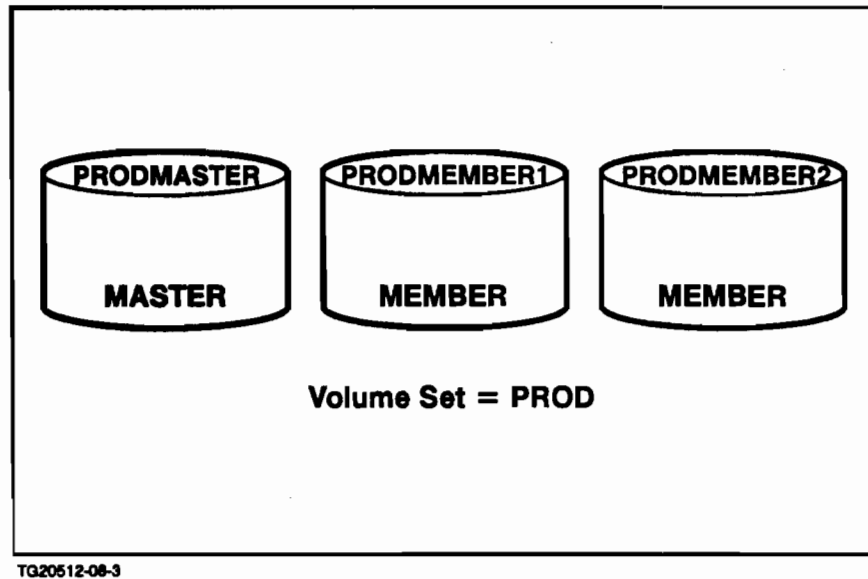


Figure 9-1. Master and Member Volumes

LDEV 1 is the disk pack or master volume of the system volume set, `MPEXL_SYSTEM_VOLUME_SET`. It must be mounted for the operating system to function.

A volume set name can contain up to 32 characters, including letters, numbers, underbar characters, and periods. The first character must be alphabetic.

A file cannot be spread across or span multiple volume sets. All volumes in a volume set should be mounted at the same time.

Accounts can span volume sets, but a group is contained within one volume set known as the home volume set. All groups have a home volume set (see the `LISTGROUP` command) that specifies on which volume set the files of any given group are to be found. A file's extents may be spread across the volumes within a volume set.

A class is a group of volumes within a volume set used to partition data. Files can be restricted to a particular volume class or volume by using the HPFOPEN intrinsic or the :BUILD command (with the ;DEV parameter.) Refer to the *MPE/iX Intrinsics Reference Manual* (32650-90028) for more information. Figure 8-2 illustrates an example of data partitioning with classes. A class name can contain up to 32 characters, including letters, numbers, underbar characters, and periods. The first character must be alphabetic.

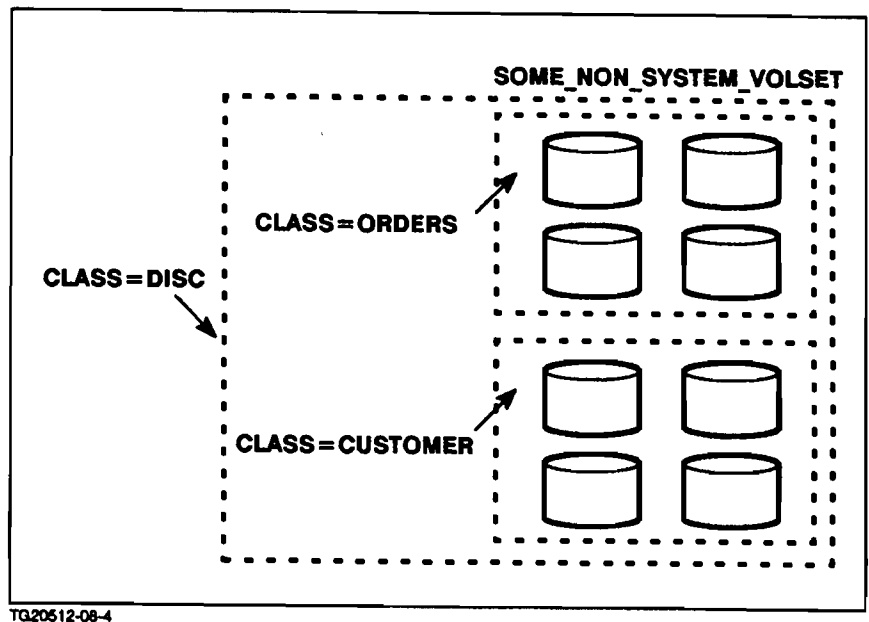


Figure 9-2. Data Partitioning with Classes

Using classes is optional. When you create a new volume set, volume management assigns all volumes in the set to the default class DISC. You can specify another class, but the DISC class is necessary for MPE V/E and MPE/iX compatibility.

To display information about all mounted volumes

You can use CI command DSTAT within VOLUTIL to display information on all mounted volumes. To use it, enter a colon before entering DSTAT at the VOLUTIL prompt.

DSTAT has the following parameters:

```
DSTAT [ ldev ]
      [ ALL ]
```

To check nonsystem volumes

To use VOLUTIL to display the status of nonsystem volumes, enter:

```
volutil: :DSTAT
```

You'll see each volume listed by its LDEV number and type, something like the information in Example 9-1, below, which shows the status of three volumes.

:dstat			
LDEV-TYPE	STATUS	VOLUME (VOLUME SET - GEN)	
3- 079370	MASTER	MEMBER1	(DISKDUMP_VOLUME_SET-0)
4- 079370	MEMBER	MEMBER2	(DISKDUMP_VOLUME_SET-0)
5- 079370	SCRATCH		
14- 079370	SCRATCH		

Example 9-1. Displaying Volume States

The following list defines the five status categories you may see when you issue the DSTAT command:

- MASTER** An accessible volume that contains volume set definition and data.
- MEMBER** An accessible volume that contains only data.
- LONER** An inaccessible volume that is closed or has no master. A volume has loner status if its master is not mounted, if it has been taken offline with the VSCLOSE command, or if it is a duplicate of another volume that is currently online.
- SCRATCH** An inaccessible volume that is marked as having no valid data.
- UNKNOWN** An inaccessible volume that is uninitialized or has an unrecognizable label. A volume has an unknown status if it does not have a label that the operating system can recognize. The volume could be a new disk pack, a volume that has been formatted, or a disk pack from another system. For example, if an MPE V/E private volume is mounted on an MPE/iX system, it is not recognized and is given an unknown status. You can initialize a volume that has an unknown status.

To check nonsystem volumes

To use VOLUTIL to display the status of nonsystem volumes, enter a colon (:) and the command DSTAT at the volutil prompt:

```
volutil: :DSTAT
```

You'll see each volume listed by its LDEV number and type, something like the information in Example 9-1, below, which shows the status of three volumes.

```
:dstat
  LDEV-TYPE  STATUS  VOLUME (VOLUME SET - GEN)
-----
  3- 079370  MASTER  MEMBER1  (DISKDUMP_VOLUME_SET-0)
  4- 079370  MEMBER  MEMBER2  (DISKDUMP_VOLUME_SET-0)
  5- 079370  SCRATCH
 14- 079370  SCRATCH
```

Example 9-1. Displaying Volume States

To check all volumes

To check the status of both system and nonsystem volumes on the system, enter a colon (:) and the DSTAT ALL command at the volutil prompt.

```
volutil: DSTAT ALL
```

DSTAT displays information about volumes that are mounted. If you have defined a volume but not initialized it, it will not appear in the display.

```
volutil: :dstat all

LDEV-TYPE STATUS  VOLUME          (VOLUME SET - GEN)
-----
1-079350  MASTER  MEMBER1         (MPEXL_SYSTEM_VOLUME_SET-0)
2-079350  MEMBER  MEMBER2         (MPEXL_SYSTEM_VOLUME_SET-0)
3-079350  MEMBER  MEMBER3         (MPEXL_SYSTEM_VOLUME_SET-0)
18-079350 MASTER  PRODMASTER      (PROD-0)
25-079350 MEMBER  PRODMEMBER1     (PROD-0)
```

Figure 9-3. Displaying Mounted Volume Information

Creating a Nonsystem Volume Set

There are four basic steps that you need to take to create a nonsystem volume set for your HP 3000. It involves planning, configuration, and finally, using **VOLUTIL** to add the set to your system in the following sequence:

- Plan the volume set's definition and use. Determine the disk drives that you need (removable media, capacity), the volume classes, and the account structure. Plan for future expansion, and keep the volume sets small.
- Order, receive, and connect the hardware. Use **SYSGEN's ADEV** command to configure the disk drives. Refer to Chapter 3 for more information on adding devices to the system.
- Mount the volumes in the volume set and enter the command **DSTAT ALL** to make sure that they have scratch or unknown status. (You will see volume status for all mounted volumes in system and nonsystem volume sets.)
- To define the volume set, volumes, and classes, first reboot the system with your new configuration and then use **VOLUTIL**.

The remainder of this section explains the fourth step, using **VOLUTIL** to add a non-system volume set. For more detailed information refer to the *Volume Management Reference Manual* (32650-90045).

To access **VOLUTIL**

No special capability is needed to start **VOLUTIL** but you must have use volumes (UV) capability to reserve or access volume sets and create volumes (CV) capability to modify volumes. The **RECOVER** command requires system manager (SM) capability. The **SHOWSET** command may be used by any user to display volume set information.

To start **VOLUTIL**, at the MPE prompt enter:

:VOLUTIL

To use online help

You can display helpful information about any of the **VOLUTIL** commands on the screen. To do so, enter the **HELP** command at the **volutil:** prompt in one of two forms:

- To get help for a specific command, type **HELP** and then the command name. For example, to display a description, the syntax, and examples of the **NEWSET** command, enter:

volutil:HELP NEWSET

- To see a list of all the **VOLUTIL** commands with a brief description of each one, simply enter **HELP** or **H**.

To define the volume set

You define a new volume set by initializing the master of the volume set. Define the volume set with the **NEWSET** command, including the set name, master volume name, and the LDEV.

NEWSET has the following parameters:

```
NEWSET { [ SNAME ] = sname } { [ MASTER ] = master }  
{ [ LDEV ] = ldev } [ [ PERM ] = percentperm ]  
[ [ TRANS ] = percenttrans ] [ [ GEN ] = gen_number ]  
[ [ CLASSES ] = cname[,cname][,...] ]
```

To define the volume set **PROD** to be created on logical device 18 with master volume name **MASTER** and with permanent disk space set to 100 percent, enter:

```
volutil:NEWSET SNAME=PROD MASTER=MASTER LDEV=18 PERM=100
```

Nonsystem volumes use only permanent space, which you should set to 100.

The system issues recovery messages each time a volume is mounted. The following example illustrates this:

```
:volutil  
Volume Utility A.00.00,(C)Hewlett-Packard Co., 1987. All  
Rights Reserved.  
volutil:newset SNAME=PROD MASTER=PRODMaster LDEV=18 PERM=100  
*Verify:Initialize new volume set  
PROD:MASTER on LDEV 18 [Y/N]? Y  
beginning recovery  
completed recovery of free space map and label table  
completed recovery of files  
begin posting of recovered files  
recovery completed  
*Note:New master volume has been initialized on LDEV 18.
```

Figure 9-4. Creating a Nonsystem Volume Set

To add members to the volume set

Use the **NEWVOL** command to add or define a second or member volume of the volume set and initialize it. **NEWVOL** has the following parameters:

NEWVOL has the following parameters:

```
NEWVOL { [ VNAME ] = sname:vname } [ [ LDEV ] = ldev ]  
[ [ PERM ] = percentperm ] [ [ TRANS ] = percenttrans ]  
[ [ CLASSES ] = cname[,cname][,...] ]
```

To prevent errors, the set name and volume name are required, but you may supply both at once in the **VNAME** position, separated by a colon. The *ldev* parameter is optional, though if you do not enter an **LDEV**, you must initialize the volume you are adding in a separate step. If you do supply the **LDEV** number, the volume is defined, initialized, then automatically recognized and mounted.

To add a member volume, do the following:

1. Start **VOLUTIL** by entering **VOLUTIL** at the MPE prompt.
2. At the **volutil:** prompt, enter:

```
volutil:NEWVOL sname:vname additional parameters
```

For example, to add **PRODMEMBER1** to the volume set **PROD** as **LDEV 25**, enter:

```
volutil:NEWVOL VNAME=PROD:PRODMEMBER1 LDEV=25
```

3. Enter the **VSCLOSE** command to post the new volume label information to disk.
4. Enter **VSOPEN** to make the new volume available to users.

Note

If you do not enter an **LDEV** number, the volume is added but not initialized. To initialize the volume later, use the **INITVOL** command. At the **volutil:** prompt, enter:

```
volutil:INITVOL sname:vname ldev
```

For example, to initialize **PROD:PRODMEMBER2** specifying logical device **25** and using positional parameters, enter:

```
volutil:INITVOL PROD:PRODMEMBER2 25
```

To create volume classes

Use the **NEWCLASS** command to define volume classes within a set. **NEWCLASS** has the following syntax:

```
NEWCLASS { [ CNAME ] = sname:cname }  
[ [ VOLUMES ] = vname[,vname][ , ... ] ]
```

To add a class, do the following:

1. Start **VOLUTIL** by entering **VOLUTIL** at the MPE prompt.
2. At the **volutil:** prompt, enter:

```
volutil:NEWCLASS sname:vname parameter
```

For example, to add the new class **ORDERS** to **PROD** and to assign the volume **PRODMASTER** to **ORDERS**, enter:

```
volutil:NEWCLASS CNAME=PROD:ORDERS VOLUMES=PRODMASTER
```

3. Enter **Y** when prompted to verify the **EXPANDCLASS** command.

To add additional volumes to an existing volume class

Use the EXPANDCLASS command to add a volume or volumes to a class. EXPANDCLASS has the following syntax:

```
EXPANDCLASS { [ CNAME ] = sname:cname }
            [ [ VOLUMES ] = vname [ , vname ] [ , ... ] ]
```

To add a volume or volumes to an existing class, do the following:

1. Start VOLUTIL by entering VOLUTIL at the MPE prompt.
2. At the volutil: prompt, enter:

```
volutil:EXPANDCLASS sname:vname parameter
```

For example, to add the volume PRODMEMBER2 to PROD:ORDERS, enter:

```
volutil:EXPANDCLASS CNAME=PROD:ORDERS VOLUMES=PRODMEMBER2
```

3. Enter Y when prompted to verify the EXPANDCLASS command.
4. Enter the VSCLOSE command to post the new volume label information to disk.
5. Enter VSOPEN to make the new volume available to users.

To display information about volume sets

Use the SHOWSET command to display information about the volume set.

To display volume set information, at the volutil: prompt, enter:

```
volutil:SHOWSET sname parameters
```

SHOWSET has the following parameters:

```
SHOWSET [ [ SNAME ] = sname ] [ INFO ] = { CLASSES
                                              VOLUMES
                                              SETINFO
                                              DSTATUS
                                              LABELS
                                              STRUCT }
```

For example, to display a summary of the current structure or class/volume hierarchy for PROD, enter:

```
volutil:SHOWSET SNAME=PROD INFO=STRUCT
```

Below is an example of the kind of information you will see. The asterisk before PRODMEMBER2 means that the volume has been defined, but not initialized.

```

volutil:showset sname=PROD info=STRUCT
Volumes in set: PROD
    PRODMASTER
    PRODMEMBER1
    *PRODMEMBER2
Classes in set: PROD
    DISC
    ORDERS
    CUST
Volumes in class: PROD:DISC
    PRODMASTER
    PRODMEMBER1
    *PRODMEMBER2
Volumes in class: PROD:ORDERS
    PRODMASTER
    *PRODMEMBER2
Volumes in class: PROD:CUST
    PRODMEMBER1

```

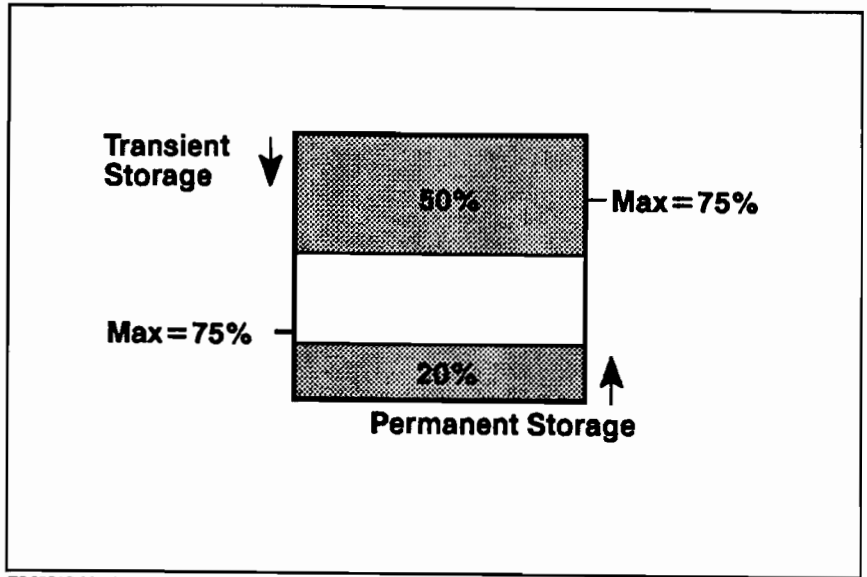
Figure 9-5. Displaying Volume Set Information

Managing Permanent and Transient Storage

Use VOLUTIL, the disk management utility, to allocate permanent storage and transient storage on system volumes. The NEWVOL command configures permanent and transient storage on system volumes, and ALTERVOL changes the allocation.

- Permanent storage is disk space used on both system and nonsystem volumes for permanent structures such as files (permanent and temporary), the label table, and the free space map. Permanent structures are those that do not need to be re-created when the system is rebooted. Nonsystem volumes may use only permanent storage.
- Transient storage is used on system volumes for structures such as virtual memory and other temporary operating system data structures. Transient structures need to be re-created when the system is rebooted.

In the figure below, permanent storage is visualized as filling in from the bottom toward its maximum. Transient storage is visualized in the figure as filling in from the top toward its maximum.



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Figure 9-6. Permanent and Transient Storage

In this figure, permanent and transient storage is limited to 75 percent of the total storage space. Permanent storage already occupies 20 percent of the total, and transient storage fills 50 percent. Permanent storage theoretically could take up another 55 percent, but only 30 percent of the total storage space remains free. So, permanent storage is limited to 30 percent more. Transient storage can take up another 25 percent. In this case, 5 percent of the space would remain free.

Note

You should always configure nonsystem volumes at 100 percent permanent, which is the default. Since the system does not put transient objects on nonsystem volumes, any transient storage that is configured cannot be used.

To configure disk storage

Use the NEWVOL command to configure disk storage. For example, to configure 65 percent permanent storage and 65 percent transient storage on the system volume MEMBER4, enter:

```
volutil:NEWVOL VNAME=MPEXL_SYSTEM_VOLUME_SET:MEMBER4 PERM=65 TRANS=65
```

Note

The operating system limits the changes that can be made to transient storage space on LDEV 1, the system master volume. It is not recommended that transient space be modified for LDEV 1, but if you must do so, plan carefully. For LDEV1, the default value for transient space is 75 percent and the default value for permanent storage is 75 percent.

To change the disk storage

Use the ALTERVOL command to change the permanent and transient disk space allocation for a particular volume.

To use ALTERVOL, at the volutil: prompt, enter:

```
volutil:ALTERVOL sname:vname percentperm percenttrans
```

ALTERVOL has the following parameters:

```
ALTERVOL { [VNAME] = sname:vname } [ [PERM] = percentperm ]  
[ [TRANS] = percenttrans ]
```

For example, to change the permanent and transient storage allocation on the volume SAMPLE_VOL in the volume set SAMPLE_SET to 100 percent, enter:

```
volutil:ALTERVOL SAMPLE_SET:SAMPLE_VOL 100 100
```

Reinitializing a Volume

Sometimes the data on a volume is obsolete and the volume is needed for another set of data. To reinitialize a volume, perform the following steps:

1. Place the volume in loner status by mounting a volume whose master is not physically mounted, or by using the CI VSCLOSE command to close the volume set. At the volutil: prompt, enter a colon, the VSCLOSE command and the volume set name:

```
volutil:VSCLOSE vname
```

2. Verify that the data on the volume is no longer needed and can be overwritten.
3. Mark the volume as free to be written on. At the volutil: prompt, enter the SCRATCHVOL command and the LDEV number:

```
volutil:SCRATCHVOL ldev
```

4. To add the volume to a set and initialize it, use the NEWVOL command. At the volutil: prompt, enter:

```
volutil:NEWVOL sname:vname additional parameters
```

To scratch a volume

The VOLUTIL command SCRATCHVOL puts the volume in scratch status. An entry is made in the volume label table to let the operating system know that someone can write on the volume.

SCRATCHVOL has the following syntax:

```
SCRATCHVOL { [LDEV =] ldev }
```

To place the volume BVOL5, whose LDEV number is 23 in scratch status, enter:

```
volutil:SCRATCHVOL 23
```

To unscratch a volume

You may, at some time, unintentionally scratch a volume that still contains important information. As long as no one has written on the volume, you can unscratch it to get the data. To do so, you can use the UNSCRATCHVOL command.

To unscratch a volume, at the `volutil:` prompt, enter:

```
volutil:UNSCRATCHVOL ldev
```

For example, to unscratch the volume BVOL5 whose LDEV number is 23, enter:

```
volutil:UNSCRATCHVOL 23
```

Creating the Account Structure for Volume Sets, Members, and Classes

To create an account structure, perform the following steps:

1. Create accounts in the system directory and the nonsystem volume set directory. To create the account `ORDERS` in the nonsystem volume set `PROD`, enter the following two commands:

```
NEWACCT ORDERS,MGR;PASS=SECRET  
NEWACCT ORDERS,MGR;ONVS=PROD;FILES=1000
```

The first command creates an account entry in the system directory, on the `MPEXL_SYSTEM_VOLUME_SET`. The entry contains information such as the account password.

The second command creates an account entry in the volume set directory. A file space limit in sectors (`FILES=`), stored in the volume set directory, is the only parameter allowed with the volume set on which the account is to be built (`ONVS=`).

2. Create groups in both directories by issuing two `NEWGROUP` commands:

```
NEWGROUP DATABASE.ORDERS;HOMEVS=PROD  
NEWGROUP DATABASE.ORDERS;ONVS=PROD
```

The `HOMEVS` parameter in the first `NEWGROUP` command specifies the volume set where the group's files are to be created. All of the files in the `DATABASE.ORDERS` group are placed on the `PROD` volume set. After this step, you can log on to this group.

The `ONVS` parameter in the second `NEWGROUP` command tells the system to build the group `DATABASE` in the `PROD` volume set's directory.

By default, the home volume set of the `PUB` group is the system volume set. The files in the `PUB.ORDERS` group will be on the system volume set. To change the home volume set, enter:

```
ALTGROUP PUB.ORDERS;HOMEVS=PROD
```

Controlling Disk Usage

MPE/iX allows system managers to limit the amount of disk space a user may allocate. Disk space limitations can only be placed on MPE/iX accounts and groups. However, a limit placed on an account or group is also imposed on all hierarchical directories and files created at all levels beneath that account or group.

Users may create files outside their logon account if granted the proper access to do so. Disk usage is still accumulated to the parent account or group, regardless of who creates the file.

Users can use `chown()` in the MPE/iX shell or the `:ALTFILE` command to change the group ID of files they created outside their logon accounts to their logon account's group ID. This puts the file in the administrative domain of the user's account manager rather than in the domain of the account manager for the account in which the file is located. The disk space for the file accrues to the account in which it resides. Account managers may need to cooperate with each other or with the system administrator to manage disk space when files are being created across account boundaries.

Note

No accounting limits exist for files that don't reside below MPE groups or for non-account directories under root.

To display disk usage information

The `REPORT` command does not show disk usage outside of the MPE account structure. In order to display disk usage for your entire system, include MPE accounts, groups and users and HFS directories, you need to use the `DISKUSE` command.

To display disk usage information for the current working directory, enter:

`:DISKUSE`

You can also report the disk space used by a directory and all subtrees below it. To do so, enter the path followed by the `TREE` parameter. For example, to display disk usage for the `PUB.SYS` account (that is, all directories identified by the HFS specification `PUB/SYS` and all subdirectories below that), enter:

`:DISKUSE /SYS/PUB;TREE`

The DISKUSE command displays usage information in a columnar format. Each column contains information about the directory or directories you are reviewing.

TREE	contains the total number of sectors used by the directory listed. This includes space used by the directory itself, all files in the directory, and all space used by subdirectories and files in the subtree below the directory.
LEVEL BELOW	shows the number of sectors allocated to all files and directories one level below the named directory. It does not include the space used by the directory itself or by the subtree.
DIRECTORY	displays the name of the directory in HFS format (for example, /MYACCT/MYGROUP).

To change file space limits

To change the file space limit for a group or account, use the FILES= parameter with ALTGROUP or ALTACCT. For example, to change the file space limit of the group PUB in the account ORDERS to 1000 sectors, enter:

```
ALTGROUP PUB.ORDERS;FILES=1000
```

To add a file to a volume set

Use the BUILD command to create a file in a volume set. For example, to create the file FILE in the PUB group and add it to MPE_SYSTEM_VOLUME_SET, enter:

```
BUILD FILE.PUB
```

Or, to create the file FILE in the DATABASE account and add it to the PROD volume set, enter:

```
BUILD FILE.DATABASE
```

Determining Free Disk Space

Use the DISCFREE utility to determine the amount of permanent space, transient space, and free space on your system. To use DISCFREE, enter:

```
DISCFREE
```

The DISCFREE utility:

- displays information about the system's free disk space in histogram or allocation formats
- determines disk volume fragmentation and transient and permanent disk space limits
- shows total volume space capacity
- shows disk allocation for single volumes or for the whole system

Transient storage is spread throughout the volume, and expands and contracts up to the limits configured. To optimize disk utilization,

space required on a volume set is allocated on the volume with the highest percentage of free space.

System volumes should be configured with some of each type of storage. The default of 75 percent for permanent and 75 percent for transient is a recommended allocation, unless you have special needs.

If the *system master* **PERMANENT** parameter is set at 100 percent, **DISCFREE** shows this allocation. However, only 75 percent of the space can be allocated as permanent space on the system master volume to ensure that the system will boot. For more information about **DISCFREE**, refer to the *MPE/iX Utilities Manual* (32650-90081).

Clearing Disk Space

When jobs are aborted because of insufficient disk space, there are steps you can take to clear disk space. Some of your options include:

- asking users to archive seldom-used files
- setting lower account or group file space limits
- decreasing the spool-file extent size
- decreasing the number of events logged by the system

Use **LISTFILE** to see how large certain files are and when they were last accessed.

For example, to see how much space the file **FILE1.TECH.MGR** takes, enter:

```
LISTFILE FILE1.TECH.MGR, 2
```

Use the **ALTACCT** and **ALTGROUP** commands with the **FILES=** parameter to decrease limits in accounts and groups, respectively.

For example, to decrease the file space in the group **TECH** to 10,000 sectors and the account manager to 100,000 sectors, enter:

```
ALTGROUP TECH;FILES=10000  
ALTACCT MGR;FILES=100000
```

System event logs are stored in permanent files on the system volume set, so decreasing the number of events logged affects system disks only.

HFS Directories and High-Availability Products

HFS directories under MPE groups can be located on nonsystem volume sets. HFS directories under the root must reside on the system volume.

High-availability products, such as Mirrored Disk, Autorestart, and SPU Switchover, are restricted to nonsystem volume sets; therefore, they cannot support HFS directories under the root. These products only support HFS directories as descendants of MPE groups.

Planning Your Backup Strategy

System backup is one of the system manager's most important responsibilities. In the event of a system failure or other problem, the system backup may be the only way to recover valuable data and application software.

Your system operator backs up the application data and software, product software, some system files, and the system directory by using the `STORE` and `RESTORE` commands.

As system manager you use the system generator (SYSGEN) to back up the operating system, system load utilities, and the system configuration. These are recovered when the system is booted from the system load tape (SLT).

A complete system backup requires both the SYSGEN and store tape sets.

In this chapter, you can find the following topics:

- choosing types of backup
- creating a backup schedule
- performing a system backup
- verifying your backup media

Choosing Types of Backup

Performing a combination of full and partial backups on a daily basis provides you with file security. As system manager, you decide what type of backup to use and how often to perform each one. In many companies, for example, the system manager schedules full backups once per week and one of two kinds of partial backups, an incremental partial backup or a cumulative partial backup, all other days to save time and decrease media usage.

- The purpose of a full system backup is to store your entire system (files, data, and programs) to tape. Depending on your needs, you will want to do a full system backup at least once a week, and perhaps more often.
- During an incremental backup, you make a backup copy of only those files that have been modified on or after a specified date. Typically, this is the date of the last backup, regardless of whether it was a partial backup or a full backup. If you back up your system on a daily basis, each incremental tape will contain those files updated during the last 24 hours.
- During a cumulative backup, you make a backup copy of all files that have changed since the last full backup, so that the number of files copied to tape accumulates. If you back up your system on a daily basis, the first cumulative tape will contain files updated in the preceding 24 hours, the second tape contains files updated in the preceding 48 hours, and so on.

Creating a Backup Schedule

A schedule helps ensure that backups are done on a regular basis. You should design one that accommodates the particular needs of your information processing environment. Here are three sample backup schedules that may be helpful in designing an appropriate schedule for your needs.

When to do full backups

One possible backup schedule is to store your entire system to tape at the end of each work day. The benefit of this schedule is that in a recovery situation, you or the system operator must handle only one tape set. The disadvantage is that, since all files (including those that have not changed) are backed up every day, the amount of time and media needed to complete the backup increases greatly.

When to use cumulative backups

Another strategy is to perform a full backup once per week, and partial cumulative backups on all other work days. This strategy reduces both time and media usage. In a cumulative backup, the date is always the date of the last full backup and uses the "greater than or equal" form ;DATE>=mm/dd/yy.

Following a cumulative backup strategy, you will need to handle only two store tape sets to perform a full system recovery: the most recent full backup set and the most recent partial backup set.

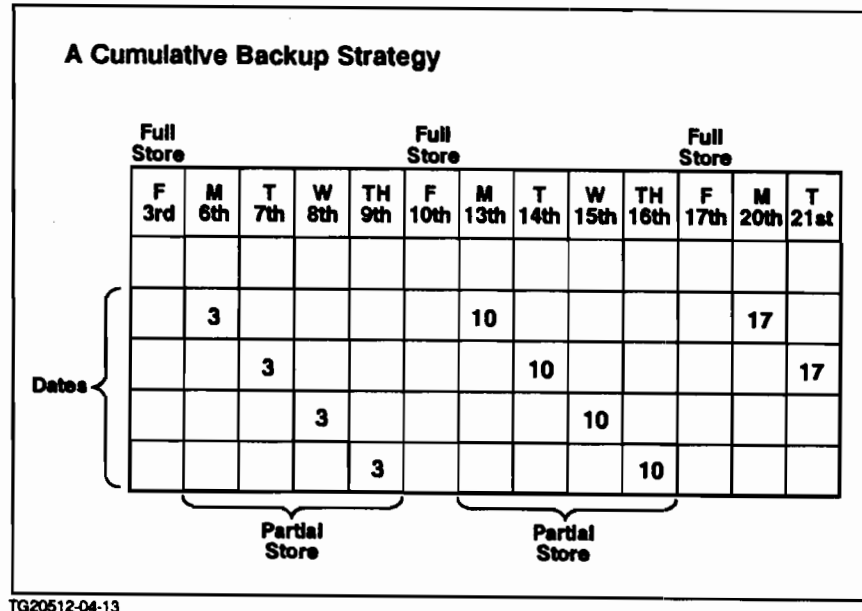


Figure 10-1. Cumulative Backup Schedule

When to use incremental backups

In an incremental backup strategy, you perform a full backup once per week and partial backups on all other workdays. However, since the date of each partial backup is the date of the last partial backup (*not* the date of the last full backup), only those files which have changed are copied to tape.

The principal advantage to the incremental backup strategy is that it uses the smallest amount of time and media. The disadvantage is that, in the event of system recovery, you must restore each tape set from the most recent full backup through the most recent partial backup.

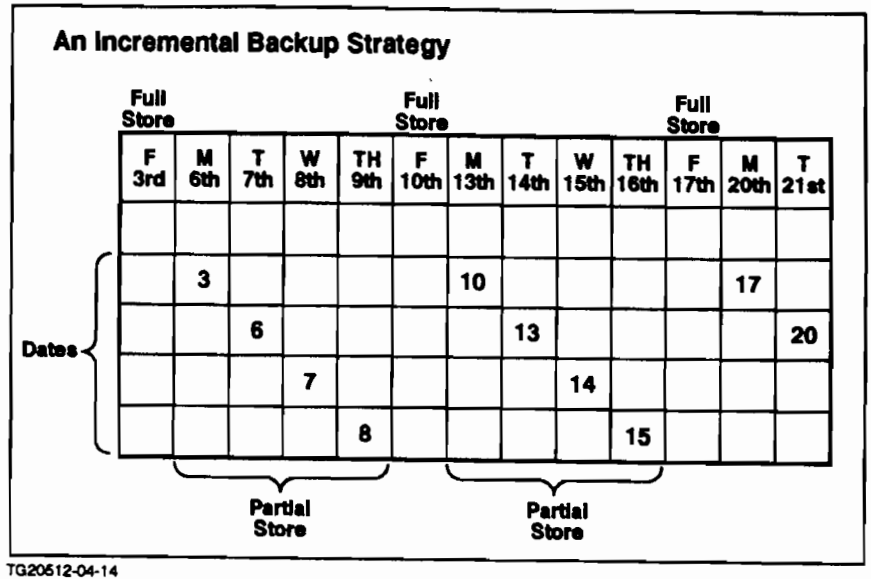


Figure 10-2. Incremental Backup Schedule

Performing a System Backup

The following sections show you how to perform a full backup and both kinds of partial backups, cumulative and incremental.

In each set of steps, you may either create a backreference to the tape drive you want to use, or you may refer to the drive via a device link.

To designate all files, you enter the file description / or you can enter @.@.@. In MPE/iX terminology, this equates to "all files in all groups in all accounts." In HFS terminology, this equates to "all files on the system."

If you choose to backup a subset of files, use the following table as a guideline for how to specify the files you want in the hierarchical file system.

Wildcard	Meaning
@.group.account	/ACCOUNT/GROUP/ or "all files in GROUP.ACCOUNT"
@.@.account	/ACCOUNT/ or "all files in the directory ACCOUNT"
@.@.@	/ or "all files on the system"
@.@	/logon account/ or "all files in the logon account"
@	./ or "all files in the current directory"

To perform a full system backup

To store your entire system to tape, do the following:

1. Create a backreference by entering:

FILE BACKUP;DEV=TAPE

Or, you can refer to the tape drive by its LDEV number:

FILE BACKUP;DEV=7

2. Enter the STORE command:

STORE @.@.@;*BACKUP;SHOW;DIRECTORY

If you do not enter a file equation, the system supplies a default file equation with your user logon name as the formal file designator. For example, if you log on as **MANAGER.SYS**, the system generates a tape file equation with **MANAGER** as the formal file designator. In this case, the tape reply request for **MANAGER** appears on the console when the **STORE** command is executed.

For more detailed information on how to do a full backup, refer to *Performing System Operating Tasks* (32650-90137).

To perform an incremental system backup

During an incremental backup, the **STORE** command makes a backup copy of only those files that have been modified on or after a specified date. Use the date of the last backup, whether partial or full, as the reference point.

To perform an incremental backup of your system, enter:

STORE @.@.@;*BACKUP;SHOW;DIRECTORY;DATE>=mm/dd/yy[yy]

Or, to use the default file equation, enter:

STORE @.@.@;;SHOW;DIRECTORY;DATE>=mm/dd/yy[yy]

The *mm/dd/yy[yy]* specifies the month, day, and year of the last partial or full backup. You can enter the year as two digits (94) or four digits (1994).

For more detailed information on how to do a partial backup, refer to *Performing System Operating Tasks* (32650-90137).

Save the tapes from each partial backup until the next full backup is complete.

To perform a cumulative system backup

In a cumulative backup, the date you enter as *mm/dd/yy[yy]* is the date of the last full backup. The number of files copied to tape during each partial backup continues to accumulate until the next full backup and, at any time, you will only need two tapes to restore the files: the last full backup and the most recent partial backup tape.

To perform a cumulative backup of your system, enter:

STORE @.@.@;*BACKUP;SHOW;DIRECTORY;DATE>=mm/dd/yy[yy]

To use the default file equation, enter:

STORE @.@.@;;SHOW;DIRECTORY;DATE>=mm/dd/yy[yy]

Verifying Your Backup Media

Use the VSTORE command to verify that your backup media is good and can be used in a recovery. This step can prevent the possible loss of data resulting from attempting to restore files on a tape that is damaged or defective.

The parameters for the VSTORE command are defined below:

Parameter	Definition
ONERR=	Specifies what to do if VSTORE encounters an error. To stop processing if it encounters an error, use ONERR=SKIP . To continue, use ONERR=SKIP .
SHOW	Specifies where to display the results of the VSTORE command. To display them on the console, use SHOW . To print the results, use SHOW=OFFLINE .
LOCAL	Use to verify files that were written to tape from a group and account other than the logon account of the verifier.
DIRECTORY	Use to verify the file system directory.

To verify your tapes

To verify your backup tape set, do the following:

1. Create a backreference by entering:

FILE TAPEFILE;DEV=TAPE

2. Enter the VSTORE command to verify the copies of the files in the specified directory. For example, to select all files in all groups in all accounts and display the results on the console, enter:

VSTORE *TAPEFILE;@.@.@;ONERR=QUIT;SHOW;LOCAL;DIRECTORY

To use the file equation issued by the system for your logon user name, use a semicolon as a place holder for the tape file reference. For example:

VSTORE ;@.@.@;ONERR=QUIT;SHOW;LOCAL;DIRECTORY

**To print the results of
VSTORE**

To print the results of the VSTORE command, add the parameter SHOW=OFFLINE. For example, to select all files in all groups in all accounts and print the results, enter:

VSTORE ;@.@.@;SHOW=OFFLINE

Note

Once you have created your backup tapes and are ready to restore them, you can use the new CHECKSLT command to check the tape and to estimate the amount of contiguous disk space required on LDEV 1 for the restore.

Shutting Down the System

System shutdown is the process of halting system activity in an orderly manner and stopping the computer operating system. A system shut does not involve turning off power to the computer hardware.

If done properly, a shutdown preserves all system and user files and copying any spool files that await printing to tape. Before the shutdown occurs, backlogged reports can be printed, or they can be saved to tape and replaced when the system is running again.

In this chapter, you can find the following topics:

- scheduling a system shutdown
- performing the shutdown

Scheduling Shutdowns

Though system shutdowns are a rare occurrence, there are situations that do require you shut down your computer. For example, you will need to shut it down if you are changing the configuration, changing system security, or moving the system to another location.

Since all users lose access to the computer when you perform a shutdown, shutdowns greatly impact productivity and business deadlines. As system manager, you should schedule any planned shutdowns at a time least likely to interfere with users' productivity.

Performing the Shutdown Process

A planned system shutdown typically consists of the steps listed below. Each of them is explained in the following sections.

- Tell users well in advance of a planned shutdown via the welcome message
- Send users a warning a few minutes before the shutdown
- Prevent users from starting a new job or session
- Prevent users from sending new reports to the printer and, optionally, clear the backlog of reports in the spool queue
- Answer any pending device requests
- Close any open communication lines
- Issue the SHUTDOWN command

To tell users in advance of the shutdown

It's a good idea to include shutdown information in the welcome message so that users can plan accordingly. Remember to include information about the time of the shutdown and whom a user should contact if he or she has any questions.

You can create the welcome message either interactively with the WELCOME command or programmatically from a text file. Unless the WELCOME command is distributed to users through the ALLOW command, you can only create a new message at the console.

For example, to replace the current message with a new one interactively, do the following:

1. Erase the existing welcome message by entering:

```
WELCOME
#Return
```

2. Create a new message by entering the WELCOME command again. When the pound sign prompt (#) appears, enter the message line by line, terminating each line with `Return`.
3. When you finish writing the message, enter `Return` at the # prompt.

To create a new welcome message programmatically, edit the welcome message text file (usually named `WELCOME.PUB.SYS`), then implement it with the following command:

WELCOME filename

To warn users a few minutes before the shutdown

Approximately 15 minutes before the shutdown, use the `TELL` command to alert users. For example:

TELL @S;Shutdown in 15 minutes. Please log off..

This message reaches all active terminals except those in quiet mode. (A few minutes before the shutdown, you will issue a `WARN` command, which reaches all terminals, including those that are “quiet.”)

To prevent new system activity

Use the `LIMIT` and `JOBFENCE` commands to prevent any new users from logging on or any scheduled jobs from starting.

1. To limit the number of concurrently running jobs and sessions, enter:

LIMIT 0,0

2. To raise the minimum input priority that a job or session must have to execute to the highest level, enter:

JOBFENCE 14

To clear the backlog of reports

To verify that the printer is available, to shut down spool queues, and begin removing backlogged reports, complete the following steps:

1. Verify that the printer is active by issuing either the `SHOWDEV` or `SPOOLER` command followed by the printer's LDEV number. For example, to check the activity of LDEV 21, enter:

SHOWDEV 21

Or:

SPOOLER 21;SHOW

2. Enter the `SHUTQ` command to prevent users from sending reports to the printer. For example, to shut the queue for LDEV 21, enter:

SHUTQ 21

Or, you can refer to the printer by its device name or device class. For example:

SHUTQ LJMFG

Or:

SHUTQ PRN

3. List the backlog of unprinted reports (spool files) by entering the SHOWOUT or LISTSPF commands. For example:

SHOWOUT JOB=@;SP

Or:

LISTSPF @

If the system responds NO SUCH FILE(S), you have no spool files.

Note

Since output spool files are permanent files, they remain on the system when it is restarted.

To answer any pending requests

It is possible that an outstanding request from the system or a processing job may hang your system and keep it from shutting down cleanly. For this reason, you should find out if there are any requests that need a reply.

To display all pending requests, enter:

RECALL

To answer pending requests, enter:

REPLY *pin#*, *reply*

The *pin#* is the process identification number and *reply* is one of the following:

- a logical device number
- either "YES" or "NO"
- a string expression consisting of *nn* characters or fewer

To close any open communication lines

Close any of the system's open communication lines. Enter both of the following commands to deactivate the NS3000/XL product:

NSCONTROL STOP

NETCONTROL STOP

Consult the manuals of any other communications products for instructions to deactivate them.

To shut down the system

To shut down the system, enter:

```
CTRL A  
=SHUTDOWN
```

You may also enter any of the keywords listed below in the SHUTDOWN command to document the shutdown. They are intended to indicate why you are shutting down the system.

```
SYSTEM  
NETWORK  
DTC  
TERMINAL  
TAPE  
DISC  
OTHER
```

For example, if you shut down to clear a dtc hang, use the dtc option.

```
CTRL A  
=SHUTDOWN DTC
```

The console responds by listing shutdown messages similar to these:

```
Shutdown of operating system begins. (Shut 1)  
Shutdown of user processes begins (Shut 2)  
Shutdown of jobs & sessions begins. (Shut 3)  
Spoolers notified of a shutdown. (Shut 16)  
Shutdown of system processes begins. (Shut 4)  
Shutdown of system managers begins. (Shut 5)  
Shutdown of operating system complete. (Shut 6)
```


System Hardware Descriptions

This chapter presents an overview of the hardware of the 900 Series HP 3000 computer. It gives you a general introduction to how the Series 925 through Series 949 systems, the Series 958 system, and the Series 950 through Series 980 systems compare with each other. In addition, this chapter provides basic hardware information about the Series 925 through Series 949 systems, the Series 958 system, and the Series 950 through Series 980 systems.

In this chapter, you can find the following topics:

- identifying the system
- identifying basic components of a Series 9X7 and 9X7LX system
- identifying basic components of a Series 9X8 and 9X8LX system
- identifying basic components of a Series 920 through Series 958 system
- identifying basic components of a Series 925 through Series 949 system
- identifying basic components of a Series 950 through Series 980 system
- identifying basic components of a Series 99X system
- identifying system connections
- determining hardware paths
- performing a system reset
- scheduling peripheral maintenance

Identifying the System

As a system manager, you need to know what a 900 Series computer system is and what systems are in the 900 Series family.

The 900 Series is a member of the Hewlett-Packard Precision Architecture (PA-RISC) family that shares a common RISC architecture. These reduced instruction set computers (RISC) can use the same software without modification.

The terms used to identify the families of computers are shown in Figure 12-1.

Table 12-1. 900 Series HP 3000 Computers

Family	Model Numbers
Series 917LX through Series 967LX	917LX, 927LX, 937LX, 947LX, 957LX, 967LX
Series 9X8	918LX/RX, 928LX/RX, 968LX/RX, 978LS/RX
Series 937 through Series 977	937LX/RX, 947LX/RX, 957LX/RX, 967LX/RX, 977LX/RX
Series 920 through Series 958	920, 922LX, 922RX, 922, 932, 948, 958
Series 920 through 958	920, 922, 922LX/RX, 932, 948, 958
Series 950 through Series 980	950, 955, 960, 980/100, 980/200, 980/300, 980/400
Series 990 through Series 995	990, 990DX, 991CX, 991DX, 992, 992DX, 995CX, 995DX

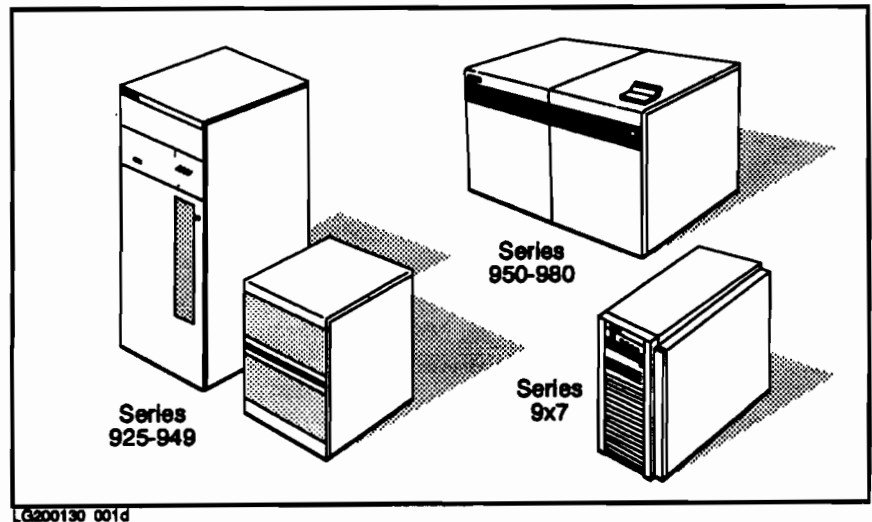


Figure 12-1. Sample System Processor Units of the HP 3000 Family

On every model of the 900 Series HP 3000: *All operating system software is compatible. *Distributed terminal controllers (DTCs) are supported.

- Networks are supported on these systems.
- The following peripherals are supported on these systems:
 - tape drives (1600 and 6250 BPI)
 - disk drives (removable and nonremovable)
 - digital data storage (DDS) units
 - line printers and page printers

(Note, data cartridges are not supported.)

How you configure your system (for example, the maximum number of DTC's, disks, system and serial printers, and the maximum amount of memory) depends upon the particular model you have. The following table gives you some basic information; for complete data, consult your Hewlett-Packard field service representative.

900 Series HP 3000 Comparisons

Model	Maximum Workstations	Maximum Memory
Series 917LX	64	192 Mbytes
Series 927LX	64	192 Mbytes
Series 937LX	152	192 Mbytes
Series 937RX/SX	152	384 Mbytes
Series 947LX	530	192 Mbytes
Series 947RX/SX	530	384 Mbytes
Series 957RX/SX	850	384 Mbytes
Series 967RX/SX	900	512 Mbytes
Series 987RX	1200	768 Mbytes
Series 987SX	1500	768 Mbytes
Series 987/150 RX/SX	1700	768 Mbytes
Series 987/200 RX/SX	1700	768 Mbytes
Series 918LX/RX	152	512 Mbytes
Series 928LX/RX	400	512 Mbytes
Series 968LX/RX	600	512 Mbytes
Series 978LX/RX	900	512 Mbytes
Series 990	2300	2048 Mbytes
Series 992	2300	2048 Mbytes
Series 991	2700	2048 Mbytes
Series 995	2700	2048 Mbytes

Components of the Series 9x7LX and 9x7 Systems

The Series 917LX through Series 967LX systems and the Series 937 through Series 977 systems are housed in small cabinets. Each small rack-mount cabinet contains the system processor unit (SPU), a channel input/output (CIO) expander, and the battery backup unit. The cabinet can also contain various peripherals. For further details about the operation of Series 917LX through Series 967LX systems, please refer to *Using Your System - HP 3000 Series 9X7LX* (A1707-92002).

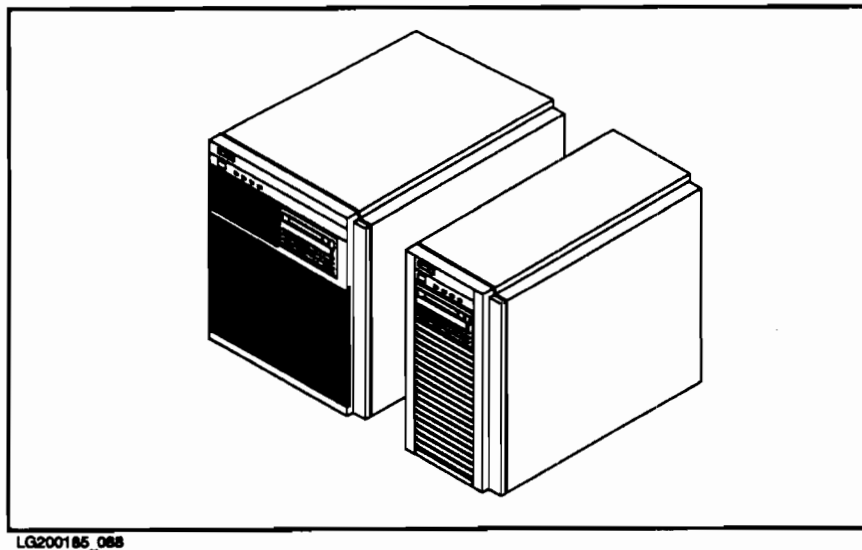


Figure 12-2. Series 9x7LX and 9x7 Systems

Brief descriptions of the components of Series 917LX through Series 967LX systems are as follows:

- The SPU houses system cards (memory, peripheral, processor) and the power supply.
- The battery backup unit (BBU) supplies power to memory cards in the event of a power failure.
- The disk drive is a nonremovable drive used to store data. Several other disk drive models can be connected to the system.
- The tape drive is used initially to load the operating system. Several tape drives can be connected to the system.
- The operating system resides on the system disk once it has been installed.
- The system console is the terminal device designated to send and receive system messages.
- Several types of page printers and line printers can be connected to the system.

Components of the Series 9x8LX and 9x8 Systems

The Series 9x8 systems are housed in small cabinets. Each small rack-mount cabinet contains the system processor unit (SPU), a channel input/output (CIO) expander, and the battery backup unit. The cabinet can also contain various peripherals.

Brief descriptions of the components of Series 917LX through Series 967LX systems are as follows:

- The SPU houses system cards (memory, peripheral, processor) and the power supply.
- The Uninterruptible Power Supply (UPS) supplies power to memory cards and selected devices in the event of a power failure.
- The disk drive is a nonremovable drive used to store data. Several other disk drive models can be connected to the system.
- The tape drive is used initially to load the operating system. Several tape drives can be connected to the system.
- The operating system resides on the system disk once it has been installed.
- The system console is the terminal device designated to send and receive system messages.
- Several types of page printers and line printers can be connected to the system.

Components of the Series 920 Through Series 958 Systems

The Series 920 through Series 958 systems are housed in a small cabinet. The small rack-mount cabinet contains the system processor unit (SPU), the CIO expander, and the battery backup unit (BBU). The cabinet can also contain various peripherals. If you are working with a Series 922 or a Series 932 system, including the LX and RX models, please refer to *HP 3000 Series 922 Family Computer Systems/Operator Handbook* (A1027-90019).

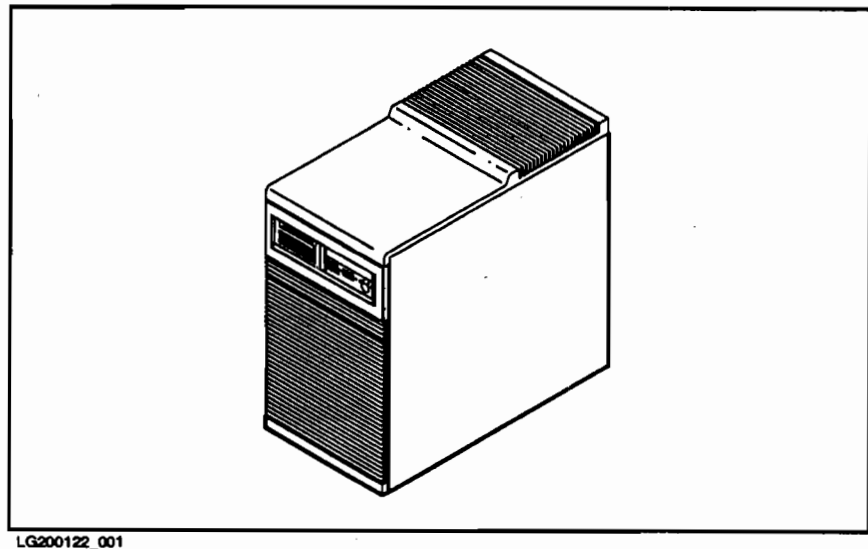


Figure 12-3. Series 920 Through Series 958 Systems

Brief descriptions of the components of Series 920 through Series 958 systems are as follows:

- The SPU houses system cards (memory, peripheral, processor) and the power supply.
- A channel adapter or precision bus adapter (PBA) connects CIO devices. The Series 948 and 958 systems also connect CIO devices through the Precision Bus Adapter (PBA).
- The battery backup unit (BBU) supplies power to memory cards in the event of a power failure.
- The operating system resides on the system disk once it has been installed.
- The system console is the device designated to send and receive system messages.
- One to four disk drives can be contained in the cabinetry.
- One digital data storage (DDS) cassette tape drive is contained in the cabinetry.
- Several types of page printers and line printers can be connected to these systems.

Components of the Series 925 Through Series 949 Systems

The Series 925 through Series 949 systems (namely, Series 925, Series 925LX, Series 935, and Series 949 systems) can be housed in large or small cabinets. The small rack-mount cabinet option contains the system processor unit (SPU), CIO expander (optional for the 925), and the battery backup unit (BBU). The large 1.6-meter cabinet can contain the same components as well as several other peripherals.

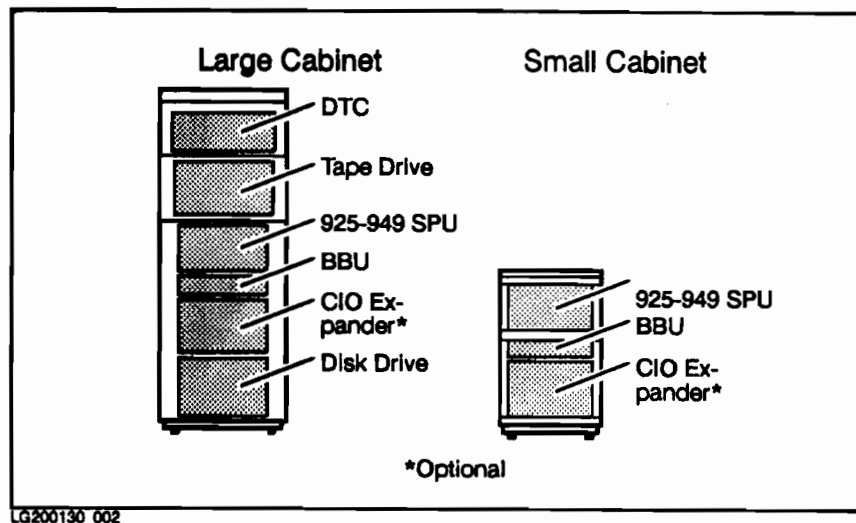


Figure 12-4. Large and Small Cabinet Installations

Brief descriptions of the components of a Series 925 through Series 949 systems are as follows:

- The SPU houses system cards (memory, peripheral, processor) and the power supply.
- The battery backup unit (BBU) supplies power to memory cards in the event of a power failure.
- The CIO expander provides eight additional peripheral card slots to the SPU.
- The disk drive is a nonremovable drive used to store data. Other disk drive models are supported. Several disk drives can be connected to the system.
- The tape drive is used initially to load the operating system. Several tape drives can be connected to the system.
- The operating system resides on the system disk once it has been installed.
- The system console is the terminal device designated to send and receive system messages.
- Several types of page printers and line printers can be connected to the system.

Switches and Lights on Series 925 Through Series 949 Systems

As system manager, you may need to turn off the computer system or report system status to a Hewlett-Packard support representative when there is a system problem. The large cabinet shown in Figure 12-5 has a power breaker switch in the rear. Use the switch to turn on and off the SPU and all of the peripherals connected to the power outlet inside the cabinet. The small cabinet has no power outlet inside the cabinet, so you turn off each unit with its own on and off switch.

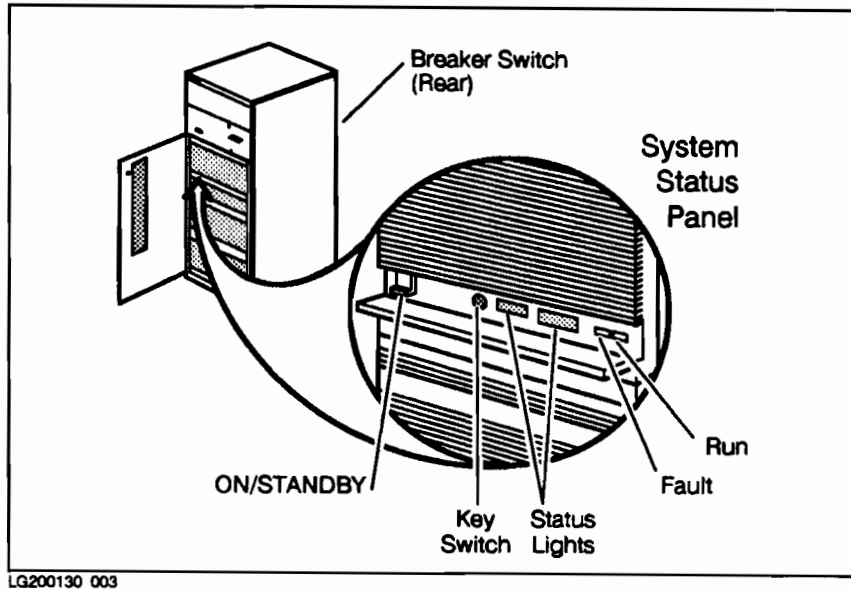


Figure 12-5. Series 925 through Series 949 Switches and Lights

The same system status panel is on the front of both the large and small cabinets and is shown in Figure 12-6. It is used to view system status and to enable remote access.



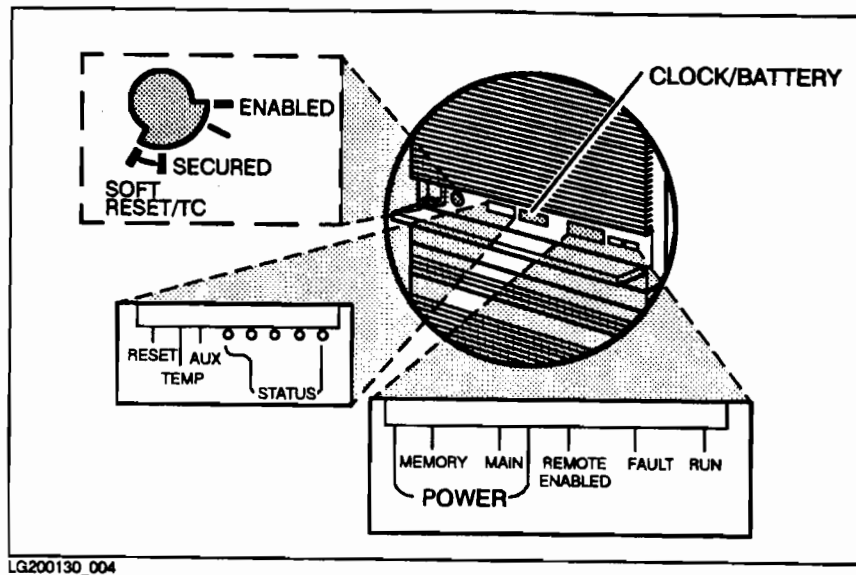


Figure 12-6. Series 925 through Series 949 System Status Panel

Viewing inside the panel, you see the following:

- a key switch to enable remote access
- an ON/STANDBY button used to turn the system on or off
- status lights that go on or off to display system status
- a red FAULT light that lights when a system fault condition has occurred or during system startup
- a green RUN light that shows that the system is running

To remove the SPU Card Cage

The SPU card cage must be removed from the SPU before you can view the cards. The system manager never needs to do this because Hewlett-Packard support representatives normally remove the card cage to service the system.

To understand the CIO expander

The channel input/output (CIO) expander is supported on Series 925 through Series 949 systems but not on Series 950 through Series 980 systems. As a system manager, you never have to access the inside of the CIO expander. This is done by Hewlett-Packard support representatives only; however, it is important to be familiar with what type of cards the CIO expander supports when you are configuring your system.

The CIO expander provides eight additional (five supported) CIO card slots to the SPU. The CIO card slots house the network, console, and device adapter cards. These CIO cards are used to communicate between the SPU and either networks, system consoles and remote consoles, or various peripherals.

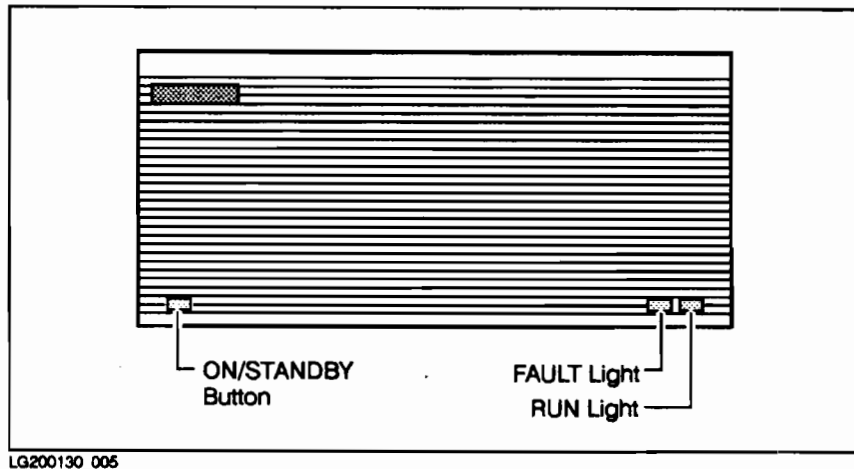


Figure 12-7. Series 925 through Series 949 CIO Expander

The CIO expander is connected with a cable to the processor-dependent hardware (PDH) card on the Series 935 system and to a channel adapter card on the Series 925 system.

CIO expander status lights

The status lights are on the front of the CIO expander, as shown in Figure 12-7. The ON/STANDBY button is used to turn the CIO expander on and off. The FAULT light and the RUN light indicate the following:

- The red FAULT light indicates that a fault condition has occurred.
- The green RUN light shows that the CIO expander is running.

Note

If the red FAULT light goes on (the green RUN light goes off), call Hewlett-Packard support personnel and report what the status lights are displaying on the system status panel.

To understand the battery backup unit

There are two kinds of secondary power supplies supported on Series 900 computer systems:

- Battery backup units (BBU), which are supported on Series 925 through Series 949 systems. For information about BBUs, continue reading this section.
- Uninterruptible Power Supplies (UPS), which are supported on the Series 991 and 995. For information about UPS hardware and software, read the next section.

The battery backup unit (BBU) is supported on Series 925 through Series 949 systems but not on Series 950 through Series 980 systems because they already have a system-installed battery. The BBU provides power to the memory cards for at least 15 to 25 minutes in the event of a power outage. By knowing how to read the front panel, you can determine if the system is running on the battery.

The two lights on the front panel of the BBU, in combination with the FAULT light on the SPU, give status about the BBU. Figure 12-8 shows the BBU status lights. Table 12-2 provides BBU status information.

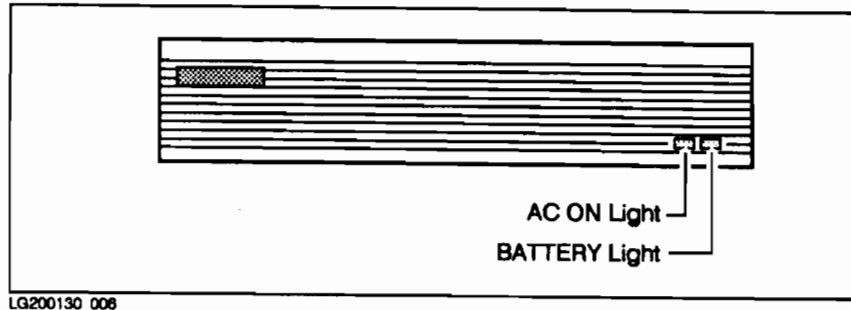


Figure 12-8. BBU Status Lights

Table 12-2. BBU Status Lights

AC Light	Battery Light	SPU - FAULT Light	BBU Status
ON	OFF	OFF	Battery in standby
ON	ON	OFF	Battery charging
ON/OFF	ON	ON	Battery discharging

Battery status conditions are described as follows:

- Battery in standby is the normal operating condition. The battery is recharged.
- Battery discharging condition occurs when power to the system has failed and the BBU needs to provide power to the memory cards.
- Battery charging condition occurs when the battery has been drained and needs to recharge. Power to the system has been applied.

When the BBU is providing power to the memory cards, the BATTERY light is on. In this state, the system is not available for command input. When power returns to the system, the AC ON light comes on. If the BATTERY light is still on, the BBU is still charging. The system resets and does not clear memory. This condition is known as a *return from power fail*. As power returns to the system after the BBU has returned to standby condition, the system resets and clears memory.

Components of Series 950 Through Series 980 Systems

The Series 950 through Series 980 system processor units (SPU) are housed in two cabinets, the processor bay and the power bay, bolted together to form a single unit. Figure 12-9 shows the Series 950 through Series 980 SPU cabinets.

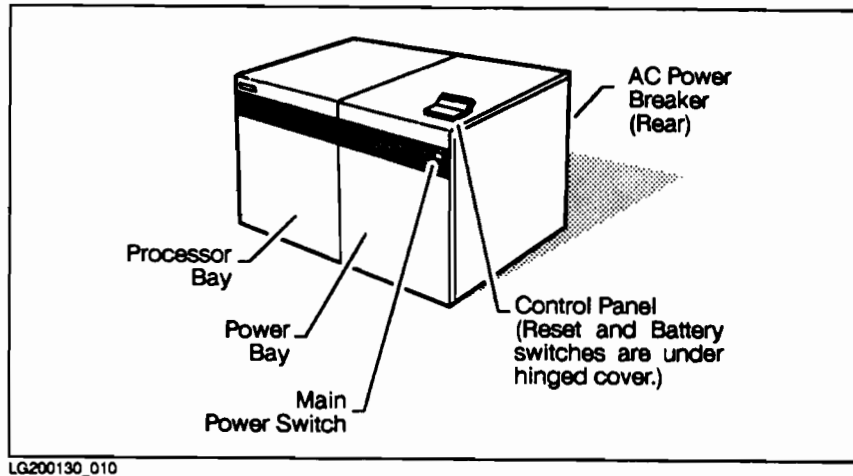


Figure 12-9. Series 950 Through Series 980 SPU Cabinet

Here is a brief description of the components of these systems:

- The processor bay houses the SPU cards and cooling fans.
- The power bay houses the air conditioning unit, the battery charger and battery pack, transformers, power supply modules, and cooling fans. It is not accessible to the system manager or system operator.
- There is no separate CIO expander Battery Backup Unit (BBU) that connects to these systems.
- Nonremovable and removable disk drives are used to store data. You can connect several disk drives to the system.
- The tape drive is used initially to load the operating system. You can connect several tape drives to the system.
- The operating system resides on the system disk once it has been installed.
- The system operator uses the system console to send and receive messages.
- You can connect several page printers and line printers to the system.

Components of Series 991, 992 and 995 Systems

The Series 991, Series 992 and Series 995 system processor units (SPU) are housed in two cabinets, the processor bay and the power bay, bolted together to form a single unit.

Here is a brief description of the components of these systems:

- The processor bay houses the SPU cards and cooling fans.
- The power bay houses the air conditioning unit, the Uninterruptible Power Supply, transformers, power supply modules, and cooling fans. It is not accessible to the system manager or system operator.
- Nonremovable and removable disk drives are used to store data. You can connect several disk drives to the system.
- The tape drive is used initially to load the operating system. You can connect several tape drives to the system.
- The operating system resides on the system disk once it has been installed.
- The system operator uses the system console to send and receive messages.
- You can connect several page printers and line printers to the system.

Switches and lights on Series 950 through Series 980 systems

As system manager you may need to know how to interpret the switches and status lights for Series 950 through Series 980 systems. A main power switch, located on the front of the power bay, is used to turn the system on and off. The ac power breaker that is located on the rear of the power bay may be used, along with the main power switch, to turn off the system power. These switches are shown in Figure 12-9.

The control panel is attached to the top of the power bay. Figure 12-10 gives a close-up look of the control panel. The function of the control panel is represented by three switches (two momentary button switches and one keyed switch), ten system status indicators, and a four-digit hexadecimal display.

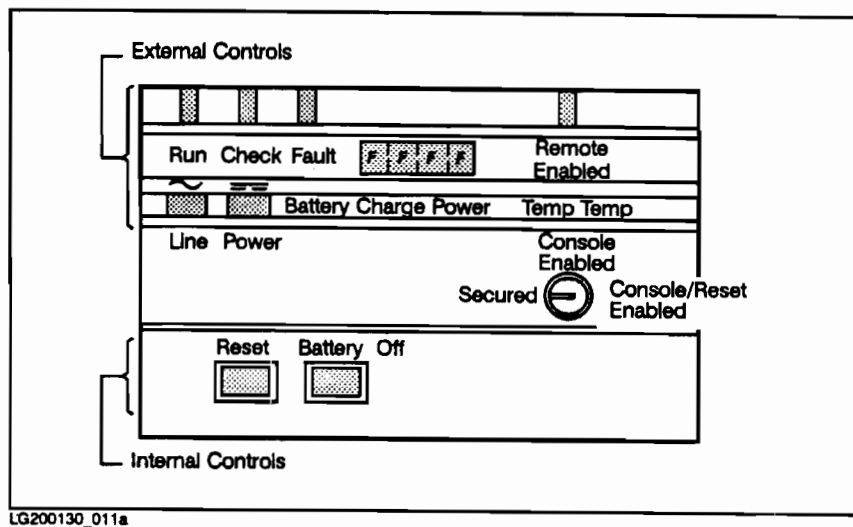


Figure 12-10. Series 950 through Series 980 Control Panel

The system manager uses the control panel to view system status and to enable remote access. Information regarding the status of the system is also found on the control panel. This information is helpful to the Hewlett-Packard support representative when servicing your system. System status is controlled by the following:

- A battery button and a reset button, located under the hinged cover of the control panel. The battery button switch is used to remove battery power from system buses and then to clear memory. The reset button switch is used to reset the system and then to clear memory.
- The “Secured, Console Enabled, Console/Reset Enabled Switch” is a keyed position switch that is controlled by the system manager. It is used to enable or disable the system console and the reset button.
- The four-digit hexadecimal display provides coded messages that are initiated by two sources: software and hardware. If messages appear, the system manager should write them down. The messages should be reported when calling for service to help diagnose status conditions of the system.
- Nine status lights are located on the control panel. Those lights are a RUN light, a LINE light, a POWER light, a CHECK light, a FAULT light, two TEMP lights, a BATTERY CHARGE light, and a REMOTE ENABLED light. If there is a system problem, status light patterns should be written down and then reported when calling for service. Table 12-3 gives information on how to interpret the lights.
- The lights on the system status panel (control panel) that you see lighted when the system is operating normally are the RUN light, the LINE light, and the POWER light.

Table 12-3. Interpretation of Status Lights

Status Light	Interpretation
RUN light	Indicates that the system is operating and there is no failure.
LINE light	Indicates that ac power is being provided to the system.
POWER light	Indicates that dc power is being provided to the system.
CHECK light	Indicates that a nonfatal error has occurred or the battery backup is charging.
FAULT light	Indicates that a fatal error has occurred and the system cannot continue normal operation. Lights during system startup.
TEMP lights (2)	Yellow light represents an over-temp warning condition but the system is still operational. Red light represents over-temp shutdown condition and the system is not operational.
BATTERY CHARGE light	Indicates that the battery is charging.
REMOTE ENABLED light	Indicates that the remote console is allowed access to the control mode commands.

To understand processor bay card cages

As a system manager, you may be interested in knowing what is inside the processor bay. This information should help you become familiar with the system.

The processor bay houses the processor and memory card cages in the front of the processor bay and the mid-bus and I/O card cages in the rear of the processor bay. These card cages are where the various processor, memory, channel adapter, and CIO device adapter cards reside.

The system manager never needs to access inside the Series 950 through Series 980 computer system. Servicing the system is performed by qualified Hewlett-Packard support personnel.

Series 950 through Series 980 systems can use 64-Mbyte memory array cards in addition to 16-Mbyte memory array cards. CIO device adapter cards residing in the CIO card cages are the HP-IB, multiplexer (MUX), LAN interface controller (LANIC), and access port (AP).

The peripherals are accessed by a path address that is defined by the card cage and slot number that the device adapters, channel adapters, and bus converters occupy.

To understand the Uninterruptible Power Supply (UPS)

The Series 9X8 systems and the Series 991 and 995 systems use the HP model A2998A PowerTrust UPS (Uninterruptible Power Supply) unit for powerfail protection.

Like the battery backup method of power failure, the UPS devices protect the HP 3000 system against the loss of “work in progress” in cases of utility AC power failures of up to fifteen minutes in duration. Furthermore, they have been designed to appear similar to the Battery Backup method which minimizes their effect on system operation and management procedures. UPS devices do offer two principal advantages over the Battery Backup method:

- In a minimal UPS-based system, the degree of power failure protection is equivalent to that of the battery backup unit. You can, however, add more UPS devices to the system and provide reserve power to selected peripherals. Depending upon how much of the system is provided with UPS power, it can run a partial or full workload non-stop through limited periods of AC power failure.
- The UPS contains a serial I/O communications interface that, in conjunction with UPS Monitor/iX software, notifies the system operator of any problems. In addition to console messages, the UPS Monitor/iX software also posts a variety of status and warning messages to the system log files which you can review and analyze to evaluate system performance.

You add UPS devices to the I/O configuration using the Node Management Services Configuration Manager (NMMGR) program. (Refer to chapter 3 of this manual for a brief introduction and read *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001) for detailed information.)

Once you have configured the UPSs, the UPS Monitor/iX software continuously monitors the condition of all UPS devices on the system. Furthermore, it emulates the power failure recovery behavior of systems using battery backup units: Upon the return of power following a failure, UPS Monitor/iX broadcasts a system-wide power failure recovery message to all active user terminals and to the console.

Identifying System Connections

To identify the distributed terminal controller (DTC) connections

Distributed terminal controllers (DTCs), terminals, systems, and consoles are connected in different ways to Series 917 through Series 937 systems, Series 925 through Series 949 systems, Series 958 systems, Series 947 through Series 967 systems, and Series 950 through Series 980 systems.

The DTC is used to control serial devices such as terminals, modems, and serial printers on a local area network (LAN). The DTC is supported on Series 917 through Series 937 systems, Series 925 through Series 949 systems, Series 958 systems, Series 947 through Series 967 systems, and Series 950 through Series 980 systems.

A user who accesses a system remotely has a choice of either a console connection or a session through the DTC. All RS 232C and RS 422 devices, except the system console, must go through the DTC to be connected to the SPU. The RS 232C (a 3-pin connector) connects serial devices (terminals, PCs, printers) to the SPU using modem or direct connections up to 50 feet away from the DTC. The RS 422 (a 5-pin connector) directly connects serial devices to the SPU up to 4000 feet away from the DTC. The DTC connects terminals for general use to a LAN. Figure 12-11 shows the rear view of the DTC and where the different connections reside.

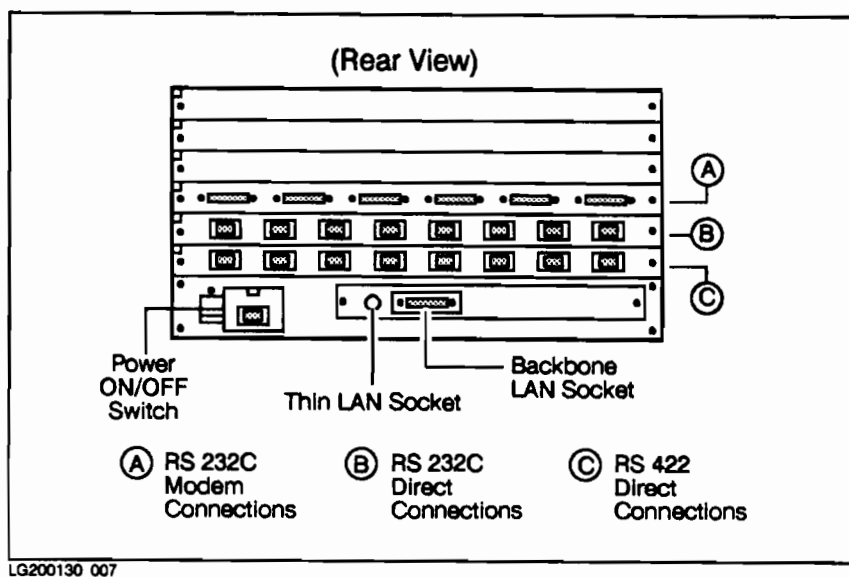


Figure 12-11. Rear View of DTC

The SPU must have one LANIC card installed and dedicated to DTC connections. The DTCs use thin or thick LAN cables.

- Using a thick LAN allows the DTC to be located up to 1,640 feet away from the SPU.
- Using a thin LAN allows the DTC to be located up to 606 feet away from the SPU.

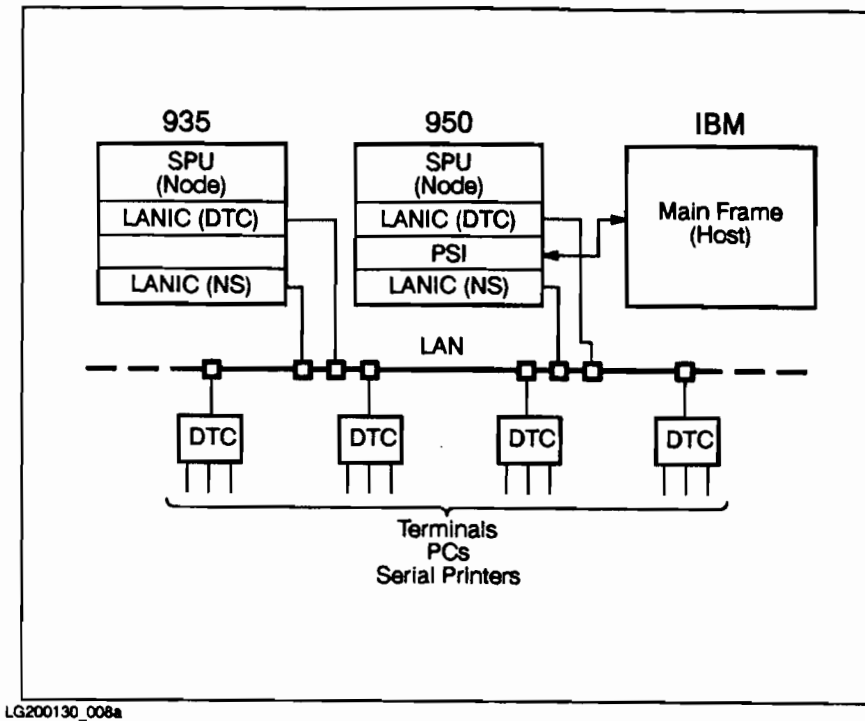
The DTC terminals are configured for each system using the NMMGR program. Refer to *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001) for a description of using the NMMGR program.

To identify network connections

Networks are used to communicate between terminals and systems (DTC), between systems and systems (NS), and between systems and IBM mainframes (PSI) and remote NS. They are supported on the Series 917 through Series 937 systems, Series 925 through Series 949 systems, Series 958 systems, Series 947 through Series 967 systems, and Series 950 through Series 980 systems. The NMMGR program, described in *Configuring Systems for Terminals, Printers, and Other Serial Devices* (32022-90001), configures the network devices; then the following systems can be accessed:

- Systems that have a LANIC card dedicated to DTC communication can access any terminal on the LAN after the terminal has been configured.
- Systems that have a LANIC card dedicated to NS communication can access any system on the LAN after the system has been configured.
- Systems that have a PSI card can access an IBM host mainframe on the network, after the system has been configured.

Figure 12-12 illustrates the various network connections that are available. The LANIC (DTC) and LANIC (NS) can be on the same LAN or on different LANs.



LG200130_008a

Figure 12-12. Network Connections

To identify system console connections

The system console is connected through the RS 232C junction box, while all other terminals are connected through the DTC. As the system manager you designate its use to send and receive system messages.

The system console can be either local or remote. The local console is used for routinely entering and receiving system messages. The remote console is normally used by Hewlett-Packard support personnel to service the system. Remote system access is available as a remote console connection or as a session through the DTC. Any DTC terminal can be designated as the logical console by the system operator. The system operator can transfer the system console capabilities to any terminal on the LAN. An example of system console connections is provided in Figure 12-13. Definitions of the terms are provided in Table 12-4.

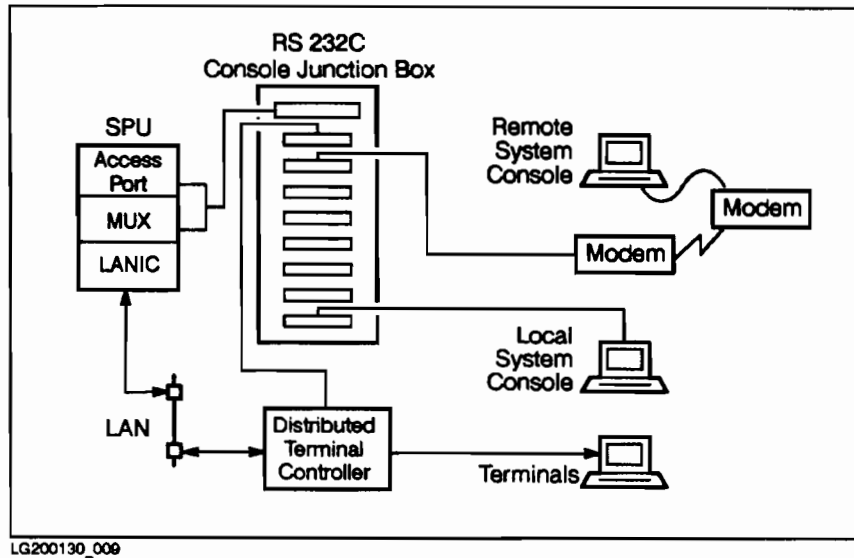


Figure 12-13. System Console Connections

Table 12-4. Definitions of System Console Connections

Term	Definition
MUX card	Communicates between SPU and system console.
AP card	Provides remote access to SPU as remote console or terminal.
LANIC card	Connects SPU to LAN.
RS 232C junction box	Connects local and remote system consoles to SPU.
Modem	Provides remote access to SPU over telephone lines.
Remote system console	Provides remote access to SPU as system console or terminal session.
Local system console	Connected to RS 232C junction box and is used for system input and messages.
DTC	Controls serial devices (terminal, modems, printers) on a LAN.

**To recognize
local/remote console
capabilities**

The local and remote system consoles are used for normal system communication by HP support personnel. Each needs to be connected to the RS 232C junction box. They have **CTRL A** and **CTRL B** command access capabilities. Table 12-5 describes each command:

Table 12-5. Control A and B Commands

Commands	Description
CTRL A	Shutdown, operator reply to peripheral requests.
CTRL B	CM> prompt, remote access commands, reset system (RS), transfer control (TC).

The remote system console is used by Hewlett-Packard support personnel to service the system.

The remote system console must be enabled by a key switch and a command from the system console before use. When it is enabled and in use, the commands and messages display on both the local and remote console screens. Only one keyboard is active, however, and the **BREAK** key on the inactive keyboard activates that keyboard and disables the other.

To identify the logical system console

The logical system console can be any distributed terminal controller (DTC) terminal. System console capabilities are moved to a DTC terminal by using the **CO** command. A logical system console does not support **CTRL A** and **CTRL B** commands.

Determining Hardware Paths

The SPU on Series 925 through Series 949 systems, Series 958 systems, and Series 950 through Series 980 systems consists of the processor, memory, and I/O. Information is communicated through buses. A bus is a path over which information is transferred from any of several sources to any of several destinations. This is how data gets from the SPU to devices, and from devices to the SPU.

When you configure the system, you need to know hardware paths. When you add a peripheral to the system, such as a new disk drive or printer, you must supply a hardware path for the configuration. Hardware paths are a map used by the system when it configures the hardware. They allow the system to find a specific peripheral when only the LDEV or the device class is specified.

To recognize hardware path components

The components that make up the hardware path are shown in Figure 12-14. A path for Series 925 through Series 949 systems and Series 958 systems consists of *module slot number.device adapter.device*. A path for Series 950 through Series 980 systems consists of *bus converter/module slot number.device adapter.device*.

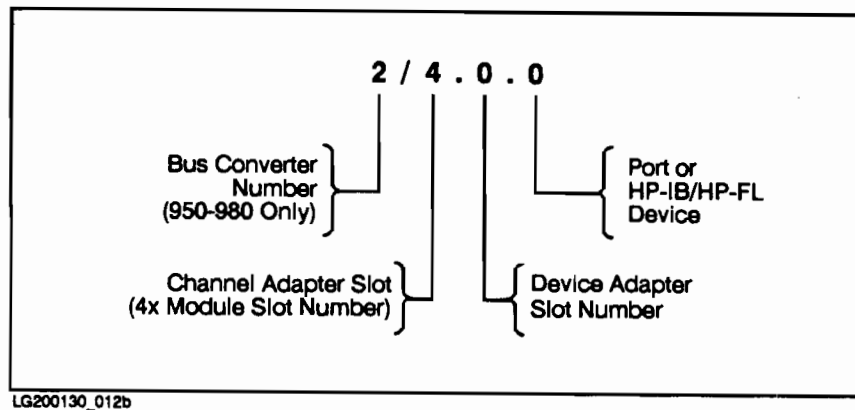


Figure 12-14. Hardware Path Components

The components are described here:

- Bus converter number (Series 947 through Series 967 systems only) –
- Bus converter number (Series 950 through Series 980 systems only) – For midbus 0 use 2/ and for midbus 1 use 6/.
- Channel adapter module number – Four times the channel adapter card slot number (Series 925 systems and Series 950 through Series 980 systems). On the Series 935 system, the channel adapter card slot number is fixed at nine, so the channel adapter module number is four times nine, or 36.
- CIO device adapter slot number – The actual slot the device adapter card is in.
- Port or HP-IB/HP-FL address – The HP-IB/HP-FL address is set on the device itself.

Understanding System Resets

A reset of the system is performed by the operator to regain control of the system whenever it “hangs” or is in an unknown condition. The system performs either destructive resets that clear memory or nondestructive resets that do not clear memory.

After a system hangs, the system console for Series 950 through Series 980 systems can display troubleshooting information. This display is known as a “tombstone” and contains data helpful in troubleshooting hardware failures. The heading for the tombstone contains the letters “HPMC” which means high-priority machine check. If your system displays a tombstone, make a hard copy of it, and contact Hewlett-Packard before resetting the system.

A system can be reset using hardware or software. Perform a software reset by entering either the access port **RS** command or the access port **TC** command. Perform a hardware reset by pushing buttons or turning switches. The system performs a self-test of its cards whenever it is reset.

- The breaker switch on the Series 925 through Series 949 and Series 958 large cabinets is used to reset the system.
- The ON/STANDBY button on the Series 925 through Series 949 systems and the Series 958 systems (any cabinet) is used to reset the system.
- The key switch on the Series 925 through Series 949 and the Series 958 status panel is used to reset the system.
- The Reset button, along with the key switch being in the Console/Reset Enabled position, on the Series 950 through Series 980 control panel is used to reset the system.

Figure 12-15 lists system reset conditions that are either destructive or nondestructive. Table 12-6 gives a description of these conditions.

CONDITION	Series 922-949	Series 950-980
■ Power ON	D	D
■ External Reset	ND	D
■ Access Port RS	D	D
■ Access Port TC	ND	ND
■ Return from Power Fail	ND	ND

D = Destructive
ND = Nondestructive

LG200130_015a

Figure 12-15. System Reset Conditions

Table 12-6. System Reset Descriptions

Condition	Reset Type	Description
Power ON	Hardware	Occurs when the system is powered on.
External reset	Hardware	Initiated by key switch (on 925 – 949, 958 status panel) or key switch and Reset button (on 950 – 980 control panel).
Access port RS	Software	Resets the system and clears memory.
Access port TC	Software	Performs transfer of control and does not clear memory.
Return from powerfail	Hardware	Occurs when BBU has kept power to memory cards and system power returns.

Scheduling Peripheral Maintenance

As system manager, you want a general maintenance schedule to keep the system working properly. You can develop one like this yourself, or you can request Hewlett-Packard support personnel to help you. Hewlett-Packard shows you how to clean the peripherals when the system is set up. Table 12-7 gives an example of recommended maintenance procedures.

Table 12-7. Peripheral Maintenance Schedule

Peripheral	Cycle	Duty
Printers	Daily	Vacuum all paper path areas.
	Daily	Wipe off paper dust from outside the printer.
	Daily	Vacuum the paper supply and paper stock areas.
	When necessary	Remove pieces of paper stuck in the loading tractors.
	When necessary	Change print ribbons.
Tape Drives	Before using first time	Clean tape drive.
	When necessary	Clean tape path.
	After eight hours of use	Clean tape path.
	After several days of inactivity	Clean tape path.
Disk Drives	After repeated RESET messages	Clean removable disk drive.
		Clean removable cover of the disk pack.

Glossary

abort

A procedure that terminates a program or session if an irrecoverable error, mistake, or malfunction occurs.

absolute pathname

A pathname that begins with the root directory, such as /SYS/PUB/TDP.

access

The process of obtaining data from files or acquiring the use of a device. Access implies an input/output (I/O) operation, and is used as a synonym for I/O.

access port (AP)

The port located in the channel I/O (CIO) section of the system card cage that provides a user support interface for issuing hard and soft resets through software commands from the console. It allows a remote console to be enabled and to switch between console and session modes.

account

A collection of users and groups. Each account has a unique name on the system. It is the method used to organize a system's users and files and to allocate use of system resources such as central processor time, online connect time, and file space. Accounts are the principal billing entity for the use of these resources. Every user must specify an account to access the system.

account level security

The types of file access assigned by the system manager to the account when it is created. The types of access are READ, LOCK, APPEND, WRITE, and EXECUTE, abbreviated R, L, A, W, and X respectively. They may be assigned to any user (ANY), members of the account only (AC), or members of the group only (GU). The types of file access permitted are the first level of system security. The account manager may further restrict groups and users within an account by assigning them a limited set of file access modes.

account librarian capability (AL capability)

A capability assigned by the account manager to a user within the account. An account librarian is allowed special file access modes to maintain specified files within the account.

account manager capability (AM capability)

A capability assigned by the system manager to one user within each account who is then responsible for establishing users and groups.

account member

A person who has been granted access to the system through the use of a valid user name within an account. Account members are created by the account manager, who defines the user name and assigns the appropriate capabilities and security restrictions for the user.

account structure

The method of providing organization, security, and billing for the system. It is used to allocate use of system resources such as central processor time, online connect time, and file space. The account is the principal billing entity for the use of system resources.

alpha character

A character in the range of A through Z (or a through z).

alphanumeric character

A character in the range of A through Z, a through z, or 0 through 9.

alternate boot path

The path used for booting the system from a boot tape.

application

A set of computer instructions or programs that guide the computer through a specific task or set of tasks. Examples of applications include spreadsheets, word processing programs, graphics, database management, and communications.

application program

A set of computer instructions that guides the computer through a specific set of tasks. Applications include spreadsheets, word processing, graphics, database management, and data communication programs.

architecture

1) The unique set of machine instructions, registers, and other components that provide the conceptual basis of a computer. 2) In networking, a structured modular network design in which different data communications tasks are assigned to different layers or levels.

attribute

File access codes and special capabilities that enable the computer to determine what functions it will or will not allow a user, group, or account to perform.

autoboot

The process of automatically starting the system.

automatic restart

Main memory battery backup to automatically restart the system after a power failure. Temporary power line interruptions can be tolerated with no data loss and without needing to restart the system.

backup

The process that duplicates computer data to offline media, such as magnetic tape. Backups protect data if a system problem should occur.

batch access capability (BA Capability)

A default capability assigned to accounts and users that allows users to submit batch jobs.

battery backup unit

A box within the SPU that contains a battery to supply power to main memory during a power failure.

boot

The process of loading, initializing, and running an operating system.

boot path

The pointers to the set of files that are used to bring up the system from disk or tape. The primary boot path is used for booting the system from disk resident software. The alternate boot path is used for booting the system from a boot tape. The console boot path is used to determine if the system can autoboot without operator intervention.

boot tape

A tape created by backing up the system configuration with the system generator (SYSGEN) utility program that is used to reload the system configuration. Also referred to as a system load tape. Equivalent to MPE V/E coldload tape.

capability

A method for determining what commands account members are allowed to execute. Capabilities are assigned to accounts, groups, and users to provide system security and access to the operating system. Account capabilities are assigned by the system manager when the account is created. The account manager then assigns capabilities to groups and users within the account.

channel

A path within a data communications line through which data flows.

channel I/O (CIO)

Input/output instructions for a channel.

channel I/O adapter

A device that provides the interface between the central bus (CTB) and the channel I/O buses. Each channel I/O adapter serves as a high performance channel multiplexer providing a full direct memory access (DMA) for all HP-IB and LAN I/O channels and synchronizing the differing speeds and bandwidths of the CTB and channel I/O buses.

channel I/O bus (CIB)

A device that provides a synchronous bi-directional data path between the central bus (CTB) and I/O devices.

channel number

The number assigned to the device controller board in the I/O card cage. It is used to calculate the logical address of the device, or device reference table (DRT) number.

CIO adapter (CA)

The interface slot number containing the adapter for the CIO Bus and central bus (CTB).

CIO expander

The channel input and output expander that provides eight additional peripheral card slots to the SPU.

class

A user-defined collection of objects.

class name

1) A label that is either unique to, or associated with, one or more devices in the system's I/O configuration, used to reference a particular device or class of devices. Device class names may be up to eight alphanumeric characters long, beginning with a letter. A single logical device can have multiple device classnames. The HP 2680 laser printer, for example, is referred to as EPOC (electrophotographic output for computers), PP (page printer), or SLP (system line printer). Directing output to any of these class names sends the output to a laser printer. 2) An abstract entity that can own objects in an HP SQL DBEnvironment. 3) A set of one or more SQL or ISQL commands in a file that can be executed with the ISQL START command.

command interpreter (CI)

A program that reads command lines entered at the standard input device, interprets them, determines if they are valid, and if so, executes them.

communication link

The software and hardware that moves data from the driver and card of one computer to the driver of an adjacent computer.

compatibility

The ability of software developed for one computer to work on another computer. See compatibility mode.

compatibility mode (CM)

A method of providing object code compatibility between MPE V/E-based systems and the 900 Series HP 3000 system. Compatibility mode allows current Hewlett-Packard customers to move applications and data to the 900 Series HP 3000 system without changes or recompilation.

configuration

1) The way in which computer and peripheral devices are programmed to interact with each other. 2) The layout of the computer system, including MPE table, memory, and buffer sizes. The configuration tells which peripheral devices are connected to the computer and how they can be accessed.

connect time

The amount of time, in minutes, that a user, group, or account has used the CPU for a session or job. It can be displayed by executing the MPE REPORT command.

console

A terminal given unique status by the operating system. The operator uses the console to monitor and manage jobs, sessions and resources, respond to requests, and communicate with other user terminals. It is used to boot the system and receive system loader error messages, system error messages, and system status messages.

console boot path

The path used to determine if the system can autoboot without operator intervention.

console command

A command that is executable only from the system console at the = prompt (generated by pressing **CTRL** and the **A** key at the console keyboard). Console commands cannot be entered by other users because **CTRL A** has no meaning on a standard terminal. The logical console, however, can be moved to a standard terminal.

console logging

A system logging event. It records console commands in the system log file.

continuation character

An ampersand (&) character entered as the last character of a command line. A continuation character tells the command interpreter that the command is longer than one line and is continuing onto a second or more subsequent lines.

control-Y

A break function activated by simultaneously pressing the **CTRL** key and the **Y** key on a terminal's keyboard. It is typically a subsystem break and does not affect MPE commands. In documentation this two-key sequence is shown as **CTRL Y**.

CPU time

The amount of time, in seconds, that a user, group, or account has used the CPU. It can be displayed by executing the MPE REPORT command.

crash

1) The unexpected shutdown of a program or system. If the operating system crashes, it is called a system crash, and requires the system to be rebooted. 2) A head crash or disk crash. This occurs when the read/write heads on a disk drive (that normally ride on a thin cushion of air above the disk) make physical contact with the disk surface, destroying data and the disk track. The extent of damage to the system depends on which disk was involved and how much of the disk was corrupted. A crash of the system disk is serious, since it contains the directory of user files as well as operating system programs, the I/O configuration, and the account structure.

create volumes capability (CV Capability)

The ability to define and access non system domain disks with the NEWSET command (private volumes with the NEWVSET command for MPE V/E). Users and accounts assigned CV capability are automatically given use volumes (UV) capability.

cumulative backup

A backup strategy where a full backup is done once a week and partial backups on all other work days.

data communications

The transmission of information from one computer or terminal to another. It is sometimes shortened to datacom.

data communications and terminal subsystems

The methodology used to connect all asynchronous devices to a 900 Series HP 3000, except for the system console.

default

A predefined value or condition that is assumed, and used by the operating system if no other value or condition is specified.

device adapter

A device that manages communications between the computer and a peripheral device. It is the same as an I/O interface card.

device class

A collection of devices that have some user-defined relation. The file system supports a means of maintaining collections of devices but is cognizant of the relation only for certain device class names.

device file

A file associated with a non shareable device (a spool file). Input and output spool files are identified by a number in the **DFID** (device file identification) column of the **SHOWIN** and **SHOWOUT** command displays. A device file can also refer to any non-disk device, such as **\$STDIN** and **\$STDLIST**, the default input and output device files for a terminal.

device independence

A characteristic of the operating system that allows users to selectively redirect input or output from a program, session, or job using the **FILE** command without regard to the nature of the device. File equations created with the **FILE** command are in effect only for the duration of the job or session in which they were defined.

device subtype

A number ranging from 0 to 15 that defines a specific device and its associated software driver. There can be several device subtypes within one basic type. For example, a graphics terminal and one without graphics capabilities can share the same device type, but are assigned different subtype numbers.

device type

A number that defines a type of device. For example, 0 represents a moving-head disk and 16 is the device type number assigned to line printers.

diagnostician capability (DI Capability)

A capability usually assigned only to the Hewlett-Packard customer engineer (CE). It allows the CE to conduct certain CPU and diagnostic tests.

directory

A system table showing the group or account in which a file is located. A directory may contain other information such as size of the file, its creation date, any modification dates, file creator, or file security information.

In the Hierarchical File System introduced with release 4.5 of MPE/iX, a directory is a special file that can contain directories and other files.

DISCFREE

A utility that supplies information about a system's unused disk space, transient and permanent space, and the volume's total space capacity. The information is supplied in either a histogram or a condensed format. Equivalent to the MPE V/E **FREE5** utility.

DISKUSE

A utility that reports information about disk usage for an entire system, including MPE accounts, groups and users and HFS directories.

disk

A circular plate of magnetically coated material used to store computer data. A disk may be fixed, removable, hard, or flexible.

disk drive

A peripheral device that reads information from and writes information to the disk.

disk file

A file stored on disk.

disk I/O

The electromechanical process of transferring the code and data that are stored on disk to and from main memory.

disk pack

A set of one or more disk platters stacked inside a plastic cylindrical container.

disk sector

A section of a disk's surface. A file is stored in one or more sectors.

distributed systems line (DS Line)

The communication line between two computers, controlled by the distributed systems network.

distributed systems network (DSN)

A system of hardware and software data communications products spanning multiple Hewlett-Packard product lines.

distributed terminal controller (DTC)

An intelligent controller with microprocessors to handle workstation connection preprocessing and communications with the system.

DRT number

Device reference table number. The physical I/O address of a device controller, displayed in the second column of the I/O Configuration Table listed during the SYSDUMP dialog. An MPE V/E index into the DRT.

DUMP

A utility program that writes the current state of the system's main memory and secondary storage to tape for analysis. DUMP also, optionally, attempts a software reboot from disk.

EXCLUSIVE access

A restriction limiting file access to one user at a time. EXCLUSIVE access is particularly important during file updates, when two or more people modifying the same record within a file, at the same time, could destroy data consistency.

execute

To carry out the instructions or to perform the routine indicated by entering a command or program name.

executing state

The state of a job or session when it is in progress. Other possible states are INTRO, WAIT, EXEC*, and SUSP.

extent

A group of one or more contiguous sectors on a volume used to allocate permanent disk space. Extents can be variable length; any number of extents can exist for a given file.

file

A group of related records that represents ASCII text (text files) or binary data (such as executable code). Every file must have a file name so the user can access the file's contents.

file code

A four-digit integer that identifies the special function of a file. Users can assign a file code between 0 and 1023 to a file they create to classify it according to its purpose.

file equation

A method of equating a file name to a device or another file. The FILE command is used to establish the relationship of the file to the device. Generally used to direct the input to or output from a program, job, or session to a particular device by referring to the device class, such as TAPE or LP.

file identifier

A number associating a name with a file system object. The file identifier is given to users to access objects via the file system.

file name

A string of up to eight alphanumeric characters, the first of which must be an alphabetic character. The file name is assigned when the file is created or first saved.

file number

An integer value assigned by the **FOPEN** intrinsic that is used to refer to a file in a user program. File numbers zero through seven are reserved for the operating system.

file owner

The person who has complete access to a file unless the user is restricted by an **\$OWNER** ACD entry. The **\$OWNER** ACD entry can restrict the file access of the file owner. The file owner is similar to the file creator. The command **LISTFILE filename -3** displays the fully qualified user ID (**user.account**) of the file owner.

file space

The number of sectors of disk space that a user, group, or account is using. It is determined by executing the **REPORT** command.

foreign disk

A non-system domain disk that MPE V/E does not recognize as a private volume or serial disk. Foreign disks are non shareable devices, and can be formatted either sequentially or for direct record access. Foreign disks, such as private volumes and serial disks, do not have entries in the system volume table.

formal file designator

An alias file name that is used either programmatically or in a file equation to refer to a file. The formal file designator is not the file name found in the system file directory.

free space map

A map of allocated and available disk sectors on the volume set.

fully qualified file name

A complete file description that includes the file name, the group to which the file belongs, and the account to which the the group belongs. The fully qualified file name of the **LETTER** file in the **PUB** group of the **SYS** account is expressed as **LETTER.PUB.SYS**.

function keys

Special keys on the terminal keyboard that are labelled sequentially, F1, F2, F3, and so on, and that correspond to the windows that appear at the bottom of the terminal screen. Function keys perform various activities.

Fundamental Operating Software (FOS)

The programs, utilities, and subsystems supplied on the master installation tape (MIT) for MPE.

group

Part of an account that is used to organize the account's files. All files must be assigned to a group. Each group must have a unique name within an account. Groups are the smallest entity for which use of system resources is reported. A **PUB** group is designated for each account when it is created. Additional groups are created within the account, as needed, by the account manager.

group-level security

The file access modes, and the types of users to whom they are available, as specified by the account manager when the group is created. File access modes assigned to a group are limited to those types permitted to the account.

group librarian capability (GL capability)

A capability assigned by the account manager to a user within an account. A group librarian is allowed special file access modes for the maintenance of certain files within the user's home group.

hard reset

A method of resetting the computer or a terminal. A hard reset erases all information in memory.

hardware

All the physical components of the computer, including the CPU cabinet, tape drives, disk drives, terminals, and other peripherals.

help facility

An online utility providing information on all commands. Information can be accessed by topic areas and tasks.

**Hewlett-Packard Data-Link Control II (HP-DLC-II)**

A standard that defines the elements and procedures for a balanced, bit-oriented, Level II protocol of the Open Systems Interconnection (OSI) model.

Hewlett-Packard Graphics Language (HP-GL)

The graphics instruction set for Hewlett-Packard film recorders and plotters.

Hewlett-Packard Interface Bus (HP-IB)

A channel consisting of an HP-IB cable connected to an HP-IB interface card that is connected to the system's backplane. It performs protocol translation between the CPU and HP-IB. For the 900 Series HP 3000 system up to six devices can be connected to a single HP-IB channel. Disk drives, tape drives, and system printers are connected via an HP-IB which is HP's implementation of the IEEE standard 488-1975 interface.

Hierarchical File System

A multi-level directory structure in which all components exist under a single root directory. Additional directories, which contain files and other directories, can exist anywhere in the file system. (MPE/iX accounts and groups are considered to be special directories that, while they fit into the hierarchical scheme, continue to serve as traditional MPE accounts and groups.)

High Level Data-Link Control (HDLC)

Types of protocols that eliminate much of the handshaking (and resultant time-consuming line turnarounds).

histogram

A graphical representation of data.

home directory

The default group, within an account, used as the current working directory when none is specified at logon time.

home group

The group to which a user is automatically logged on to if no other group is specified with the HELLO or JOB command. If no home group is assigned, the user must always specify a group when logging on. The account manager assigns the home group when a user's name is first defined.

host computer

1) The primary or controlling computer in a multiple computer installation. 2) In a network, the computer that primarily provides services such as computation, database access, or special programs or programming languages, to other users on the network.

implied run

The ability to run a program without explicitly using the RUN command. In MPE/iX it is not necessary to specify RUN FCOPY.PUB.SYS to invoke and run the FCOPY program. It is only necessary to enter FCOPY.

incremental backup

A backup strategy where a full backup is done once a week and partial backups are done on every other work day.

initial program load (IPL)

The initialization procedure that causes an operating system to begin operation.

initial system loader (ISL)

The software used to bring up MPE/iX or to perform a memory dump to tape. It provides a user interface to obtain information about or to alter the bootpath.

input

1) The data to be processed. 2) The process of transferring data from external storage to the computer.

input/output (I/O)

The process of, or equipment used in, transmitting information to or from the computer.

input priority

A number in the range of 1 (lowest priority) to 14 (highest priority) assigned to input jobs. The input priority can be assigned by the system (default is 8) or by the user. Jobs with a input priority less than or equal to the system outence (default 7) are deferred.

INSTALL

The MPE/iX initial system loader (ISL) utility that performs a system load from tape and builds essential operating system files and data structures on disk. Equivalent to the MPE V/E RELOAD operation.

interactive session

A session that allows users to enter commands and data at the terminal and receive an immediate response. Interactive sessions are useful for data entry and retrieval, text editing, or program development where direct dialog with the computer is preferred.

interactive access capability (IA capability)

A capability assigned to accounts and users allowing users to initiate sessions with the HELLO command.

interactive user

A user who enters commands at a terminal.

I/O bay

A cabinet containing the card cages and device controller boards for peripherals connected to the HP 3000.

I/O dependent code (IODC)

The portion of the operating system software that contains I/O module dependent data and code used by Processor Dependent Code (PDC) in configuring the I/O module and in booting the system.

I/O path

The address of the interface hardware and the physical path to reach a device. It is constructed top down from where the device is physically attached to the system. The path is determined by the CIO adapter module number, the device adapter (DA) slot number, and the device address.

job

A method of submitting a single command to process multiple operating system and utility commands. Once submitted, the job executes independently of the user's session. Jobs are used to compile source programs, modify files, or perform other functions not requiring user interaction.

job limit

A limit set to manage the number of jobs executing on the system. The system manager or operator can restrict system usage by reducing the number of jobs allowed to run. If the **LIMIT** command is used to set the job limit to 0 (zero), no additional jobs can log onto the system.

keyword

A word assigned a specific meaning by the operating system, a subsystem, a computer language, or a utility.

keyword parameters

Words that have special meaning to the command interpreter and are used to modify the intent or effect of an MPE command. Keyword parameters, unlike positional parameters, may appear in any order after a command has been entered on the command line. An entire keyword parameter group, such as **PASS=password**, must be separated from other keyword parameters by a semicolon (;).

LAN 3000/XL LINK

The hardware and communications software needed to connect 900 Series HP 3000 machines to a network for system-to-system communication.

LAN cables

Cables used to connect the distributed terminal controller (DTC) and the system.

LDEV number

See logical device number.

library

A file containing a set of procedures and variables that can be accessed by programs.

Local Area Network (LAN)

A computer network confined to a single location. For example, connecting two or more computer systems within a single office together creates a LAN.

Local Area Network Interface Controller (LANIC)

A hardware card that fits into the backplane of the HP 3000 system and provides a physical layer for IEEE 802.3 local area networks.

local network

The network to which the local node belongs.

local node

The system where you are physically located and logged on, and at which you enter commands.

locked state

The status of an output spoolfile when it is unavailable for printing.

lockword

A word used as a security device on files. A lockword can be assigned to a file when it is created or renamed, and must be supplied to regain access to the file. The word can be from one to eight alphanumeric characters long and must begin with an alphabetic character.

log file

A file that maintains a record of events. Each event is recorded in a separate log record, and is correlated with the job or session causing the event.

logging

1) The process of recording all system modifications to a tape or disk file for the purpose of recovery or accountability. If the system fails, the log file can be used to restore the system to its state prior to the failure. 2) The process used by DBCore to record the activity of a DBEnvironment to enable either rollback or rollforward recovery if necessary.

logging shutdown

A shutdown marking the end of the logging cycle. In most cases, it is performed just prior to either system or database backup.

logical device (LDEV)

A disk file, a set of disk files, or a physical device associated with a data stream between a host and a remote system.

logical device number

A number assigned to all hardware components of a computer system and used for identification purposes.

logoff

A method of terminating a session. To log off the system, enter the **BYE** or **EXIT** command.

logon

A method of initiating a session. To log on to MPE/iX, enter the **HELLO** command and a valid user and account name, plus a group name if necessary, and any required passwords.

logon group

The group specified when logging on using the HELLO command. The syntax is *username.accountname, groupname*. Once the desired group is accessed, resident files can be referred to without fully qualifying them.

logon identity

A security device used to verify users to the system. A logon identity includes a valid user name and account name in the form *user.account*.

logon prompt

A system prompt that indicates the computer is ready to initiate a session.

logon session

An identification device used when logging on. The correct syntax is *sessionname, username.accountname*.

master volume

The only volume needed to define a volume set. It contains the configuration data, the root directory, a free space map, file label table, and a volume label with a unique volume set ID for the volume set.

member volume

A volume containing a volume label indicating that it belongs to a volume set. It may be used by one or more volume classes.

memory error logging

A facility that records all memory errors. It begins automatically when the system is initialized.

memory mapped I/O

A configuration in which each device or I/O interface card is assigned a set of memory locations, or memory mapped I/O registers.

menu

A display on the terminal screen showing the options available within a program. Many application programs use menus to show the options a user can select.

MPE/iX

Multi-Programming Executive with integrated POSIX. The operating system for the 900 Series HP 3000 computers. MPE/iX manages all system resources and coordinates the execution of all programs running on the system.

multiple RIN capability (MR capability)

A capability assigned to accounts and users allowing a user multiple RINs (resource identification numbers) so they can lock more than one resource or device at a time. MR capability is

usually restricted to only a few users, since simultaneous resource locking can lock (or hang) the entire system.

multiple RINs

The mechanism that allows an account, group, or user to lock more than one resource at a time by specifying the multiple RIN (MR) capability with the **ALTACCT**, **ALTGROUP**, or **ALTUSER** commands.

native mode (NM)

The native run-time environment of MPE/iX. In native mode, source code has been compiled into the native instruction set of the 900 Series HP 3000 system.

network

A group of computer systems connected so that they can exchange information and share resources.

network administrator capability (NA capability)

A capability that allows a user to manage the data communications subsystem at a specified location.

network architecture

A structured, modular design for networks.

network services (NS)

A group of software products that provide the user interface to the network. They allow batch jobs submittals, file transfers, virtual terminal access, and other services.

node

One end of a communications link or a computer system in a network. For example, if two HP 3000 computers are connected via a DS line, each system is considered a node.

node manager capability (NM capability)

A capability assigned to users allowing them to control communications subsystems at their node.

node name

A string of up to 31 characters, not including control characters or spaces, that uniquely identifies a node on a local area network (LAN).

non-shareable device capability (ND capability)

A capability assigned to accounts and users allowing account members to own non-shareable devices such as unspooled tape drives and line printers, serial disks, private volumes (on MPE V/E), and foreign disks.

nonsystem volumes

Volumes that are member volumes of a volume set. They do not need to be mounted for the operating system to run.

operating system

The software that allows the computer to operate. It consists of programs such as basic file and I/O manipulators. All subsystems run upon the operating system.

operator command

Commands executed only at the system console by the system operator. Operator commands can be distributed to specific users at the operator's discretion with the **ALLOW**, **ASSOCIATE**, and **JOBSECURITY** commands.

OPERATOR.SYS

The user and account that MPE automatically logs on to at the console when the system is started. **OPERATOR.SYS** may or may not be assigned special capabilities. Unlike the system supervisor (who is assigned **OP** capability), or the system manager (who is assigned **SM** capability), there is no mnemonic that entitles the operator to execute a special subset of commands. The operator's power and responsibilities derive solely from control of the system console and any capabilities assigned to it by the account manager of the **SYS** account.

optional parameter

A parameter that is not required when entering a command or calling an intrinsic. In reference manuals, optional parameters are surrounded by square brackets ([]).

outfence

A number in the range of 1 (lowest priority) to 14 (highest priority), used to control access to the system printer. If a job does not have an input priority higher than the system outfence (default 7), it will not print.

output

Data transferred from internal to secondary (external) storage in a computer. Also, the process of transferring information from the computer to a peripheral device.

output priority

A number in the range of 1 (lowest priority) to 13 (highest priority) assigned to an output spool file either by the system (a default value) or by a user. It is used to determine the order in which files will be printed.

parameter

A value in a list of values that is passed to a procedure. The parameter is used in calculations or operations in the procedure.

parent directory

A directory that contains other directories.

path

The course within a computer that a message takes, typically through software protocol handlers.

pathname

A way of identifying the path to any MPE/iX file. For example, you can refer to the `FILE1.PUB.SYS` using the pathname `/SYS/PUB/FILE1`. Notice that pathnames are top-down rather than bottom-up as in MPE syntax.

peripheral

A hardware device attached to and controlled by a computer, such as a terminal, tape drive, disk drive, or printer.

permanent file

A disk file with an entry in the system directory. To delete the file, it must be erased from the system with the `PURGE` command or with certain invocations of the `FCLOSE` intrinsic.

permanent space

Disk space reserved for use by permanent structures such as files, the label table, or the free space map.

port

An outlet from the computer used to connect the computer to peripheral devices. A cable runs between the outlet and the device.

positional parameters

One or more terms appearing in a specific order on the command line that modify the intent or effect of the command. If a positional parameter is omitted, the user must supply a comma in its place.

POSIX

Portable Operating System Interface. A set of standards describing functions of an operating system interface that applications use to become *POSIX-compliant*. Such applications facilitate software portability and minimize porting costs.

power down

To turn the system power off.

power up

To turn the system power on.

preventive maintenance (PM)

The regular housecleaning chores performed to keep the system from suffering performance degradation and to prevent problems from developing on the system.

primary boot path

The path used to boot the system from disk-resident software.

priority request

The use of the optional parameter ;HIPRI in the HELLO and JOB commands. This capability, granted to system supervisors and system managers, allows a job to be dispatched or a session to be initiated, overriding the current jobfence or execution limit.

private volumes

MPE V/E removable disk volumes that are not included in the system I/O configuration table and, therefore, must be brought online with an explicit LMOUNT command. To access a private volume, a user's logon group and account must be assigned to a specific volume set with the VS parameter of the ALTGROUP and ALTACCT commands. Private volumes are nonsystem domain devices. Equivalent to MPE/iX mountable or nonsystem volumes.

privileged mode capability (PM capability)

A capability assigned to accounts, groups, or users allowing unrestricted memory access, access to privileged CPU instructions, and the ability to call privileged procedures.

process

The unique execution of a program or procedure by a particular user at a particular time. If several users execute the same program, each is a separate process. Similarly, if the same user runs several programs, each execution is also considered a distinct process.

process handling capability (PH capability)

A capability optionally assigned to accounts, groups, and users allowing a currently executing process to create other processes. PH capability also allows process suspension, interprocess communication, and process deletion. Since the proliferation of processes results in heavy system resource usage, PH capability is typically restricted to only a few users.

process identification number (PIN)

A number assigned to a process by MPE when the process is created. It is used internally by MPE (in the process control block (PCB) table) and during requests for system resources at the console (when the operator responds to requests by referencing the PIN in the REPLY command).

processor dependent code (PDC)

An MPE/iX hardware routine to read and initialize the I/O paths used for booting or rebooting the system.

program

A sequence of instructions that tells the computer how to perform a specific task.

programmable sessions capability (PS capability)

A capability allowing a user to execute the **STARTSESS** command and to call the **STARTSESS** and **ABORTSESS** intrinsics.

prompt

The character(s) displayed at the terminal screen indicating that the system is ready for a command. The default MPE command interpreter's prompt is a colon (:). Other subsystems have different prompts.

PUB group

A group created when an account is created whose files are usually accessible to all users within the account.

PUB.SYS

The public group of the system account. **PUB.SYS** is the group in which programs and applications available to all users of the system reside.

quiet mode

A session mode in which messages sent from other jobs or sessions to a terminal are not displayed. Users control quiet mode with the **SETMSG** command. To determine who is running quietly, execute the **SHOWJOB** command. Those sessions not receiving messages are indicated by the word **QUIET** in the third column of the listing. A **WARN** message from the system console overrides quiet mode, and should be used for all critical communication, such as informing the user of an impending system shutdown.

relative pathname

A pathname that is interpreted from the current working directory. For example, **./dir1/myfile** refers to the file **myfile** in the directory **dir1** in the current directory.

remote access

Communication with a computer from a physically separate location.

remote mode

A mode in which a terminal transmits and receives data from a remote (or host) computer.

remote node

A node that is not physically located where you are and which you communicate with via data communication.

remote session

A session initiated from an area physically separated from the computer.

remote system

A computer system physically separated from other computer systems.

remote system console

A terminal which provides remote access to the SPU as a system console or terminal session.

remote terminal

A terminal that is indirectly connected to the computer, using a modem and telephone hook up.

required parameter

A parameter that is required when entering a command or calling an intrinsic. In reference manuals, required parameters are surrounded by braces ({}).

resource

Any device or item used by a computer, for example I/O devices, disk files, or programs.

resource identification number (RIN)

A number identifying a user-defined resource. Users are normally allowed to lock only a single RIN, which means they can have exclusive access to one resource at a time, such as an I/O device, a file, or a program.

resource sharing

The most significant feature of a network. With resource sharing, elements at each node are accessible from other nodes in the network. These elements may include disk files, printers, magnetic tapes, terminals, and other programs.

response center support (RCS)

An HP support agreement coverage that provides telephone assistance with software usage and problems.

restore

The process of retrieving user files from **SYSGEN** (MPE/iX), **SYSDUMP** (MPE V/E), and **STORE** tapes or from serial disk and writing them to disk. Restoring is executed with the **RESTORE** command.

restricting data

A way of limiting access to data by grouping data into volumes, volume classes, and volume sets.

root directory

In the Hierarchical File System introduced with Release 4.5 of MPE/iX, the main directory under which all accounts, groups, files and other directories are organized. Designated by a slash (/).

run

To execute a program.

run time

The environment in which a process is running or executing.

save files capability (SF capability)

The capability allowing users to save the files they create. It is assigned by default to accounts and users.

search path

A mechanism that controls which file is opened once a command is determined not to be a UDC nor an MPE command.

sector

A portion of a track on a disk, and the smallest addressable piece of the disk. MPE-formatted disks use 128-word sectors (256 bytes).

security

1) The provisions that prevent unauthorized users from entering the system, accessing data, or using resources, programs, or capabilities. 2) The provisions included in MPE to protect the system from unauthorized use. MPE offers several methods of creating a secure environment. The most basic level of security includes organizing files into groups and users into accounts, either of which may be assigned a password. Security also refers to the ability to read, write, append, lock, and execute files, optionally assigned to accounts by the system manager and to groups and users by the account manager.

segmented library (SL)

A file structure containing code segments that are shareable, general-use MPE, utility, and subsystem procedures not unique to a particular process. The three levels of SLs are group library SL, available to any user who can access the group; the public library SL, accessible to account users; and the system library SL, used by all system users.

session

A mode in which the HP 3000 system is used interactively by entering commands and data through a terminal's keyboard and receiving immediate responses to input. A session is initiated with the **HELLO** command and is ended with the **BYE** command, or a second **HELLO** command that logs the user off the first session and onto another session.

single-user mode

A DBEnvironment startup mode that allows only one DBE session to be active at a time.

single-user state

A condition of the MPE/iX operating system in which the system console provides the only communication mechanism between the system and its user.

single-user system

A system that can communicate with only one fixed terminal.

soft reset

A reset that initializes a variety of terminal functions but does not reset the memory.

software

A set of programs, instructions, rules, and procedures concerned with the operation of a computer.

spooling

An activity that permits the concurrent use of output devices and batch job input. (SPOOL is an acronym for simultaneous peripheral operations online.) If multiple users send output to a nonshareable device, such as a tape drive or line printer, their output is directed to spool files on disk. The output is printed on a priority basis as the printer becomes available and the users can proceed with other processing activities without waiting for the printer. Multiple batch jobs can also be submitted concurrently. The jobs are spooled to disk and executed according to the priority level specified by its submitter with the JOB command.

spool queue

Disk space where spool files are kept.

START

An initial system loader (ISL) utility and its options that is used to start the system from disk and to build the system data structures. This utility is used to recover from a hang or failure or to reboot the system after scheduled downtime. The START RECOVERY option is equivalent to the MPE V/E WARMSTART procedure, and the START NORECOVERY option is equivalent to the MPE V/E COOLSTART procedure.

\$STDIN

A system-defined file name that refers to the standard input device used to initiate a session or job; usually a terminal keyboard, card reader, or tape drive.

\$STDLIST

A system-defined file name indicating the standard job or session listing file corresponding to the particular input device being used. The listing device is usually a printer for batch jobs and a terminal for sessions.

storage device

A device (such as a disk pack, a disk cartridge, a flexible disk, magnetic tape, or cartridge tape) onto which data can be stored and subsequently retrieved.

STORE

1) The process of saving HP 3000 files to tape or serial disk. Storing is executed by using the **STORE** command. 2) A machine instruction that tells the CPU to take information from a register and put it in memory.

stream

To run batch jobs or data from a session or a job by using the **MPE STREAM** command. Once a job is streamed, it will execute as a separate process without requiring any further user input or supervision.

subdirectory

A directory that is contained within another directory.

subsystem

A software program that performs a specific function, such as compiling programs, copying files, or editing text. Subsystems are executed by entering a single command at the colon prompt. At that point a different prompt is displayed, and a set of commands specific to the subsystem become available to the user. The user must explicitly exit the subsystem, usually by entering **E** or **EXIT**.

SYS account

A special account on the HP 3000 system, included with the system when it is first installed. It contains all MPE files (stored in the segmented library), supported subsystems, utility programs, and compilers.

system

A group of one or more CPUs that communicate through buses without the use of data communications software.

system abort

An orderly system failure. MPE tries to clean up by closing files and flushing buffers when possible.

system configuration

The process of tailoring the operating system to accommodate the current physical layout and workload of a particular installation. The configuration is typically modified when new terminals, another line printer, or a disk drive are added. The system also

can be reconfigured to assign new class names to existing devices, change the size of system tables or virtual memory, modify system logging, or alter any other configuration parameter.

system console

1) A workstation given a unique status by the operating system. It is used by the operator to execute specific commands for the purpose of managing sessions, jobs, and system resources. It is associated with all boot or system loader error messages, system error messages, and certain system status messages. 2) The terminal, usually logical device 20, that the system operator uses to monitor system activity, respond to resource requests, and send messages to user's terminals. The console (and its associated privileges and responsibilities) may be transferred to another logical device with the **CONSOLE** command.

system control panel

A panel on the computer, containing control switches and status indicator lights.

system-defined files

The files defined by MPE and made available to all users to indicate standard input or output devices, special temporary files, and files opened for output that do not perform an actual write operation.

system disk

The disk volume mounted as logical device 1. It contains MPE, I/O configuration information, the account structure and file directory, and utilities and subsystems. It also contains an area reserved for virtual memory and can be used to store user files.

system domain

An MPE V/E configuration for disk drives. System domain disks contain only shareable files, and remain online until the system is shut down. Because information about all system domain disks is entered into the system volume table, a system domain disk can be taken offline only by altering the I/O configuration during the SYSDUMP dialog and coldloading the new configuration. Equivalent to MPE/iX system volume.

system failure

An internally detected error from which recovery is not possible. Rather than continue to operate, risking data integrity, the operating system halts the computer.

system file directory

A directory maintained by MPE that records the name, group, and account of each permanent file on the system. The directory contains the size of each file, its location on the disk, who may access it, and other information.

system generator (SYSGEN)

The MPE/iX utility used to create or modify system and I/O configurations; add, remove, and replace program files and boot files; replace system libraries; generate a full system backup; and create a boot tape to bring up an MPE/iX system with the new configuration. Equivalent to MPE V/E SYSDUMP and INITIAL utilities.

system halt

The condition following a system shutdown or system failure, indicated by no response at the system console or to any user command.

system load tape

A tape that contains the system load utilities, base system files, and user files. It is generated with the SYSGEN utility. Equivalent to the MPE V/E coldload tape.

system logging

The facility that records details of system resource requests in a series of log files on disk. The system manager or operator can select which system events to record such as job or session initiation or termination, program termination, file closing, file spooling completion, and system shutdown. I/O device failures are recorded in the system log and are used to detect problems before they interfere with overall system operation.

system manager

The person who manages the computer installation, is responsible for creating accounts, and assigns capabilities and resource limits.

system manager capability (SM capability)

A capability assigned to the user name and account to which the person designated as system manager logs on. The system manager is responsible for the structure, security, and overall operation of the system by establishing accounts and assigning capabilities and resource-use limits to each. The system manager assigns account manager and system supervisor capabilities to specific users.

system processor unit (SPU)

The box in which all the processor boards and cards reside.

system startup

A method of loading the MPE operating system from either disk or tape by bringing a subset of the MPE initiator program into memory.

system supervisor capability (OP capability)

A capability assigned by the system manager to the system supervisor's user name and account. The system supervisor is responsible for performing backups, altering the system

configuration, and in general, tuning the computer so that it continues to perform well and meet the needs of users.

system volume

An MPE/iX system volume set. It contains a bootable system image and system configuration on its master volume. It is the only volume needed to load and start the system. It is always mounted and named `MPEXL_SYSTEM_VOLUME_SET`.

temporary file

A file that exists only for the duration of a session or job.

terminal

A hardware device connected to a computer and used for entering and receiving data. A terminal consists of a keyboard and a display screen.

terminal type

Hewlett-Packard's classification for terminal models and their capabilities.

throughput

A measurement of a computer system's speed and productivity.

transaction

A logical unit of work.

transaction logging

A method of tracking each unit of work to facilitate recovery from the abnormal end of transaction processing and system failures. A transaction log file is automatically generated and maintained by the transaction management facility. Files can be restored to a consistent state by copying the contents of the log file into the data file.

transient space

Disk space used for temporary processes such as stacks and operating system data structures.

unit number

A part of an address used for devices. A number whose meaning is software-dependent and device-dependent, but which is often used to specify a particular disk drive in a device with a multidrive controller.

UPDATE

1) The MPE/iX ISL utility that performs a system load from tape. It replaces the current base system files on disk, and optionally replaces configuration files. The ISL `UPDATE CONFIG` option is equivalent to the MPE V/E `COLDSTART` procedure, and the `UPDATE NOCONFIG` option is equivalent to the MPE V/E `UPDATE` operation. 2) An MPE V/E coldload option that loads all files in the `PUB` group of the `SYS` account from the backup

media. I/O configuration data, the directory, and user files are loaded from the system disk. **UPDATE** is typically used to install a new version of system software or to load MPE from another computer. Equivalent to the MPE/iX ISL **UPDATE** utility **UPDATE NOCONFIG** option.

use communications subsystems capability (CS capability)

A capability assigned to accounts and users allowing access to the MPE communications subsystems.

user command

A set of MPE/iX commands that a user has grouped together to perform a specific task. A user command is stored in a command file and does not have to be entered into a catalog. User commands are last in MPE's search path for commands.

user level security

The file access modes permitted the user. User level security must duplicate, or be a subset of, the file access permitted the user's account and group.

user logging

A facility that enables users and subsystems to record additions and modifications to files. If necessary, user logging also provides the means whereby recorded entries can be used to recover the files themselves.

use volumes capability (UV capability)

A capability assigned at the account and user level allowing users to access private disk volumes.

utility program

An operating system program that performs specific functions such as file copying, sorting, merging, memory dump analysis, or monitoring available disk space.

variable

A value that can be changed, as opposed to a constant, usually represented by a letter or a group of alphanumeric characters.

volume

A single disk pack. Each volume is a member of a volume set and contains a volume label, a label table, and a free space map.

volume class

A class used for the allocation and restriction of disk space. A volume class is a logical subset or partition within a volume set and can bridge any number of physical member volumes of a volume set.



volume name

The name given to a volume set or volume class with the **NEWSET** command. The name can be assigned only by a user with CV (create volume) capability, usually the system manager or account manager. The volume name is an ASCII character string of up to eight alphanumeric characters, beginning with an alphabetic character.

volume number

The part of an address used for a device number whose meaning is software and device dependent, but is often used to specify a particular volume on a multivolume disk drive.

volume set

A group of up to 255 related disk packs. One volume of the volume set must be designated as the master volume for the set. Each volume set is assigned a name by which it is identified and referenced. MPE/iX recognizes both system volume sets and nonsystem, or mountable, volume sets.

volume set information table (VSIT)

A part of a master volume of a volume set containing the volume set configuration data.

volume testing

The verification that the system continues to operate when loaded to each limit, the determination of what occurs when those limits are exceeded, and the determination of what occurs when the system is emptied after being in a full state.

VOLUTIL

The MPE/iX utility that provides volume initialization and maintenance, volume label and membership inquiries, and volume space and sector status. Equivalent to the MPE V/E **VINIT** subsystem.

welcome message

A file containing a greeting and important system information. It is created by the system operator and displayed each time a user logs onto the system.

work file

A temporary file created when a text editor is invoked. A work file is a copy (in memory) of a permanent disk file. Any changes to the work file are lost unless the user saves the updated version of the file.

write

To put information in a certain place.

write-enable

To remove a disk's write-protection, allowing the disk to be written upon.

write-protect

To protect stored data so that it cannot be overwritten.

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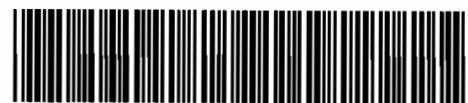
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