

Shared Resource Management System Manager's Guide

HP 9000 Computers

HP Part Number 98619-90033



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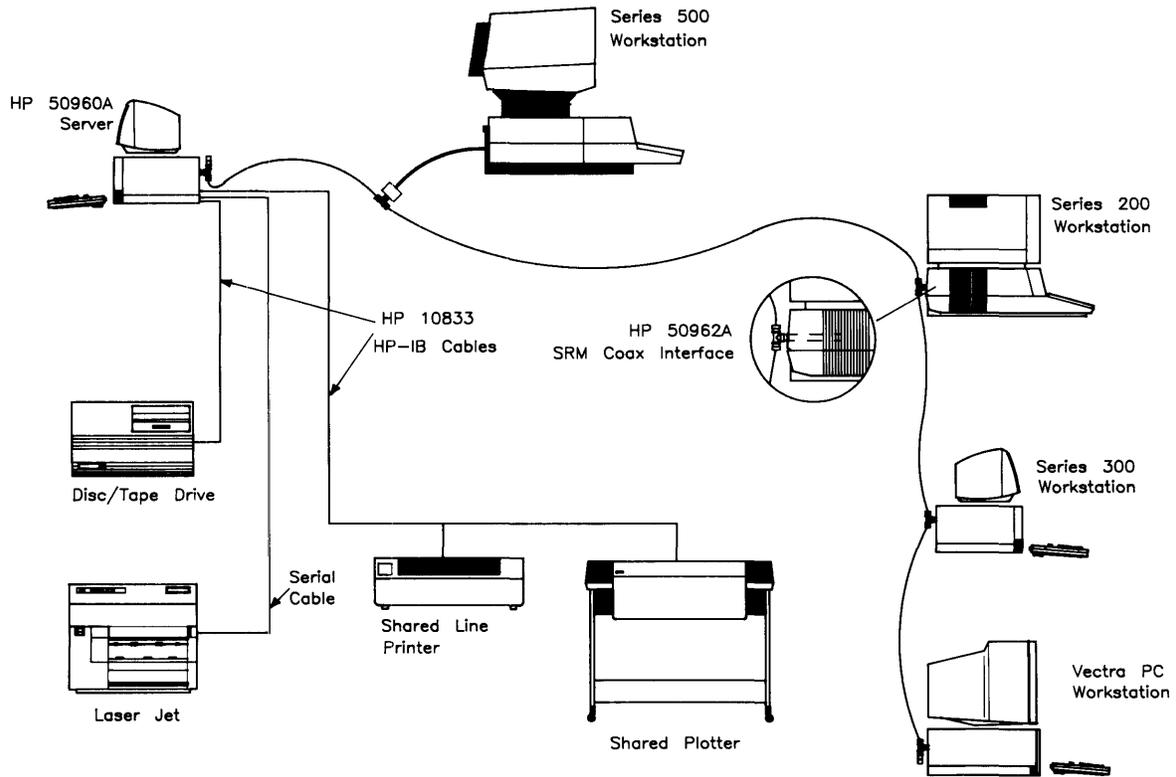
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Introduction

The Shared Resource Management (SRM) system allows sharing of files and peripheral devices within a network of workstations.



Example of a Shared Resource Management System Using the Coax Network

About This Guide

The SRM system manager (the person who sets up, maintains and troubleshoots the SRM system) should read this guide.

When to Use This Guide

Use this guide **AFTER**:

- you have planned your SRM system and prepared its site using the *Shared Resource Management System Planning Guide*,
- you have installed the SRM system hardware using the *Shared Resource Management Hardware Installation Manual*, and
- you have installed the SRM system software for an SRM server and its workstations using the *Shared Resource Management Software Installation Manual*.

What Is in This Guide

This is **NOT** a workstation manual and does not explain the user commands or user interface for workstations connected to the SRM system.

The following is a summary of what this guide covers:

This **Introduction** gives system requirements, a conceptual overview of the SRM system, and additional references.

Part I: Routine System Management

Use this part of the guide to learn how to perform routine SRM system management and to become more familiar with how the system works.

Chapter 1 describes how to customize your system by assigning names to workstations and by combining the directory structures of SRM discs.

Chapter 2 explains how to restart and stop an SRM server (or bring up the system and bring down the system).

Chapter 3 discusses how to manage the system's shared peripherals (mass storage devices, printers, and plotters) for maximum performance, efficiency, and security.

Chapter 4 gives suggestions for designing a system backup strategy and media management scheme.

Chapter 5 covers how to perform a backup and change the system's current backup setup.

Chapter 6 covers how to restore backed up directories and files to reconstruct an entire file system or only part of it.

Part II: Troubleshooting

Use this part of the guide when something goes wrong with the SRM system, and you need help correcting the problem.

Chapter 7 explains how to use the Disc Check Utility to diagnose and correct a disc's directory and file structure in the event of accidental disc corruption.

Chapter 8 explains how to fix common spooled device (printer and plotter) problems.

Chapter 9 contains diagnostic flowcharts for isolating and repairing system faults.

Chapter 10 lists SRM server messages and briefly explains each message.

Part III: Reference

This part of the guide contains reference information on miscellaneous topics.

Appendix A is a summary of server keyboard functions and commands.

Appendix B describes how to restore files from SRM 2.2 and earlier backups.

Appendix C contains the escape sequences supported by the 2608A printer.

Appendix D gives the operating system enhancements for SRM 2.0, SRM 2.1, SRM 2.2, SRM 3.0, SRM 3.1, and 3.2.

Appendix E is a glossary of SRM terminology.

Conventions Used in This Guide

Document titles and disc labels are in *italics*.

References to chapter and section titles are in quotation marks (“ ”).

Text appearing on a server's or workstation's display (whether it is generated by software or by your typing at the keyboard) is shown in **computer font**.

Keycaps, such as Return, are boxed. When shown after a line of **computer font**, they indicate the key or keys to press after typing the preceding text.

Where this manual shows two different keycaps in a row, the first keycap is for an HP 46020A or HP 46021A keyboard. The second keycap is the equivalent key for an HP 98203A or HP 98203B keyboard.

Procedures are in an indented, step-by-step paragraph format. When a procedure step requires supporting information (such as syntax details, examples, or a multiple-choice decision), this information appears below the step.

Troubleshooting hints are in framed boxes.

SRM System Requirements

Listed below are the minimum requirements for an SRM system. The hardware components are covered in more detail in the *Shared Resource Management System Planning Guide* and the *Shared Resource Management Hardware Installation Manual*.

Hardware Requirements

HP 50960A, HP 9000 Model 220
or
Model 226 SRM server¹

Keyboard and monitor and supporting interfaces

Two HP-IB ports

DMA Controller

SRM Coax Interface

Supported hard disc drive with tape drive

with **at least** 768 Kbytes of RAM memory for SRM system **with** on-line backup and restore, and serial printers or with **at least** 512 Kbytes of RAM memory for SRM system **without** on-line backup and restore, and serial printers

integrated for the Model 226

high-speed for mass storage devices, slower speed for printers and plotters

high-speed built-in for HP 50960A

slow-speed built-in for Model 226

built-in for HP 50960A

for coax link configuration

tape drive used for initial system installation and backup; see list of SRM supported tape drives in the *SRM System Planning Guide*

Software Requirements

SRM Systems & Utilities tape cartridge

volume name: SRM3_1
file names: SYSTEM_INS
SYSTEM_BKP
SYSTEM_DSK
SRM_W_BKP
SRM_WO_BKP

¹ The terms “server” and “controller” are often used interchangeably in this manual. They signify the same entity: the component of the SRM system that executes the SRM Operating System software and manages access to the shared resources.

Conceptual Overview of the SRM System

The *Shared Resource Management System Planning Guide* and *Shared Resource Management Hardware Installation Manual* familiarize you with SRM system requirements and hardware configuration possibilities. This overview acquaints you with the operational features and capabilities of a Shared Resource Management system.

SRM Operating System

An SRM server running the SRM Operating System has a very specialized set of capabilities. As a multi-user file system built on a multi-tasking operating system, the SRM Operating System handles all activities related to the operation and use of shared system resources.

The SRM Operating System's command set allows you, the SRM system manager to:

- set up and monitor the configuration of peripherals and workstations recognized by the system,
- control and monitor the operation and use of the system's shared peripherals, and
- preserve the system's integrity by performing system backups and restoring files when necessary.

Note that an SRM server is dedicated to resource management activities **only** and can **NOT** be used simultaneously as a user workstation.

SRM File System

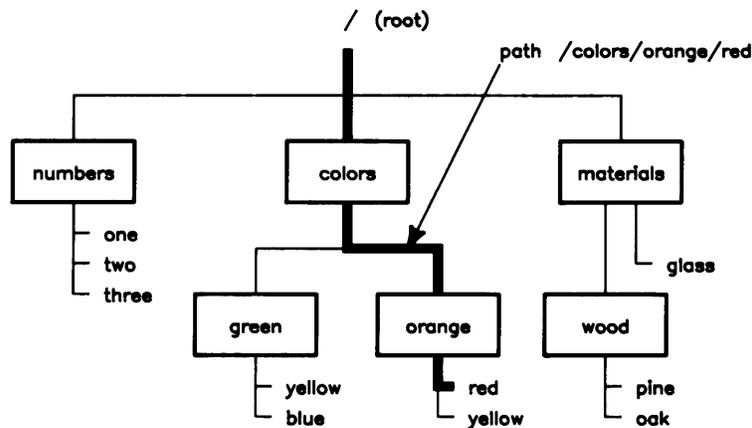
With an SRM system, multiple workstation users can use a mass storage device connected to a server for storing and retrieving their files. Each mass storage device connected to an SRM server is called a "volume." The SRM system handles one or more mass storage volumes, each one physically and logically distinct from the others. Each volume has a unique name, optional associated password, and a unique volume address.

With many users' files on the same shared mass storage device, workstation users can easily access one another's files. In addition, multiple workstation users can access the same file simultaneously.

Such sharing of mass storage devices and files could become chaotic if the SRM system did not provide some organization, protection, and control mechanisms for the file system.

Hierarchical Structure

To help keep the file system organized, the SRM supports a hierarchical directory structure. Directories themselves may contain files or other directories. This keeps the file system uncluttered because separate groups of related files can be put in different directories. Related directories can be grouped together under a single directory with an appropriate, encompassing name. Two or more files may have the same name, as long as they are in different directories. A workstation user can even work with files in one directory without ever having to be aware of the files in other directories above, below, or at the same level as the current one.



Example SRM Directory Structure

An SRM directory or file is identified by a combination of:

- the names of those directories you must follow in the hierarchy to reach that directory or file and
- the name of the directory or file itself.

This list of directory names, along with the name of the destination directory or file, is called a "path." Names in a path are separated by slashes (/). A single or initial slash denotes the top (or "root") of the hierarchical structure.

Password Protection

To maintain security, access to an SRM volume, directory, or file may be restricted with a password. Only those who know the password assigned to a volume, directory or file may gain access to it.

Passwords are always enclosed in <> brackets to distinguish them from the volume, directory, and file names in a path.

The SRM system allows workstation users to further customize the type and extent of protection for their directories and files. The SRM system divides "access" into the types of operations that can be performed on a directory or file. These types of allowed operations are called "access capabilities." For example, one access capability might be the ability to read a directory or file. Another might be the ability to write to a directory or file.

Different passwords may protect different sets of access capabilities for the same directory or file. In this way, a workstation user who knows a less powerful password assigned to a file would, for example, only be able to read that file. In contrast, a workstation user who knows a more powerful password assigned to the same file might be able to both read and write to that file.

Access Control

When more than one workstation user has the ability to access a file at the same time, certain operations, if performed simultaneously, can cause unpredictable results. For example, two workstation users may simultaneously try to write different information to the same file. There is no way of telling which information will be written to the file.

The SRM system can protect files during critical operations by providing the ability to establish exclusive access to a file.

Extendable Directories and Files

To use shared disc space most efficiently, the SRM system may store a file in pieces, called “extents.” This process is transparent and cannot be externally controlled. There are two advantages to this scheme:

- First, the system can use up free areas on the disc, even if their size and location vary. By filling free areas of the disc automatically, the system eliminates the need to pack the shared disc’s files.
- SRM directories and files can grow dynamically as data is entered into them. If additional entries added to a directory or additional data placed into a file would cause it to overflow its current space allocation, the system automatically allocates more space for the directory or file.

Directories and files are extended as long as there is sufficient unused disc space on the same volume. Excess data from a file will not be placed on any other disc (volume) on the SRM system.

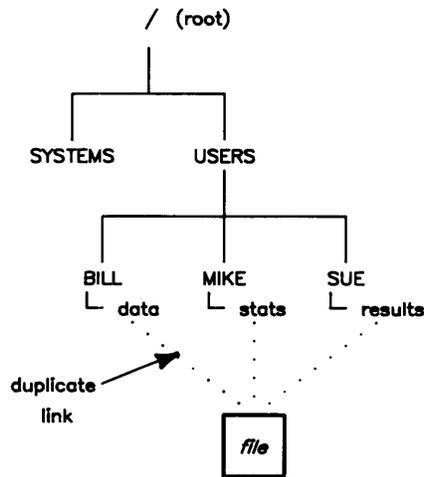
Duplicate Links to Files

Pascal Workstation System users and users of HP-UX systems with SRM File Access Utilities can create one or more alternate paths to an existing file. This is known as creating a “duplicate link” to a file.

With this capability, there is no need to have multiple copies of the same file taking up extra space on an SRM disc volume. Each user can access the same file through an “individualized” path—a meaningful path within the context of the user’s working directory structure.

Creating duplicate links to a file also saves time. Workstation users need not wait for the system to copy an entire file to a different path. The system can simply establish an additional path to an existing file.

The illustration below shows an example to clarify the concept of duplicate links to an SRM file:



Example of Duplicate Links to an SRM File

Printer and Plotter Spooling

The SRM Operating System provides printer and plotter spooling. Spooling allows multiple workstation users to send files to a shared printer or plotter whenever they want to, without waiting for the device to finish printing or plotting its current file.

Each SRM printer and/or plotter has a “spooler directory” associated with it. This directory temporarily holds files that workstation users place there for the printer or plotter to process.

If desired, a printer or plotter spooler directory can have a “priority” subdirectory. Files placed in the “priority” subdirectory are spooled before other files in the spooler directory. Priority spooling allows a rush file to pre-empt all other files in the spooler directory.

Spooler directories can also contain an “environments” subdirectory. The “environments” subdirectory contains files that define a printing environment (such as page orientation, font, etc.) and can be specified when sending a print file to a spooler directory. When specified, an environment file is sent to the printer ahead of the print file, setting the printing environment in which the print file is processed.

Once a file is placed in the appropriate spooler directory, a workstation is free to devote its processing power to tasks other than waiting for a printer or plotter to process the file sent to it.

Note that spooled devices on the SRM system can **NOT** send data **BACK** to a workstation. If you need to input data from the device to the workstation (such as in digitizing from a plotter), you must connect the device directly to the workstation.

Spooled devices on the SRM are discussed in more detail in the “Managing Shared Peripherals” chapter of this guide.

SRM Workstations

SRM workstations have the advantage of being able to apply their independent processing power to a variety of shared resources.

Workstations running the BASIC Language System or the Pascal Workstation System have built-in access to an SRM server’s shared resources. Almost all of the statements or commands comprising each of these systems may be directly applied to directories and files on an SRM disc volume. Workstation users can even “boot” (start up) a BASIC Language or Pascal Workstation System that is stored on an SRM disc.

In contrast, the SRM File Access Utilities for HP-UX systems give HP-UX users a limited subset of special commands for common SRM file management operations. However, HP-UX users can transfer a file from an SRM disc to an HP-UX system disc (and vice-versa) and then work with the file using a multitude of HP-UX commands and applications.

No workstation on an SRM system can pass information directly to another workstation. To pass information from one workstation to another, one workstation must place the information in a shared file on an SRM disc. The other workstation can then access the file to get the information in it.

Additional References

Refer to this list of additional references if you find that you need more information about a certain topic mentioned in this guide.

- *Shared Resource Management System Planning Guide*

This guide discusses available SRM system components, possible SRM system configurations, and site preparation. It also lists environmental and physical specifications for various SRM servers, workstations, and peripherals.

- *Shared Resource Management Hardware Installation Manual*

This manual covers how to set up and connect the hardware components of an SRM system.

- *LAN Cable and Accessories Installation Manual*

This manual details the cabling options and procedures for SRM systems and other local area networks.

- *Shared Resource Management Software Installation Manual*

This manual tells how to install the SRM Operating System for an SRM server. For SRM workstations, the manual tells how to install and configure the BASIC Language System and the Pascal Workstation System on the SRM system disc.

- Installation and operator's guides to your SRM system peripherals

Each of your SRM system peripherals should come with its own guide to installation and operation. Keep these guides within close reach of your peripherals. The SRM system documentation gives only general guidelines for setting up and operating peripherals on the SRM system. To actually implement the guidelines, you may need the specific instructions and detailed information in the guides to the peripherals themselves.

- Interface and memory card installation notes

The various interface and memory cards required by SRM servers and workstations may come with their own installation notes showing how to set switches on the cards and install them. Keep these for future reference.

- *Shared Resource Management Access Utilities for HP-UX Manual*

This manual explains how to install the SRM Access Utilities software. It also covers the SRM Access Utilities commands for managing SRM directories and files from HP-UX, and for transferring files between HP-UX and SRM systems.

- Workstation system manual sets

The documentation that comes with systems that run on HP 9000 workstations and that support SRM (BASIC, Pascal, and, to a limited extent, HP-UX) is a valuable reference. This documentation contains detailed information on how workstation system commands and options work with an SRM system.

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Chapter 6:

Restoring from Backups

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Customizing the System

When the server is running the SRM Operating System, you can use a few of its commands to make the system easier to administer and use. This chapter tells how to:

- assign names to the workstations connected to the server, and
- “splice” the directory structure of one SRM volume into another’s so that the two separate directory structures function as one.

Workstation Names

From the server’s perspective, a workstation without a name is uniquely identified by a combination of two values:

- the select code of the server’s SRM interface to which the workstation is attached by cable and
- the node address set on the workstation’s SRM interface.

To avoid having to remember these values for every workstation, you can associate an easily remembered name with them. Then you can use the names to tell workstations apart on various system listings you can generate from the server.

For example, you might name a workstation after the person who uses it or after the function it performs (if it has a primary function).

Assigning Workstation Names

To assign a name to a workstation, follow these steps:

1. At the server’s **Enter** command: prompt, type:

INTERFACES or

Result: The server displays a listing similar to the following:

```

-----Interfaces-----
select  interface  interrupt  node
code    type       level     address
-----
      7      HPIB        3
      8      98625A      5
     21      SRM         4         0

```

Example INTERFACES Listing

- Note the server's node address in the last column of the INTERFACES listing.

Note

The server's node address is set in switches on the server's SRM interface(s). Refer to the *Shared Resource Management Hardware Installation Manual* or to the interface's *Installation Note* for details.

- On your worksheets from the *Shared Resource Management Hardware Installation Manual*, find the node address of the workstation you want to assign a name to.
- On the same worksheets, find the select code of the server's SRM interface. (See the following example worksheet.)

WORKSTATIONS:						CONNECTED TO SERVERS ¹ :			
User's Name	User's Phone Number	Workstation		Workstation Select Code ²	Workstation Node Address ³	HP 98629 Interface Select Code of Server at			
		Location	Type			Node Address 0	Node Address 1	Node Address 2	Node Address 3
Ted	x 34		520	5	20	21	21		
Carol	68		216	21	22	21	21		
Betty	22		226	21	24	21	21		
Joel	40		217	21	26	21	21		
Kevin	18		236	21	28	21	21		
Deanna	29		216	21	30	21	21		
Larry	45		236	21	32	21	21		
Steve	47		320	21	34	21	21		
Janet	46		310	21	36	21	21		
Mary Ann	51		520	6	38	21	21		

Example Worksheet Showing How to Determine Server's SRM Interface Select Code

5. At the server's **Enter command:** prompt, type:

NAME *select_code.node_address:name* or

where	is
<i>select_code</i>	the server's SRM interface select code value you obtained in step 4 above. The select code is set in switches on the interface to which the workstation is attached by cable. Refer to the <i>Shared Resource Management Hardware Installation Manual</i> or to the interface's <i>Installation Note</i> for details.
<i>node_address</i>	the workstation's SRM interface node address value you obtained in step 3 above. The node address is set in switches on the workstation's SRM interface(s). Refer to the <i>Shared Resource Management Hardware Installation Manual</i> or to the interface's <i>Installation Note</i> for details.
<i>name</i>	the name you want to assign to the workstation. The name may be 1 to 10 characters long and may consist of any characters except spaces.

Example Entry: NAME 21.28:BILL or

Result: The server displays:

User name 21.28:BILL Added

6. Repeat steps 3 to 5 for every other workstation.

7. Type:

SAVE_CONFIGURATION or

Result: The server saves the names in the file /SYSTEMS/CONFIG_SRM and displays:

Configuration file saved

This saves the workstation names you have just assigned, so that you do not have to reassign them every time you restart the server.

Deleting Workstation Names

You can also delete a workstation's name. To do so, type:

NAME : *workstation_name* or

Example Entry: NAME :BILL or

Result: The server displays:

User name 21.28:BILL Removed

Viewing Workstation Names

To view a list of assigned workstation names, type:

NAME or

Result: The server displays a list similar to the following:

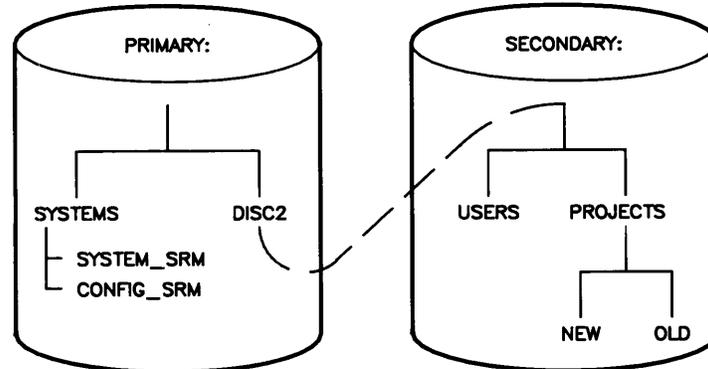
```
  _User Name List_
  sc nd   name
  -- --  -----
  21.28:BILL
  21.29:SUE
  21.30:MIKE
  21.46:HP-UX
```

Example Workstation Name List

Combining the Directory Structures of SRM Volumes

The SRM Operating System can “splice” the directory structure of one SRM disc into another’s so that their separate directory structures appear to be, and function as, one continuous directory structure. In this way, workstation users treat all the discs attached to an SRM server as a single “pool” of mass storage.

The SRM Operating System command that allows you to do this is the MOUNT command. The diagrams below illustrate the effect of the MOUNT command:



Example Showing Effect of the MOUNT Command

Some Cautions about Using the MOUNT Command

Before you decide whether to use the MOUNT command, you should be aware of its effects.

While a directory on one volume has another volume mounted under it, any other entries within that directory become temporarily inaccessible (or “hidden”), being replaced by the root directory of the mounted volume. Once the other volume is unmounted, the entries become accessible again. Therefore, the directory under which you choose to mount another volume’s directory structure should be **EMPTY**.

All attributes possessed by a directory that has another directory mounted under it are replaced by the attributes of the root of the mounted volume. This includes password protection. Changing the password protection for a directory that has another directory mounted under it is actually changing the protection of the root directory of the mounted volume.

However, the catalog listing entry for a directory is the **same** before and after a volume is mounted under it. The catalog listing entry shows size, protection, and creation and last modify dates for the directory as they were before a volume was mounted under it.

A directory that has a volume mounted under it is listed as open in shared mode because mounting a volume under a directory opens the directory.

You can **NOT** back up a mounted volume as part of another volume’s directory structure. A backup can copy from only one disc.

Workstations running the BASIC Language System have no trouble accessing the combined directory structure produced by mounting. Therefore, the MOUNT command provides an easy way to give BASIC workstation users transparent access to multiple SRM disc volumes.

Note

BASIC workstation users can also access multiple SRM volumes in another way. They can access a different SRM volume by specifying the volume's label (name) in a MASS STORAGE IS statement. Refer to the BASIC system manual set for details.

The same is **NOT** true for workstations running the Pascal Workstation System. The Pascal Workstation System Editor can **NOT** save (write) text to an SRM file whose directory path crosses physical disc boundaries. Therefore, do **not** use the MOUNT command if there are Pascal Workstation System users on your SRM system.

You can give Pascal Workstation System users **direct** and **more reliable** access to multiple SRM disc volumes by modifying and recompiling the Pascal Workstation System's CTABLE source program. The procedure for this is in the *SRM Software Installation Manual's* chapter on "Workstation Startup with Pascal."

Mounting an SRM Volume

Note

The directory under which you mount an SRM volume **MUST** already exist and should be empty. You can create directories on an SRM disc volume from a workstation, but not from the server.

To mount the directory structure of one SRM volume under the directory of another SRM volume, follow these steps:

1. At the server's Enter command: prompt, type:

VOLUMES or

Result: The SRM Operating System displays a list similar to the following:

```
-----SRM Volumes-----
vol      bus      free      block
add sc   add      volume name  blocks      size
-----
* 8  8  0, 0  PRIMARY          21847      1024
   9  8  1, 0  SECONDARY        21847      1024
```

Example VOLUMES Listing

2. Note the disc interface select code and the source volume's bus address. (The source volume is the volume to be mounted under a directory on the destination volume.)

Also note the name of the destination volume.

3. At the server's **Enter** command: prompt, type:

```
MOUNT interface_sel_code, source_vol_bus_addr, source_vol_sub_num
"dest_vol_name<dest_vol_passwd>: dest_vol_dir_path" Return or ENTER
```

Item	Description	Value or How to Obtain It
<i>interface_sel_code</i>	For an HP 50960A server, this is a setting of its built-in HP-IB disc interface. For an HP 9000 Model 220 or Model 226 server, this is set in switches on its HP 98625A Disc Interface.	For an HP 50960A server, the value is 8. For an HP 9000 Model 220 or Model 226 server, the factory setting is 14.
<i>source_vol_bus_addr</i>	This is the source volume's bus address, which is set in switches on the back of the source volume disc drive.	<ul style="list-style-type: none"> • Read the switch settings as described in the drive's operator's manual.¹ • Check a VOLUMES command display. • Check your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i>.
<i>source_vol_sub_num</i>	This is the source volume's subunit number, which is a setting that distinguishes one drive from another in the same mass storage device.	<ul style="list-style-type: none"> • Consult the source volume disc drive's operator's manual. • Check a VOLUMES command display. • Check your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i>.
<i>dest_vol_name</i>	the name you assigned to the destination volume when you initialized it.	Check a VOLUMES command display.
<i>dest_vol_passwd</i>	the password you had the option to assign when you initialized the destination volume. This is required only if the destination directory is protected.	
<i>dest_vol_dir_path</i>	the path to the directory under which you are mounting the source volume. A directory's path is a list of those directories that lead to that directory. Directory names in a path are separated by slashes (/). A single or initial slash denotes the disc's top (or "root") directory.	

¹ If the server has more than one of the same drive model, this is the only way to determine which bus address belongs to which drive.

Example Entry: MOUNT 8,1,0 "PRIMARY<OnlyIKnowThis>:/DISC2" or

Result: The server mounts volume 8,1,0's directory structure below volume PRIMARY's /DISC2 directory and displays:

Volume is mounted

Note

You no longer have to manually mount discs each time the system boots. SRM systems with online backup and restore save mount information in /SYSTEMS/MOUNT_SRM on the system disc. The system uses this information to automatically mount discs each time the system boots.

Unmounting an SRM Volume

You can also unmount a volume. To do so, type:

UNMOUNT *source_vol_sel_code, source_vol_bus_addr, source_vol_sub_num* or

(The source volume is the volume that has been mounted under a directory on another volume.)

Example Entry: UNMOUNT 8,1,0 or

Result: The server displays:

Volume is unmounted

Note

Bringing down the system also unmounts volumes. The SAVE_CONFIGURATION command does **NOT** save mounted volumes in the file /SYSTEMS/CONFIG_SRM, so the system does not come up with volumes mounted.

Viewing Mounted Volumes

To view a list of mounted volumes, type:

MOUNT or

Result: The server displays a list similar to the following:

```
-----Mounted Volumes-----
vol   bus   volume   directory
adr sc  adr     mounted on  mounted on
-----
  9  8  1, 0  PRIMARY     DISC2
```

Example List of Mounted Volumes

Restarting and Stopping the Server

2

Overview

This chapter explains how to:

- restart an SRM server whose configuration (spooler directories and workstation names) you saved with the `SAVE_CONFIGURATION` command and
- stop an SRM server.

To restart the server after you have saved the SRM system's configuration, you must:

- insure that all of the server's shared peripherals are on,
- insure that any backup media are loaded into the proper drives,
- insure that all printers and plotters are loaded with the proper type of media,
- insure that all printers are on-line and all plotters are in the remote state,
- restart the SRM system,
- (if necessary) set the SRM system's date and time,
- verify that the server recognizes all of the system's shared peripherals,
- (optional) remount any previously mounted SRM volumes, and
- have workstation users reboot their workstations.

To stop the server's activity, you must:

- check if any workstations are currently using SRM resources,
- inform users that they have to finish using the SRM system so that you can bring it down,
- bring down the system, and
- (optional) turn off the server and its peripherals.

Restarting the Server

Follow these steps to:

- prepare the server's peripherals to be "recognized" by the SRM Operating System,
- restart the SRM Operating System on the server,
- verify that the SRM Operating System recognizes all of the server's peripherals,
- remount volumes, and
- tell users to reboot their workstations.

1. Prepare the server's peripherals to be "recognized" by the SRM Operating System as follows:

Note

For details on preparing the peripherals as stated below, refer to the peripheral's operator' guide.

- a. Insure that all disc drives attached to the server are on.
- b. If you have an HP 35401 1/4-Inch Cartridge Autochanger Tape Drive, insure that the drive is set to Sequential Mode.
- c. Insure that any necessary tapes or micro flexible discs are inserted into the appropriate drives, and wait for the drives' BUSY lights to go out. (This is particularly important for tape drives.)
- d. Turn on all of the printers and plotters attached to the server.
- e. Load all of the printers with paper.
- f. Insure that all of the printers are on-line.

Note

Turning on some printers automatically puts them on-line. Others require you to press an on-line button.

- g. Insure that all plotters have the proper type of paper loaded and fed into place: sheet paper for use as a single sheet plotter or roll media for use as a roll-feed plotter.

Note

The HP 7550 can be used only as a single-sheet plotter but has manual and automatic paper feed modes. Be sure that the 7550 is placed in the proper mode and loaded with paper.

- h. Insure that all plotters are in the remote state.

Note

The HP 7550 is in the remote state whenever it has a sheet of paper in it. Other plotters require you to press a remote button.

- i. If the server is an HP 9826 with a Boot ROM version prior to 3.0, insert the *SRM Boot Utility for 9826A* flexible disc into the server's internal disc drive.

Note

Be sure that the disc is labeled *for use with SRM Rev. 3.0 98619A*. This disc allows the server to boot a system from both Structured Disc Format (SDF) media and Logical Interchange Format (LIF) media.

2. Restart the SRM Operating System on the server as follows:

a. If the server is already on, at its **Enter** command: prompt, type:

SYSTEM UP or

If the server is off, then turn it on again.

Do **NOT** press or while the server is searching for a system to boot.

Result: The server boots the SRM Operating System. Then the SRM Operating System recognizes and activates the server's shared peripherals (including printer and plotter spoolers), gets workstation names, and in the process displays a series of startup messages. After this, the server's display looks similar to the following:

Note

Depending on the number of files on your SRM disc(s), there may be a delay of up to several minutes before the SRM volumes listing appears.

```
SRM X.X System with Backup DD Month YY 8:03:36 AM
-----Requests----- %cpu = 0
Total Pending Processing Open files
      0      0      0      0
```

Configuration file read

```
DD Month YY 8:00:22 AM
-----SRM Volumes-----
vol bus free block
add sc add volume name blocks size
-----
* 8 8 3, 0 PRIMARY 21848 1024
```

System up at: DD Month YY 8:00:22 AM

```
Enter the time:
DD Month YY 8:00 AM
```

Example SRM Server Display After System Is Loaded

- b. Check if the time in the upper right corner of the server's display is incrementing properly.

Result: If the time functions correctly, the server is operational. If not, the system has failed. To identify the problem, refer to the chapter on "Diagnostic Flowcharts" in this guide.

- c. If the displayed date and time are correct, then press `Return` or `ENTER`.

Otherwise, correct the date and time by typing over them. Then press `Return` or `ENTER`.

Result: If you are running the SRM system with on-line backup, the system checks if and when any backups are scheduled to occur automatically and displays `Backup schedule file read`. Either SRM system displays the prompt and message:

```
Enter command:                System is UP
```

If a power failure has caused the system to go down, you may see the following message on the previous screen instead of the startup messages:

```
Boot the Backup Utility (SYSTEM_BKP) to back up files, or boot the Disc Check
Utility (SYSTEM_DSK) to repair the disc corruption. If you do not reboot now,
workstations will be allowed to use the server and the corruption may grow worse.
```

```
Do you want to reboot now (y/n)?
```

This message gives you a chance to repair any disc corruption that may have occurred before the workstations start using the system again. It appears only if one of the discs did not shut down properly, AND you selected the option to wait for operator intervention after a power failure when you installed the SRM software.

If you select "yes," you return to the boot ROM and should then boot the Backup or Disc Check utility from tape or diskette to resolve the problem. If you select "no," the system comes up and is available for workstations to use. The disc corruption, however, may get worse. We recommend that you reboot now and fix the problem unless it is critical to use the system immediately.

If you do not fix the problem now, the message will continue to be displayed whenever the system boots until you either run the Disc Check Utility, or run the Installation Utility and disable the feature.

If you have not backed up your system recently, use the Backup Utility (on tape or diskette) to do so as soon as possible. To eliminate power failure problems, we recommend that you obtain a standby power supply and use the "graceful shutdown" feature when you configure your system. For more information, refer to "Graceful System Shutdowns" in Chapter 2 of the SRM Hardware Installation Manual, and the SYSTEM DOWN command in the SRM System Manager's Guide.

3. Verify that the system recognizes all of the server's peripherals as follows:

a. Type:

UNITS or

Result: The SRM Operating System displays a list similar to the following (with HP 9876A printers, tape drives, and micro flexible disc drives recognized by type only, not by model number):

```
-----Peripheral Devices-----
device      select      bus
type        code        address
-----
      7941         8         0,0
Removable   8           1,0
      2563A        7          1
      2631B        7          2
      PRINTER      7          3
      7550A        7          8
```

Example UNITS Command Listing

b. Check the UNITS command listing for all of the peripheral models attached to the server.

Troubleshooting Hints

If a peripheral is missing from the UNITS listing, verify that:

- the HP-IB cable to the peripheral is securely connected to the HP-IB port on the back of the peripheral.
- the peripheral's bus address switches are set correctly. You must set each plotter's bus address to an unused address between 8 and 29. Otherwise, the SRM system does **NOT** recognize the peripheral as a plotter. The factory setting of the bus address on a plotter is 5.
- any special feature switches on the peripheral are set correctly.
- you have added any serial printers using the UNIT ADD command.

For more detailed information about performing the peripheral checks above, consult the "Peripheral Installation" chapter of the *Shared Resource Management Hardware Installation Manual*, and consult the peripheral's operator's guide.

After you have checked and corrected (if necessary) any missing peripheral's setup, repeat steps 1 through 3 of this procedure.

c. Type:

SPOOLER or

Result: The SRM Operating System displays a list similar to the following:

Note

A spooler's status will be inactive if no files are in its spooler directory

```
-----_Spoolers-----
select  bus  device      directory
code   add  type         name          status
-----
   7    1    2563A  PRINTOUTS    inactive B
   7    8    7550A  PLOTS        inactive
   2    0    Printer PP          inactive NB
```

Example SPOOLER Listing

d. Check the SPOOLER command listing for all configured printer and plotter spoolers.

Troubleshooting Hints

If any spoolers are missing from the listing, type:

READ_CONFIGURATION or

and then check for the spoolers again with the SPOOLER command.

4. If any volumes were mounted into the directory structure of another volume before you stopped the server, remount each volume as explained in this guide's chapter on "Customizing the System."

Otherwise, continue with the next step.

5. Tell BASIC and/or Pascal workstation users to reboot their workstations before using the SRM system again.

Result: This re-establishes workstations' BASIC and Pascal system configurations.

Your SRM system is now fully operational.

Stopping the Server

Caution

Do not turn off the server or any of its disc drives before bringing down the SRM system! If any workstations are transferring data to an SRM disc when the server or the disc loses power, the workstation can lose the data and the disc can become corrupt! If this happens, you can use the Disc Check Utility to recover files. See the chapter on “Diagnosing and Correcting a Corrupt Disc” in this guide.

To stop the server, follow these steps:

1. At the server’s **Enter** command: prompt, type:

USERS or

Result: The server displays a list similar to the following:

Note

No names are listed if you did not assign a name to each workstation with the server’s **NAME** command.

```
-----Current Users-----
-----user-----  open   working
sc nd   name   files  directories
-----
21.28:BILL           0       3
21.29:SUE            1       3
21.30:MIKE           1       2
```

Example USERS Listing

2. Tell the users whose workstations are listed to finish using the SRM system because you will be bringing it down.

Note

In the USERS listing,

sc is the select code of the server's SRM interface to which the workstation is attached by cable, and

nd is the node address of the workstation's SRM interface.

You can check your worksheets from the *Shared Resource Management Hardware Installation Manual* for these values and the name of the workstation user, if necessary.

3. At the server's Enter command: prompt, type:

SYSTEM DOWN or

Result: The SRM Operating System prompts:
Are you sure you want to do this?
N

4. Type:

YES or

Result: The SRM Operating System completes workstations' activities with the server's shared resources, prevents workstations from starting new ones, and displays the message:
System down
This stops the SRM Operating System's resource sharing activity.

If you need to turn off the server or any of its peripherals, you may do so once the SRM system is down.

Managing Shared Peripherals

Overview

This chapter explains how to:

- increase system performance,
- manage mass storage devices on your SRM system, and
- manage printers and plotters on your SRM system.

Attention to this information helps create an SRM system that is easy for you, the system manager, to control and for workstation users to use.

Caution

While the SRM system is UP, do **NOT** turn off power to, or disconnect cables from, any peripherals attached to the server. Doing so can cause unpredictable results and may corrupt a disc's file system. If you must turn off the power to a peripheral while the system is up, disconnect the peripheral's cable first before turning off the peripheral's power.

Increasing System Performance

There are several ways you can increase the SRM system's performance, thereby minimizing the access time for shared peripherals.

Adding Memory

The minimum RAM required for SRM servers is 512 Kbytes for the SRM system without on-line backup and 768 Kbytes for the SRM system with on-line backup.

Use of up to a total of 1¼ Mbytes of memory increases the flexibility and performance of the SRM system. You can improve backup performance by installing 1½ Mbytes of memory in the server.

Reloading the SRM Operating System

The SRM does not have dynamic hardware memory management. To reduce eventual fragmentation of SRM system's memory and prevent "soft" memory failures which can result in data loss,

- bring down the system with the SYSTEM DOWN command when adding spooler directories or peripheral devices, and
- reboot the system periodically (such as monthly) using the SYSTEM DOWN and SYSTEM UP commands.

(See the SYSTEM command in the "Server Keyboard Functions and Commands" appendix.)

Limiting Directory and Disc Capacity

Limiting the number of entries (subdirectories and files) in every directory to less than 42 improves system structure control and search speeds. Greatly exceeding this limit (such as by having several hundred files in a directory) can severely degrade system performance and cause workstation timeouts. This guideline applies especially to the root directory, but the /SYSTEMS directory is an exception because it is the required location for a large number of system files.

Keep more than 20% of an SRM disc's total space free (unused) to avoid excessive fragmentation of files. (Refer to this chapter's section on "Determining the Percentage of Free Space on a Disc.") Allowing the amount of free space on an SRM disc to drop significantly below this (such as to 10% or less of the total) can severely degrade system performance and cause workstation timeouts.

Managing Mass Storage Devices

CAUTION

Using a tape or micro flexible disc as an active volume is **NOT** recommended. It may result in slower SRM operations, time-outs for workstations waiting for SRM access, reduced life of the medium and its drive, and degradation of overall SRM system performance.

Protecting and Recovering Data

Performing Backups

Regular backup of SRM volumes protects your data. You should back up your data often enough to make its reconstruction less difficult. For example, a power failure during a directory update on the disc could corrupt the directory and result in loss of data.

For more information on backups, see this guide's chapters on "Backup Design and Media Management" and "Performing a Backup."

Correcting a Corrupt Disc

In the event of volume damage (e.g., due to power failure), files stored on an SRM disc may be recovered with the Disc Check Utility. The Disc Check Utility allows you to verify the directory structure and its integrity on an SRM disc. Note that the utility may **NOT** recover data contained in files, but can make the directory structure (and the files in it) accessible again.

Files recovered by the Disc Check Utility are placed in the disc's "lost_found" directory. The "lost_found" directory is automatically created in the root directory of every SRM disc.

Depending on system use, you should run the Disc Check Utility regularly (e.g., every month) or when the SRM Operating System reports a disc corruption. See the "Diagnosing and Correcting a Corrupt Disc" chapter for detailed information on this process.

Using Removable Hard Disc Drives

The following disc drives have a removable hard disc pack:

- HP 7907
- HP 7935

If you have one of these models, always **BRING DOWN THE DISC** with the server's VOLUME DOWN command **BEFORE** you press:

- the RUN/STOP rocker switch on the HP 7907 or
- the LOAD/UNLOAD button on the HP 7935.

Failure to do so CORRUPTS THE DISC. If this happens, refer to this guide's chapter on "Diagnosing and Correcting a Corrupt Disc."

Identifying Mass Storage Devices in Server Commands

You identify a disc, tape, or micro flexible disc drive by the server's disc interface select code and the drive's device bus address and subunit number:

interface_select_code,bus_address,subunit_number

Item	Description	Value or How to Obtain It
<i>interface_select_code</i>	For an HP 50960A server, this is a setting of its built-in HP-IB disc interface. For an HP 9000 Model 220 or Model 226 server, this is set in switches on its HP 98625A Disc Interface.	For an HP 50960A server, the value is 8. For an HP 9000 Model 220 or Model 226 server, the factory setting is 14. Check an INTERFACES command display for the setting.
<i>bus_address</i>	This is set in switches on the back of the drive. The mass storage device with the lowest bus address (usually 0) on the HP-IB is the SRM system disc. The SRM system disc contains directories and files that are essential to the SRM system.	<ul style="list-style-type: none"> • Read the switch settings as described in the drive's operator's manual.¹ • Check a UNITS command display of peripheral devices. • Check your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i>.
<i>subunit_number</i>	This is a setting that distinguishes one drive from another in the same mass storage device.	<ul style="list-style-type: none"> • Consult the mass storage device's operator's manual. • Check a UNITS command display of peripheral devices. • Check your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i>.

Example Command

An example command is:

```
UNIT ADD DISC 8,3,0
```

This command adds a mass storage device to the SRM system's configuration (the list of peripherals that the SRM system recognizes). In this example, the mass storage device to add is identified by the server's disc interface select code (8), the device's bus address (3), and the device's subunit number (0).

¹ If the server has more than one of the same drive model, this is the only way to determine which bus address belongs to which drive.

Example Display

An example display is:

```
-----Peripheral Devices-----
device      select      bus
type        code        address
-----
      7941         8         0,0
Removable   8         1,0
      2563A        7         1
      2631B        7         2
PRINTER     7         3
      7550A        7         8
```

Example UNITS Command Listing

This display is the result of giving a UNITS command at the server. It lists all of the peripherals that the SRM system recognizes. The first two devices in the list are mass storage devices (their subunit number is the second number listed under the `bus address` column).

Using Tape Drives on the Same Controller as a Disc

Discs with a built-in tape drive may be either a dual-controller device (disc and tape are accessed via separate HP-IB addresses) or a single-controller device (tape access through the same HP-IB port as the disc).

The following tape drives share a controller with a fixed disc:

- HP 7908 • HP 7914
- HP 7911 • HP 7942
- HP 7912 • HP 7946

If you have one of these models, do **NOT** insert a tape into the built-in tape drive when the SRM system is busy. Doing so may make the fixed disc inaccessible for upwards of 30 seconds, especially with the HP 7942 and HP 7946. The entire SRM system may appear “hung” while the tape is loading, and workstation timeouts may occur.

If you must load a tape while the system is busy, use a tape drive with a separate controller (such as an HP 9144 or HP 35401). If you do not have such a drive, plan tape loading times in advance such that you minimize disruption to workstation users.

Managing an SRM Disc's Directory Structure

It is important to keep an SRM disc's directory structure organized and uncluttered by creating and maintaining a hierarchy of directories. Encourage workstation users to do the same within their own personal directories. By organizing small groups of related files under various directories, users are able to access and manage their files more efficiently.

Volume Password

You can assign a password to a volume when you initialize it. You may then use the volume password to override any other password on the volume. This provides all access capabilities to all files on the volume and complete freedom within the directory structures. You need the volume password to re-initialize a disc and to perform any backup or restore. You should strictly limit knowledge of the volume password.

Root Password

Each volume has a root (top level) directory with the same name as the volume. You can assign a password to the root directory when you initialize the volume. The root password controls access to the root directory and prevents workstation users from creating many files there, which can degrade system performance.

Directories

Every directory (including the root) may contain pointers to other directories and/or data files. Limit a disc's directory structure to a depth of 30 levels or less (including the root). Backups cannot copy files that are over 30 directory levels deep (files whose full paths name more than 30 directories). You also cannot use the Disc Check Utility if a disc's directory structure exceeds this limit.

Passwords

Each directory or file, including the root directory, may have one or more passwords associated with it. A password is a string of ASCII characters used to limit access to shared discs, directories, and files. Limit the number of passwords assigned to a directory or file to 40 or less. Backups cannot record more than 40 passwords per file.

Naming Restrictions

Every volume, directory, and file name and any associated passwords may be up to 16 characters long. The SRM file system allows any 8-bit ASCII character, **but the SRM console and most workstations allow a limited subset of ASCII characters (system dependent)**. To allow intersystem file sharing, all characters in volume, directory and file names, and any associated passwords, must be compatible across different workstation systems. Do not use blanks in any name or password.

Determining the Percentage of Free Space on a Disc

To determine what percent of a disc's total space is free, follow these steps:

1. At the server's **Enter Command:** prompt, type:

HEADER *interface_select_code, bus_address, subunit_number* or

Result: The server displays a listing similar to the following:

```
-----Volume Header-----
Volume name:      PRIMARY
Creation date:    23 Jul 86   3:16:13 PM
Bytes per block:  1024
Size:            44743680 bytes
Last base backup: 2 Oct 86   12:23:22 PM
```

Example HEADER Command Listing

2. Note the size (or total capacity) of the disc.
3. Divide the disc's size in bytes by the number of bytes per block listed in the **HEADER** command display.

Example: 44743680 total bytes / 1024 bytes per block = 43695 total blocks

Result: This converts the disc's size into a number of blocks.

4. At the server's **Enter Command:** prompt, type:

VOLUMES or

Result: The server displays a list similar to the following:

```
-----SRM Volumes-----
vol  bus      free  block
add sc add   volume name  blocks  size
-----
* 8  8  0, 0  PRIMARY      609    1024
   9  8  1, 0  SECONDARY    7230   1024
```

Example VOLUMES Command Listing

5. Note the number of free blocks on the disc whose free space you are trying to determine.
6. Divide the number of free blocks (from the previous step) on the disc by the total number of blocks on the disc (from step 3).

Example: 609 free blocks / 43695 total blocks = 0.14 (1.4%)

Result: You get the percentage of the disc's total space that is free.

Adding a Mass Storage Device to the System

Note

You can perform the following steps with the system DOWN or UP. Performing them with the system DOWN optimizes the system's memory management. (To bring down the SRM system, give the SYSTEM DOWN command at the server.)

Follow these steps to add a mass storage device to your SRM system:

1. Set up the new mass storage device, and attach it to the SRM server according to the instructions in the *Shared Resource Management Hardware Installation Manual*.
2. Turn on the new mass storage device.
3. If the SRM system is DOWN, bring up the SRM system again with the SYSTEM UP command at the server. Allow the system to automatically recognize the new mass storage device.

If the SRM system is UP, type at the server:

```
UNIT ADD DISC1 interface_select_code, bus_address, subunit_number  or 
```

Example Entry: UNIT ADD DISC 8,3,0 or

Result: The server adds the mass storage device to the SRM system's configuration and displays:

```
Unit 8,3 added
```

¹ The DISC keyword applies to any mass storage device. For example, you may add a tape drive with the UNIT ADD DISC command.

4. If the mass storage device is **NOT** a shared disc, skip to step 6.

If the mass storage device is a shared disc, initialize the new disc in SDF (structured disc format) as follows:

a. Type at the server:

```
INITIALIZE interface_select_code, bus_address, subunit_number
"vol_name<vol_pass>" "<root_pass>"  or 
```

Item	Description	Length	Composition
<i>vol_name</i>	The volume name you want to assign to the disc.	1 to 16 characters	A—Z a—z 0—9 - .
<i>vol_pass</i>	You may optionally assign a volume password to the disc. A volume password is like a “super password” that allows complete access to the contents of the entire disc and supercedes all access restrictions placed on individual files and directories.	1 to 16 characters	A—Z a—z 0—9 ~ ‘ ! @ % ^ & () - _ + { } \ ; “ ’ .
<i>root_pass</i>	You may optionally assign a root password to the disc. The root password controls access to, and prevents unauthorized tampering with, the disc’s root directory.	1 to 16 characters	A—Z a—z 0—9 ~ ‘ ! @ % ^ & () - _ + { } \ ; “ ’ .

Example Entry: INITIALIZE 8,3,0
"EXTRA_STORAGE<free_rein>" "<no_mess>" or

Result: The server displays:

Initializing 8,3,0
--Warning: Initialization will destroy all data on the volume

Are you sure you want to do this?
N

b. Press and then or .

Result: The server displays:

Initializing.....

When the server finishes, it displays:

Volume
interface_select_code, bus_address, subunit_number
initialized

5. If the mass storage device is a shared disc, type at the server:

VOLUME UP *interface_select_code, bus_address, subunit_number* or

Example Entry: VOLUME UP 8,3,0 or

Result: The server brings up the volume (allowing workstations to access it) and displays:

Volume 8,3,0 is up

6. To verify that the new device is in the list of peripherals that the system recognizes, give a UNITS command at the server.

Removing a Mass Storage Device from the System

Note

You can perform the following steps with the system DOWN or UP. Performing them with the system DOWN optimizes the system's memory management. (To bring down the SRM system, give the SYSTEM DOWN command at the server.)

Follow these steps to remove a mass storage device from your SRM system:

1. If the system is DOWN, skip to step 3.

If the system is UP, and the mass storage device is **NOT** a shared disc, skip to step 2.

If the system is UP, and the mass storage device is a shared disc, type at the server:

VOLUME DOWN *interface_select_code, bus_address, subunit_number* or

Example Entry: VOLUME DOWN 8,3,0 or

Result: The server brings down the volume (shutting down workstation access to it) and displays:

Volume 8,3,0 is down

2. Type at the server:

UNIT DELETE *interface_select_code, bus_address, subunit_number* or

Example Entry: UNIT DELETE 8,3,0 or

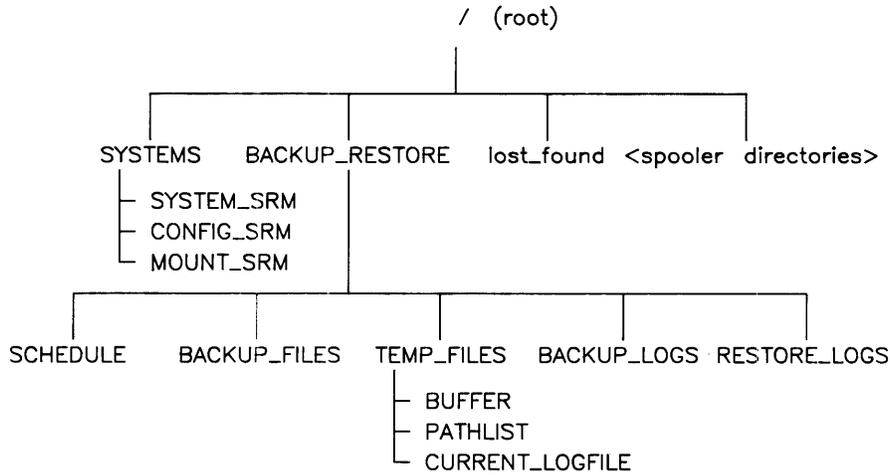
Result: The server deletes the mass storage device from the SRM system's configuration and displays:

Unit 8,3 deleted

3. Disconnect the cable(s) attached to the mass storage device. (If the device is cabled to other devices in a daisy-chain, you may have to reconnect the remaining devices in the daisy chain.)
4. Turn off the device you removed.
5. If the system is DOWN, bring up the SRM system again with the SYSTEM UP command at the server.

About the SRM System Disc

The SRM *system* disc has the lowest device bus address (usually 0) of all the devices on the HP-IB. The SRM system disc contains the following directories and files that are essential to the SRM system:



System Directories and Files on SRM System Disc

SYSTEMS directory	This directory is automatically created by the SRM Installation Utility and contains SRM and workstations' operating systems and configuration files.
SYSTEM_SRM file	This is the contiguous SRM Operating System file. This file is automatically created by the SRM Installation Utility. All access capabilities except READ are protected for this file.
CONFIG_SRM file	You create this file with the SAVE_CONFIGURATION command. This file saves the SRM system's spooler directory and workstation name configuration.
MOUNT_SRM file	This file is automatically created or overwritten each time a MOUNT or UNMOUNT command is executed. The file saves information about which discs should be automatically mounted each time the system boots.
BACKUP_RESTORE directory	This directory and all the directories and files shown below it in the illustration above are automatically created by the SRM Installation Utility. These directories and files are related to the implementation and execution of backup and restore operations.
SCHEDULE file	This file contains information about what backups are scheduled to run automatically and when. To prevent accidental deletion of this file, all of its access capabilities except READ are protected.

BACKUP_FILES directory	This is where the BACKUP DEFINE command saves the backup files you create. (Backup files specify the scope of a backup.) The MANAGER and PURGELINK access capabilities for this directory are protected.
TEMP_FILES directory	This is the “scratch” directory for backup and restore operations. The MANAGER and PURGELINK access capabilities for this directory are protected.
BUFFER file	This is a contiguous file used to temporarily hold data read from or written to a backup medium. While a backup or restore operation transfers data to or from this buffer file, the disc controller is busy and allows no other disc transactions. If the disc and the drive containing the backup medium are on separate controllers, the entire HP-IB bus is busy while the transfer occurs. This results in some performance degradation noticeable to users. All access capabilities for the BUFFER file are protected.
PATHLIST file	This file temporarily holds path and protection information (passwords and access capabilities) during a backup or restore operation. To prevent accidental deletion or examination by unauthorized users, all access capabilities for this file are protected.
CURRENT_LOGFILE file	A backup or restore operation creates this file. It contains the log of the last backup or restore operation. When the backup or restore operation finishes, it creates a duplicate link from this file to a log file in the /BACKUP_RESTORE/BACKUP_LOGS or /BACKUP_RESTORE/RESTORE_LOGS directory.
BACKUP_LOGS and RESTORE_LOGS directories	These directories hold log files created by backups and restores, respectively. The MANAGER and PURGELINK access capabilities for this directory are protected, but the log files themselves are unprotected.
lost_found directory	The SRM system automatically created this directory when you booted the installed system for the first time. In this directory the Disc Check Utility places files whose identifying information has been corrupted or lost. This directory exists on all SRM discs.
spooler directories	The SPOOLER ADD command creates spooler directories in the root directory of the SRM system disc. You assign a name to each spooler directory with the command. To send files to a printer or plotter, workstation users place files in its spooler directory.

Managing Printers and Plotters

Identifying Printers and Plotters in Server Commands

HP-IB printers and plotters share the same HP-IB. You identify a printer or plotter by the server's HP-IB select code and the printer or plotter's device bus address:

interface_select_code, bus_address

Item	Description	Value or How to Obtain It
<i>interface_select_code</i>	<p>For an HP 50960A server, this is the select code setting of its Human Interface/HP-IB interface.</p> <p>For an HP 9000 Model 226 server, this is the select code setting of its built-in HP-IB port.</p> <p>For an HP 9000 Model 220 server, this is the select code setting of its keyboard/HP-IB interface.</p>	For all server models, the value is 7. You can check an INTERFACES command display for the setting.
<i>bus_address</i>	<p>This is the bus address set in switches on the back of the printer or plotter.</p> <p>Printer bus addresses MUST be between 0 and 7. The printer with the lowest bus address on the HP-IB is the default printer (used when you turn on the "Print All" keyboard function).</p> <p>For automatic configuration (recognition) of plotters as the SRM system comes up, you MUST set every plotter's bus address in the range 8 through 29. (Every plotter's bus address is set to only 5 at the factory.)</p>	<ul style="list-style-type: none"> • Read the switch settings as described in the printer or plotter's operator's manual.¹ • Check a UNITS command display of peripheral devices. • Check your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i>.

Serial Printers do not use HP-IB and are not automatically configured (recognized) as the SRM system comes up. They must be added manually with the UNIT ADD command. See the subsection that follows, "Adding a Serial Printer to the System."

¹ If the server has more than one of the same printer or plotter model, this is the only way to determine which bus address belongs to which printer or plotter.

You can identify a serial printer by its serial interface select code:

interface_select_code

Item	Description	Value or How to Obtain It
<i>interface_select_code</i>	For an HP 50960A server, this is the select code of its built-in serial interface or the select code of an installed HP 98626 serial interface card. For HP 9000 Model 226 and 220 servers, this is the select code of an installed HP 98626 serial interface card.	For the HP 50960A, the built-in serial interface select code is 2. An installed HP 98626 interface card must have an unique select code greater than 10 to operate with SRM. Use the INTERFACES command to display its value. An installed HP 98626 must have an unique select code greater than 10 to operate with SRM. Use the INTERFACES command to display its value.

Example Display

An example display is:

```

-----Peripheral Devices-----
device   select   bus
type     code     address
-----
    7941      8      0,0
Removable  8      1,0
    2563A     7       1
    2631B     7       2
    Printer   2       0
    7550A     7       8

```

Example UNITS Command Listing

This display is the result of giving a UNITS command at the server. The last four devices in the list are printers or plotters (the last device is a plotter; the second last is a serial printer). (Note that zero is listed as the HP-IB bus address for the serial printer. Since serial printers do not use bus addresses, this value can be ignored.)

Printing Information from the Server's Display

You can print a copy of the server's current display or print (over a period of time) every message that appears on the server's display.

Printing a Copy of the Server's Current Display

To print the server's current screen image on the default printer (printer with the lowest bus address or serial printer if there is no HP-IB printer), press **Shift-f6** or **DUMP ALPHA** (**SHIFT-ALPHA**). (To enable this feature, press, **ONCE ONLY**, **STOP** or **CLR I/O** after the system is up.

Printing Every Message Appearing on the Server's Display over Time

To print the messages that appear on the server's display over time, turn on the "Print All" keyboard function. The "Print All" keyboard function prints the messages on the default printer (printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer).¹

To turn on the "Print All" keyboard function, press `Print` (`Shift-Enter`) or `PRT ALL`.

Result: The server displays:
Printall ON

To stop printing messages that appear on the server's display, turn off the "Print All" keyboard function by pressing `Print` (`Shift-Enter`) or `PRT ALL` again.

Result: The server displays:
Printall OFF

Stopping the Printing or Plotting of a File

From the server, you can stop the printing or plotting of a file:

- with the ability to continue the printing or plotting where it left off,
- with the ability to reprint or replot the file from the beginning, or
- by removing the entire file from the spooler directory.

Note

Bus addresses for serial units need not be specified in the SPOOLER commands.

With the Ability to Continue the Printing or Plotting Where It Left Off

To stop a printout or plot in progress with the ability to continue to printout or plot where it left off, type at the server:

SPOOLER HOLD *interface_select_code, bus_address* `Return` or `ENTER`

Example Entry: SPOOLER HOLD 7,1 `Return` or `ENTER`

Result: After a delay, the server halts the printing or plotting of the file and displays:
Spooler 7,1 held

* If there is no configured HP-IB printer, but at least one configured serial printer, the serial printer with the lowest select code (e.g. 2, for the HP 50960 built-in serial interface) is used as the printall device. Serial interfaces must be added with the UNIT ADD command before they can be used as a printall device with the *SRM System with Backup*.

With the Ability to Reprint or Replot the File from the Beginning

To stop a printout or plot in progress with the ability to continue to printout or plot from the beginning, type at the server:

SPOOLER DOWN *interface_select_code, bus_address* or

Example Entry: SPOOLER DOWN 7,1 or

Result: After a delay, the server halts the printing or plotting of the file and displays:

Spooler 7,1 down

The printout or plot stops until you tell the server to bring the spooler back up. To bring the spooler back up and reprint or replot the entire file, type at the server:

SPOOLER UP *interface_select_code, bus_address* or

Example Entry: SPOOLER UP 7,1 or

Result: The server reprints or replots the entire file from the beginning and displays:

Spooler 7,1 up

By Removing the Entire File from the Spooler Directory

To stop a printout or plot in progress by removing the file from the spooler directory, type at the server:

SPOOLER ABORT *interface_select_code, bus_address* or

Example Entry: SPOOLER ABORT 7,1 or

Result: After a delay, the server halts the printing or plotting of the file and displays:

Spooler 7,1 aborted

The printout or plot stops, and the server removes the file from the spooler directory and starts printing or plotting the next file (if any) in the queue.

Adding an HP-IB Printer or Plotter to the System

Note

You can perform the following steps with the system DOWN or UP. Performing them with the system DOWN optimizes the system's memory management. (To bring down the SRM system, give the SYSTEM DOWN command at the server.)

Follow these steps to add an HP-IB printer or plotter to your SRM system:

1. Set up the new printer or plotter and attach it to the SRM server according to the instructions in the *Shared Resource Management Hardware Installation Manual*.
2. Load the new printer or plotter with paper.
3. Turn on the new printer or plotter.
4. If you are adding a new printer, put the printer on-line. If you are adding a new plotter, put the plotter in the remote state.
5. If the system is DOWN, skip to step 6.

Otherwise:

If you are adding a new HP-IB printer, type at the server:

```
UNIT ADD PRINTER interface_select_code, bus_address  or 
```

Example Entry: UNIT ADD PRINTER 7,3 or

Result: The server adds the HP-IB printer to the SRM system's configuration and displays:

```
Unit 7,3 added
```

If you are adding a new plotter, type at the server:

```
UNIT ADD PLOTTER interface_select_code, bus_address  or 
```

Example Entry: UNIT ADD PLOTTER 7,10 or

Result: The server adds the plotter to the SRM system's configuration and displays:

```
Unit 7,10 added
```

6. Give a SPOOLER ADD command at the server to create a spooler directory for a printer or plotter.

For printers, type:

SPOOLER ADD *banner_switch interface_select_code,bus_address "spooler_dir_name"*
or

For plotters, type:

SPOOLER ADD *buffer_switch nocontinue interface_select_code,bus_address
"spooler_dir_name"* or

Note that BANNER and NOBANNER are mutually exclusive values for specifying printers, and that BUFFERED and UNBUFFERED are mutually exclusive values for specifying plotters. Use only one of these values per command. Use NOCONTINUE only when specifying a plotter. It can be used in combination with either BUFFERED or UNBUFFERED.

Item	Description	Length	Value/Composition
<i>banner_switch</i>	This optional value determines whether a printer produces a banner page at the beginning of every printout. A banner page identifies the printout and separates one from the next. No banner pages are produced for plotters, regardless of the <i>banner_switch</i> value.	Not Applicable	BANNER or NOBANNER (value set to BANNER if not specified explicitly)
<i>buffer_switch</i>	This optional value determines how data is sent from the SRM controller to HP-IB plotters. Select UNBUFFERED when it is important that the plotter pens move smoothly and uniformly. Select BUFFERED for better system performance.	Not Applicable	BUFFERED or UNBUFFERED (value set to UNBUFFERED if not specified explicitly)
<i>nocontinue</i>	This optional mode eliminates the need to type SPOOLER CONTINUE at the server console when using a plotter. Spooling begins as soon as paper is loaded and the plotter is online. When the plot is done, the plotter is automatically taken offline. (The plotter stays online if it can automatically feed its own paper.) To start the next plot, load the paper and put the plotter back online using the "view" or "remote" buttons on the plotter.	Not Applicable	NOCONTINUE (If the NOCONTINUE option is not explicitly specified, you must type SPOOLER CONTINUE commands between plots.)
<i>spooler_dir_name</i>	The name you want to assign to the spooler directory. The SPOOLER ADD command creates all spooler directories in the SRM system disc's root directory.	1 to 16 characters	A Z a-z 0 9 -

Example Entry: SPOOLER ADD BANNER 7,3 "DRAFTS" or

Result: The server creates the /DRAFTS spooler directory, brings up the spooler and displays:

Spooler 7,3 ("DRAFTS ") Added

7. Type at the server:

SAVE_CONFIGURATION or

Result: The server saves the spooler configuration in the file /SYSTEMS/CONFIG_SRM on the SRM system disc so that you do not have to recreate the spooler directory every time you bring up the system.

8. If you performed the previous steps with the system DOWN, bring up the SRM system again with the SYSTEM UP command at the server.
9. To verify that the new printer or plotter is in the list of peripherals that the system recognizes, give a UNITS command at the server. To verify that the spooler directory is created, give a SPOOLER command at the server.

Adding a Serial Printer to the System

The following procedure **MUST** be performed by you so that the SRM system recognizes the serial printer. Serial units are not automatically configured (recognized) by SRM when the system comes up. Serial printers are supported only on *SRM System with Backup* and *SRM Disc Check Utility*.

Note

You can perform the following steps with the system DOWN or UP. Performing them with the system DOWN optimizes the system's memory management. (To bring down the SRM system, give the SYSTEM DOWN command at the server.)

Follow these steps to add a serial printer to your SRM system:

1. Set up the new printer and attach it to the SRM server according to the instructions in the *Shared Resource Management Hardware Installation Manual*.
2. Load the new printer with paper.
3. Turn on the new printer.
4. Put the printer on-line.

5. Type at the server:

UNIT ADD PRINTER *interface_select_code* or

Example Entry: UNIT ADD PRINTER 2 or

Result: The server adds the serial printer to the SRM system's configuration and displays:

Unit 2,0 added

You may also type at the server:

UNIT ADD RAW *interface_select_code* or

Example Entry: UNIT ADD RAW 2 or

Result: The server adds a raw serial device (one that receives no special characters from the server after print jobs) to the SRM system's configuration and displays:

Unit 2,0 added

Note

Serial units and spooler directories created for serial units do not need HP-IB bus addresses specified as part of the UNIT or SPOOLER commands.

6. Give a SPOOLER ADD command at the server to create a spooler directory for the printer or plotter. Type:

SPOOLER ADD *banner_switch interface_select_code "spooler_dir_name"* or

Item	Description	Length	Value/Composition
<i>banner_switch</i>	This optional value determines whether a printer produces a banner page at the beginning of every printout. A banner page identifies the printout and separates one from the next. No banner pages are produced for plotters, regardless of the <i>banner_switch</i> value.	Not Applicable	BANNER or NOBANNER (value set to BANNER if not specified explicitly)
<i>spooler_dir_name</i>	The name you want to assign to the spooler directory. The SPOOLER ADD command creates all spooler directories in the SRM system disc's root directory.	1 to 16 characters	A - Z a - z 0 - 9 -

Example Entry: SPOOLER ADD BANNER 2 "LASER" or

Result: The server creates the /LASER spooler directory, brings up the spooler and displays:

Spooler 2 ("LASER ") Added

7. Type at the server:

SAVE_CONFIGURATION or

Result: The server saves the spooler configuration in the file /SYSTEMS/CONFIG_SRM on the SRM system disc so that you do not have to recreate the spooler directory every time you bring up the system.

8. To verify that the new printer or plotter is in the list of peripherals that the system recognizes, give a UNITS command at the server. To verify that the spooler directory is created, give a SPOOLER command at the server.

Configuring a Serial Printer

Serial printers are not automatically configured when the *SRM System with Backup* comes up. To add a serial unit, see the preceding section, "Adding a Serial Printer to the System."

When a serial unit is added, it is configured with default values. The following table lists the default and possible values for each parameter:

Parameter	Default Value	Possible Values
Baud Rate	9600	50, 75, 110, 134.5 ¹ , 150, 200, 300, 600, 1200, 2400, 4800, 9600, and 19200. ²
Parity	None	Odd, even, 0, 1, and none.
Data Bits	8	5, 6, 7, and 8.
Stop Bits	2	1, 1.5, 2
Handshake	Both	Xonxoff, hardware, both, and none.

Note

Serial printall with the *Disc Check Utility* requires the use of the default configuration.

¹ For baud rate 134.5, enter either 134 or 135.

² The baud rate of 19200 is not allowed for the built-in serial interface on the HP 50960A server.

You can check the configuration of your existing serial printer(s) with the INTERFACES command display. An example display:

```

-----INTERFACES-----
select  interface  interrupt  node
code    type       level      address
-----
  7      HPIB       3
  2      Serial      6
-----
| baud | parity | data bits | stop bits | handshake |
| 9600 |  none  |    8     |    2     |   both   |
-----
  8      98625A      5
 21      98629      4      0

```

If you want to configure your serial printer with values other than the defaults, follow these steps to change the configuration of a serial printer on your SRM system:

1. Type at the server:

```
SPOOLER DOWN interface_select_code Return or ENTER
```

Example Entry: SPOOLER DOWN 2 **Return** or **ENTER**

Result: The server brings down the spooler and displays:
SPOOLER 2,0 DOWN

2. Type at the server:

```
SPOOLER DELETE interface_select_code Return or ENTER
```

Example Entry: SPOOLER DELETE 2 **Return** or **ENTER**

Result: The server deletes the spooler and displays:
SPOOLER 2,0 DELETED

3. Type at the server:

```
INTERFACE CHANGE interface_select_code Return or ENTER
```

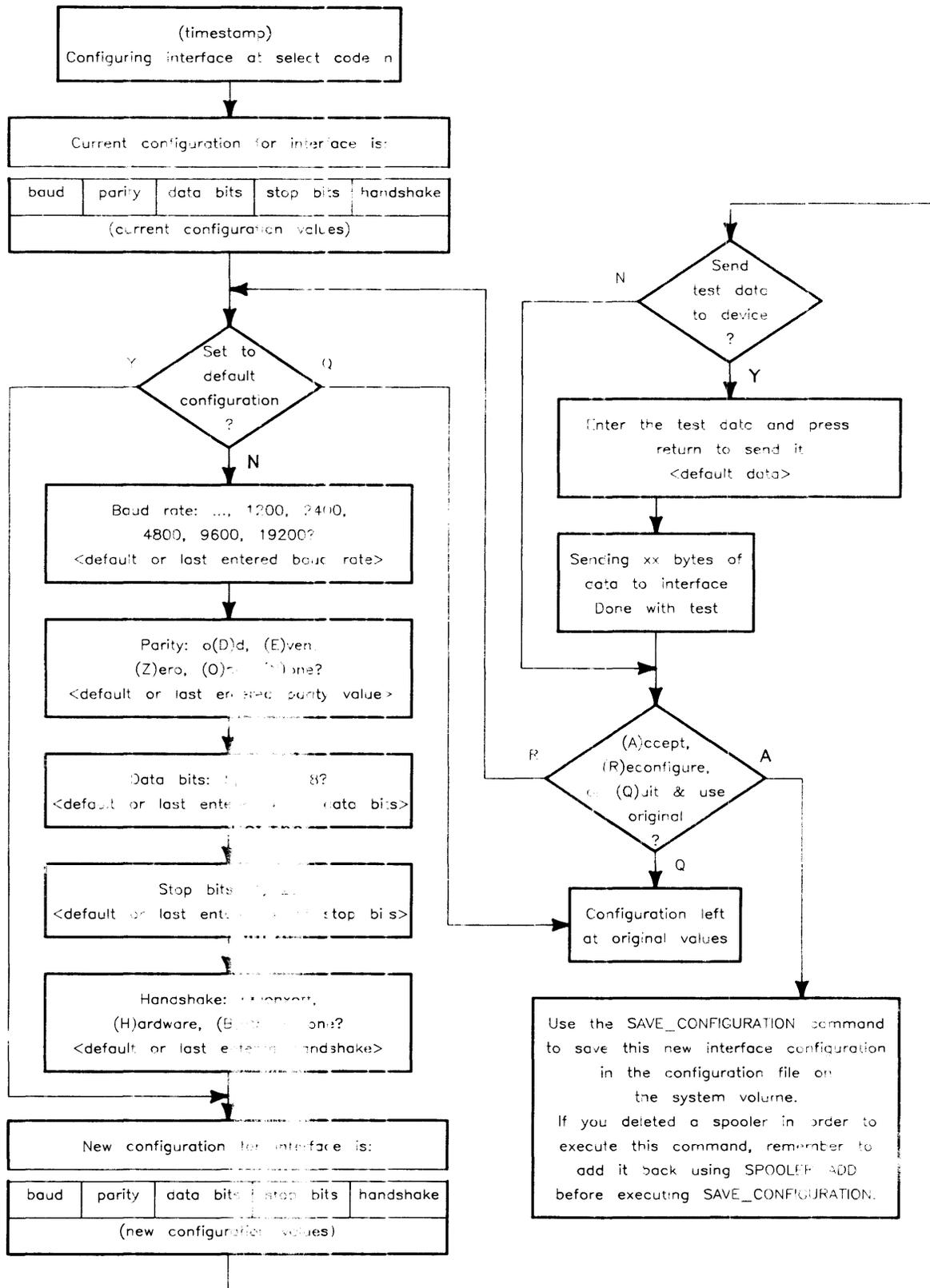
Example Entry: INTERFACE CHANGE 2 **Return** or **ENTER**

Result: The system prompts you for the serial configuration values.

4. The flowchart on the next page illustrates the serial configuration procedure with default system prompts in **bold**. Answer the system's questions when the system prompts you for serial configuration information. You can follow your progress through the procedure by referring to the following flowchart.

Information printed between brackets (e.g. <abcdefg>) is displayed by the system on the monitor. Overtyping this information to enter your configuration values.

5. When you are finished with changing the serial configuration, save the new serial configuration with the SAVE_CONFIGURATION command.



Removing a Printer or Plotter from the System

Follow these steps to remove a printer or plotter from your SRM system:

1. Bring down the SRM system with the SYSTEM DOWN command at the server.

Note

Bringing the system down first and then back up after changing the peripheral configuration optimizes the system's memory management.

If you can **NOT** bring down the system, at the server type instead:

```
SPOOLER DOWN interface_select_code[,bus_address]  or 
```

Example Entry: SPOOLER DOWN 2 or

Result: The server brings down the spooler and displays:

```
SPOOLER 2,0 down
```

2. At the server, type:

```
SPOOLER DELETE interface_select_code[,bus_address]  or 
```

Example Entry: SPOOLER DELETE 2

Result: The server deletes the spooler directory (if it is empty) and displays:

```
SPOOLER 2,0 deleted
```

3. At the server, type:

```
SAVE_CONFIGURATION  or 
```

Result: This removes the spooler directory from the file /SYSTEMS/CONFIG_SRM on the SRM system disc. (The spooler's configuration was saved in this file.)

4. If the system is DOWN, skip to step 5.

Otherwise, type at the server:

```
UNIT DELETE interface_select_code[,bus_address]  or 
```

Example Entry: UNIT DELETE 2 or

Result: The server deletes the serial printer from the SRM system's configuration and displays:

```
Unit 2,0 deleted
```

5. Disconnect the cable(s) attached to the serial printer.
6. Turn off the printer you removed.
7. If you brought down the system in step 1 above, then bring up the SRM system again with SYSTEM UP command.

Viewing Spooler Information

You can view the following spooler information from the server:

- the printer or plotter model associated with each spooler directory,
- each spooler directory's name,
- each printer or plotter's status (active or inactive), and
- whether a printer is set up to produce a banner page at the beginning of every printout.

To view this information, type at the server:

SPOOLER or

The server displays a list similar to the following (the “B” in the far right column is the banner flag, “UN” is unbuffered, “BF” is buffered, and “NC” is a plotter in “nocontinue” mode).

```
-----Spoolers-----
select  bus  device  directory
code   add  type    name      status
-----
   7    1   2563A  PRINTOUTS   active  B
   7    2   2631B  DRAFT_PRINTOUTS  inactive B
   7    8   7580A  PLOTS       inactive UN
   2    0   Printer PP         inactive B
   7    9   7585A  PLOT2      inactive BF NC
```

Example SPOOLER Command Listing

Sending Files from a Workstation to a Printer or Plotter

Printers and plotters are accessed only through the SRM system's spooler. Every printer or plotter must have its own spooler directory, which you configure with the SPOOLER ADD command at the server. A spooler directory keeps files from workstations in order and sends the files, one by one, to its associated printer or plotter. All spooler directories are at the root level of the SRM system disc. To the extent that a user workstation can treat printers and plotters as files, access to these shared peripherals is transparent.

A banner page is produced for each printout unless you disable it when configuring the spooler directory. No banner pages are produced for plotters.

To use a spooler, a workstation user places a copy of the file to print or plot into a spooler directory (for priority printing, the file is placed into a special "priority" subdirectory in the spooler directory.) Any SRM data file may be spooled. (Non-ASCII files must be constructed with care or unexpected results may occur.)

A spool file is automatically sent to the printer or plotter associated with the spooler directory when the file meets the following criteria:

1. The file is not empty.
2. The file is closed.
3. The file is at either:
 - a. the head of the queue of files in the PRIORITY subdirectory of the spooler directory
or
 - b. the head of the queue in the spooler directory and the PRIORITY queue is empty.

Printer Environments and Priority Spooling

SRM provides environment spooling and priority spooling. These features and their use are described in the next two sections.

Printer Environment Spooling

Some printers allow you to send commands and data that set up a desired printing environment, e.g. loading a certain font or selecting a printing orientation. An SRM system spooler allows files that contain printer environment information (environment files) to be held in an ENVIRONMENTS subdirectory of the spooler directory. When a print file is sent to a printer, the spooler prepends an environment file that you specify to the print file. The environment file's printer information defines the printer environment in which the print file is then printed.

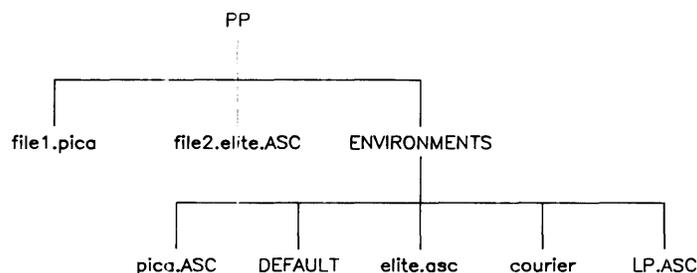
Files spooled without environment files are handled this way:

- ASCII files are sent with an automatic carriage return and line feed after each record.
- Files of any non-ASCII type are printed or plotted exactly as the byte stream sent.

To set up environment spooling, follow these steps:

1. Use a workstation on the SRM to create a subdirectory called ENVIRONMENTS (type in all upper-case) in the desired printer spooler directory.
2. Determine from the particular printer manual what environment information is required.
3. Place the appropriate information in a file in the ENVIRONMENTS subdirectory. Environment files:
 - must be of ASCII, BDAT, or Pascal Data type. Do not use Pascal TEXT. ASCII type files may end in .ASC or .asc.
 - must **not** contain periods.
 - must have unique filenames. Do not distinguish environment filenames with different extensions.
4. Repeat steps 2 and 3 to create a file for each printer or plotter environment desired.
5. Optionally, place default environment information in a file in the ENVIRONMENTS subdirectory. Name this file DEFAULT, DEFAULT.ASC, or DEFAULT.asc. This environment is used when no other environment file is specified.

Here is an example spool directory set up for environmental spooling:



To use environment spooling:

1. Specify the name of the desired environment filename as part of the file name of the spooled file. A spool filename then takes the form:

spool_filename.environment_filename[.ASC]

where a period is used to separate *spool_filename* from *environment_filename*, and the suffix, [.ASC] or [.asc], applies to the spool file itself and not to the environment file.

For example, `file2.ASC` is to be printed in the printer environment specified by the environment file `elite.asc`. To do this, a file with the following filename is placed in the spool directory:

`file2.elite.ASC`

Note that the .ASC extension is part of the original filename, `file2.ASC`.

When an environment file is not specified in the spool file name, the spooler prepends the DEFAULT environment file to the spool file. In the absence of a DEFAULT environment file, the spool file is printed without an environment.

Note

If you create an ENVIRONMENTS subdirectory in a spooler directory, you should thereafter include the name of an environment file as part of every file you send to that spooler, unless you want the default environment.

If you have plotter application software that resets the plotter at the beginning of file, the application will void (nullify) the SRM environment file.

An Example Environment File

The data below could be placed in an ASCII environment file called “LP” or “LP.ASC.” In this example, the unprintable ASCII character 27 (escape) is replaced by “^.” You would have to substitute ASCII 27 for every occurrence of “^” in the example below for the example to work.

```
^ [&110^ [(8U^ [(s0P^ [(s16.66H^ [(s8.5V^ [(s0S^ [(s-3B^ [(s0T^ [&15C
```

Do not confuse 0 (zero) with O (capital “o”) or lowercase “l” with the numeral “1.”

This environment works with the HP LaserJet Series II printer and sets up the printer to print in landscape orientation; “Line Printer” is the primary typeface. This environment is good for printing program listings.

To use this environment file, you would type:

```
file_name.LP.ASC
```

and *file_name* would print in the environment described above.

Priority Spooling

The SRM system’s spooler allows you to print “rush” jobs before others. Print or plot files sent to the PRIORITY subdirectory in a spooler directory will print or plot before other files in the spooler directory.

To set up priority spooling, use a workstation on the SRM to create a subdirectory called PRIORITY in the desired spooler directory.

To use priority spooling, place the file to be printed or plotted with higher priority into the spooler directory’s PRIORITY subdirectory. Any file in the PRIORITY subdirectory is printed before the files placed directly in the spooler directory. In other words, files that are placed directly in the spooler directory have no special priority.

Printing a Rush File Next

Placing a file in the PRIORITY subdirectory does not automatically override the printing of a normal file that is currently being printed.

To preempt a normal file with a priority file, follow these steps:

1. Use a workstation on the SRM to place the desired file in the PRIORITY subdirectory of the spool directory.

2. At the server, type:

`SPOOLER DOWN interface_select_code[,bus_address]` or

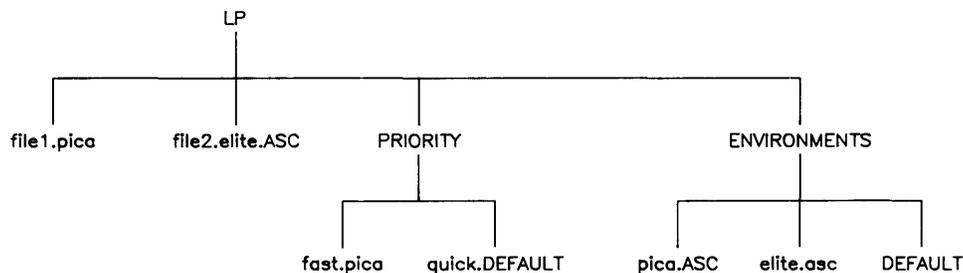
3. At the server, type:

`SPOOLER UP interface_select_code[,bus_address]` or

The spooler restarts and selects the file in the PRIORITY directory with the earliest last modify date. If your file is the only file in the PRIORITY subdirectory, it prints next.

Files (in the regular spooler directory) preempted this way are not deleted. A file which was being printed is reprinted from the beginning after all files in the PRIORITY subdirectory are finished printing.

Priority spooling is compatible with environment spooling, as described in the subsection above. Below is an example spooler directory set up for both priority spooling and environment spooling:



Note

You should limit the use of the priority subdirectory. If all spool files are placed in the PRIORITY subdirectory, the priority advantage is gone. You may want to protect the PRIORITY directory with a password and distribute the password only to selected users.

More About Using SRM System Plotters

All of the SRM supported plotters are controlled using the Hewlett-Packard Graphics Language (HP-GL) and have a common set of capabilities. Larger drafting plotters (the HP 7580 series, for example) have expanded capabilities.

Because the SRM Operating System requires the workstations to treat their graphic output device as a file, there is no device feedback in a spooled environment. This means that the plot size must be specified when the commands are written to the plot file.

If a plotter is frequently taken off the SRM and used locally at bus address 5 (the factory setting), the plotter can be reconfigured **MANUALLY** at the SRM server using the UNITS command with the ADD directive. For example,

```
UNITS ADD PLOTTER 7,5
```

This eliminates the need to reset the bus address switches every time the plotting application changes.

Plotters supporting a paper feed mechanism are issued a page eject command by the SRM after completing a plot. This allows plots to advance automatically. To avoid wasting paper, user programs should **NOT** use the pagination and cutter activation commands in the plot file with any spooled plotters.

For most plotters, the “error” light or “out of limit” light may come on during plotter initialization and after a plot finishes. This is normal. However, if either light comes on **DURING** a plot, the data is in error.

Single sheet plotters require setup before they can plot each sheet. If the plotter is not loaded with a sheet of paper when it is ready to plot a workstation’s file, the server puts the plotter on HOLD and displays a message requesting you to set up the plotter. You or the workstation user must load the plotter with a sheet of paper and then go to the server and type:

```
SPOOLER CONTINUE interface_select_code, bus_address  or 
```

Example Entry: SPOOLER CONTINUE 7,8 or

Result: The server starts the plot on the sheet of paper you loaded into the plotter and displays:

```
Spooler 7,8 continued
```

You do not have to type the SPOOLER CONTINUE command for each sheet of paper if you type the SPOOLER ADD command with the NOCONTINUE keyword.

Example Entry: SPOOLER CONTINUE 7,8 or

Result: The server starts the plot on the sheet of paper you loaded into the plotter and displays:

Spooler 7,8 continued

Example Entry: SPOOLER ADD BUFFERED NOCONTINUE 7,8 "PLOTTER_DIR" or

Result: The server starts the plot as soon as paper is loaded and the plotter is online. When the plot is done the plotter is taken offline (unless it can automatically feed its own paper). To start the next plot, load the paper and press the plotter's "view" or "remote" button to put the plotter back online.

The NOCONTINUE keyword does not work on 9872 plotters or 740 ColorPro plotters.

Backup Design and Media Management

4

Overview

To successfully protect the data on your SRM system, you must design:

- | | |
|--|--|
| a backup strategy, including: | what to back up,
when to back up,
how often to back up, and
how long to retain each backup medium. |
| a media management scheme, including: | how to keep track of media age,
how to keep track of media wear,
where to store media,
when to reuse media, and
when to replace media. |

This section contains information, examples, questions, and suggestions to help you design a backup strategy and media management scheme best suited to your needs, including:

- a description of backup features, capabilities, and limitations,
- definitions of backup design and media management terms and concepts,
- what you, the SRM system manager, need to evaluate in order to design an effective backup strategy,
- recommended approaches to various backup requirements,
- an example backup strategy,
- ideas for managing backup media, and
- example media retention and reuse schemes.

Backup Features, Capabilities, and Limitations

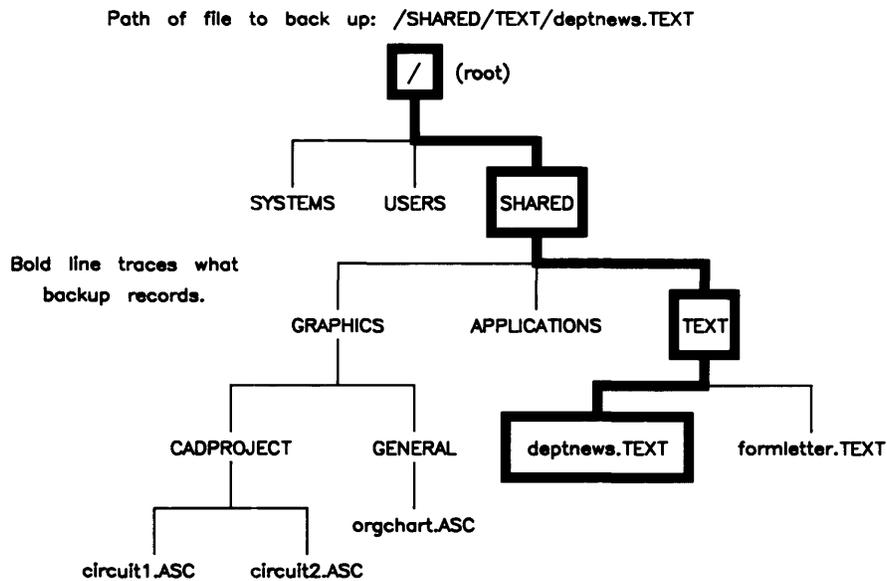
Selective Backup

You can choose what to back up: a file, a set of files, a directory, a set of directories, any combination of files and directories, or an entire file system.

For each file you choose to back up, the backup records:

- the file itself and
- the complete path (from the root directory) to the file.

The following illustration shows an example:



Example of What a Backup Records for Each File

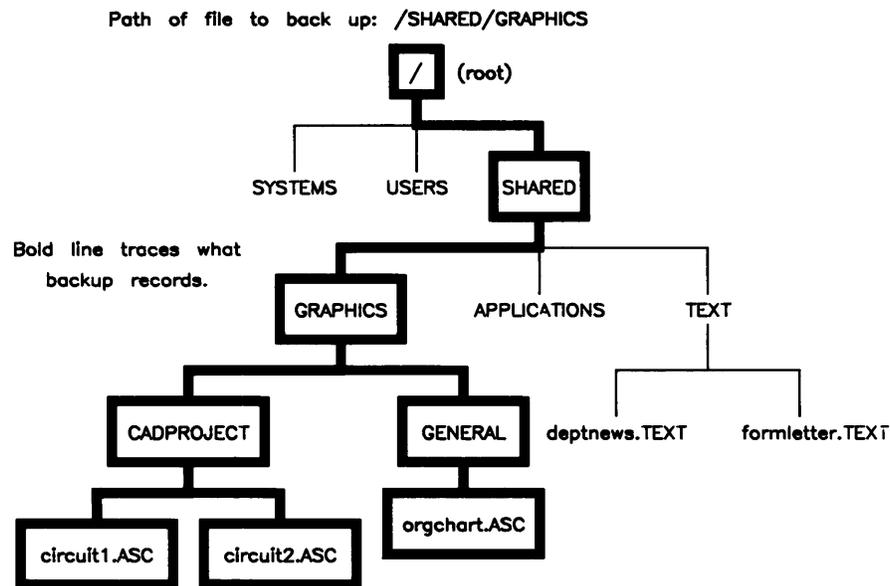
Note

A backup can record files that are up to 30 directory levels deep (files whose full paths name up to 30 directories, including the root).

For each directory you choose to back up, the backup records:

- the contents of the directory and
- the complete path (from the root directory) to the directory.

The following illustration shows an example:



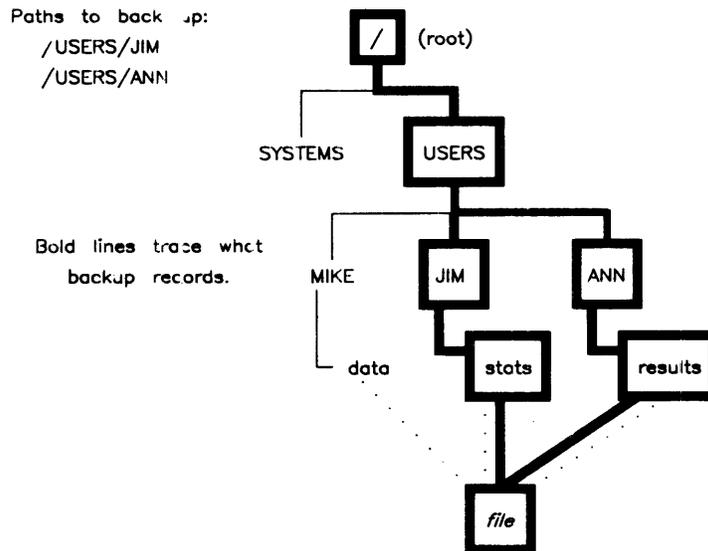
Example of What a Backup Records for Each Directory

Note

A backup records the protection information (up to 40 passwords and their associated access capabilities) for every directory and/or file to which the backup applies.

Duplicate Links

Along with the file itself, a backup records all of the duplicate links (alternate paths) to a file **ONLY IF** those links are among what you select for the backup. That is, a backup records **ONLY** those duplicate links that are among what you select for the backup.



Example of How a Backup Records Duplicate Links

One Disc per Backup

One backup can **not** copy from more than one disc. If you want to back up more than one disc, you must implement separate backups for each disc.

However, you may implement more than one backup for the same disc.

Mounted Volumes

You must back up mounted volumes separately. Mounted volumes can **not** be backed up with the volume on which they are mounted.

Back Up on Demand or Automatically on a Regular Schedule

With either SRM system (with or without on-line backup), you can start a backup whenever you want to. The system with on-line backup can also start backups automatically on a regular schedule you set. You can select:

- when (at what time and on what day(s) of the week) you want the system to start each backup and
- how often (in intervals of one or more weeks) you want the system to repeat each set of weekly backups.

Backup Status Checks

As a backup runs, it displays brief status messages on the server's screen to let you know:

- if the backup is running,
- how many directories and/or files the backup has copied so far,
- if the backup completed without or with errors, and
- if the system could not perform or complete the backup due to fatal errors.

For more detailed status information, each backup creates its own log file. As a backup runs, it also displays entries it makes to its log file on the server's scrolling screen. You can also read or print the log file from a workstation. A log file shows what was not backed up and gives specific error messages. The path to the log file from the last backup or restore is:

```
/BACKUP_RESTORE/TEMP_FILES/CURRENT_LOGFILE
```

Backup Media Features

A backup provides the following media features:

Backup Destination Media

You can copy files to any supported mass storage device as follows:

- You can copy files to 1/4-inch tape cartridges.
- You can copy files to double-sided micro flexible discs, fixed discs, or removable hard discs if they are **NOT** SDF (Structured Disc Format) volumes.
- You can reuse media that have already had files copied to them. A backup **OVERWRITES** existing data on tapes and non-SDF (Structured Disc Format) discs.
- You can **NOT** put multiple backups on a single medium. A medium may have at most one backup on it (and may have only part of a backup on it.)

Automatic Initialization of Backup Destination Discs

A backup initializes double-sided micro flexible discs, fixed discs, and removable hard discs automatically. However, while a disc is being initialized, any other volumes **on the same controller** are inaccessible.

HP 1/4-inch tape cartridges come preformatted and certified, so a backup does not ever automatically initialize them.

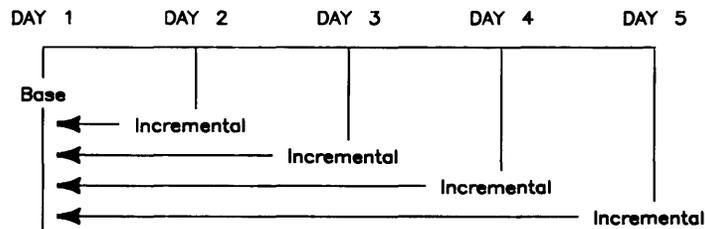
Multiple Backup Destination Devices

A backup can copy files to a sequence of backup devices **without intervention**. You can specify the order in which you want the backup to use the devices. All destination devices for a backup **MUST** be of the **SAME** type (all tape drives or all micro flexible disc drives). You can **NOT** back up to multiple fixed discs—only to one.

Backups can use the HP 35401A 1/4-Inch Cartridge Autochanger Tape Drive, which can automatically sequence through multiple tape cartridges.

Terms and Concepts

Term	Definition
<i>full backup</i>	The result of copying all of the directories and files on a disc volume to another storage medium. Perform a full backup regularly. Depending on your backup needs, you may want to perform a full backup every week, every month, every quarter and/or every year. Also, a full backup insures that all of the duplicate links in the volume's file system are recorded.
<i>partial backup</i>	The result of copying a set of directories and/or files you choose to another storage medium.
<i>base backup</i>	A full backup on whose date subsequent incremental backups base their selection of what to copy. This type of backup sets the last backup date of an SRM disc. There is only one base backup date per disc.
<i>incremental backup</i>	A backup that automatically selects, and copies onto another storage medium, only those directories and/or files created or changed since the last base backup. A directory is considered changed if its contents change, its name changes, or its password(s) and/or associated access permissions change. A file is considered changed if its content changes, its name changes, its password(s) and/or associated access permissions change, or a duplicate link is created to the file. An incremental backup selects from among the same directories and/or files, or a subset of those, copied by the last base backup.



Daily incremental backups copy any files created or modified since last base backup.

Base-Incremental Backup Scheme

Some characteristics of a base-incremental backup scheme are the following:

- Incremental backups can operate on either all of the files on a system or only the set of files you choose (such as frequently modified files). Depending on your choice, you can easily reconstruct the latest state of either an entire file system or only a portion of it. To do so, you restore the last base (full) backup and then the last incremental backup.
- You get multiple copies of the same files: if file X is modified on DAY 2, then file X is copied during DAY 3's, DAY 4's and DAY 5's backups. However, if file X is deleted after day 2, then file X is not copied during subsequent backups.
- In general, the time and media required to do an incremental backup may increase each day until the next base backup.

Term	Definition
<i>copy backup</i>	A full or partial backup that has no effect on the last backup date of an SRM disc or on a base-incremental backup scheme (see below). This type of backup copies all selected files, regardless of their creation date or the dates on which they were last modified. A copy backup is useful for archiving files or for transferring them (by restoring them) to another SRM system.

Designing a Backup Strategy

To design a backup strategy, you need to determine what to back up and how often to back it up. This section contains suggestions to help you optimize your backup strategy—to provide adequate protection while minimizing its cost in time, personnel, media, storage, etc.

Evaluating the Files on the System

If possible, have at hand a diagram of the current directory structure on each SRM disc.

If a directory contains files, evaluate the files as a group. Evaluate individual files as necessary. Consult the system's **users** when evaluating **their** files.

Question	Suggested Approach
How critical are the files to either the system itself or to your business?	Do a copy backup of critical files (files that you cannot afford to lose, no matter what) and archive the resulting media. In this way, you avoid the risk of losing the files when backup media are recycled.
How often are the files modified?	<p>A base-incremental backup scheme is an efficient way to back up frequently modified files. To optimize such a scheme, separately back up and archive those files that are seldom modified, and exclude them from the base-incremental backup.</p> <p>Keep your backup scheme up-to-date with the file system. Insure that any directories and files added to the system later are covered by your current backup scheme.</p>
Does a set of critical files need to be changed all at once?	First do a partial copy backup of the files before any are changed. Afterward, if the changes are successful, do a partial backup of the newly modified files. (You may then want to purge or reuse the media from the first backup.) If corruption ever occurs when files are being changed, you will always have the latest version of the files <i>before</i> the changes began.
Do the files contain sensitive information?	Store media with sensitive files in a locked vault.
Does law or corporate directive require you to keep the files for a certain length of time?	Perform a copy backup of these files and store the resulting media in another building or in a fireproof vault. Some cities have services that will pick up a set of your media and take it off site on a regular schedule.
How large are the files? About how long would it take to back all of them up?	Consider backing up the SRM file system in parts so that backups do not take too long. Or, have the same backup copy files to more than one tape or microdiskette drive or an HP 35401A 1/4-Inch Cartridge Autochanger Tape Drive so that the backup can run uninterrupted by media changes.
Do you want to be able to retrieve the files quickly from a backup medium?	<p>If your system has a group of large, interrelated files that consume an excessive amount of a backup medium, consider doing a partial backup of these files. This eliminates the need to search through a full backup for the files.</p> <p>With a base-incremental backup scheme, a particular file is easy to locate. You need to search through at most only the last incremental and last base backup media.</p>

Other Considerations

Question	Suggested Approach
When, and for how long, are personnel available to attend to a backup?	<p>For the SRM system with on-line backup, personnel need only load and unload tapes or insert and eject microdiskettes. Personnel may also need to change media and continue a paused backup unless you use an automatic tape changer.</p> <p>For the SRM system without on-line backup, personnel need to do all of the above, plus bring down the system, start the backup, and then bring up the system when the backup has finished.</p>
When, and for how long, are most or all users off the system?	<p>The system can NOT back up files that are opened exclusively by users. Also, while a backup is running, the SRM system may respond more slowly to shared resource use, and the backup takes longer to complete. Therefore, it is best to do a backup when system usage is lowest.</p> <p>If you must perform backups when the system is busy, you can improve the system's performance by installing 1½ Mbytes of memory in the server and by using tape drives that have their own controller (such as an HP 9144 or HP 35401).</p>
How often has the system or a disc drive failed?	Back up often enough to protect your SRM system's files from equipment or software failures.

An Example Backup Strategy

The Situation

Assume that:

- Your SRM server has enough memory for on-line backup.
- Your SRM system has two tape drives available for backups.
- You want to conserve as much media and time on daily backups as possible.
- You can load the two tape drives with tape before you leave work each weeknight.
- You want a daily backup to execute automatically at 4:30 a.m. when no one is at work using the system.
- When you come into work in the morning, you can remove and store the backup tapes containing your SRM system's files.

The Approach

The approach is to perform weekly base (full) backups and omit the system's most static files from your daily incremental backups. A base-incremental backup scheme is most efficient for backing up the most current versions of frequently modified files. It is also good idea to perform a full copy backup of every disc on your system and archive the resulting backup media.

Set up a weekly base backup of all files and a daily incremental backup of the following directories (assuming that they exist on your SRM system):

- /USERS

This directory contains SRM workstation users' personal working directories and files. This directory is where SRM workstation users daily create and modify most of the files that are most important to their work. Users want the latest versions of these files backed up.

- /WORKSTATIONS

Within this directory, Pascal Workstation System users' have their own own system directories which contain "work files." These are files that Pascal workstation users have just created or are currently modifying. These files are probably important to users' current work and should be backed up frequently.

- /SHARED/TEXT

This directory is for public messages, commonly used forms, shared documents, etc., and users may frequently contribute important or useful files to this directory. You should back up this directory daily.

- /SHARED/GRAPHICS

This directory is for commonly used slides, drawings, graphs, etc., and users may frequently contribute important or useful files to this directory. You should back up this directory daily.

Other directories, such as /SYSTEMS, seldom change or change so infrequently than you need not back them up daily. For example, the /SYSTEMS directory may be modified only when you get a new version of an SRM or workstation operating system or when you add a new user to the system.

You should plan an automatic base backup of all files at 4:30 a.m. on Monday of every week, and an automatic incremental backup of the directories listed above at 4:30 a.m. on Tuesday, Wednesday, Thursday, and Friday of every week.

Managing Backup Media

This section contains suggestions for protecting the backup media that contain your system's files.

Buy New Media

Before you implement a new backup and media management scheme, buy a set of new media from Hewlett-Packard. Your media will be reliable from the start.

Keep Track of Media Age and Wear

Know at what age or after what number of uses your backup medium is prone to fail. Here are two examples:

Tape Drive Model Number	Usage Limit, whichever comes first:
7908, 7911, 7912, 7914	<p>A long or short cartridge tape has been loaded automatically 2500 times.</p> <p>A <i>long</i> cartridge tape has had a total of 20,000 Mbytes of data read from or written to it over its lifetime.</p> <p>A <i>short</i> cartridge tape has had a total of 5000 Mbytes of data read from or written to it over its lifetime.</p>
9144A, 35401A, 794X	<p>A long or short cartridge tape has been loaded automatically 2000 times.</p> <p>A <i>long</i> cartridge tape has had a total of 8000 Mbytes of data read from or written to it over its lifetime.</p> <p>A <i>short</i> cartridge tape has had a total of 2000 Mbytes of data read from or written to it over its lifetime.</p>

The following suggestions may help you keep track of media age and wear:

- Verify that your backup media can be read from, without errors, regularly or just when the media reach a certain age or have been accessed a certain number of times.
- As a precaution, verify a backup medium **before** you restore files (especially a disc's entire file system) from it.
- Before you use a new backup medium, label it with the date you put the medium into service.
- Provide a label with a chart to check off each time the medium is used (written to, read from).
- Dispose of media that has become corrupted or is too old or worn to be reliable.

Store Media Properly

Store media in an environment where

- dust (especially air-borne dust) is kept to a minimum,
- there is no direct sunlight,
- temperature is between 18.2° and 23.8°C (65° to 75°F), and
- relative humidity is between 35% and 45% (non-condensing).

Clean Tape Heads Periodically

If the backup medium you use is a cartridge tape, periodically clean the recording heads of the tape drive. Otherwise, oxide and other contaminants may build up enough to begin lifting the tape off of the head.

Clean tape heads:

- weekly,
- when read/write errors occur,
- after a magazine of new cartridges has been used in the tape drive, and
- especially after using new tapes, since they leave more contaminants on the tape heads than used tapes.

For HP 9144A Cartridge Tape Drives, you can order an HP 92193E cleaning cartridge kit. This kit is a standard accessory with the HP 35401A drive, and lets you clean tape heads reliably and easily. All you need to do is moisten the foam pad in the cleaning cartridge with head cleaning fluid and insert the cartridge into the tape drive. The drive automatically cleans the tape head by rapidly moving the foam pad back and forth.

Retain Backup Media Long Enough

When deciding how long to retain backup media, consider the following recommendations:

- Anticipate what you would need to recover lost files. From how far into the past would you have to recover files? Keep enough media to reconstruct the system as it existed at several points in the past (such as yesterday, last week, last month, last quarter, last year).

Example

What if a set of files that are updated regularly were corrupted at some time in the past, and you just discovered it now?

Recommendation: Keep backup media from far enough into the past to “reconstruct” the files as they existed just *before* they were corrupted. Once you reconstruct the files, perform the updates which occurred *after* the files were corrupted.

- It is inadvisable to overwrite any of the media composing a full backup unless you have at least *two additional* full backups. (It is alright if one is an earlier backup of the system than the other.) If you have only one full backup, and there are problems with the media that compose it, then you have no recourse for reconstructing the system.
- Keep enough of one frequency’s backups to slightly overlap the time period covered by the next longer frequency. For example, keep a month’s worth of the most recent weekly backups, plus one extra.

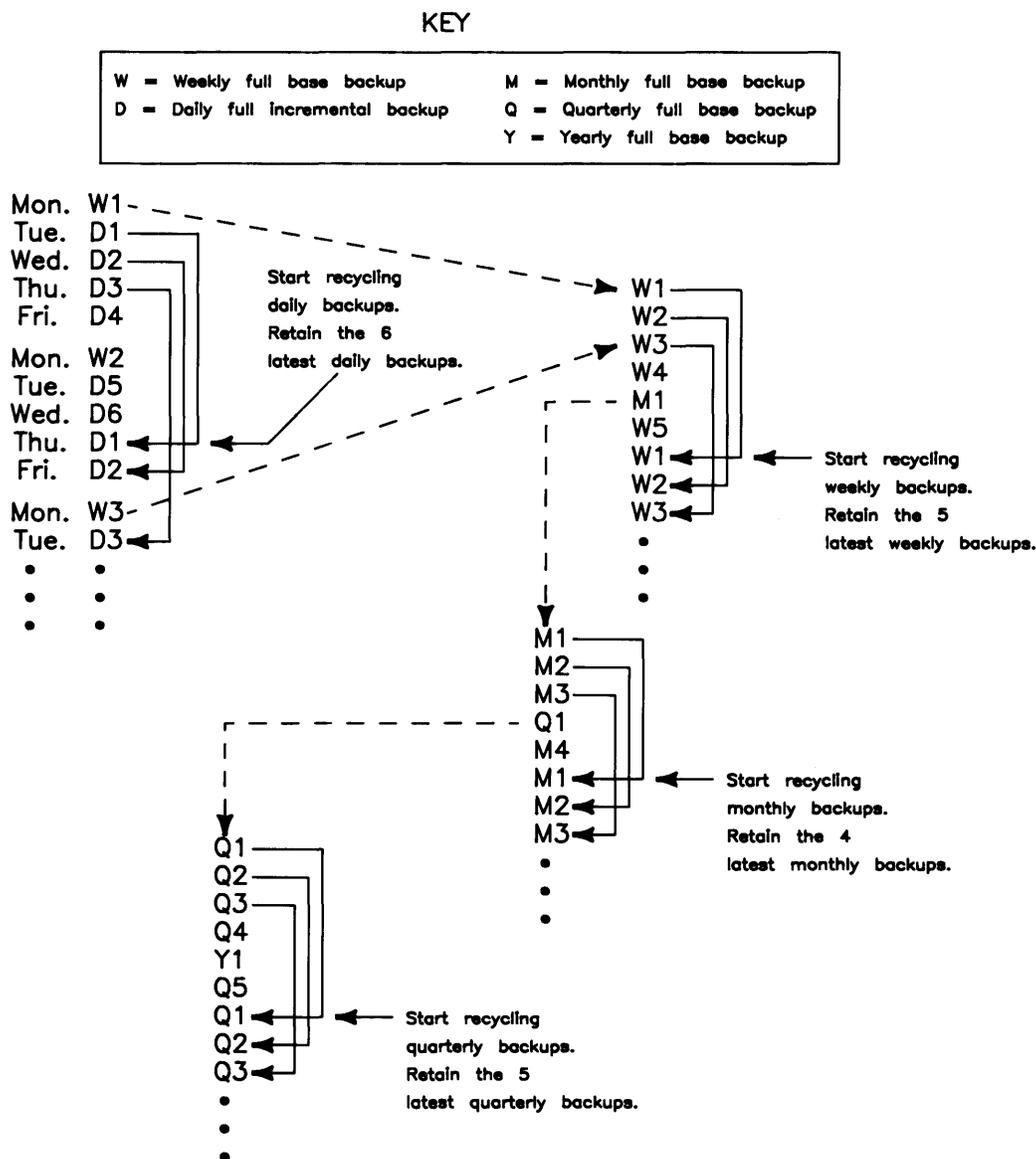
Archive Media Regularly

It is a good idea to put a set of system backup media in “permanent” storage every 3, 6, or 12 months. This has two benefits:

- You can recover from past “accidents” that are not discovered until later—perhaps **much** later. For example, if a file is not accessed very frequently, someone may not realize that the file is gone until months after it was actually lost.
- You must buy a new set of backup media to replace those you have archived. In this way, you “retire” old media that may not be reliable for much longer and replace them with new, reliable media.

Example Media Retention and Reuse Plans

Example Media Retention and Reuse Plan 1



Plan 1's Advantages and Disadvantages

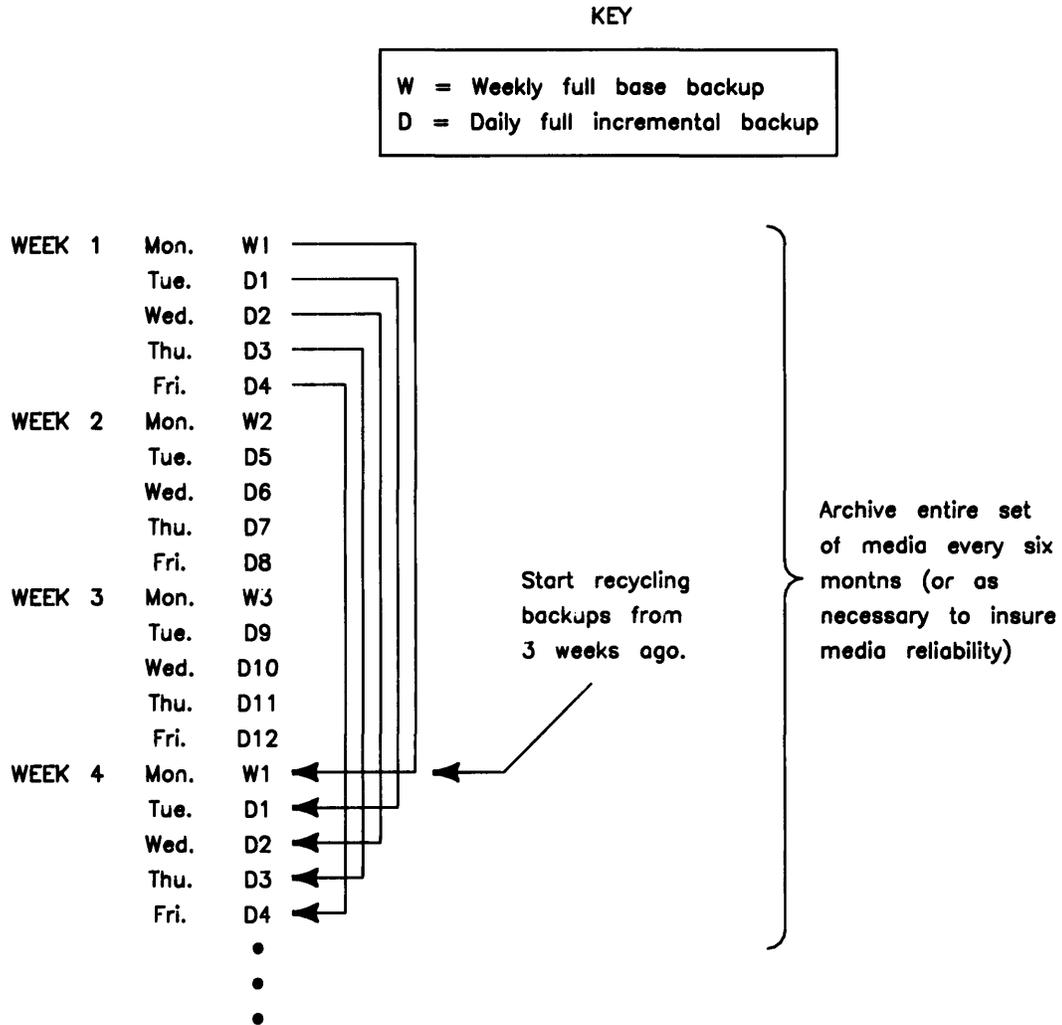
Advantage

- Provides thorough long- and short-term backup protection.

Disadvantages

- Requires elaborate, extensive “bookkeeping.”
- Requires a large stock of media.
- Requires a large, well-organized storage area.
- Requires close monitoring of media age and wear.
No built-in catalyst for media replacement (such as regular archival or verification).

Example Media Retention and Reuse Plan 2



Plan 2's Advantages and Disadvantages

Advantages

- Good short-term backup protection.
- Need only a small stock of media.
- Need only small amount of storage space.
- Simple to administer. Little "bookkeeping" required.
- No need to monitor media age and wear. Media archived and replaced regularly.

Disadvantage

- Sketchy long-term backup protection.

Performing a Backup

Overview

If you have on-line backup and restore, performing a backup entails:

- creating a file with which you specify what to back up and where to copy it (with the option to verify the destination media),
- loading media into the destination drive(s) for the backup,
- specifying what type of backup it is, and either starting it immediately or specifying when and how often you want the backup to start automatically in the future,
- after the backup has completed, checking its log file, and
- storing the resulting backup media.

If you use the Backup/Restore Utility, performing a backup entails:

- stopping the server,
- starting (booting) the Backup/Restore Utility,
- creating a file with which you specify what to back up and where to copy it (with the option to verify the destination media),
- loading media into the destination drive(s) for the backup,
- specifying what type of backup it is and starting the backup,
- after the backup has completed, restarting the server,
- checking the backup's log file, and
- storing the resulting backup media.

Starting the Backup/Restore Utility

Note

This section applies **ONLY** to SRM systems **WITHOUT** on-line backup and restore. If your SRM system has on-line backup and restore, skip to the next section on “Specifying a Backup’s Scope.” You do **NOT** need to use the SRM Backup/Restore Utility.

If your SRM system does **NOT** have on-line backup and restore, you must use the stand-alone Backup/Restore Utility to perform backups. The SRM Operating System must be down and unavailable to users while the Backup/Restore Utility runs instead on the server.

To start, you must boot the Backup/Restore Utility as follows:

1. Stop the server (bring down the SRM Operating System) as described in this manual’s chapter on “Restarting and Stopping the Server.” Do **NOT** turn off the server or any of its peripherals.
2. Insert the *SRM Systems & Utilities* tape or the *SRM Backup/Restore Utility* micro flexible disc into the appropriate type of drive and wait for the drive’s BUSY light to go out.
3. If the server is an HP 9826 with a Boot ROM version prior to 3.0, insert the *SRM Boot Utility for 9826A* flexible disc into the server’s internal disc drive.

Otherwise, skip to step 6.

Note

Be sure that the disc is labeled *for use with SRM Rev. 3.0 98619A*. This disc allows the server to boot a system from both Structured Disc Format (SDF) media and Logical Interchange Format (LIF) media.

4. At the server's Enter command: prompt, type:

SYSTEM UP or

and wait until the server displays a numbered list of systems available for you to boot.

Result: The server first displays a series of powerup messages and then loads the Boot Utility from the internal disc drive. The Boot Utility then searches for systems to boot and displays a listing similar to the following:

```
SRM X.X System Boot Utility
Copyright 19YY Hewlett-Packard

98625A interface found at select code 14
98624A interface found at select code 7
 1.      7946 at 14,0,0
      Bootfile PRIMARY           :SYSTEM_SRM
 2. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_INS
 3. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_BKP
 4. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_DSK

Number of boot system (30 sec to enter):
1
```

Example Boot Utility Display with Backup/Restore Utility Highlighted

5. Skip to step 7.

6. At the server's **Enter** command: prompt, type:

SYSTEM UP **Return** or **ENTER**

and press the space bar a few times while the server is displaying its bootup messages.

Note

Pressing the space bar interrupts automatic booting of a system and allows you to manually choose a system to boot.

Result: After several seconds, the server displays a listing of the systems available for you to boot, as in the following example display:

```
ID PROM Not Installed           :HP7941, 800, 0, 0
Copyright 19YY,                 1S SYSTEM_SRM
Hewlett-Packard Company.       :HP9144 TAPE, 801, 0, 0
All rights reserved.           1I SYSTEM_INS
                                1B SYSTEM_BKP
BOOTROM 4.0                     1D SYSTEM_DSK
MC68000 Processor
Keyboard
HP-IB
ID0 at 0
ID127 at 4
HP98625 at 8
HP SRM at 21
786272 Bytes
```

```
SEARCHING FOR A SYSTEM (ENTER To Pause)
RESET To Power-Up
```

Example Server Display upon Powerup with Backup/Restore Utility Highlighted

7. If the server is a 9826A using the SRM Boot Utility, type the number to the upper left of the label **SYSTEM_BKP** and press **[ENTER]**.

Otherwise, type the two-character (digit-letter) code to the left of the label **SYSTEM_BKP**.

Result: The server boots the Backup/Restore Utility. After the Backup/Restore Utility has been booted, the server's display looks similar to the following:

Note

Depending on the number of files on your SRM disc(s), there may be a delay of up to several minutes before the SRM volumes listing appears.

```
SRM X.X Backup Utility      DD Month YY  12:26:37 PM
                               %cpu =    0
                               Open files
                               0

-----SRM Volumes-----
vol      bus      free  block
add sc  add      volume name  blocks  size
-----
* 8 8 0, 0 PRIMARY      52018   1024

System up at: DD Month YY  12:23:42 PM

-----
REMINDER:  Before executing a backup or restore,
           remove the medium used to boot this
           utility, and load the backup device(s)
           to be used with the proper media.
-----

Enter the time
DD Month YY  12:23 PM
```

Example Initial Backup/Restore Utility Display

8. If the displayed date and time are correct, then press **Return** or **ENTER**.

Otherwise, correct the date and time by typing over them. Then press **Return** or **ENTER**.

Result: The utility displays the date and time you set.

9. Unload and eject the *SRM Systems & Utilities* tape from its drive, or eject the *SRM Backup/Restore Utility* micro flexible disc from its drive. Store the tape or micro flexible disc in a safe place.

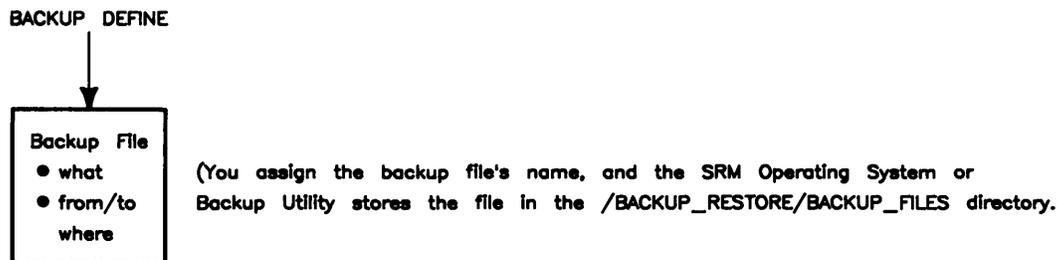
You are now ready to perform a backup. Continue with the next section on “Specifying a Backup’s Scope.”

Specifying a Backup's Scope

The SRM Operating System with on-line backup and the SRM Backup/Restore Utility provide a `BACKUP DEFINE` command. This command guides you in creating a backup file by prompting you for the values that define the scope of a backup. These values include:

- the SRM volume that contains the files you want to back up,
- the directories and/or files you want to back up (all files or selected files),
- the backup device(s) to which files are to be copied, and
- whether or not you want the backup to automatically verify each destination medium.

The following diagram illustrates the process described above:



Follow these steps to define the scope of a backup:

1. At the server's **Enter** command: prompt, type:

```
BACKUP DEFINE "backup_file_name<backup_file_password>"  or 
```

Item	Description	Length	Composition
<i>backup_file_name</i>	The name you want to assign to the backupfile that you create with the BACKUP DEFINE command. If you assign an illegal filename, the BACKUP DEFINE command displays the filename on the screen and warns you that it may be an illegal name.	1 to 16 characters	A Z a z 0 9 -
<i>backup_file_password</i>	A password you have the option to assign to the backup file. The password protects all of the file's access capabilities. Without specifying the assigned password, no one can display, print, or modify the contents of the backup file or delete, schedule, or unschedule the backup file itself.	1 to 16 characters	A Z a z 0 9 ~ ! @ % ^ & () - _ + { } \

Example Entries: `BACKUP DEFINE "Static_Files<Security>" or`

```
BACKUP DEFINE "Public_Files"  or 
```

Result: The server displays:

```
Backup define "Public_Files" started
File does not exist. Create it (y/n)?
Y
```

Example Entries: `BACKUP DEFINE "Illegal,name" or`

Result: The server displays:

```
BACKUP DEFINE "Illegal,name" started
This file name may be illegal on some workstations
File does not exist. Create it (y/n)?
```

2. Press or .

Result: The server prompts:

```
Name of volume to backup:
volume_name
```

3. If the displayed volume name is the name of the volume containing what you want to back up, then press or

Otherwise, type:

volume_name or

where *volume_name* is the name you assigned to the volume when you initialized it. You can obtain the name of each volume from a VOLUMES command display.

Example Entry: PRIMARY or

Result: The server displays the volume name you entered and prompts:
 Back up all files on volume (y/n/quit)?
 Y

4. If you want to back up **ALL** of the directories and files on the disc, or if you are defining a **BASE** backup, skip to step 7.

If you want to select which directories and files to back up, press and then or .

Result: The server prompts:
 Path to add/remove (enter nothing to finish):

5. Type:

path or

Item	Description	Length
<i>path</i>	The path from the root directory to a directory or file you want to back up. A path is a list of those directories you must follow in the hierarchical structure to reach a directory or file. A path includes the directory or file itself. Directory and file names in a path are separated by slashes (/). A single or initial slash denotes the disc's top (or "root") directory.	1 to 160 characters

Note

Any directory with a volume mounted below it is backed up as an empty directory. A path can span a maximum of 30 directories, including the root directory.

Example Entry: /SHARED/GRAPHICS or

Result: The server displays the path you enter and again prompts:
 Path to add/remove (enter nothing to finish):

- Repeat the previous step until you have specified all of the paths to the directories and/or files you want to back up.

Caution

To insure that the system can restore the backup properly, every path you enter **MUST** specify a **UNIQUE** area of the directory structure. Do **NOT** enter two or more paths that specify overlapping areas of the directory structure. For example, do not specify the two paths /WORKSTATIONS and /WORKSTATIONS/SYSTEM34 for the same selective backup. (The /WORKSTATIONS directory already contains the SYSTEM34 directory, so there is no need to enter it separately.)

Also, the total number of characters in **ALL** of the paths you specify may be up to 1600.

- Press `Return` or `ENTER` to finish specifying what you want to back up.

Result:

The server prompts:

Device to add/remove (enter nothing to finish):
interface_select_code, bus_address, subunit_number

and displays a list of the server's peripherals similar to the following:

```
----Mass Storage Devices----
device      select      bus
  type      code       address
-----
      7941      8         0,0
Removable   8         0,1
```

Example Listing of Server's Mass Storage Devices

Note

If you plan to use an HP 35401 Autochanger Tape drive as a backup destination device, the backup will run more efficiently if the drive is the **ONLY** backup destination device. If you need to use any additional tape drives, specify the HP 35401 drive **LAST** so that the backup uses the drive last. This avoids a noticeable delay when the backup must change destination drives.

8. If the displayed device address identifies a drive to which you want the backup to copy files, press `Return` or `ENTER`.

Otherwise, enter the device address of a drive to which you want the backup to copy files by typing:

interface_select_code, bus_address, subunit_number `Return` or `ENTER`

Example Entry: 8,5,0 `Return` or `ENTER`

Result: The server displays the device address you enter and again prompts:

Device to add/remove (enter nothing to finish):

9. If you have more than one drive to which the backup may copy files, you can repeat the previous step until you have specified all of those drives.

Caution

If you want the backup to copy files to a fixed disc, the disc must be the **ONLY** backup device. (You can restore from only one mass storage device, although if the device supports removable media, you can restore from a multiple-media backup.)

Otherwise, **ALL DRIVES you specify must be of the SAME TYPE: either all tape or all micro flexible disc.** By allowing the backup to copy files to more than one drive, you reduce the need for human intervention during the backup. The backup uses the drives in the order that you specify them.

You can specify up to 10 destination drives for the backup.

10. Press `Return` or `ENTER` to finish specifying the backup's destination drives.

Result: The server prompts:

Media check: (V)erify or (N)one
v

11. If you want the backup to automatically verify that a restore could read what the backup copied to the media, press V and then Return or ENTER.

Otherwise, press N and then Return or ENTER.

Note

A backup takes longer to complete if you do a verify.

A backup verifies only the part of the medium containing the backup, whereas the server's VERIFY command verifies the entire medium.

Result:

The server saves the backup file in the directory /BACKUP_RESTORE/BACKUP_FILES on the SRM system disc and displays the messages:

```
Backup file "file_name" saved.
```

where *file_name* is the name you assigned when you gave the BACKUP DEFINE command.

If your SRM system has on-line backup and restore, the server also displays:

```
Warning: Backup file is not currently scheduled.  
Use BACKUP SCHEDULE command.
```

This is to inform you that the backup does not run until you start it manually with the BACKUP EXECUTE command or set up the backup to start automatically on a regular schedule with the BACKUP SCHEDULE command.

Preparing for a Backup's Execution

To prepare for a backup's execution after you have created a backup file, follow these steps:

1. Insure that the SRM system disc and the disc with the files to be backed up are turned on.
2. Insure that every destination drive for the backup is turned on. (A destination drive is a drive to which the backup copies files.)
3. Insure that the SRM system or the Backup/Restore Utility system is UP.
4. Insure that the SRM system disc and the backup's source disc (these may be the same) are UP.

Caution

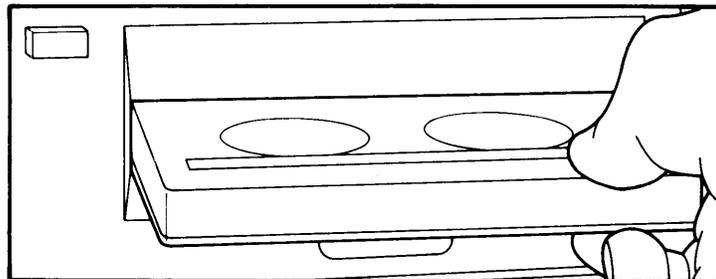
Any backup automatically **WRITES OVER** any data on any tape media or non-SDF disc media in the backup's destination drive(s). You can **NOT** put more than one backup on any medium. To avoid losing important data on media suitable for backups, consider write-protecting the media. (For instructions, refer to the operator's manual for a compatible type of drive.)

5. If you are backing up to removable media, load each backup destination drive with the proper type of medium or media, and wait for each drive's BUSY light to go out.

Note

If a disc is uninitialized, the backup automatically initializes it before copying files to it.

Some fixed disc drives with built-in micro flexible disc drives share the same controller (or bus address). While a backup initializes a new micro flexible disc in such a drive, the fixed disc is inaccessible for up to several minutes. Therefore, the first time you do a backup to a new micro flexible disc in a single-controller drive, start the backup when system usage is low.



Load Each Destination Drive with Proper Type of Medium or Media

Manually Starting a Backup

Note

If you are using the Backup Utility, you must start every backup manually (attend every backup) with the `BACKUP EXECUTE` command.

If you have on-line backup, you may choose whether to start a backup manually with the `BACKUP EXECUTE` command or schedule a backup to start automatically at a time, date, and frequency you set. (See the next section on “Scheduling a Backup to Start Automatically.”)

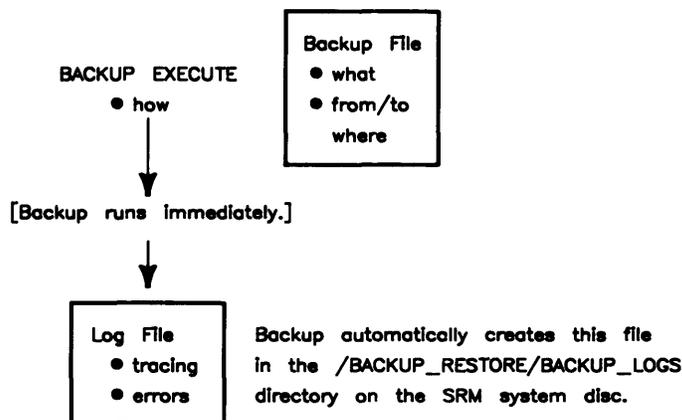
To manually start a backup on demand, you use the `BACKUP EXECUTE` command. The `BACKUP EXECUTE` command starts a backup only once. Each time you want to start a backup in this way, you must give a `BACKUP EXECUTE` command.

This command requires you to specify:

- the name of an existing backup file that defines the scope of the backup you want to perform,
- the volume password of the disc to be backed up, and
- the type of backup (base, incremental, or copy) you want to perform in this instance

and then immediately starts the backup.

The following diagram gives a schematic overview of how the `BACKUP EXECUTE` command works:



Note

As a backup runs, it not only creates a log file on the SRM system disc, but also displays log file entries on the server's scrolling screen. A backup's log file tracks the backup's progress and records detailed error messages. To print the log file entries as they appear and before they scroll off the screen, you can turn on the "Print All" keyboard function.

Do so now **BEFORE** you start the backup by pressing () or .

The server displays:

Printall ON

The default printer (the printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer) will print everything that the server displays on its scrolling screen. Note that log file messages may get intermixed with spooled data or spooler messages if the printer is shared by workstation users.

Leave "Print All" ON until the backup finishes. To turn off "Print All," again press the same key(s) shown above.

Follow these steps to manually start a backup:

1. At the server's **Enter** command: prompt, type:

BACKUP EXECUTE "*backup_file_name*<*backup_file_password*>" or

where	is
<i>backup_file_name</i>	the name of a backup file you created with a BACKUP DEFINE command. The backup file you name specifies the scope of the backup you want to perform.
<i>backup_file_password</i>	the password you had the option to assign when you created the backup file. If you assigned a password to the backup file, you MUST specify it here.

Example Entries: BACKUP EXECUTE "Static_Files<Security>" or
 BACKUP EXECUTE "Public_Files" or

Result: The server displays the contents of the backup file and prompts:
 Password of volume to be backed up:

2. Type:

volume_password or

where *volume_password* is the password you had the option to assign when you initialized the source volume for the backup. (See the example below.)

If you did not assign a password to the source volume for the backup, then press or .

Note

Backups do not copy volume passwords.

Since the volume password does not appear on the scrolling screen part of the server's display, the "Print All" keyboard function (if ON) does not print the volume password.

Example Entry: OnlyIKnowThis or

Result: The server prompts:
 (B)ase, (I)ncremental, (C)opy, or (Q)uit?

3. If in the previous step you entered a volume password, press

or .

Result: This clears the server's recall buffer so that no one can redisplay the volume password you entered with the "Recall" keyboard function.

4. Type the initial letter of the type of backup you want this to be, and then press `Return` or `ENTER`.

Note

The scope of the backup you want to perform may be the same for different types of backups. (That is, you can specify the same backup file name in different `BACKUP EXECUTE` commands and vary the type of backup with each instance of the command.) The only exception to this is that the backup file for base backup must always define a full backup.

Example Entry: If you wanted an incremental backup, you would press `I` and then `Return` or `ENTER`.

Result: The server momentarily displays the message:

```
Backup "backup_file_name" running
```

where *backup_file_name* is the name you specified when you gave the `BACKUP EXECUTE` command.

As the backup runs, the server displays one or more other messages, depending on the status of the backup. Refer to this chapter's sections called "While a Backup Is in Progress" and "After a Backup Has Completed" for information about possible status messages.

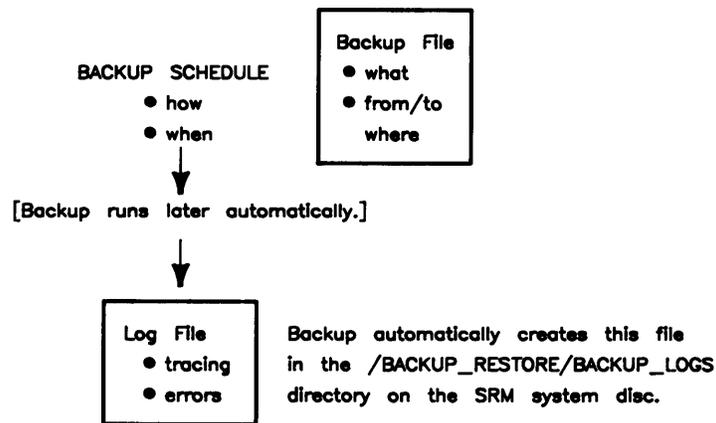
Scheduling a Backup to Start Automatically

If you have on-line backup, you can have the SRM system start a backup automatically on a regular schedule with the `BACKUP SCHEDULE` command. You can schedule different types of backups to start at different times for the same disc. If a backup is already running when another one is scheduled to start, the SRM system waits until 10 minutes after the first backup is finished before starting the next one.

The `BACKUP SCHEDULE` command requires you to specify:

- the name of an existing backup file that defines the scope of the backup,
- the volume password of the disc to be backed up,
- the type of the backup (base, incremental, or copy),
- the days of the week on which to start the backup,
- the time to start the backup on every day of the week you select, and
- how long to wait (in weeks) before repeating each day of the week's backup.

The following diagram gives a schematic overview of how the `BACKUP SCHEDULE` command works:



Follow these steps to schedule a backup to start automatically at a time, date, and frequency you set:

1. At the server's **Enter** command: prompt, type:

BACKUP SCHEDULE "*backup_file_name*<*backup_file_password*>" or

where	is
<i>backup_file_name</i>	the name of a backup file you created with a BACKUP DEFINE command. The backup file you name specifies the scope of the backup you want to perform.
<i>backup_file_password</i>	the password you had the option to assign when you created it. If you assigned a password to the backup file, you must specify it here.

Example Entries: BACKUP SCHEDULE "Static_Files<Security>" or

BACKUP SCHEDULE "Public_Files" or

Result: The server displays the contents of the backup file and prompts:
Password of volume to be backed up:

2. Type:

volume_password or

where *volume_password* is the password you had the option to assign when you initialized the source volume for the backup. (See the example below.)

If you did not assign a password to the source volume for the backup, then press or .

Note

Backups do not copy volume passwords.

Example Entry: OnlyIKnowThis or

Result: The server prompts:
(S)chedule, (U)nschedule, or (Q)uit?

3. If in the previous step you entered a volume password, press

-- or --.

Result: This clears the server's recall buffer so that no one can redisplay the volume password you entered with the "Recall" keyboard function.

4. Press **[S]** and then **[Return]** or **[ENTER]**.

Result: This tells the server that you want schedule a backup to run automatically. The server prompts:

(B)ase, (I)ncremental, (C)opy, or (Q)uit?

5. Type the initial letter of the type of backup you want this to be, and then press **[Return]** or **[ENTER]**.

Note

The scope of the backup you want to schedule may be the same for different types of backups. (That is, you can specify the same backup file name in different BACKUP SCHEDULE commands and vary the type of backup with each instance of the command.) The only exception to this is that the backup file for base backup must always define a full backup.

Example Entry: If you wanted an incremental backup, you would press **[I]** and then **[Return]** or **[ENTER]**.

Result: The server prompts:

Day(s) of week to back up on (S M T W H F A):

6. Enter the day(s) of the week on which you want the backup to start. (See the following example.)

Note

H stands for Thursday, and A stands for Saturday. You can enter up to seven different days. If you enter more than one day, do **not** use punctuation marks to separate the days. The order of the days does not matter.

Example Entry: If you wanted the backup to start automatically on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays and Saturdays, you would type:

M T W H F A **[Return]** or **[ENTER]**

Result: The server prompts:

Back up on these days every how many weeks?

7. Type the number of weeks for the system to wait before it repeats each day of the week's backup. Then press `Return` or `ENTER`.

Note

You can specify a number of weeks from 1 to 52. A value of 1 tells the system to start the backup every week on the day(s) you specified in the previous step. A value of 2 tells the system to start the backup every other week on the day(s) you specified in the previous step, and so on.

If you want a backup to run automatically **ONLY ONCE** at a later time and/or date, you must schedule a (fake) repetition interval for the backup for now, and then unschedule the backup after it runs the first time. For instructions on how to unschedule a backup, refer to this chapter's section on "Changing a Backup's Automatic Startup Schedule."

Result: The server prompts:

Time to start backup (HH:MM [AM|PM]):

8. Type the time at which you want the system to always start the backup. Then press `Return` or `ENTER`. (See the following example.)

Note

If you want a backup to start at different times on different days of the week, you must schedule a separate instance of the backup for each different day and time (using multiple `BACKUP SCHEDULE` commands with the same backup file name).

Example Entry: 4:00 AM `Return` or `ENTER`

Result: The server displays all of the information you specified to schedule the backup and shows the time and date on which the system will start the first backup.

Note

The system starts the first backup on whichever scheduled day of the week occurs next and assumes that “weeks” start on Sunday and end on Saturday. After the first “week” (which may be an incomplete week), the system waits the specified number of weeks before starting the next backup on the first scheduled day of the week.

For example, if today is Tuesday, and you schedule a backup to start on Mondays, Wednesdays, and Fridays every other week, the first backup will start on Wednesday (tomorrow), the second on Friday, and the third **A WEEK AFTER** the following Monday.

Once you have scheduled one or more backups, check daily or periodically when each scheduled backup is set to start next automatically. To view scheduled backup information, see this chapter’s section on “Viewing Scheduled Backup Information.”

Before each backup is set to start, remember to:

- set up the appropriate mass storage devices for the backup as described in this chapter’s section on “Preparing for a Backup’s Execution,” and
- enable “Print All” mode by pressing `Print` (`Shift-Enter`) or `PRT ALL`.

The server displays:

```
Printall ON
```

The default printer (the printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer) will print everything that the server displays on its scrolling screen.

As a backup runs, it not only creates a log file on the SRM system disc, but also displays log file entries on the server’s scrolling screen. A backup’s log file tracks the backup’s progress and records detailed error messages.

Enabling “Print All” mode prints the log file entries as they appear and before they scroll off the screen. Note that log file messages may get intermixed with spooled data or spooler messages if the printer is shared by workstation users.

Leave “Print All” mode ON until the backup finishes. To turn off “Print All” mode, press the same key(s) shown above.

While a Backup Is in Progress

This section explains what you can and cannot do while a backup is in progress. It also explains how to stop a backup that is running and how to continue a paused backup that has filled up every destination medium and needs more.

Using the SRM System

Using a Server

While a backup is running, you may give any server command **except for** the following ones:

- UNIT DELETE
to delete the SRM system disc or a mass storage device that the backup is copying files to or from.
- RESET
to reset the server's disc interface.
- VOLUME DOWN
to inactivate the SRM system disc or a disc that the backup is copying files from.
- BACKUP EXECUTE
to start another backup while one is currently running.
- RESTORE EXECUTE
to start a restore while a backup is currently running.
- SYSTEM DOWN

Also, do not turn off the server or any mass storage device being used during the backup. Do not unload or remove any backup medium from its drive, unless the backup has paused for you to do so.

Using a Workstation

Workstations may use the SRM system while a backup is running. However, workstation users should be aware of the following:

- The backup degrades the SRM system's performance.
- The backup can **not** copy files that workstations have exclusively open at the time of the backup.
- The backup may interfere with applications that try to use files the backup has opened. For example, an application may try to exclusively open a file that the backup already has open.
- Workstation users may create or modify directories and/or files in disc areas that the backup has already "covered." Therefore, the backup does **not** copy the latest version of these directories and/or files.

For these reasons, you should perform backups when system usage is lowest.

Checking a Backup's Status

Status Messages

While a backup runs, it displays status messages at the bottom of the server's screen. You can look up the meaning of a status message in this guide's appendix on "SRM Server Messages."

Log File

Each backup creates its own log file in the /BACKUP_RESTORE/BACKUP_LOGS directory. The log file tracks a backup's progress and records detailed error messages. While a backup is running, it displays its log file entries on the server's scrolling screen. Note that other SRM server messages may be interspersed with the log file messages on the screen.

For more information on backup log files, turn to this chapter's section called "After a Backup Has Completed."

Stopping a Backup in Progress

To abort, or stop, a backup that is running, type at the server's **Enter** command: prompt:

BACKUP ABORT or

Result: The backup does not stop immediately, but stops as soon as it can leave its current destination medium in a consistent, readable state. If a backup is copying a file that does not fit onto the remaining part of the current destination medium, the backup copies only the first part of the file. (The backup does not require you to insert another medium before it aborts.)

Note

If you abort a backup that is set to start automatically on a regular schedule, the backup will start again at the next scheduled time. You can prevent the backup from starting again by uncheduling it. See this chapter's section on "Changing a Backup's Automatic Startup Schedule."

Continuing a Paused Backup

There are two reasons a backup may be paused:

1. The backup is paused because it needs to write to a drive which does not contain a medium. This message is displayed:

```
Backup needs medium in <device address>
```

Obtain the device's address by using the UNITS command or from your system configuration worksheets (supplied in the *SRM Hardware Installation Manual*.) Then insert the proper medium into the drive and continue the backup as described below.

2. The backup is paused because it has completed one pass of writing to the drives selected for the backup. To avoid overwriting media, the backup pauses before again writing to the first drive and the following status message is displayed:

```
<backup name> needs media in ALL devices
```

If you are backing up to one device, this message means "insert the next medium." If you are backing up to multiple devices, make sure that each drive used by the backup has a new medium. After supplying new media, continue the backup as described below.

To resume a paused backup after you have inserted one or more new media into the backup's destination drive(s), type at the server's **Enter command:** prompt:

```
BACKUP CONTINUE  or 
```

Result: The server displays:
`Backup continue requested`
and resumes the backup where it left off.

If a Scheduled Backup Overlaps with One in Progress

If your SRM system has on-line backup and restore, and a backup is set to start automatically at a time when a backup or restore is already in progress, the scheduled backup starts 10 minutes **AFTER** the backup or restore in progress finishes.

After a Backup Has Completed

Note

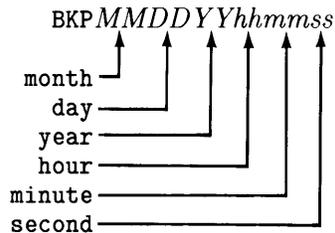
Each tape is unloaded when a backup finishes copying to it. Tapes left in a tape drive after a backup can **not** be overwritten by the next backup that copies to the same drive. **Since a backup cannot automatically eject micro flexible discs, be sure to remove them when a backup has finished copying to them.**

If You Performed the Backup with the Backup/Restore Utility

If you used the SRM Backup/Restore Utility to perform the backup, you need to bring down the Backup/Restore Utility system and bring up the SRM Operating System. This allows workstations to again access SRM system resources. For detailed directions, see this guide's chapter on "Restarting and Stopping the Server."

Check the Log File for Backup Errors

Each backup creates its own log file in the /BACKUP_RESTORE/BACKUP_LOGS directory on the SRM system disc. The name of a backup's log file consists of the prefix BKP followed by the date and time (in numerical form) that the backup started. The time is in 24-hour clock notation. The system-assigned format of a backup log file name is:



An example backup log file name for a backup started on August 18th, 1986 at 9:23:43 p.m. (21:23:43 in 24-hour clock notation) is:

BKP081886212343

The last backup or restore's log file is also listed in the /BACKUP_RESTORE/TEMP_FILES directory as CURRENT_LOGFILE for easy access.

Viewing a Log File

Log file entries for a backup in progress appear on the server's scrolling screen.

You can also display the contents of a log file at a workstation in the same way as you would display the contents of any other ASCII-type file on the SRM system disc.

Printing a Log File

Since log file entries for a backup in progress appear on the server's scrolling screen, you can print them by turning on the "Print All" keyboard function at the server. The "Print All" keyboard function prints everything that appears on the server's scrolling screen.

You can also print a log file from a workstation in the same way as you would print any other ASCII-type file on an SRM system printer. To do so, copy the log file to an SRM system printer's spooler directory.

Deleting a Log File

You must delete a log file from a workstation in the same way as you would delete any other ASCII-type file from the SRM system disc. You can **NOT** delete a log file at the server.

Log files can accumulate and take up disc space, so periodically delete log files that you do not need to refer to.

Label Backup Media and Store Them in a Safe Place

Label backup media according to the media management scheme you have designed to:

- show what the media contain,
- keep track of media age and wear, and
- determine when you can reuse or "recycle" the media as part of a media retention and reuse plan.

For future reference, make the following printouts and keep them with the media from each backup:

- a listing of the contents of the media (optional; this may be extremely long). Use the RESTORE command to produce this. For details on the RESTORE command, see this guide's chapter on "Restoring from Backups."
- a listing of the backup's log file.

After you have labeled the media, store them in a safe place for data security.

Viewing and/or Changing the Current Backup Setup

This section tells how to view and/or change all aspects of the backup(s) that you have set up for your SRM system, including:

- viewing the values that define the scope of a backup,
- viewing scheduled backup information,
- changing the contents of a backup file,
- renaming a backup file,
- deleting a backup file, and
- changing a backup's automatic startup schedule.

Viewing the Values That Define the Scope of a Backup

The contents of a backup file tell you the scope of a backup, including:

- the disc that contains what the backup is to copy,
- what (which directories and files) the backup is to copy,
- the drive(s) to which the backup is to copy, and
- whether or not the backup is to automatically verify each media after copying to it.

To display the values that define the scope of a backup from the server, follow these steps:

1. If your SRM system does **NOT** have on-line backup and restore, boot (start) the SRM Backup/Restore Utility as described in this chapter's section on "Starting the Backup/Restore Utility."
2. At the server's **Enter command:** prompt, type:

```
BACKUP DEFINE "backup_file_name<backup_file_password>"  or 
```

where	is
<i>backup_file_name</i>	the name of the backup file whose contents you want to view.
<i>backup_file_password</i>	the password you had the option to assign when you created the backup file. If you assigned a password to the backup file, you must specify it here.

Example Entry: BACKUP DEFINE "Static_Files<Security>" or

Result: The server displays the contents of the backup file in a format similar to the following:

```
Backup Define started

Contents of backup file "Static_Files  ":
Volume to back up: PRIMARY
Paths to back up:
/BACKUP_RESTORE
/SYSTEMS
/WORKSTATIONS
Backup destination devices:
8,5,0
Media check: Verify

File exists.  Modify it (y/n)?
Y
```

Example Display of Backup File Contents

3. Press and then or .

Result: The server ends the BACKUP DEFINE command and redisplay its Enter command prompt.

Viewing Scheduled Backup Information

Note

This section applies to SRM systems with on-line backup only.

You can view the following information for every scheduled backup:

- the name of the backup file that defines the scope of the backup,
- the backup's type (base, incremental, or copy),
- the day(s) of the week on which the backup is set to start automatically,
- the number of weeks that the system is set to wait before it repeats each day of the week's backup,
- the time that the system is scheduled to start the backup every time, and
- the date of the next occurrence of the backup.

To display scheduled backup information from the server, type the following at the server's **Enter command:** prompt:

BACKUP SCHEDULE or

Result: The server displays information in a format similar to the following:

```
-----Scheduled Backups-----
Backup File  Type  Days  Int  Time  Next Exe
-----
Dynamic_Files  Base S      1  4:00 AM  8/17/86
Dynamic_Files  Incr MTWHF  1  4:00 AM  8/18/86
Static_Files   Copy      A 12  4:00 AM  11/08/86
```

Example BACKUP SCHEDULE Command Display

4. If you want to change the source disc for the backup, type over the displayed volume name with the new volume name, and then press `Return` or `ENTER`.

If you do **NOT** want to change the source disc for the backup, press `Return` or `ENTER`.

Result: The server prompts:

```
Back up all files on volume (y/n/quit)?
```

If you changed the name of the backup's source disc, server displays the new volume name also.

5. If you want to change whether the backup copies the contents of the entire disc, type over the displayed response with the new response (Y or N) and then press `Return` or `ENTER`.

Otherwise, to keep the displayed response, press `Return` or `ENTER`.

Result: If you chose to back up the entire disc, the server displays the backup's current destination drive(s) and prompts:

```
Device to add/remove (enter nothing to finish):
```

If you chose **NOT** to back up the entire disc, the server displays the path(s) (if any) that specify what the backup is to record and prompts:

```
Path to add/remove (enter nothing finish):
```

6. If, in the previous step, you chose to back up the entire disc, skip to step 10.

Otherwise:

If you want the backup to record an additional file or directory, type its path and then press `Return` or `ENTER`.

If you want to delete or change a path that is listed so that the backup does not record the directory or file, type the path **as it appears in the list** and then press `Return` or `ENTER`.

Note

To change a path, you must first remove it and then add the new path.

Result: If you specified a new path, the server displays the path and again prompts:

```
Path to add/remove (enter nothing to finish):
```

If you specified a path already in the backup file's list of paths, the server prompts:

```
Remove path from list (y/n/quit)?
```

```
N
```

7. If you specified an existing path to remove or change in the previous step, press **Y** and then **Return** or **ENTER**.

Otherwise, skip to step 9.

Result: The server deletes the path you specified from the current paths to back up, and again prompts:

Path to add/remove (enter nothing to finish):

8. If you have deleted a path you want to change, type its replacement path and press **Return** or **ENTER**.

Otherwise, skip to step 9.

Result: The server adds the path you specified and again prompts:

Path to add/remove (enter nothing to finish):

9. Repeat steps 6 to 8 as many times as necessary to change what the backup is to record. When you are finished, press **Return** or **Enter** without typing anything else.

Result: The server displays the backup's current destination drives and prompts:

Device to add/remove (enter nothing to finish):

10. If you want the backup to copy to an additional drive **of the same type** as the one(s) listed, type its device address and then press **Return** or **ENTER**.

If you want to delete or change a drive so that the backup does not copy to it, type its device address **as it appears in the list** and then press **Return** or **ENTER**.

Note

To change a destination drive's device address, you must first remove it and then add the new device address. If you want the backup to copy files to a fixed disc, the disc must be the **ONLY** backup device.

You can specify up to 10 destination drives for a backup.

Result: If you specified a new device address, the server displays the device address and again prompts:

Device to add/remove (enter nothing to finish):

If you specified a device address already in the backup file's list of device addresses, the server prompts:

Remove *device_address* from list (y/n/quit)?

N

11. If you specified an existing device address to remove or change in the previous step, press **Y** and then **Return** or **ENTER**.

Otherwise, skip to step 13.

Result: The server deletes the device address you specified from the backup's current destination drive(s) and again prompts:

Device to add/remove (enter nothing to finish):

12. If you have deleted a device address you want to change, type its replacement device address and press **Return** or **ENTER**.

Otherwise, skip to step 13.

Note

Remember that **all of the backup's destination drives must be the same type: either all tape drives or all micro flexible disc drives**. Also, remember that if you want the backup to copy files to a fixed disc, the disc must be the **ONLY** backup device. (You can restore from only one mass storage device, although if it supports removable media, you can restore from a multiple-media backup.)

Result: The server adds the device address you specified and again prompts:

Device to add/remove (enter nothing to finish):

13. Repeat steps 10 to 12 as many times as necessary to change the destination drives for the backup. When you are finished, press **Return** or **ENTER** without typing anything else.

Result: The server displays the prompt:

Media check: (V)erify or (N)one

14. If you want to change whether the backup verifies that it can read back what it wrote to each backup medium, type over the displayed response with the new response (V or N) and then press **Return** or **ENTER**.

Otherwise, to keep the displayed response, press **Return** or **ENTER**.

Result: The server saves the backup file again with the new values you specified. If the backup file is already scheduled to start automatically on a regular basis, the server also displays the schedule information for the backup.

Performing Other Operations Regarding Backup Files

Except for creating, displaying the contents of, and modifying a backup file, any action having to do with a backup file must be performed **FROM A WORKSTATION**. This includes:

- renaming a backup file,

Note

If your SRM system has on-line backup and restore, and you rename a backup file that is set to start automatically on a regular schedule, you must reschedule the backup file under its new name. To do so, use the `BACKUP SCHEDULE` command at the server.

- deleting a backup file,
- changing a backup file's password, and
- listing the names of backup files in the `/BACKUP_RESTORE/BACKUP_FILES` directory on the SRM system disc.

From a workstation, you treat a backup file just like any other file on the SRM system disc.

Changing a Backup's Automatic Startup Schedule

Note

This section applies only to SRM systems with on-line backup.

To change when or how often a backup is scheduled to start or to change a backup's type (base, incremental, or copy), you must first unschedule the backup and then reschedule it.

To prevent a scheduled backup from starting, you must unschedule it. Unscheduling a backup prevents the backup from ever starting automatically again, unless you reschedule the backup afterwards.

Unscheduled a Backup

To remove a backup's automatic startup schedule (including the type of the backup), follow these steps:

1. Insure that the SRM system disc and the backup's source disc (these may be the same) are on.
2. Insure that the SRM system is UP.
3. Insure that the SRM system disc and the backup's source disc (these may be the same) are active or "UP."
4. At the server's **Enter** command: prompt, type:

```
BACKUP SCHEDULE "backup_file_name<backup_file_password>"  or 
```

where	is
<i>backup_file_name</i>	the name of the existing backup file that specifies the scope of the backup you want to unschedule.
<i>backup_file_password</i>	the password you had the option to assign when you created the backup file. If you assigned a password to the backup file, you MUST specify it here.

Example Entries: `BACKUP SCHEDULE "Static_Files<Security>" or`
 `BACKUP SCHEDULE "Public_Files" or`

Result: The server displays information on all scheduled backups, shows the contents of the backup file you specified, and prompts:

```
Password of volume to be backed up:
```

5. Type:

```
volume_password  or 
```

where *volume_password* is the password you had the option to assign when you initialized the source volume for the backup. (See the example below.)

If you did not assign a password to the source volume for the backup, then press or .

Example Entry: `OnlyIKnowThis or`

Result: The server prompts:
 (S)chedule, (U)nschedule, or (Q)uit?

6. If in the previous step you entered a volume password, press or .

Result: This clears the server's recall buffer so that no one can redisplay the volume password you entered with the "Recall" keyboard function.

7. Press U and then Return or ENTER to unschedule a backup.

Result: The server redisplay the name of the backup file, and asks if you want to remove the scheduling information for the first backup whose scope is defined by that backup file.

An example display is:

```
File to be unscheduled is "Dynamic_Files  "  
Remove Incr SMTWH 1 4:00 AM 8/21/86 (y/n)?
```

8. If the displayed scheduling information is for the backup you want to unschedule, press Y and then Return or ENTER.

Otherwise, press N and then Return or ENTER.

Result: If you unschedule the backup by responding Y (yes), the server displays a message confirming that the backup has been removed and redisplay the **Enter command:** prompt.

If there is at least another scheduled backup listed with the same backup file, the server asks if you want to remove the next backup's scheduling information.

Otherwise, the server redisplay the **Enter command:** prompt, leaving the schedule for all backups unchanged.

9. If necessary, repeat step 8 until you have removed the scheduling information for the backup(s) you want to unschedule.

If you are changing a backup's scheduling information, and you have unscheduled the backup, reschedule the backup as desired according to the instructions in this chapter's section on "Scheduling a Backup to Start Automatically."

Restoring from Backups

Overview

To restore backed up files and directories, you must:

- determine which backup medium or media contain what you want to restore,
- specify what to restore, and
- specify where in the directory structure you want to put what you restore.

This chapter describes restore features, capabilities, and limitations, and explains how to perform a restore, what you can and can not do while a restore is in progress, and what to do after a restore finishes.

Restore Features, Capabilities, and Limitations

This section discusses the restore feature's behavior, which you should be familiar with before you use the RESTORE command.

Note

You can restore **AT MOST** one backup with each instance of the RESTORE command. To restore multiple backups (such as a base backup and the most recent incremental backup), you must give multiple RESTORE commands.

Selective Restore

You can choose what to restore: a file, a set of files, a directory, a set of directories, any combination of files and directories, or an entire backup.

For each file you choose to restore, the restore recreates:

- the file itself and
- the complete path (from the root directory) to the file. (A restore does not recreate existing directories, however.)

For each directory you choose to restore, the restore recreates:

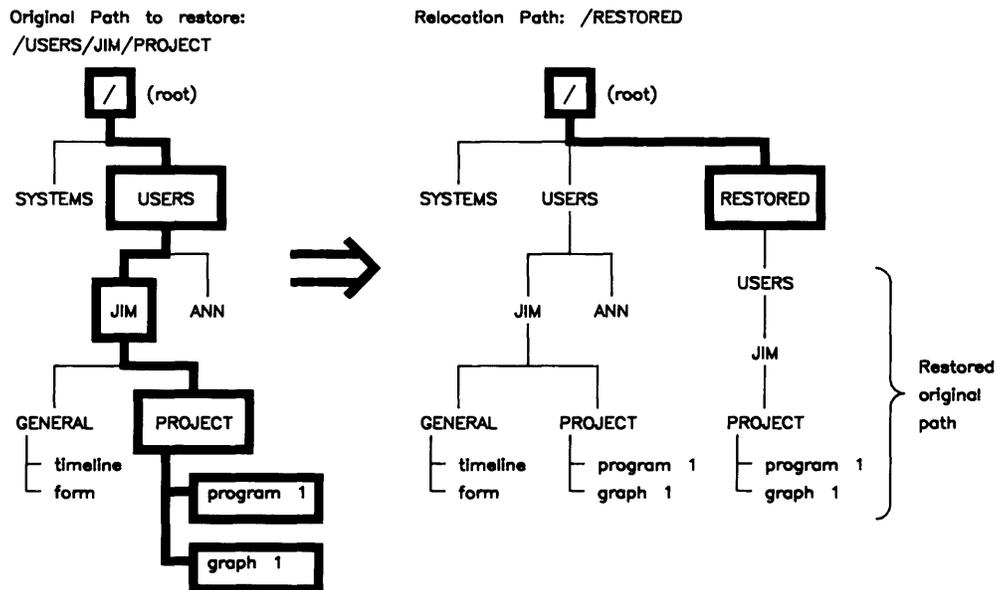
- the contents of the directory (including all subdirectories and files) and
- the complete path (from the root directory) to the directory.

Note

A restore also recreates the protection information (any passwords and their associated access capabilities) for all of directories and files included in the restore. A restore does not recreate the protection information for existing directories, however.

Relocation Option

You can choose to place everything you specify to restore in another directory. The relocation appends the original path(s) of all restored directories and files to the relocation directory's path.



Example Relocation of a Restored Directory

What to Expect from a Restore

Existing Directories and Files

If a file included in the restore already exists on the disc, the restore **REPLACES** the existing file and its protection information (any passwords and their associated access capabilities) with those from the backup.

If a directory included in the restore already exists on the disc, restoration does nothing to the existing directory and its protection information. However, if the restore adds entries (subdirectories and files) to an existing directory, the restore updates the directory's last modified date and time to when the restore occurs.

If a path on the backup medium and an existing path on the disc are the same, but one names a directory and the other names a file, the restore does nothing to the existing path on the disc. The restore reports an error, however.

Duplicate Links

A restore recreates all of the duplicate links (alternate paths) to a file **ONLY IF** those links are among what you choose to restore. That is, a restore recreates only those duplicate links that are among what you choose to restore. The restore copies the file itself even if you restore only one path to the file.

Note

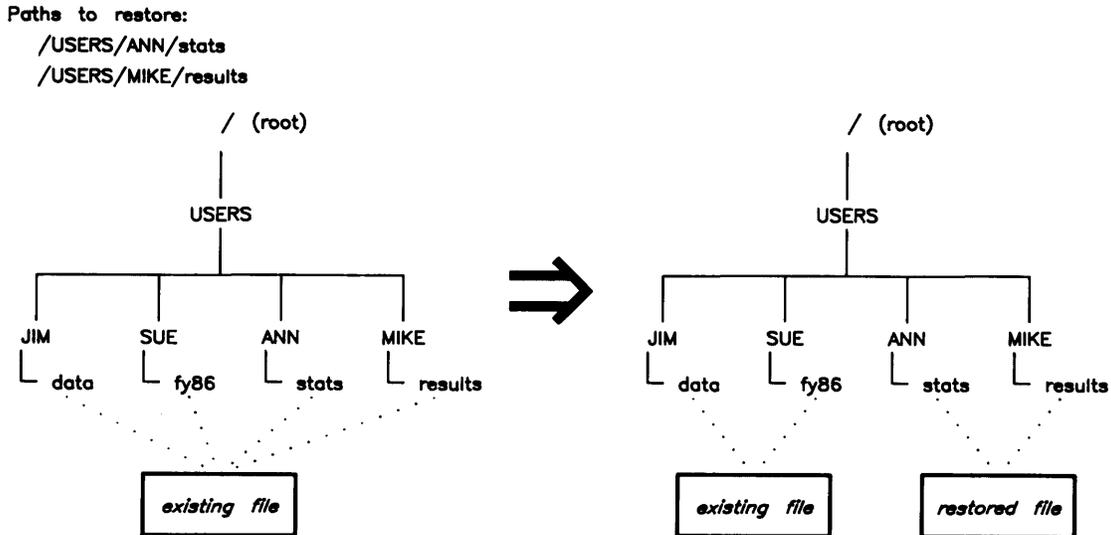
To restore from a sequence of backup tapes in an HP 35401 Autochanger Tape Drive without human intervention (allowing the autochanger to sequence through the tapes), you must do the following two things:

- If the restore includes any files with duplicate links to them, you must restore all of the duplicate links to every one of those files.
- You must load the backup tapes into the drive's magazine in the correct order (the order produced by the backup).

Otherwise, you may have to manually change the order of the tapes in the drive several times.

If the restore includes any duplicate links that already exist to a file on the disc, the restore resets those links to a copy of the file from the backup medium. If you restore all existing duplicate links to a file on the disc, the restore resets all of the links to a copy of the file from the backup medium.

If, however, you restore only some of the existing duplicate links to a file on the disc, the restore resets the restored links to a copy of the file from the backup medium, while those links you did not restore remain set to the existing file on the disc. This can also happen if the existing file on the disc had other duplicate links created to it **after** the backup you are restoring from occurred.



Example of Restoring Only Some Duplicate Links to a File

Treatment of Backup Media

Media Sequencing

A backup may be recorded on more than one medium. If this is the case, you must be careful to restore the media **in the SAME ORDER in which the backup copied to them**. Each backup medium has a sequence number that you can view with the RESTORE command.

One Source Drive Only

You must restore from only one drive. This means that if you need to restore a backup from more than one medium, you must change each medium when the restore is ready to copy from another one.

When you need restore a backup from more than one tape, an HP 35401 Autochanger Tape Drive can automatically sequence through the backup tapes **IF YOU LOAD THE TAPES INTO THE MAGAZINE IN THE CORRECT ORDER**.

Backup Media Identification

To identify what is on a backup medium, you can list its contents with the RESTORE command. This can help you determine whether the backup medium contains what you want to restore. It can also help you determine the complete path to a file or directory you want to restore. The RESTORE command also allows you to view information about the backup that copied to the medium.

Restoring a Disc's Entire File System

You can restore a disc's entire file system to the state it was in during the last incremental backup as follows:

1. If you are restoring the SRM system disc, use the SRM Installation Utility to reinitialize the corrupt system disc and to then reinstall the the SRM Operating System onto the disc.

Otherwise, reinitialize the corrupt disc with the INITIALIZE command.

Note

The INITIALIZE command recreates the disc's root directory and sets its creation and last modified dates to the initialization time.

If you assign a password to the root directory with the INITIALIZE command, a restore will **NOT** overwrite the root password.

2. Use the RESTORE command to restore everything from the last base (full) backup. Detailed directions for using the RESTORE command are in the rest of this chapter.
3. Use the RESTORE command to restore everything from the last incremental backup. Detailed directions for using the RESTORE command are in the rest of this chapter.

If a Restore Includes the SYSTEMS Directory

Upon bootup, workstations automatically load the first bootable system file in the SRM system disc's /SYSTEMS directory. If you have more than one bootable system file in the /SYSTEMS directory, note the following:

A restore operation may restore files in a different order than before. Restoring the contents of the /SYSTEMS directory can change the order of bootable system files, and therefore change the first system file that workstations boot automatically.

The following procedure tells how to keep the first bootable system file before the other bootable system files in the /SYSTEMS directory. You may want to use this procedure if you plan to restore the SRM system disc's entire file system or if you plan to restore some or all of the contents of the /SYSTEMS directory.

1. From a workstation, list the contents of the /SYSTEMS directory and do the following:
 - a. Note the names of all bootable system files. (These are files whose names begin with SYS and whose type is System.)
 - b. Also note the name of the **FIRST** bootable system file. (This file usually follows the CONFIG_SRM file and may be, for example, the BASIC Loader Utility system boot file, SYSTEM_LD.)
2. Perform the restore that you planned and that includes the /SYSTEMS directory.
3. After you have finished with the restore, go to a workstation and do the following:
 - a. Create a temporary directory (such as /TEMP) on the SRM system disc.
 - b. Copy every bootable system file from the /SYSTEMS directory into the temporary directory.
 - c. Delete every bootable system file you copied from the /SYSTEMS directory.
 - d. Copy the bootable system file that belongs first in the /SYSTEMS directory from the temporary directory back into the /SYSTEMS directory.
 - e. Copy the remaining bootable system files from the temporary directory back into the /SYSTEMS directory.
 - f. Delete every file from the temporary directory and then delete the temporary directory itself.

Performing a Restore

Note

You may want to write-protect each medium you intend to restore files from to avoid accidentally overwriting the medium. (For instructions refer to the operator's manual for a compatible type of drive.)

The SRM Operating System with on-line backup and restore and the SRM Backup Utility provide a RESTORE EXECUTE command. This command guides you through restoring an entire backup or only each directory and/or file you select. With the RESTORE EXECUTE command, you can:

- obtain a listing of what is on one or more backup media to identify the medium or media that contain what you want to restore,
- choose what to restore, and
- choose whether you want to put what you are restoring in the same place as before or relocate it to a different place in the directory structure.

Each restore automatically creates its own log file in the

`/BACKUP_RESTORE/RESTORE_LOGS`

directory.

To restore all or part of a backup, follow these steps at the server:

1. If your SRM system does **NOT** have on-line backup and restore, boot (start) the SRM Backup/Restore Utility as described in this chapter's section on "Starting the Backup/Restore Utility."
2. If you are restoring from removable media, insert a backup medium into the appropriate type of drive and wait for the drive's BUSY light to go out.

Note

If you have an HP 35401 Autochanger Tape Drive, you can insert a set of backup tapes into the drive and wait until the first tape is fully loaded.

3. At the server's **Enter** command: prompt, type:

```
RESTORE interface_select_code,bus_address,subunit_number  or 
```

where *interface_select_code*,*bus_address*,*subunit_number* identifies the drive containing the backup medium or media.

Example Entry: RESTORE 8,0,1 or

Result: The server displays general information about the backup recorded on the medium, as in the following example display:

```
Restore from 8,0,1

Device:                8,0,1
Volume Backed Up:     "PRIMARY          "
Backup Media Number:  1
Backup File:          "Static_Files     "
Backup Date:          22 Aug 86   4:00:00 AM
Backup Type:          Incr
Last Base Date:       20 Aug 86   4:00:00 AM1
Backup Log File:      "BKP082286040000 "

List catalog entries from backup media (y/n/quit)?
Y
```

Example Backup Medium Header Display

4. If you want to list what is on the backup medium, press or .

Otherwise, press and then or .

Result: If you chose to list what is on the backup medium, the server prompts:

```
List catalog entries to what volume:path (blank = console)
```

If you chose **NOT** to list what is on the backup medium, the server prompts:

```
Define restore operation (y/n)?
Y
```

¹ This line appears only for incremental backups.

- Choose one of the five following actions, depending on the server's prompt and what you want to accomplish:

If the server's prompt is `Define restore operation (y/n)?`, you can choose to:

- **NOT** restore from the backup medium, by pressing `[N]` and then `[Return]` or `[ENTER]`

Result: The server aborts the RESTORE command and redisplay the `Enter command:` prompt.

- restore from the backup medium by skipping to step 10.

If the server's prompt is: `List catalog entries to what volume:path (blank = console)`, you can choose to:

- print a listing of the backup medium's contents,
- view a listing of the backup medium's contents, or
- save a listing of the backup medium's contents in a new file or append the listing to an existing file.

Instructions for performing each of these three options follow:

Printing a Listing of the Backup Medium's Contents

Type:

`/spooler_dir_name/file_name [Return]` or `[ENTER]`

Item	Description	Length	Composition
<i>spooler_dir_name</i>	The name of the existing spooler directory for the SRM system printer on which you want to print the listing.	(not applicable)	(not applicable)
<i>file_name</i>	The name you want to assign to the file that the server creates to contain the listing of the backup medium's contents.	1 to 16 characters	A—Z a—z 0—9 - .

Example Entry: `/PRINTOUTS/restore_list [Return]` or `[ENTER]`

Result: The server creates the file `restore_list` in the spooler directory `PRINTOUTS`, prints the file when the printer becomes available, and deletes the file after the printer finishes printing it.

Viewing a Listing of the Backup Medium's Contents

Press **Return** or **ENTER**.

Result: The server displays a listing similar to the following:

Tree Lvl	SRM Pathname	Creation Date	Last Mod Date	Size (bytes)	
0	.	1 Aug 86	18 Aug 86	---	} No size indicates a directory
1	BACKUP_RESTORE	1 Aug 86	1 Aug 86	---	
2	BACKUP_FILES	1 Aug 86	5 Aug 86	---	
3	All_Files	5 Aug 86	5 Aug 86	40	
3	Dynamic_Files	4 Aug 86	20 Aug 86	48	
3	Static_Files	1 Aug 86	1 Aug 86	68	
2	BACKUP_LOGS	1 Aug 86	21 Aug 86	---	
3	BKP080486145811	4 Aug 86	5 Aug 86	1174	/ Asterisk means file is split across more than one medium.
3	BKP080586150601	4 Aug 86	5 Aug 86	1174	
2	RESTORE_LOGS	1 Aug 86	18 Aug 86	---	
2	SCHEDULE	1 Aug 86	20 Aug 86	142	
1	SYSTEMS	1 Aug 86	18 Aug 86	---	
2	CONFIG_SRM	6 Aug 86	6 Aug 86	*26	

Example Listing of a Backup Medium's Contents

If there is at least another screenful of information, the server prompts:

Continue listing this medium (y/n/quit)?

Y

Otherwise, the server prompts:

Continue listing with another medium (y/n/quit)?

N

Saving a Listing of the Backup Medium's Contents in a File

Type:

volume_name: *path* or

where	is
<i>volume_name</i>	the volume name of the SRM disc on which you want to create the file or that contains the file to append to. You assigned a volume name to each SRM disc when you initialized it. If you do NOT specify a volume name, the server assumes that the path is on the SRM system disc.
<i>directory_path</i>	<p>a list of the directories that lead to the file you want to create or append to. The path must include the file name itself. Directory names in a path are separated by slashes (/). A single or initial slash denotes the disc's top (or "root") directory.</p> <p>If you are appending to an existing file, the file MUST be an ASCII-type file.</p> <p>If you are creating a new file, you can also create the directories in its path by specifying new directory names.</p> <p>New directory and file names can be from 1 to 16 characters long and may consist of the following characters:</p> <p>A—Z a—z 0—9 _ .</p>

Note

Once you save a listing in a new file or append a listing to an existing file, you can access (display, copy, edit, rename, delete, etc.) the file from a workstation.

Example Entry: SECONDARY:/RESTORE_LISTINGS/media_catalog or

Result: The server displays:

Listing entries to "*path*"

where *path* is the path you specified in this step. If *path* identifies an existing file, the server appends the listing to the contents of the file. If *path* identifies a new file, the server creates the file as an ASCII-type file and places the listing in it. If any directories in the file's path do not exist, the server creates them also.

When this is finished, the server prompts:

Continue listing with another medium (y/n/quit)?

N

6. Perform one of the following four actions, depending on the server's prompt and what you want to accomplish:

If the server's prompt is:

```
Continue listing this medium (y/n/quit)?
```

```
Y
```

you can choose to:

- display another screenful of information, by pressing or .

Result: The server displays another screenful of information and prompts:

```
Continue listing with another medium (y/n/quit)?
```

```
N
```

If the server has another screenful of information to display, the server instead prompts:

```
Continue listing this medium (y/n/quit)?
```

```
Y
```

- **NOT** display another screenful of information by pressing and then or .

Result: The server prompts:

```
Continue listing with another medium (y/n/quit)?
```

```
N
```

If the server's prompt is:

```
Continue listing with another medium (y/n/quit)?
```

```
N
```

you can choose to:

- list the contents of another medium, by pressing and then or .

Result: The server displays the message:

```
Load medium in device_address and press return
```

where *device_address* identifies the drive containing the medium whose contents you just listed.

If the backup medium is a tape, the server automatically unloads the tape.

- **NOT** list the contents of another medium by pressing or .

Result: The server prompts:

```
Define restore operation (y/n)?
```

```
Y
```

7. If you are listing the contents of another backup tape in the magazine of an HP 35401 Autochanger Tape Drive, wait for the drive to unload the current tape and then load the next. When the next tape is fully loaded, press or .

If you are listing the contents of another backup medium in a single-medium drive, replace the current backup medium with the new one, wait for the drive's BUSY light to go out, and then press or .

Otherwise, skip to step 9.

Result: The server displays general information about the new backup medium and prompts:

```
Continue listing with this medium (y/n/quit)?
```

```
Y
```

8. If you want to list the contents of this next medium, press or .

Otherwise, press and then or .

Result: If you chose to list the contents of this next medium, the additional listing goes to the same place you selected in step 5: the server's display or a file for printing or workstation access.

If you chose **NOT** to list the contents of this other medium, the server prompts:

```
Continue listing with another medium (y/n/quit)?
```

```
N
```

9. If you have found the backup medium or media that contain what you want to restore, then go to the next step.

Otherwise, repeat steps 6 to 8 until you have found the backup medium or media that contain what you want to restore.

10. In response to the server's prompt:

Define restore operation (y/n)?

Y

press **Return** or **ENTER**.

Note

When restoring from a set of backup tapes in an HP 35401 Autochanger Tape Drive, be sure that the tapes are loaded into the drive's magazine in the correct order (the order produced by the backup). The restore begins with whichever tape is currently loaded into the drive; the restore does **NOT** sequence back to the first tape automatically.

Result: The server prompts:

Name of volume to restore to:

volume_name

Note

As a restore runs, it not only creates a log file on the SRM system disc, but also displays log file entries on the server's scrolling screen. A restore's log file tracks the restore's progress and records detailed error messages. To print the log file entries as they appear and before they scroll off the screen, you can turn on the "Print All" keyboard function.

Do so now **BEFORE** you start the restore by pressing **Print** (**Shift-Enter**) or **PRT ALL**.

The server displays:

Printall ON

The default printer (the printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer) will print everything that the server displays on its scrolling screen. Leave "Print All" ON until the restore finishes. To turn off "Print All," again press the same key(s) shown above.

11. If the displayed volume name identifies the disc you want to restore to, press **Return** or **ENTER**.

12. If you assigned a password to the restore's destination volume when you initialized it, type the password, and then press **Return** or **ENTER**.

Otherwise, press **Return** or **ENTER**.

Result: The server prompts:

Relocation path:

13. If in the previous step you entered a volume password, press **CTRL-Shift-f2** or **CTRL-SHIFT-RECALL**

Result: This clears the server's recall buffer so that no one can redisplay the volume password you entered with the "Recall" keyboard function.

14. If you want to restore everything you select to its original place in the destination disc's directory structure, press **Return** or **ENTER**.

If you want to restore everything you select to a new directory on the destination disc, type:

path **Return** or **ENTER**

Item	Description/Composition	Length
<i>path</i>	a list of those directories you must follow in the hierarchical structure to reach the relocation directory. A path includes the relocation directory itself. Directory names in a path are separated by slashes (/). A single or initial slash denotes the disc's top (or "root") directory.	1 to 160 characters
directory name	The directory names in a path may contain the following characters: A—Z a—z 0—9 - .	1 to 16 characters

Note

A relocation path allows you to restore what you select without affecting any existing directories and files on the disc. The relocation appends the original path(s) of all restored directories and files to the relocation directory's path. If any directories in the relocation path you specify do not already exist, the restoration creates them.

Example Entry: /RESTORED_STUFF **Return** or **ENTER**

Result: The server prompts:

Restore ALL files from this backup (y/n/quit)? Y

If you specify a relocation path containing an illegal character, a warning message is displayed and you are asked to verify that the path is correct. Illegal characters include: null, blank (), comma (,), forward slash (/), greater than (>), less than (<), and double quote ("). Do not use these characters if you need to access a file from a workstation that does not allow these characters in paths.

Example Entry: Relocation path: BAD,PATH

Result: The server prompts:

```
This file name may be illegal on some workstations
Is this correct (y/n/quit)?
```

15. If you want to restore the contents of the entire backup, press or .

Otherwise, if you want to select what to restore from the backup, press and then or .

Result: If you chose to restore the contents of the entire backup, the server starts the restore and displays:

```
All files on this backup will be restored.
```

```
Restore running
```

As the restore runs, the server displays one or more other messages, depending on the status of the restore.

If you chose to restore only what you select, the server displays the message:

```
Path to add/remove (enter nothing to finish):
```

16. If the restore has started, turn ahead to this chapter's sections called "While a Restore Is in Progress" and "After You Have Performed a Restore."

Otherwise, type:

```
path  or 
```

Item	Description/Composition	Length
<i>path</i>	The complete path from the root directory to a directory or file you want to restore. A path is list of those directories you must follow in the hierarchical structure to reach a directory or file. A path includes the directory or file itself. Directory and file names in a path are separated by slashes (/). A single or initial slash denotes the disc's top (or "root") directory.	1 to 160 characters

Result: The server displays the path you entered and again prompts:

```
Path to add/remove (enter nothing to finish):
```

Note

To remove a path you have entered, type the path **as it appears in the list** and then press `Return` or `ENTER`.

The server displays:

```
Remove path from list (y/n/quit)?
```

```
N
```

Press `Y` and then `Return` or `ENTER` to confirm that you want to remove the path.

17. Repeat the previous step until you have specified all of the paths to the directories and/or files you want to restore.

Note

The total number of characters in **ALL** of the paths you specify may be up to 1600.

18. Press `Return` or `ENTER` to finish specifying what to restore.

Result:

A list of files that will be created by the RESTORE command is displayed, followed by this prompt:

```
Is this correct (y/n)?
```

```
Y
```

If you respond "yes," the workstation starts the restore and displays the message:

```
Restore running
```

If you respond "no," you are given another chance to define the restore operation. The following prompt is displayed:

```
Define restore operation (y/n)?
```

As the restore continues, the server displays one or more other messages, depending on the status of the restore. Now continue with this chapter's section called "While a Restore Is in Progress" and "After You Have Performed a Restore."

While a Restore Is in Progress

This section explains what you can and cannot do while a restore is in progress. It also explains how to stop a restore that is running and how to continue a paused restore that needs to copy from a backup's next medium.

Using the SRM System

Using a Server

While a restore is running, you may give any server command **except for** the following ones:

- UNIT DELETE
to delete the SRM system disc or a mass storage device that the restore is copying files to or from.
- RESET
to reset the server's disc interface.
- MOUNT or UNMOUNT
to change the directory structure of a disc that the restore is copying files to. (This could affect whether files are restored correctly.)
- VOLUME DOWN
to inactivate the SRM system disc or a disc that the restore is copying files to.
- BACKUP EXECUTE
to start a backup while a restore is currently running.
- RESTORE EXECUTE
to start another restore while one is currently running.
- SYSTEM DOWN

Also, do not turn off the server or any mass storage device being used during the restore. Do not unload or remove any backup medium from its drive, unless the restore has paused for you to do so.

Using a Workstation

If the SRM system has on-line restore, workstations may use the SRM system while a restore is running. However, workstation users should be aware of the following:

- The restore degrades the SRM system's performance.
- The restore can **NOT** overwrite files that workstation users are accessing at the time of the restore.

For these reasons, you should perform restores when system usage is lowest.

Checking a Restore's Status

Status Messages

While a restore runs, it displays status messages at the bottom of the server's screen. You can look up the meaning of a status message in this guide's appendix on "SRM Server Messages."

Log File

Each restore creates its own log file in the /BACKUP_RESTORE/RESTORE_LOGS directory. The log file tracks a restore's progress and records detailed error messages. While a restore is running, it displays its log file entries on the server's scrolling screen. Note that other SRM server messages may be interspersed with the log file messages on the screen.

For more information on restore log files, turn to this chapter's section called "After a Restore Has Completed."

Stopping a Restore in Progress

To abort, or stop, a restore that is running, type at the server's **Enter command:** prompt:

```
RESTORE ABORT  or 
```

Result: The restore does not stop immediately, but stops as soon as it can leave the disc it is copying files to in a consistent, readable state.

Aborting a Paused Restore

If you abort a paused restore that needs the next backup medium to finish copying a file that is split across two backup media, the last file restored may be unusable. The restore copies only the first part of the file and does not require you to insert another medium before it aborts.

You should list the contents of the backup medium that was in the drive when you aborted the restore. If the last file listed from the medium has an asterisk (*) before its size, that file is split across two or more backup media. You should delete the restored part of this file and then fully restore it.

Continuing a Paused Restore

A restore may pause because it has finished copying from one backup medium and needs you to replace that medium with the next medium from the backup. Check the restore's status message. The message shows the sequence number of the backup medium that the restore needs and shows the device address of the drive from which the restore is copying.

To continue a paused restoration after you have replaced the current backup medium in the restore's source drive with the next one, type at the server's **Enter command:** prompt:

```
RESTORE CONTINUE  or 
```

Result: The server displays:
Restore continue requested
and continues the restore where it left off.

After You Have Performed a Restore

Note

Files deleted since the last restored backup are recopied to the disc. You or the system's users may have to delete these again after they are restored.

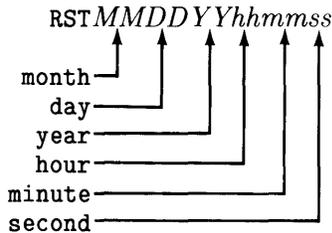
A restore unloads a tape when it finishes copying from it.

If You Performed the Restore with the Backup/Restore Utility

If you used the SRM Backup/Restore Utility to perform the restore, you need to bring down the Backup/Restore Utility system and bring up the SRM Operating System. This allows workstations to again access SRM system resources. For detailed directions, see this guide's chapter on "Restarting and Stopping the Server."

Check the Log File for Restore Errors

Each restore creates its own log file in the /BACKUP_RESTORE/RESTORE_LOGS directory on the SRM system disc. The name of a restore's log file consists of the prefix RST followed by that date and time (in numerical form) that the restore started. The time is in 24-hour clock notation. The system-assigned format of a restore log file name is:



An example restore log file name for a restore started on August 18th, 1986 at 9:23:43 p.m. (21:23:43 in 24-hour clock notation) is:

RST081886212343

The last restore's log file is also listed in the /BACKUP_RESTORE/TEMP_FILES directory as CURRENT_LOGFILE for easy access.

Viewing a Log File

Log file entries for a restore in progress appear on the server's scrolling screen.

You can also display the contents of a log file at a workstation in the same way as you would display the contents of any other ASCII-type file on the SRM system disc.

Printing a Log File

Since log file entries for a restore in progress appear on the server's scrolling screen, you can print them by turning on the "Print All" keyboard function at the server. The "Print All" keyboard function prints everything that appears on the server's scrolling screen.

You can also print a log file from a workstation in the same way as you would print any other ASCII-type file on an SRM system printer. To do so, copy the log file to an SRM system printer's spooler directory.

Deleting a Log File

You must delete a log file from a workstation in the same way as you would delete any other ASCII-type file from the SRM system disc. You can **NOT** delete a log file from the server.

Log files can accumulate and take up disc space, so periodically delete log files that you do not need to refer to.

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SRM Server Messages

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Diagnosing and Correcting a Corrupt Disc

7

Overview

This chapter tells how to diagnose and correct a corrupt disc using:

the SRM Operating System's VERIFY command	to identify unreadable (corrupt) areas of the disc and make these areas inaccessible in future disc operations.
the Disc Check Utility	to identify and attempt to repair problems in the disc's file system, and identify and attempt to recover lost directories and files.
the SRM Operating System's or Backup/Restore Utility's RESTORE command	to (if necessary) restore the entire disc's file system or unrecoverable or corrupt directories and files.

The following steps outline the procedure:

- Use the server's VERIFY command to find out if there are any unreadable areas (bad blocks) on the disc.
- If there are more than 100 bad blocks on the disc, restore the disc's entire file system from your latest backup(s).
Otherwise, bring down the SRM system and run the Disc Check Utility on the server.
- Allow the Disc Check Utility to identify any problems on the disc and identify the directories and files affected by the disc's bad blocks (if any).

Note

The Disc Check Utility may find that the disc's file system is too damaged or corrupt to be repaired. If this is the case, you must restore the disc's entire file system from your latest backup(s).

- Run the Disc Check Utility again to repair the disc's problems (if any).

Note

The Disc Check Utility may completely fill the disc's /lost_found or root (/) directory with recovered "orphan" directories and files. If this happens, you must bring your SRM system back up, go to a workstation, and move the recovered directories and files to media **OTHER THAN** the disc.

Do **NOT** attempt to run the Disc Check Utility again without first moving the recovered orphan directories and files off the disc to empty the full /lost_found or root (/) directory! Otherwise, you may further corrupt the disc.

- Run the Disc Check Utility a third time to verify that the disc's file system is now consistent.

Note

If the Disc Check Utility shows that there are still problems with the disc, you should repeat the previous two steps at least once more. If the disc's file system is not completely repaired after that, it is likely that you must restore the disc's entire file system from your latest backup(s).

- Bring up the SRM system again.
- Use a workstation to check the /lost_found or root directory for orphan directories and files recovered by the Disc Check Utility.
- If the Disc Check Utility found any overlapping files (files that occupy the same areas of the disc), copy them to new files and delete the existing ones. (The new copies of the files are probably corrupt, but you may be able to recover some of their data.)
- Purge any directories and files that the Disc Check Utility identified as affected by bad blocks.
- Restore the directories and files affected by bad blocks from your latest backup(s).

Checking a Disc for Unreadable Areas

The SRM Operating System's VERIFY command can identify unreadable areas on an SRM disc volume or any mass storage medium. Unreadable areas of the disc are called "bad blocks," and any data stored in those areas (or "blocks") is unrecoverable, except from backups. Extremely worn tapes or micro flexible discs commonly have bad blocks.

The SRM system reports a data error whenever it encounters a bad block on a medium. If this happens for an SRM disc volume, use the VERIFY command to find out which blocks are bad and then "spare" them. Sparring bad blocks makes them inaccessible in future disc operations. This prevents the system from writing any more data to the unreadable areas of the disc.

Once the VERIFY command tells you which blocks are bad, the Disc Check Utility can tell you which directories and files were affected by the bad blocks. You must then recover these directories and files from your latest backup(s).

Follow these steps to check a disc for bad blocks and spare any that are found:

1. Insure that no workstation users need to access the disc while you are verifying it.
2. At the server's **Enter** command: prompt, type:

VOLUME DOWN *interface_select_code, bus_address, subunit_number* **Return** or **ENTER**

Result: The server shuts down workstation access to the disc and displays:
Volume *interface_select_code, bus_address, subunit_number* is down

3. Press **Print** (**Shift-Enter**) or **PRT ALL**.

Result: The server displays:
Printall ON

With the "Print All" keyboard function ON, the server sends everything that appears on its scrolling screen to the default printer (the printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer). This gives you a printed listing of any bad block numbers the VERIFY command finds. The Disc Check Utility needs these numbers to tell you which directories and files are affected by the bad blocks.

Note that if workstation users are sending files to the default printer, these files or spooler messages may get intermixed with the printout of VERIFY command messages.

Note

Verifying a disc can take from a few minutes to a few hours, depending on the size of the disc.

4. At the server's **Enter Command:** prompt, type:

`VERIFY interface_select_code,bus_address,subunit_number` **Return** or **ENTER**

Result: The server displays:

```
Verifying interface_select_code,bus_address,subunit_number
Verifying...
If the VERIFY command finds no bad blocks, it displays
Verification complete
when it finishes.
If the VERIFY command finds a bad block, it displays:
Bad data found at block block_number
Continue verification (Y/N)?
N
```

5. If the VERIFY command did **NOT** find any bad blocks on the disc, skip to the next section on "Checking and Repairing a Disc's File System."

If the VERIFY command found a bad block, press **Y** and then **Return** or **ENTER**.

Result: The server prompts:

```
Spare bad blocks (Y/N)?
N
```

6. Press **Y** and then **Return** or **ENTER**.

Result: The server spares bad blocks as it finds them. When finished, the server displays:

```
Verification complete
```

7. Press **Print** (**Shift-Enter**) or **PRT ALL**.

Result: This turns off the "Print All" keyboard function, and the server displays:

```
Printall OFF
```

You now have a printed listing of the bad block numbers on the disc. You will need to enter these numbers while running the Disc Check Utility to determine which directories and files are affected by the bad blocks.

8. If the VERIFY command found 100 or more bad blocks, then restore the disc's entire file system as explained under "Restoring a Disc's Entire File System" in this guide's chapter on "Restoring from Backups."

Otherwise, use the Disc Check Utility to find out which directories and files are affected by the bad blocks, as explained in the next section on "Checking and Repairing a Disc's File System."

Checking and Repairing a Disc's File System

The SRM Disc Check Utility is a utility you can run on the server (in place of the SRM Operating System) to check and repair an SRM disc volume's file system.

The Disc Check Utility can also:

- tell you which directories and files are affected by bad blocks on the disc,
- find files that claim the same area of the disc (find overlapping files), and
- recover directories and files whose location in the directory structure is lost.

Note

The Disc Check Utility can only check and repair the **structure** of a disc's file system. It can **NOT** check the validity of a file's contents or recover a file's contents if the contents are corrupt or lost. Therefore, the Disc Check Utility is **NOT** a substitute for regular backups of the file system.

You can run the Disc Check Utility in two ways: as a diagnostic tool to identify and report problems with the disc's file system and as a corrective tool to actively repair problems with the disc's file system.

Starting the Disc Check Utility

Follow these steps to start the Disc Check Utility on the server:

1. Stop the server (bring down the SRM Operating System) as described in this manual's chapter on "Restarting and Stopping the Server." Do **NOT** turn off the server or any of its peripherals.
2. Insert the *SRM Systems & Utilities* tape or the *SRM Disc Check Utility* micro flexible disc into the appropriate type of drive and wait for the drive's BUSY light to go out.
3. If the server is a 9826 with a Boot ROM version prior to 3.0, insert the *SRM Boot Utility for 9826A* flexible disc into the server's internal disc drive.

Otherwise, skip to step 6.

Note

Be sure that the disc is labeled *for use with SRM Rev. 3.0 98619A*. This disc allows the server to boot a system from both Structured Disc Format (SDF) media and Logical Interchange Format (LIF) media.

4. At the server's **Enter** command: prompt, type:

SYSTEM UP or

and wait until the server displays a numbered list of systems available for you to boot.

Result: This reboots the server. After displaying a series of bootup messages, the server loads the Boot Utility from the internal disc drive. The Boot Utility then searches for systems to boot and displays a listing similar to the following:

```
SRM X.X System Boot Utility
Copyright 19YY Hewlett-Packard

98625A interface found at select code 14
98624A interface found at select code 7
 1.      7946 at 14,0,0
      Bootfile PRIMARY           :SYSTEM_SRM
 2. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_INS
 3. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_BKP
 4. Removable at 14,0,1
      Bootfile SRM3_0:SYSTEM_DSK

Number of boot system (30 sec to enter):
1
```

5. Skip to step 7.

6. At the server's **Enter** command: prompt, type:

SYSTEM UP **Return** or **ENTER**

and press the space bar a few times while the server is displaying its bootup messages.

Note

Pressing the space bar interrupts automatic booting of a system and allows you to manually choose a system to boot.

Result: This reboots the server. After several seconds, the server displays a listing of the systems available for you to boot, as in the following example display:

```
ID PROM Not Installed           :HP7941, 800, 0, 0
Copyright 19YY,                 1S SYSTEM_SRM
Hewlett-Packard Company.       :HP9144 TAPE, 801, 0, 0
All rights reserved.           1I SYSTEM_INS
                                1B SYSTEM_BKP
                                1D SYSTEM_DSK
BOOTROM 4.0
MC68000 Processor
Keyboard
HP-IB
IDO at 0
ID127 at 4
HP98625 at 8
HP SRM at 21
786272 Bytes
```

```
SEARCHING FOR A SYSTEM (ENTER to Pause)
RESET To Power-Up
```

Example Server Display upon Powerup with Disc Check Utility Highlighted

7. If the server is a 9826A using the SRM Boot Utility, type the number to the upper left of the label `SYSTEM_DSK` and press `ENTER`.

Otherwise, type the two-character (digit-letter) code to the left of the label `SYSTEM_DSK`.

Result: The server boots the Disc Check Utility. After the Disc Check Utility has been booted, the server's display looks similar to the following:

```
SRM X.X Disc Check (DSCK) Utility

Copyright Hewlett-Packard Company, 1983, 19YY.
All rights reserved.

Printed output can be generated on the default
printer. (lowest HP-IB address on select code 7
or a serial printer if there is no HP-IB printer.)

98624A interface found at select code 7
98625A interface found at select code 8
Unit # 1: 7941 found on 8,0,0

Which disc (unit #) would you like to check ?
1
```

Example Initial Disc Check Utility Display

Checking a Disc's File System

You may first want to run the Disc Check Utility as a diagnostic tool to identify and report problems with the disc's file system. This tells you the nature and extent of the problems before you try to correct them. If there are bad blocks on the disc, you can also get the names of the directories and files affected by the bad blocks.

Follow these steps to check a disc's file system with the Disc Check Utility:

1. Press **Print** (**Shift-Enter**) or **PRT ALL**.

Result: This turns on the server's "Print All" keyboard function and prints everything that appears on the server's scrolling screen on the default printer (the printer with the lowest bus address). This gives you a printout of the messages the Disc Check Utility displays, before they scroll off the screen.

2. If the displayed unit number identifies the disc you want to check, press **Return** or **ENTER**. Otherwise, type the unit number of the disc you want to check and press **Return** or **ENTER**.

Result: The server displays:

```
DSCK can tell you which files contain bad blocks
if the VERIFY command found any.
```

```
Are there any bad blocks (Y or N)?
```

```
N
```

3. If you used the SRM Operating System's VERIFY command to check the disc for unreadable areas (bad blocks), and the command found some, press Y and then Return or ENTER.

Otherwise, press Return or ENTER.

Result: If you told the Disc Check Utility that the disc contains bad blocks, the utility displays:

```
You can specify a range of blocks to check.  If
there is just one bad block, enter the same value
for the first and last block.
```

```
Enter first bad block number:
0
```

Otherwise, the Disc Check Utility displays:

```
DSCK can automatically repair the disc if problems
are found, but you must give DSCK permission to
write on the disc.  You can run DSCK once WITHOUT
write permission to determine the extent of any
problems and then run it a second time WITH write
permission when you are ready to correct the
problems - if any are found.
```

```
Do you want DSCK to write on the disc (Y or N)?
N
```

4. If you are **NOT** checking the disc for bad blocks, skip to step 6.

Otherwise, enter the number of the first bad block from your VERIFY command printout and press Return or ENTER.

Result: The server prompts:

```
Enter last bad block number:
block_number
```

5. Enter the number of the last bad block from your VERIFY command printout, and press `Return` or `ENTER`.

(If the VERIFY command found only one bad block, enter the same block number for the first and last blocks.)

Result: The server displays:

```
DSCK can automatically repair the disc if problems
are found, but you must give DSCK permission to
write on the disc. You can run DSCK once WITHOUT
write permission to determine the extent of any
problems and then run it a second time WITH write
permission when you are ready to correct the
problems - if any are found.
```

```
Do you want DSCK to write on the disc (Y or N)?
N
```

6. Press `Return` or `ENTER`.

Result: The server displays:

```
DSCK will now run unattended.
```

As the Disc Check Utility runs, it displays various status messages to allow you to track its progress. The Disc Check Utility may also display error messages if it finds problems with the disc's file system. These messages are listed and explained at the end of this chapter in the section on "Disc Check Utility Messages."

If you gave the Disc Check Utility a range of bad block numbers to check for affected directories and files, the utility lists their complete path in messages that read:

```
path may be lost.
```

If the Disc Check Utility finishes without finding anything wrong with the disc's file system, the utility displays:

```
Disc checked out OK.
```

Otherwise, the utility displays:

```
Problems were found on the disc.
```

In either case, the utility prompts:

```
Do you want to run DSCK again (Y or N)?
N
```

7. If the Disc Check Utility did **NOT** find anything wrong with the disc's file system, you are finished. Turn off the "Print All" keyboard function by pressing `[Print]` (`[Shift]-[Enter]`) or `[PRT ALL]`.

If the Disc Check Utility found that the disc's file system is too damaged or corrupt to be repaired, it tells you to:

Use latest backup to restore entire file system.

If this is the case,

- a. Press `[Return]` or `[ENTER]`.

Result: The server prompts:
Do you want to reboot now?
Y

- b. Press `[N]` and then `[Return]` or `[ENTER]`.

Result: The server displays:
Program ended.

- c. Turn off the "Print All" keyboard function by pressing `[Print]` (`[Shift]-[Enter]`) or `[PRT ALL]`.
- d. Restore the disc's entire file system as explained under "Restoring a Disc's Entire File System" in this guide's chapter on "Restoring from Backups."

If the Disc Check Utility found problems on the disc that are **NOT** beyond repair, continue with the next section on "Repairing a Disc's File System."

Repairing a Disc's File System

Now that you know the nature and extent of the problems with the disc's file system (the previous procedure gave a printout of the problems), you can run the Disc Check Utility as a corrective tool to actively repair problems with the disc's file system.

Follow these steps to repair a disc's file system with the Disc Check Utility:

1. Insure that the "Print All" keyboard function is ON. (It should still be ON from the previous procedure.)

Result: This gives you a printout of the changes that the Disc Check Utility may make to the disc's file system.

2. In response to the Disc Check Utility's prompt:

Do you want to run DSK again (Y or N)?

N

press Y and then Return or ENTER.

Result: The server restarts the Disc Check Utility.

3. If the displayed unit number identifies the disc you want to repair, press Return or ENTER. Otherwise, type the unit number of the disc you want to repair and press Return or ENTER.

Result: The server displays:

```
DSCK can tell you which files contain bad blocks
if the VERIFY command found any.
```

```
Are there any bad blocks (Y or N)?
```

```
N
```

4. Press Return or ENTER.

Result: The Disc Check Utility displays:

```
DSCK can automatically repair the disc if problems
are found, but you must give DSK permission to
write on the disc. You can run DSK once WITHOUT
write permission to determine the extent of any
problems and then run it a second time WITH write
permission when you are ready to correct the
problems - if any are found.
```

```
Do you want DSK to write on the disc (Y or N)?
```

```
N
```

5. Press **Y** and then **Return** or **ENTER**.

Result: The server displays:

DSCK will now run unattended.

As the Disc Check Utility runs, it displays various status messages to allow you to track its progress. The Disc Check Utility may also display other messages as it finds and corrects problems with the disc's file system. These messages are listed and explained at the end of this chapter in the section on "Disc Check Utility Messages."

When the Disc Check Utility finishes, it displays:

```
Problems were found on the disc.  
File system was changed on the disc.  
  
Do you want to run DSCK again (Y or N)?  
N
```

Note

The Disc Check Utility places recoverable orphan directories and files in the disc's `/lost_found` directory. If there is no `/lost_found` directory on the disc, the utility uses the root (`/`) directory. Orphan directories and files are those that have lost their location in the directory structure due to disc corruption. By placing these files in a known directory, the utility makes them accessible again. If the utility can **NOT** recover the name of an orphan directory or file, it assigns the name `inodenum` to it, where `number` can be up to 11 digits long.

Caution

The Disc Check Utility may completely fill the disc's /lost_found or root (/) directory with recovered "orphan" directories and files. If this happens, the Disc Check Utility displays:

The lost_found or root directory became full

and you must:

1. Bring up your SRM system as explained in this guide's chapter on "Restarting and Stopping the Server."
2. Go to a workstation and copy the recovered orphan directories and files to media **OTHER THAN** the disc.
3. Delete the recovered orphan directories and files from the /lost_found or root (/) directory.
4. Go back to the server and run the Disc Check Utility again with write permission to recover more orphan directories and files.

Do **NOT** attempt to run the Disc Check Utility again without first moving the recovered orphan directories and files off the disc to empty the full /lost_found or root (/) directory! Otherwise, **you may further CORRUPT THE DISC.**

6. Press or .

Result: The server restarts the Disc Check Utility.

7. Answer the utility's prompts to check the same disc again **WITHOUT** giving the utility permission to write on (actively repair) the disc.

Result: This allows you to verify if the utility has corrected the disc's file system.

8. If the Disc Check Utility shows that there are still problems with the disc, repeat steps 2 to 7 of this procedure at least once more. If the disc's file system is not completely repaired after that, it is likely that you must restore the disc's entire file system from your latest backup(s). To do so, refer to the section on "Restoring a Disc's Entire File System" in this guide's chapter on "Restoring from Backups."

If the Disc Check Utility finds no more problems on the disc, turn off the "Print All" keyboard function by pressing (-) or .

9. Bring up your SRM system again as explained in this guide's chapter on "Restarting and Stopping the Server."
10. Go to a workstation and check the /lost_found or root directory for orphan directories and files recovered by the Disc Check Utility. View or print them to determine to whom they belong and/or where they belong in the directory structure.
11. If the Disc Check Utility found any overlapping files, do the following while at a workstation:
 - a. Check your printout of the utility's messages for the paths of the overlapping files.
 - b. **COPY** (do **NOT** move, rename, or form a duplicate link to) every overlapping file to a new file (name) on the disc.
 - c. Delete all of the original overlapping files.

Note

The new overlapping files may be corrupt (check their contents from a workstation), and you may need to restore them from your latest backup(s).

12. If the disc contained bad blocks, do the following:
 - a. Check the utility's printout for the paths of the directories and files affected by the bad blocks. The paths are listed in messages that read:
path may be lost.
 - b. Delete the directories and files affected by the bad blocks, since the data that resided in the bad blocks is unrecoverable.
 - c. Restore the directories and files affected by the bad blocks from your latest incremental or base backup(s). For detailed directions, refer to this guide's chapter on "Restoring from Backups."

You are now finished repairing the disc's file system.

Disc Check Utility Messages

This section lists and explains most of the messages that the Disc Check Utility can display. The rest of the messages that the utility can display are listed in this guide's chapter on "SRM Server Messages."

Message List

Attempt to read/write an empty directory. - This means that there is a problem with the Disc Check Utility itself.

Try running the utility again. If the problem persists, call your HP Sales and Service Office for assistance.

Attempt to read/write past end of directory - This means that there is a problem with the Disc Check Utility itself.

Try running the utility again. If the problem persists, call your HP Sales and Service Office for assistance.

Bad date found. - The Disc Check Utility found a date or time which contains invalid information. The illegal values may be for the year, month, day, hour, minute, second. The date or time may be a creation or modification timestamp associated with a directory or file, or it may be a date or time used by the file system itself. Additional error messages may follow which may clarify the error.

Run the Disc Check Utility again and let it repair (write on) the disc. The utility can make sure that the date or time is composed of values within the valid range for any date or time, but it can **NOT** make sure that the date or time is accurate. If the date or time is important to you, you need to restore the affected directory, file, or the entire file system from your backup(s).

Bad day value: (number) - See explanation for the message **Bad date found**. This message gives a more specific error, however.

Bad month value: (number) - See explanation for the message **Bad date found**. This message gives a more specific error, however.

Bad time found. - See explanation for the message **Bad date found**. This message gives a more specific error, however.

Bad year value: (number) - See explanation for the message **Bad date found**. This message gives a more specific error, however.

Check for incorrect link counts complete. - This is just an informational message to allow you to track the Disc Check Utility's progress.

Checking for bad directories to reconstruct. - Bad directories are directories whose entries are lost or misplaced due to corruption in the file system. The Disc Check Utility can recover and restore the original entries to these directories. This is just an informational message to allow you to track the Disc Check Utility's progress.

Corrupt directory entry in: (path) - Information about one of the files in this directory is lost. Such a file often ends up as an “orphan” file that the Disc Check Utility transfers to the /lost_found or root directory.

Let the Disc Check Utility repair (write on) the disc, and watch for messages that tell you what files the utility moves to the /lost_found or root directory. You may be able to recover the file there. You can also list the contents of the directory containing the corrupt entry and compare it against an old backup or directory listing to see which file is missing or corrupt. You can restore this file from a backup.

Corrupt parent directory reference on: (path) - Each directory contains information about its parent directory (the directory above it in the hierarchical structure). This information is corrupt within the directory named.

Let the Disc Check Utility repair (write on) the disc. The utility may be able to determine the correct values from redundant information on the disc. If not, the directory may end up as an “orphan” that the utility transfers to the /lost_found or root directory. Look carefully at the contents of the /lost_found or root directory to see if any directories have been moved there.

Current physical file size is incorrect in file: (path) - The amount of disc space that the file thinks it claims is inconsistent with the amount of disc space that the file actually possesses. The file’s data may be corrupt.

Let the Disc Check Utility repair (write on) the disc. You may need to delete this file and restore it from a backup.

Dir (name) -> (path) - An orphan directory had to be moved to its parent directory, the /lost_found directory or the root directory. The directory moved no longer exists at its former location in the directory structure. All subdirectories and files under this directory were probably moved as well.

Let the Disc Check Utility repair (write on) the disc. Then look in the /lost_found or root directory to see what directories were moved. You can either copy the directories back to their original locations or restore them from your backup(s).

Directory is full. - A directory became full while the Disc Check Utility was moving orphan files or reconstructing bad directories. The Disc Check Utility cannot automatically extend a directory as the SRM normally would, because to do so might further corrupt the disc.

Refer to additional messages to determine which directory became full. When the Disc Check Utility finishes, boot the SRM system again, copy the files from this directory to another medium (**NOT** the disc being repaired), and then remove the files in the full directory. Then run the Disc Check Utility again to let it move more files into this directory.

Directory (path) is corrupt. - A directory is corrupt and all files under it may be lost or misplaced.

Let the Disc Check Utility repair (write on) the disc. Watch for messages that tell which files the utility moves to the /lost_found or root directory. Afterwards, check the /lost_found or root directory for the files that the utility moved there. You may want to restore the contents of the corrupt directory from a backup.

Directory (path) is full. - See the explanation for the message **Directory is full**. This message tells you which directory became full.

Directory (path) is full or corrupt - See the explanation for the messages **Directory is full.** and **Directory (path) is corrupt.**

Directory structure too deep. (path) Boot SRM, purge files and directories that are too deep in the directory structure, and run DSCK again. Program ended. - The disc has a directory structure that spans more than 30 levels including the root. The Disc Check Utility can not proceed until you remove the directories and/or files that are more than 30 levels deep in the directory structure.

Boot the SRM system again and restructure your directories so that no path names more than 30 directories and/or files.

Directory traversal complete. - This is just an informational message to allow you to track the Disc Check Utility's progress.

Disc checked out OK. - This means that the disc's file system is consistent and intact. This is just an informational message.

Error during path backtrack: reference to parent directory is corrupt. - See the explanation for the message **Corrupt parent directory reference on: (path).**

Error during path backtracking: parent not directory. - Each directory contains information about its parent directory (the directory above it in the hierarchical structure). The Disc Check Utility found a directory that thinks its parent directory is a data file. The result is that the directory may be orphaned, along with all of the files under it.

Let the Disc Check Utility repair (write on) the disc. The utility may be able to use redundant information on the disc to correct the problem, or the utility may have to move the directory to the /lost found or root directory. Watch for messages that tell which directories and files the utility moves to the /lost_found or root directory. Afterwards, check the /lost_found or root directory for those directories and files.

Error in program execution. - This indicates a problem with the Disc Check Utility itself.

Try running the utility again. If the problem persists, call your HP Sales and Service Office for assistance.

Failed to process entry #: (number) in (path) - See the explanation for the message **Corrupt directory entry in: (path).**

Failure in checking the free/claimed areas. - The Disc Check Utility was unable to finish checking information that may affect all of the directories and files on the disc.

Let the Disc Check Utility repair (write on) the disc. If the utility can not fix the problem, you must restore the disc's entire file system from your backup(s).

Failure in checking the volume header. - See the explanation for the message **Failure in checking the free/claimed areas.**

Failure in final check of disc. - See the explanation for the message **Failure in checking the free/claimed areas.**

Failure in finding testable units. - The Disc Check Utility encountered an error while trying to access the disc drive(s) on your SRM system. This may be caused by a hardware or hardware configuration problem.

Check the hardware configuration carefully and try running the Disc Check Utility again.

Failure in printing overlapping files. - See the explanation for the message **Failure in checking the free/claimed areas.**

Failure in recovering orphaned directory or file. - The Disc Check Utility could not recover a directory or file whose location in the directory structure is lost.

Check for other messages that may help you determine which directory or file was affected. Then run the Disc Check Utility again, allowing it to repair (write on) the disc. If the problem persists, you have lost a directory or file and should look at all of your directories to see if any entries are missing. You may have to restore the disc's entire file system from your backup(s).

Failure in traversing directory structure. - See the explanation for the message **Failure in checking the free/claimed areas.**

File has bad timestamp. - See the explanation for the message **Bad date found.**

File (path) overlaps another file from block # (number) to block # (number) - Two or more files think that they claim the same physical location on the disc. The data for one or more of the files may be corrupt.

Try to find out the paths of the other file(s), either by looking for similar messages from the Disc Check Utility or by running the utility again and using the bad blocks feature normally used in conjunction with the SRM Operating System's VERIFY command. Delete the overlapping files and restore them from your backup(s).

File system was changed on the disc. - The Disc Check Utility found and corrected at least one problem on the disc when you gave the utility permission to write on (actively repair) the disc.

Unless the Disc Check Utility told you to boot the SRM system first, run the utility again WITHOUT write permission to check if all of the problems have been corrected.

File system was not changed on the disc. - The Disc Check Utility did **NOT** repair the disc, either because there were no problems with it or because you did not give the utility permission to write on the disc.

If the utility did not find any problems, then you are finished with it. If the utility found problems, and if you have more than one backup of the disc's entire file system, run the utility again and give it permission to write on (or actively repair) the disc.

File type for root directory is incorrect. - The root directory is corrupt. Although the incorrect file type is not itself a serious problem, there is a good chance that there are other more serious problems with the directory.

Let the Disc Check Utility write on the disc. It is likely that the utility will report other errors too.

Finished checking for bad directories. - This is just an informational message to allow you to track the Disc Check Utility's progress.

Found a problem in the map of free and claimed areas on the disc. - The Disc Check Utility found that the disc space actually occupied by files is inconsistent with the space that the disc has marked as free. This often occurs after system power failures, and if uncorrected, can lead to overlapping files and other serious problems with the file system.

Let the Disc Check Utility repair (write on) the disc.

Incorrect file size. - This indicates a problem that may affect all of the directories and files on the disc.

Let the Disc Check Utility repair (write on) the disc. You may have to restore the disc's entire file system from your backup(s).

Invalid password information found in file; (path) Deleting all password information for this file. - The passwords and/or access capabilities for the file were corrupt, and the Disc Check Utility had to remove them.

Let the Disc Check Utility repair (write on) the disc. Then delete the file and restore it from a backup.

Latter part of data is lost in file: (path) - Some of the data for the file was corrupt and had to be removed.

Let the Disc Check Utility repair (write on) the disc. Then delete the file and restore it from a backup.

Latter part of file data lost in file: (path) - See the explanation for the message **Latter part of data is lost in file: (path)**.

Link count for root directory is incorrect. - The root directory is corrupt. Although the link count is not itself a serious problem, there is a good chance that there are other more serious problems with the root directory or the disc's file system.

Let the Disc Check Utility repair (write on) the disc. It is likely that the utility will report other errors, too.

Logical end of file is incorrect in file: (path) - The end-of-file mark is wrong for this file. The data in the file may be corrupt as well.

Let the Disc Check Utility repair (write on) the disc, and then delete the file and restore it from a backup.

(name) -> "lost_found" - The Disc Check Utility moved a file whose location in the directory structure is lost to the /lost_found directory.

Let the Disc Check Utility repair (write on) the disc. When the utility finishes, look through the /lost_found directory to see what files the utility placed there.

(name) -> root directory - The Disc Check Utility moved a file whose location in the directory structure is lost to the root (/) directory.

Let the Disc Check Utility repair (write on) the disc. When the utility finishes, look through the root directory to see what files the utility placed there.

No discs found. - The Disc Check Utility was unable to find any discs to check. There may be a hardware or hardware configuration problem.

Check your SRM system's hardware configuration and run the Disc Check Utility again.

Now checking for files with incorrect link counts. - Every file keeps track of how many directories it appears in (such as if the file has duplicate links, or alternate paths, to it). The Disc Check Utility can check whether each file's link count is correct. This is just an informational message to allow you to track the utility's progress.

Now checking the map of free and claimed areas on the disc. - Each disc keeps track of what areas are available for storage and what areas are already occupied by files. The Disc Check Utility can check whether this map of free and claimed areas is correct. This is just an informational message to allow you to track the utility's progress.

Now traversing the directory structure - The Disc Check Utility traces the disc's entire directory structure to determine if it is intact and if directories and files are in the right place. This is just an informational message to allow you to track the utility's progress.

(number) directories found. - This is just an informational message about the size of the disc's directory structure.

(number) directory levels below root found. - This is just an informational message about the depth of the directory structure. Keep the depth of the directory structure to 30 levels or less (including the root).

(number) files and directories found. - This is just an informational message about the size of the disc's file system.

(number) non-contiguous files found. - This is just an informational message about how many files are stored on the disc in separate "pieces," instead of in one whole piece.

Number of blocks marked free on disc:(number) - This is just an informational message about how much available space the disc has.

Orphan file is corrupt. - The Disc Check Utility is unable to recover a file whose place in the directory structure is lost.

Let the Disc Check Utility repair (write on) the disc. If the utility can not repair the problem, you have probably lost a file. You should check all directories for missing files. You may have to restore the disc's entire file system from your backup(s).

Orphan file unrecoverable. - See the explanation for the message **Orphan file is corrupt.**

Orphaned directory (name) placed in (path) - The Disc Check Utility had to move a directory whose location in the directory structure is lost to the /lost_found or root directory. The moved directory no longer exists at its former location in the directory structure. All subdirectories and files under this directory were probably moved as well.

Let the Disc Check Utility repair (write on) the disc. Then look in the /lost_found or root directory to see what directories were moved. You can either copy the directories back to their original locations or restore them from your backup(s).

Overlapping files were found; now traversing the directory structure checking for overlapping files. - The Disc Check Utility found at least one file that claims the same physical space on the disc as another file. The Disc Check Utility attempts to identify the files and physical locations involved.

Let the Disc Check Utility actively repair (write on) the disc. Refer to other messages for the specific files affected. You should delete these files and restore them from your backup(s).

Overlapping files were found; you should COPY each overlapping file to a new file, then purge ALL of the old overlapping files. NOTE: These new files may be corrupt. - See the explanation for the previous message.

(path) is corrupt. - Something is wrong with the file identified.

Let the Disc Check Utility actively repair (write on) the disc. Then delete the file and restore it from your most recent backup.

(path) overlaps another file and resides in two or more directories. - Two or more files claim the same physical location on the disc, and the file identified also has duplicate links to it. The data for one or more of the files may be corrupt.

Try to find out the paths of the other file(s) by looking for similar messages from the Disc Check Utility. Delete the overlapping files and restore them from your latest backup(s).

Preliminary check of disc complete. - This is just an informational message to allow you to track the Disc Check Utility's progress.

Printed output can be generated on the default printer with the lowest HP-IB address on select code 7 or the serial printer at the lowest select code. - This is just an informational message. You can press the **Print** (**Shift-Enter**) or **PRT ALL** key to get a printed copy of all of the messages the Disc Check Utility displays on the server's scrolling screen.

Problem found in file; (path) Correcting problem. - See the explanation for the message **(path) is corrupt**.

Problems were found on the disc. - The Disc Check Utility found at least one problem on the disc. The utility may have displayed other messages if it could isolate the problem to a particular directory or file. However, it is always possible that all of the files on the disc may have been affected by the problem(s).

Let the Disc Check Utility repair (write on) the disc. Follow the instructions (such as looking in the disc's /lost_found directory) associated with other displayed messages. Keep running the Disc Check Utility with write permission until this message goes away or until it appears that the utility is making no progress in repairing the disc (this is usually evident after three consecutive runs).

Root directory entries are corrupt. - Some of the directories or files in the root directory may be lost or misplaced due to disc corruption.

Let the Disc Check Utility repair (write on) the disc. Check the /lost_found or root directory for orphan directories and files that the utility recovered. It may be necessary to restore the disc's entire file system from your backup(s).

Root directory is corrupt. - The root directory may be lost. If this is the case, all of the files on the disc may be lost.

Let the Disc Check Utility repair (write on) the disc. The utility may be able to recover some or all of the files. Many files may have lost their place in the directory structure, and the utility may have moved them to the /lost_found or root directory. The /lost_found or root directory may become full many times. (Every time this happens, you must move the entries in /lost_found or root to media other than the disc and then run the Disc Check Utility again to recover more files.) You may have to restore the disc's entire file system from your backup(s).

Search for orphan files completed. - This is just an informational message to allow you to track the Disc Check Utility's progress.

Searching for discs; this takes several seconds. - This is just an informational message to let you know that the Disc Check Utility is looking for available discs. The utility then gives you a list of the discs it found and lets you choose one to check.

Searching for orphan files - The Disc Check Utility can find directories and files whose place in the directory structure is lost due to disc corruption. This is just an informational message to allow you to track the utility's progress.

System out of memory. - This is caused by the hardware being faulty or improperly configured. The server needs at least 512 Kbytes of memory.

Check the system's hardware configuration.

The lost_found or root directory became full;

When this program is finished:

- bring up your system;
- move all files in lost_found or root (that you wish to keep) to **SOME OTHER MEDIA, NOT THIS DISC;**
- purge the files in lost_found or root;
- run this program again to recover more orphan files. - The /lost_found or root (/) directory became full while the Disc Check Utility was moving orphan directories and/or files into it. The Disc Check Utility cannot automatically extend a directory as the SRM normally would.

When the Disc Check Utility finishes, boot the SRM system again and copy the recovered orphan directories and/or files to a medium **OTHER THAN** the disc. Then empty the /lost_found or root directory by deleting its entries. Finally, run the Disc Check Utility again to let it move more recovered orphan directories and/or files into this directory.

Use latest backup to restore entire file system. - The Disc Check Utility found a severe problem which it probably can not correct.

Let the utility try to repair the disc by writing on it. If this message persists, you must restore the disc's entire file system from your backup(s).

Volume header is corrupt in some area.

You must supply the volume name and password. - There is a problem with the information stored in the volume header. This is serious and may affect all of the files on the disc.

Let the Disc Check Utility repair (write on) the disc and answer the prompts given with the disc's volume name and volume password. The Disc Check Utility will attempt to fix the corrupt volume header. If this message persists, you must restore the disc's entire file system from your backup(s).

Volume header is OK. - This is just an informational message.

Volume was disconnected or power-down occurred before volume was brought down. - A power failure occurred while the volume was active (or UP).

Let the Disc Check Utility repair (write on) the disc.

Fixing Common Printer and Plotter Problems

8

Overview

This chapter tells how to fix common printer and plotter problems such as:

- printer or plotter out of paper,
- printer or plotter paper jam,
- printer or plotter offline,
- printer or plotter not printing or plotting a workstation's file,
- "Print All" or "Dump Alpha" keyboard function not printing server display messages, or
- SPOOLER or UNITS command malfunction at the server,
- printer or plotter device error.

Out of Paper Condition

Correct an out-of-paper condition as follows:

1. For an HP 2608S, HP 2563A, or HP 2564A printer, remove the old paper and follow the instructions in the printer manual for setting top of form. When the paper is installed, place the printer online and it should continue where it left off.
2. For all other printers, note the position of the last page in the printer and eject it. Align the first new page in the same position and place the printer online. **Do not reset the printer.** Printing should resume where it left off.

Single-sheet plotters require you to give a SPOOLER CONTINUE command at the server after you load the plotter with a sheet of paper.

Paper Jam

If a paper jam occurs on an HP 2608S, HP 2563A, or HP 2564A printer, fix the paper jam and give a SPOOLER CONTINUE command. This allows the spooler to restart from a point just before the paper jam occurred (it does not lose data).

No other spooled devices are capable of supporting this feature. This means that after you fix the paper jam, the workstation user must resubmit the file to the printer's or plotter's spooler directory.

Offline

To correct an “offline” condition, place the printer online and the output resumes where it left off. **Do not reset the printer.**

Note

Server commands to the device are queued until the offline condition is corrected. Therefore, it is not possible to take down or abort a spooler which is offline.

Workstation’s File Not Printing or Plotting

If a workstation user’s file is not printing or plotting, and there is nothing wrong with the printer or plotter itself, the file may still be open. A file must be closed before a spooler will send the file to a printer or plotter.

Determining If a Workstation User’s File Is Open

To determine if a workstation user’s file is open, at the server’s **Enter** command: prompt, type:

FILES :*workstation_name* or

where *workstation_name* is the name you assigned to the workstation with the server’s NAME command.

If you did not assign a name to the workstation, you must identify the workstation by typing:

FILES *server_select_code.ws_node_address* or

Item	Description	How to Obtain Value
<i>server_select_code</i>	the select code of the server’s SRM interface to which the workstation is connected. The select code is set in switches on the interface.	• Refer to your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i> .
<i>ws_node_address</i>	the node address of the workstation’s SRM interface(s). The node address is set in switches on the interface.	• Refer to your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i> .

Example Entry: FILES :ANN or

Result: The server displays a list of the directories and files that the workstation user has open. A user's locked files are indicated in the Open Mode column as LOCKED. If the user "owns" the locked file, the file is listed as MYLOCK in the Open Mode column.

```
-----Open Files-----
_user_      volume      name of file   open
sc nd       name        or directory   mode
-----
21.17      srm_9153    X2             SHARED
21.17      srm_9153    Y             LOCKED
21.17      srm_9153    X             MYLOCK
21.17      srm_9153    lost_found    DIR
```

Example FILES Command Listing for a Workstation User

Note

A file that is open in SHARED mode remains open if any user has it open. That is, to close a file that is open in SHARED mode, all users who have it open must close the file.

To view all open directories and files on the SRM system, type:

FILES or

Result: The server displays a list similar to the one above for a single user, except that all open directories and files on the system are listed.

To view a list of all workstations that have a particular file open, type:

FILES <file_path> or

Example Entry: FILES "SRMVOL:/USERS/FRED/FILENAME"

Result: The server displays a list of all workstations that have the file /USERS/FRED/FILENAME open.

Closing a Workstation User's File

Note

Before you close a workstation user's files, have the user save any file he or she is currently working on.

To close all of a workstation user's files, at the server's **Enter Command:** prompt, type:

```
REMOVE_USER :workstation_name  or 
```

where *workstation_name* is the name you assigned to the workstation with the server's NAME command.

If you did not assign a name to the user's workstation, you must identify the workstation by typing:

```
REMOVE_USER server_select_code.ws_node_address  or 
```

Item	Description	How to Obtain Value
<i>server_select_code</i>	the select code of the server's SRM interface to which the workstation is connected. The select code is set in switches on the interface.	• Refer to your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i> .
<i>ws_node_address</i>	the node address of the workstation's SRM interface(s). The node address is set in switches on the interface.	• Refer to your worksheets from the <i>Shared Resource Management Hardware Installation Manual</i> .

Example Entry: REMOVE_USER :ANN or

Result: The server displays:
User 21.37: removed from system

The server just closes all of the workstation user's open directories and files. The next time the workstation user opens a directory or file, the system adds the user automatically again.

The workstation user can also try turning the workstation off and then on again. This also closes the workstation user's open directories and files.

To close a subset of a workstation user's files instead of all of that user's files, type:

```
REMOVE_USER workstation_name "filename"  or 
```

Supplying an optional file name with the REMOVE_USER command closes the file names that match the given file name. The file name must be a simple file name and not a complete path.

Example Entry: REMOVE 21.17 "FLIPPO.ASC"

Result: The server displays:
User 21.17: "FLIPPO.ASC " closed

The server closes the file named FLIPPO.ASC.

“Dump Alpha” or “Print All” Keyboard Function Problem

If the server’s “Dump Alpha” or “Print All” keyboard function is not printing server display messages on the default printer, do the following:

1. Insure that there are no SRM mass storage device operations currently in progress. All activity lights on the mass storage devices attached to the server must be out.
2. Press the **Stop** or **CLR I/O** key **ONCE ONLY**.

CAUTION

If you press this key twice in less than half a second, you abort any disc or tape operation currently in progress. This may corrupt the disc or tape.

3. Try using the “Dump Alpha” or “Print All” keyboard function again.
4. If you are using “Print All” with a serial printer to print a listing of the Disc Check’s messages, the serial printer must be using the default serial configuration. See the section on “Configuring a Serial Printer” in this manual for a listing of the SRM default serial interface values. Check that your serial printer is using the same values.

SPOOLER or UNITS Command Malfunction

If a SPOOLER or UNITS command does not work properly when you give it at the server, do the following:

1. Insure that nothing is printing or plotting on any of the server’s printers or plotters.
2. At the server’s **Enter** command: prompt, type:

RESET 7 **Return** or **ENTER** (for HP-IB printers and plotters)

OR

RESET 2 **Return** or **ENTER** (for serial printers)

Note

7 is the select code of the server's HP-IB interface to which all HP-IB printers and plotters are attached. For serial printers, 2 is the select code of the HP 50960 server's built-in serial interface. For serial printers connected to an HP 98626 serial interface, give the select code of that interface.

Result: The server prompts:
Are you sure you want to do this?

CAUTION

Resetting the interface to its power-up state destroys all data currently in the interface. Therefore, do not do this when the server is spooling anything to a printer or plotter.

3. Press Y and then Return or ENTER.

Result: The server displays:
Card at selectcode 7 reset
OR
Card at selectcode 2 reset

4. Try giving the SPOOLER or UNITS command again.

Printer or Plotter Device Error

To fix a printer or plotter device error do the following:

1. Reset the server's HP-IB interface as instructed in the previous section called "SPOOLER or UNITS Command Malfunction."
2. Remove the printer or plotter from the system as instructed in this guide's "Managing Shared Peripherals" chapter under "Removing a Printer or Plotter from the System." Do **NOT** disconnect any of the printer or plotter's cables, however.
3. Reset the printer.
4. Again add the printer or plotter to the system as instructed in this guide's "Managing Shared Peripherals" chapter under "Adding a Printer or Plotter to the System."

This should correct the error, unless there is a continual hardware problem in the printer or plotter itself.

Diagnostic Flowcharts

Overview

This chapter provides some troubleshooting hints and techniques to aid the system manager in locating system faults, primarily interconnection and setup problems. You locate faults by testing the individual components in logical progression until the fault is isolated.

Before beginning it is useful to have an up-to-date system map detailing all the system peripherals and workstations currently connected to the SRM. This map should have been filled out before or at the time you installed the SRM system.

A Shared Resource Management system may be logically broken into three separate components:

1. The SRM server—the HP computer with associated interface cards that manages the shared resources through the use of special operating system software.
2. The resource management link—this is the HP 50962A/HP 50963A SRM Coax Interface, or the HP 50961 Resource Management Coax Adapter and connecting coaxial cables, or the HP 98028A Resource Management Multiplexer and connecting HP 97061 cables.
3. User workstations—these are the HP 9000 Series 200, Series 300, and Series 500 computers, the HP Vectra PC equipped with the HP Language Processor, and the HP 9835/45 computers connected to the server via the resource management link. Communication on the link is accomplished through resource management interfaces (HP 50962A/50963A, HP 98629 (with or without the HP 50961A Resource Management Coax Adapter), HP 27123A, and HP 98029A) installed in the user workstations.

The flowcharts on the following pages can help you trace a problem to a component of your SRM system. This discussion assumes that all of the system has worked at one time. If this is the first time you are bringing the system up, refer to the installation manuals and use this information for assistance.

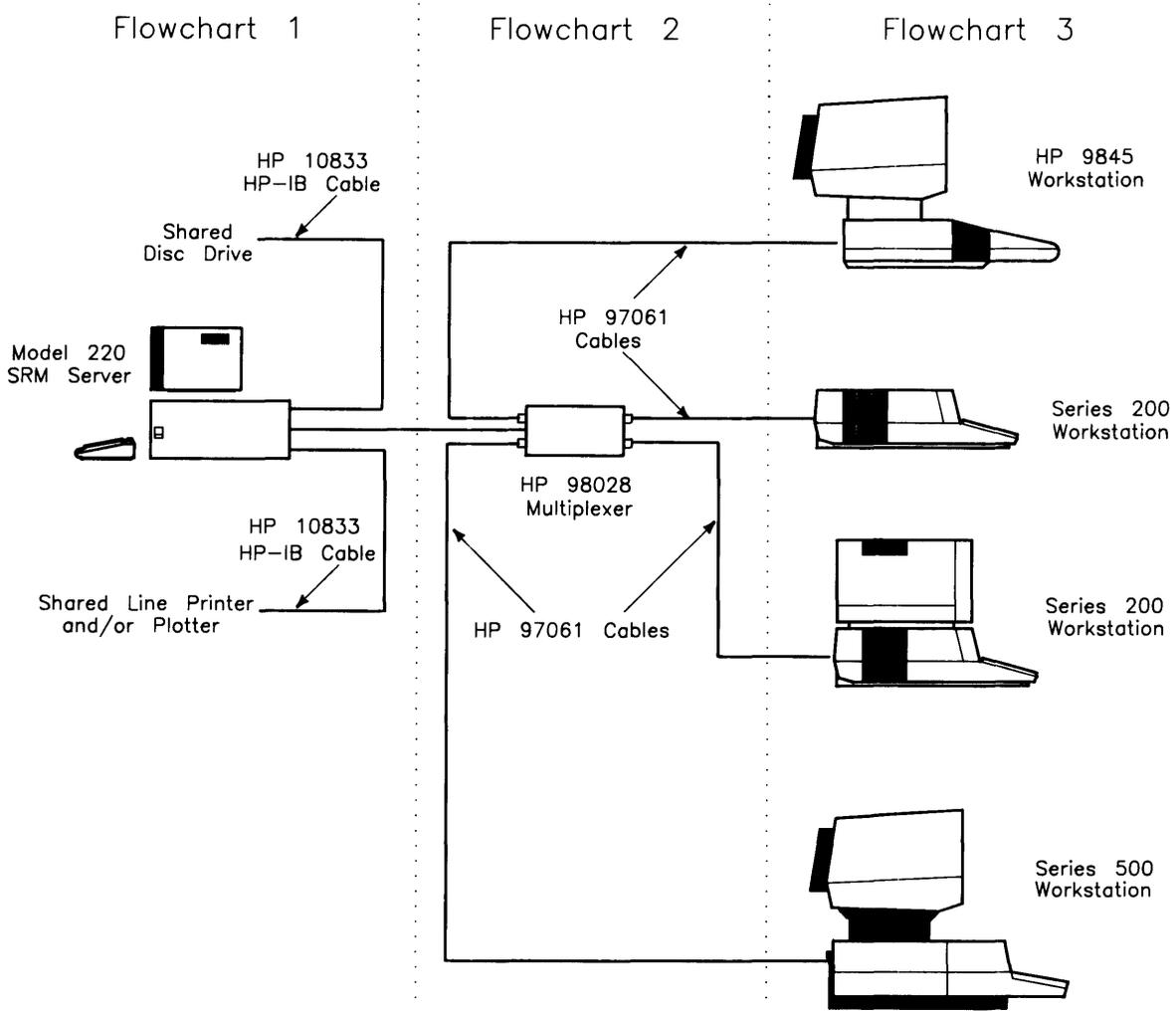
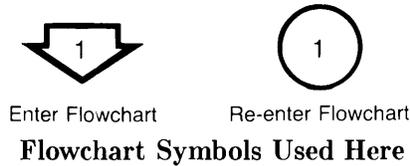
Communication on the SRM is achieved through either or both of two cabling schemes. One configuration, often referred to as the “coax link configuration,” uses either the HP 50961 Resource Management Coax Adapter or the HP 50962A/50963A SRM Coax Interface and coaxial cabling. The servers and workstations are connected to the SRM in a bus fashion, as shown in the Flowchart Break-out for a Coax Link.

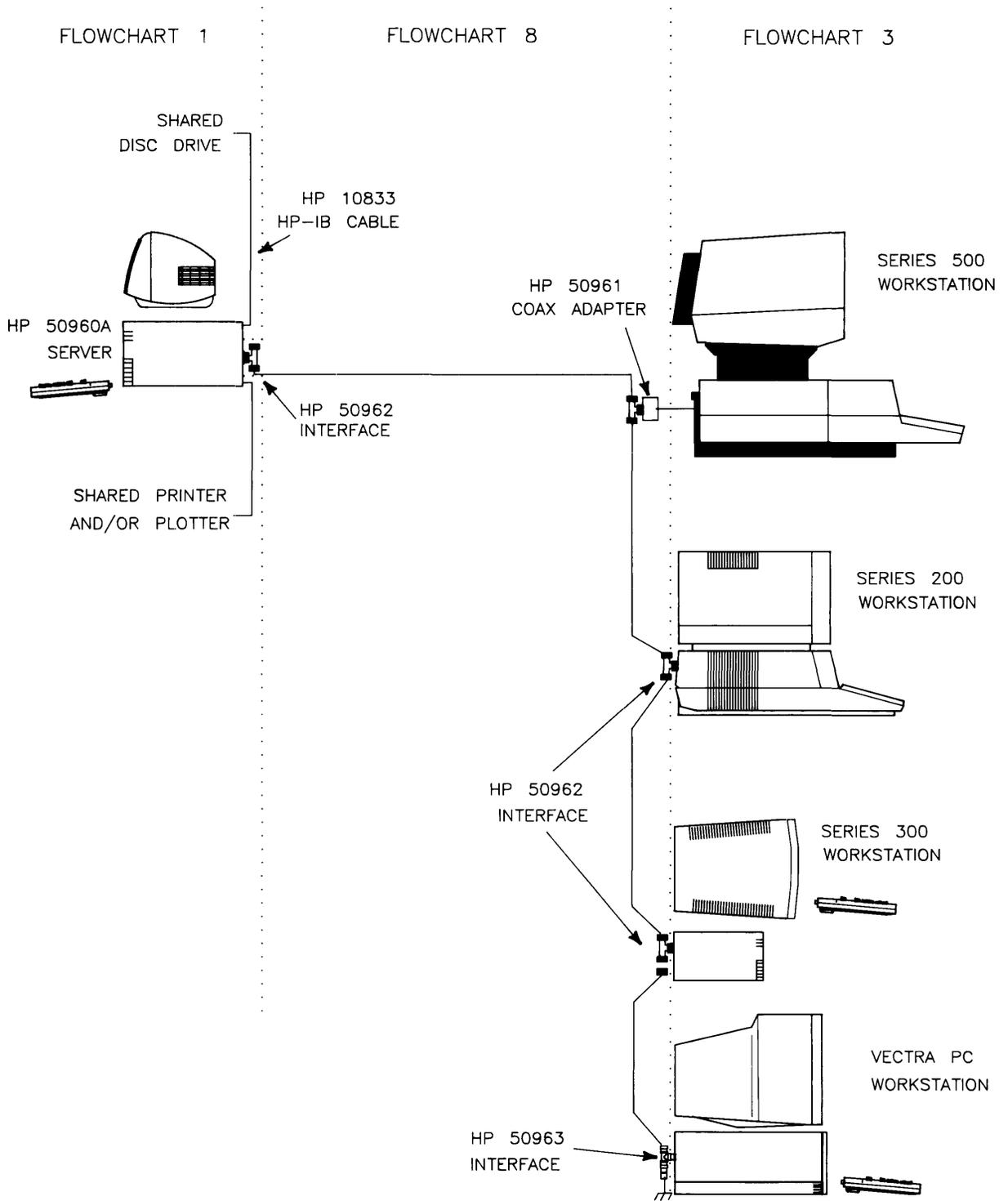
The other configuration, shown in the Flowchart Break-out for a Multiplexer Link, uses the HP 98028A Resource Management Multiplexer. Of the five possible connections to a multiplexer, at least one must go to a server, one must go to a workstation, and the other three can connect to either workstations or other servers.

These two configurations are functionally identical, but troubleshooting procedures need to be tailored to the hardware involved. In addition, it is possible for these two configurations to coexist on the same SRM. If this is your situation, troubleshoot one link configuration and then the other, if necessary.

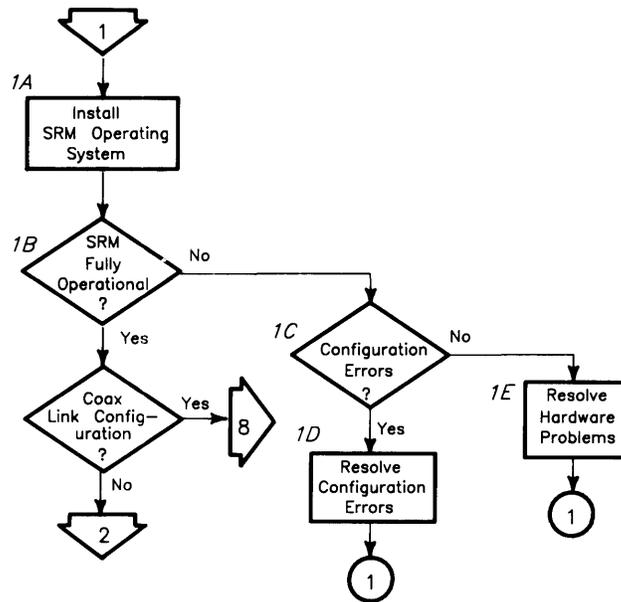
The flowcharts shown on the following pages are based on typical systems. Modify the diagnostic flow to match your system.

- Flowchart 1 deals with the server and its peripherals.
- Flowchart 2 deals with the multiplexer link configuration. It also directs you to flowcharts 4 through 7 for link and interface problems.
- Flowchart 3 covers the workstations and their interfaces.
- Flowchart 8 helps you troubleshoot a coax link configuration and directs you to flowcharts 9 through 12 for further troubleshooting information.





Flowchart Break-out for a Coax Link



Flowchart 1

Flowchart 1

- 1A **Install SRM Operating System**—Follow the procedure in the “Server Startup” chapter of the *SRM Software Installation Manual*. The only **allowable** error messages if the system is being configured for the first time are

Error reading configuration file
Configuration file needs to be updated

(This message appears if you did not resave the SRM configuration after recreating spooler directories and reassigning workstation names.)

or,

Error reading configuration file
File not found

(This message appears if the disc has been initialized by an SRM operating system but no SRM configuration has been saved.)

Any other error messages which appear as the system is starting up should be corrected.

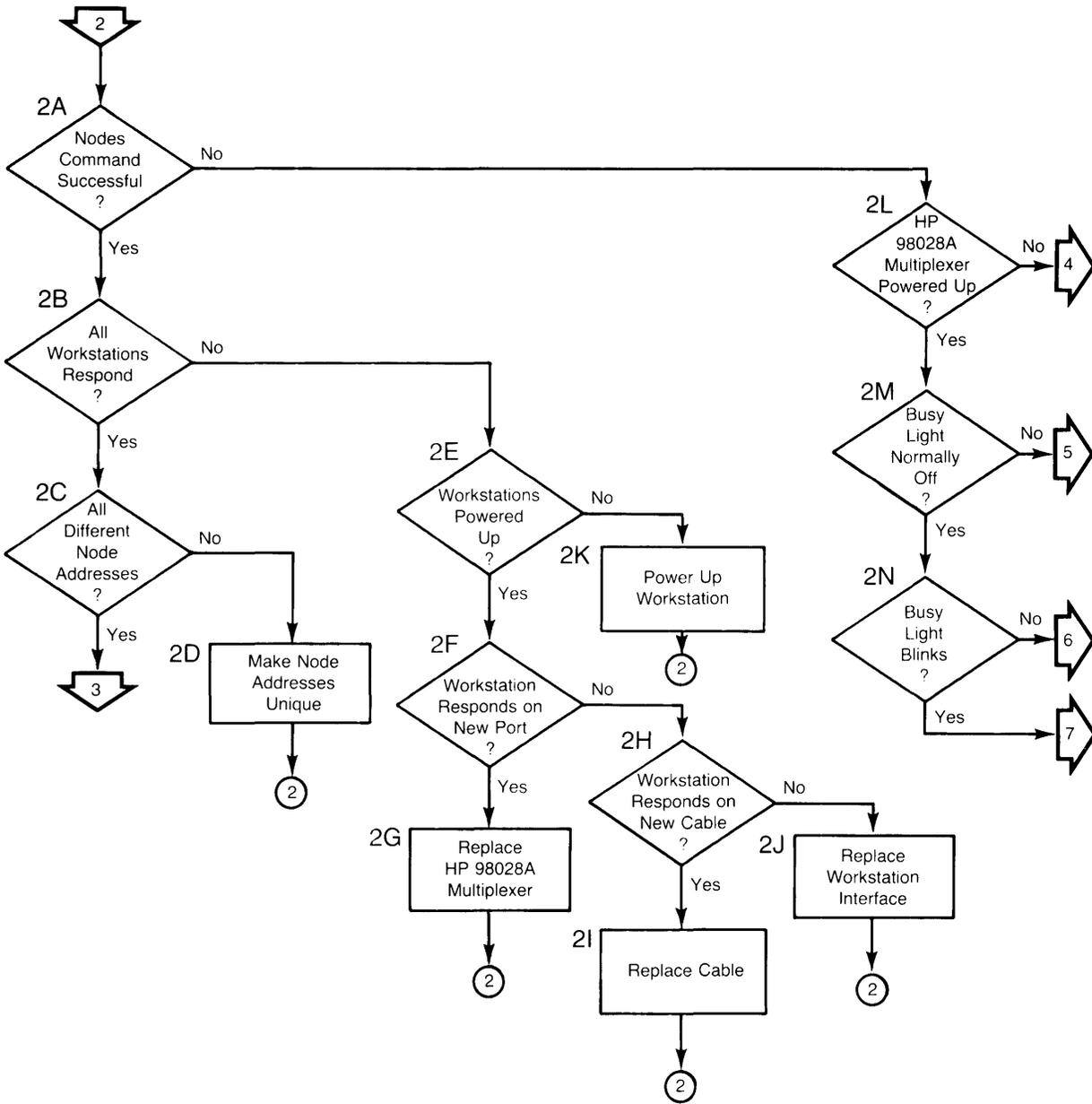
If the SRM system was installed and configured on a previous occasion, error messages at subsequent system startups could involve spooled devices that have been physically removed. If the removal is a permanent one, you should also remove the spooler directory and resave the SRM configuration (see the “Server Keyboard Functions and Commands” chapter).

It is also possible on subsequent system startups for a message to appear saying the disc may be corrupt. This message appears if the SRM server was powered down while the system was in the UP state, such as during a power failure. If such a message appears, back up the disc and then **run the Disc Check utility before proceeding.**

Note

Ensure that the time in the upper right corner of the server's screen is incrementing properly. If the time functions correctly, the server is operational. If not, the system has failed. Follow step 1C to find the problem.

- 1B **SRM Fully Operational**--If the hardware configuration of the interfaces (interrupt levels and select codes) and the peripheral devices is correct, and if there are no hardware errors, the system should be in the UP state with no errors reported on the server's display. A good test to determine if your SRM is fully operational is to execute the console commands INTERFACES, UNITS, VOLUMES, and SPOOLERS. (See the "Server Keyboard Functions and Commands" appendix.)
- 1C **Configuration Errors**--are indicated on the console and by the execution of the UNITS and INTERFACES commands.
- 1D **Resolve Configuration**--If there are configuration errors with the interfaces or peripherals, these need to be corrected before normal operation can be expected.
- 1E **Resolve Hardware Problems**--Hardware problems must be resolved through use of the HP Series 200 exercisers available for the SRM system server. If there are hardware failures, contact an HP Service Office for assistance in fixing the hardware.



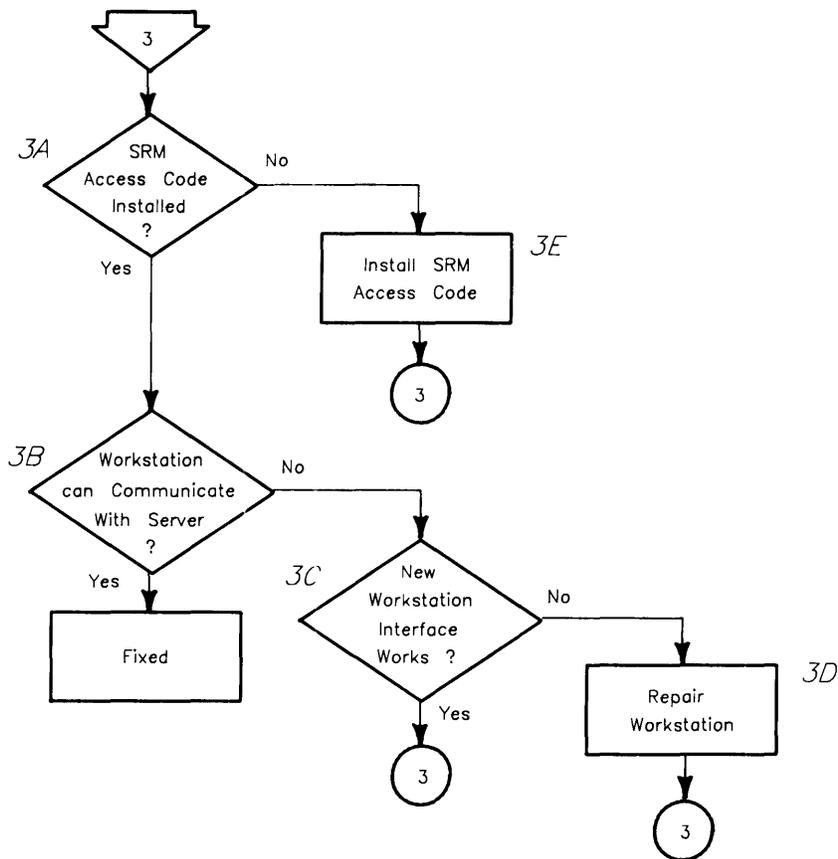
Flowchart 2

Flowchart 2

This flowchart applies troubleshooting procedures for a multiplexer link configuration. If you wish to troubleshoot a coax link configuration, begin with flowchart 8.

The procedure outlined here must be done for each HP 98629 interface in the SRM server to which a multiplexer is connected. Do an INTERFACES command to verify the select code of each interface.

- 2A **NODES Command Successful?**—Do a NODES command for the select code of an HP 98629 in the SRM sever. The command should complete without any error messages on the console.
- 2B **All Workstations Respond?**—All the powered-up workstations connected to the HP 98028A multiplexer on the HP 98629 interface in the server should respond with their node address and type of workstation. Note that any HP Series 200 or 300 workstation may be identified as an HP 9826 if the SRM binary is not installed.
- 2C **All Different Node Addresses**—All reporting workstations should have unique node addresses. This is a must for correct operation (workstations on different HP 98028A multiplexers can have the same node address, but this practice is not recommended.)
- 2D **Make Node Addresses Unique**—A workstation having a duplicate node address must have its node address changed. Go to the workstation and follow the hardware installation procedure to give a unique node address to the resource management interface on that HP 98028A multiplexer.
- 2E **Workstation Powered Up?**—For workstations that did not respond, verify that they are powered up and that the cable is connected between the workstation interface and the correct HP 98028A multiplexer.
- 2F **Workstation Responds on New Port**—Move the non-identifying workstation cable to another port on the HP 98028A multiplexer (one that is known to be good), to verify that the channel on the HP 98028A multiplexer is working.
- 2G **Replace HP 98028A Multiplexer**—The multiplexer is bad and must be replaced.
- 2H **Workstation Responds on New Cable**—Use a cable known to be good and a port known to be good on the HP 98028A multiplexer and connect the workstation to the SRM. Now check for response to the NODES command.
- 2I **Replace Cable**—The cable is bad and must be replaced.
- 2J **Replace Workstation Interface**—The workstation interface must be replaced.
- 2K **Power Up Workstation**—Power up the workstations which are not on.
- 2L **HP 98028A Multiplexer Powered Up?**—The power light (LED) on the HP 98028A multiplexer must be on. Verify that the machine which is supplying power (via the short cable) is powered on.
- 2M **Busy Light Normally Off?**—The normal state of the busy light (LED) on the HP 98028A multiplexer is in the off state. It should blink when messages are being sent across the link.
- 2N **Busy Light Blinks?**—When messages are sent across the link, the busy light on the HP 98028A multiplexer blinks. Doing the NODES command from the controller should cause the busy light to blink.

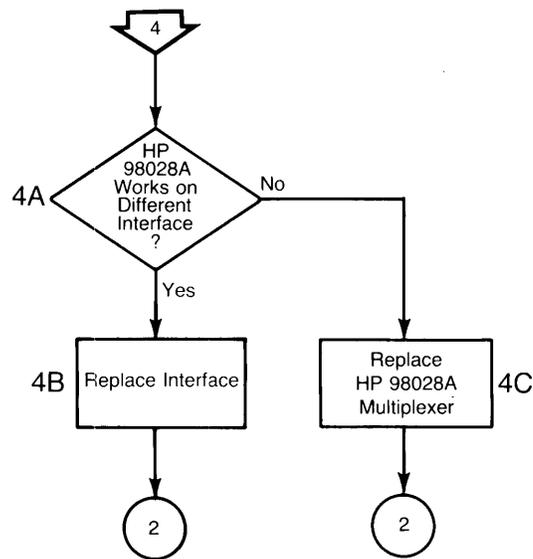


Flowchart 3

Flowchart 3

If all has worked correctly so far and you are still having troubles, it is time to check the workstations. While continuing these diagnostics, it is helpful to have someone assisting you at each of the workstations.

- 3A **SRM Access Code Installed?**—For the workstation to access the SRM system, the necessary workstation code must be installed. In the case of BASIC, this is either a “binary” or an “option ROM;” in the case of PASCAL, it must be configured in the “INITLIB,” and for HP-UX, an optional utility must be installed. Verify that this SRM access code is properly installed.
- 3B **Workstation Can Communicate with Server?**—To check this communication, list the SRM root directory from the workstation.
- 3C **New Workstation Interface Works**— Replace the workstation interface with one known to work (from another workstation) to check operation.
- 3D **Repair Workstation**—Use the hardware exercisers for the workstation to find errors and failures. It may be necessary to contact an HP Service Office to have the workstation repaired.
- 3E **Install SRM Access Code**

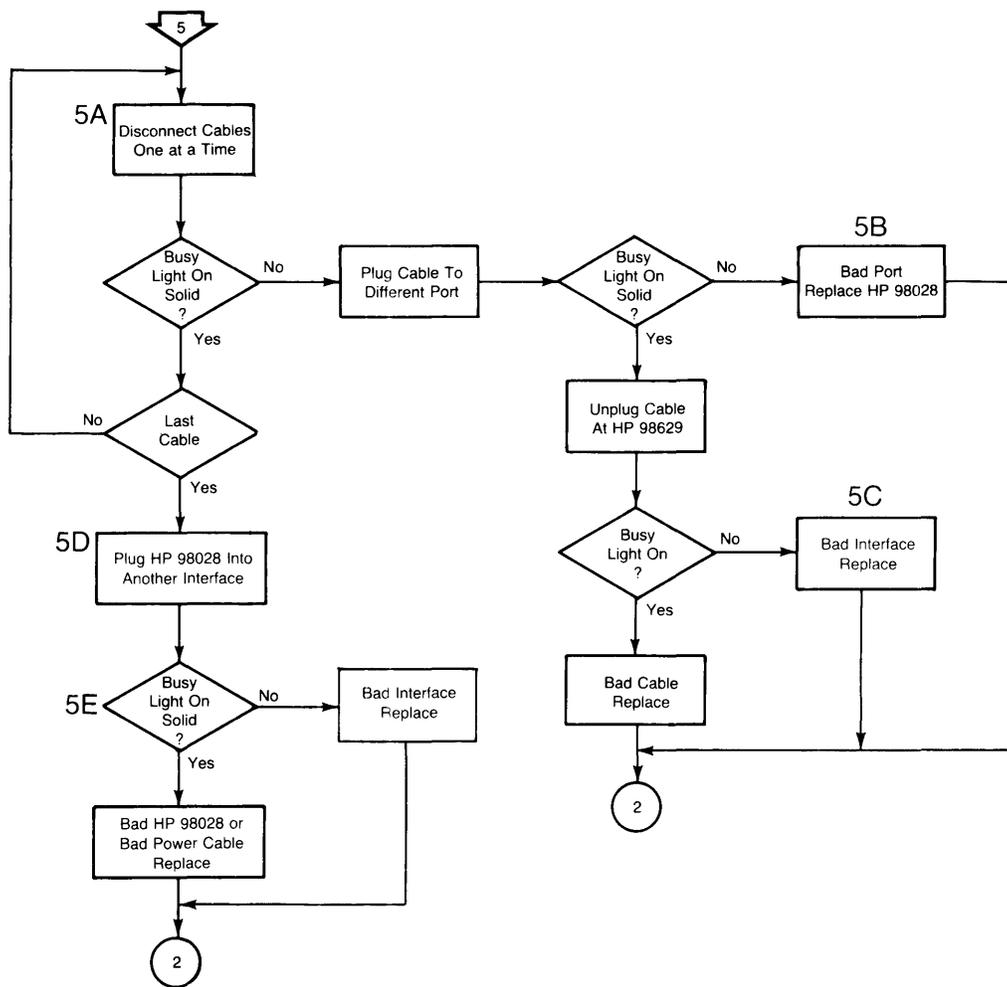


Flowchart 4

Flowchart 4

Multiplexer is without power.

- 4A **HP 98028A Multiplexer Works on Different Interface**—Move the HP 98028A to a new HP 98629 interface (HP Series 200 or Series 300, except a Model 216) or an HP 27123A interface (HP Series 500), and check the power on light.
- 4B **Replace Interface**—The interface which could not supply power to the HP 98028A multiplexer has blown a fuse.
- 4C **Replace HP 98028A Multiplexer**—Either the cable or the PC board itself is bad and needs to be replaced.



Flowchart 5

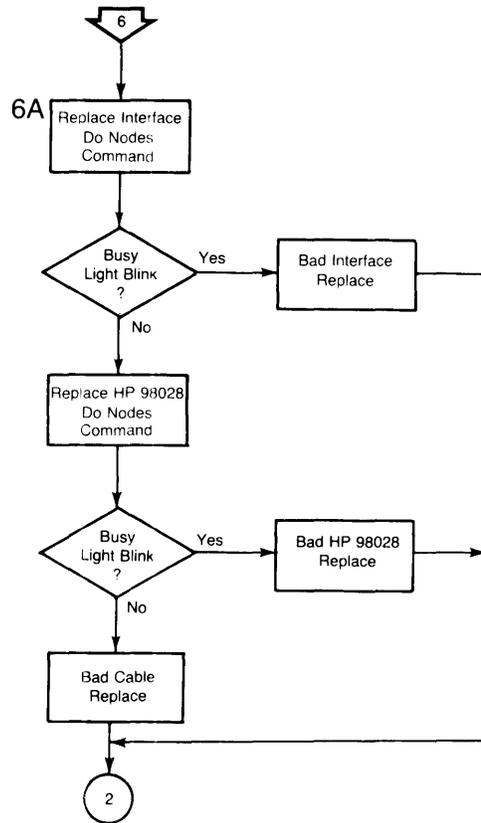
Flowchart 5

If, in flowchart 2, you did not get a response to the NODES command, the multiplexer power LED is on, but the busy LED is on continuously, you should use this flowchart.

Note

When a NODES command is executed, the busy LED should blink. If there is a problem, the busy LED is either on or off depending on the problem.

- 5A **Check Link Cables**—Start by disconnecting the link cables one at a time. After removing each cable, check the busy LED. If it goes off, connect the last cable removed into another port on the multiplexer. If the busy LED comes back on, leave the cable connected to the multiplexer and disconnect the cable from the interface at the other end. If the busy LED stays on, you have a bad link cable, replace it. Re-enter flowchart 2.
- 5B **Replace Bad Multiplexer**—If the busy LED started to blink or went dark when the link cable was connected to another port, you have a bad multiplexer. Replace the HP 98028 multiplexer. Re-enter flowchart 2.
- 5C **Replace Bad SRM Interface**—If, after leaving the cable connected to the multiplexer and disconnecting the link cable from the interface, the busy LED went dark, you have either a loose connection to your HP 27123A card or a bad HP 98629 interface. Check the card connection. If the problem persists, replace the defective SRM interface. Re-enter flowchart 2.
- 5D **HP 98028A Works on a Different Interface**—If, after removing all of the link cables, the busy LED is still on continuously, connect the HP 98028A into another interface. If the busy LED goes dark or starts to blink, you have either a bad HP 98629 or a bad HP 27123. Replace the bad interface. Re-enter flowchart 2.
- 5E **HP 98028A Light On Continuously**—If, after connecting the HP98028A into another interface, the busy LED is still on continuously, you have a bad HP 98028A or a bad multiplexer power cable. Replace the HP 98028A multiplexer. Re-enter flowchart 2.

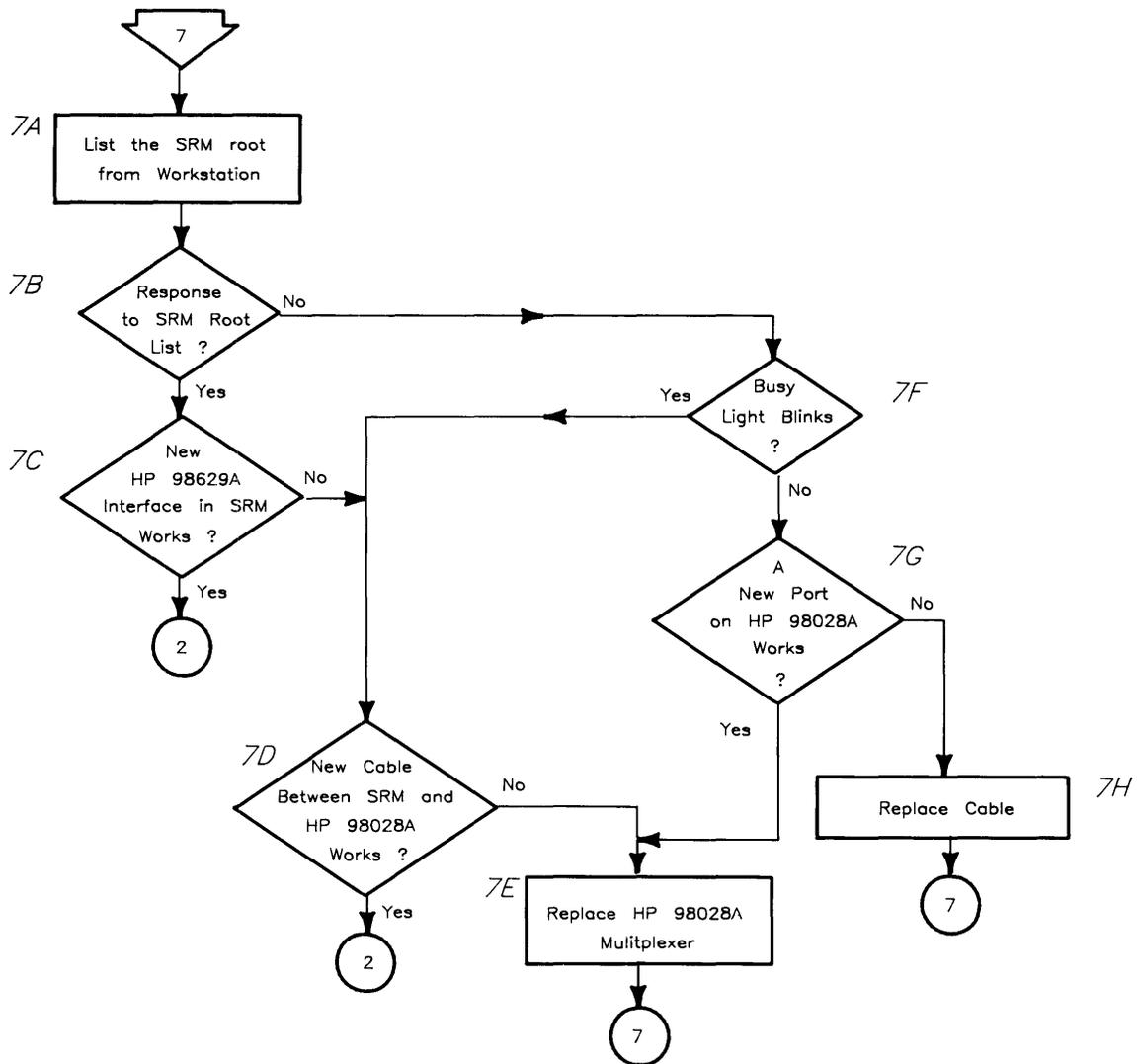


Flowchart 6

Flowchart 6

If, in flowchart 2, you did not get a response to the NODES command, the multiplexers do have power, and the busy LED is off, you should use this flowchart.

- 6A **Replace Interface, Do NODES Command**—If the busy LED now blinks, the interface is bad. If the busy LED does not blink, return the interface and replace the HP 98028A and do a NODES command. If the busy LED now blinks, the original HP 98028A is bad. If the busy LED does not blink, the link cable is bad. Replace it. Re-enter flowchart 2.



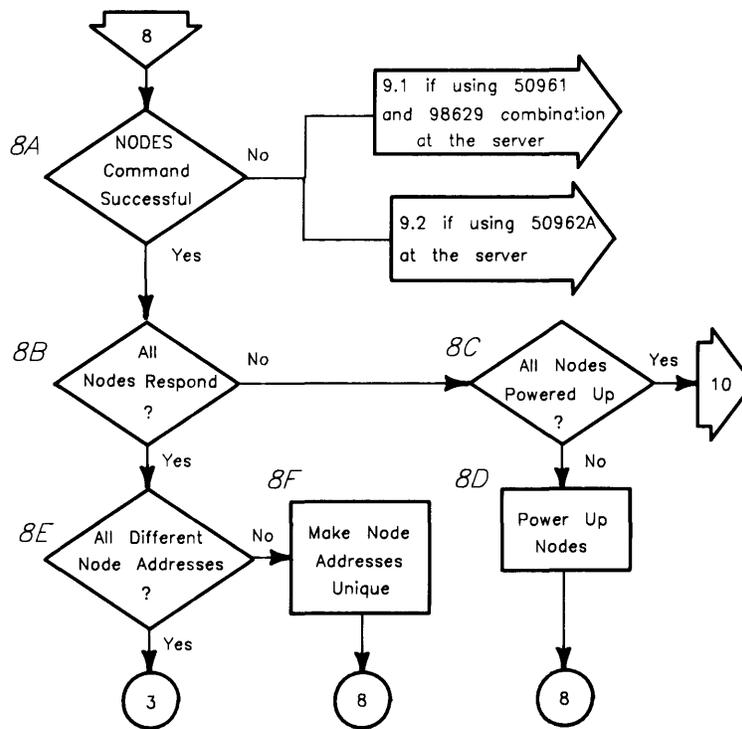
Flowchart 7

Flowchart 7

The busy light on the HP 98028A multiplexer blinks when a NODES command is executed from the SRM console, but there is no response from the workstations. The workstations are all powered up and cabled to the HP 98028A multiplexer.

- 7A **List the SRM Root from Workstation**—Go to all of the workstations connected to the 98028A multiplexer in question and list the root directory of the SRM.
- 7B **Response to SRM Root Listing?**—Were any of the commands successful?
- 7C **New HP 98629 Interface in SRM Works?**—Replace the HP 98629 interface in the SRM server and do a NODES command from the SRM server. The workstations should respond.

- 7D **New Cable Between SRM and HP 98028A Works**—Replace the cable between the SRM server and the HP 98028A multiplexer (this is the short built-in 98028A cable) or replace the entire HP 98028A. Now do a NODES command from the SRM server. A normal response should result.
- 7E **Replace HP 98028A Multiplexer**—Replace the HP 98028A multiplexer on the SRM server.
- 7F **Busy Light Blinks**—When doing a directory listing of the SRM from the workstation, the busy light should blink as messages are sent over the link.
- 7G **A New Port on the HP 98028A Works**—Move the workstation cables to a different port on the HP 98028A multiplexer. Repeat the directory listing from the workstation. A normal response should be displayed.
- 7H **Replace Cable**—Get a new cable for this workstation.



Flowchart 8

Flowchart 8 for Coax Link Configurations

If your SRM system uses a multiplexer link configuration, turn to “Flowchart 2 for Multiplexer Link Configurations.”

The SRM server appears to be fully operational; that is, the INTERFACES, UNITS, VOLUMES, and SPOOLERS commands give the expected results. However, some form of communication problem exists between the server and one or more workstations. This flowchart qualifies the problem.

8A

NODES Command Successful?—Execute a NODES command on the SRM server for the select code of the combined HP 98629 interface/HP 50961 Resource Management Coax Adapter or the HP 50962 interface which is connected to the coax link having problems. The command should complete without any error messages on the console display.

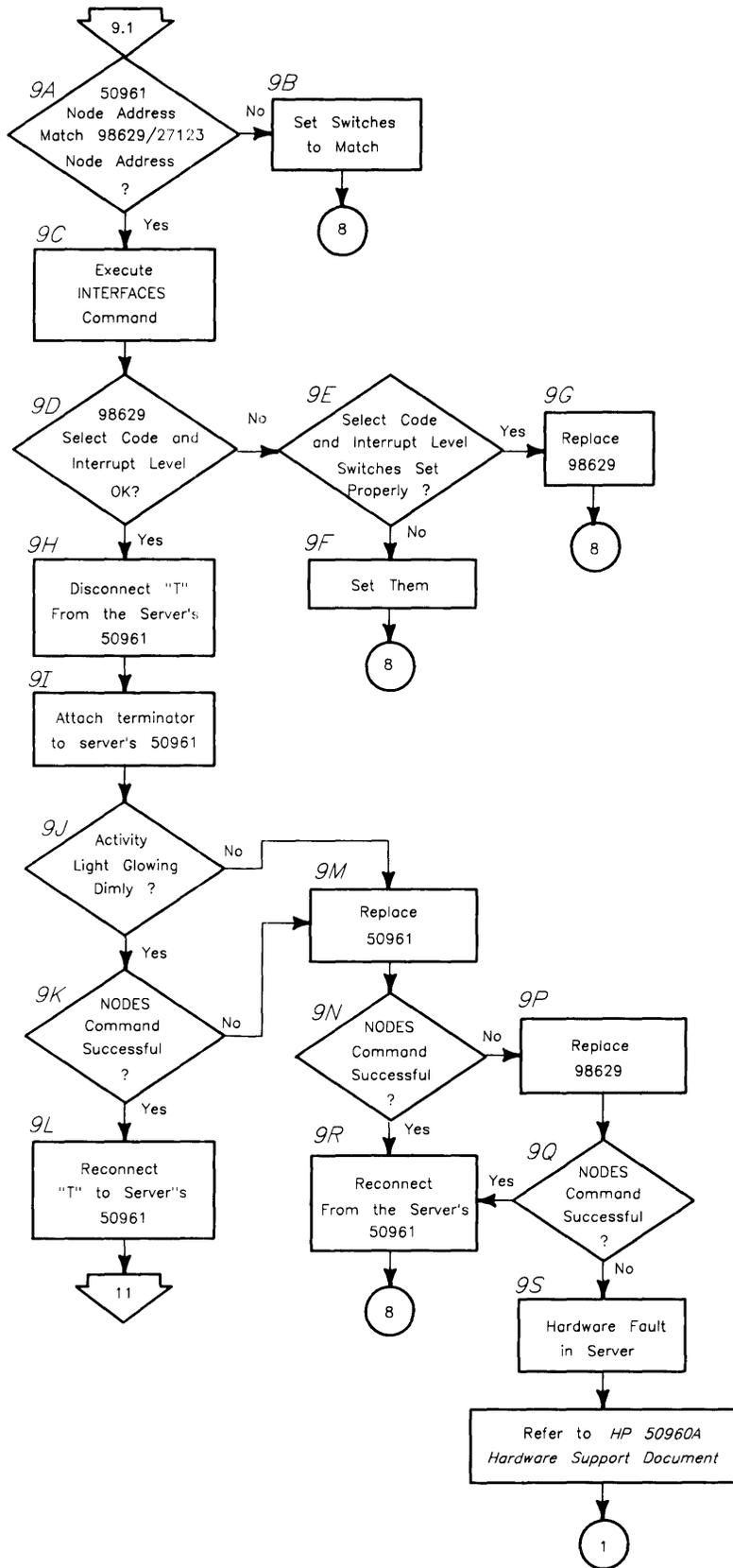
8B **All Nodes Respond?**—All the powered up nodes on the link, whether they are workstations or servers, should respond to the NODES command. HP Series 200 or 300 workstations may identify themselves as 9826 workstations. This is normal.

8C **All Nodes Powered UP?**—If not, they will not respond to a NODES command.

8D **Power up**—Power up any nodes which are not already powered up.

8E **All Different Node Addresses**—Every node on a link must have a unique node address. If any node address is duplicated on the link, messages may be misrouted or overwritten during transmission.

8F **Make Node Addresses Unique**—Set a unique node address on each SRM interface. Be sure to set the same node address on the HP 50961 Resource Management Coax Adapter as on the 98629 interface that the coax adapter is connected to.



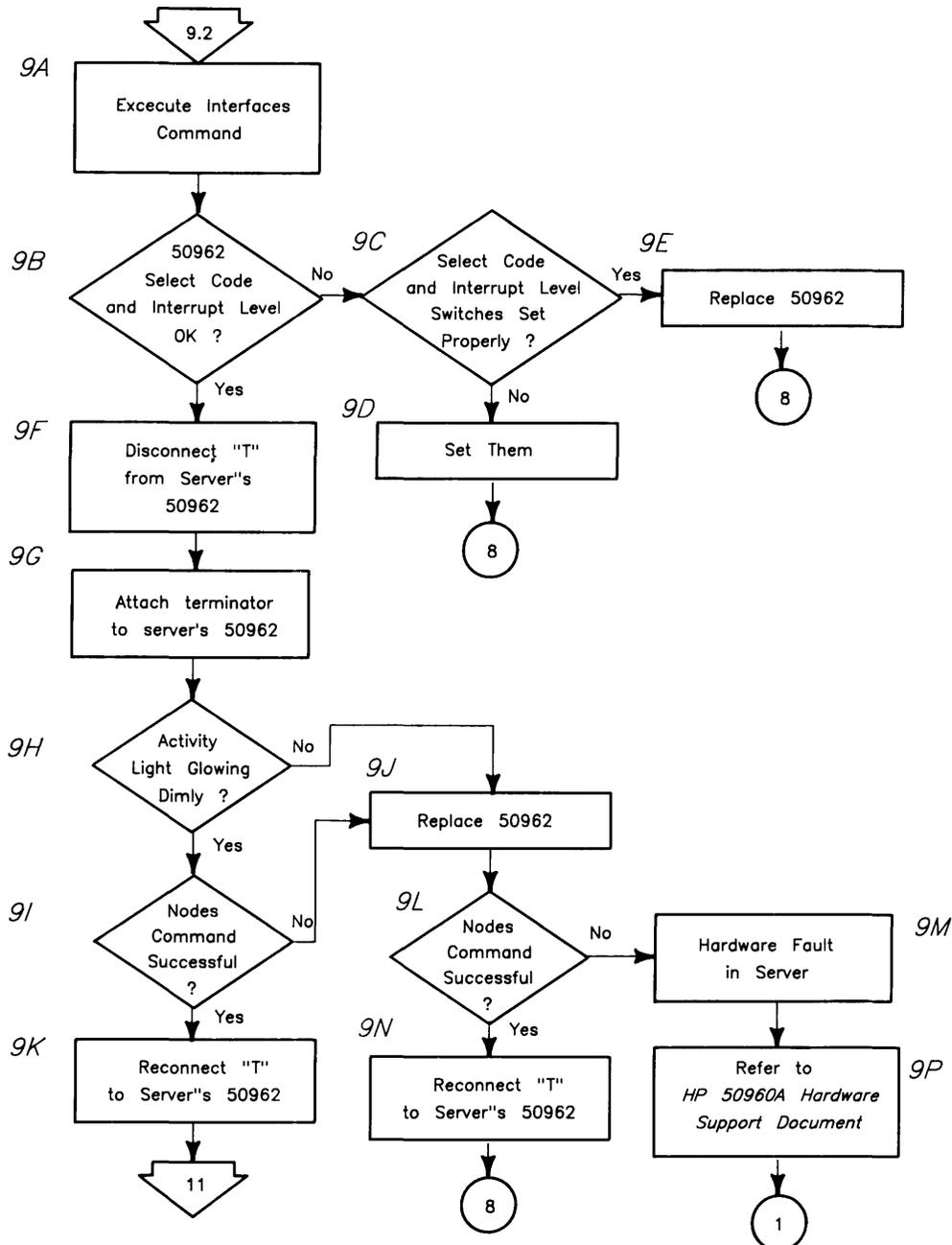
Flowchart 9.1

Flowchart 9.1: Problem at the Server's HP 98629/50961 Pair

A problem exists at the server's 98629/50962 assembly: the NODES command has not been successful. Some error message was reported.

- 9A **50961 Node Address Match 98629/27123 Node Address?**—All HP 50961 coax adapters must have their node address switches set to match those of the SRM interface card to which they are connected.
- 9B **Set Switches to Match.**
- 9C **Execute INTERFACES Command**—This command, executed at the SRM server, should display all of the interfaces in the server which are recognized by the SRM operating system.
- 9D **98629 Select Code and Interrupt Level OK?**—The select code should be in the range of 21 to 31 and should be different from the select codes of any other interfaces in the server. The interrupt level must be 4. The SRM operating system will ignore interface cards which are not set to proper interrupt levels.
- 9E **Are the Select Code and Interrupt Level Switches Set Properly?**—You will need to take down the SRM system, turn off the server, and remove the interface to check these. Verify the switch settings by referring to your *SRM Hardware Installation Manual*.
- 9F **Set Them**—If they are not set properly, set them and try again.
- 9G **Replace 98629**—If the switches are set properly and the SRM operating system still does not recognize the interface, replace the HP 98629 interface.
- 9H **Disconnect "T" from the Server's 50961**—By disconnecting the BNC connector from the server, the link appears to be a very small link consisting of only one node.
- 9I **Attach terminator to server's 50961**—Attach a coax cable terminator to the server's 50961 coax adapter to re-terminate the link.
- 9J **Activity Light Glowing Dimly?**—The activity light at the lowest-numbered node on a link should always glow dimly and flash brightly during the execution of NODES commands (or any other console command that causes activity on the link). Since there is currently only one node on the link, it should be glowing.
- 9K **NODES Command Successful?**—Try executing the NODES command. It should complete without errors and display the SRM server as the only node on the link.
- 9L **Reconnect "T" to Server's 50961**—If the NODES command was successful, reconnect the T connector to the 50961 interface. A problem exists elsewhere on the link which is preventing communication from the server to the link.
- 9M **Replace 50961**—If the activity light does not glow or the NODES command is still not successful, try replacing the 50961 coax adapter.
- 9N **NODES Command Successful?**—Try executing the NODES command. It should complete without errors and display the SRM server as the only node on the link.
- 9P **Replace 98629**—If the NODES command does not complete without errors, try replacing the 98629 interface in the server link which is connected to the link in question.

- 9Q **NODES Command Successful?**—Try executing the NODES command. It should complete without errors and display the SRM as the only node on the link.
- 9R **Reconnect the "T" to the 50961 Coax Adapter**—If the NODES command was successful, reconnect the node to the link by attaching the T connector to the 50961 coax adapter. Continue testing the link.
- 9S **Hardware Fault in Server**—If the NODES command is still not successful, then there is a hardware fault in the server. Refer to the *HP 50960A Hardware Support Document* for more troubleshooting information.

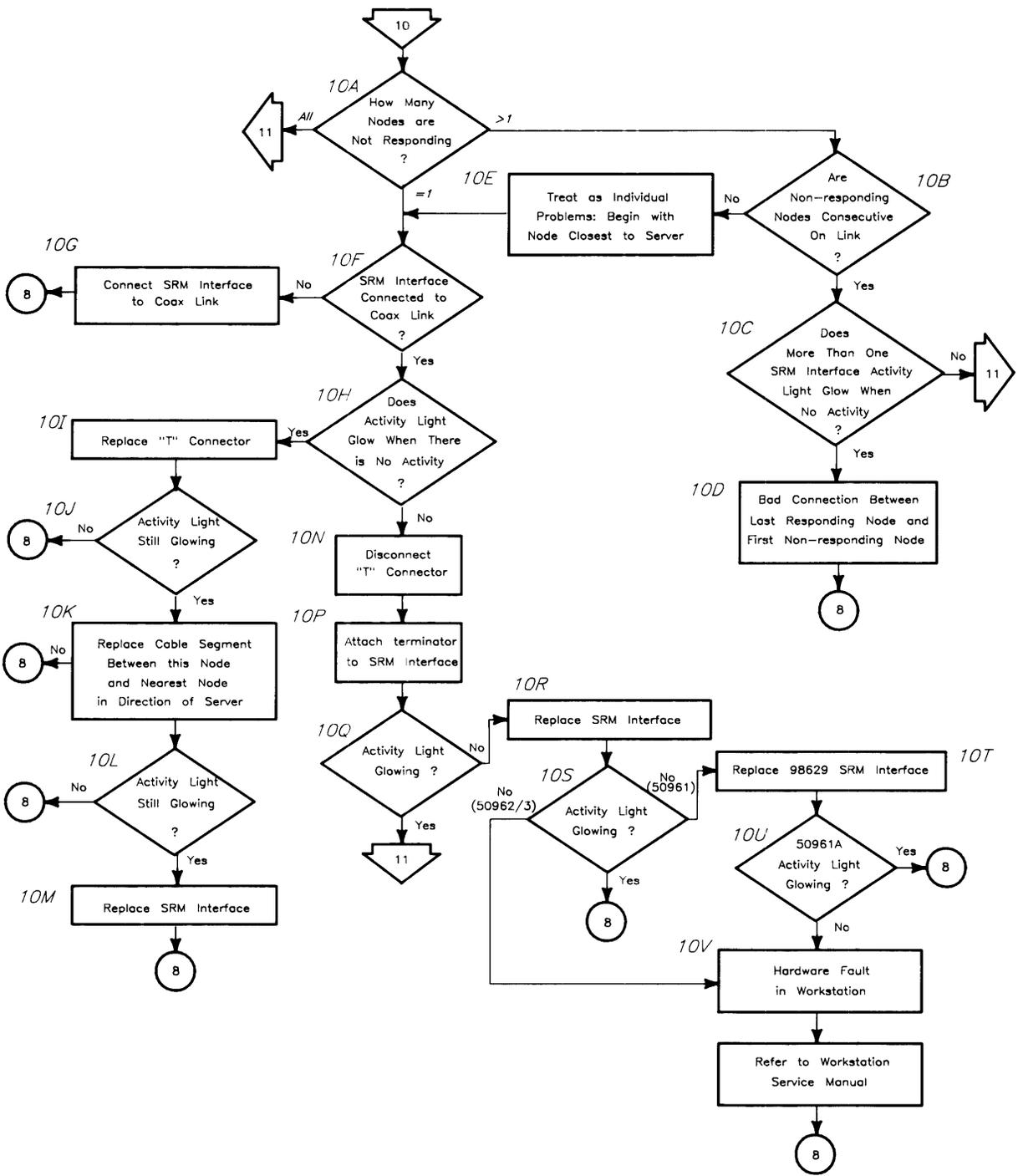


Flowchart 9.2

Flowchart 9.2: Problem at the Server's HP 50962A Interface

A problem exists at the server's 50962A interface: the NODES command has not been successful. Some error message was reported.

- 9A **Execute INTERFACES Command**—This command, executed at the SRM server, should display all of the interfaces in the server that are recognized by the SRM operating system.
- 9B **50962 Select Code and Interrupt Level OK?**—The select code should be in the range of 21 to 31 and should be different from the select codes of any other interfaces in the server. The interrupt level must be 4. The SRM operating system will ignore interface cards which are not set to the proper interrupt levels.
- 9C **Are the Select Code and Interrupt Level Switches Set Properly?**—You will need to take down the SRM system, turn off the server, and remove the interface to check these. Verify the switch settings by referring to your *SRM Hardware Installation Manual*.
- 9D **Set Them**—If they are not set properly, set them and try again.
- 9E **Replace 50962**—If the switches are set properly and the SRM operating system still does not recognize the interface, replace the HP 50962 interface.
- 9F **Disconnect "T" from the Server's 50962**—By disconnecting the BNC connector from the server, the link appears to be a very small link consisting of only one node.
- 9G **Attach terminator to server's 50962**—Attach a coax cable terminator to the server's 50962 interface to re-terminate the link.
- 9H **Activity Light Glowing Dimly?**—The activity light at the lowest-numbered node on a link should always glow dimly and flash brightly during the execution of NODES commands (or any other console command that causes activity on the link). Since there is currently only one node on the link, it should be glowing.
- 9I **NODES Command Successful?**—Try executing the NODES command. It should complete without errors and display the SRM server as the only node on the link.
- 9J **Replace 50962**—If the activity light does not glow or the NODES command is still not successful.
- 9K **Reconnect "T" to Server's 50962**—If the NODES command was successful, reconnect the "T" connector to the 50962 interface. A problem exists elsewhere on the link which is preventing communication from the server to the link.
- 9L **NODES Command Successful?**—Try executing the NODES command. It should complete without errors and display the SRM server as the only node on the link.
- 9M **Hardware Fault in the Server**—If the NODES command is still not successful, then there is a hardware fault in the server. Refer to the *HP 50960A Hardware Support Document* for more troubleshooting information.
- 9N **Reconnect "T" to Server's 50962**—If the NODES command was successful, reconnect to node to the link by attaching the T connector to the 50962 interface. Continue testing the link.
- 9P **Refer to the HP 50960A Hardware Support Document**—for more troubleshooting information.



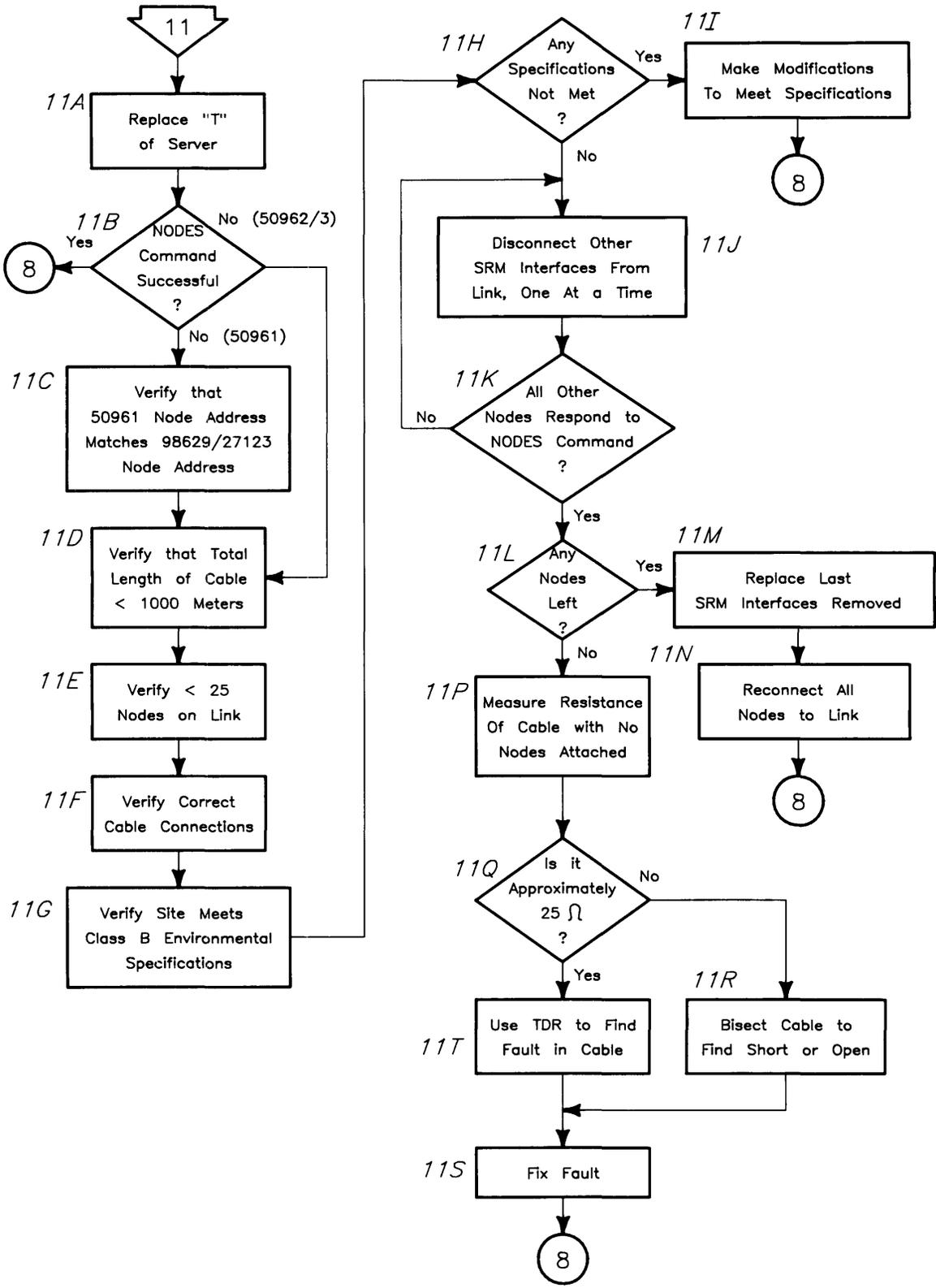
Flowchart 10

Flowchart 10: Problem in the Cable or at a Remote Node

The NODES command completed with no errors and listed at least the SRM server as a responding node. Possibly some other nodes were listed as well. This flowchart helps determine where in the rest of the link the fault might be.

- 10A **How Many Nodes are Not Responding?**—If **all** of the nodes are not responding, then there is some problem preventing communication between the server and the link. If only **one** node is not responding, the problem is probably at that node. If **several** nodes are not responding, then the problem is likely in the cabling leading up to that group.
- 10B **Are Non-responding Nodes Consecutive on Link?**—If so, then the probability is high that the cable is damaged or disconnected somewhere before these nodes. If the nodes are not consecutive on the link, then treat each non-responding node individually to find the problem.
- 10C **Does More Than One Activity Light Glow When No Activity?**—Only the server's activity light should glow when there is no link activity. If more than one is glowing, then this usually indicates a break in the link.
- 10D **Bad Connection Between Last Responding Node and First Non-responding Nodes**—Following the cabling from the last responding node to the first non-responding node, check for loose or incomplete connections. If the connections appear to be solid, replace the cable between these two nodes.
- 10E **Treat as Individual Problems: Begin with Node Closest to Server**—Tracing the cabling from the server to the first non-responding node, work with this node individually until you are able to correct its problem.
- 10F **Is SRM Interface Connected to Coax Link?**—Is the T connector attached firmly to the SRM Interface? Are the coax cables attached firmly to the T?
- 10G **Connect SRM Interface to Coax Link**—if it was disconnected for some reason.
- 10H **Does Activity Light Glow When there is No Activity?**—It should **not**. Only the node with the lowest node address (must be a server) should have a 50961 coax adapter or a 50962 SRM coax interface with its activity light glowing.
- 10I **Replace the “T” Connector**—If the activity light is glowing and there was no activity, there may be some fault in the connection at that node.
- 10J **Activity Light Still Glowing?**—It should have stopped.
- 10K **Replace Cable Segment Between This Node and Nearest Node in Direction of Server**—if the activity light is still glowing.
- 10L **Activity Light Still Glowing?**—It should have stopped.
- 10M **Replace SRM Interface**—Replace the 50961 coax adapter or the SRM coax interface.
- 10N **Disconnect “T” Connector**—By disconnecting the BNC T connector, the link appears to be very small, consisting of only one node.

- 10P **Attach terminator to SRM Interface**—Attach a coax cable terminator to the 50961 coax adapter or the SRM coax interface to re-terminate the link.
- 10Q **Activity Light Glowing?**—If so, there is probably some external condition on the link preventing proper communication. If not, there is some defect at this node.
- 10R **Replace SRM Interface**—Replace the 50961 coax adapter or SRM coax interface at this node. It is the most likely cause of a failure of this type.
- 10S **Activity Light Still Glowing?**—If it does, this confirms that the SRM coax interface was defective. If it doesn't, the problem has not been found yet.
- 10T **Replace SRM Interface**—Replace the SRM interface at this node. If the node is a Series 500 computer, also replace the cable between the interface and the coax adapter.
- 10U **Activity Light Glowing?**—If it does, then the SRM interface was defective.
- 10V **Hardware Changes in Workstation**—If the activity light still did not glow, you have a hardware fault in the computer at this node. Refer to the service manual for your computer for additional troubleshooting information.



Flowchart 11

Flowchart 11: Problem with the Link

Some problem exists on the link which is preventing most or all communication from the server to the workstations. There may be numerous reasons for this, from defective hardware to improper installation. This flowchart identifies the most likely failures.

- 11A **Replace "T" at Server** --If this T connector is defective, no communication the link can take place, since all communication involves the server.
- 11B **NODES Command Successful?** --Do a NODES command and determine whether all nodes connected to the link respond. If they do, then replacing the T connector at the server was the solution.
- 11C **Verify that 50961 Node Address Matches 98629/27123 Node Address** --Verify at each node on the link that the 50961 coax adapter node address switches match the node address switches on the SRM interface card to which it is connected. The server must have the lowest node address.
- 11D **Verify that Total Length of Cable < 1000 metres.**
- 11E **Verify \leq 25 Nodes on Link**
- 11F **Verify Correct Cable Connections** --Verify that the cable is connected in bus fashion and that no branches of cable exist. Cable segments between the BNC T connector and the 50961 coax adapter or 50962A coax interface are illegal. For more information refer to your *SRM Hardware Installation Manual*.
- 11G **Verify Site Meets Class B Environmental Specifications** --as described in the *SRM System Planning Guide*.
- 11H **Any Specifications Not Met?** --Are any of the requirements described in 11C through 11G not met?
- 11I **Make Modifications to Meet Specifications** --If any requirements described in 11C through 11G were not met, make modifications to the component in error.
- 11J **Disconnect Other SRM Interfaces from the Link, One at a Time** --Starting at one end of the link, disconnect the T connectors from the coax adapters or coax interfaces one at a time. Leave the server's T connector connected. After removing each T connector, perform a NODES command.
- 11K **All Other Nodes Respond to NODES Command?** --Determine whether all remaining nodes responded to the NODES command.

The bisection method could be substituted for steps 11J and 11K above. Some link installations may find this method easier.

1. Divide the SRM link approximately at midpoint. Add a terminator to the end of the link which includes the server.
2. Execute a NODES command.
3. If all nodes remaining on the link respond, then add about half of the other portion of the link and go to step 2.

4. If nodes remaining on the link do not respond, then divide the unproven portion of the link approximately at its midpoint. Go to step 2.

This process will converge upon a single node which is causing problems.

- 11L **Any Nodes Left?**—If after this process of elimination there are no nodes left which could be causing the problem, then the fault must be in the cable itself.
- 11M **Replace Last SRM Coax Interface Removed**— The node whose 50961 was just removed contains some defective hardware: either the 50961 coax adapter or the SRM interface. Replace the SRM interface and the coax adapter one at a time until the link works. (Execute the NODES command to test the replacement hardware.)
- 11N **Reconnect All Nodes to Link** —after fixing the fault and try the troubleshooting procedure again.
- 11P **Measure Resistance of Cable with No Nodes Attached**—If the fault is in the cable itself, it can usually be found by either DC or AC measurements. Disconnect all nodes from the link. With both terminators still in place, measure the DC resistance of the cable. Take the measurement between the center pin and the outer shield of a BNC T connector on the link. The resistance should be about 25 ohms (two 50-ohm terminators in parallel).
- 11Q **Is it Approximately 25 Ohms?**— If it is significantly higher than this, then one or both of the terminators are missing or there is a break somewhere in the cable. If it is significantly lower than this, then there is a short in the cable.
- 11R **Bisect Cable to Find Short or Open**—If there is an open or short, it can be found by bisecting the cable and measuring the DC resistance of each section. A cable section with a terminator at only one end should have a DC resistance of about 50 ohms. A DC resistance of about 0 ohms indicates a short, and a very high DC resistance indicates a break in the cable or a missing terminator.
- 11S **Fix the Fault**—in the cable by either replacing the defective section of the cable or replacing the old connector with a new one. (Most cable faults occur at the connectors.) After this has been done, start the troubleshooting procedure again.
- 11T **Use TDR to Find Fault in Cable** — If the DC resistance of the entire cable is close to 25 ohms, then the fault is not easily diagnosed with a DC ohmmeter. For diagnosing cable faults of this sort, use a Time Domain Reflectometer (TDR). When using a TDR, disconnect all nodes from the coax cable to avoid damage to the TDR. Follow the instructions which come with your unit to pinpoint the cable fault.

This chapter describes the messages which an SRM server generates. Most of the messages described here are error messages, but many are simply reporting important system events.

Normal output resulting from server input is detailed in the “Server Keyboard Functions and Commands” appendix.

System Errors

The following errors indicate a severe software or hardware fault. If any of these errors occur, contact an HP Systems Engineer at once. In general, the system should recover from such an error, but the system should be brought down and rebooted as soon as possible.

- Address error
- Bad argument to tasker
- Bus error
- Case statement error
- Check instruction
- Divide by zero
- Driver tasking error
- Illegal instruction
- Integer overflow
- Nil pointer dereference
- Stack overflow
- Value/subscript range
- 1010 opcode
- 1111 opcode

Backup/Restore Errors

In the event of an error or illegal condition occurring during the execution of a BACKUP or RESTORE command, the messages which appear indicate that the command execution has stopped at the point of error.

Device Errors

Certain errors may occur for any device type and normally occur when configuring a device into the system.

HP 98629/50962A/50963A Interface Card Errors

Error recovery is automatic for data link faults that apply to both 50962A/50963A and 98629 interface cards unless specified otherwise.

HP-IB/Disc Interface Card Errors

Error recovery is automatic for errors on HP-IB or disc interface cards unless specified otherwise.

Printer/Plotter Errors

Error recovery is automatic for a printer or plotter fault unless specified otherwise.

System Management Errors

The following errors reported by the system following a system status change indicate that the system requires more memory to perform the specified operation.

- Insufficient memory
- Out of buffers
- Out of semaphores

Message List

Ambiguous keyword - a server command was typed without enough characters to uniquely identify the command (e.g. HE instead of HEADER or HELP).

ASCII record too long - This message means that the ASCII file being read contains a record that is legal, but is too long for the SRM system to deal with.

Either do not use this file, or change it so that offending records are shorter.

(Backup filename) aborted by user - This indicates that the last backup operation was aborted by a user. This is just an informational message.

(Backup filename) aborted due to error(s) - This indicates that the last backup operation was aborted due to some fatal error.

Look at the log file to determine what error occurred and correct its cause. Redo the operation.

(Backup filename) backing up file/dir # XXXXX - This indicates how many files the backup operation has backed up so far. This is just an informational message that lets you check a backup's progress over time.

(Backup filename) completed with error(s) - This indicates that the last backup operation completed with 1 or more errors.

Look at the log file to determine what errors occurred and correct their cause. After noting what occurred you may want to redo the operation.

(Backup filename) completed without errors - This indicates that the last backup operation completed without any errors. This is just an informational message.

(Backup filename) needs media in ALL devices - The current backup operation needs new media in ALL the devices being used for this backup operation.

Load new media into ALL of the backup devices and continue the backup operation.

Backup needs medium in device sc,ba,du - The current backup operation needs new medium in the device sc,ba,du.

Load a new medium into the device sc,ba,du and continue the backup operation with the BACKUP CONTINUE command.

Backup operation must be aborted first - This message is in response to a SYSTEM DOWN or a VOLUME DOWN command that involves a volume being used in a backup operation.

Wait until the backup completes or abort the backup operation.

Backup or restore already in progress - This message is given in response to RESTORE EXECUTE or BACKUP EXECUTE when there is already a backup or restore in progress.

Abort the currently executing backup or restore, or wait for it to complete.

Backup/Restore abort requested - A user has requested that the current backup/restore operation be aborted. This is just an informational message.

Backup/Restore aborted due to error(s) on (date/time stamp) - The backup/restore operation was aborted due to some fatal error.

Look at the log file to determine the cause of the aborted operation and correct the cause. Redo the operation.

Backup/Restore aborted by user on (date/time stamp) - The backup/restore operation was aborted by a user. This is just an informational message.

Backup/Restore continue requested - A user has requested that the current backup/restore operation be continued after it was waiting for new medium. This is just an informational message.

Backup/Restore log file error - The log file /BACKUP_RESTORE/TEMP_FILES/CURRENT_LOGFILE had a failure of some kind in an open, close, read or write operation to it.

Look at the message on the scrolling screen to determine the cause of the error and correct the condition. Redo the operation.

Backup/Restore running - This indicates that a backup/restore operation has just started to run and hasn't backed up/restored any files yet. This is just an informational message.

Backup/Restore completed with no errors on (date/time stamp) - The backup/restore operation completed without any errors. This is just an informational message.

Backup/Restore completed with 1 error on (date/time stamp) - The backup/restore operation completed with one error.

Look at the log file to determine the cause of the error in the operation and correct its cause. After noting what occurred you may want to redo the operation.

Backup/Restore completed with XX errors on (date/time stamp) - The backup/restore operation completed with multiple errors.

Look at the log file to determine the cause of the errors and correct their cause. After noting what occurred you may want to redo the operation.

Backup/restore of path failed - The backup or restore of a file or directory failed.

Check the log file for the reason that path failed, remedy the cause and try the backup/restore operation again.

Backup/Restore startup failed - A backup/restore operation failed during its startup procedure.

Look at the message indicating why the startup failed and correct the cause of the problem. Redo the operation.

Backup/restore volume not online - The volume is being backed up to or restore from is not on-line.

Make sure (with the VOLUMES command) that the volume being backed up or restored to is in the on-line volumes list.

Backup/Restore volume validation failed - The SDF volume that was to be backed up from or restored to could not be validated.

Look at the message indicating why the validation of this volume failed and correct the cause of the problem. Redo the operation.

Backup schedule list full - There is not enough memory to hold any more entries in the list of scheduled backups.

Add more memory, or use the BACKUP SCHEDULE command to re-create the list.

Bad access code - An invalid access code was transmitted from a workstation. Access codes may be sequential or random, anything else is unacceptable. A reply is sent to the workstation containing the appropriate error code.

Bad ASCII file format - The format of the ASCII file being read (either a define file or the schedule file) is corrupt.

Do not use this file. Remove it and re-create it (using the appropriate command) if necessary.

Bad backup buffer file - SRM was improperly installed or /BACKUP_RESTORE/TEMP_FILES/BUFFER has been modified since installation.

Run the SRM Installation Utility again.

Bad backup file format - This message means that the backup file being read is not in the proper define file format.

Remove the file and use the BACKUP DEFINE command to re-create it.

Bad byte number - An illegal byte offset or byte position (probably negative) was specified.

Bad file ID - A file access request was made using a file identifier which is invalid. This usually occurs when the user attempts to access the SRM after it has been brought down and back up.

Bad file size - An invalid maximum file size (negative) was specified.

Bad packet - cannot transmit - This is an internal error indicating that the SRM system attempted to transmit an invalid packet. Should this occur, contact an HP Customer Engineer.

Bad request format - A request packet was received with one or more fields containing invalid data. A reply is sent to the workstation containing the appropriate error code.

Bad schedule file format - The schedule file is not in the proper schedule file format.

Use the BACKUP SCHEDULE command to re-create the file.

Base backup must back up all files - You tried to execute or schedule a base backup that is not defined to back up all files.

Use the BACKUP DEFINE command to change the backup file so that it specifies all files for backup.

Bringing up discs - this may take several minutes - This is displayed in the error window when the system activates the disc volumes during the initialization phase.

Bringing up volume - this may take several minutes - This is displayed in the error window when the system activates a disc volume after you give a VOLUME UP command.

Cannot access file - The user does not have permission to access the file.

Cannot back up to SDF disc - Only tapes and non-SDF (Structured Disc Format) discs are supported as backup devices.

Using BACKUP DEFINE, check to make sure that you have selected the right device and make sure that you have chosen a tape or non-SDF disc for each backup destination drive. If you are sure that you want to overwrite the SDF data on this disc, then connect it to a workstation and initialize it in LIF (Logical Interchange Format) first.

Cannot install from a fixed disc - You must specify a tape or micro flexible disc drive as the source device for the installation.

Check the device address and enter the address of a tape or micro flexible disc drive.

Cannot install without permission to initialize - If a disc has not previously been initialized to SRM format, it cannot be used at an SRM until this is done.

Make sure that there is no irreplaceable data on the disc, run the Installation Utility again, and answer affirmatively to the prompts about initializing the disc.

Cannot mix tape and floppy devices - Since you cannot switch devices in the middle of a restore, you cannot back up to incompatible devices.

Using BACKUP DEFINE, select a different list of backup devices that contains all tape or all micro flexible disc drives.

Cannot mount a volume on itself - A volume cannot be mounted on a directory on that same volume.

Cannot move directory - A create link request was made which attempted to move a directory to another position in the directory structure.

Cannot restore continuation file first - The medium that is currently loaded in the restore device cannot be restored from first.

Redo the restore operation and make sure that it begins with the medium that has media sequence number 1.

Cannot purge existing data file - A data file exists at a point in the directory structure where a directory needs to be installed by SRM.

Check this guide for the directory structure that is installed by SRM and purge or rename any files that conflict with what SRM uses.

Cannot purge existing directory - A directory exists at a point in the directory structure where a data file needs to be installed by SRM.

Check this guide for the directory structure that is installed by SRM and purge or rename any files that conflict with what SRM uses.

Change over to medium #X failed - During a backup/restore operation the changeover to medium #X failed.

Look at the message indicating why the changeover to this medium failed and correct the cause of the problem. Redo the operation.

Change over to medium #X succeeded - This indicates when a changeover to a different backup/restore medium succeeded. This is just an informational message.

Changing over to medium number # - This is an informational message indicating that a changeover to a different backup/restore device is in progress.

Closed Backup/Restore device sc,ba,du - This indicates when a backup/restore device is closed during a backup/restore operation. This is just an informational message.

Close of Backup/Restore device sc,ba,du failed - The close of backup/restore device sc,ba,du failed during a backup/restore operation.

Look at the message indicating why the close failed and correct the cause of the problem. Redo the operation.

Close or purge of duplinked files directory failed - The close or purge of the file /DUPLINK_DIR on the volume being restored to failed.

Look at the message indicating why the close or purge of this directory failed and correct the cause of the problem. Redo the operation.

Configuration error on select code - An error occurred when attempting to configure an interface card. The error condition is displayed following this message.

Configuration file needs to be updated - The system's configuration file was created by an incompatible version of the SRM Operating System.

Using the NAME command, reassign all workstation names. Using the SPOOLER ADD command, recreate all spooler directories. Then save the configuration with the SAVE_CONFIGURATION command.

Copy of path list file failed - The copy of the pathlist file /BACKUP_RESTORE/TEMP_FILES/PATHLIST to or from a backup/restore medium failed.

Look at the message indicating why the copy of this file failed and correct the cause of the problem. Redo the operation.

Data error - Unrecoverable data was read from the disc or backup medium.

Verify the disc to check for bad areas and to possibly spare them.

Data error at block XXXXX on Backup/Restore device sc,ba,du - A data error has occurred during a read/write operation to/from device sc,ba,du.

Backup: replace the suspect medium and do the backup operation again.

Restore: restore will automatically get as much data from the medium as possible. After the restore is done, check the file on which that data error occurred to insure that the file is usable. (The file probably will be truncated.)

Data error at block# XXXXX on Backup/Restore SDF volume - A data error has occurred during a read/write operation to/from the SDF volume being backed up/restored.

Do the following:

1. Use the VERIFY command to determine which volume caused the error. The volume on which the error occurred can be either the SRM system disc, the source volume for a backup (may also be the SRM system disc), or the destination volume for a restore (may also be the SRM system disc).
2. Use the VERIFY command again to find out which blocks on the volume are bad. Write down the bad blocks that the VERIFY command reports and spare them if you can.

If the VERIFY command identifies 100 or more bad blocks, and you have several full system backups you can restore from, do the following (instead of performing steps 3 through 7 in this procedure):

- If the volume is the SRM system disc, use the SRM Installation Utility to reinitialize the disc and re-install the SRM Operating System. Then restore the disc's entire file system (by completely restoring the last full backup and the last incremental backup). As a final check, you may want to perform step 6 of this procedure.
 - If the volume is **NOT** the SRM system disc, use the INITIALIZE command to reinitialize the volume, and then restore its entire file system (by completely restoring the last full backup and the last incremental backup). As a final check, you may want to perform step 6 of this procedure.
3. (Optional) Use the VERIFY command again to verify that the first instance of the command successfully spared any bad blocks.
 4. Take the system down and run the Disc Check Utility to determine which files were affected by the bad blocks on the volume. (Upon starting the Disc Check Utility, you must specify the bad blocks found by the VERIFY command.) Write down the paths of the affected files.
 5. Run the Disc Check Utility (again) and allow it to correct the problems on the disc (by writing on the disc).

6. (Optional) Run the Disc Check Utility (again) to verify that the volume is fixed (has a consistent file system).
7. Restore the files that the Disc Check Utility identified in step 3 as affected by the bad blocks on the volume. Restore these files from your most recent backup.

Data error on unknown Backup/Restore device - A data error has occurred during a read/write operation. The backup/restore was unable to determine which device caused the error.

Use the VERIFY command to determine which device caused the error. The device on which the error occurred can be either the SRM system disc, the source volume or destination drive(s) for a backup, or the source drive or destination volume for a restore.

- If the device that caused the error is a disc volume, perform steps 2 through 7 under the preceding error message, **Data error at block# XXXXX on Backup/Restore SDF volume**.
- If the device that caused the error is a removable medium, do one of the following:
 - Backup: replace the suspect medium and do the backup operation again.
 - Restore: restore will automatically get as much data from the medium as possible. After the restore is done, check the file on which that data error occurred to insure that it is usable. The file probably will be truncated.

Deadlock detected - A file lock request was given which, if performed, would cause a deadlock in the file system.

Determine which workstation is causing the deadlock and cancel one of the file lock requests.

Device absent or not configured - An attempt was made to reference a device that is not on the bus or has not been configured.

Device driver access timeout - This is an internal error implying that a task was unable to gain access to the device driver in the allotted time. Should this occur, contact an HP Customer Engineer.

Device driver timeout - This is an internal error caused when the device driver failed to complete an operation in the allotted time. This should not normally occur.

Device drivers do not match - The device driver specified in the volume specifier does not match the current device driver being used for the volume.

Device error - An unknown error occurred with the disc. Should this occur, contact an HP Customer Engineer.

Device list is full - In the BACKUP DEFINE command, the list of destination devices is full. No remedy.

Dir catalog error: (error message describing what failed)

/PATH/THAT/FAILED - The catalog of a directory being backed up failed.

Run the Disc Check Utility and allow it to write on the disc that the catalog failed on. Redo the backup operation. If the problem persists contact an HP Customer Engineer.

Directory not backed up:

/BACKUP_RESTORE/TEMP_FILES - This is a warning that the backup operation's scratch directory was not backed up. This is normal behavior. The backup operation's scratch directory is never backed up.

Directory not empty - This error occurs if an attempt is made to purge a directory that is not empty.

Directory structure too deep - The directory structure that you are trying to back up or that the Disc Check Utility is trying to check is more than 30 levels deep.

Modify your directory structure so that all paths name no more than 30 directories or files (including the root).

Disc or tape controller error - The controller of the disc or tape indicated a fault. This indicates that the disc or tape hardware is in error.

Disc or tape diagnostic error - The disc or tape has failed a diagnostic test. The disc or tape hardware should be checked.

Disc drive error - The disc unit indicated a fault. This can either indicate a drive failure or a media failure.

Disc or tape failure - Disc or tape did not return extended status message correctly. This is a fatal error and indicates a hardware problem with the disc or tape.

Disc or tape powerfail or media change - The disc or tape has powered up. This generally will not be seen since all disc or tape operations are retried if the error is of a certain class (e.g. powerfail). This also may occur if you remove a backup medium during a backup or restore operation.

Disc <-> removable medium copy error - This may happen when a backup is copying to, or a restore is copying from, a tape drive that is on the same controller (is accessed through the same HP-IB port) as the SRM system disc.

Backup: Redo the backup operation using a different tape. If the problem persists, the tape drive may be defective.

Restore: Redo the restore operation and avoid restoring the file on which the error occurred.

Disc or tape uninitialized - The disc or tape medium has not been formatted or is unusable. Try to format the disc. If the operation fails, the medium is bad.

Discs must be connected to the high-speed HP-IB - There are discs on the system connected to the low-speed HP-IB interface. Discs and tape drives are not allowed on the low-speed HP-IB interface. Bring the system down, turn off the power, and reconfigure the discs correctly on the high-speed HP-IB interface and bring the system up again.

Disc write error on <volume name> block <nn> - An error occurred while writing data to a disc volume. This message is followed by a second message. Look up the second message in this chapter and follow the instructions. Since the file system is often corrupted after this type of error, use the Disk Check Utility to find out which file contains the block address shown in the above message and to repair the damage.

Dispatcher Failure <nn>, <nn> - The numbers following the error message are the ioresult and the escapecode. The packet dispatcher task failed. The system is unable to recover from this error. This failure should be reported to an HP Customer Engineer.

Duplicate passwords - An attempt was made to assign a password to a file with an existing password by that name.

Duplicate volume names - An attempt was made to access an SRM disc volume by name when more than one volume by that name is up.

Duplinked file modified after its backup

Data for the following file is suspect:

/PATH/OF/MODIFIED/DUPLINK/FILE - A file with duplicate links to it was modified after its initial backup and before all links to it were backed up.

Schedule or execute backup operations to take place during periods of low usage.

Duplink file modified after restore - A file with duplicate links to it was restored and was modified before all links to the file were restored.

Do not modify files with duplicate links to them during the restore operation.

End of physical vol - The system attempted to write past the physical end of a medium. This should never happen. If it does, contact an HP System Engineer.

EOF encountered - A request was made which caused the file system to read past the logical end of file.

Error closing spool file for device <nn>, <nn> - The numbers displayed in the error message are the select code and the bus address of the plotter. An error occurred when closing the specified file. This should not normally occur. The actual file system error will be printed following this message.

Error detected during creation of (path) - An error occurred while one of the SRM system files was being installed. Refer to the other error messages printed to determine the action to take.

Error during system cleanup: - If the system is unable to close all the files and update any disc volumes, this message is displayed. This is normally due to removing a volume without bringing the volume down first.

Error opening spool file for device <nn>,<nn> - The numbers displayed in the error message are the select code and the bus address of the plotter. An error occurred when opening the specified file. This should not normally occur. The actual file system error will be printed following this message.

Error reading configuration file - An error occurred when reading the system configuration file. The actual error condition is displayed following this message.

Error reading mount file - An error occurred while reading data from /SYSTEMS/MOUNT_SRM. This message is followed by a second message. Look up the second message and follow the instructions. Usually the mount file has been changed, or there is a hardware or corruption problem with the disc. Do not edit a mount file directly. Always use the MOUNT or UNMOUNT command to change this file. If needed, use the Disc Check Utility to verify whether the disc is corrupted.

Error reading spool file for device <nn>, <nn> - The numbers displayed in the error message are the select code and the bus address of the plotter. An error occurred when reading the specified file. This should not normally occur. The actual file system error will be printed following this message.

Error saving configuration file - An error occurred when saving the system configuration file. The actual error condition is displayed following this message.

Error writing mount file - An error occurred while writing data to /SYSTEMS/MOUNT_SRM. This message is followed by a second message. Look up the second message and follow the instructions. There may be a hardware or corruption problem with the disc. If needed, use the Disc Check Utility to verify whether the disc is corrupted.

Execution terminated - This message is displayed following a system failure.

Expected device address specifier - A device address specifier was expected in the specified field.

Expected end of line - A server command was entered with more information than expected.

Expected integer value - A number was expected in the specified field.

Expected letter - A letter was expected near the indicated position in the input line. Enter a letter.

Expected name - A file, directory, or volume name was expected near the indicated position in the input line. Enter a name.

Expected userid - A userid was expected in the specified field.

Fatal Backup/Restore Error: (error message) - A fatal backup or restore error has occurred. This kind of error terminates a backup or restore operation.

Correct the cause of the error and redo the operation.

*****FATAL ERROR while moving extent. *****

*****Disc may be corrupt. Run DSCK. ***** - A severe problem, such as a disc failure, was encountered during the 'collecting free space' phase of the installation.

Run the Disc Check Utility to determine if any damage was done and to repair any such damage.

File Attribute file corrupt – run DSCK Utility - The file attribute file for that volume contains illegal or conflicting information.

Run the Disc Check Utility to check and repair that volume as soon as possible.

File Attribute file full - The request could not be satisfied because another file information record could not be added to the file attribute file for the volume.

File Backup/Restore error: /PATH/OF/FILE/THAT/HAD/ERROR - The file specified in /PATH/OF/FILE/THAT/HAD/ERROR was unable to be backed up or restored for the following reason.

Look at the message indicating why the file could not be backed up or restored and correct the cause of the problem. Redo the operation.

File has more passwords than can be backed up - Only 40 passwords can be backed up for any one file, but the file's data was completely backed up.

Go to a workstation and delete some of the passwords for this file.

File in use - The request cannot be performed because the designated file is open or in use at the current time.

File modified during its backup

Data for the following file is suspect:

/PATH/OF/MODIFIED/FILE - Some user modified the file while it was being backed up.

Try to insure that backup operations take place during periods of low usage.

File not directory - A directory operation was attempted on a data file.

File not found - An attempt was made to access a file which does not exist.

File not open - An attempt was made to access a file which is not open. This usually occurs when a user attempts to access the SRM after it has been brought down and back up.

HP-IB no response - A device did not indicate that it was operational within its allocated time. The response by the device is by parallel poll or service request.

HP-IB timeout - The HP-IB interface timed out. This is caused by some device not responding (due to power failure, a loose or faulty cable, etc.).

Illegal character in input line - A server command was typed with an unacceptable character.

Illegal day letters - This message is printed if illegal letters are entered to represent days of the week.

Enter the correct letters (SMTWHFA).

Illegal disc or tape address - Address to disc or tape was out of range. This should not occur since the user has no control over the address given to the disc or tape.

Illegal file, directory or volume name - This message is given when an illegal name is entered. Enter only legal names.

Illegal interrupt level - A 98625 card was set to the same interrupt level as some other interface card.

Turn off the computer's power and check all interface cards.

Illegal parameter to driver - This means that an illegal parameter was specified. This most commonly occurs when an unsupported device is connected to the system.

Illegal password - An illegal password (all blanks) was specified in a request.

Illegal path - The path entered is in illegal form.

Enter paths with correct formats.

Illegal time input - An illegal response to the TIME command was entered.

Incorrect device type or missing device - This message appears for either of two reasons:

- you attempt to give the UNIT ADD command and there is no device at the bus address specified, or
- a device is configured as one device type, but the physical device is different. This is caused by configuring a device, disconnecting it without removing the unit, and then reconnecting a different one.

Initializing..... - This message appears in the error window when a CS/80 volume is being initialized.

Illegal time input - An illegal response to the TIME command was entered.

Incorrect device type or missing device - This message appears for either of two reasons:

- you attempt to give the UNIT ADD command and there is no device at the bus address specified, or
- a device is configured as one device type, but the physical device is different. This is caused by configuring a device, disconnecting it without removing the unit, and then reconnecting a different one.

Initializing..... - This message appears in the error window when a CS/80 volume is being initialized.

Initializing backup medium - The backup is initializing a backup medium. Look for a lit activity light on a backup destination drive to see which medium is being initialized. This is just an informational message.

Input line too long - Too many characters were entered from the server. This usually occurs when a pathname is entered that overflows the available space.

Insufficient disc space - Not enough space on the volume could be allocated to satisfy the request.

Insufficient free space for installation - More free disc space is needed to install the SRM software.
Boot the old SRM system, go to a workstation, and delete enough files to get to the required amount of free space.

Insufficient memory to extend file table - There was not enough memory to extend the open file table.

Integer must be greater than zero - The integer value entered was 0. Enter a value larger than 0.

Integer value too large - An integer was entered which was too large to be processed.

Internal error - This error is for debugging purposes and should never occur in normal operation.

Invalid baud rate value - The baud rate entered is not one of the legal values. Choose from 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 2400, 4800, 9600, or 19200.

Invalid data bits value - The data bits value entered is not between 5 and 8.

Invalid device address specifier - The address of a mass storage device was entered incorrectly. Check this guide for proper syntax. Check bus address and unit number on device and re-enter.

Invalid file name - The operator attempted to configure a spooler with an unacceptable file name. This is usually caused by specifying the volume name or a path name instead of just a simple file name.

Invalid handshake - The handshake mode entered is not legal. Choose from XonXoff, Hardware, Both, or Neither.

Invalid LIF volume - The medium is not the one shipped with SRM or it is an improperly made copy of one of the shipped media. The medium's LIF directory may be too big (i.e. too many entries).

Make sure that you are using the medium that was shipped with the SRM software and make sure that any copies that you make are in LIF format and have 192 or fewer directory entries.

Invalid or corrupt backup medium - Medium was not made with SRM 3.0 or later backup, or medium was modified or damaged after the backup was done.

Using BACKUP DEFINE, check to make sure that you have the right medium and the right device address.

Invalid parity value - The parity mode entered is not legal. Enter odd, even, zero, one, or none.

Invalid record mode - A file operation was attempted which specified something other than a directory or data file.

Invalid select code - A select code was entered for which there was no corresponding interface card, or the select code entered does not reference an RS232 interface. Recheck the select code of the serial interface card.

Invalid spooler command - A spooler command was issued to a spooler which cannot accept that particular command. For example, someone attempted to take down a spooler which is already down.

Invalid SRM installation medium - The medium is not the one shipped with the SRM software or it has been damaged or improperly copied.

Make sure that you are using the proper medium or, if using a copy, make sure that all of the files were copied correctly.

Invalid stop bits value - The stop bits value entered is not legal. Enter 1 or 2. The stop bits value of 1.5 may only be used with 5 data bits. To specify 1.5 stop bits for a HP 98626 serial interface card, enter 2.

Invalid userid - The userid entered was syntactically incorrect.

Locked - retry later - A file operation was attempted to a locked file and rejected by the SRM system.

Media error on disc or tape - There has been a media fault on the disc or tape. There is no way to recover from this.

Medium not formatted - A medium was not formatted because too many bad blocks were spared. The medium should be checked. Also, if the medium is a disc, the hardware should be checked.

Mounted directory not backed up

/PATH/OF/MOUNTED/VOLUME - This is a warning that the directory of a mounted volume was not backed up.

To back up mounted volumes you must explicitly define and schedule (or execute) a backup operation for each mounted volume that you want backed up.

Must have at least one disc unit - The Installation Utility found only tapes or micro flexible discs and did not find any fixed discs.

Make sure that a supported fixed disc and a supported tape/micro flexible disc drive are connected and turned on prior to running the Installation Utility. Make sure that the busy light on any tape drive remains out for several seconds prior to running the Installation Utility.

Must have at least one Removable unit - The Installation Utility found only fixed discs and no tapes or micro flexible discs.

Make sure that a supported fixed disc and a supported tape/micro flexible disc drive are connected to the server. Make sure that these devices are properly connected and turned on prior to running the Installation Utility. Make sure that the busy light on any tape drive remains out for several seconds prior to running the Installation Utility.

Must have at least two CS80/SS80 units - The Installation Utility did not find the source and destination devices required.

Make sure that a supported fixed disc and a supported tape/micro flexible disc drive are connected to the server. Make sure that these devices are properly connected and turned on prior to running the Installation Utility. Make sure that the busy light on any tape drive remains out for several seconds prior to running the Installation Utility.

19200 not allowed for built-in RS232 of 50960 - The baud rate of 19200 is not supported for 50960A built-in RS232. You must specify a lower baud rate for this RS-232 port.

98625 at wrong interrupt level - must use 5 - The 98625 disc interface card must be at interrupt level 5. Bring the system down, turn off the power, and reconfigure the 98625 card with its interrupt level switches set correctly. Then power on the system and bring it up.

98626 at wrong interrupt level - must use 6 - The 98626 serial interface card must be at interrupt level 6. Bring the system down, turn off the power, and reconfigure the 98626 card with its interrupt level switches set correctly. Then power on the system and bring it up.

98629 or 50962 at wrong interrupt level - 98629 or 50962A interface cards must be set to interrupt level 4. To correct, turn off the computer's power and check the interface cards.

98629 or 50962 Bad register data - Internal error indicating data to a register of the 98629 or 50962A was out of range.

98629 or 50962 Bad register number - Internal error indicating the 98629/50962A register was out of range.

No backup is paused - This message is given in response to BACKUP CONTINUE when there is no backup operation in the paused state. No remedy.

No capability for operation - An attempt was made to access a volume or file without the proper access capability (e.g. renaming a volume without a valid volume password).

No memory for device driver - An attempt was made to configure a peripheral when the server does not have enough memory to do so.

This condition can be avoided by adding more memory to the server.

No memory for user requests, data loss possible - The datacomm buffer pool did not have enough buffers to handle incoming requests, and the unused memory in the system was insufficient to allow extension of the buffer pool. If the 98629 or 50962A card overflows before enough buffers become free, the card's data area will overflow and subsequent packets will be lost. In this case, the transmitting workstation should get an error.

This condition can be avoided by adding more memory to the server.

No reply - A packet was received for which no response was required. This may appear when using a trace function.

No restore executing - This message is given in response to a RESTORE ABORT command when there is no restore operation currently executing. No remedy.

No restore is paused - This message is given in response to RESTORE CONTINUE when there is no restore operation in the paused state. No remedy.

No spares available - No more spare tracks are available on the medium. This indicates that the medium is damaged beyond repair or there is a severe hardware problem with the mass storage device.

If the medium is removable, discard it. If the medium is a fixed disc, contact your HP Sales and Service office for assistance.

No such spooler - A command was issued to a spooler which does not exist.

No such subunit on device - The subunit specified for the device does not exist.

Specify a different subunit number.

Note: The autochanger may have a loaded another tape after the error(s) occurred. Check a previous tape. - An error may have occurred during a backup or restore on the previous tape. The tape autochanger may have unloaded this previous tape and then loaded another tape before the error message was noticed. Check a previous tape for the error.

No writing on directory - An attempt was made to write to a directory. Only the SRM file system may access the directories directly.

Not ASCII file - The file specified by the user is not an ASCII type file.

Specify an ASCII type file for BACKUP DEFINE and for RESTORE catalog listings.

Open file table full - The file or directory could not be opened because no more entries in the file id table were available.

Add more memory to the server.

Open of Backup/Restore device sc,ba,du failed - The open of a backup/restore device failed during a backup/restore operation.

Look at the message indicating why the open failed and correct the cause of the problem. Redo the operation.

Open of /BACKUP_RESTORE/TEMP_FILES failed - The open of the /BACKUP_RESTORE/TEMP_FILES directory failed.

Look at the message indicating why the open of this directory failed and correct the cause of the problem. Redo the operation.

Open of duplinked files directory failed - The open of the file /DUPLINK_DIR on the volume being restored to failed.

Look at the message indicating why the open of this directory failed and correct the cause of the problem. Redo the operation.

Open of relocation path failed - The open of the relocation directory path failed during a restore operation.

Look at the message indicating why the open of this directory failed and correct the cause of the problem. Redo the operation.

Opened Backup/Restore device sc,ba,du - This indicates when a backup/restore device is opened during a backup/restore operation. This is just an informational message.

Parity error - A memory board has detected corrupt data. This is usually caused by a hardware failure or an electrical disturbance such as lightning. Record any numbers or messages that are displayed with this message. Shut down the system as soon as possible and use the Disc Check Utility to check for disc corruption. If the problem persists after rebooting the system, replace the memory boards in the server, and eliminate any electrical disturbances on the power supply for the server.

Password expected - A password was expected in the specified field.

Password not found - A password was passed to the file system for a volume or file which was not in the protection table.

Password unterminated or too long - A password was entered without a trailing '>' character. Passwords may be sixteen characters or less.

Path list is full - In the BACKUP DEFINE command, the list of paths to back up is full.

Define another backup to back up the remaining paths, or choose some subset that will fit in the path list.

Path not a directory - Some part of a path that should be a directory is actually a file. (Example: /A/B/C is specified as a path to back up or restore and /A/B is a file instead of a directory).

Correct the specification of the path with the BACKUP DEFINE command or with the RESTORE EXECUTE command.

Path too long - The path entered as input was too long to be handled by the SRM.

Enter a path with fewer segments.

Path list file close failed - The close of the file /BACKUP_RESTORE/TEMP_FILES/PATHLIST on the system disc failed.

Look at the message indicating why the close of this file failed and correct the cause of the problem. Redo the operation.

Path list file open failed - The open of the file /BACKUP_RESTORE/TEMP_FILES/PATHLIST on the system disc failed.

Look at the message indicating why the open of this file failed and correct the cause of the problem. Redo the operation.

Path list read failed - The read of the pathlist file (which is on the system disc) failed during a restore operation.

Reinstall the SRM Operating System and try the restore operation again.

Path list write failed - A write to the pathlist file (which is on the system disc) failed during a backup operation.

Reinstall the SRM Operating System and try the operation again.

Pathname missing - A file request was made to the file system without a specified pathname.

Physical EOF reached - An attempt was made to read or write past the physical end of file. The physical end of file is the maximum size allowed for the file.

Plotter not in remote state - Plotter is not ready with paper loaded and in remote state.

Put the plotter into remote state.

Plotter out of paper - Plotter is using roll feed and is out of paper.

Put new paper in the plotter or use it without roll feed.

Printer failed self test - The printer has failed self test. There is a hardware fault in the printer.

Printer failure - Printer has indicated it is on-line but not ready for data.

Printer is off-line - The printer is off-line.

Putting the printer on-line will cause it to continue printing from where it left off.

Printer mechanism error - The printer mechanism is unable to move.

Check for obstructions around the core bar. The printer must be reset to correct this error. If the error is not correctable, the printer hardware is at fault.

Printer not cleared - Printer was not cleared by the driver. Should this occur, contact an HP Customer Engineer.

Printer not responding - The printer fails to respond to a mainframe request. Should this occur, contact an HP Customer Engineer.

Printer out of paper - The printer has run out of paper.

To allow printing to continue, reload paper into the printer. Set the top of form. Do NOT use reset. You must put the printer on-line after loading paper.

Printer overheat - The printer has overheated. This should not occur during normal operation.

Printer paper jam - Paper has jammed in the printer.

Reinsert the paper into the printer and set the top of form.

Printer parity error - The printer has detected a parity error on the HP-IB bus. This can be caused by bad cables, bad hardware, or loose cables.

Printer platen/ribbon error - Either the paper has jammed or the platen gate is open.

Printer powerfail - The printer had a power failure. This is caused by either power interruption or the printer being reset.

Printer read failure - The printer did not return the proper amount of data for a checkpoint when requested. This indicates either a printer fault or a cable fault.

Printer response incorrect - The printer returned with an unexpected response. Should this occur, contact an HP Customer Engineer.

Printer retry error - Printer did not respond on retries. Should this occur, contact an HP Customer Engineer.

Printer ribbon error - The printer ribbon has jammed in the mechanism. Either the ribbon was improperly inserted or is too worn to work.

Printer sequence error - The sequence number for communication to the printer was wrong. This can be caused by configuring a printer, using the printer elsewhere, and reconnecting the printer.

If it cannot be corrected by the spooler, turn the power off and then on again.

Purge of open file - An attempt was made to purge a file which is open by some user.

Read of next entry from pathlist file failed - The read of the next entry from the file /BACKUP_RESTORE/TEMP_FILES/PATHLIST failed.

Look at the message indicating why the read from this file failed and correct the cause of the problem. Redo the operation.

Read of volume's last backup date failed - The read of the last backup base date from the SDF volume being backed up failed.

Look at the message indicating why the read of the base date failed and correct the cause of the problem. Redo the operation.

Relocation path not a directory - The relocation path specified in a restore operation refers to a file rather than a directory.

Try the restore operation again, this time specifying a relocation path that either does not exist or refers to a directory.

Relocation path open failed - The relocation path specified in a restore operation could not be opened.

Close some files on the SRM and try the operation again.

Removable medium not ready - The tape or micro flexible disc drive is not ready. This could appear if the disc drive is not ready, but more generally applies to the tape drive.

Printer read failure - The printer did not return the proper amount of data for a checkpoint when requested. This indicates either a printer fault or a cable fault.

Printer response incorrect - The printer returned with an unexpected response. Should this occur, contact an HP Customer Engineer.

Printer retry error - Printer did not respond on retries. Should this occur, contact an HP Customer Engineer.

Printer ribbon error - The printer ribbon has jammed in the mechanism. Either the ribbon was improperly inserted or is too worn to work.

Printer sequence error - The sequence number for communication to the printer was wrong. This can be caused by configuring a printer, using the printer elsewhere, and reconnecting the printer.

If it cannot be corrected by the spooler, turn the power off and then on again.

Printers and Plotters must be on the low-speed HP-IB - Printers and plotters are not allowed to be connected to the high-speed HP-IB interface. Connect printers and plotters to the low-speed HP-IB interface at select code 7.

Purge of open file - An attempt was made to purge a file which is open by some user.

Read of next entry from pathlist file failed - The read of the next entry from the file /BACKUP_RESTORE/TEMP_FILES/PATHLIST failed.

Look at the message indicating why the read from this file failed and correct the cause of the problem. Redo the operation.

Read of volume's last backup date failed - The read of the last backup base date from the SDF volume being backed up failed.

Look at the message indicating why the read of the base date failed and correct the cause of the problem. Redo the operation.

Relocation path not a directory - The relocation path specified in a restore operation refers to a file rather than a directory.

Try the restore operation again, this time specifying a relocation path that either does not exist or refers to a directory.

Relocation path open failed - The relocation path specified in a restore operation could not be opened.

Close some files on the SRM and try the operation again.

Removable medium not ready - The tape or micro flexible disc drive is not ready. This could appear if the disc drive is not ready, but more generally applies to the tape drive.

Removable medium write protected - A write was attempted on a write-protected medium. A tape can be unprotected by turning the pointer away from SAFE. A micro flexible disc can be unprotected by sliding the black or red write protect tab toward the disc's shutter.

Restoring file/dir#XXXXXX - This indicates how many files the restore operation has restored so far. This is just an informational message.

Scheduled backup delayed until hh:mm am mm/dd/yy. - This indicates that a scheduled backup's execution must be delayed past its scheduled starting time. Backups are not allowed to start within 10 minutes of the completion of another backup or restore.

Sharing conflict - An attempt was made to open a file which is open exclusively, or to exclusively open a file which is already open. This error can occur during a backup when a file that is locked or opened exclusively was to be backed up. This error can happen during a restore when the file to be overwritten by the restore is open.

Software checksum failure - The software copied into memory by the boot process is corrupt. Following are possible causes:

- The system was copied from a damaged or defective tape, diskette, or disc. Repair or replace the medium and re-install, if necessary.
- If this error occurs when booting **SYSTEM_SRM**, the system disc may be corrupt. Run the Disc Check Utility and re-install.
- The tape or disc drive may be defective or in need of maintenance. Try booting from a different drive.
- A system hardware failure may have occurred, such as a defective memory board or interface card.

Spooled device not found on address <nn>,<nn> - The numbers following the error message are the select code and the bus address searched. This message is displayed when the configuration file is read and no device is found corresponding to a configured spooler.

Spooled plotter at address <nn>,<nn> requires setup - The numbers displayed in the error message are the select code and the bus address of the plotter. A spooled plotter has a file ready for spooling.

Prepare the plotter and issue a **SPOOLER CONTINUE** command.

Spooler busy - This message is issued when a spooler can no longer accept server commands. Spooler commands are queued and acted on when the device task can accept commands. When the spool command queue is overflowed, this message is issued and the command rejected.

Spooler configured on unit - An attempt was made to delete a unit which has a configured spooler.

Spooler is already configured - An attempt was made to configure a spooler to a device which already has a configured spooler.

Spooler is not down - A command was issued to a spooler which required the spooler to be in the down state. This normally occurs when a SPOOLER UP command was issued to a spooler in the “held” or “errored” state.

Spooler may not be continued - A SPOOL CONTINUE command was issued to a spooler which is not in the “held” or “errored” state.

Spooler <nn>,<nn> error: - A device error occurred on the specified device. The actual error is displayed following the above message.

Correct the condition and issue a SPOOLER CONTINUE command.

Spooler <nn>,<nn> is offline - The specified printer is off-line.

To correct, turn the printer online. DO NOT RESET THE PRINTER.

Spooler <nn>,<nn> is out of paper - The specified printer is out of paper.

To correct, insert new paper, ensuring that the new paper is in the same position that the printer left the old paper. DO NOT RESET THE PRINTER.

Spooler <nn>,<nn> spooling <file> - The specified spooler is spooling the named file.

Spooler out of memory - This error may occur during spooling or during the execution of a spooler command. It means that there is insufficient memory for the spooler to complete the spooling operation or spooler command (such as SPOOLER CONTINUE, SPOOLER DELETE). The server needs additional memory to support the current configuration. If this error occurs regularly, do **NOT** use the SRM spoolers until you install more memory in the server, or else further memory problems may arise. (For example, if this error occurs for a SPOOLER DELETE command, certain RAM structures are not de-allocated when the spooler is deleted, and you have to reboot the server to reuse this RAM space.)

The only remedy is to install additional memory in the server.

System down - A file system request was made when the SRM system was in the down state.

System error (configuration) - The configuration/spooler task encountered a system error. The error message will follow this message. The system will normally recover from this condition without problems, but the server information and the conditions under which it occurred should be reported to an HP Customer Engineer.

System execution terminated - This message is displayed following a system failure.

SYSTEM FAILURE <nn>,<nn> - The numbers displayed are the ioreult and the escapecode. This is displayed on the server if the system fails completely at any point. If the problem occurs during initialization and is due to insufficient memory, the only fix is to add more memory cards. Any other error should be reported to an HP Customer Engineer. The system is unable to recover from this error.

System file not backed up: /SYSTEMS/SYSTEM_SRM - This is a warning that the installed system file on the system disc was not backed up. This is normal behavior. The installed system file on the system disc is never backed up.

System must be up - A server command was issued which requires the system to be up.

System volume must be up - This message means that the system volume must be up before the command or the scheduled backup can execute.

Use the VOLUME UP command to bring up the system volume and try again.

Tape drive error - The tape drive indicated a fault. This can indicate either a drive failure or a media failure.

Task # xx failure <userid> - A packet task failed. The system is unable to recover from this error. Should this occur, contact an HP Customer Engineer.

This file name may be illegal on some workstations - You entered a filename that contains one of the following illegal characters: null, blank (), comma (,), greater than (>), or double quote ("). Make sure you have entered the correct filename. Do not use an illegal character if you need to access a file from a workstation that does not allow these characters in paths.

Unable to start configuration task - This indicates that the system was unable to start the configuration spooler task during the initialization phase. This is always due to insufficient memory.

Unable to purge spooler directory - The system was unable to purge the spooler directory when a SPOOLER DELETE command was issued. This usually occurs because the directory was not empty. The actual error will be printed after this message. The spooler will be deleted anyway, and you will have to delete the directory from a workstation yourself.

Uninitialized block or EOT on removable medium - This indicates that (1) a removable medium is unformatted or is excessively worn - try reinitializing the medium or replace it with a new, initialized one, or (2) SRM cannot read tapes with an EOT (End of Tape) mark in block 0. Reinitialize the tape or replace it with a new, initialized one.

Unit is not a disc - The server command just issued applies only to disc volumes.

Update of volume's last backup date failed - The update of the base backup date of the SDF volume being backed up failed.

Look at the message indicating why the update of the base date failed and correct the cause of the problem. Redo the operation.

Unrecognized directory format - The disc format on the specified mass storage medium is not recognized by the SRM. The SRM recognizes the SDF format only.

Unrecognized keyword - An unrecognized server command was just issued.

Unrecognized request - An unrecognized request type was received from a workstation. This is generally caused by a workstation transmitting packets that are not in a recognized request format. A reply is sent the workstation containing the appropriate error code.

Unsupported configuration - This message alerts you to an unsupported hardware installation. The specific problem is displayed on the monitor above this message. If no specific message accompanies this message, review your configuration and see that it meets system requirements.

Unsupported directory operation - An attempt was made to perform an operation that is not allowed for directories (such as copy).

Unsupported mass storage device - The physical record size of the mass storage device is too large to be used with the SRM cache buffer mechanism. Should this occur, contact an HP Customer Engineer.

Unsupported request - The file system request is not supported in the current version.

User selected path not found - A file specified to be backed up was not found on the volume being backed up. Or, a file specified to be restored was not found on the media of the restore operation.

Check the name of the file specified to be backed up or restored and try the operation again.

Verifying... - This message appears in the error window when a volume is being verified.

Verifying backup medium - The backup is insuring that what it wrote to the backup medium is readable. Look for a lit activity light on each backup destination device to see which medium is being verified. This is just an information message.

Volume already mounted - A mount request was issued for a volume which is already mounted.

Volume in use - A request was issued which requires the volume to be down. This is usually caused by an attempt to initialize a volume which is up.

Volume is not mounted - An attempt was made to unmount a volume which is not mounted.

Volume labels do not match - The (non-blank) volume label given in the volume specifier does not match the label on the volume addressed.

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Server Keyboard Functions and Commands

A

This appendix contains information covering:

- special keyboard functions
- server command syntax conventions, and
- server commands.

The first section describes useful keyboard functions such as “Recall,” “Clear Screen,” and “Print All” ON/OFF.

The second section provides important guidelines for using the SRM server commands.

The third section lists the server commands with syntax diagrams, examples, and descriptions. These commands are **NOT** available from user workstations.

Special Keyboard Functions

The SRM system supports the use of three different HP keyboards: the HP 46020A/46021A, the HP 98203A, and the HP 98203B. The HP 46020A/46021A’s special function keys for SRM are listed first below. For the HP 98203A and B, most of the key labels are the same and are listed second below.

Clear I/O

This keyboard function reconfigures the default printer and should be used if the “Dump Alpha” or “Print All” keys do not work. Also, it aborts any disc or tape operation currently in progress if pressed twice in less than a half second.

Caution

Disc or tape operation should be aborted with extreme care as a corrupt volume could result when workstation users are writing data to it.

Key: Stop or
CLR I/O

Response: -none-

Clear Screen

This keyboard function clears the server's screen by rolling the current bottom line off the top of the screen.

Key: `Clear display` or
`CLR SCR`

Response: -screen is cleared-

To erase the entire screen buffer, hold down `CTRL` while you press the `Clear display` or `CLR SCR` key.

Dump Alpha

This keyboard function sends the current screen image to the default printer (printer with the lowest bus address).

Keyboard: `Shift-f6` or
`DUMP ALPHA`

Response: -screen image is sent to printer-

Print All

This keyboard function sends messages that appear on the server's scrolling screen to the default printer (printer with the lowest bus address or serial printer at the lowest select code if there is no HP-IB printer). The key toggles the function between the "ON" and "OFF" states.

Key: `Print` (`Shift-Enter`) or
`PRT ALL`

Response: Printall ON
or
Printall OFF

Recall

This keyboard function redisplay a previously entered command. The recall buffer is about 400 characters long (the recall line length is the number of characters in the line plus a one character delimiter).

Key: `f2` or
`RECALL`

Response: -last command entered-

To move forward through the list of previous commands, hold down the `Shift` or `SHIFT` key while pressing `f2` or `RECALL`.

To clear the recall buffer, hold down the `CTRL` key while pressing `Shift-f2` or `SHIFT-RECALL`.

Enable/Disable User Request Trace

This keyboard function turns on or off the user request trace.

Key: f8 or
k9

Response: Request trace on
or
Request trace off

Server Command Syntax Conventions

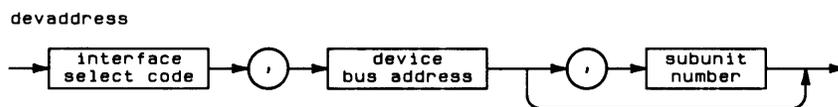
The following notational conventions are used in the command descriptions:

- Command keywords are shown in upper case even though keywords in lower case are also recognized. In other words, `TIME`, `time`, and `TiMe` are all valid.
- Using enough letters of a command keyword to uniquely identify it is all that is required. (A list appears with the `HELP` command description.)
- A `?` following a command keyword displays the syntax for that command.
- Two arguments separated by a vertical line (`|`) means that either of the arguments may be used.
- Arguments shown in brackets (`[]`) are optional.
- Optional arguments that appear in braces (`{ }`) may be repeated any number of times.

The following items describe user-defined parameters in the command sequences.

devaddress

A device address is used to specify an HP-IB device.



Item	Description/Default	Range Restrictions
interface select code	integer constant	7 thru 31
device bus address	integer constant	0 thru 29
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14

Semantics

The HP-IB select code range is 8 thru 31 for all mass storage devices.

Note

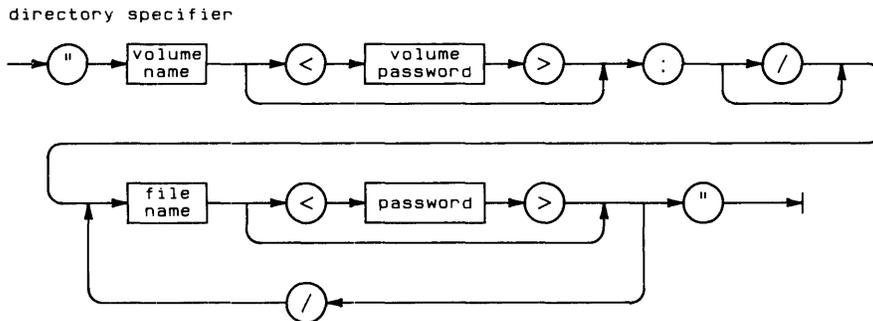
The select code of the built-in disc interface of the HP 50960A is 8. The select code of the HP 98625A Disc Interface used in the Model 220 and Model 226 is typically 14.

For printers and plotters, the HP-IB select code is 7.

Note that if no subunit number is specified, a default value of zero is used.

directory specifier

A directory specifier is used to describe a file or a directory on an SRM disc volume.



Item	Description/Default	Range Restrictions
volume name	string expression (1 thru 16 characters)	<, : and / not allowed
volume password	string expression (1 thru 16 characters)	> not allowed
file name	string expression (1 thru 16 characters)	<, : and / not allowed
file password	string expression (1 thru 16 characters)	> not allowed

root password

The root password is the password for the root level directory for the volume.



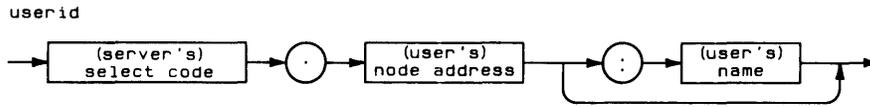
Item	Description/Default	Range Restrictions
root password	string expression (1 thru 16 characters)	> not allowed

Semantics

The root password controls access to the root directory and prevents workstation users from creating many files there, which can degrade system performance.

userid

A userid uniquely identifies a user on the SRM system.



Item	Description/Default	Range Restrictions
(server's) select code	integer constant	8 thru 31
(user's) node address	integer constant	0 thru 63
(user's) name	string expression (1 thru 10 characters)	name associated with sc.node user

Semantics

The "server's select code" refers to the select code set in switches on the HP 50962A SRM Coax Interface or the HP 98629 Resource Management Interface. If the server has more than one resource management interface, use the select code of the interface to which the user is connected.

If you attempt to enter a name containing more than 10 characters, the system truncates the name to 10 characters.

volspec

A volspec is used to specify an SRM volume.



Item	Description/Default	Range Restrictions
volume name	string expression (1 thru 16 characters)	<, : and / not allowed
volume password	string expression (1 thru 16 characters)	> not allowed

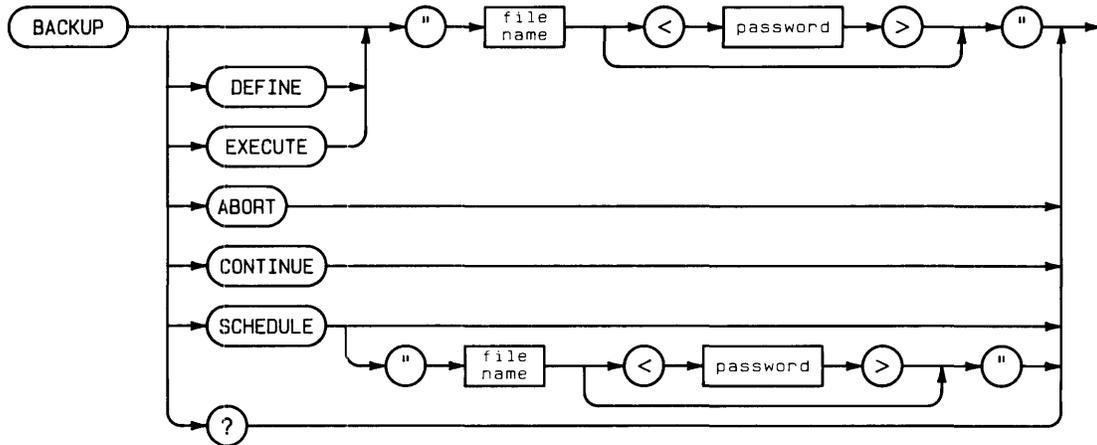
Semantics

Any blanks found immediately after the right angle bracket (>) are ignored, but any characters (including blanks) occurring after the colon are treated as legal file name characters.

Server Commands

BACKUP

The various forms of this command define, change, or display the scope of a backup, start a backup, stop a backup, resume a backup, specify when and how often the system is to start a backup automatically, or list the current schedule of automatic backups.



Item	Description/Default	Range Restrictions
file name	string expression (1 thru 16 characters)	<, : and / not allowed
password	string expression (1 thru 16 characters)	> not allowed

Example Command

```
BACKUP DEFINE "all_files<BKPpass>"
```

Response

```
1 Jun 86      1:21:22 PM
Backup define started
```

If you type in:

```
BACKUP SCHEDULE
```

you get something that resembles:

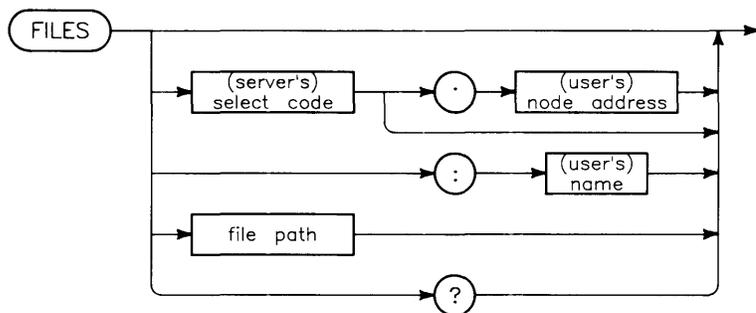
```
-----Scheduled Backups-----
Backup File  Type Days  Int  Time  Next Exe
-----
Dynamic_Files  Base S      1  4:00 AM  8/17/86
Dynamic_Files  Incr MTWHF   1  4:00 AM  8/18/86
Static_Files   Copy      A  4  4:00 AM  9/13/86
```

Semantics

- DEFINE** This command prompts you for the values that specify what you want to back up and to where you want to copy it. This command then automatically creates a backup file containing these values in the SRM system disc's /BACKUP_RESTORE/BACKUP_FILES directory. If the file already exists, this command allows you to view and modify the values in that file.
- EXECUTE** This command allows you to specify the type of backup you want to start and then starts the backup. The backup's scope is defined by the (existing) backup file name you give. The EXECUTE keyword is optional.
- ABORT** This command stops a backup in progress.
- CONTINUE** This command resumes a backup that paused in need of one or more additional media to copy to. Use this command after you have replaced any full media with new ones.
- SCHEDULE** If the SRM system has on-line backup and restore, this command allows you to specify the type of backup you want the system to start automatically and the schedule on which you want the system to repeat the backup. This command also allows you to remove backups from an automatic startup schedule. The BACKUP SCHEDULE command alone shows the next date and time that every scheduled backup starts.

FILES

This command is used to list the names of all open files and the names of the users who have the files open. The FILES command can also be used to list all workstations that have a specified file open.



Item	Description/Default	Range Restrictions
(server's) code	integer constant	8 thru 31
(user's) node address	integer constant	0 thru 63
(user's) name	string expression (1 thru 10 characters)	name associated with sc.nd user
file path	directory specifier	see "directory specifier" section earlier in this appendix

Example Command

```
FILES : Joe
```

Response

```
1 Jun 83 8:52:20 AM
-----Open Files-----
 _user_      volume      name of file      open
sc nd       name        or directory      mode
-----
21.11 MYFILE1      Document          EXC
21.11 VOLUME4      FORMATTER         DIR
21.11 SMITH      Utilities         LOCKED
21.11 BOB2       MISC              SHARED
21.11 VOLUME4      REPORTS           MYLOCK
```

Semantics

FILES lists file and directory names; entire directory specifiers are not shown. If you don't include a user name, this command lists all files open in the system. Otherwise, it will display the files open for the specified user.

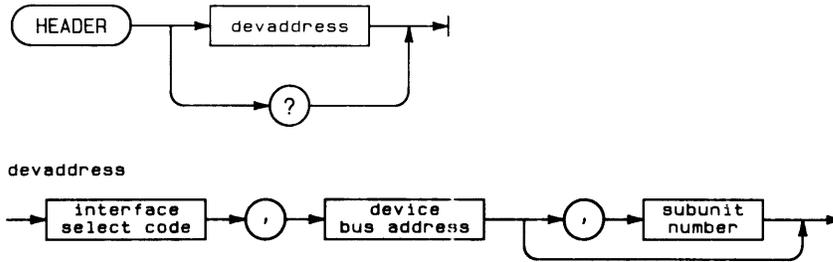
If the select code is specified without the node, all files open to users on that select code are shown.

A file may have any of five open modes:

1. DIR—The file is an SRM directory. Note that only directories can be open in the DIR mode.
2. EXC—The file is open for exclusive use by one particular user. No other user can gain access to the file.
3. LOCKED—The file may be opened by more than one user. However, the user who locked the file has sole access to the file until the file is unlocked.
4. MYLOCK—The file may be opened by more than one user. However, the user identified by MYLOCK has sole access to the file until the file is unlocked.
5. SHARED—The file is open and accessible to more than one user.

HEADER

Use this command to view the volume header of a mass storage disc.



Item	Description/Default	Range Restrictions
devaddress	integer constant	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14

Example Command

```
HEADER 14,0,0
```

Response

```

15 Jun 83  8:52:20 AM
-----Volume Header-----
Volume name:      InterAccounts
Creation date:    13 May 83  10:15:43 AM
Bytes per block:  256
Size:             132120567 bytes
Last base backup: 1 Jun 83  12:45:16 PM
  
```

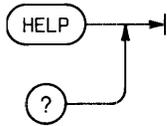
Semantics

If the volume is an SDF type volume, then the information contained in the header is displayed.

HEADER may be executed with the volume up or down.

HELP

This command displays a list of the console commands.



Example Command

```
HELP
```

Response

Note

The commands shown in the display depend on which system the server is running.

```
1 Jun 83  8:52:20 AM
-----SRM Commands-----
BACKup      Files      HEAder
HELp        INItialize
INTErfaces  Mount     NAme
NODes       REAd_configuration  REMove_user
REName      RESEt     REStore
SAve_configuration  SPooler   SYstem
TIme        TRace     UNIts
UNMOUNT     USers    VErify
VOLumes     ?        *
```

A "?" following a command keyword will display the syntax for that command. For complete command details refer to the SRM System Manager's Guide.

Semantics

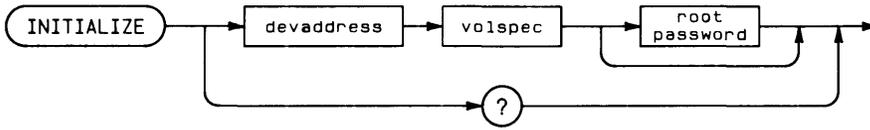
More detailed information for a specific command can be obtained on the console by typing a question mark after the keyword.

Capitalized portions of commands in the help text indicate the shortest sequence of letters you could type to identify the given command.

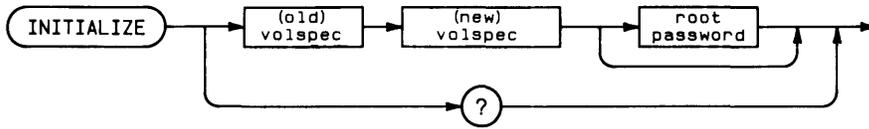
INITIALIZE

This command initializes or re-initializes a mass storage device.

first time initialization



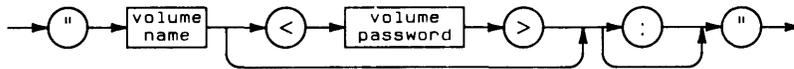
subsequent initializations



devaddress



volspec



root password



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
volspec	literal expression	(see beginning of this chapter)
root password	literal expression	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14
volume name	string expression (1 thru 16 characters)	<, : and / not allowed
volume password	string expression (1 thru 16 characters)	> not allowed
root password	string expression (1 thru 16 characters)	> not allowed

Example Commands

(first time) INITIALIZE 8,0,0 "SALESDATA<october>"
(subsequent) INITIALIZE "OLDVOLUME<oldpass>" "NEWVOLUME<newpass>" "<trythis>"

Response

```
 1 Jun 83  8:52:20 AM
Initializing 8,0,0
--Warning:  Initialization will destroy
           all data on the volume.
 1 June 83 8:52:20 AM
Volume 8,0,0 initialized.
```

Semantics

The first example command above shows how you might initialize a mass storage disc for the first time. The option of including a root password has been declined.

The second example command might be used to initialize an existing SRM disc. Note that the optional root directory password has been used. This password protects the MANAGER capability, preventing unauthorized tampering with protection of the disc's root directory.

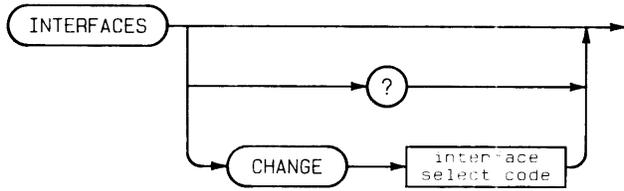
Discs and tapes may be initialized with the **system** up or down, but the **volume** must be down to be initialized. A volume may be de-activated using the VOLUMES DOWN command.

Note

Initialization is not executed until the operator answers YES to a prompt appearing at the bottom of the screen. This ensures that the disc is not accidentally erased and initialized. The last two lines of the above screen response appear after prompt is answered affirmatively. A negative replay to the prompt aborts the command.

INTERFACES

This command verifies the select codes and interrupt levels assigned to the interfaces connected to the SRM server.



Item	Description/Default	Range Restrictions
interface select code	integer constant	2, 10 thru 31

Example Command

```
INTERFACES
```

Response

```

1 Jun 83      8:52:20 AM
-----
Interfaces
-----
select  interface  interrupt  node
code    type       level      address
-----
        98620      3
7       HP-IB      3
14      98625A     6
21      98629      4         0
22      98629      4         0
  
```

Semantics

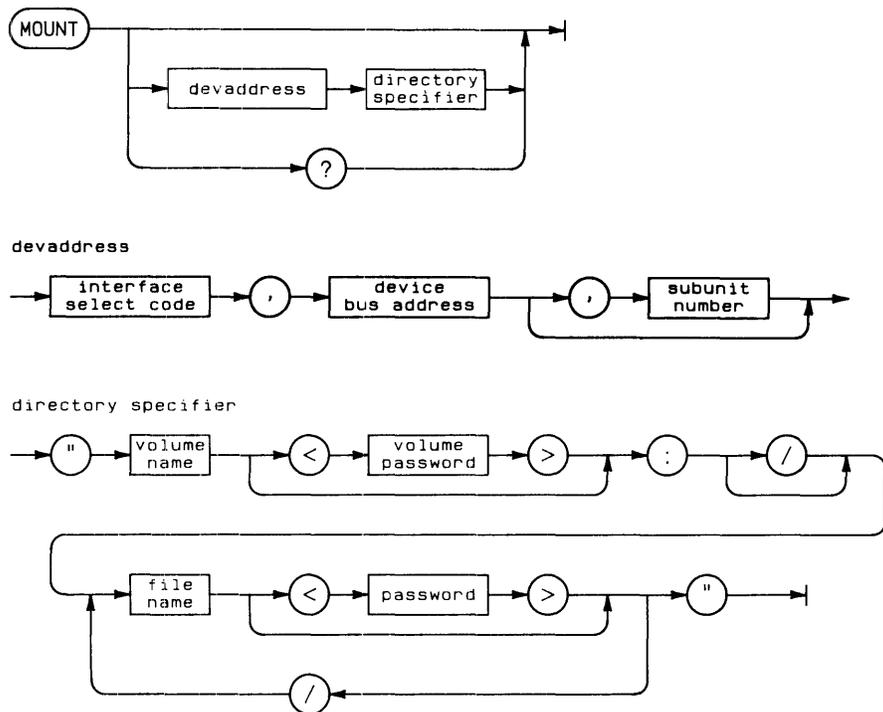
The built-in HP-IB interface in the HP 50960A will be displayed as a 98625A at select code 8. If an interface card generates an error at powerup, it does not appear in this list.

Serial Interface Configuration

For information on using INTERFACE CHANGE, see the section on "Configuring a Serial Printer."

MOUNT

This command logically mounts a volume into a directory of another volume.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14
directory specifier	literal expression	(see beginning of this chapter)
volume name	string expression (1 thru 16 characters)	<, : and / not allowed
volume password	string expression (1 thru 16 characters)	> not allowed
file name	string expression (1 thru 16 characters)	<, : and / not allowed
file password	string expression (1 thru 16 characters)	> not allowed

Example Command

```
MOUNT 14,0,0 "VOLUME1:CHUCK"
```

Response

```
1 Jun 83 9:23:17 AM  
Volume mounted
```

Semantics

The mounted volume appears as a branch within the volume it is mounted on. The directory specified in the MOUNT command **must** already exist.

A directory list of the directory specified in the MOUNT command shows the files in the root of the mounted volume. Any entries that were in the directory before the volume was mounted are not accessible while the volume is mounted.

If no parameters are given, the system displays a list of the mounted volumes.

Links from a file in one volume to a file in another volume are not possible.

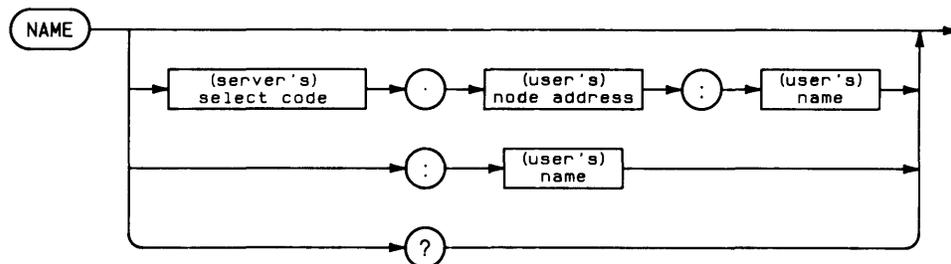
Volumes must be remounted each time the system is brought up.

Automatic Mounting of Discs

Manual mounting of discs each time the system boots is not necessary. SRM systems with online backup and restore save mount information on the system disc. When the system boots again, it automatically mounts the discs that were mounted when the system last went down. The mount information is saved in an ASCII file named /SYSTEMS/MOUNT_SRM. This file is created or overwritten each time a MOUNT or UNMOUNT command is executed.

NAME

This command makes or changes an association between a userid and a 10-character user name.



Item	Description/Default	Range Restrictions
(server's) select code	integer constant	8 thru 31
(user's) node address	integer constant	0 thru 63
(user's) name	string expression (1 thru 10 characters)	name associated with sc.nd user

Example Command

```
NAME 21.23:George
```

Response

```
1 Jun 83 8:52:20 AM
User 21.23:George Added
```

Entering the command NAME alone results in:

```
1 Jun 83 8:52:20 AM
_User Name List_
sc nd name
---
21.23:George
```

Semantics

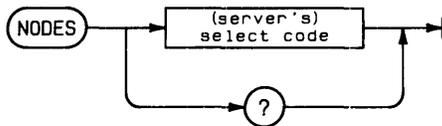
If the full userid is specified, the name is added to the name list.

The user is removed from the list if the name is specified alone.

If the NAME keyword appears alone, the user name list is displayed.

NODES

This command lists, by the select code and node address, other interfaces connected on the same network as the specified interface select code.



Item	Description/Default	Range Restrictions
(server's) select code	integer constant	8 thru 31

Example Command

```
NODES 21
```

Response

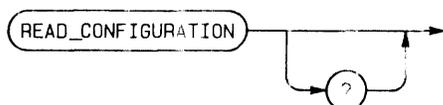
```
1 Jun 83 8:52:20 AM
-----Active Nodes-----
sc nd  name      retries  workstation
-----
21. 0:  This SRM      3
21.14:BOB      3
21.16:system1  1
21.52:Michelle 0
21.32:80       0
```

Semantics

“Retries” is a cumulative value. At 256 it rolls over to 0. If the number of retries on a node increases greatly from day to day, then some network troubleshooting should be done.

READ_CONFIGURATION

This command is used to re-load the SRM configuration information from the SRM system disc.



Example Command

```
READ_CONFIGURATION
```

Response

```
1 Jun 83 8:52:20 AM
Configuration file read
```

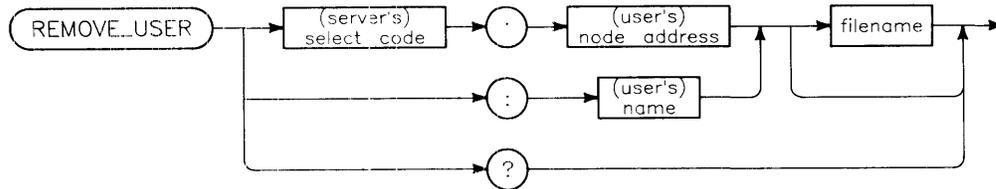
Semantics

The command clears and rebuilds the user name list. Spooler already configured in the system remain unchanged by READ_CONFIGURATION.

Spoolers not currently configured are added to the system.

REMOVE_USER

REMOVE_USER logically removes a specified workstation from the system.



Item	Description/Default	Range Restrictions
(server's) select code	integer constant	8 thru 31
(user's) node address	integer constant	0 thru 63
(user's) name	string expression (1 thru 10 characters)	name associated with scand user
filename	string expression	

Example Command

```

REM 21.14
or
REM 21.14 "FILE.ASC"

```

Response

```

1 Jun 83 8:52:20 AM
User 21.14:TIM removed from system
or
12 May 89 11:01:45 AM
User 21.14:TIM "FILE.ASC" closed

```

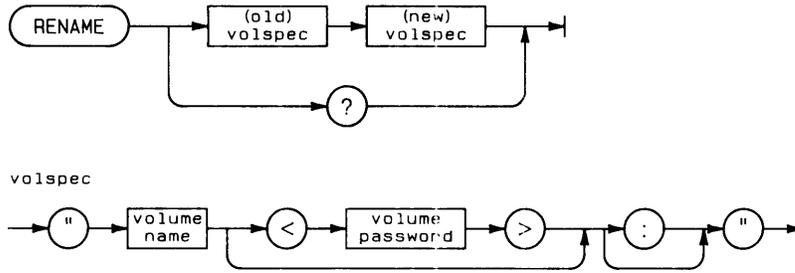
Semantics

The first example command logically removes a workstation from the system and closes the files and directories opened by the workstation. The workstation is added to the system the next time the workstation opens a file or directory.

The second example command keeps a workstation on the system, but closes all of the user's file names that match the file name you specify in the command. If no file names match, no files are closed.

RENAME

RENAME is used to change the volume name and password for a specific mass storage volume.



Item	Description/Default	Range Restrictions
volspec	literal expression	(see beginning of this chapter)
volume name	string expression (1 thru 16 characters)	<, : and / not allowed
volume password	string expression (1 thru 16 characters)	> not allowed

Example Command

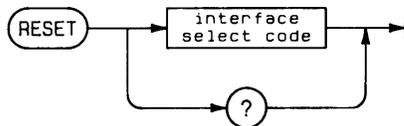
```
RENAME "Lab1<password>" "Newlab1<password>"
```

Response

```
1 Jun 83 8:52:20 AM
"Lab1 " renamed to "Newlab1 "
```

RESET

This command resets a particular interface to its power-up state.



Item	Description/Default	Range Restrictions
interface select code	integer constant	7 thru 31

Example Command

```
RESET 21
```

Response

```
15 Jul 83      12:47:55 PM
--Warning: Reset will destroy any
             data in the card
Card at selectcode 21 reset
```

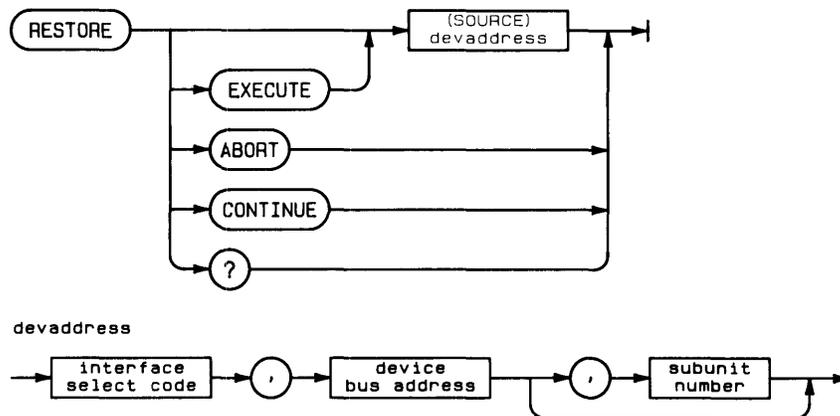
Semantics

Note that executing RESET results in the loss of all data contained in the interface and thus may affect normal system activity.

RESET is not executed until the operator enters an affirmative reply to a prompt at the bottom of the screen. A negative reply to the prompt aborts the command.

RESTORE

The various forms of this command list the contents of a backup medium, restore what you select from a backup, stop a restoration, or resume a restoration.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14

Example Command

```
RESTORE 8,0,1
```

Response

```
3 Aug 86 2:43:54 PM
Restore from 8,0,1
```

```
Device:          8,0,1
Volume Backed Up: "PRIMARY      "
Backup Media Number: 1
Backup File:     "all_files     "
Backup Date:     22 Jun 86 4:00:00 AM
Backup Type:     Incr
Last Base Date:  20 Jun 86 4:00:00 AM1
Backup Log File: "BKP062286040000 "
```

¹This line appears only for incremental backups.

Semantics

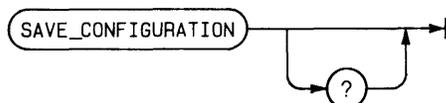
EXECUTE Through prompts, this command allows you to list the contents of backup media, select what you want to restore, and specify where you want to restore it. and start the restoration. The EXECUTE keyword is optional.

ABORT This command stops a restoration in progress.

CONTINUE This command resumes a paused restoration in need of the next medium from a backup. Use this command when you have replaced the current backup medium with the next one.

SAVE_CONFIGURATION

This command saves the current spooler configuration and the user name list into a file on the SRM system disc.



Example Command

```
SAVE_CONFIGURATION
```

Response

```
1 Jun 83 8:52:20 AM
Configuration file saved
```

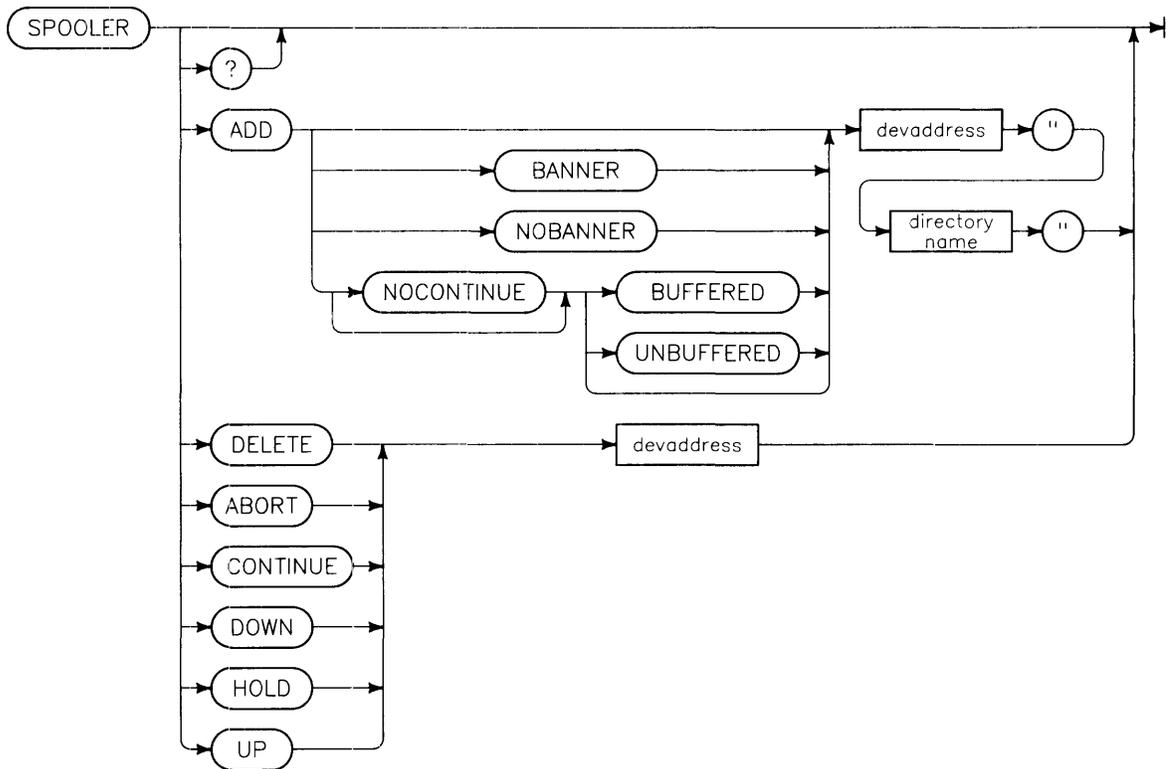
Semantics

The system configuration is saved on the SRM system disc in the file **CONFIG_SRM** in the directory **SYSTEMS**. If **SYSTEMS** does not exist, the operating system creates it automatically. The file **CONFIG_SRM** and the directory **SYSTEMS** should never be removed from a working SRM system.

On subsequent loadings of the SRM operating system, the system searches the SRM system disc for the configuration file.

SPOOLER

This command lists the current spooler configuration, changes the status of a spooler, or configures a new spooler.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
directory name	string expression (1 through 16 characters)	<, : and / not allowed
interface select code	integer constant	7 through 31
device bus address	integer constant	0 through 30

Example Command

```
SPOOLER ADD 7,3 "Printer"
```

Response

```
1 Jun 83      8:52:20 AM
-----Spoolers-----
select  bus  device  directory
code   add  type    name      status
-----
7       1   2631A   LP        inactive B1
7       2   Printer LP2       inactive NB2
7       8   7580A   PLOT     inactive UN3
7       9   7585A   PLOT2    inactive BF4
7       9   7585A   PLOT3    inactive NC5
```

¹B means the printer produces a banner page before each printout.

²NB means the printer produces no banner pages.

³UN means the plotter receives HP-GL commands one at a time, or 20 bytes at a time for commands larger than 20 bytes.

⁴BF means the plotter receives HP-GL commands all at once since they are stored in a buffer until it is full.

⁵NC means that the user does not need to type SPOOLER CONTINUE commands at the server console when using the plotter.

Semantics

ADD The ADD subcommand configures a new spooler. This command automatically creates a directory on the SRM system disc (if one does not exist) and enables normal spooling operation. The spooler directory must be in the root directory. The banner option allows you to enable and disable the banner for a printer (default = banner on). Plotters do not produce banners, regardless of the banner option setting. The buffer option allows you to determine how data is sent from the SRM controller to HP-IB plotters. Unbuffered allows the plotter pens to move smoothly and uniformly. Buffered allows for better system performance.

The NOCONTINUE option eliminates the need to type SPOOLER CONTINUE commands at the server console when using a plotter. Spooling begins as soon as paper is loaded and the plotter is online. When the plot is done, the plotter is automatically taken offline. (The plotter stays online if it can automatically feed its own paper.)

DELETE The DELETE subcommand removes an empty spooler directory from the system configuration. The spooler should be taken DOWN before it is deleted.

ABORT This command stops output in progress and purges the file. The next file in the spooler directory is then output.

CONTINUE This command resumes output of a device that has either a "held" or "error" status.

DOWN This command sets the spooler status to "down" and stops the printing or plotting in progress without purging the active file. A spooler with "down" status does not search the spooling directory for files.

HOLD This command halts the printing or plotting of a file. A device may be put on hold via the HOLD command; plotters are put on hold pending operator setup. Output may be resumed via the CONTINUE command.

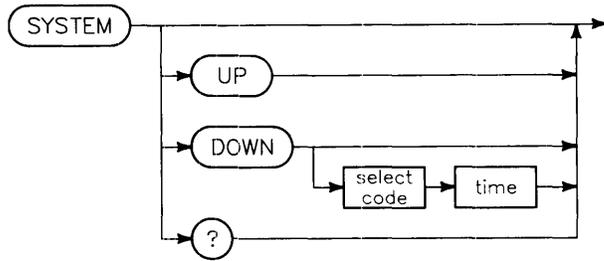
UP This command sets the spooler to the "up" status, but does not resume output from a spooler with "held" or "error" status.

devaddress The device address of the spooled device.

file name The spooler directory name which is entered in the root level directory of the SRM system disc.

SYSTEM

This command sets the SRM status to the UP state or the DOWN state.



Item	Description/Default	Range Restrictions
interface select code	integer constant	9 thru 31
time	integer constant	0 or greater (up to 32.760 seconds)

Example Command

```

SYSTEM DOWN
OR
SYSTEM DOWN 12 5
SAVE
  
```

Response

```

Are you sure you want to do this?  System is UP
N
  
```

User Reply

```

YES
  
```

Response

```

1 Jun 83 8:52:20 AM
System down
  
```

Semantics

The command `SYSTEM UP` reboots the server and sets the SRM status to the UP state, ready to process requests. The command `SYSTEM DOWN` sets the SRM status to the DOWN state where it rejects all requests. The system must be taken DOWN before shutting off power to the server and disc/tape drives.

The `SYSTEM DOWN` command is used to shut down the system. The file system is allowed to complete all disc transfers and the spoolers are shut down. If power is lost before the system is shut down, the disc may be corrupted.

You can shut down the system immediately, or you can configure it to shut down automatically when power is lost. Automatic shutdown is available only for systems with online backup and restore.

To shut down the system immediately, execute the `SYSTEM DOWN` command with no parameters.

To configure the system to shut down automatically when power is lost, execute the `SYSTEM DOWN` command with one or two parameters. When a power failure is detected, all open files are closed without warning, spoolers are taken down, and any backup or restore operations in progress are aborted. A backup power supply must supply power while the shutdown is taking place.

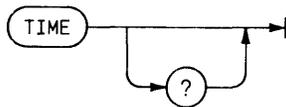
The system shutdown is triggered by a signal from the server's RS-232 serial interface. The first parameter for the `SYSTEM DOWN` command is the select code for the server's serial interface. For more information about the interface and other hardware considerations, refer to the SRM Hardware Installation Manual.

The second parameter tells the system how many seconds to wait once it receives a shutdown signal from the interface. This value depends on how much standby power is available. If you omit this parameter, the default is zero.

After you use the `SYSTEM DOWN` command to choose the interface and set the time, use the `SAVE_CONFIGURATION` command to save this information on the system disc. This enables the system to handle multiple shutdowns and reboots if necessary.

TIME

Use this command to set the system date and time.



Example Command

```
TIME
```

Response

```
Prompt:  1 Jun 83      8:52:20 AM
```

```
Reply:  -edit time-
```

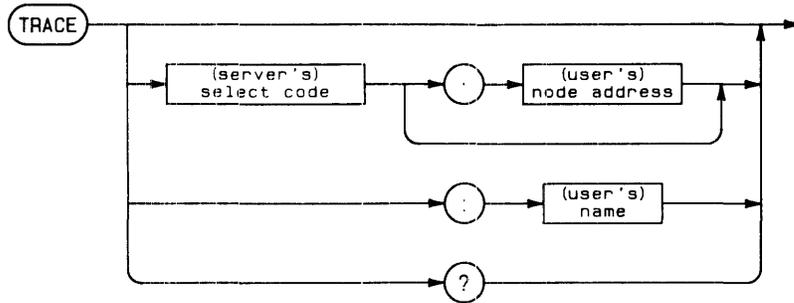
```
Result: The time is  1 Jun 83   8:52:00 AM  
        System up on 30 May 83  7:22:20 AM
```

Semantics

Upon entering the command `TIME`, the current date and time are displayed. If necessary, this line may be edited followed by pressing `[Return]` or `[ENTER]`. Clearing the line causes the current time and the system-up time to be printed.

TRACE

This command requests activity tracing for one or more users.



Item	Description/Default	Range Restrictions
(server's) select code	integer constant	8 thru 31
(user's) node address	integer constant	0 thru 63
(user's) name	string expression (1 thru 10 characters)	name associated with sc.nd user

Example Command

```
TRACE :TIM
```

Response

```
1 Jun 83 8:52:20 AM
Trace enabled for user 21.29:TIM
```

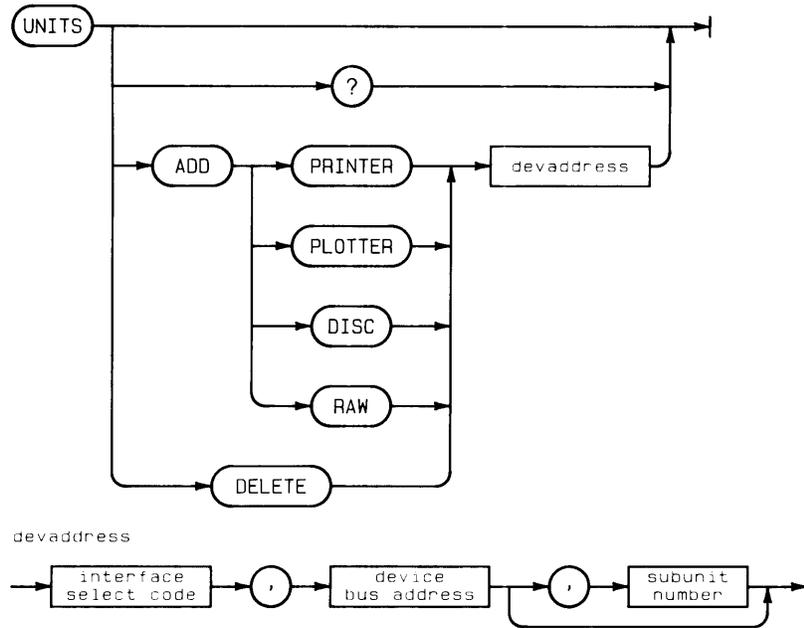
Semantics

If no user is specified with the TRACE command, all users are traced. If a select code is specified along, all users connected to that interface are traced. Softkeys **[k8]** or **[k9]** on the HP 98203A/B keyboard, or **[f8]** on the HP 46020A/46021A keyboard, are used to start and stop tracing output.

The trace output goes to the display unless the “Print All” keyboard function is turned on. “Print All” causes trace information to be printed on the default printer (printer with the lowest device bus address) as well as on the display. (See the “Special Keyboard Functions” section of this appendix.)

UNITS

This command lists the current peripheral configuration and adds or removes peripherals.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
interface select code	integer constant	7 thru 31
device bus address	integer constant	0 thru 29
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14

Example Commands

```
UNIT ADD PRINTER 7,1
UNIT ADD PLOTTER 7,8
```

Response

```
1 Jun 83 8:52:20 AM
Unit 7,1 added
1 Jun 83 8:52:20 AM
Unit 7,8 added
```

Or you may use the command:

```
UNITS
```

which results in:

```
-----Peripheral Devices-----
device   select   bus
type     code     address
-----
Printer   7        1
Plotter   7        8
  7914    14      1,0
Removable 14      2,0
Printer   2        0
```

Semantics

This command may be used with the system up, but any attempt to remove a spooled device or a volume which is up results in an error.

Note

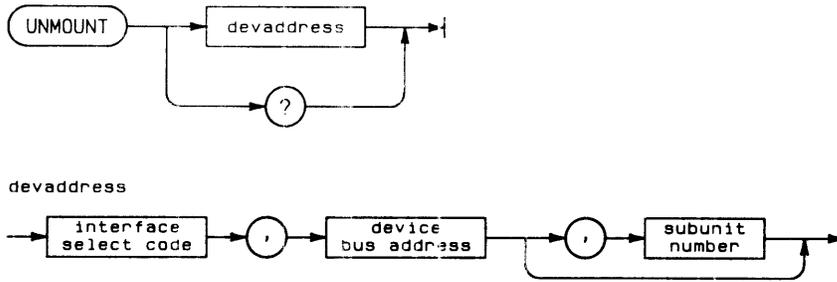
When adding or removing units, it is **very important** to ensure that the cables are connected properly and the device bus address is correct.

The UNIT ADD or UNIT DELETE commands will work with disc and tape volumes. However, it is recommended that the addition or deletion of disc or tape volumes be done by taking down the system (SYSTEM DOWN). You should switch the device's power ON to add it and OFF to delete it. Bringing the SRM system up again (SYSTEM UP) will then ensure that volume addressing is consistent. (See "Volume Address Assignments" in the "Interfaces and Peripherals" chapter.)

It is recommended that system activity be minimal when a unit is added or removed. If the change is to be permanent, the system should be brought down and then back up with the new unit connected or the old unit disconnected.

UNMOUNT

This command removes the specified mounted volume from the directory structure of the volume mounted on.



Item	Description/Default	Range Restrictions
devaddress	integer constant	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default == 0)	0 thru 14

Example Command

```
UNMOUNT 14,3
```

Response

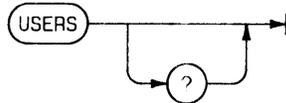
```
1 Jun 83 8:52:20 AM
Volume unmounted
```

Semantics

Note that bringing the system down also UNMOUNTs volumes.

USERS

This command lists all users that have files or directories open.



Example Command

USERS

Response

```

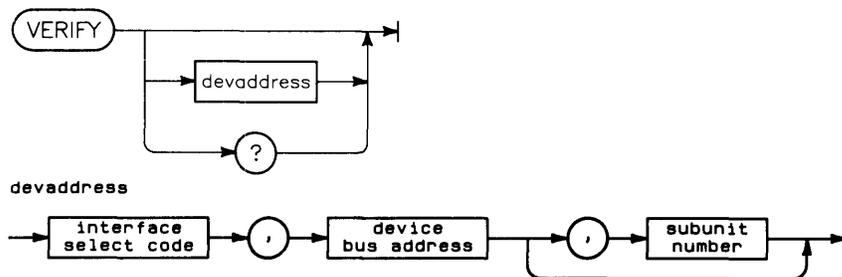
1 Jun 83      8:52:20 AM
-----Current Users-----
-----user----- open   working
sc nd  name   files  directories
-----
21.11: CAROL      3      5
21.14: COLIN      5      0
21.23:             11     1
22.11: ISABEL     7      2
  
```

Semantics

This command also displays the name assigned with the NAME command.

VERIFY

This command verifies readability of RAM memory or a specified mass storage device medium.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices; (default = 0)	0 thru 14

Example Commands

```
VERIFY
```

or

```
VERIFY 14,0,0
```

Response

```
9 Nov 89 4:48:12 PM
```

```
Verifying memory
```

```
9 Nov 89 4:48:17 PM
```

```
Verification complete: 1310720 bytes
```

or

```
10 Aug 83 1:43:14 PM
```

```
Verifying 14,0,0
```

```
10 Aug 83 2:17:32 PM
```

```
Verification complete
```

Semantics

When used without parameters, this command checks RAM memory. It computes the software checksum and reads every byte of RAM memory in an attempt to force a parity error.

When used with parameters, this command performs a simple read in order to determine whether the medium is readable and contains no bad blocks. If a portion of the medium is bad, then a data error results. This command makes no comparisons.

The operator is given the option to “spare” the bad blocks on the medium. Thereafter, the bad block or blocks are not used in device operations.

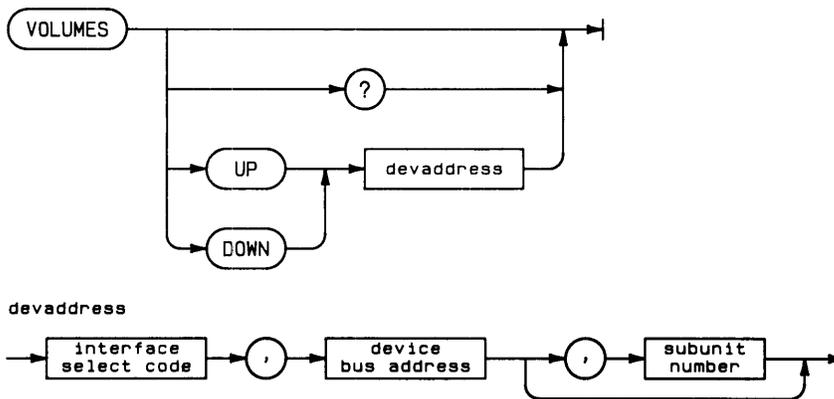
This command verifies the entire medium. This may be more of the medium than was actually used if the medium is a backup medium. Bad blocks on the unused part of a backup medium do not affect the ability to restore files from the backup medium.

Data residing in a bad block may not be recoverable. If the bad blocks are on an SRM disc volume, you should run the Disc Check Utility to determine what files were affected by the bad blocks.

VERIFY can be executed with the volume UP or DOWN, but it is recommended that the volume be DOWN.

VOLUMES

Use this command to display the information for all of the currently active disc volumes.



Item	Description/Default	Range Restrictions
devaddress	integer constants	(see beginning of this chapter)
interface select code	integer constant	8 thru 31
device bus address	integer constant	0 thru 7
subunit number	integer constant; applies to mass storage devices only; (default = 0)	0 thru 14

Example Command

```
VOLUMES
```

Response

```

1 Jun 83      8:52:20 AM
-----SRM Volumes-----
vol   bus      free   block
add  sc  adr  volume name  blocks  size
-----
* 8 14  1, 0  DATAFILE1   23145  1024
  9 14  2, 0  OPEN_ACCOUNTS 234876 1024

```

Semantics

Only active volumes are displayed. An asterisk in the volume address column indicates the SRM system disc.

Discs may be activated and deactivated using the UP and DOWN options, respectively, while the SRM system is in the up state. For example,

```
VOLUMES DOWN 14,2,0
VOLUMES UP 14,2,0
```

After an SRM system is brought up, discs are normally left in the up state.

?

This command is equivalent to the HELP command.



Example Command

?

Response

Note

The commands shown in the display depend on which system the server is running.

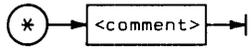
```
1 Jun 83  8:52:20 AM
-----SRM Commands-----
BACKup      Files      HEAder
HELp        INItialize
INTErfaces  Mount     NAme
NODEs       REAd_configuration  REMove_user
REName      RESEt     RESTore
SAve_configuration  SPOoler   SYStem
Time        TRace     UNIts
UNMount     USers     VErify
VOLUMes     ?         *
```

A "?" following a command keyword will display the syntax for that command. For complete command details refer to the "SRM System Manager's Guide."

Semantics

If ? is used following a console command, additional information about that command is displayed on the console screen.

The * allows a non-executable comment line to be entered on the console.



Example Command

```
*This is a comment.
```

Response

```
1 Jun 83 8:52:20 AM  
This is a comment
```


Restoring from Pre-3.0 SRM Backups **B**

The SRM 3.0 RESTORE command can **NOT** restore from backups produced by a pre-3.0 SRM system. Therefore, you must restore these backups with your pre-3.0 SRM system. A recommended procedure for doing this (assuming that you must restore the pre-3.0 backup to an SRM disc currently in use) follows. This procedure is time-consuming (it can take up to a day or more), but it converts a pre-3.0 backup into a 3.0 backup so that you can selectively restore files from it.

1. Select an SRM disc at least as large as the one backed up with the pre-3.0 SRM system.
2. Perform a copy backup of the entire disc with the SRM 3.0 BACKUP command. (You can skip this step if you do not need to save what is currently on the disc.)
3. Bring down the SRM 3.0 system (stop the server).
4. Boot the pre-3.0 SRM Operating System you saved on tape.
5. Use the pre-3.0 SRM system's RESTORE command to restore the pre-3.0 backup to the disc you selected.
6. If the disc you selected to restore to was your SRM 3.0 system disc, use the SRM 3.0 Installation Utility to re-install SRM 3.0 on the disc. (Do **not** re-initialize the disc!)
7. Reboot your SRM 3.0 system.
8. Use the SRM 3.0 BACKUP command to perform a copy backup of the entire disc containing the restored pre-3.0 backup.
9. If you performed step 2, use the SRM 3.0 RESTORE command to restore the backup you performed in step 2. This restores the original contents of the SRM disc.

You now have an SRM 3.0 backup of the pre-3.0 data. Use the SRM 3.0 RESTORE command to restore all or part of this backup to suit your needs.

2608A Driver Supported Escape Sequences



ESC ([code] Set the primary character set according to [code]:

[code]	2608A char set number
OU	0 - (USACII)
OV	1 - (ARABIC)
1R	2 - (CYRILLIC)
1K	3 - (KATAKANA)
OL	4 - (LINE DRAW)
OP	7 - (APL)
OF	8 - (FRENCH)
OG	9 - (GERMAN)
OS	10 - (SWEDISH/FINNISH)
OD	11 - (DANISH/NORWEGIAN)
1S	12 - (SPANISH)
1E	13 - (BRITISH)
OK	14 - (JAPANESE)
OE	15 - (ROMAN EXTENSION)
@	- (POWERUP DEFAULT)
A	7 - (APL)
B	4 - (LINE DRAW)

ESC) [code] Set the secondary character set according to [code]. See above summary of [code] values.

ESC & a [n] L Set Left Margin to [n], where $0 < = [n] < = 15$.

ESC & l [n] V Do a vertical form control channel. For $1 < = [n] < = 16$, do vertical form channel. For $128 < = [n] < = 255$, do [n]-128 line slews with a CR operation.

ESC & k [n] S Select print size. [n] = 0 for normal or 10 char per inch. [n] = 8 for expand or 5 char per inch and 3 lines per inch.

ESC & l [n] D Select lines per inch. [n] = 6 normal, 6 lines per inch. [n] = 8 compress, 8 lines per inch.

ESC n Turn printer on line, unless an error condition exists.

ESC o Turn printer off line.

ESC * r A Enter graphics mode. Escape sequences, CR, LF will be recognized. All other data is thrown out.

ESC * r B Exit graphics mode.

ESC * r C:D Do a form feed while in graphics mode.

ESC * b [n] W
[data] Graphics data output. This can be done either in graphics or normal mode. [n] is the byte count of characters in [data]. Each byte (8 bits) is mapped horizontally (msb left, lsb right), with '1' printed, and '0' not printed.

Operating System Enhancements

D

Introduction

There have been a number of improvements in the Shared Resource Management Operating System. Enhancements to the SRM 1.0 Operating System changed it to SRM 2.0. Some bug fixes and a few improvements revised SRM 2.0 into the SRM 2.1 Operating System. Performance improvements were added to SRM 2.2. Selective backup and restore produced 3.0. New enhancements have now created SRM 3.1. This appendix lists the characteristics of each revision.

SRM 1.0 vs. SRM 2.0

In addition to the compatibility of the SRM 1.0 files with the SRM 2.0 Remote File Access, the SRM 2.0 version allowed:

- support for the HP 7914P disc;
- ability to use the HP 9000 Model 220 (HP 9920A) as the SRM server;
- support of CIPER protocol printers;
- support of plotters;
- automatic bootup and system execution from local CS/80 disc;
- improved server commands;
- improved printer management;
- auto-configuration of devices and interfaces;
- one disc to be backed up to its built-in tape drive without affecting operation of other discs on the SRM;
- expanded backup for HP 7914 support (multiple tapes per volume);
- multiple volumes to appear as one logical hierarchy;
- recovery of one file from a backup tape by putting it on the system and bringing it up as an active volume (except from HP 7914 backups).

SRM 2.0 vs. SRM 2.1

Some mistakes in the SRM 2.0 Operating System were corrected, some additional peripherals were supported, and the BACKUP process was enhanced in SRM 2.1. The SRM 2.1 version:

- added support for the HP 50960A server hardware;
- added support for the HP 46020A keyboard;
- added support for 2932/33/34 printers;
- added support for 7941/42 and 7945/46 disc drives, and 9144 tape drive;
- added support for 7550A and 7586B plotters;
- stopped producing banners for plots (banners normally contain the name of the file being plotted and the time the plot started); and
- improved the BACKUP operation for better performance, more error recovery possibilities, and use of any number of tapes of equal size for a backup.

SRM 2.1 vs. SRM 2.2

The SRM 2.2 Operating System retained the features of SRM 2.1. A number of software discrepancies were worked out to improve the server's performance in SRM 2.2.

SRM 2.2 vs. SRM 3.0

For SRM 3.0 some Operating System mistakes are corrected, and the installation process for the Operating System is improved. In version 3.0, two SRM Operating System configurations are available:

- a full system with on-line selective backup and restore and
- a partial system without on-line selective backup and restore for servers with less than 3/4 Mbyte of memory. A stand-alone Backup/Restore Utility accompanies this system to allow off-line selective backup and restore.

In addition to this, the SRM 3.0 version adds the following features:

- the system with on-line selective backup and restore can automatically start backups on a regular schedule you set,
- incremental backups of only those files created or changed since the last full (base) backup,
- backup and restore of selected directory trees and files,
- ability to use a disc volume while it is being backed up or restored to (with some limitations),
- with some restrictions, use of any supported mass storage device for backups,
- ability to back up to multiple backup media without human intervention,
- ability to relocate restored directories and files to a different area in the directory structure,
- choice of whether or not printers produce a banner page at the beginning of every printout,
- an improved user interface to the Disc Check Utility,
- support of additional mass storage devices: 7907, 7935, 7957, 7958, 9122, 9133H/L option 001, 9134H/L option 001, and 9153B disc drives, and 35401 tape drive, and
- support of additional plotters: 7440, 7570.

SRM 3.0 vs. 3.1

For SRM 3.1, the installation process is improved and some operating system mistakes are corrected. SRM 3.1 supports serial-interfaced printers, notably the LaserJet family of laser printers. A serial printer can be used as the printall device for the *SRM System with Backup* and *SRM Disc Check Utility*.

In addition, SRM 3.1 adds the following features:

- improvements to the Disk Check Utility
- improvements to the selective backup system
- support of a battery-powered clock to maintain the proper system time in the event of a power failure. The HP 50960A comes installed with the HP 98561-66532 interface card, which includes a battery-powered clock. Additionally, users of HP 9826 SRM servers can use the HP 98270F powerfail option.
- support of environment spooling, where a file containing printing or plotting environment information can be prepended to a spooled print file
- support of priority spooling
- removal of the 35-week maximum interval restriction between automatic backups
- support of HP Draftmaster plotters: 7595A, 7596A
- support of new mass-storage devices: 7933H, 7936H, and 7937H
- support of additional printers: LaserJet, LaserJet+, and 500+, LaserJet II, Tempest LaserJet, Tempest LaserJet+, QuietJet+ (on HP-IB), Rugged Writer 2235B & D (on HP-IB), and PaintJet 3630A color printers.

SRM 3.1 vs. 3.12

For SRM 3.12, you can now perform the following actions:

- Configure the buffering that is used to send data to HP-IB plotters
- Automatically detect damaged or defective installation media
- Continue a backup after an error is detected while opening a backup device (for example, a write-protect error)

The following enhancements were also made:

- Improved performance for RESTORE operations involving a large number of duplicately linked files
- Disc check utility detects and corrects more types of file system corruptions

SRM 3.12 vs. 3.2

SRM 3.2 supports several new peripherals and a buffered plotter driver that increases throughput and improves workstation response. The NOCONTINUE keyword provides automatic plotter spooling that eliminates the need to type commands after every plot. Tape drives can be connected to the low-speed HP-IB to eliminate interference with faster disc drives.

SRM 3.2 also provides these enhancements:

- Handling of large directories is improved. You can now catalog or back up large directories much more quickly.
- Closing locked files that can hang a workstation is easier. The FILES command lists all workstations with a particular file open, and identifies which workstation has a locked file. The REMOVE_USER command can close one file at a time.
- The MOUNT keyword can be used to save disc mount information and automatically mount disc drives when the system is booted.
- The system can be configured to automatically shut itself down when it detects a power failure.
- Parity checking is available on 98257A memory boards. The VERIFY command can be used to check for memory errors.
- New messages help identify faulty tape cartridges during backup and restore operations.

Glossary

E

access capability	Different capabilities are required to perform different remote mass storage operations. Each file created can have any number of passwords. Each password allows specific access capabilities. The access capabilities are MANAGER, READ, WRITE, SEARCH, PURGELINK, and CREATELINK.
archive media	To store media permanently, taking them out of service.
ASCII file	A sequential access file of variable length records. Each record is composed of a length field (16 bits) long, followed by the indicated number of ASCII characters as specified in the length field. This is a Hewlett-Packard interchange standard.
base backup	A full backup on whose date subsequent incremental backups base their selection of what to copy. This type of backup sets the last backup date of an SRM disc.
Baud rate	A measure of the effective transfer of bits per second over a serial link.
CIPER printer	A printer which uses the CIPER protocol to communicate with the SRM system.
configuration file	A file (SYSTEMS/CONFIG_SRM) on the primary disc which contains the system information that cannot be set up automatically. This includes spoolers and the user name list. Note that the spooled devices are configured automatically, but the operator must assign a directory name to the spooler with the SPOOLER command.
copy backup	a full or partial backup that has no effect on the last backup date of an SRM disc or on a base-incremental backup scheme. This type of backup copies all selected files, regardless of their creation date or the dates on which they were last modified.
Data bits	Those bits that carry actual information in a serial transmission, in contrast to start bits, stop bits, and parity bits which delineate characters and provide error checking.
default printer	The printer with the lowest bus address on the HP-IB interface with the lowest select code or the serial printer with the lowest select code if there is no HP-IB printer.
devaddress	A specifier for an HP-IB device. Refer to the Server Commands sections of the “Server Keyboard Functions and Commands” appendix for more information.

directory	Files which contain information about the type, location, size, etc., of the subordinate files and directories in the next level of the shared resource hierarchical directory structure. Directories cannot be copied. As with any file, directory files can have their access capabilities protected with passwords.
directory specifier	A descriptor for a directory on an SRM disc volume. Refer to the Server Commands section of the “Server Keyboard Functions and Commands” appendix for more information. The same syntax is used for a file specifier.
down state	The system state in which no user requests are processed. Most console commands may still be used. The “down state” is used when reconfiguring the system. The system should always be brought down before disconnecting the power to the servers and peripherals.
environment file	A file that contains printer control information. This file can be prepended to a spool file, in which case it defines the print environment in which the spool file is printed.
extendable file	All shared-resource files are extendable. When you write past the file size, the system automatically extends or enlarges the file by a size equal to the extent size specified when the file was created. This extensibility is possible because shared resource files are not constrained to be contiguous mass storage media.
file	A collection of bytes defined by the programmer and accessed by the workstations as a single unit. Each file has a unique file specifier.
file name	A string expression utilized in the directory specifier to indicate a desired file. The file name may be from 1 to 16 characters in length and the characters <, : and / are not allowed.
file specifier	(See directory specifier.)
full backup	The result of copying all of the directories and files on your system to another storage medium.
handshake	A protocol that allows serial-interfaced devices to signal each other when they are sending data, receiving data, or when an error condition exists.
incremental backup	A backup that automatically selects, and copies onto another storage medium, only those directories and/or files created or changed since the last base backup. An incremental backup selects from among the same directories and/or files, or a subset of those, that the last base backup copied.
LIF	Acronym for Logical Interchange Format. This is one of Hewlett-Packard’s standard disc formats and is the format used for SRM ship media and backup media.

packet	A set of information transmitted as a single unit between workstations. It contains control information, source and destination node addresses, and data or other information pertaining to the system operation.
parity	An error checking scheme used in serial transmission.
partial backup	The result of copying a set of directories and/or files you choose to another storage medium.
password	A string ASCII characters used to limit access capabilities to shared resource files and directories. A password is required by the shared resource security system for providing non-public capabilities or files. See the section on volume and root passwords in the “Managing Shared Peripherals” chapter for more information.
peripherals	Devices such as discs, printers and plotters. For a list of the peripherals that can be used with the SRM operating system, see the <i>SRM System Planning Guide</i> .
recycle media	To copy over the backup(s) already on the media.
remote	The terms describing operations that use shared peripherals and disc drives rather than local peripherals and resources that are connected to the individual workstations.
resource management coax adapter (HP 50961)	A device which plugs directly into an HP 98629 interface or into the end of the interface cable of an HP 27123A and encodes and decodes packets of information being transferred over the coax link configuration.
resource management multiplexer (HP 98028A)	An electronic switching device that controls data transmission between workstations and controllers in the shared resource management system.
retain media	To keep media temporarily, intending to reuse them eventually.
root directory	Each disc volume has a root directory which is the highest directory in the shared resource hierarchical directory structure. That is, all directories are subordinate to the root directory. The root directory has no name, but its name can be treated as being the same as the volume name.
SDF	Acronym for Structured Disc Format. This is the format used on SRM discs.
shared file	A file which can be concurrently accessed by multiple workstations.
shared resource management system	A multi-user operating system through which multiple workstations can share disc drives and peripherals (includes hardware, e.g. interfaces, cables, and servers).
shared peripherals	Disc(s), printer(s), and plotter(s) connected to the shared resource management system server that are shared among the workstations in the system.

shared resource management controller/server	The HP 50960A or the HP Series 200 Model 220, 226 or 236 that controls shared disc and printer resources, and controls access to them by workstations in the Shared Resource Management system.
shared resource management operating system	The software that enables an HP computer (see shared resource management controller/server) to act as a Shared Resource Management server. The operating system controls shared disc and printer resources, and controls access to them by workstations in the SRM system.
sparing	Replacement of a bad block on a disc with a “spare” block from a reserved track.
spooled device	A shared printer or plotter that gets its information from a spooling directory defined by the SRM system manager.
spooling	A process by which a file can be sent to a shared printer or plotter by means of a spooling directory. When the device is available, the file is printed or plotted and then purged from the directory. Once the file is written to the spooler directory, the workstation is free to perform other tasks.
SRM Coax Interface	A 50962 interface card that combines the circuitry of the 98629 interface card and the 50961 coax adapter onto a single interface card. It encodes and decodes packets of information that are transferred over the coax link configuration.
stop bits	Bits that define, in a serial transmission, the end of a data bit string.
subordinate directory	A directory whose name appears in a catalog listing of another (superior) directory.
superior directory	A directory which lists a file or directory in its catalog listing. This directory is said to be superior to the directories in its catalog. The root directory has no superior directory.
system disc	The disc on the lowest bus address on the disc interface.
system map	A diagram showing a detailed pictorial representation of the shared resource system, including node addresses, equipment locations, equipment types, etc. A system map for your system should be located near your server.
time stamp	Each file in a directory is give a time stamp indicating the year, month, day, hour, minute, and second of the last update to that file.
up state	A system state in which users may make file system requests.
volspec	This is used to specify an SRM volume. See the beginning of the “Server Keyboard Functions and Commands” appendix for more detail.

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System Manager's Guide

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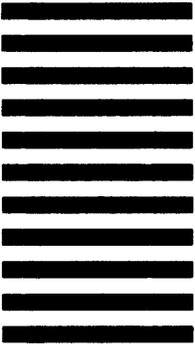


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