



COMPUTERS, INCORPORATED

**AMPRO SCSI UTILITIES**

**USER'S MANUAL**

**P/N: A74027-A**

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HEDIT.EXE . . . . Hard disk partition editor  
HFORMAT.EXE . . . Hard disk formatter  
HPARK.EXE . . . . Moves hard disk head to landing zone  
SCSICOMP.EXE . . . SCSI device block compare  
SCSICOPY.EXE . . . SCSI device block copy  
SCSITOOL.EXE . . . SCSI device exerciser/debugger

## CHAPTER 1

### GENERAL INFORMATION

#### 1.1 INTRODUCTION

This manual is for users and integrators of PC-DOS (or MS-DOS) based systems which utilize a Small Computer System Interface (SCSI) for hard disk access, and which contain AMPRO's "SCSI/BIOS." This includes:

- The AMPRO Little Board/186 single board computer
- The AMPRO Little Board/PC single board computer
- Other licensed systems or host adapters

Within this manual is a description of each of the programs included on the AMPRO SCSI Utilities software diskette, and information on how to perform typical software installation for a variety of system configurations.

#### 1.2 MANUAL ORGANIZATION

This manual is organized as follows:

**Chapter 1 - GENERAL INFORMATION** - An introduction to the structure of this manual, an overview of the AMPRO SCSI Utilities, and a discussion of conventions used in program operation descriptions.

**Chapter 2 - SOFTWARE INSTALLATION** - Hardware setup and software configuration procedures.

**Chapter 3 - PROGRAM DESCRIPTIONS** - Detailed descriptions and operating instructions for each of the programs of the AMPRO SCSI Utilities.

Chapter 3 is intended to provide a convenient user reference. The program descriptions are arranged alphabetically.

#### 1.3 SOFTWARE OVERVIEW

The AMPRO SCSI Utilities represent a breakthrough in mass storage software technology. Through the universal command protocols offered by the Small Computer System Interface (SCSI), it has become possible to connect a wide variety of mass storage devices to a computer system with virtually no changes to system software. To this, AMPRO has added an additional level of universality, by creating an extension to one of the IBM PC ROM-BIOS functions (INT13H), which presents a hardware-independent interface between system software and the SCSI bus protocols. This is called the "SCSI/BIOS."

Providing your system is equipped with the AMPRO "SCSI/BIOS," SCSI disk drives and other devices with SCSI interfaces may be easily added to your system. The AMPRO SCSI Utilities currently support drives up to 128 megabytes in size, on

up to seven SCSI controllers. Support for the first hard disk drive or partition, from which your system can be configured to boot, is contained within the SCSI/BIOS. Additional drives or drive partitions are added by means of the AMPRO partition editor (HEDIT.EXE) and mass storage device driver (HARD.SYS).

Removable media (e.g. cartridge disk drives) is also supported, on the Adaptec 4000 series SCSI controllers. For example, the Syquest SQ306 (5 MB) and SQ312 (10 MB) cartridge drives can be used on an ACB-4000 controller, and the SQ319 (15 MB) can be used on the ACB-4070 controller. Combined with the AMPRO SCSICOPY utility (Chapter 3), this provides a useful backup option.

The following SCSI Utilities are available at this time. Actual utility names and descriptions may vary. Refer to Chapter 3 for detailed program descriptions and operating instructions.

**HARD.SYS** - Random access device driver (usually hard disk). Allows the addition of one or more random access devices, on one or more SCSI controllers.

**HEDIT.EXE** - Drive partition editor. Allows partitioning of a drive into multiple DOS drive letters, up to four, each 32 megabytes or smaller.

**HFORMAT.EXE** - Formats hard disk drives.

**HPARK.EXE** - Hard disk park. Used to position hard disk heads over a defined safety zone, to reduce likelihood of head "crash" on powerdown or during transit.

**SCSICOMP.EXE** - SCSI device block compare utility. (For technical users.)

**SCSICOPY.EXE** - SCSI device block copy utility. (For technical users.)

**SCSITool.EXE** - SCSI device exerciser and debugger. (For technical users.)

**TBACKUP.EXE** - Streaming tape image backup and restore utility. (Available soon.)

## 1.4 CONVENTIONS

In the descriptions of the use of software utilities, terminal keyboard inputs which you will make to the system are shown underlined. This has been done to make it easy for you to distinguish between the computer's prompts and the operator's keystrokes. For example,

A>DIR<RETURN>

means that you type "DIR" and then press the <RETURN> key on your keyboard.

Also, certain keys on your terminal's keyboard have special uses. The control key, generally labeled CTRL, is meant to be pressed at the same time as another key. In this manual, such two-key combinations are written: <CTRL-C>, which means "hold down the CTRL key while you press the C key."

Two other special keys are the "escape" key, indicated by <ESC> and the

"return" key (also called the "carriage return" or "enter" key), indicated by <RETURN>. In general, all commands you enter from the DOS command prompt require you to press the <RETURN> key to begin the operation, as in the example above.

## 1.5 REFERENCES

Some familiarity with the PC-DOS (or MS-DOS) operating system is assumed. Please refer to the appropriate DOS reference manuals for further information on the use of the DOS operating system and its drivers and utilities.

For information on the operation, capabilities, and configuration of your particular host system SCSI hardware, refer to the appropriate hardware technical manual. Those associated with the AMPRO single board computers are:

**AMPRO Little Board/186 Technical Manual - part number A74011**

**AMPRO Little Board/PC Technical Manual - part number A74024**

## CHAPTER 2

### HARD DISK INSTALLATION

#### 2.1 INTRODUCTION

This chapter provides information on how to configure and install an SCSI hard disk controller and drive in your system. The following are required:

- PC-DOS or MS-DOS, version 3.x
- AMPRO SCSI Utilities
- System containing AMPRO SCSI/BIOS
- SCSI controller, hard disk drive, cables, etc.

The SCSI disk controller must be of the type supported by the AMPRO HFORMAT utility (see Chapter 3). The hard disk drive must be compatible with your SCSI controller.

The sections which follow will guide you through the required hardware and software setup and installation procedures. Refer to Chapter 3 for detailed program descriptions and operating instructions on the required AMPRO utilities and drivers.

#### 2.2 HARDWARE PREPARATION

The SCSI hard disk controller(s) must be connected to the SCSI connector on the host system, and also to one or more hard disk drives. The host computer, the SCSI controller, and the hard disk drive require some jumpers to be set. In addition, you will need the following information on each drive to be used:

- Number of cylinders
- Number of heads
- Step rate
- Cylinder number to begin write precompensation (if needed)
- Cylinder number to begin reduced write current (if needed)

##### 2.2.1 Host ID Jumpering

All SCSI bus devices have a unique SCSI bus ID. The host system has an "Initiator ID" and the target device has a "Target ID". For automatic booting from a SCSI bus device under the AMPRO SCSI/BIOS, the host hardware should be jumpered to an Initiator ID value of "7." Consult your host SCSI hardware technical manual for details on setting the Initiator ID.

##### 2.2.2 Target Device Jumpering

Each type of hard disk drive usually has a jumper configuration area, generally located near the 34-pin drive cable connector. Consult your drive's documentation to determine how it needs to be jumpered. If only one drive is connected to a controller, it should be jumpered as the first logical unit

(LUN 0), and connected to the connector on the controller designated for that unit. When two or more drives are connected to a single controller, they are jumpered to different logical unit numbers, and connected to the appropriate connectors on the controller.

The controller also needs to be jumpered. Here are some notes on the installation of several controller types:

**Seagate 225N Embedded SCSI Drive** - set the SCSI bus ID jumpers, which are located next to the SCSI interface connector, as indicated in Table 3-1.

**Xebec OWL** - set the sector size jumper, labeled "SS," to the 512 byte sector position. The OWL is shipped jumpered for SCSI bus ID 0, so if you are only using one controller use that bus ID.

**Adaptec ACB-4000 or ACB-4070** - set the SCSI device ID jumper, J5, for the desired controller ID, as shown in Table 3-1. The ID is specified as a 3-bit binary code, with the least significant bit corresponding to A-B and the most significant bit E-F. The associated bit is a 0 when the jumper is off. If only one controller is on your SCSI bus, you can select bus address 0 by leaving off all of the address jumpers. The jumpers near J1, labeled T, PU, R and S are used for write precompensation setup. Generally a single jumper should be inserted here, between R and S.

**Shugart 1610-4** - set its SCSI bus ID jumper (jumper pairs CU1, CU2, and CU4) as shown in Table 3-1. No other jumpering is required.

**Table 3-1. Seagate, Adaptec, and Shugart ID Jumpering**

SCSI Bus ID	Seagate 225N			ACB-4000,4070			Shugart 1610-4		
	1-2	3-4	5-6	D-E	C-D	A-B	CU4	CU2	CU1
0	out	out	out	out	out	out	out	out	out
1	out	out	in	out	out	in	out	out	in
2	out	in	out	out	in	out	out	in	out
3	out	in	in	out	in	in	out	in	in
4	in	out	out	in	out	out	in	out	out
5	in	out	in	in	out	in	in	out	in
6	in	in	out	in	in	out	in	in	out
7	in	in	in	in	in	in	in	in	in

**NOTE**

If you are using multiple controllers, be sure only one of them has its SCSI bus termination resistors installed.



## 2.3 FORMATTING THE DRIVE

### WARNING!

All data on the drive formatted will be destroyed.

Use the AMPRO HFORMAT utility to format and initialize the drive(s) to be used. HFORMAT writes a "clean" set of data to the drive, stores information about the drive needed by the SCSI controller, and can map out any bad regions on the drive's storage surface that may be found. Run the HFORMAT utility, as described in Chapter 3, on each drive you will be using.

HFORMAT will indicate a problem if the controller is not responding to commands from your computer, or if the controller cannot properly access your disk drive. If errors are indicated, check all connections, jumper configuration, drive parameters, etc. It is always helpful to try a second identical controller, drive, cables, etc., to aid in fault isolation.

## 2.4 PREPARING A DRIVE AS A DOS BOOT DEVICE

This drive must be jumpered as logical unit 0 (LUN 0), on an SCSI controller whose SCSI ID is set for ID 0 (according to the drive's documentation).

Do the following:

- (a) Format the drive as described above.
- (b) If you wish to partition the drive into several drive letters, use the AMPRO HEDIT utility as described in Chapter 3. This is required if your drive is larger than 32 megabytes.

Also, the HARD.SYS device driver must be properly installed in your system, before you can access more than the first drive partition. This is accomplished by adding one or more lines to your CONFIG.SYS file (see Chapter 3). For example, if you have a 100 megabyte drive and you partition it as four DOS drive letters (using HEDIT), you will need the following lines in CONFIG.SYS (assumes SCSI ID=0, LUN=0):

```
DEVICE = HARD.SYS S0 L0 P1
DEVICE = HARD.SYS S0 L0 P2
DEVICE = HARD.SYS S0 L0 P3
```

- (c) Reboot your system (press the RESET button). DOS should now recognize the presence of the newly formatted hard disk drive as a DOS drive, assigning it as the next letter beyond the number of drives indicated by the setting of the drive quantity switches or jumpers in your computer system. For example, if your drive quantity switches or jumpers are set for 4 drives, the hard disk drive will have DOS letter "E". You can test this by using the DOS DIR command.
- (d) After you have re-booted your system and tried accessing the hard disk drive with the DOS DIR command, run the DOS FORMAT utility (with the /S option) on the drive, as follows:

```
A><u>FORMAT E:/S</u><RETURN>
```

This will copy the operating system on the drive. Now copy the rest of the contents of your BOOT diskette with the DOS copy command:

```
A><u>COPY *.* E:</u><RETURN>
```

Your system should now be able to "boot" directly from the hard disk drive. Remove the floppy from drive A, and again RESET your computer. This time, it should boot directly from the hard disk drive; the DOS prompt should indicate the hard disk drive's device letter, for example:

```
E>_
```

From now on, when you RESET your system with your system BOOT diskette in floppy drive A, the system will boot from the floppy, whereas if no diskette is present in drive A, the system will boot from the hard disk drive.

## 2.5 PREPARING ADDITIONAL DRIVES FOR DOS USE

Any additional drives must be jumpered as an appropriate logical unit (LUN 0 - LUN 3), on one or more SCSI controllers whose SCSI ID(s) are set for unique SCSI ID's (0-7).

Do the following, for each drive you add to your system:

- (a) Format the drive with the AMPRO HFORMAT.EXE utility, as described in Chapter 3.

### NOTE

Do not use the DOS FORMAT or SYS utilities.

- (b) Run the AMPRO HEDIT utility if the drive is larger than 32 megabytes, or if you wish to have multiple smaller partitions.
- (c) Add a line invoking HARD.SYS to your boot drive's CONFIG.SYS file for each additional drive or drive partition to be used. (Refer to the information on the HARD.SYS driver in Chapter 3.) For example:

```
DEVICE = HARD.SYS S1 L0 P0
```

would be used to add a drive at SCSI ID 1, LUN 0, partition 0.

- (d) RESET your computer. If the drive and controller are properly connected and jumpered, the drive will now be accessible as the DOS drive letter indicated in the driver sign-on message, for example:

```
SCSI Hard Disk Driver Version 4.0  
drive letter D: installed
```

Verify that the drive can be properly accessed using a command such as the DOS DIR function.

## 2.6 HARD DISK PARKING

Always "park" all hard disk drives before you power your system down. This can be done using the AMPRO HPARK.EXE utility (see Chapter 3). For example:

```
E>HPARK 0<RETURN>
```

You may wish to create a DOS "batch" file (called PARK.BAT, etc.) to simplify this task.

## CHAPTER 3

### DETAILED PROGRAM DESCRIPTIONS

This chapter contains detailed information on each of the driver and utility programs supplied on the AMPRO SCSI Utilities diskette. Each program's description explains what the program does and how it is used. Program descriptions are in alphabetical order, so this chapter can serve as a handy reference.

Each program is identified by a version and revision level. When the program is run, its version number (and a revision level) generally appear in a sign-on message such as the following:

```
        AMPRO Hard Disk Format Utility
        Copyright (C) 1986 AMPRO Computers, Inc.
        Version 4.00
```

In this case the program is version 4, revision "00". Versions of a program which have the same "version" number operate in the same manner. When a change is made to a program which necessitates a new description, its version number is changed, indicating that the old description is no longer accurate.

#### NOTE

Read the contents of the ".DOC" files on your AMPRO SCSI Utilities diskette (filenames of the form "PROGRAM.DOC"). They contain information on recent program revisions, enhancements, or additions relative to the published user's manual.

Additional programs and features, offered on an on-going basis, will be available to you through software updates, at a nominal charge. You are encouraged to use the AMPRO customer support electronic bulletin board system which provides a 24-hour software update service, answers to user questions, public domain software, etc.:

**AMPRO Customer Support BBS — (415) 962-9023 — 300/1200 baud**

#### NOTE

The PC-DOS (or MS-DOS) Operating System Version 3.x and the AMPRO SCSI/BIOS, are required for operation of any of the AMPRO SCSI Utilities.

## HARD.SYS

(Version 4)

### Description

The AMPRO HARD.SYS device driver supports one or more hard disk drives (or drive partitions) connected to one or more SCSI compatible hard disk controllers, in a system equipped with the AMPRO SCSI/BIOS. HARD.SYS is not required for your system's first hard disk drive (LUN 0 on SCSI ID 0), and is only necessary if you wish to add additional drives, or if you wish to partition a drive into multiple 32 megabyte (or smaller) partitions. Refer to Chapter 2, Hard Disk Installation, for instructions on hard disk installation, formatting, and partitioning.

### Operation

To use the hard disk device driver, create a text file called CONFIG.SYS on your system boot drive, containing at least one line, of the following form:

```
DEVICE = HARD.SYS Ss Ll Pp
```

Refer to the DOS reference documentation for further information on the use of the DOS CONFIG.SYS function.

Each such line defines a drive or a drive partition. Three numbers (s,l,p) indicate the hard disk controller's SCSI bus ID, the hard disk drive's Logical Unit Number (LUN), and the partition number on the drive, which are defined as follows:

- s - SCSI bus ID: This number, from 0 through 7, corresponds to jumper settings on the SCSI controller board. Refer to the controller's documentation for specific configuration information.
- l - Logical Unit Number (LUN): This number, from 0 through 3, corresponds to jumper settings on the hard disk drive. In addition, the hard disk drive's data cable must be connected to the connector on the SCSI controller associated with the drive's LUN.
- p - Partition number: This number, from 0 through 3, corresponds to one of four possible partitions on the drive.

Your system's CONFIG.SYS file must contain a separate device definition line for each hard disk drive or partition to be used.

As with other DOS disk device drivers, the defined drive(s) will occupy sequential drive letters, beginning with the next available drive letter beyond those defined by the computer board's floppy drive quantity switch or jumper settings and other installed device drivers (floppy, RAM-disk, etc.). There is one exception: when the floppy drive quantity is set to "1," DOS assigns two drive letters to the first floppy drive. In this case, the single drive is accessed as both A and B, and additional drives begin with drive letter C. Also, the AMPRO SCSI/BIOS recognizes the first partition of the first hard disk

drive automatically -- without the use of HARD.SYS -- once it has been properly formatted and partitioned (see Chapter 2), resulting in an additional occupied drive letter.

### Examples

The following CONFIG.SYS command defines the second partition (P=1), on the first drive (L=0), on a controller jumpered for the the first SCSI ID (S=0):

```
DEVICE = HARD.SYS S0 L0 P1
```

The following pair of CONFIG.SYS commands define two additional system drives:

```
DEVICE = HARD.SYS S1 L0 P0      <--- defines second system drive  
DEVICE = HARD.SYS S2 L0 P0      <--- defines third system drive
```

### Notes on HARD.SYS

Here are several important notes concerning the use of HARD.SYS:

- AMPRO systems are currently jumpered to a floppy drive quantity setting of four floppy drives, regardless of the actual number of drives in the main system enclosure. Therefore additional drives or partitions installed by HARD.SYS would have DOS drive letters E, F, etc.
- The hard disk drive(s) must be formatted prior to use. Refer to the section on Hard Disk Drives in Chapter 3, for step-by-step procedures.
- The AMPRO HEDIT partition "editor" must be used to partition drives before partitions other than 0 can be used, or before drives larger than 32 megabytes can be accessed after formatting.
- You must RESET your system after adding a HARD.SYS drive definition line to your CONFIG.SYS file, in order for DOS to recognize the added drive definition. If your hard disk drive or controller are not properly accessed by HARD.SYS when you RESET your system, then the drive you have attempted to define will not occupy a DOS drive letter.

## HEDIT.EXE

(Version 4)

### Description

HEDIT is the AMPRO hard disk partition editor. It is used to subdivide a hard disk drive into multiple DOS drive letters. This is required for drives which are larger than 32 megabytes under DOS version 3.x. You can create up to four partitions per physical drive, of any desired size (up to 32 MB).

HEDIT allows you to specify the first partition as the DOS "boot" partition, allowing your system to directly boot from the hard disk. The AMPRO hard disk device driver (HARD.SYS) must be installed before you can actually access the additional partitions.

### Operation

#### NOTE

Before you use the HEDIT utility, the drive to be partitioned must be formatted using the AMPRO hard disk format utility, HFORMAT.EXE, version 4.0 or later. In addition, the AMPRO hard disk device driver (HARD.SYS) must be installed before any programs other than the AMPRO utilities can access the added drive partitions.

Refer to the information on HFORMAT.EXE and HARD.SYS elsewhere in this chapter, and to the step-by-step installation procedures in Chapter 2.

To run the partition editor program, type its name at the DOS command line:

A>HEDIT<RETURN>

The program will display a sign-on message, followed by its main command menu:

**\*\* Main Menu \*\***

Choose one of these options:

1. Select hard disk drive
2. Show partition information
3. Install DOS partition
4. Remove DOS partition
5. Set 'BOOT' partition
  
- X. EXIT -- Return to DOS.

Enter your choice: \_\_\_

As indicated, six command options are available. The program will prompt for any information required as each option proceeds. The main menu options are used as follows:

(1) Select hard disk drive. This is used to specify the location of the drive you will be partitioning. For example, when you select option 1 (Select hard disk drive), you will be prompted for a controller SCSI ID and a drive Logical Unit Number (LUN):

What is the SCSI ID of your controller (0-7)? 0  
Which drive on the controller (0-3)? 0

Partition information loaded.

Press the <RETURN> key to continue.

After you press <RETURN>, the program will return to the main menu.

(2) Show partition information. Option 2 is used to display the current partition status of the drive. When you select option 2, a table such as the following will be displayed:

Hard disk at SCSI ID: 0, Logical unit 0 selected.  
(611 cylinders, 2 heads, 18 sectors/track, 22031 total sectors)

Partition	Status	Type	Start Cyl	End Cyl	Total Cyls	Size
0	Boot	MS-DOS	0	304	305	(5.36 Mb)
1	Data	MS-DOS	305	610	611	(5.37 Mb)
2	--	--	--	--	--	
3	--	--	--	--	--	

(3) Install DOS partition. Option 3 is used to define up to four partitions for DOS use (Type = MS-DOS). The size of each partition is specified as "Start" and "End" cylinder numbers, and can be any size desired, up to 32 megabytes of storage (storage = cylinders X heads X sectors X 512 bytes).

(4) Remove DOS partition. Option 4 is used to remove partition(s) from DOS use. This option is not generally used.

(5) Set 'BOOT' partition. Option 5 is used to specify which partition DOS shall boot from, on powerup or reset. The boot partition must have cylinder 0 specified as its "Start" cylinder in the partition table, and must be the first partition (Partition 0).

#### NOTE

For a partition to be "bootable" by the AMPRO SCSI/BIOS, the drive must be connected as logical unit 0 (LUN 0) on a SCSI controller which is jumpered for SCSI ID 0.

#### NOTE

If the drive will be accessed through the HARD.SYS device driver, it does not matter if the partition is labeled as a "Boot" or a "Data" partition.



## SCSICOMP.EXE

(Version 2)

### Description

The AMPRO SCSICOMP.EXE utility allows you to compare the contents of two SCSI direct access devices (e.g. hard disk drives). Although the program must be run from PC-DOS (or MS-DOS), SCSICOMP pays no attention to the contents of the source and destination SCSI devices, and does not care what (if any) operating system has been used to write data to them.

You can specify any two SCSI controller ID's, drive Logical Unit Numbers (LUN's), SCSI block range to be compared.

### Operation

To run the program, type its name at the DOS command line:

```
A>SCSICOMP<RETURN>
```

The program will display a sign-on message and will then prompt you to press the <RETURN> key to continue. After you press the <RETURN> key, the program will prompt you for information required, including the first SCSI ID, first logical unit number, second SCSI ID, second logical unit number, starting block number, and number of blocks to compare. Then, the program will compare the specified segments of the two SCSI devices and report on any errors or differences that occur during the comparison.

The required parameters are defined as follows:

**SCSI ID:** Each device's SCSI ID is determined by the jumpering of the device's SCSI controller and is in the range 0 through 7.

**Logical Unit Number (LUN):** Each device's logical unit number is based on how the device is connected to the controller and may also depend on the setting of jumpers on the device; it is generally 0 or 1.

**Block Number:** A SCSI "block" is 512 bytes of data; the first block on the device is numbered 0.

The current version of SCSICOMP requires that the block starting numbers on the two drives be the same, so only one starting block number is requested by the program.

The total number of blocks for a given drive can be found using the AMPRO HEDIT utility's partition status table (option 2). The "total sectors" value in the table is equivalent to the total number of SCSI blocks on the drive. In addition, you can compute the starting block number and number of blocks for each partition on a drive, from the values in HEDIT's partition status table (blocks = cylinders x heads).

**Example**

In this example, 2000 blocks (10,240,000 bytes) of data are compared, between LUN 0 on SCSI ID 0 and LUN 1 on SCSI ID 1.

What is the first SCSI ID and logical unit number?

SCSI ID (0-7): 0<RETURN>

Logical unit number (0-3): 0<RETURN>

What is the second SCSI ID and logical unit number?

SCSI ID (0-7): 1<RETURN>

Logical unit number (0-3): 1<RETURN>

Starting block number: 0<RETURN>

Number of blocks: 2000<RETURN>

You are about to compare:

From:	SCSI ID: 0	To:	SCSI ID: 1
	LUN: 0		LUN: 1

Starting with block 0, for 2000 blocks.

Is this correct (Y/N)? Y<RETURN>

Press the <RETURN> key to begin or the <ESC> key to start over: <RETURN>

Compare completed, 0 errors.

Compare another (Y/N)? N<RETURN>

A>\_\_

## HFORMAT.EXE

(Version 4)

### Description

HFORMAT is the AMPRO hard disk formatter utility. It is used to format and initialize hard disk drives, prior to final formatting with the standard DOS FORMAT utility.

The current version of HFORMAT supports four types of SCSI hard disk controllers, and many types of hard disk drives. Consult the specific SCSI hard disk controller manual for information as to which drives it can control. The controllers currently supported are:

Adaptec ACB-4000 and ACB-4080  
Shugart 1610-4  
Xebec OWL SASI drive  
Seagate ST225N SCSI drive

In addition, removable media support for cartridge drives, such as those manufactured by Syquest, is available on the Adaptec 4000 series controllers. Also, drive-level bad block lockout is provided for fixed media on controllers which support the lockout function.

HFORMAT completely reformats the target drive, writing over all previous data in all partitions on the drive, and yields a unpartitioned drive. The HEDIT partition editor must be used following HFORMAT, if the drive is larger than 32 megabytes, or if multiple smaller partitions are desired.

### Operation

#### WARNING!

All data on the drive you format will be destroyed.

To run the hard disk formatter utility, type the program's name at the DOS command line:

A>HFORMAT<RETURN>

The program will prompt you for any required information, and then proceed to format the target drive.

You will be prompted for:

**Controller SCSI ID** - Depends on jumper settings on the controller. This is normally 0 for the first SCSI controller.

**Controller make and model** - Select from those listed.

**Drive "logical unit number"** - Depends on which connector on the controller the drive's data cable is connected. Drive must also be correctly jumpered according to this number. This is normally 0 for the first drive connected to a particular SCSI controller.

**Drive characteristics** - these are obtained from the drive's technical manual or data sheet. These are:

- Number of cylinders
- Number of heads
- Starting cylinder for reduced write current (RWC), if needed
- Starting cylinder for write precompensation (WPC), if needed
- Landing zone cylinder
- Drive step rate

If either reduced write current or write precompensation are not required by your drive, use the last cylinder number for these values.

**Format interleave** - Normally, an interleave of 2 is best. However, selection of an interleave value other than 2 may be an advantage, depending on the specific controller and drive. Adaptec controllers can be used with an interleave of 1, for increased speed.

#### **NOTE**

After the format is complete, you still must prepare the drive for DOS access. In particular, you will need to run:

- the AMPRO HEDIT utility if your drive is larger than 32 megabytes, or if you wish to create multiple smaller partitions
- the DOS FORMAT utility with the "/S" option if you wish to boot from the drive

Refer to the Chapter 2 for step-by-step procedures.

## HPARK.EXE

(Version 4)

### Description

The AMPRO HPARK utility is used to position the read/write head(s) of a hard disk drive to a predefined safety zone on the disk surface, to guard against accidental data loss due to either power on/off glitches in the drive electronics or media damage due to mechanical shock. You should always use HPARK to "park" your drives' heads prior to switching off AC power.

The current version of HPARK supports the following SCSI controllers:

Adaptec ACB-4000, and ACB-4070  
Shugart 1610-4  
Xebec OWL SASI drive  
Seagate ST225A SCSI drive

### Operation

To use HPARK to park a drive's heads, type the program's name followed by one or more SCSI ID(s) of the controller(s) to which the drive(s) are connected. All drives on each SCSI controller will be parked by the single command. For example:

```
C><u>HPARK 0 1</u><RETURN>
```

will park all drives detected on SCSI controllers with ID's of 0 and 1. You can also use an asterisk (\*), to have all possible SCSI ID's parked. That is,

```
C><u>HPARK *</u><RETURN>
```

will park drives on all SCSI controllers detected. "HPARK \*" is equivalent to "HPARK 01234567".

### NOTE

Be sure not to access a hard disk drive after it is parked, as this will move the drive's heads off the landing zone. Some controllers (e.g. the OWL) do not permit drive access once the drive is parked.

You may wish to create a DOS "batch" file containing the required HPARK command line.

## SCSICOPY.EXE

(Version 4)

### Description

The AMPRO SCSICOPY.EXE utility allows you to copy a block of data between two SCSI direct access devices (e.g. hard disk drives). Although the program must be run from PC-DOS (or MS-DOS), SCSICOPY pays no attention to the contents of the source SCSI device, and does not care what (if any) operating system has been used to write data to it.

You can specify any two SCSI controller ID's, drive Logical Unit Numbers (LUN's), and any block range.

### CAUTION

(1) SCSICOPY will destroy data on the destination device within the specified block range. Use with extreme care!

(2) Copying less than the full drive may leave part of the destination device unusable.

### Operation

To run the program, type its name at the DOS command line:

A><u>SCSICOPY</u><RETURN>

To run the program, type its name at the DOS command line:

A><u>SCSICOPY</u><RETURN>

The program will display a sign-on message and will then prompt you to press the <RETURN> key to continue. After you press the <RETURN> key, the program will prompt you for information required, including the first SCSI ID, first logical unit number, second SCSI ID, second logical unit number, starting block number, and number of blocks to copy. Then, the program will copy the specified segment between the two SCSI devices and report on any errors that occur during the process.

The required parameters are defined as follows:

SCSI ID: Each device's SCSI ID is determined by the jumpering of the device's SCSI controller and is in the range 0 through 7.

Logical Unit Number (LUN): Each device's logical unit number is based on how the device is connected to the controller and may also depend on the setting of jumpers on the device; it is generally 0 or 1.

Block Number: A SCSI "block" is 512 bytes of data; the first block on the device is numbered 0.

The current version of SCSICOPY requires that the block starting numbers on

the two drives be the same, so only one starting block number is requested by the program.

The total number of blocks for a given drive can be found using the AMPRO HEDIT utility's partition status table (option 2). The "total sectors" value in the table is equivalent to the total number of blocks on the drive. In addition, you can compute the starting block number and number of blocks for each partition on a drive, from the values in HEDIT's partition status table (blocks = cylinders x heads).

### Example

In this example, 2000 blocks (10,240,000 bytes) of data are copied from LUN 0 on SCSI ID 0 to LUN 1 on SCSI ID 1.

What is the first SCSI ID and logical unit number?

SCSI ID (0-7): 0<RETURN>

Logical unit number (0-3): 0<RETURN>

What is the second SCSI ID and logical unit number?

SCSI ID (0-7): 1<RETURN>

Logical unit number (0-3): 1<RETURN>

Starting block number: 0<RETURN>

Number of blocks: 2000<RETURN>

You are about to copy:

From:	SCSI ID: 0	To:	SCSI ID: 1
	LUN: 0		LUN: 1

Starting with block 0, for 2000 blocks.

Is this correct (Y/N)? Y<RETURN>

Press the <RETURN> key to begin or the <ESC> key to start over: <RETURN>

Copy completed, 0 errors.

Copy another (Y/N)? N<RETURN>

A>\_\_

## SCSITOOl.EXE

(Version 2)

### Description

The AMPRO SCSITOOl utility is a powerful and flexible SCSI debugging tool which allows you to demonstrate, test, and debug SCSI commands and devices. Options are provided which allow you to create any desired SCSI command, and write or read desired data patterns to or from any type of SCSI device. Although the program must be run from PC-DOS (or MS-DOS), SCSITOOl pays no attention to the contents of the SCSI devices accessed, and does not care what (if any) operating system has been used to write data to them.

### CAUTION

SCSITOOl can destroy data on the destination SCSI device. Use with extreme care!

### Operation

The SCSITOOl utility is very easy to use, but you need to understand SCSI command principles in general, as well as the specific SCSI command set of the SCSI Target devices you will be accessing. Refer to the technical information supplied by the SCSI Target devices' manufacturers, and to the ANSI X3.131 SCSI Specification for a full functional specification of the SCSI interface protocols.

To begin program operation, type the program's name at the DOS command line:

A><u>SCSITOOl</u><RETURN>

The program will display a brief sign-on message, followed by the SCSITOOl command prompt:

Command (C,D,E,R,S,?,<ESC> to quit): \_\_\_

Entering a "?" results in the display of SCSITOOl's command menu:

Commands available:

- C - Enter command buffer
- D - Enter data buffer
- E - Execute SCSI command
- R - Reset SCSI bus
- S - Set SCSI ID
- ? - Display this help message

Command (C,D,E,R,S,?,<ESC> to quit): \_\_\_

When you use either the C (Enter command buffer) or D (Enter data buffer) options, the program will display the current contents of the SCSI command or



data buffer in one area of your screen, and will position the cursor over the first byte of data on the command or data buffer entry line.

For example:

Command (C,D,E,R,S,?,<ESC> to quit): C

The Command Buffer currently contains:

```
      0  1  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19
      -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Enter the new values in hexadecimal. The <SPACEBAR> leaves a digit unchanged, while the <RETURN> key stops editing and returns to the list of commands.

0 \_ <-- cursor on first command byte

You can use the <SPACEBAR> key to move through the buffer to one or more bytes which you wish to modify. A little experimentation will make the process clear.

Similarly, you view and optionally edit data in the SCSI data buffer with the D (Enter data buffer) option, if data is to be sent or received from the SCSI device. The data buffer size is actually 5K bytes, but only the first 512 bytes are available through this program's D command. Since the entire 512 bytes of the data buffer display do not fit entirely on one screen, use <CTRL-S> to pause the display when necessary (and any other key to resume display).

Do not execute a SCSI command with the E (Execute SCSI command) option until you have first used the S (Set SCSI ID) option to specify the SCSI ID of the device to which the command will be issued.

### Examples

Example #1: Test Unit Ready command. Enter all 0's in the command buffer with the C command; set the appropriate SCSI controller ID with the S command. Then use the E command to perform the Test Unit Ready function. (This example assumes LUN 0.)

Example #2: Rezero Unit command. Enter 01 in the first command byte, and all 0's in the rest of the command buffer, with the C command; set the appropriate SCSI controller ID with the S command. Then use the E command to perform the Test Unit Ready function. (This example assumes LUN 0.)