

# Series 8000 Disk Subsystem

## User's Manual

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***BERING***<sup>™</sup>

Bering Industries, Inc.

(408) 379-6900

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**BERING SERIES 8000**

**DISK SUBSYSTEM**

**USER'S MANUAL**

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**APPENDIX A: Multi-language Installation for Series 200 Computers**  
**APPENDIX B: Changing Partitioning of Fixed Winchester Disk**

## CHAPTER 1

### INTRODUCTION

This chapter includes the following sections:

#### 1.1 General Description

#### 1.2 Accessories

### 1.1 GENERAL DESCRIPTION

The Bering Series 8000 family of Winchester hard disk subsystems features a high-performance 5.25" fixed disk with 10 to 70 megabyte storage capacity. In addition, either of two built-in removable media drives are available as options: a 5.25" cartridge disk (10MB) or a 3.5" double-sided floppy (788 KB). For maximum data security, the TopSecret configuration offers the removable cartridge disk alone or with the floppy option.

The Series 8000 is plug compatible with Hewlett-Packard business, technical, and personal computers such as the HP3000, HP1000, HP250, HP9000, HP150B/C TouchScreen PC, and Portable 110. No software or hardware modifications are required. The Series 8000 subsystems support the latest HP 3.5" floppy disk instruction sets and can emulate HP disk drives.

The Series 8000 lets you maintain up to three language systems on a single hard disk and create multiple levels of file directories for more effective data organization. You may choose one of fifteen available combinations of disk partitions (up to three units or eight volumes) by setting simple configuration switches during installation.

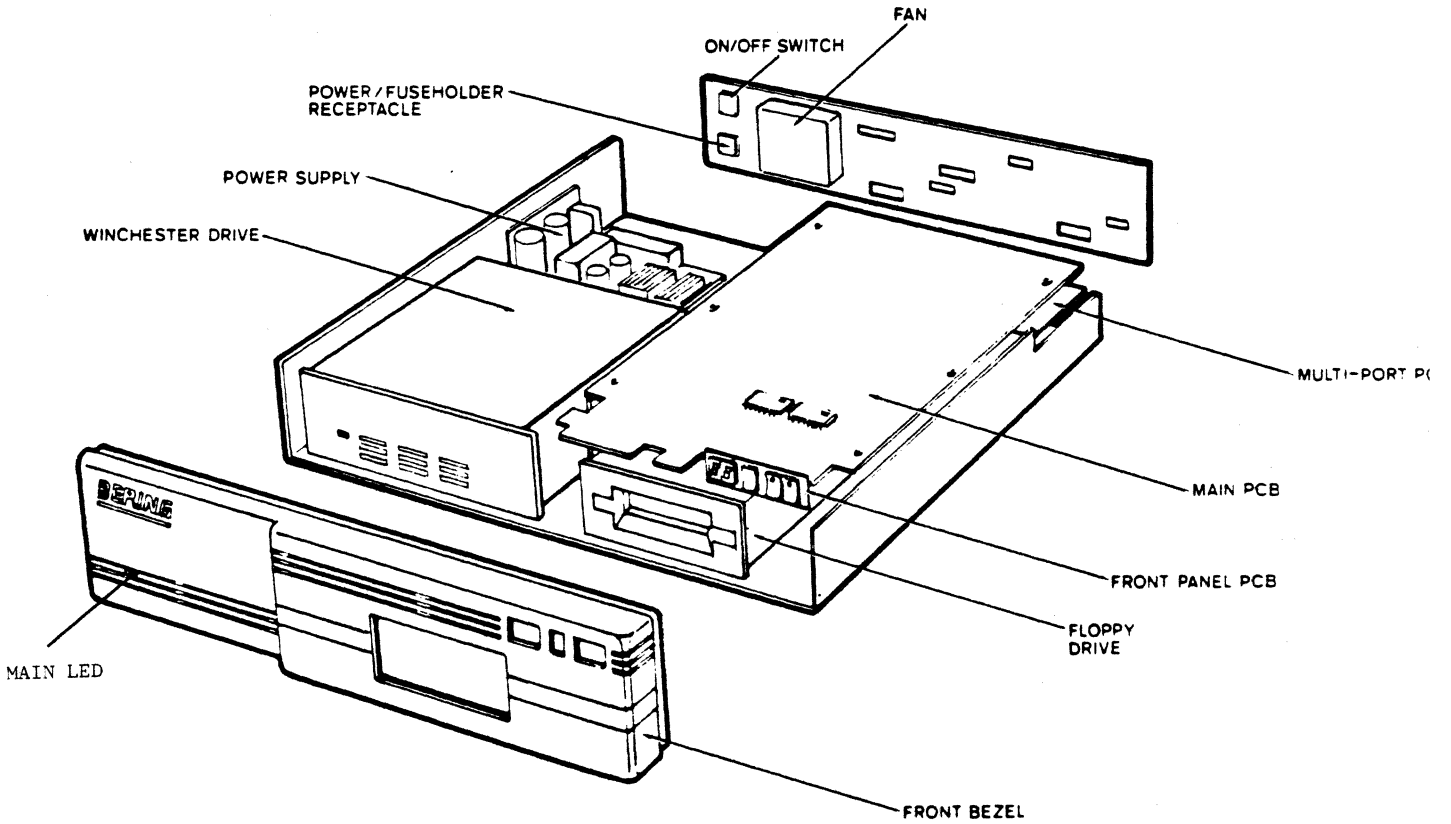
With Opt. 7xx Disk and File Sharing, Bering provides the HP-IB connectors and firmware that allow two or three computers to share disk storage and exchange files. Opt. 7xx offers a unique and less costly alternative for small offices or laboratories which desire a local area network.

The subsystem consists of up to four major functional modules, referred to as Field Replaceable Units (FRU's). (See Fig. 1.1) These include the Controller Board, Winchester Disk, optional auxiliary drive— either Floppy or Removable Winchester Cartridge Disk—, and the Power Supply. In addition to these FRU's, other subsystem components include the Cooling Fan and Power Receptacle/Fuseholder.

The Series 8000 is easy to install, requiring only simple switch settings and easy-to-perform cabling, as described in Chapter 2 titled Installation.

Figure 1.1

Series 8000 Field Replaceable Units and Other Components



1.2 ACCESSORIES

The Series 8000 subsystem includes the accessories shown in Table 1.1 below.

Table 1.1  
Series 8000 Accessories

Description	Quantity
Power Cord	1
3.5" floppy diskette (83xx Models)	1
Removable Disk Cartridge (81xx or 8x10RM Models)	1
User's Manual	1

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## CHAPTER 2

### INSTALLATION

This chapter contains the following sections:

- 2.1 Checking Your Disk Drive
- 2.2 Quick Reference for Installation
- 2.3 Basics of Disk Partitioning
- 2.4 Switch Settings at Port 1 (Single Port)
- 2.5 Disk and File Sharing
- 2.6 Switch Settings at Port 2 and Port 3
- 2.7 Connecting Your Disk Drive
- 2.8 Power-Up and Self-Test

#### 2.1 CHECKING YOUR DISK DRIVE

1. Carefully remove your disk drive from the shipping carton.
2. Inspect your disk drive for any physical damage that may have occurred during shipment. If you do find any damage, notify your dealer or the Bering Customer Service Department. Also file a damage claim with the carrier.
3. Save the shipping carton and all the packing material. When moving the disk drive or shipping it back to the factory for repair, repack your disk drive in the shipping carton.
4. Copy the model, option, and serial number of your subsystem from the rear panel to the space below for future reference.

Model No. \_\_\_\_\_

Opt. No. \_\_\_\_\_

Serial No. \_\_\_\_\_

## 2.2 QUICK REFERENCE FOR INSTALLATION

1. Turn off your computer and disk drive.
2. The following switch settings indicate typical configurations that will define single-unit-single-volume storage.

If you prefer an explanation of unit and volume storage and an illustrated step-by-step guide to configuration, skip this section and proceed to Sections 2.3 (BASICS OF DISK PARTITIONING) and 2.4 (SWITCH SETTINGS AT PORT 1 (SINGLE PORT)).

### Switch Settings at Port 1 (Single Port)

HP-IB Address	0
Slow HP-IB	0 (=Off / Default 500 nanoseconds)
Configuration	Single Port: 0 (HP150, HP250 see Chapter 4) Multi-Port: 9 (HP150, HP200, HP250, HP64000 see Chapter 4)

### Switch Settings at Port 2 and Port 3

HP-IB Address	0
Slow HP-IB Address	0 (=Off / Default 500 nanoseconds)
Reserved	Do Not Require Setting

Check that there is no duplication of bus addresses on the HP-IB bus connected to the same port. This is particularly important in systems with complex cabling.

3. Plug one end of the HP-IB interface cable into the HP-IB socket of the computer and the other end into the socket on the rear panel of the Series 8000 subsystem.
4. Connect the disk drive to AC power with supplied cord.
5. Turn all peripherals on.
6. Go to Chapter 4 and follow the Initialization procedures for your computer.

## 2.3 BASICS OF DISK PARTITIONING

NOTE: If you are familiar with partitioning disk storage as multiple units and volumes, you may wish to skip ahead to Section 2.4 SWITCH SETTINGS AT PORT 1 (SINGLE PORT).

The configuration switches set the partition of the fixed Winchester disk. At the simplest level of organization, disk storage exists as a single contiguous space. The Series 8000 also allows you to create multiple levels of storage addressing for more effective data organization. This hierarchy of storage organization is accomplished by partitioning the disk storage space into units and volumes. The units are at the top of the organization while volumes are contained within a unit. Thus a unit can contain one or several volumes.

To help you in selecting the appropriate configuration for your application, the three types of unit and volume configurations shown in Table 2.3 are described briefly below:

### 1 Unit With 1 Volume:

The fixed Winchester disk can be configured as a single contiguous storage space. With the configuration switches set at 0 (0 0 0 0) the fixed Winchester is defined as unit # 0 and the auxiliary disk (floppy or removable Winchester) is defined as unit # 1--as they are addressed by the host computer(s). The other single unit single volume configuration setting is 15 (1 1 1 1). The fixed Winchester is then unit # 1 and the auxiliary disk is unit # 0.

### 1 Unit With Multiple Volumes (2 to 8):

The fixed Winchester can be configured as a single unit partitioned into multiple volumes of varying sizes. The fixed Winchester is always addressed as unit # 0, while the auxiliary disk is always addressed as unit # 1. This configuration is set by any of the tabled switch settings from 1 (0 0 0 1) through 8 (1 0 0 0).

### Multiple Units:

The fixed Winchester can be evenly separated into 2 or 3 units. Each unit has 1 volume only. With settings 9 (1 0 0 1) the Winchester is configured as 2 units-- #'s 0 and 1. The auxiliary disk is unit #2. Set at 10 (1 0 1 0) the Winchester is 3 units-- #'s 0,1, and 2. The auxiliary disk is unit #3. Switch settings 11 and 12 define similar two and three unit configurations.

Remember that the floppy or removable Winchester disk is always 1 unit only and can have only 1 volume.

For TopSecret models (831ORM, 801ORM): Because the removable Winchester cartridge can have only 1 unit 1 volume, only configurations 0 (0 0 0 0) and 15 (1 1 1 1) may be used.



## 2.4 SWITCH SETTINGS AT PORT 1 (SINGLE PORT)

The layout of the Port 1 switches and the position of the switches on the rear panel are illustrated below in Fig. 2.1 .

The switches located at the Port 1 section of the rear panel allow the setting of three functional options:

1. HP-IB Address for Port 1
2. Slow HP-IB (200 microseconds)
3. Storage configuration for all ports

All switches are sampled only as the power of the subsystem is turned on. If the disk subsystem requires reconfiguration, follow these steps:

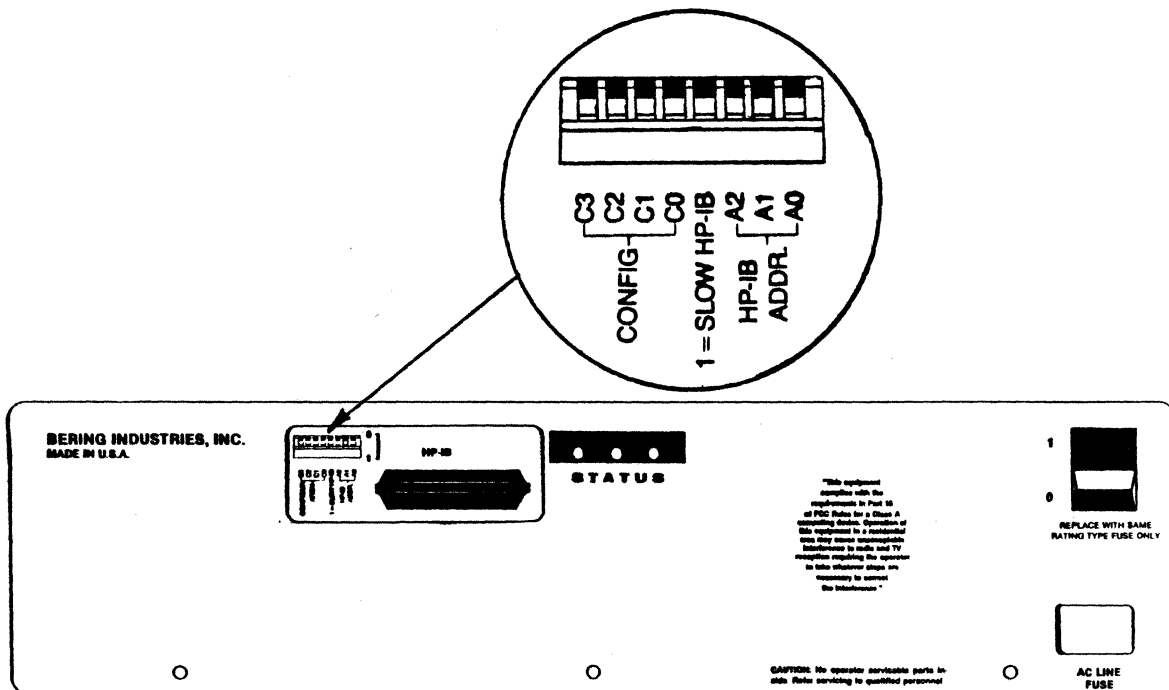
1. Turn off the power
2. Determine the required configuration of the three functional options.
3. Using a small screwdriver or similar object, move the appropriate switches to the new settings. The relationship of the three functional options to the switch settings is described in detail on the following pages.

Remember when setting configuration switches that the UP position is 0 and the DOWN position is 1.

4. Ensure the power has been off for at least 30 seconds, then turn power on.

Figure 2.1

Port 1 Section of Rear Panel



### 2.4.1 HP-IB Address

At Port 1, switches A2 A1 A0 are used to set the HP-IB address of the disk storage at Port 1. Valid addresses range from 0 to 7.

Table 2.1

Port 1 HP-IB Address Switch Settings

Address	Switches		
	A2	A1	A0
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

### 2.4.2 Port 1 Slow HP-IB

This switch sets Slow HP-IB. When the switch is ON (set to 1) the HP-IB settling time is changed from 500 nanoseconds to 200 microseconds. Do not use the slow transfer rate unless all devices on the bus use the slow rate. Hewlett-Packard computers and peripherals use the fast (500 nanosecond) transfer rate. Therefore, most users will set this switch OFF (set to 0).

Table 2.2

Port 1 Slow HP-IB Switch Settings

OFF	0
ON	1

### 2.4.3 Disk Partitioning And Emulation

#### 2.4.3.1 Configuration Switches

The Port 1 configuration switches labelled C3 C2 C1 C0 determine the way the fixed hard disk storage will be partitioned. They are used to:

partition your Winchester disk into one or more units (volumes)

select the auxiliary disk unit number (Models 81xx and 83xx)

enable disk and file sharing (Opt. 7xx)

emulate HP disks (details in Section 2.4.3.2)

Table 2.3 on the following page lists valid configuration switch settings.

**Note For TopSecret models (8x10RM):** Because the removable Winchester cartridge can have only 1 unit 1 volume, only configurations 0 (0 0 0 0) and 15 (1 1 1 1). may be used.

A few examples are given below to help in your use of the Configuration Table:

**EXAMPLE # 1:**

Bering 8310 single-port with C3 C2 C1 C0 set at 0 (0 0 0 0).

Per Table 2.3, this configuration specifies a single unit of storage containing one volume of 10MB. The fixed Winchester is assigned unit # 0 and the auxiliary disk (in this case, the floppy disk) is assigned unit # 1.

**EXAMPLE # 2:**

Bering 8120 single-port with C3 C2 C1 C0 set at 3 (0 0 1 1).

Per Table 2.3, this configuration specifies a single unit of storage containing four volumes of 5MB each. The fixed Winchester is assigned unit #0 and the auxiliary disk (in this case, the removable Winchester) is assigned unit # 1.

**EXAMPLE: # 3**

Bering 8345 3-port with C3 C2 C1 C0 set at 10 (1 0 1 0).

Per Table 2.3, this configuration specifies 1 unit/port with one volume per unit of 15MB each. The fixed Winchester is assigned unit # 1 and the auxiliary disk (in this case, the floppy) is assigned unit # 0.

Table 2.3

Configuration Switches Settings

Config. Setting	Switches C3 C2 C1 C0	No. of units	Volumes per unit	Volume size <sup>1</sup>	Winch unit#	Aux unit# <sup>2</sup>
0	0 0 0 0	1	1	1	0	1
1	0 0 0 1	1	2	.5	0	1
2	0 0 1 0	1	3	.333	0	1
3	0 0 1 1	1	4	.25	0	1
4	0 1 0 0	1	1 1	.8 .2	0	1
5	0 1 0 1	1	6	.166	0	1
6	0 1 1 0	1	1 2	.666 .166	0	1
7	0 1 1 1	1	8	.125	0	1
8	1 0 0 0	1	1 3	.5 .166	0	1

<sup>1</sup>Volume size in fraction of total Mbyte per given disk model.

<sup>2</sup>Auxiliary unit may be floppy or removable Winchester.

For TopSecret models (831ORM, 801ORM): Because the removable Winchester cartridge can have only 1 unit 1 volume, only configurations 0 (0 0 0 0) and 15 (1 1 1 1) may be used.

Table 2.3, continued

Configuration Switches Settings

Config. Setting	Switches C3 C2 C1 C0	No. of units	Volumes per unit	Volume size <sup>1</sup>	Winch unit#	Aux unit# <sup>2</sup>
9	1 0 0 1					
	Single Port:	2	1	.5	0,1	2
	Multi Port:	1	unit/port		0	1
10	1 0 1 0					
	Single Port:	3	1	.33	0,1,2	3
	Multi Port:	1	unit/port		1	0
11	1 0 1 1					
	Single Port:	2	1	.5	1,2	0
	Multi Port:	1	unit/port; SIS at unit 1		0	2
12	1 1 0 0					
	Single Port:	3	1	.33	1,2,3	0
	Multi Port:	1	unit/port; SIS at unit 2		1	0
14	1 1 1 0	1	1	emulation	0	1
15	1 1 1 1	1	1	1	1	0

<sup>1</sup>Volume size in fraction of total Mbyte per given disk model.

<sup>2</sup>Auxiliary unit may be floppy or removable Winchester.

#### 2.4.3.2 Emulation

Another advantage of the Series 8000 is its ability to emulate a variety of HP disk drives (as shown in Table 2.4). This allows the Series 8000 to function with older computers and software. Note that in order to emulate any of the HP drives, the storage space of the Bering Series 8000 may not be fully utilized.

To configure a Series 8000 to emulate one of the HP hard disk drives, set the configuration switches to 14 (1 1 1 0). See the top section of Table 2.4.

Additionally, each unit of 15MB configured into a Series 8000 by the various other available configuration settings will emulate an HP9133D/34D hard disk.

Other configurations provide a 10 Mbyte emulation to simplify local data backup using the removable disk cartridge (81xx Models).

#### EXAMPLE:

Bering 8170 Single Port with the configuration switches set at 14 (1 1 1 0).

Per Table 2.4, this configuration in a Bering 8x70 specifies an emulation of an HP 7912. Per Table 2.3, a single unit of storage containing one volume is indicated. Volume size depends on the disk being emulated. In this example, in order to emulate the HP7912, only 65.6 Mbytes will be available. The fixed Winchester is assigned unit # 0 and the auxiliary disk (in this case, the removable Winchester) is assigned unit # 1 with the same HP-IB address.

Table 2.4

Disk Partitions And Emulations

Bering Models	Primary Disk (Mbytes x unit)	HP Disk Emulations
8x20	16.5 X 1	7908
8x33	28.1 X 1	7911
8x70	65.6 X 1	7912
8x15	14.8 X 1	9133D/34D
8x33	14.8 X 2	9133D/34D
8x45	14.8 X 3	9133D/34D
8x70	14.8 X 4*	9133D/34D
8x10RM/8x10	10.4 X 1	None
8x20	10.4 X 2	None
8x33	10.4 X 3	None
8x45	10.4 X 4*	None

\*3 Port with SIS only.

If you have a single-port 8000, proceed to Section 2.7.

## 2.5 DISK AND FILE SHARING

If you have a single-port 8000, proceed to Section 2.7.

A multi-port Series 8000 disk subsystem performs disk and file sharing in three different ways. Arbitration of the sharing traffic is maintained by firmware inside the disk controller. The three modes of disk and file sharing are described in Sections 2.5.1 through 2.5.3 below.

### 2.5.1 Simple Disk and File Sharing

Each disk port provides an exclusive Winchester disk space to the computer connected to it. Each computer runs independently of the others. For example, a 45MB fixed disk with 3 ports may have 15MB of exclusive storage for each of the three computers connected to it.

### 2.5.2 Shared Information Space (SIS)

Each computer is given an exclusive disk space and may also gain control of a shared disk area. For example, a 20MB disk with 3 ports may have a 5MB unit for each port and a SIS unit of 5 MB.

The SIS unit is shared by all ports. Use is on a "first-request-first own" basis. Only one computer may access the shared disk space at any one time. Thus while one port is using the SIS unit, other ports wait for it to become available. To gain access to the SIS, a SIS driver is required. The special commands used to control the SIS are described in Chapter 7, Technical Information.

### 2.5.3 Multi-Access in Common (MAC)

The subsystem may be configured to make the entire disk space accessible from any port. The first computer to gain control of the shared disk space will own it until that computer releases it. Special commands are provided to semaphore lock read/write operations. Coordination of data between ports is left to the software utilizing this feature. The semaphore lock commands are described in Chapter 7, Technical Information.



#### 2.5.4 Sharing Removable Media

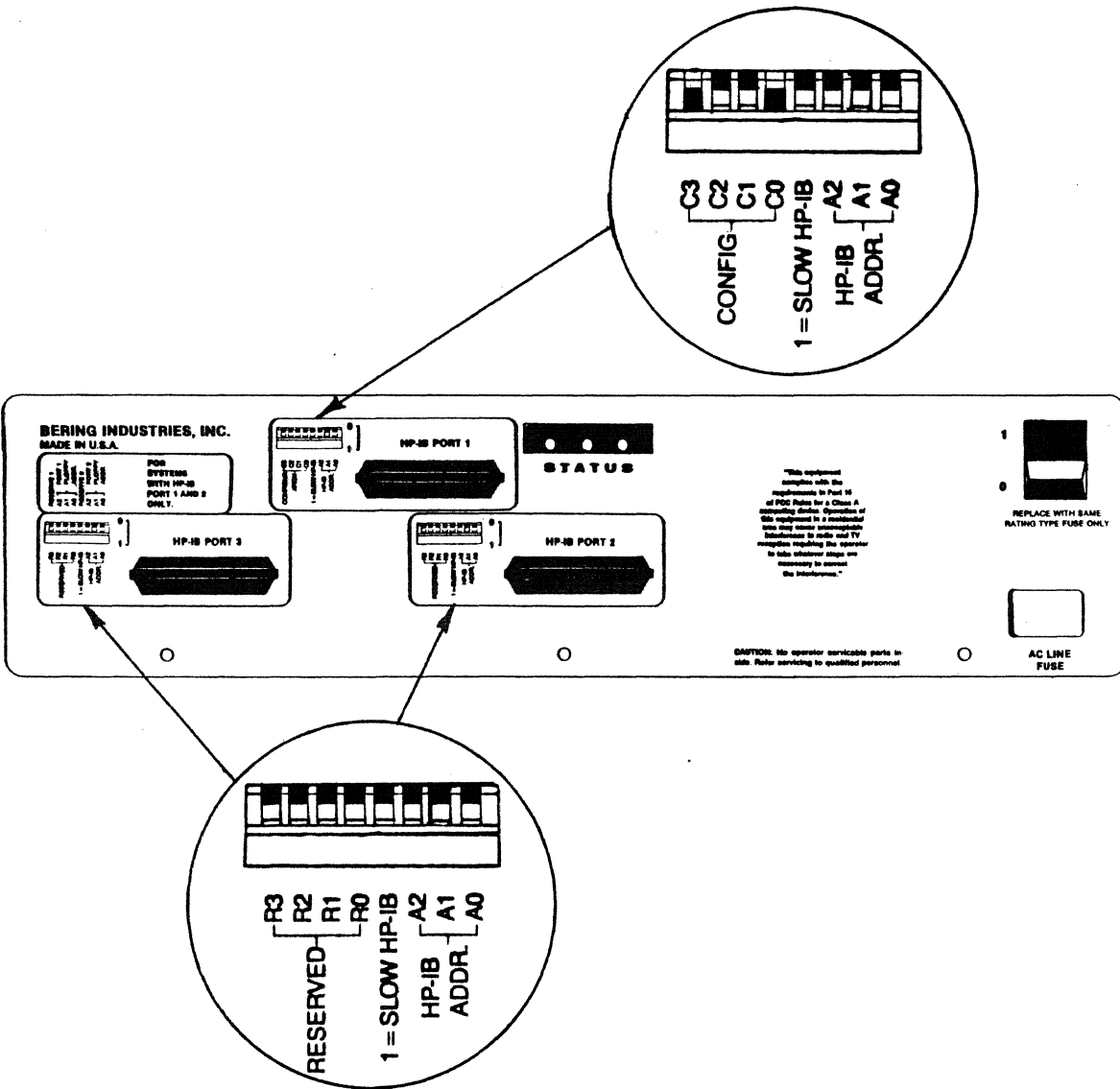
In the multi-port subsystem, the floppy drive or removable cartridge disk drive is also shared by all ports. Use of this auxiliary disk is on a "first-use-first-own" basis. Once the media is inserted into the drive, the first computer to access the disk will own the drive until the media is removed. While the auxiliary drive is in use by one computer, computers at other ports attempting access will detect a "drive-not-ready" error.

2.6 SWITCH SETTINGS AT PORT 2 AND PORT 3

The layout of the Port 2 and Port 3 switches and the positions of the switches on the rear panel are illustrated below in Fig. 2.2.

Figure 2.2

Configuration Switches - Ports 1, 2, and 3



### 2.6.1 Ports 2 and 3 HP-IB Address Switches

At Port 2 and at Port 3, switches A2 A1 A0 are used to the HP-IB address of the subsystem as read by the computers cabled to those ports. Valid addresses range from 0 to 7.

Table 2.5

Port 1 and Port 3 HP-IB Address Switch Settings

Address	Switches		
	A2	A1	A0
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

### 2.6.2 Port 2 and Port 3 Slow HP-IB Switch Settings

This switch sets Slow HP-IB. When the switch is ON (set to 1) the HP-IB settling time is changed from 500 nanoseconds to 200 microseconds. Do not use the slow transfer rate unless all devices on the bus use the slow rate. Hewlett-Packard computers and peripherals use the fast (500 nanoseconds) transfer rate. Therefore, most users will set this switch OFF (set to 0).

Table 2.6

Port 2 and Port 3 Slow HP-IB Switch Settings

OFF	0
ON	1

### 2.6.3 Port 2 and Port 3 Reserved Switch Settings

Switches labelled Reserved are not used. Set them to 0.

Note that configuration for ALL ports is set by the configuration switches located at the Port 1 section of the rear panel. Refer to Section 2.4.3 for detailed procedures on setting multi-port system configuration.

## 2.7 CONNECTING YOUR DISK DRIVE

Note: If you are cabling a single computer to a 2 or 3-port 8000 subsystem, select a port for use. It is most logical to cable the first computer to Port 1.

1. Turn off your disk drive and computer.
2. Attach one end of the HP-IB cable onto the HP-IB connector of your disk drive, and tighten the screws on the HP-IB cable with your fingers.
3. Attach the other end of the HP-IB cable onto the HP-IB connector of your computer, and tighten the screws on the HP-IB cable with your fingers.

## 2.8 POWER-UP AND SELF-TEST

Turn on the power switch on the rear panel of the 8000 subsystem. The subsystem will now perform a self-test. (If your 8000 Model includes Opt. 401, after completing this section, refer to Chapter 6, Section 6.3.1 for further explanation of the self-test codes used by the digital display located on the subsystem front panel).

- a. The fixed Winchester is the first module to be tested. The Main LED will not come on for approximately 30 seconds. It will then blink for 2 seconds as the fixed Winchester is tested.
- b. In those models with an auxiliary drive, the auxiliary drive is tested next. The Drive Select LED (red) on the auxiliary drive will blink for 2 seconds as the auxiliary drive is tested. After the self-test is completed, the Drive Select (red) of the auxiliary drive should be OFF (All Removable models-- see Note # 1 below).
- c. After the self-test is completed, the Main LED should be OFF (TopSecret (8x1ORM) models-- see Note # 2 below).

If the Main LED or the Drive Select LED continue to blink, the subsystem has failed the self-test. Consult the Troubleshooting Guide in Chapter 6 for information that will assist you in identifying the faulty Field Replaceable Unit.

```
*****  
* The Main LED will blink during normal use of the fixed      *  
* Winchester to indicate activities in progress.              *  
* This is NOT a sign of subsystem failure.                    *  
*****
```

NOTE # 1: For all Removable models, the Ready LED (green) will remain ON if there is a properly installed cartridge in the drive.

NOTE # 2: If you have a TopSecret (8x1ORM) model, the Main LED on the subsystem front panel will remain ON during normal operation. For the TopSecret models, this lit Main LED is NOT a sign of subsystem failure.

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## CHAPTER 3

### USING REMOVABLE DISKS

This Chapter contains the following sections:

3.1 Using Your Floppy Diskette

3.2 Using Your Removable Winchester

#### 3.1 USING YOUR FLOPPY DISKETTE

##### 3.1.1 Handling the Floppy Diskette

1. Make sure the shutter is closed when the diskette is not in use.
2. Use the diskette in a clean environment.
3. Keep diskette in a cool, dry place.
4. Avoid magnetic fields such as near appliances with motors.
5. Do not touch the surface of the diskette.
6. Do not attempt to clean the diskette.



### 3.1.2 How to Insert and Remove Floppy

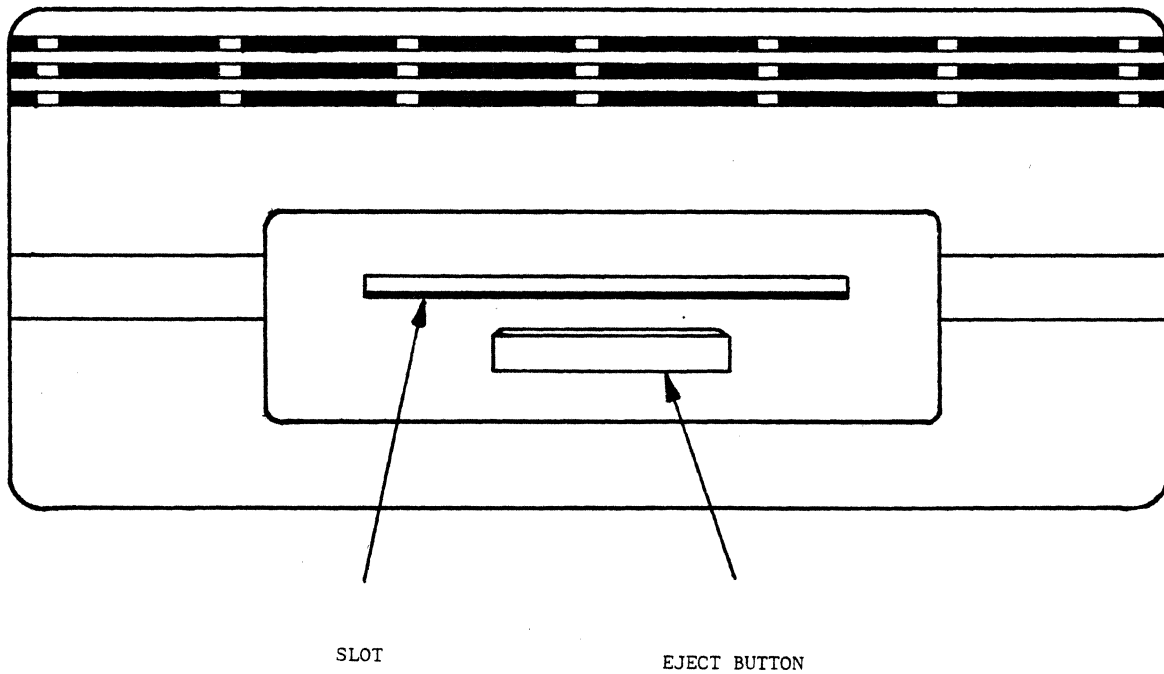
Series 8000 built-in 3.5" disk drives support floppy diskettes with AUTO-SHUTTERS only. The front panel of the disk drive is illustrated in Fig. 3.1 below.

To load the diskette, insert it into the slot until the EJECT BUTTON pops out.

To remove the diskette, simply push in the EJECT BUTTON.

Figure 3.1

Front Panel of Floppy Disk Drive



### 3.1.3 Single-Sided Versus Double-Sided

Double-sided diskettes are recommended for use in the Series 83xx disk subsystems. Single-sided diskettes may be used but data should be copied onto double-sided diskettes for daily use. Table 3.1 below compares single-sided and double-sided diskettes and disk drives.

Table 3.1

Single-Sided Versus Double-Sided

Single-Sided	Double-Sided
Records data on 1 side of the diskette only	Records data on both sides of the diskette
Diskette can be formatted with single-sided format only	Diskette can be formatted with either single-sided or double-sided format
Diskette can be used only in single-sided drives	Diskette can be used in either single-sided or double-sided drives
Disk drive has only 1 read/write head	Disk drive has 2 read/write heads

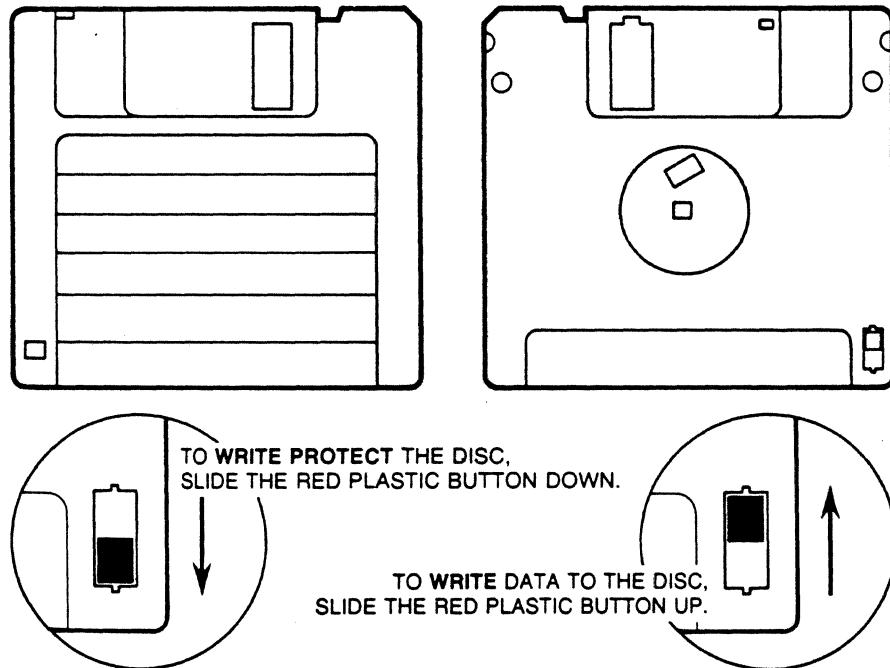
### 3.1.4 Write Protect Tab

To WRITE-PROTECT the floppy diskette, place the tip of a pen in the small hole at the top of the write-protect tab and slide the tab down until it locks into place (Fig. 3.2 Left).

To WRITE data onto the diskette, slide the tab up (Fig. 3.2 Right).

Figure 3.2

Using Write Protect Tab in 3.5" Floppy



### 3.2 USING YOUR REMOVABLE WINCHESTER

#### 3.2.1 Handling the Removable Cartridge

\*\*\*\*\*  
\* Be sure to turn ON power for the subsystem BEFORE attempting to \*  
\* install or remove the disk. \*  
\*\*\*\*\*

1. Do not put labels on the cartridge. Labels can peel off and damage the vacuum system and head load mechanism.

You may label the Winchester cartridge sleeve. It is useful to mark the partition configuration (per Table 2.3) on the cartridge sleeve to avoid confusion when the cartridge is used on different drives.

2. Always store the cartridge in the sleeve when not in use.
3. Do not place cartridge on surfaces where it can be easily knocked off or dropped.
4. Keep cartridges in a cool, dry place.
5. Avoid magnetic fields such as near appliances with motors.
6. Do not attempt to open the access doors on the cartridge.
7. Always remove the cartridge before you turn off your disk drive.
8. Do not attempt to clean the Read/Write heads.

Figure 3.3

Removable Winchester Drive

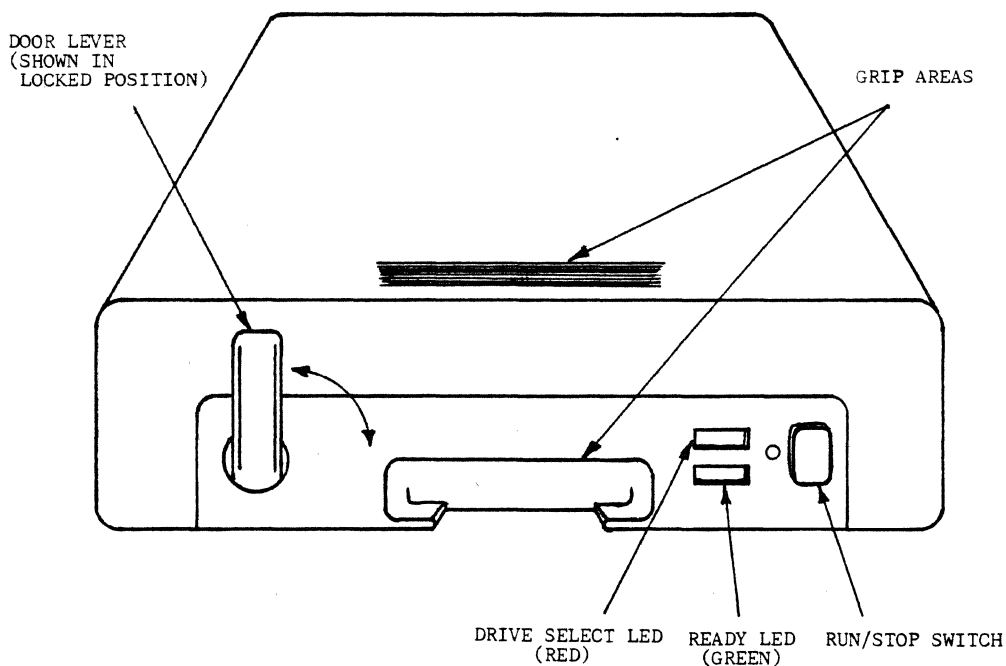
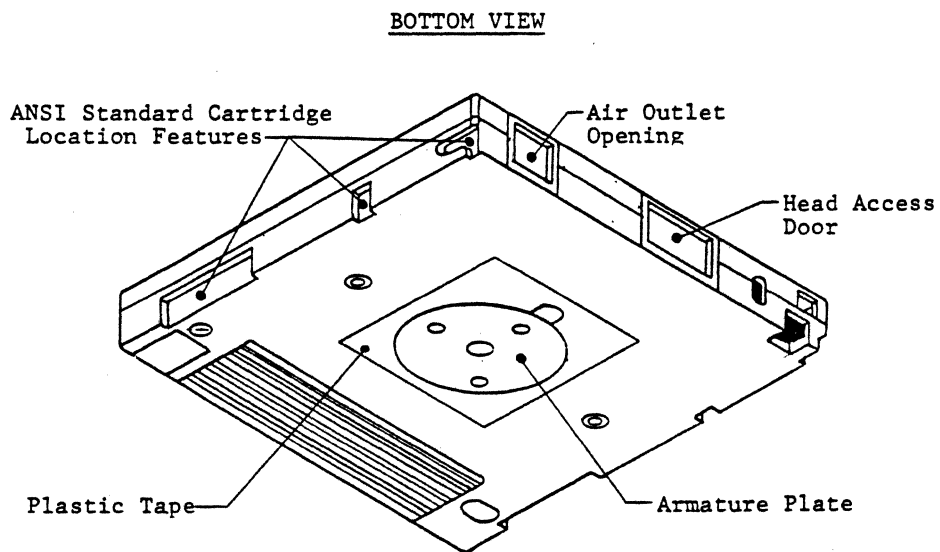
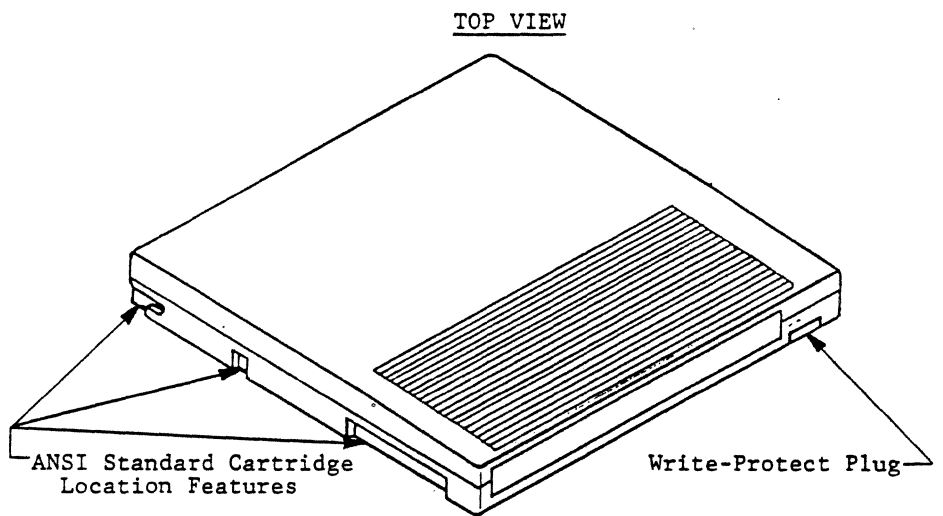


Figure 3.4

Top and Bottom Views of Removable Cartridge



### 3.2.2 Cartridge Installation

1. Turn on your disk drive.
2. The Ready LED (green) should be off. If the Ready LED is blinking or is lit, a cartridge is already loaded in the drive.

Follow the instructions below under Cartridge Removal to unload the cartridge.

3. Unlatch the door by rotating the Door Lever clockwise 90 degrees.

Pull the drawer out from the front panel until you hear it click into position. The drive will be approximately 5 inches from the front panel when it locks in position.

4. Gently pull the drive door down. It will open 90 degrees, and the cartridge receiver tray will raise up approximately 1/4 inch.
5. Remove the cartridge from the protective sleeve.
6. Make sure the plastic tape on the armature plate located on the underside of the cartridge is removed.
7. Slide the cartridge all the way into the receiver tray.
8. Gently pivot the drive door upward until it closes. The receiver tray will retract and seat.
9. Move the Door Lever counter-clockwise until it is pointing straight up. This will lock the drive door and release the latch.
10. Gently slide the drive back into the housing until you hear it click. The drive is now locked in position.
11. Push in the Run/Stop switch firmly to start the spindle motor. The Ready LED (green) will start blinking at a rate of once per second for approximately 30 seconds— indicating that the drive is coming up to speed.
12. If a new, unformatted cartridge is loaded, the Ready LED (green) will blink at a rate of 4 times per second. Proceed to format the new disk cartridge from your computer.
13. When the Ready LED (green) remains lit steadily, a self-test procedure will be performed to make sure both the drive and cartridge are operational.

If the self-test fails, the Drive Select LED (red) will blink at a rate of 5 times per second. Refer to Chapter 6 Troubleshooting Guide for additional procedures.

NOTE: The Drive Select LED (red) will blink during normal access of the cartridge. This is NOT a sign of disk failure.

14. Following the self-test, the Drive Select LED (red) on the Removable Drive will dim. The disk is now ready for use.

### 3.2.3. Cartridge Removal

1. Make sure your disk drive is turned ON. You cannot remove the cartridge when the power is off.
2. If the Ready LED (green) is off, the cartridge has already been unloaded. If the Ready LED is on, push in the Run/Stop Switch firmly and then release it. The Ready LED will blink at a rate of once per second. After the head has retracted and the spindle motor has stopped, the Ready LED will be off.
3. Unlatch the door by rotating the Door Lever clockwise 90 degrees.

Pull the drawer out from the front panel until you hear it click into position. The drive will be approximately 5 inches from the front panel when it locks into position.

4. Gently pull the drive door down. Use a firm push to pop up the cartridge receiver tray. It will open 90 degrees, and the cartridge receiver tray will raise up approximately 1/4 inch.
5. Slide the cartridge all the way out of the receiver tray.
6. Put the cartridge back into the protective sleeve.
7. Gently pivot the drive door upward until it closes.
8. Move the Door Lever counter-clockwise until it is pointing straight up. This will lock the drive door.
9. Gently slide the drive back into the housing until you hear it click. The drive is now locked into position.

### 3.2.4 Write Protect Plug

To write-protect the cartridge, slide the plastic plug out of the write-protect cavity (see Fig. 3.4 Top View). Save the plug so that you can insert it back into the cavity to write-enable the disk cartridge for future data modifications.

## CHAPTER 4

### GETTING STARTED

This chapter contains the following sections:

- 4.1 HP Touchscreen PC
- 4.2 Series 200 - BASIC 2.0
- 4.3 Series 200 - BASIC 3.0
- 4.4 Series 200 - PASCAL 2.0
- 4.5 Series 200 - PASCAL 3.0
- 4.6 Series 200 -SRM
- 4.7 HP250
- 4.8 HP1000-A, X, L
- 4.9 HP1000-M/E/F
- 4.10 HP9845
- 4.11 HP64000
- 4.12 HP Integral Personal Computer (IPC)

#### 4.1 HP TOUCHSCREEN PC

The following sections describe the procedures to boot the operating system from the micro-floppy disk, prepare the Winchester disk, install operating system and application software onto the Winchester disk, and finally boot from the Winchester disk.

For Multi-port systems, use the same procedure to install the software at each computer. Each port will operate as a stand-alone disk.



#### 4.1.1. Configuration

1. Set the Address Switches to 0 and the switches at Port 1 labelled C3 C2 C1 C0 to the following table.

Table 4.1.1

#### Initial Configuration Setting

Model	Configuration Setting	Switches			
		C3	C2	C1	C0
8310	15	1	1	1	1
8315	15	1	1	1	1
8320	11	1	0	1	1
8333	11	1	0	1	1
8345	12	1	1	0	0
Multi-port	10	1	0	1	0
Multi-port + SIS	12	1	1	0	0

2. Load P.A.M. and the operation system as follows:
  - a. Turn on disk drive.
  - b. Insert the SYSTEM MASTER disk into the floppy disk drive.
  - c. Turn on your HP Touchscreen PC.
  - d. Wait until the P.A.M. screen appears.
3. Load DEVICE CONFIG as follows:
  - a. Touch DEVICE CONFIG until it is highlighted.
  - b. Press START APPLIC. The MS-DOS Device Configuration menu will now appear on your screen.

- Modify the lower half of the menu to configure the disk drives until they appear as listed in the following table. Touch the area to be modified until it lights up. Press NEXT CHOICE until the desired value is displayed.

Table 4.1.2

Device Configuration

Configuration	Switches				Interface	Disk Drives Addr	Drive Unit Number
	C3	C2	C1	C0			
10 (multi-port)	1	0	1	0	A: HP-IB B: HP-IB	0 0	0 1
11	1	0	1	1	A: HP-IB B: HP-IB C: HP-IB	0 0 0	0 1 2
12 (single-port)	1	1	0	0	A: HP-IB B: HP-IB C: HP-IB D: HP-IB	0 0 0 0	0 1 2 3
12 (multi-port) (SIS)	1	1	0	0	A: HP-IB B: HP-IB C: HP-IB	0 0 0	0 1 2
15	1	1	1	1	A: HP-IB B: HP-IB	0 0	0 1

- Press the SAVE CONFIG. The message DEVICE CONFIGURATION HAS BEEN SAVED will appear on the top of the screen.
- Press EXIT CONFIG. Now your drive A: is the floppy drive and B:, C: or D: are the Winchester disk units.

#### 4.1.2. Formatting the Winchester Disk

Before the Winchester disk can be used for the first time, it must be formatted.

1. Make sure the SYSTEM\_MASTER disk is write-protected and inserted in the floppy drive.
2. Load FORMAT utility as follows:
  - a. Touch FORMAT until it is highlighted.
  - b. Press START APPLIC. Now the FORMAT main menu will appear on your screen.
3. Touch the disk you wish to format. Since you wish to format the Winchester disk, touch DRIVE B.
4. If you want to label the disk, type a name of up to 11 characters and press return. Otherwise press NO DISC LABEL.
5. Press the COPY SYSTEM. An asterisk (\*) will show up in the COPY SYSTEM block indicating that the operating system will be copied to the Winchester disk.
6. Press START FORMAT. Now the screen may display the message, "THIS DISK HAS FILES, DO YOU WANT TO DESTROY THEM? TYPE Y OR N; PRESS RETURN." Type Y and press return. If you do NOT want to destroy the information on the disk, type N and press return.
7. As the COPY SYSTEM option selected in step 5, the computer first reads all the operating system files from the floppy. When all the files have been read, a message appears on the screen, "ALL SYSTEM FILES HAVE BEEN READ. INSERT DISC(S) TO BE FORMATTED." Press return.
8. DRIVE B is highlighted to indicate formatting. After the disk is formatted, the highlight is removed.
9. Press EXIT FORMAT.

### 4.1.3. Booting from Winchester

1. Remove the floppy diskette from the drive.
2. Turn off your computer and disk drive.
3. Change the Configuration Switches as listed in the following table.

Table 4.1.3

Configuration Switch Settings

Model	Old Setting				New Setting			
	C3	C2	C1	C0	C3	C2	C1	C0
8310	1	1	1	1	0	0	0	0
8315	1	1	1	1	0	0	0	0
8320	1	0	1	0	1	0	0	1
8333	1	0	1	1	1	0	0	1
8345	1	1	1	0	1	0	1	0
multi-port	1	0	1	0	1	0	0	1
multi-port + SIS	1	1	0	0	1	0	1	1

4. Turn on disk drive. The Winchester disk now becomes your primary disk drive (drive A).
5. Turn on your computer to boot from the Winchester disk. There should be no installed applications.

#### 4.1.4. Installing Applications

1. Insert the SYSTEM\_MASTER disk into the floppy disk. Press REREAD DISC.
2. Load INSTALL utility as follows:
  - a. Touch INSTALL until it is highlighted.
  - b. Press START APPLIC.
3. Press INSTALL APPLIC. Now the install screen appears.
4. Select the floppy drive in the FROM: column. The drive letter is listed in the following table.

Table 4.1.4

Drive Assignment for HP150

Switch Setting				Disk Drive
C3	C2	C1	C0	
0	0	0	0	A: Winchester B: Floppy
1	0	0	1	A: Winchester B: Winchester C: Floppy
1	0	1	0	A: Winchester B: Winchester C: Winchester D: Floppy
1	0	0	1	A: Winchester B: Floppy (multi-port)
1	0	1	1	A: Winchester B: Winchester/SIS C: Floppy (multi-port, SIS)

5. Touch the Winchester drive (drive A) in the TO: column.
6. Press the SHOW APPLIC to list all the application programs available for copying. Touch each application program that you wish to copy until it is highlighted.
7. Press START INSTALL. The screen shows the application programs you are installing.

8. After all the programs are copied, remove the floppy disk.
9. If the Shared Information Space feature is utilized (multi-port system with switches C3 C2 C1 C0 set to 1 0 1 1 or 12), insert the supplied floppy disk with SIS software into the floppy disk. Repeat steps 6, 7, and 8 to install "SHARE-OPTION SIS."
10. If more programs need to be installed, remove the floppy disk from the drive. Insert the floppy with the programs into the floppy drive. Repeat steps 6, 7, and 8.
11. When the installation is complete, press EXIT SELECT, then MAIN MENU, and then EXIT INSTALL to return to P.A.M.

#### 4.1.5. Using Share Software

Share can be activated in two ways:

1. From P.A.M., by touching the "SHARE-OPTION SIS" box until it is highlighted and then START APPLIC key.
2. From MS-DOS by typing Share then return.

##### 4.1.5.1. REQUEST SIS

Press the REQUEST to request the SIS. If the request is rejected, then one of the following messages will be displayed:

SIS BUSY - SIS is already configured to another computer. Wait and touch REQUEST to try again.

SIS ALREADY CONFIGURED - SIS is already configured to the requesting computer. The SIS is released temporarily and then reconfigured to the same computer. If unable to reconfigure, SIS BUSY will be displayed.

OPTION SIS NOT INSTALLED - The SIS option is not configured. Check the configuration switches.

COMMAND FAILURE - The disk does not recognize the SIS commands. The disk drive may be faulty or the drive is not a BERING product.

HP-IB ERROR - The computer HP-IB hardware has failed, the HP-IB cable is loose, or the Share software is not compatible with the operating system.

##### 4.1.5.2. RELEASE SIS

Press the RELEASE key to make the SIS available for other computer(s).

#### 4.1.5.3 Configuration Options of Share

The default address of the SIS used by the Share is HP-IB address 0. The drive number of the SIS for series 8000 is 1 for configuration 11 and 2 for configuration 12.

If Share is scheduled from MS-DOS, the following command can be used:

Share [SIS HP-IB address]

If Share is to be scheduled by P.A.M., and HP-IB address is NOT 0, then the file Share.IN\$ needs to be edited before installing the Share software. Use WORDSTAR with non-document mode, MEMOMAKER or EDLIN to change the line 4 from

Address 0 Drive 2

to

Address x Drive 2

where x is the desired HP-IB address.

After the SIS address is selected, use DEVICE CONFIG to assign a drive letter for the SIS. Make sure the SIS address is entered into the configuration menu correctly.

## 4.2. SERIES 200 - BASIC 2.0

### 4.2.1 Use of Configuration Switches

For single-port systems, use the configurations 0(0000), 9(1001), or 10(1010) as listed in Table 2.3. Configuration 14(1110) may be used for models 8020, 8033 or 8070 to emulate HP7908, HP7911 or HP7912 disk drives. Normally, configuration 0 is recommended. Configurations 9 or 10 allow you to have multiple directories. Thus it will help you to organize files better.

For multi-port system, use configurations 9 or 11 as listed in Table 2.3.

Note that BASIC 2.0 does not support multiple volumes.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

Refer to Appendix A for multiple language installation procedures.

### 4.2.2. Mass Storage Unit Specifier

Mass Storage Unit Specifier (MSUS) is what the computer uses to identify your disk drive. For example, the MSUS of an 8000 might appear as follows:

":CS80,700,1"

Note that the MSUS is composed of three parts, separated by commas:

- |                    |       |
|--------------------|-------|
| 1. Device type     | :CS80 |
| 2. Device selector | 700   |
| 3. Unit number     | 1     |

The device selector is the address of your disk drive. The first digit is the select code of your HP-IB interface. For internal HP-IB, it is 7. The last two digits are the HP-IB address of the



disk drive as set by the address switches at the back panel. The range of address is from 00 to 07.

The unit number is the part of the Winchester disk or the floppy disk you wish to access. Refer to Table 2.3 for appropriate unit numbers.

#### 4.2.3. Booting Your System

The BASIC 2.0 does not support 3.5" disk drives without the binary extension AP2.1. Therefore, either the internal floppy or a HP9121 type micro-floppy disk drive is required to initially boot system and load the AP2.1. After the BASIC 2.0 is ready, then the Winchester can be initialized and configured to boot the BASIC 2.0 and AP2.1 utilizing the loader utility supplied by HP.

1. Be sure the address switches at the back panel are set as desired and different from other disk drive(s) (e.g. HP9121 micro-floppy drive).
2. Turn off your computer.
3. Turn on your disk drive(s) and wait for the self test to complete.
4. Insert the BASIC system disk into the internal floppy disk drive or the HP9121.
5. Turn on your computer. Your computer automatically loads the operating system and prompts "BASIC READY."
6. Remove the BASIC system disk from the floppy drive.
7. Insert the AP2.1 disk into the internal floppy drive or the HP9121.
8. Type LOAD BIN "AP2\_1" and press EXECUTE.
9. Now the BASIC 2.0 is ready to use.

#### 4.2.4. Disk Initialization

Note that BASIC 2.0 does not support the double-sided micro-floppy. Therefore, only the Winchester initialization procedure is described here.

If your disk is configured with multiple units, each unit needs to be initialized before use.

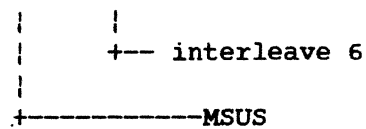
The interleave factor affects the performance of your computer. The following table details some recommended interleave factors:

Table 4.2.1

Recommended Interleave Factors	
Hardware	Interleave Factors
Disk Interface 98625A + DMA 98620B	3
Build-in HP-IB + DMA 98620B	4
Build-in HP-IB	7
With Bering T-100 tape	6

Initialize the disk using a command similar to the following and remember to press EXECUTE to start the process.

```
INITIALIZE ":CS80,700,0",6
```



#### 4.2.5. Booting from Winchester

In order to boot from the Winchester, the BOOT ROM 3.0 should be installed and all the system files need to be copied from the floppy disk onto the Winchester disk.

1. Insert the BASIC 2.0 system disk into the internal disk drive or the HP9121.
2. Copy the loader utility onto the Winchester using commands similar to the following:

```
COPY "SYSTEM_LD" to "SYSTEM_LD:CS80,700,0"  
COPY "CONFIGER" to "CONFIGER:CS80,700,0"  
COPY "CONFIG_CHK" to "CONFIG_CHK:CS80,700,0"
```

3. Copy the system using a command similar to the following:

```
COPY "SYSTEM_BAS" to "SYSTEM_BAS :CS80:700,0"
```

4. Insert the AP2.1 disk into the internal disk drive or HP9121.
5. Copy the AP2.1 using a command similar to the following:

```
COPY "AP2_1" to "AP2_1:CS80,700,0"
```

6. Load the CONFIGER utility using commands similar to the following:

```
MSI ":CS80,700,0"  
LOAD "CONFIGER"
```

Then press RUN to start loader configuration.

7. Enter the loader command file name

```
CONFIG_LD (ENTER)
```

8. Enter the files to be loaded:

```
SYSTEM_BAS (ENTER)  
AP2_1      (ENTER)  
           (ENTER)
```

9. Remove the disk from the floppy drive and turn off your computer.
10. Now you should be able to boot from the Winchester by turning on your computer.

## 4.3 SERIES 200 - BASIC 3.0

### 4.3.1. Use of Configuration Switches

For single-port systems, any of the configurations listed in Table 2.3 can be selected. Multiple volume, multiple unit or HP disk emulation are supported by BASIC 3.0. Multiple volume and multiple unit configurations allow you to have multiple directories. Thus you can organize your files better. Multiple volume configuration requires longer Mass Storage Unit Specifier than using multiple unit configuration.

For multiple-port system, select configuration 9 or 11 as listed in Table 2.3.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk. See
* Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

Refer to Appendix A for multiple language installation procedures.

### 4.3.2. Mass Storage Unit Specifier (MSUS)

MSUS is what the computer uses to identify your disk drive. For example, the MSUS of an 8000 might appear as follows:

":CS80,700,1,4"

Note that the MSUS is composed of four parts separated by commas:

- |                    |               |
|--------------------|---------------|
| 1. Device type     | :CS80         |
| 2. Device selector | 700           |
| 3. Unit number     | 1 (default 0) |
| 4. Volume number   | 4 (default 0) |

The device type is optional with the BASIC 3.0 operating system. You may type your MSUS as ":",700,1,4", leaving out the device type.

The device selector is the address of your disk drive. The first digit is the select code of your HP-IB interface. For internal HP-IB, it is 7. The last two digits are the HP-IB address of the disk drive as set by the address switches at the back panel. The range of address is from 00 to 07.

The unit floppy number is the part of the Winchester disk or the floppy drive you wish to access. Refer to Table 2.3 for appropriate unit numbers.

The volume number is the part of the Winchester disk within the unit you wish to access. Refer to Table 2.3 for number of volumes and respective sizes.

#### 4.3.3. Booting Your System

The following procedure assumes that Boot ROM 3.0 is installed in your computer. Otherwise, boot your system with the built-in floppy drive(s).

1. Be sure the address switches at the back panel are set as desired (0 is recommended).
2. Turn off your computer.
3. Turn on your disk drive and wait for the self test to complete.
4. Insert the BASIC 3.0 system disk in the floppy disk drive.
5. Turn on your computer. Your computer automatically loads the operating system and prompts "BASIC READY."
6. Remove the BASIC system disk from the floppy drive.
7. Insert the BASIC 3.0 Drivers disk into the floppy disk drive.
8. Type LOAD BIN "HPIB" and press Return.
9. When the prompt "BASIC HPIB 3.0" appears, type LOAD BIN "CS80" and press Return.
10. Now the system is ready to use with BASIC 3.0.

4.3.4. Disk Initialization

4.3.4.1. Winchester Initialization

If your disk is configured with multiple volumes, each volume must be initialized separately.

The interleave factor affects the performance of your computer. Following table details some recommended interleave factors:

Table 4.3.1

Recommended Interleave Factors

Hardware	Interleave Factors
Disk Interface 98625A + DMA 98620B	3
Built-in HP-IB + DMA 98620B	4
Built-in HP-IB With Bering T-100 tape	7 6

Initialize the disk, using a command similar to the following:

```
INITIALIZE ":",700,0",6
      -
      |
      |  +-- interleave 6
      |
      +-----MSUS
```

For multiple volumes, specify the volume number as part of the MSUS:

```
INITIALIZE ":",700,0,0",6
      -
      |
      +-- volume 0
```

Use the above command with different volume numbers to initialize other volumes.

#### 4.3.4.2. Floppy Initialization

There are several formatting options as listed in the following table. Note that sector size of 512 bytes is not support by BASIC 3.0.

Table 4.3.2

Floppy Disk Formatting Options

Format Option	Sector Size	Sides	Kbytes of Storage
0	256	2	630
1	256	2	630
3	1024	2	788
4	256	1	277

Initialize the floppy disk, using a command similar to the following command:

```
INITIALIZE ":",700,1",2,0
```

```
-----
|           | |
|           | +---format option
|           + ---interleave factor
+-----MSUS
```

Remember the following:

1. format double-sided ONLY in double-sided disks,
2. a disk formatted double-sided can only be used in a double-sided disk drive.
3. a disk formatted singled-sided can be used in both a single-sided and a double-sided drive.

#### 4.3.5. Booting from Winchester

In order to boot from the Winchester, all the system files need to be copied from the floppy disk onto the Winchester disk.

1. Insert the BASIC 3.0 Drivers Disk into the floppy drive.
2. You have already loaded the disk drivers HP-IB and CS80. Load any other driver using the following command:

```
LOAD BIN "filename"
```

and press Return.

3. Insert the BASIC 3.0 Language Extension into the floppy disk drive.
4. Load any language extension BIN files, using the following command:

```
LOAD BIN "filename"
```

and press Return

5. Create a system file on the Winchester disk, using a similar command as following:

```
STORE SYSTEM "SYSTEM_BA3 :,700,0,0"
```

```
-----  
|           |  
|           +--MSUS  
+----System file name
```

6. Remove the floppy disk and turn off your computer.
7. Now you should be able to boot BASIC 3.0 and all the binary modules from the Winchester disk by turning on your computer.



#### 4.4. SERIES 200 - PASCAL 2.0

##### 4.4.1. Use of Configuration Switches

For single-port system, select configuration 0(0000) as listed in Table 2.3. Configuration 14 (1110) may be selected for models 8x20, 8x30, or 8x70 to emulate HP7908, HP7911 or HP7912 disk drives.

For multi-port system, select configurations 9 or 11 as listed in Table 2.3.

Note that PASCAL 2.0 does not support disks with multiple volumes.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk. See
* Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

If the SIS feature is utilized (configuration 11 in multi-port system), the CTABLE needs to be changed to reflect the additional unit (SIS). PASCAL 2.0 only configures the first unit of hard disk it found during power up initialization.

Furthermore, PASCAL 2.0 will logically divide the hard disk into multiple volumes. The maximum number of volumes is 30 and the minimum volume size is 1 Mbyte. Therefore, for models 8x20, 8x33 or 8x70 the minimum volume size defined in CTABLE (local hard disk partitioning parameters) need to be changed. No changes are necessary if your disk is configured to emulate HP disks (configuration 14).

Refer to Appendix A for multiple language installation procedures. Make sure your PASCAL 2.0 language system is installed at unit 0 of the Winchester.

#### 4.4.2. Booting Your System

1. Be sure the address switches at the back panel are set as desired (0 is recommended).
2. Turn off your computer.
3. Turn on your disk drive and wait for the self test to complete.
4. Insert the Pascal BOOT: disk in the floppy disk drive.
5. Turn on your computer. Your computer automatically loads the operating system and prompts "PLEASE PUT SYSVOL IN UNIT #3 AND PRESS THE X KEY," remove the BOOT: disk. Insert the SYSVOL: disk in the floppy drive and press the X key.
6. When the screen displays "NEW SYSTEM DATE?", type the date and press ENTER.
7. When the screen displays "NEW SYSTEM CLOCK TIME?", type the time and press enter.
8. Now your screen will display the following command line and ready for a command:

Command: Compiler Editor Filter Initialize Librarian Run  
eXecute Version?

#### 4.4.3. Logical Units

During the Boot procedure, the TABLE utility in the operating system finds all the available disk drives and assigns one or more logical unit numbers to each unit. Winchester with capacities of larger than 1 megabyte will be assigned with multiple logical unit numbers starting from #11.

#### 4.4.4. CTABLE Modifications

This section outlines procedures to modify the CTABLE to support high capacity drives and SIS unit. Details of editing, compiling and installing the new CTABLE can be found in the Technical Reference section of the PASCAL User's Manual.

Always make a copy of the original CTABLE.TXT file before editing.

For example, copy the CTABLE.TXT to NEWCTABLE.TXT before entering the Editor.

#### 4.4.4.1. Volume Size:

For disks with capacities larger than 30 Mbytes, or if you need to have volumes larger than 1 Mbyte, change the CTABLE as follows:

1. Enter the Editor to edit the NEWTABLE file.
2. Locate the following section in the beginning of CTABLE.

```
{local hard disk partitioning parameters}
type
...
const
...
    minimum_volume_size = {in bytes}
    1000000;
```

3. Change the 100000 to desired value (i.e., 20000000).

#### 4.4.4.2. Configuration SIS Unit:

1. Locate the following section near the end of the CTABLE.

```
$if false$ {current Command Set '80 discs}
    devid:=7908; nvols:=16; ...
    ...
    for i := 0 to nvols-1 do
        tea_CS80_disc {11+i, ...
$end$
```

2. Change the devid, mp, tpm as listed in the following table:

Table 4.4.1

#### Tracks per Media (mp, tpm) Entry

Model (devid)	Configuration Settings	
	9	11
	Tracks Per Media	
8x10/8x10 RM	400	300
8x15	596	447
8x20	800	600
8x33	1264	948
8x45	1273	1292
8x70	2694	2020

3. Change the mp.bpt to 34\*256.
4. Find next available logical unit number (nlu). This may be done by running the MEDIAINIT utility.
5. Change the ll+i to nlu+i.
6. Change the 0 next to {ba} to the HP-IB address of the disk.
7. Change the 0 next to {bu} to 1 for SIS unit.
8. Change \$if false\$ to \$if true\$

#### 4.4.5. Disk Initialization

Use the following steps to initialize a disk.

1. Insert the ACCESS: disk into the floppy disk drive.
2. Type X for execute.
3. When the screen displays "Execute What File?", type:

```
ACCESS:MEDIAINIT
```

and Press ENTER.

4. The screen may display "Volume ID?". To Initialize the Winchester, type #11.
5. The screen then displays:

```
WARNING: the initialization will also destroy:  
#12 <no dir>  
#13 <no dir>  
...
```

This indicates number of logical units assigned to the disk drive. This information can be used to modify the CTABLE for configuring the SIS unit.

6. When the screen displays "Are you sure you want to proceed Y/N", type Y.

#### 4.4.6. Booting from Winchester

After your Winchester disk is initialized, you can copy all the system files onto it. Use the following steps to copy all the files on all the floppy disks.

1. Insert the ACCESS: disk into the floppy disk drive.
2. When the command line appears (Command: Compiler Editor Filer ...), type F for filer.
3. When the filer line appears (Filer:Change Get ...), remove the ACCESS: disk. Insert the BOOT: disk in the floppy disk drive.

4. Type F for filecopy.
5. When the screen displays "Filecopy what file?", type  

#3:=

and press ENTER. This tells the Filecopy utility to copy all the files from the floppy disk.
6. When the screen displays "Filecopy to what?", type  

#11:\$

and press ENTER. This tells the Filecopy utility to copy all the files to volume 11 using the same file names.
7. When the copying is complete, the filer line (Filer: Change Get ...) again appears on the screen.
8. Remove the floppy disk. If more disks are to be copied (e.g., ACCESS:, SYSVOL, ...), insert next disk and repeat the steps 4 to 7.
9. Type Q for quit to exit the Filer and the command line again appears on the screen.
10. Turn off your computer.
11. Now you should be able to boot from the Winchester disk by turning on your computer.

## 4.5. SERIES 200 - PASCAL 3.0

### 4.5.1. Use of Configuration Switches

For a single-port system, select configuration 0(0000) as listed in Table 2.3. Configuration 14(1110) may be selected for models 8x10, 8x33 or 8x70 to emulate HP7908, HP7911 or HP7912 disk drives.

For multi-port system, select configuration 9 or 11 as listed in Table 2.3.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

PASCAL 3.0 will logically divide the hard disk into multiple volumes. The maximum number of volumes is 30 and the minimum volume size is 1 Mbyte. Therefore, for models 8x33, 8x45 or 8x70 the minimum volume size defined in CTABLE (local hard disc partitioning parameters) need to be changed (i.e., changes from 1000000 to 2000000). Follow the instructions in the Technical Reference section of your PASCAL User's Manual to edit, compile, and install the CTABLE. No changes are necessary if your disk is configured to emulate HP disks (configuration 14).

### 4.5.2. Booting Your System

1. Be sure the address switches at the back panel are set as desired (0 is recommended).
2. Turn off your computer.
3. Turn on your disk drive and wait for the self test to complete.
4. Insert the Pascal BOOT: disk in the floppy disk drive.
5. Turn on your computer. Your computer automatically loads the operating system and prompts "PLEASE PUT SYSVOL IN UNIT #3 AND PRESS THE X KEY," remove the BOOT: disk. Insert the SYSVOL: disk in the floppy drive and press the X key.

6. When the screen displays "NEW SYSTEM DATE?", type the date and press ENTER.
7. When the screen displays "NEW SYSTEM CLOCK TIME?", type the time and press enter.
8. Now your screen will display the following command line and ready for a command:

Command: Compiler Editor Filter Initialize Librarian Run  
eXecute Version?

#### 4.5.3. Logical Units

During the Boot process, the TABLE utility in the operating system finds all the available disk drives and assigns one or more logical unit numbers to each unit. For the Winchester units larger than 10 Mbytes, it will partition each unit into multiple volumes with 1 Mbyte each and assign a unit number to each volume starting with #11. It will assign the micro-floppy drive with unit #3. Computers with internal floppy drive(s), it will assign the micro-floppy with unit #7 instead of #3.

If the capacity of the Winchester unit is less than 10 Mbytes, then the TABLE utility will assume it is a floppy. It will assign the Winchester with unit #3 and the micro-floppy drive with unit #4. In the case of computers with internal floppy drive(s), it will assign the Winchester with units #7 and the micro-floppy drive with unit #8.

#### 4.5.4. CTABLE Modifications

This section outlines procedures to modify the CTABLE to support high capacity drives and SIS unit. Details of editing, compiling and installing the new CTABLE can be found in the Technical Reference section of the PASCAL User's Manual.

Always make a copy of the original CTABLE.TXT file before editing.

For example, copy the CTABLE.TXT to NEWCTABLE.TXT before entering the Editor.

##### 4.5.4.1 Volume Size

For disks with capacities larger than 30 Mbytes, or if you need to have volumes larger than 1 Mbyte, change the CTABLE as follows:

1. Enter the Editor to edit the NEWCTABLE file.



2. Locate the following section in the first page.  
(local hard disc partitioning parameters)  
type  
...  
const  
min\_size = (in bytes [1..maxint])  
1000000;
3. Change the 100000 to desired value (i.e., 2000000).

#### 4.5.4.2. SIS Configuration

Use the following procedure to configure the SIS unit.

1. Locate the following section near the end of CTABLE.

```
$if false$ { current CS/80 discs "soft" ...}
  CS80id:=7908; nvols:=16; ...
  ...
  for i := 0 to nvols=1 do
    tea_CS80_mv (11+i, ...
  $end$
```

2. Change the CS80id, mp,tpm as listed in the following table:

Table 4.5.1

Tracks per Media (mp,tpm) Entry

Model (devid)	Configuration Settings	
	9	11
	Tracks Per Media	
8x10/8x10 RM	400	300
8x15	596	447
8x20	800	600
8x33	1264	948
8x45	1273	1292
8x70	2694	2020

3. Change the mp.bpt to 34\*256.
4. Find next available logical unit number (nlu).
5. Change the 11+i to nlu+i.
6. Change the 0 next to {ba} to the HP-IB address of the disk.
7. Change the 0 next to {bu} to 1 for SIS unit.
8. Change \$if false\$ to \$if true\$

#### 4.5.5. Disk Initialization

Use the following steps to initialize a disk.

1. Insert the ACCESS: disk into the floppy disk drive.
2. Type X for execute.
3. When the screen displays "Execute What File?", type:

ACCESS:MEDIANIT

and press ENTER.

4. The screen then displays "Volume ID?". If you wish to initialize the Winchester, type #11. If you wish to initialize the floppy disk, type #3.
5. For the Winchester initialization, the screen then displays:

```
WARNING: the initialization will also destroy!  
#12 <no dir>  
#13 <no dir>  
...
```

This indicates number of logical units assigned to the disk drive. This information can be used to modify the CTABLE for configuring the SIS unit.

6. Remove the ACCESS: disk from the floppy drive.
7. When the screen displays "Are you sure you want to proceed Y/N", type Y.
8. If you are initializing the floppy disk, the screen will display "Formatting option?", type one of the options as listed in the following table and press ENTER.

Table 4.5.2

Floppy Disk Formatting Options

Format Option	Sector Size	Sides	Kbytes of Storage
0	256	2	630
1	256	2	630
2	512	2	710
3	1024	2	788
4	256	1	277

Remember the following:

1. format double-sided ONLY in double-sided disks.
2. a disk formatted double-sided can only be used in a double-sided disk drive.
3. a disk formatted single-sided can be used in both a single-sided and a double-sided disk drive.

Note: For Removable Winchester or fixed Winchester units of less than 10MB, the formatting option may also be requested. Press ENTER to continue.

9. Now the screen displays "Interleave factor? (default to 2)."

Enter the interleave factor and press Enter. Following table lists some recommended interleave factors:

Table 4.5.3

Recommended Interleave Factors

Hardware	Interleave Factors
Disk Interface 98625A + DMA 98620B	3
Build-in HP-IB + DMA 98620B	4
Build-in HP-IB	7
With Bering T-100 tape	6

#### 4.5.6. Booting from Winchester

After your Winchester disk is initialized, you can copy all the system files onto it. Use the following steps to copy all the files on all the floppy disks.

1. Insert the ACCESS: disk into the floppy disk drive.
2. When the command line appears (Command: Compiler Editor Filer ...), type F for filer.
3. When the filer line appears (Filer:Change Get ...), remove the ACCESS: disk. Insert the BOOT: disk in the floppy disk drive.
4. Type F for filecopy.
5. When the screen displays "Filecopy what file?", type

#3:=

and press ENTER. This tells the Filecopy utility to copy all the files from the floppy disk.

6. When the screen displays "Filecopy to what?", type

#11:\$

and press ENTER. This tells the Filecopy utility to copy all the files to volume 11 using the same file names.

7. When the copying is complete, the filer line (Filer: Change Get ...) again appears on the screen.
8. Remove the floppy disk. If more disks are to be copied (e.g., ACCESS:, SYSVOL, ...), insert next disk and repeat the steps 4 to 7.
9. Type Q for quit to exit the Filer and the command line again appears on the screen.
10. Turn off your computer.
11. Now you should be able to boot from the Winchester disk by turning on your computer.

## 4.6 SERIES 200 - SRM

### 4.6.1. Configuration

SRM supports only single unit and single volume of fixed disk. Therefore models 8010RM, 8x20, 8x30, 8x45, 8x70 with switches C3 C2 C1 C0 set to 0 can be configured into the SRM.

1. Shut down your SRM by entering the following command and answer with Y when prompted.  
System Down
2. Turn off your SRM system.
3. Set the HP-IB address of your disk and make sure there are no address conflicts.
4. Make sure switches C3 C2 C1 C0 are set to 0. Then connect the disk to either the internal HP-IB (select code 7) or the high speed HP-IB (select code 14).
5. Turn on the disk drive and your SRM system.
6. Boot your SRM operating system from either existing hard disk or tape.
7. Your disk should be configured into the SRM system. But it needs to be initialized before it can be used as a SRM volume.

### 4.6.2. Disk Initialization

Use the following command to initialize the disk:

```
Initialize sc,ba,su "name<pass word>" "<root pass word>"
```

where sc is the select code the HP-IB channel (7 or 14), ba is the bus address of the disk, and su is the unit number (0).

Example:

```
Initialize 14,0,0 "SRM_DISC"
```

#### 4.6.3. Installing System

Use the following command to install the SRM boot files onto the disk:

Install "from path name" "to path name"

where "from path name" is the source of the files, and "to path name" is the name of your disk.

Example:

Install "SYSTEM\_SRM:SRM\_2.0" "SYSTEM\_SRM:SRM\_DISC"

where SRM\_2.0 is the tape and SRM\_DISC is the volume as initialized in the previous example.

## 4.7. HP250

### 4.7.1. Configuration

Note that HP250 does not support multiple volumes, multiple units, Multi-access, SIS or the HP 3.5" floppy disk. Only disks with 7908, 7911 or 7912 format are supported.

1. Make sure switches C3 C2 C1 C0 at the back panel are set to 14(1110) to emulate one of the HP disks listed above.
2. Set the Address Switches and make sure there is no conflict with any built-in disk drives or other peripherals.
3. Turn on your disk drive.

### 4.7.2. Mass Storage Device

Use the following command to specify the Mass Storage Device:

```
MASS STORAGE IS volume spec
or
MSI volume spec
```

For example, to specify the 7908 as your default mass storage, enter the following command:

```
MSI ":Q2,3,0"
```

Note that the MSI command is composed of four parts:

1. Device type :Q
2. HP-IB selector 2
3. Device address 3
4. Device unit number 0

The device type varies with the model of the disk. Following table lists some of the types:

Table 4.7.1

Device Type

HP Model	Bering Model	Device Type
7908	8x20	Q
7911	8x33	R
7912	8x70	S
Built in Floppy		F

If there is only one disk of each kind connected to the computer, then only the device type is needed in the MSI command. For example, if there is only one 7908 connected to the system, then use the following MSI command.

MSI ":Q"

#### 4.7.3 Booting Your System

1. Turn off your computer and make sure the bootrom switch is set to 2.
2. Insert the Operating System Diskette in the floppy disk drive.
3. Turn on your computer. The computer automatically loads the operating system and is ready for commands.

#### 4.7.4. Initializing Your Disk

1. Remove the Operating System Diskette and insert the Utility Diskette in the floppy disk drive.
2. Type RUN "INIT" and press ENTER.
3. After the Initialization Utility menu shows up on your screen, press the INITIALIZE softkey.
4. Now the screen and the softkeys indicate all the disks which are on-line. Press the appropriate softkey to select the disk to be initialized.
5. Now the screen displays the selected disk and indicates the default interleave factor. If you want to change the interleave factor, press the INTERLEAVE softkey and enter the desired interleave factor (from 1 to 33). Press ENTER.
6. Press CONTINUE softkey to proceed.
7. When initialization is complete, press EXIT PROGRAM softkey to return to BASIC.



#### 4.7.5. Booting from Winchester

After the Winchester disk is initialized, the operating system can be copied onto it. Then you can boot from the Winchester directly. Complete the following steps.

1. Insert the Utility Diskette in the floppy disk drive.
2. Type RUN "ROUTIL" and press ENTER to run the read-only file utility.
3. When the RUN-ONLY PROGRAM MAINTENANCE UTILITY MAIN MENU appears on your screen, press the SYSTEMS & DROMS softkey.
4. Now the COPY/PURGE menu appears on your screen. Remove the Utility Diskette and insert the Operating System Diskette in the floppy drive.
5. Press the COPY softkey to start copy function.
6. Now the screen prompts with the message "Please select SOURCE volume". Select the softkey labeled with SYSTEM.
7. Now the screen prompts with the message "Please select DESTINATION volume". Select the softkey labeled with 7908, 7911 or 7912.
8. Then the computer lists all the system files and DROM files on the screen. Press the COPY ALL softkey to copy all the files.
9. When the copy is complete, remove the Operations System Diskette and replace the Utility Diskette in the floppy drive. Press EXIT to return to the ROUTIL main menu.
10. Press EXIT ROUTIL to return to BASIC.
11. Remove the Utility Diskette from the floppy drive, and turn off your computer.
12. Set the Bootrom switch to 4. Now you should be able to boot from the Winchester disk when you turn on your computer.

## 4.8. HP1000-A,XL

### 4.8.1. Use of Configuration Switches

For single-port system, select configuration 0 as listed in Table 2.3. For multi-port system select configuration 9 for disk sharing and configuration 11 to use SIS as listed in Table 2.3.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

Note that HP1000 does not officially support the HP 3.5" floppy, but you may generate your system to use the basic format (256 bytes/sector double-sided).

### 4.8.2. System Requirements

Device Driver:	DD.33
Interface Card:	HP-IB Interface Card
Interface Driver:	ID.37

### 4.8.3. Generation Considerations

#### 4.8.3.1. System Relocation Phase

The following module of code must be relocated during this phase:

```
&DD.33 (Disk service driver)
$ID.37 (HP-IB Interface driver)
```

#### 4.8.3.2. Table Generation Phase

The Interface Table (IFT) for drive ID.37 must be constructed in this phase. Use the following command:

```
IFT,%ID.37,SC:sc
```

where sc is the octal select code of the interface card. Select code of 27B is the value that the boot ROM defaults to when auto-booting from disk.

A Device Table (DVT) must be constructed for each logical unit (LU) on the disk in this phase. Use the following command:

```
DVT,LU:lu,EDD.33,DT:33B,TO:1000,TX:ex,-  
PR:0,QU:FIFD,DX:B,-  
DP:1:address:uv:sb2:sb1:sb0,-  
DP:6:tracks:bpt:0
```

where

lu:	logical unit of the cartridge
ex:	extension. RTE A - 61 RTE XL- 60
address:	HP-IB address of the disk.
uv:	unit number/volume number. Winchester - 0 floppy - 400B
sb2,sb1,sb0:3	3-word starting block number.
tracks:	number of tracks in that LU.
bat	blocks per track. Winchester - 34 floppy - 16

The following table lists available tracks for each model using different configuration settings. Use this table to select sizes of your LU's in terms of number of tracks. Calculate the starting block number for a LU (SB(LU)) using the following formula:

$$SB(LU) = SB(LU-1) + tracks(LU-1)*34$$

Table 4.8.1

Available Tracks Per Unit

Model	Switches				Switches				Switches			
	C3	C2	C1	C0	C3	C2	C1	C0	C3	C2	C1	C0
	0	0	0	0	1	0	0	1	1	0	1	1
					2-port	3-port	2-port	3-port				
8x10, 8010RM	1200				600	400	400	300				
8x15	1705				894	596	596	447				
8x20	2400				1200	800	800	600				
8x33	3792				1705	1264	1264	948				
8x45	5171				2585	1723	1723	1292				
8x70	8083				4041	2691	2691	2020				
floppy	152				152	152	152	152				

4.8.3.3. Node List Entries

All devices with multiple LUs using the same controller must have their LU numbers placed into a node list. Use the following command:

```
NODE,lu of subdivision 0,
      lu of subdivision 1,
      lu of subdivision 2,
      lu of subdivision 3,...
```

4.8.3.4. Memory Allocation Phase

Cartridge List Allocation

The maximum of disk cartridges to be mounted on the system at one time must be described at this time. Add the total number of DVT's constructed for each disk to the number passed to the generator.

4.8.4. Example:

Assuming switches C3 C2 C1 C0 are set to 0000, the following lists some possible LU assignments for various 8000 models. For instance, for 8x15, LU's 10, 11, 12, and 13 may be assigned with 600, 600, 304, and 201 tracks respectively. For 8x20, in addition to LU's 10, 11, 12 and 13, two LU's 14 and 15 with 400 and 295 tracks respectively can also be assigned.

Note that the unit parameter is 0.

Table 4.8.2

LU Assignment Example

LU	SB2	SB1	SB0	tracks	Model
10	0	0	0	600	+ + + + + +
11	0	0	20400	600	8x10
12	0	0	40800	304	
13	0	0	51136	201	8x15
14	0	0	57970	400	
15	0	1	6034	295	8x20
16	0	1	16064	696	
17	0	1	39728	696	8x33
18	0	1	63392	800	
19	0	2	25056	320	
20	0	2	35936	259	8x45
21	0	2	44742	726	
22	0	3	3890	726	
23	0	3	28574	726	
24	0	3	53258	734	8x70
25	0	0	0	152	floppy

#### 4.8.5. Formating Winchester

Before the Series 8000 Winchester disk be put on line, it is a good idea to go through the format procedure. This will allow any defective tracks to be spared. Use the FORMC utility supplied by HP and enter a command similar to the following:

```
RU,FORMC,,FO,disk lu,interleave factor
```

where FO is the format option, disk lu is the logical unit of the Winchester or floppy, interleave factor is 1 for Winchester and 2 for floppy. Follow the instructions in the Software Installation Manual to load the program. Detailed instructions for FORMC can be found in the Utility Manual.

## 4.9. HP1000-M/E/F

### 4.9.1. Use of Configuration Switches

For single-port systems, select configuration 0. For multi-port system select configuration 0 to use multi-access. Select configuration 9 for disk sharing and configuration 11 to use SIS.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

Note that HP1000 does not officially support the HP 3.5" floppy.

### 4.9.2. System Requirements

Device Driver:	DVM33
Interface Card:	12821A Interface Card

Disks managed by DVM33 (3.5" floppy disks) and disks managed by DVA32 (ICD disks) cannot be on the same 12821A card.

If an additional 12821A is use, the DVN33 and \$TN33 should be used for the 3.5" floppy disks or the DVP32 and \$TC32 should be used for the ICD disks.

### 4.9.3. Disk Configuration

Series 8000 disk subsystems are compatible with HP Command Set 80 Disk drives. Therefore, in general, the system generation instructions for HP 3.5" floppy disks can be applied to Series 8000 disk drives. Use the Table 4.8.1 and the following formula to determine the number of blocks available to build the disk subchannel assignments.

$$\text{available blocks} = \text{available tracks} * 34$$

## 4.10. HP9845

### 4.10.1. Configuration

1. In order for a disk drive to be accessed by the computer, it must be connected to an HP 98034 (HP-IB) interface card inserted in one of the I/O slots in the back of your computer. Make sure it is properly seated. Set the select code to any code not used by other interface cards. Select code of 7 is recommended.
2. In addition to the interface card, the mass storage ROM (MSROM) is needed. Although the HP MSROM (98413C) can be used, it will not support the multi-unit Winchester, and the doubled-sided floppy drive, SSS MSROM (Bering part number 0021-0011-00) is recommended and is assumed in following procedures.

To install your MSROM, proceed as follows:

- a. Turn off your computer.
  - b. Pull the left ROM drawer out.
  - c. Squeeze the sides of cover and lift up.
  - d. Insert the ROM in any available slot.
  - e. If HP MSROM is installed, use the triangle slot for the SS MSROM.
  - f. Make sure the ROM goes all the way to the bottom.
  - g. Snap the cover shut and close the drawer.
3. For single-port system, select configurations 0(0000), 9(0001), 10(1010), 11(1011) or 12(1100) as listed in Table 2.3. For multi-port system, select configurations 9(1001), 10(1010), 11(1011) or 12(1100) as listed in Table 2.3.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.



#### 4.10.2. Mass Storage Unit Specifier

Mass Storage Unit Specifier (MSUS) is what the computer uses to identify your disk drive. For example, the MSUS for an 8000 using SS MSROM appears as follows:

":A7,0,1"

Note that the MSUS is composed of four parts, separated by commas:

- |                          |    |
|--------------------------|----|
| 1. Device type           | :A |
| 2. Interface select code | 7  |
| 3. Device address        | 0  |
| 4. Device unit number    | 1  |

The device address is the HP-IB address you set at the back panel of the disk drive. The device unit number depends on the configuration you selected and is listed in Table 2.3.

#### 4.10.3. Disk Initialization

Every mass storage medium (disk or floppy) must be initialized before use. Use the following command:

INITIALIZE <msus> [,<option>]

where msus is the mass storage specifier of the device and the option is used to specify the interleave factor or format type.

To initialize the Winchester use a command similar to the following:

INITIALIZE ":A7,0,0",6

To initialize a floppy diskette use a command similar to the following:

INITIALIZE ":A7,0,1",102

where 102 is (format option number \* 100 + interleave factor). The format option number is defined as follows:

- |   |   |
|---|---|
| 1 | 256-byte blocks, double-sided(default)          |
| 2 | 512-byte blocks, double-sided                   |
| 3 | 1024-byte blocks, double-sided                  |
| 4 | 256-byte blocks, single-sided (9121 compatible) |

Refer to the HP MASS STORAGE ROM Programming Manual (09845-93070) or the SSS MASS STORAGE ROM User's Manual for more disk access instructions.

## 4.11. HP64000

### 4.11.1. Configuration

Note that HP64000 does not support multiple volumes, multiple units, multi-access, SIS and the 3.5" floppy disk.

1. Make sure switches C3 C2 C1 C0 at the back panel are set to 0.
2. For primary system disk, make sure that the Address Switches are set to 000. For add-on disk, the HP-IB address can be any value in the range of 2 through 7.
3. Turn on your disk drive.

### 4.11.2. Disk Initialization

1. Turn off the master controller.
2. Set the CONTROL SOURCE switches on the rear panel of the master controller station to LOCAL MASS STORAGE position.  
Ensure that all other development stations in the cluster are turned off.
3. Install OP SYSTEM tape #1 or Floppy disk #1 into the master controller tape drive or floppy disk drive.
4. Turn on the master controller.
5. The SYSTEM DISK UTILITY appears on your screen. Press the "fmt & test" softkey.
6. Now the controller displays all the devices on the HP-IB bus and prompts "DO YOU WANT TO FORMAT?" Press the "yes" softkey to proceed.
7. When the formatting is complete, press the "end" softkey. Now the controller copies all the files on the tape or disk onto the Winchester.
8. Remove the OP SYSTEM tape or disk #1. Insert the OP SYSTEM tape or disk #2. The controller will automatically boot the system utility programs.
9. Continue inserting additional tapes or floppy disks in numerical order.
10. After all the tapes or floppy disks are loaded, set the rear panel SYSTEM CONTROL SOURCE switches to the SYSTEM BUS mode of operation. The system is now operational.

## 4.12. HP INTEGRAL PERSONAL COMPUTER (IPC)

### 4.12.1. Configuration

For single-port system, any of the configurations listed in Table 2.3 can be selected.

For multi-port system, select configurations 9 or 11 listed in Table 2.3.

```
*****CAUTION*****
*
* If you change the partitioning after you have initialized
* the Winchester disk, data will be lost. You should change
* the partitioning BEFORE initializing the disk.
* See Appendix B for additional information.
*
*****
```

To set the configuration switches, complete the following steps:

1. Turn off the disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0.
3. Turn on the disk drive.

### 4.12.2. Drive Name

The drive name is what the computer uses to identify your disk drive. For example, the drive name of an 8000 with switches C3 C2 C1 C0 set at 2 might appear as follows:

D210

Note that the drive name composed of four parts:

- |                          |   |
|--------------------------|---|
| 1. Device type           | D |
| 2. Volume number         | 2 |
| 3. HP-IB address of disk | 1 |
| 4. Unit number           | 0 |

#### 4.12.3. Disk Initialization

Any floppy diskette or Winchester volume needs to be initialized before it can be used. Follow the following procedure:

1. Insert the Utility disk into the floppy drive.
2. Press the Reread key to update your PAM screen.
3. Move the file indicator to select `FORMAT_DISC` utility. Press the `START(f1)` function key to execute the format utility.
4. Press the `CHANGE NAME (f3)` function key to modify the disk name in the program window. Enter the desired name at the line with the following message:  
What will the new disc name be?
5. Press the `CHANGE DRIVE (f4)` function key to select the disk drive. Enter the `drive_name` (i.e., `D210`) at the line with the following message:  
What drive will contain the disc?
6. Press `START FORMAT (f1)` function key to proceed.
7. Press `EXIT (f8)` function key to exit the utility and return to PAM.

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## CHAPTER 5

### LOCAL BACKUP AND RESTORE

This chapter contains the following sections.

#### 5.1 Local Backup

#### 5.2 Local Restore

### 5.1. LOCAL BACKUP

The image of a unit, a volume or the entire Winchester disk can be copied onto the removal Winchester cartridges. The capacity of the cartridge is 10 Mbytes, therefore for source data of more than 10 Mbytes, multiple cartridges are needed.

If the source data is 10 Mbytes or less, and it is in a single volume, the backup data can be accessed as a normal disk. Otherwise the cartridge will appear as uninitialized to your computer.

#### 5.1.1. Backup Procedure

1. Load a cartridge into the drive. Refer to Chapter 3.2 Using Your Removable Winchester for details. If the cartridge has not been previously formatted, the backup procedure will format it before copying data.

```
*****  
* ALL DATA ON THE CARTRIDGE WILL BE DESTROYED. *  
*****
```

2. Press the BACKUP button until the LED above the button is lit.
3. Now the front panel display shows the default source. For single-port subsystems, it shows 2 digits.

```
  0  A  
  -  -  
  |  |  
  |  +----volume number  
  +----unit number
```

The first digit is the unit number (range 0-2) and the second digit is the volume number (range 0-7, A = all).

For multi-port subsystems, it shows 1 digit indicating the port number (1-3) or the SIS unit (S).

```
1
-
|
+----port number
```

Press the SELECT button to select the next choice of the course.

4. Press both the BACKUP and SELECT simultaneously to start the backup process. The Main LED and the Drive Select LED (red) on the removable Winchester drive should be blinking. The LED on the BACKUP button should remain lit during the entire backup process.
5. When the "UL" appears on the display, the backup process is completed. Remove the cartridge from the drive and label it with the following information.

Unit/Volume number  
Capacity  
Date

Press SELECT to go back on-line.

6. When "CH" appears on the display, it means another cartridge is needed to continue the backup process. Remove the cartridge and label it with the following information.

Unit/Volume number  
Date  
Cartridge Number

At this time, the backup process may be aborted by pressing all three buttons (SELECT, BACKUP and RESTORE).

Insert another cartridge into the drive. If the cartridge has not been previously initialized, it will be initialized.

Press SELECT to continue and repeat step 5 until "UL" appears on the display.

Press SELECT to go back on-line.

### 5.1.2. Backup Error Messages

dE Destination write error

Possible bad spot on the Cartridge

Press SELECT button to clear the error.

Change cartridge or re-initialize the cartridge using your computer. Try the backup procedure again. If it still fails, call Bering Customer Service for assistance.

dF Destination Initialization Failure.

An un-initialized cartridge is detected and too many bad spots found on it. Use a different cartridge.

dr Cartridge not ready

SE Source read error.

Possible bad spot on the Winchester fixed disk.

Press SELECT button to clear the error.

Try the backup procedure again. If it still fails, use file-by-file copy to backup all the readable files onto the cartridge. Re-initialize the Winchester to remove bad spots.

SF Source disk not initialized

Sr Source disk not ready



## 5.2. LOCAL RESTORE

Cartridge generated by the local backup procedure can be restored onto the Winchester fixed disk. If multiple cartridges are required, the cartridges can be restored in any order as long as within the same set.

### 5.2.2. Restore Procedure

1. Load a cartridge into the drive. Refer to Chapter 3.2 Using Your Removable Winchester for details.
2. Press the RESTORE button until the LED above the button is lit.
3. Now the front panel display shows the default destination. For single-port subsystems, it shows 2 digits.

```
  0 A
  - -
  | |
  | +----volume number
  +-----unit number
```

The first digit is the unit number (range 0-2) and the second digit is the volume number (range 0-7, A = all).

For multi-port subsystems, it shows 1 digit indicating the port number (1-3) or the SIS unit (S).

```
  1
  -
  |
  +----port number
```

Press the SELECT button to select the next choice of the destination.

4. Press both the RESTORE and SELECT simultaneously to start the restore process. The Main LED and the Drive Select LED (red) on the removable Winchester drive should be blinking. The LED on the RESTORE button should remain lit during the entire restore process.
5. When the "UL" appears on the display, the restore process is completed. Remove the cartridge from the drive.

Press SELECT to go back on-line.

6. When "CH" appears on the display, it means another cartridge is needed to continue the restore process. Remove the cartridge.

At this time, the restore process may be aborted by pressing all three buttons (SELECT, BACKUP and RESTORE). Note that the restore process is not complete and the data on the disk may be corrupted.

Insert another cartridge within the same set into the drive.

Press SELECT to continue and repeat step 5 until "UL" appears on the display.

Press SELECT to go back on-line.

### 5.2.3. Restore Error Messages

dE Destination write error

Possible bad spot on the Winchester fixed disk.

Press SELECT button to clear the error.

Re-initialize the Winchester using your computer. Try the backup procedure again. If it still fails, call Bering Customer Service for assistance.

S0 No back-up data on source (cartridge)

Sd Source and Destination mismatch

Data on the cartridge is not the same format as any unit or volume on the Winchester fixed disk. Use a different cartridge.

SE Source (cartridge) read error

Possible bad spot on the cartridge.

Press SELECT button to clear the error. Then restore process will continue and skipping the bad spot.

Press all 3 buttons (SELECT, BACKUP and RESTORE) to abort the restore process.

SF Source (cartridge) disk not initialized.

Sr Cartridge not ready

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## CHAPTER 6

### TROUBLESHOOTING AND SERVICE ASSISTANCE

This chapter contains the following sections:

- 6.1 Troubleshooting Guide
- 6.2 Service Assistance
- 6.3 Front Digital Display Codes (Opt. 401 Only)

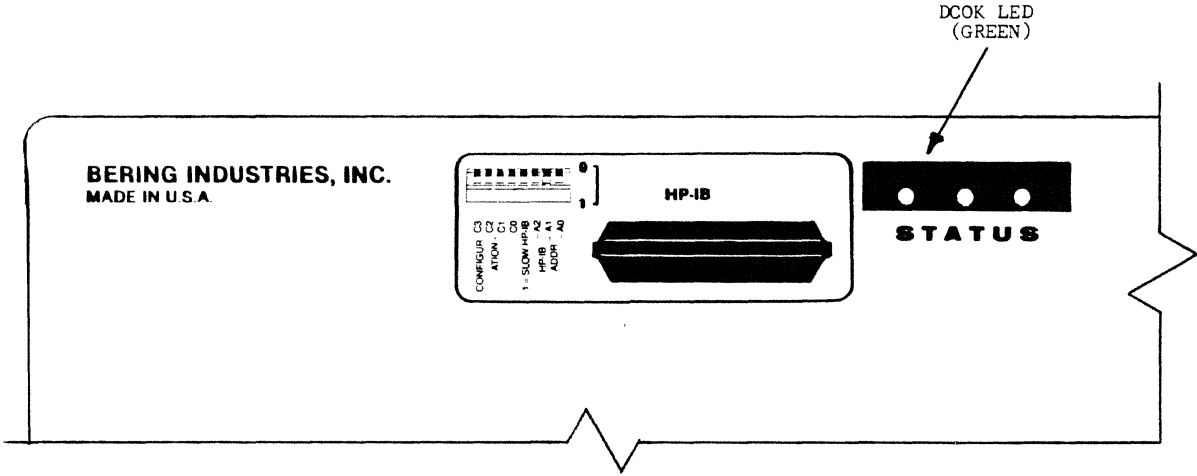
#### 6.1. Troubleshooting Guide

- A. Turn off your disk drive. Disconnect all HP-IB connections from the back panel. Make sure the power cord is securely connected at both ends.
- B. Set all the switches at the back panel to 0 (up position). Turn on your disk drive and wait for 30 seconds to allow the drive to complete the self-test procedure (described in Section 2.8). If the Main LED on the subsystem front panel (refer to Fig. 1.1) remains blinking, go to step C.
  - B.1. If the fan is running, go to step B.2.
    - B.1.1. Turn off power and disconnect power cord.
    - B.1.2. Check fuse and replace.
  - B.2. Locate the STATUS LED's positioned on the back panel (see Fig. 6.1). If the DCOK LED (green) is steadily lit, go to step B.3.
    - B.2.1. Measure the voltages using a multimeter. If the voltages are within spec, replace controller board.  
  
4.75 < 5V < 5.25  
10.8 < 12V < 13.2
    - B.2.2. Adjust power supply.
      - B.2.2.3 Replace power supply.
  - B.3. Replace controller board.
- C. If the Main LED is blinking 5 times/second, the Winchester model failed self-test. Replace the Winchester drive.
- D. If the Main LED is blinking 1 time/second, replace floppy drive.

- E. If the Drive Select LED (red) of the Removable Winchester is blinking 5 times per second, the drive/cartridge failed the self-test.
  - E.1. Remove cartridge
  - E.2. Cycle power (turn off 30 sec / on 30 sec).
  - E.3. Insert a new cartridge
  - E.4. If drive still fails the self-test, replace the drive.
- F. Make sure the correct HP-IB/Disk interface and driver software are properly installed in your computer. Verify that your operating system supports the 3.5" floppy disk drives.
- G. Turn off the disk. Select the HP-IB address and configuration correctly (Consult Chapters 2 and 4 for details).
- H. Inspect the HP-IB cable for wear, particularly examine the contacts. If possible, use a cable that is known to be good. Connect the disk drive to your computer ONLY.
- I. Try to access the Winchester disk with the correct unit number and volume number (see Table 2.3). If test passes, go to step 1.
  - I.1. Double-check the HP-IB connection, drive installation, interface installation, HP-IB address and the disk access commands.
  - I.2. Does the Main LED blink when the disk is being accessed? If yes, go to step H.3.
    - I.2.1. Is the disk initialized?
    - I.2.2. If data need to be recovered, call the service department.
    - I.2.3. Try to initialize the disk and note the Main LED. If the Main LED blinks and the disk has failed the initialization process, replace Winchester disk.
    - I.2.4. Replace controller boards.
  - I.3. Re-initialize the Winchester disk.
- J. Insert a double-sided micro-floppy disk into the drive. Try to access the floppy disk with the correct unit number (see Table 2.3).
  - J.1. Make sure your operating system supports the 3.5" double-sided floppy disk drive.
  - J.2. If the Activity LED on the floppy drive does not light during access, replace the controller board.
  - J.3. Initialize the floppy disk. If failed, try a new disk. If failed again, replace the disk drive.

Figure 6.1

STATUS LED's on Rear Panel



## 6.2. SERVICE ASSISTANCE

If you purchased your disk drive from an authorized dealer, distributor or reseller, you should contact these sales outlets for assistance.

When you need help from Bering Industries, call the following hot-line:

Customer Service  
Bering Industries  
415-651-3300

To return any equipment or parts to Bering Corporation, follow this procedure:

1. Call the Customer Service Department to obtain the Return Material Authorization (RMA) number, proper shipping address and carrier.
2. Repack the disk drive in the original shipping carton.

## 6.3 FRONT PANEL DIGITAL DISPLAY CODES (Opt. 401 Only)

### 6.3.1 Power-on Self-test Error Codes

<u>CODE</u>	<u>DESCRIPTION</u>
A0	Removabler Winchester drive not selected
A1	Removable Winchester drive not ready
A2	Rotational speed of Removable Winchester not within spec.
A3	Removable Winchester drive fails to recalibrate
A4	Removable Winchester drive fails to seek to test cylinder
A5	Fails to format all heads in test cylinder
A6	Fails to read at least 1 sector on each test track
A7	Fails in error correction
A8	Reading the bad track map (not an error state)
A9	Bad track map check sum error
C1	Channel 1 bad hardware
C2	Channel 2 bad hardware
C3	Channel 3 bad hardware
C5	Channel interrupt stuck
C6	Channel 1 not interrupting
C7	Channel 2 not interrupting
C8	Channel 3 not interrupting
F1	Floppy drive not ready
F2	Rotational speed of floppy not within spec.
F3	Floppy fails to recalibrate
F4	Floppy fails to step
F5	Failure to format a cylinder in floppy
F6	Failure to read all formatted sectors in floppy
H0	Winchester not selected
H1	Winchester not ready
H2	Rotational speed of Winchester not within spec.
H3	Winchester fails to recalibrate
H4	Winchester fails to seek to test cylinder
H5	Fails to format all heads in test cylinder
H6	Fails to read at least 1 sector on each test track
H7	Fails in error correction
H8	Reading the bad track map (not an error state)
H9	Bad track map check sum error



Power-on Self-test error codes (continued)

<u>CODE</u>	<u>DESCRIPTION</u>
L0	Read/write interrupt stuck high
L1	Winchester PLL initialization failure
L2	Floppy HP format PLL initialization failure
L7	CRC/ECC circuit failure
L9	R/W hardware fails to generate interrupt
LA	R/W buffer addressing problem
LH	R/W buffer high nibble failure
LL	R/W buffer low nibble failure
P0	8085 test failure
P1	ROM 1 checksum error
P2	ROM 2 checksum error
P3	ROM 2 checksum error
P4	ROM 4 checksum error
P5	ROM 5 checksum error
P6	ROM 6 checksum error
PA	2114 RAM failure
PF	8155 RAM failure
PH	RAM high nibble failure
PL	RAM low nibble failure
PP	Stack operation failure
U0	8155 output ports failure
U1	Timer not running
U2	Timer is too fast
U3	Timer is too slow
U4	Timer fails to generate interrupt

### 6.3.2 Back-up Restore Codes

CODE	DESCRIPTION
CH	Change cartridge
dE	Destination error
dF	Destination read/write failure
dr	Destination not ready
SO	Source no data
Sd	Source and destination format do not match
SE	Source read/write failure
SF	Source uninitialized
Sr	Source not ready
UL	Unload cartridge
Ld	Load cartridge

### 6.3.3 Format Status Codes

CODE	DESCRIPTION
AL	Writing servo on cartridge
AF	Formatting tracks (cartridge)
Ar	Verifying data (cartridge)
AC	Clear media (cartridge)
HL	Writing servo on fixed Winchester
HF	Formatting tracks (fixed Winchester)
Hr	Verifying data (fixed Winchester)
HC	Clear media (fixed Winchester)

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## CHAPTER 7

### TECHNICAL INFORMATION

This chapter contains the following sections:

7.1 SIS (Shared Information Space)

7.2 MAC (Multi-Access in Common)

7.3 Specifications

#### 7.1 SIS (Shared Information Space)

##### 7.1.1 Description

Disk and file sharing among similar computers (Opt. 7xx) is made possible by SIS-- Shared Information Storage. SIS is a unit of disk storage shared by 2 or 3 computers connected to a multi-port Series 8000 subsystem. The SIS unit exists as a defined storage area that each port may access in addition to its own exclusive storage area. The capacity of the SIS is 1/3 of the total disk capacity in 2 port subsystems (1/4 in 3-port subsystems). For example, a 2 port 15MB subsystems (Model 8x15 Opt. 721) can be configured to provide 5MB of dedicated disk space at each port and the remaining 5MB as SIS. The applications of SIS may be:

- transfer of files between computers
- sharing of files, programs, libraries
- temporary storage

SIS is not supported by standard HP software. A simple program involving input/output to HP-IB is required. Please consult Bering's Customer Support to see if a standard program exists for your particular HP computer or operating system. Otherwise, write your program using algorithms and other programming aids presented in this section.

### 7.1.2 Limitations

1. A Bering Series 8000 with Opt. 7xx is required.
2. Special software is required to configure the SIS (see following subsections).
3. SIS cannot be concurrently accessed by more than one computer. It is available to the next computer only after the current host computer has released it via software control. A busy SIS will generate system messages like "Device Not Ready". Such messages may be fatal to certain applications software.
4. SIS does not provide file management. Therefore, computers connected to different ports must recognize a common file structure in order to interpret the SIS data. Sometimes different HP computers (models and/or operating environments) can communicate with one another through a standard file structure with HP software (eg. LIP).

### 7.1.3 Configuration

Set the switches at Port 1 labelled C3 C2 C1 C0 as shown below.

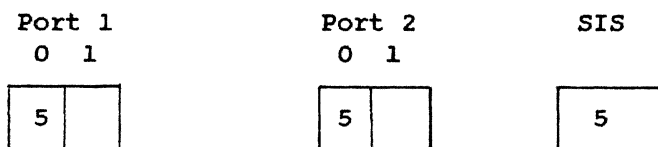
Config. Setting	Switches				No.of units	Volumes per unit	Volume size	Winch unit#	Aux unit#
	C3	C2	C1	C0					
11	1	0	1	1	1	unit/port;SIS at unit 1	0	2	
12	1	1	0	0	1	unit/port;SIS at unit 2	1	0	

An example of file sharing using SIS is given below, using a Bering Model 8015 with Opt. 721 (2-ports).

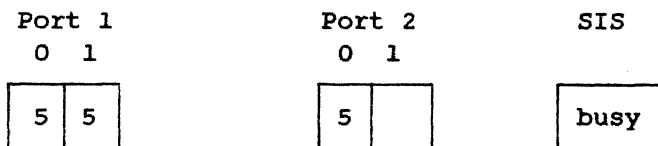
**EXAMPLE:**

The configuration is set to 11. This assigns the fixed Winchester unit # 0 and the SIS unit # 1.

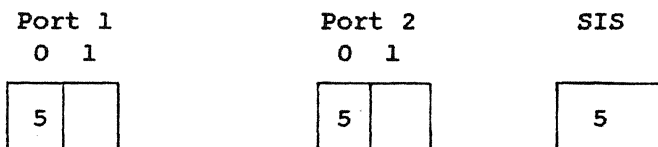
As shown in the diagram below, each port is configured with a 5MB partition, and the remaining 5MB is reserved for SIS.



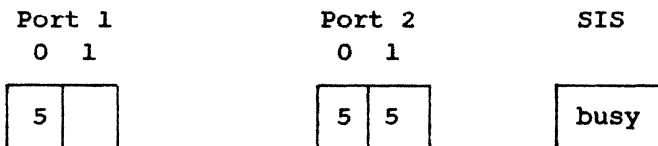
- (a) Below, Port 1 configures the SIS as one of its units using the REQUEST command (described in Section 7.1.4).



- (b) Port 1 writes a file into Unit 1. At the same time, Port 2 can be continuously REQUEST-ing the SIS.  
 (c) Below, Port 1 releases the SIS using the RELEASE command.



- (d) Below, SIS is configured as a unit of Port 2 upon its release.



- (e) Port 2 reads the file created by Port 1 during Step (b).

#### 7.1.4 HP-IB Commands

Each HP-IB command consists of three components: the header-- containing address information; the text-- containing device operation commands; and the trailer-- containing unaddress information. Typically, the header contains both primary addresses and a secondary command.

Components	ATN	EOI	DATA	
Header	1	0	Pxxxxxxx	Primary addresses
	1	0	Pxxxxxxx	
	1	0	P11xxxxx	Secondary
Text	0	0	data	
	-	-	--	
	0	1	data	
Trailer	1	0	P1011111	Untalk
	1	0	P0111111	Unlisten
P = parity				

The commands needed to utilize SIS are: REQUEST, RELEASE, QSTAT, and REQUEST STATUS. These commands are discussed in Sections 7.1.5 - 7 which follow. Additional details of QSTAT and REQUEST STATUS can be found in the CS/80 Instruction Set Programming Manual (HP part # 5955-3442).

#### 7.1.5 REQUEST Command

This command is used to request the SIS. The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1101100	Secondary command
0	0	00011011	Opcode
0	1	00000000	

For data per the above table, ccccc is the HP-IB address of your computer and yyy is the HP-IB address of the 8000 subsystem.

At the completion of the REQUEST, the status commands should be executed to examine the state of the SIS.

If successful and the SIS is configured:

QSTAT = 0

If unsuccessful:

QSTAT = 1

Status bits:	5	illegal code	SIS not supported by drive
	6	module addressing	SIS is not configured
	35	not ready	SIS configured to another port

#### 7.1.6 RELEASE Command

This command is used to release the SIS. The overlaid storage (if any) at the port will be restored with no data loss.

The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1101100	Secondary command
0	0	00011100	Opcode
0	1	00000000	

If successful:

QSTAT = 0

If unsuccessful:

QSTAT = 1

Status bits:	5	illegal code	SIS not supported by drive
	6	module addressing	SIS is not configured
	35	not ready	SIS configured to another port



### 7.1.7 STATUS Commands

QSTAT command returns 1 byte of pass/fail status for the previous command. The format is as follows:

ATN	EOI	DATA	
1	0	P01cccc	My listen address
1	0	P1000yyy	Talk device yyy
1	0	P1110000	Secondary command
0	1	0000000s	s = 0 pass 1 fail

The REQUEST STATUS command is used to examine the status of the previous command. The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1100101	Secondary command
0	0	00101111	Select controller
0	1	00001101	Request status
1	0	P1011111	Untalk
1	0	P0111111	Unlisten
1	0	P01cccc	My listen address
1	0	P1000yyy	Talk device yyy
1	0	P1101110	Execute command
			drive returns 20MB status
1	0	P1011111	Untalk

Status bytes:

0, 1	identification errors field
2 - 9	error reporting fields (bits 0 - 63; bit 0 is MSB)
10 - 19	parameter field
16	port # of your computer
17	= 0 is SIS mode = 0 is MAC mode
18	SIS unit #
19	SIS owner

### 7.1.8 Programming Examples

The following Basic program segments are for reference only. They are not tested.

```
! Symbols:

! select_code      HP-IB channel
! MTA              My talk address
! MLA              My listen address
! UNT              Untalk
! UNL              Unlisten
! addr             HP-IB address of the Winchester disk
! SEC              Secondary
! END              End of data (EOI=1)
```

Integer s(20)

```
Request_SIS:
  SEND select_code;MTA LISTEN addr SEC 12 DATA CHR$(27)&CHR$(0)
END UNL

!Get QSTAT and check if ok.
  SEND select_code;MLA TALK addr SEC 16
  ENTER select_code USING"#,B"; D
  SEND select_code;UNT
  IF D=0 THEN GOTO CONFIGURED

!Get status.
  SEND select_code;MTA LISTEN addr SEC 5 DATA
CHR$(47)&CHR$(13)END UNL
  SEND select_code;MLA TALK addr SEC 14
  ENTER select-code USING"#,B";S(*)
  SEND select_code;UNT
  IF S(2)=4 THEN GOTO SIS_not_supported
  IF S(2)=2 THEN GOTO SIS_not_configured
  IF S(6)=16 THEN GOTO SIS_is_busy
  GOTO HP-IB_system_failure

Release_SIS
  SEND select_code;MTA LISTEN addr SEC 12 DATA CHR$(28)&CHR$(0)
END UNL
  SEND select_code;UNT
```

7.2 MULTI-ACCESS IN COMMON (MAC)

7.2.1 Description

Under the MAC mode of disk and file sharing, each port shares a common access to the entire fixed disk storage as one SIS. Thus the entire fixed disk may be locked or unlocked by the first computer that makes the access.

Semaphore lock commands are not supported by standard HP operating systems. Therefore a simple program or routine involving Input/Output to the HP-IB is required. Please consult Bering's Customer Support to see if a standard software package exists for your particular computer or operating system.

7.2.2 Configuration

Set the switches at Port 1 labelled C3 C2 C1 C0 to a setting 0 to 8 ; 14 or 15 as indicated below (reproduced from Table 2.3).

Config. Setting	Switches C3 C2 C1 C0	No.of units	Volumes per unit	Volume size	Winch unit#	Aux unit#
0	0 0 0 0	1	1	1	0	1
1	0 0 0 1	1	2	.5	0	1
2	0 0 1 0	1	3	.333	0	1
3	0 0 1 1	1	4	.25	0	1
4	0 1 0 0	1	1 1	.8 .2	0	1
5	0 1 0 1	1	6	.166	0	1

Config. Setting	Switches				No. of units	Volumes per unit	Volume size	Winch unit#	Aux unit#
	C3	C2	C1	C0					
6	0	1	1	0	1	1	.666	0	1
						2	.166		
7	0	1	1	1	1	8	.125	0	1
8	1	0	0	0	1	1	.5	0	1
						3	.166		
14	1	1	1	0	1	1	emulation	0	1
15	1	1	1	1	1	1	1	1	0

### 7.2.3 HP-IB Commands

Each HP-IB command consists of three components: the header-- containing address information; the text-- containing device operation commands; and the trailer-- containing unaddress information. Typically, the header contains both primary addresses and a secondary command.

Components	ATN	EOI	DATA	
Header	1	0	Pxxxxxxx	Primary addresses
	1	0	Pxxxxxxx	
	1	0	P1xxxxxx	Secondary
Text	0	0	data	
	-	-	--	
	0	1	data	
Trailer	1	0	P1011111	Untalk
	1	0	P0111111	Unlisten
P = parity				

#### 7.2.4 Lock Commands

This command is used to read/write lock the current unit for exclusive use. The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1101100	Secondary command
0	0	00011001	Opcode
0	1	000abc00	Lock option

For data per the above table:

- ccccc is the HP-IB address of your computer
- yyy is the HP-IB address of the 8000 subsystem.
- abc are Lock Option bits:

a = 0 lock out other ports  
1 lock all ports

b = 0 (no write lock)  
1 write lock

c = 0 (no read lock)  
1 read lock

If successful:

QSTAT = 0

If unsuccessful:

QSTAT = 1

Status bits: 5 illegal opcode MAC not supported by drive  
32 illegal parallel drive is locked by another operation

To change the lock option, re-issue the lock command.

### 7.2.5 Unlock Command

This command is used to unlock the current unit for common access. The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1101100	Secondary command
0	0	00011010	Opcode
0	1	00000000	

If successful:

QSTAT = 0

If unsuccessful:

QSTAT = 1

Status bits: 5 illegal opcode      MAC not supported by drive  
 32 illegal parallel      drive is locked by another port  
 operation

### 7.2.6 Status Commands

QSTAT command returns 1 byte of pass/fail status for the previous command.

ATN	EOI	DATA	
1	0	P01cccc	My listen address
1	0	P1000yyy	Talk device yyy
1	0	P1110000	Secondary command
0	1	0000000s	s = 0 pass 1 fail

The REQUEST STATUS command is used to examine the status of the previous command. The command format is as follows:

ATN	EOI	DATA	
1	0	P10cccc	My talk address
1	0	P0100yyy	Listen device yyy
1	0	P1100101	Secondary command
0	0	00101111	Select controller
0	1	00001101	Request status
1	0	P1011111	Untalk
1	0	P0111111	Unlisten
1	0	P01cccc	My listen address
1	0	P1000yyy	Talk device yyy
1	0	P1101110	Execute command
			drive returns 2OMB status
1	0	P1011111	Untalk

Status bytes:

0, 1 identification errors field

2 - 9 error reporting fields  
(bits 0 - 63; bit 0 is MSB)

10 - 19 parameter field

16 port # of your computer

17 = 0 is SIS mode  
= 0 is MAC mode

18 unit 0 lock status

19 unit 1 lock status

lock status bits:

0,1 port # lock to

2 read lock

3 write lock

4 lock all ports

5 port 1 write status

6 port 2 write status

7 port 3 write status

Note that each port has 1 bit of write status indicating the media is updated by other port(s). This bit is reset after the request status command.

### 7.3. SPECIFICATIONS

#### Performance Characteristics:

	Floppy	Winchester					
		10MB	15MB	20MB	30MB	45MB	70MB
Bytes/Selector	256	256	256	256	256	256	256
Sectors/Track	16	34	34	34	34	34	34
Maximum Capacity	630K	10.4M	14.8M	20.9M	33.0M	45.0M	70.4M
Bytes/Sector	512						
Sectors/Track	9						
Maximum Capacity	710K						
Bytes/Sector	1024						
Sectors Track	5						
Maximum Capacity	788K						
Tracks/Surface	80	611	304	611	639	753	753
Surfaces/Disk	2	2	6	4	6	7	11
Tracks/Inch	135	612	345	588	656	760	760
Maximum Sustained Transfer Rate	13	160	160	160	160	170	170
Track Access Time	18ms	18	18	15	23	8	8
Average Access Time	185ms	85	139	89	102	39	39
Maximum Access Time	355ms	210	329	194	214	64	64
Rotational (rpm)	300	3600	3600	3600	3600	3600	3600

#### Experimental Ranges:

##### Temperature:

operating: 10 to 40 degrees C  
(50 to 104 degrees F)

non-operating: -40 to 60 degrees C  
(-40 to 140 degrees F)

##### Humidity:

operating: 20% to 80%

non-operating: 5% to 95%

##### Altitude:

operating: 0 to 4572m  
(0 to 15000 ft)

non-operating: -304 to 1524m  
(-1000 to 50000 ft)



Vibration: 0.5g  
Shock: 10.0g

**Physical Characteristics:**

**Size:**

Height 107 mm (4.2")  
Depth 446 mm (17.5")  
Width 394 mm (15.5")

**Weight:**

Winchester only 10.58 kg (23.5 lb)  
Winchester and Floppy 11.03 kg (24.5 lb)  
Winchester and Removable 12.16 kg (27.0 lb)

**Power Requirement:**

	Opt.101	Opt.102
Voltage (vac)	90 to 132	198 to 264
Frequency (Hz)	47 to 63	47 to 63
Current (amp)	1.1	.6

## APPENDIX A: MULTI-LANGUAGE INSTALLATION FOR SERIES 200 COMPUTERS

Multiple copies of different languages can be installed in the Series 8000 disk. A particular language can then be selected during the boot procedure. For example, the following procedure configures a 8330 disk drive (30MB Winchester with 3.5 " built-in floppy) into 2 units, installs PASCAL in the first unit and BASIC in the second unit.

Note the Boot ROM 3.0 is assumed to be installed in your computer. Other versions of Boot ROM cannot boot selectable language systems.

1. Turn off your computer and disk drive.
2. Set the switches at Port 1 labelled C3 C2 C1 C0 to 9 (2 units of Winchesters at unit 0 and 1, the floppy at unit 2).
3. Turn on the disk drive and wait until ready.
4. Load the PASCAL system diskette into the floppy drive.
5. Turn on the computer to boot PASCAL. Follow the procedure described in the Series 200 - PASCAL 3.0 section to install the system onto LU #11.
6. Turn off your computer and put the BASIC system diskette in the floppy drive.
7. Turn on your computer and hit a key shortly after.
8. Boot ROM 3.0 will display available systems similar to the following:

```
1P - SYSTEM_PAS
1B - SYSTEM_BAS
```

where 1P is the PASCAL system already installed in the Winchester Unit 0, and 1B is the BASIC system on the floppy diskette. Enter 1B to select the BASIC system.

9. Follow the instructions as described in the BASIC section to install the language system in the unit 1. Make sure your MSI is specified for unit 1 similar to the following:

```
":CS80,700,1"
```

10. Remove the diskette from the drive and reboot the system as described in step 7. Now 1P and 1B indicates the systems in unit 0 and unit 1 of the Winchester disk. It is necessary to put different language systems in different units, because of the difference in the file structure. But different versions of the same language may be able to reside in the same unit.

**APPENDIX B: CHANGING PARTITIONING OF FIXED WINCHESTER DISK**

Do not reset switches C3 C2 C1 C0 at Port 1 unless you intend to repartition the fixed Winchester disk. Newly repartitioned disk space should be reinitialized by following the appropriate procedure for your computer described in Chapter 4. This reinitialization will make the disk space ready for use again.

ALL PREVIOUS DATA STORED ON THE DISK WILL BE LOST.

EXCEPTION: You do not need to reinitialize if both conditions described below apply:

- (1) You are modifying switches C3 C2 C1 C0 merely to reassign the device unit number of the fixed Winchester disk.

AND

- (2) You do NOT change the internal partitioning within the unit.

If both conditions (1) and (2) above apply, do not reinitialize.

NO DATA WILL BE LOST.