



# Installation guide

## Ultrastar 9LZX & 18ZX

Multi-mode SE/LVD

Models: DRVS-09V  
DRVS-09D  
DRVS-18V  
DRVS-18D



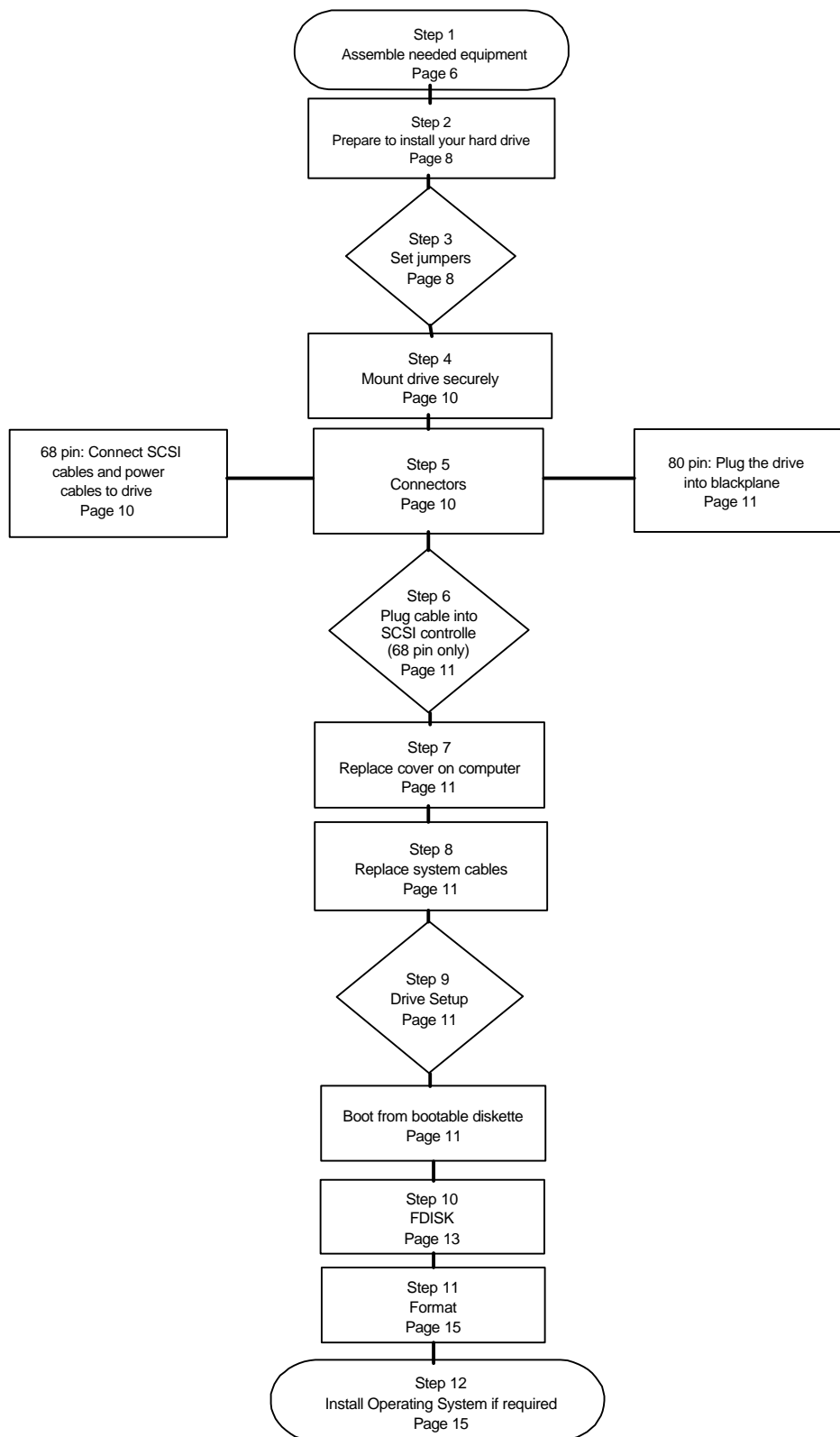
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## TECHNICAL SUPPORT

<http://www.ibm.com/harddrive>  
888.426.5214

## HARD DISK DRIVE INSTALLATION FLOW CHART



## **INTRODUCTION**

### ***The Hardware Installation and Drive Preparation Manual for IBM Hard Disk Drives***

This manual was prepared to help you install your IBM Ultrastar 9LZX or Ultrastar 18ZX hard drive in most computer systems. If you do not feel comfortable installing this drive yourself, take it to a qualified installer.

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Before you begin installation, please read the following important disk drive handling caution:



## **HARD DISK DRIVE HANDLING GUIDE**

These notes are designed to provide a simple overview of the need to be cautious when handling a disk drive.

Disk drives can be easily damaged either by electrical static shock or by rough handling. In order to minimize the risk of damage it is essential that disk drives be handled on a cushioned surface (which is electrostatically safe). Many such static safe mats are available, examples are 3M's 8210 table mat or 3M's "First Touch" computer pad. Great care should be taken when handling disk drives. Do not bump them against any object. When attaching brackets or mounting the drive in the computer, be very careful. It is VERY EASY to introduce shocks which exceed the specification.

Please note that the capacity of each disk drive to withstand electrical or mechanical shock varies depending on its design. The IBM Hard Disk Drive Technical Support Center can advise you on the suitability of your Deskstar drive for a specific application.

Damage incurred to a drive might not be immediately evident and may cause it to fail months later.

**Step 1: Installation Checklist**

To install the Ultrastar drive you may need the following components, depending on your computer:

- 1) \_\_\_ The installation kit containing your Ultrastar drive, 4 mounting screws, and any related publications. Save the box the drive came in.
- 2) \_\_\_ The documentation that came with your computer or storage enclosure.
- 3) \_\_\_ A small, flat-blade screwdriver.
- 4) \_\_\_ A SCSI controller, which is either built-in or an adapter inside your computer, and any related documentation.
- 5) \_\_\_ Mounting brackets, if required for your computer. Contact your place of purchase if you are unsure if mounting brackets are required.
- 6) \_\_\_ A bootable DOS diskette. (If you do not have a bootable DOS diskette, see instructions for creating one in the appendix.)
- 7) \_\_\_ If you are replacing an older internal drive with the new Ultrastar drive and want to copy all of the files from the older drive to the new drive, you may need additional software. (See the section entitled *Drive Copy* on page 25 for more information.)

Continue installation with the following procedures:

- 1) \_\_\_ Backup your existing drive to avoid any loss of data during installation. (See the section entitled *Backup & Restore* on page 24.) After completing backup, shut down as normal.
- 2) \_\_\_ Unplug your system from the electrical outlet.
- 3) \_\_\_ Establish a common voltage between your body and the hard drive. Simultaneously touch an unpainted metal surface on the outside of your computer system with your bare hands and with the hard drive encased in it's anti-static bag. Avoid excessive movement until the drive has been mounted.
- 4) \_\_\_ DO NOT LOW-LEVEL FORMAT YOUR DRIVE! IBM drives are low-level formatted by the manufacturer and reformatting may cause permanent damage to your drive and/or your system. (See *Utilities* on page 25)
- 5) \_\_\_ Record the following information:  
Drive Model \_\_\_\_\_ Date of Purchase \_\_\_\_\_  
Drive P/N \_\_\_\_\_ Place of Purchase \_\_\_\_\_  
Serial # \_\_\_\_\_



**Installation Kit**

The DRVS model drives come complete with 4 screws for mounting and an installation guide.

**Hardware Description**

The Ultrastar 9LZX and 18ZX family is available in various models with a variety of the following options:

Capacity	Model	SCSI Pins/Connector Type	SCSI Electrical Signal Type
9.1 GB	DRVS-09V	68 / Unitized Connector	Low Voltage Differential (Ultra2)
9.1 GB	DRVS-09D	80 SCA-2	Low Voltage Differential (Ultra2)
18.2 GB	DRVS-18V	68 / Unitized Connector	Low Voltage Differential (Ultra2)
18.2 GB	DRVS-18D	80 SCA-2	Low Voltage Differential (Ultra2)

- { Capacity of 9.1GB or 18.2GB
- { 68 pin or 80 pin (SCA) connectors
- { 68 pin SCSI connectors use the SCSI P connector which supports wide data transfers
- { 80 pin SCSI connectors use the SCA-2 connector

These drives have an advanced LVD interface and support transfer rates of up to 80 MB/sec. To take advantage of the higher transfer rate of 80 MB/sec, your computer will need to have a controller that supports the LVD interface. If your SCSI controller does not support LVD, the drive will work, but will be limited in data transfer speed due to the lower speed of your controller. If you have a slower controller, you may choose to purchase an LVD controller card (which fits into one of the available slots in your computer) to take advantage of Ultrastar's 80 MB/sec data transfer rate.

If you currently have wide SCSI drives (single-ended) and a non-LVD controller, you may still attach the Ultrastar 9LZX or 18ZX to the existing cable. However, single-ended wide SCSI drives cannot be added to a bus with an LVD drive if it is connected to an LVD controller.

To determine if your current controller card is LVD, refer to the documentation that came with your controller or contact the controller manufacturer for information.

These drives are 3.5" drives designed to work in NT and Unix workstations and servers. They are ideal for use in video production and movie editing. The Ultrastar 9LZX and 18ZX families are designed to work with MMX systems. Compatibility listings are included in the appendix.

**Step 2: Prepare to install your hard drive**

**Opening your computer**

1. Turn the system off.
2. Unplug the power cord from the wall outlet.
3. Remove all cables from the back of your computer, labeling them if necessary.
4. Remove the cover from your computer. (Consult your user's guide for instructions if needed.)

**Unpackaging your hard drive**

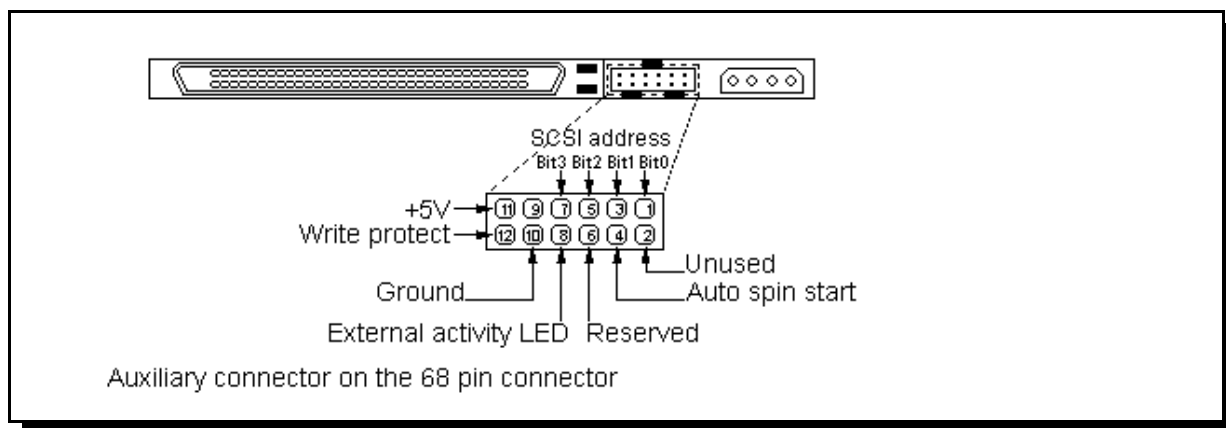
1. Remove the drive from the anti-static package that it was shipped in.
2. Handle the drive by the sides only.
3. Do not touch the main computer chip board.
4. Do not drop. A drop of only 1/4 inch could permanently damage your hard drive.
5. If available, use an ESD (Electronic Static Discharge) wrist strap while handling your drive.
6. Place the drive carefully on a static free area.

**Step 3: Jumper Settings**

The jumper settings are found on the hard drive on the opposite end of the interface connector. (See the diagram on page 9.) These are physical settings that can be changed to allow for different uses of your hard drive.

	BIT 3	BIT 2	BIT 1	BIT 0	Address
	off	off	off	off	0
<b>SCSI ID</b>	off	off	off	on	1
<b>Jumpers</b>	off	off	on	off	2
	off	off	on	on	3
Each SCSI device will need to have its own SCSI ID. You can use ID 0 through ID 15 reserving ID 7 for your controller card.	off	on	off	off	4
	off	on	off	on	5
	off	on	on	off	6
	off	on	on	on	7
	on	off	off	off	8
	on	off	off	on	9
	on	off	on	off	10
	on	off	on	on	11
	on	on	off	off	12
	on	on	off	on	13
	on	on	on	off	14
	on	on	on	on	15

Follow the table below to set an ID on your SCSI drive.



#### SCSI Address Determination

#### Drive Termination

The SCSI bus will need to be terminated at both ends of the bus. The Ultrastar 9LZX and 18ZX do not have onboard active termination. You will need to supply an external Ultra2 compatible terminator.

#### Termination Power

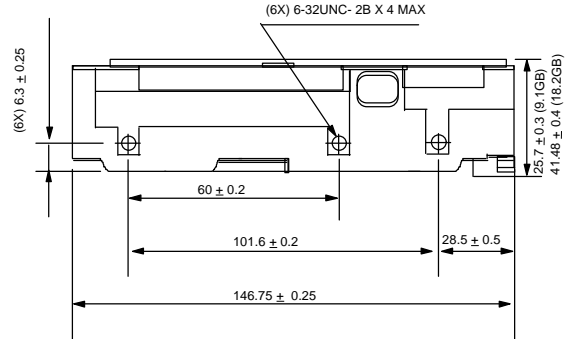
Some controllers may require the drive to supply 5 volts of power to the bus to in termination. If your controller requires this, place a jumper on the Termination Power Enable jumpers to the side of the jumper block. These pins require a 2.54mm jumper shunt.

#### Auxiliary Option Jumper Block

The 68 pin models contain an “auxiliary” connector that replicates some of the functions contained in the front option jumper block. Either the front option block or the auxiliary option block may be used, but not both.

#### Additional Jumper Options

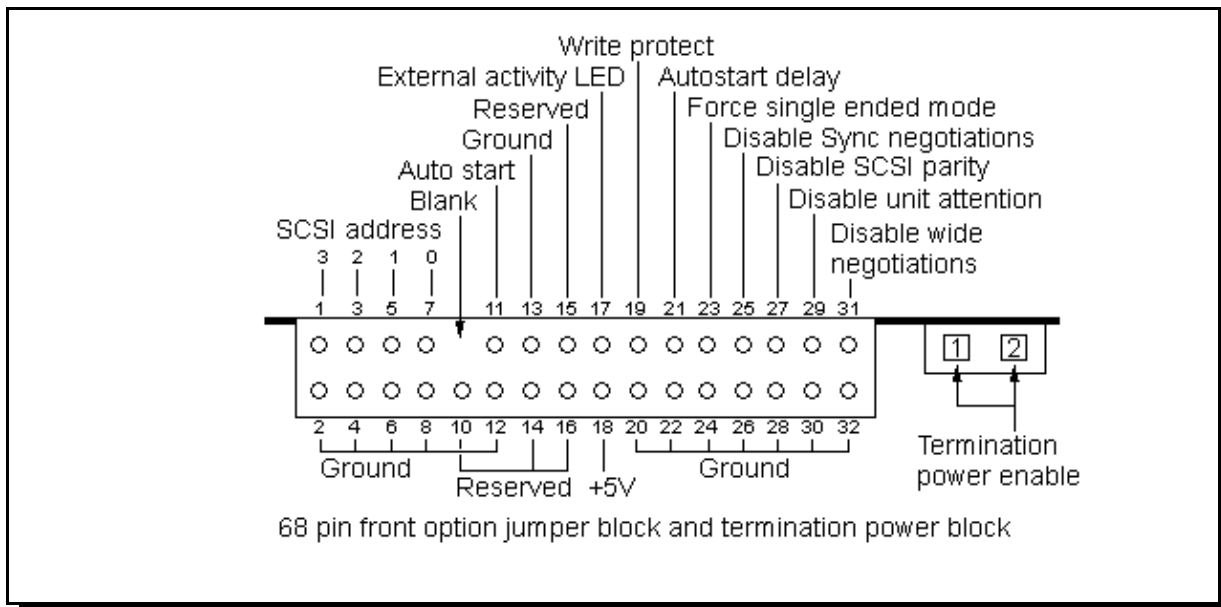
The Ultrastar drives offer additional options on the jumper block. See the appendix for details of the additional jumper options shown below.



*Jumper settings*

**Step 4: Mounting**

After setting the jumpers, mount the hard drive in your system. The Ultrastar drive can be mounted with any of its six surfaces facing down (right side up, upside down, sideways, etc.). See below for mounting hole locations. Be sure to treat the disk drive very carefully and gently.

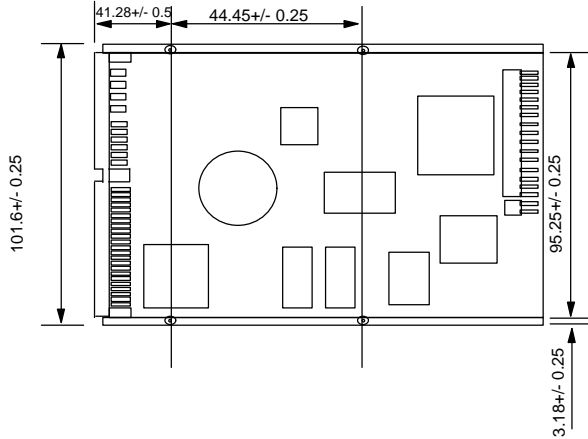


*Mounting hole locations*

## IBM storage products

You must ensure that the drive has sufficient air flow. Mount the drive in the system using the 4 6-32 UNC screws (included). The maximum screw length is 3.5 mm for the side holes and 6 mm for the bottom holes. Mount the drive securely enough to prevent excessive motion or vibration.

If you are mounting your drive in a 5" bay, you may need to purchase mounting brackets from your computer manufacturer for the drive to be mounted securely.



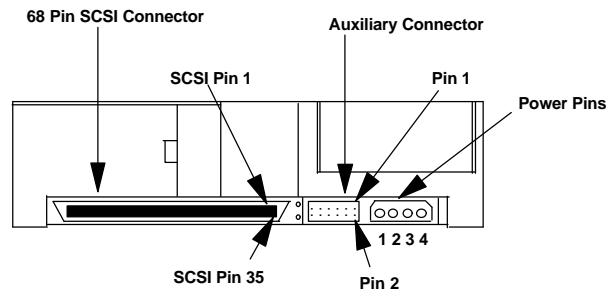
### Step 5a: Connectors (for 68 pin drives only)

After the drive has been carefully mounted, connect the SCSI cable and the power cable to the drive. (Note that the SCSI connector and power connector are keyed for proper insertion)

### Step 5b: Connectors (for 80 pin drives only)

80 pin drives are to be plugged into backplanes of servers and require no cables. If you have an 80 pin drive that you want to connect to a 68 pin SCSI cable, you will need to purchase a converter. A local computer store should have these converters.

**Step 6:** If your drive is a 68 pin model, plug the cable into the SCSI controller. If you have an 80 pin drive, plug it into the backplane.



### Step 7: Replace the cover on your computer.

With the cables connected properly (or plugged into the backplane) and the drive mounted securely, replace the cover on the computer.

**Step 8:** Connect all cables and plug the power cord into the wall.

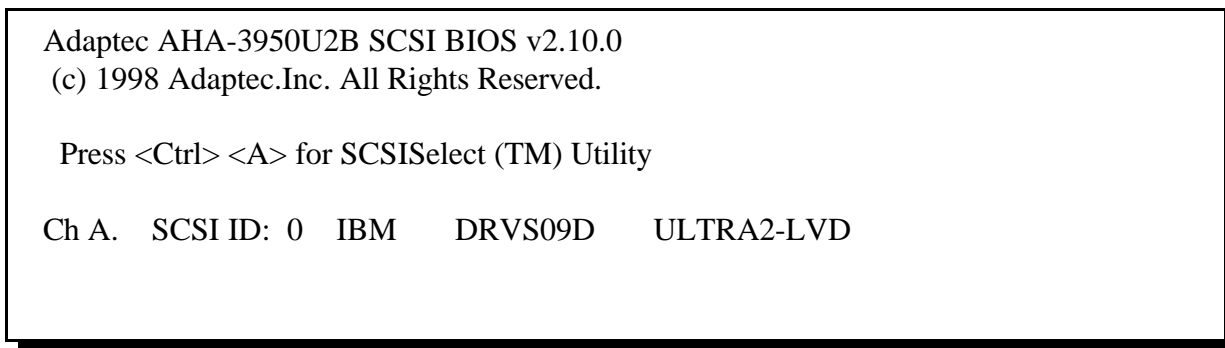
### Step 9: Drive Setup

If you have just added a SCSI controller card, follow the manufacturer's instructions to install the card.

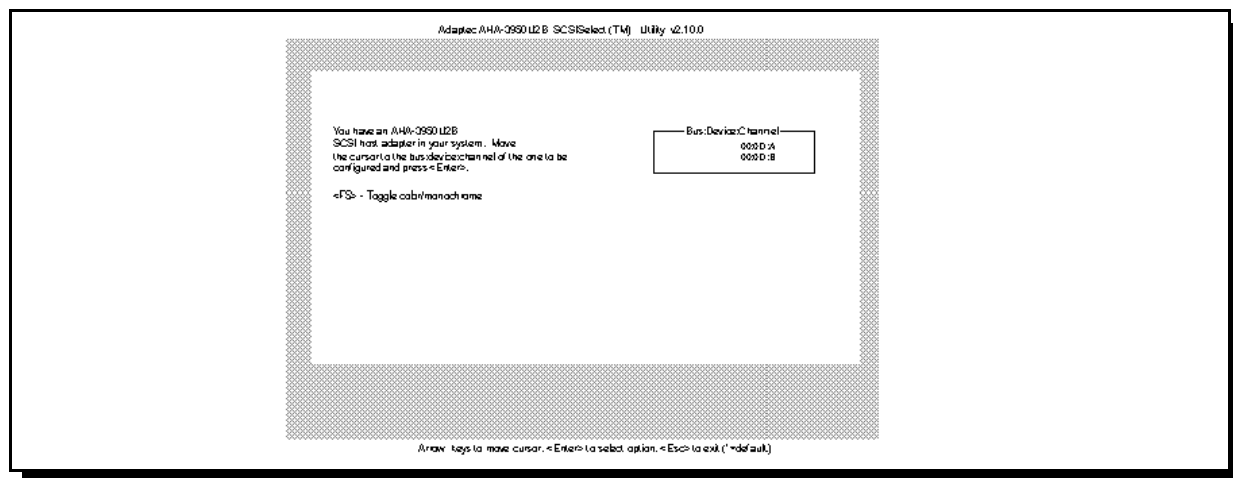
#### Boot Computer

Insert a bootable diskette and "boot up" (turn on) your computer. You should see the drive model appear on the screen when the system is booting.

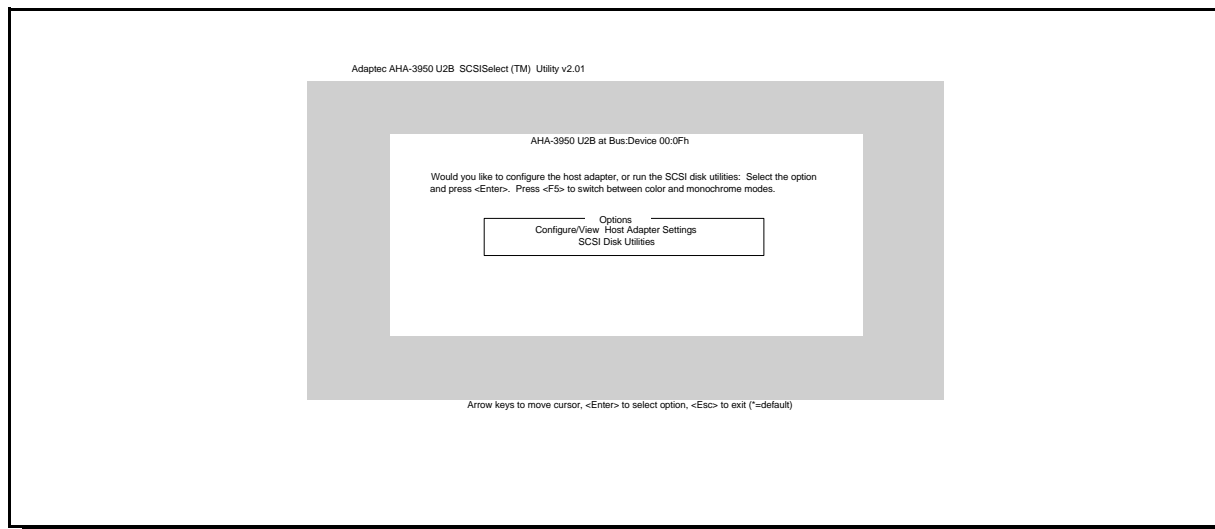
Note: This example uses the Adaptec 3950U2 controller and the Model DRVS-09D drive.



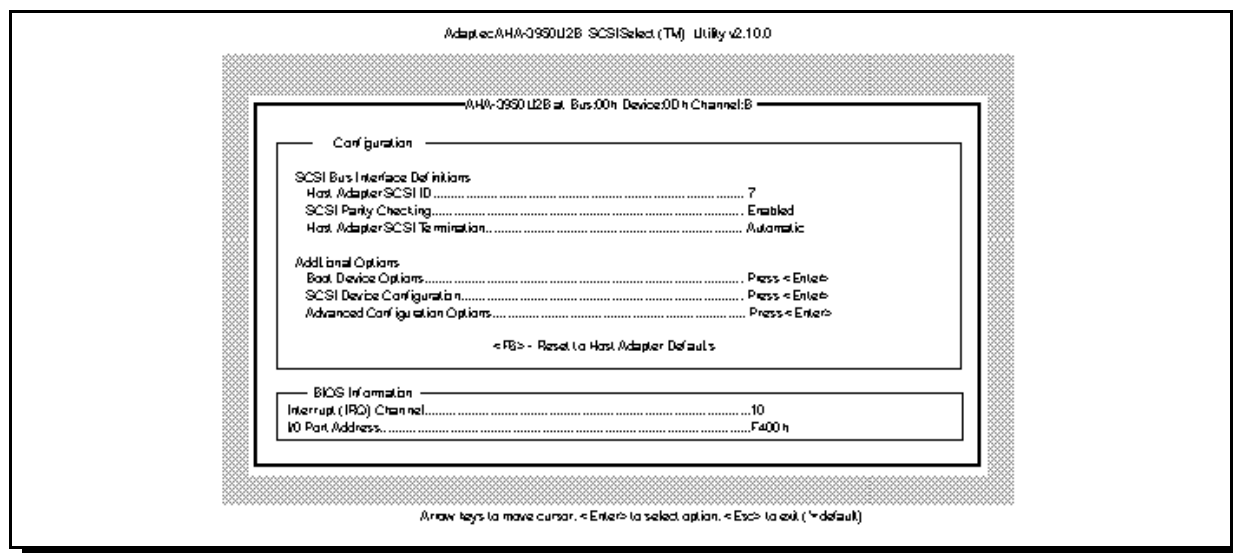
At this time, you can press <ctrl> <a> to enter the Adaptec SCSI setup utility. Following is the first screen that will appear.



Select the channel that you have your drive attached to. The next screen will follow.



Select the first option *Configure/View Host Adapter Settings*. The next screen is shown below with the



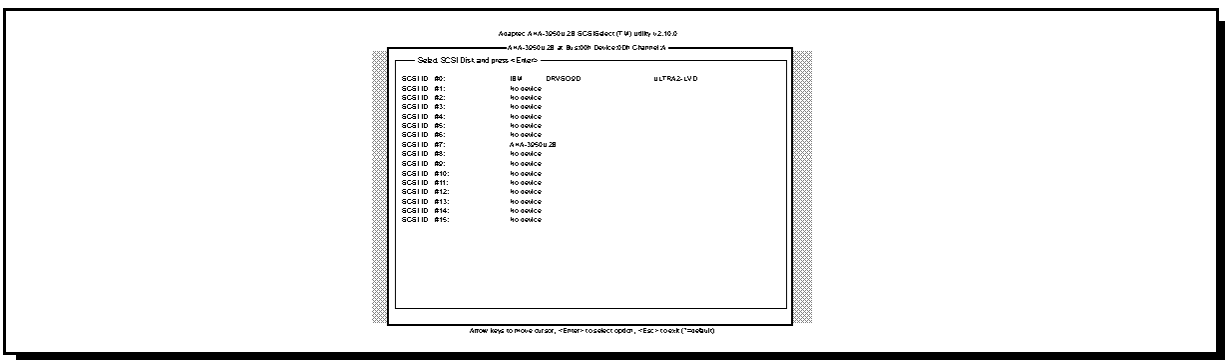
default settings.

You can accept the default settings with *Host Adapter SCSI Termination* set to Automatic. If you wish to accept the default settings, press **ESC** to return to the previous menu. Select the SCSI Utilities.

This shows all devices attached to the Bus. To do a *Verify Media*, highlight the drive you would like to verify and press **Enter**. If you wish to accept all settings, press **ESC** to exit out of the Adaptec settings and continue with the next step, partitioning and formatting your drive.

### Step 10: FDISK

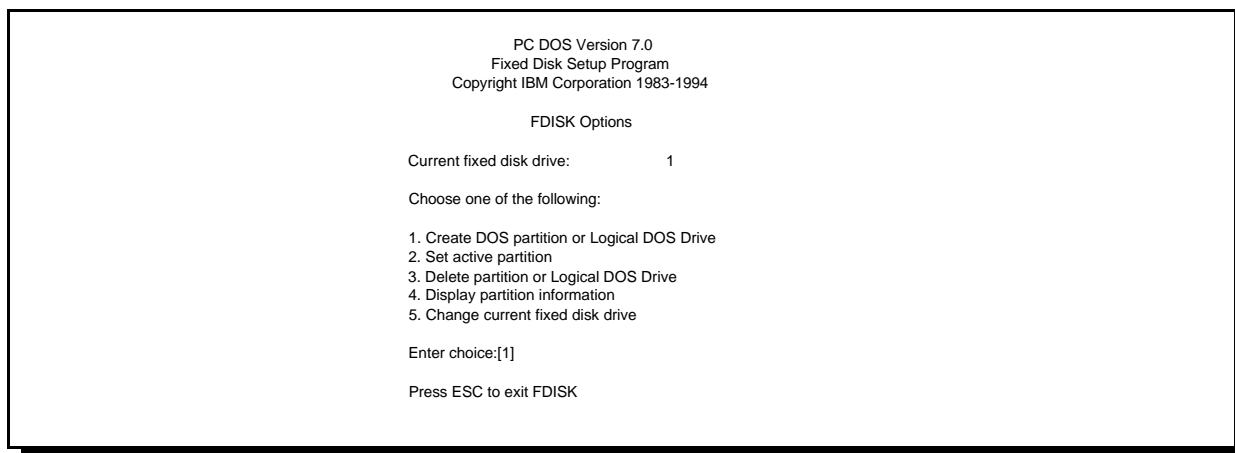
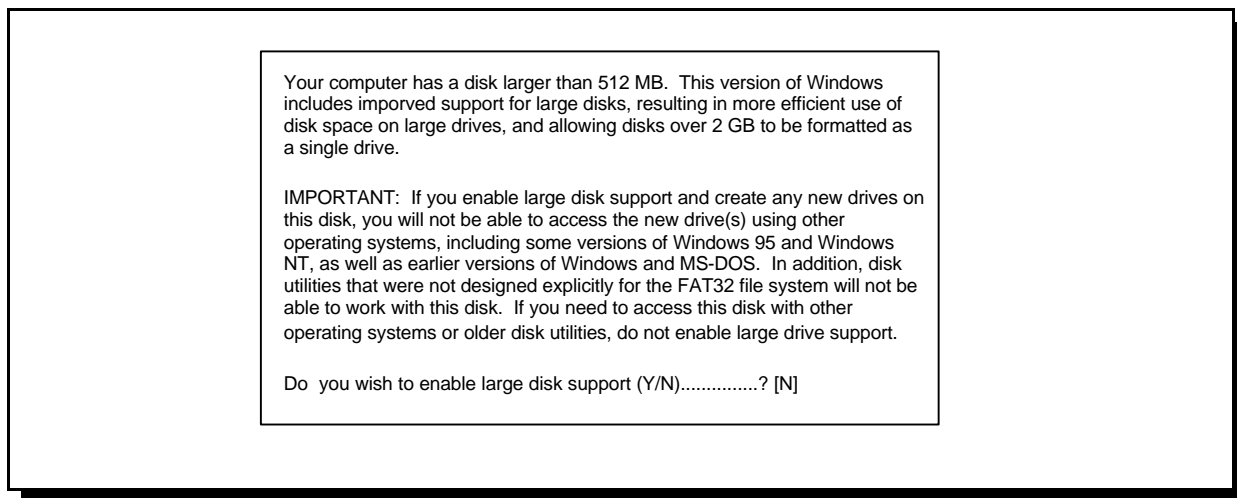
Type FDISK at the A:\ prompt after booting to a bootable diskette. If Windows® 95 OS/R2 or Windows® 98 is used, the following screen will appear.

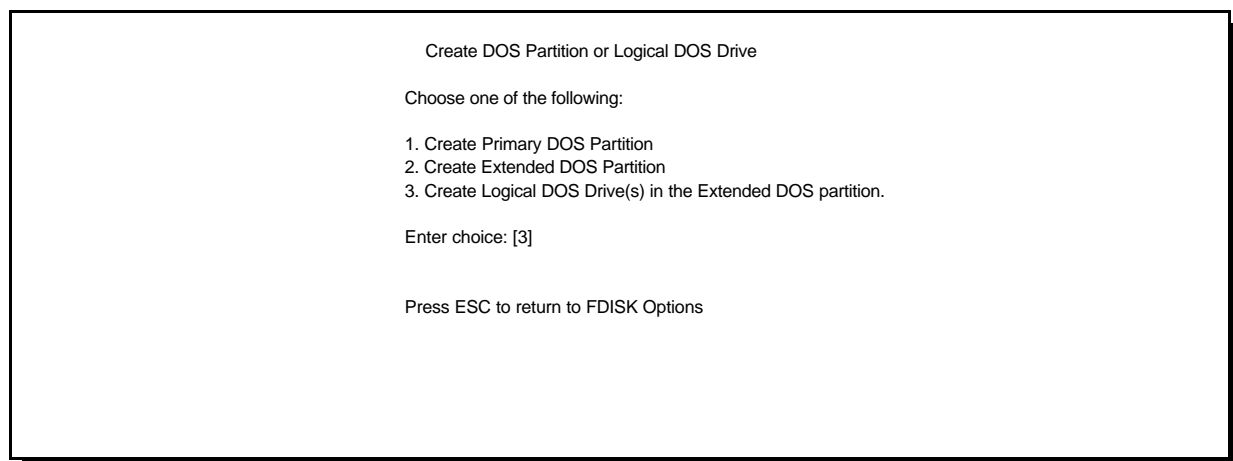


Type *Y* to select the FAT 32 file system. Type *N* to select the FAT 16 file system.

Next you will see the screen below allowing you to create partitions.

Note: You will only have 5 options if you have more than 1 drive. Option 5 allows you to select the drive you wish to partition.



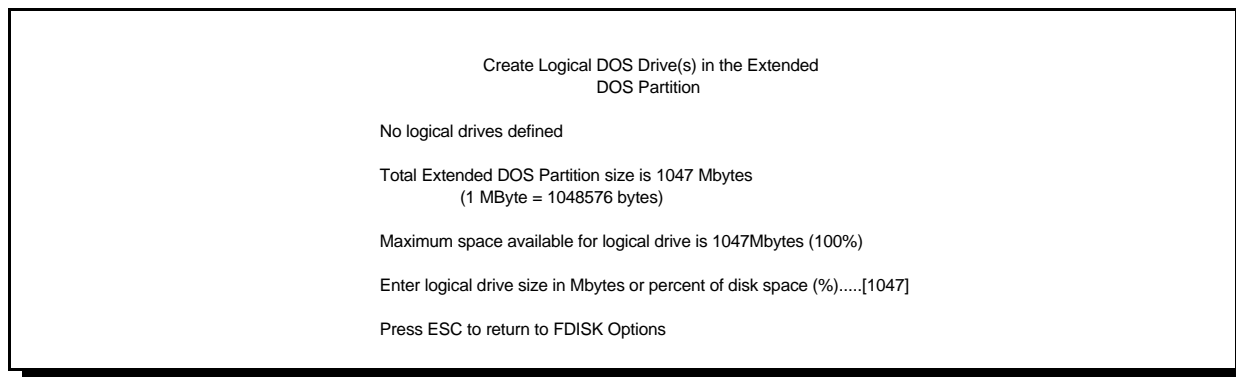


Select option 1 to **Create a Primary DOS Partition**. If this is to be the boot drive, set this partition to "Active".

Press **ESC** to return to the FDISK options. Create an **Extended DOS Partition** by selecting option 1 from the main menu and option 2 from the second menu. (Both menus shown above.)

Note that the Maximum Capacity shows only 8455 MB instead of 9130 MB. This is because some system BIOSs recognize a Megabyte as 1,048,576 bytes (binary). Drive manufacturers recognize a Megabyte as 1,000,000 bytes (decimal). The capacities are the same in actual number of bytes.

After creating the **Extended DOS Partition** assign a drive letter to that partition. Press **ESC** to return to the FDISK main menu. Select option 1 to create a **Logical DOS Drive**, then option 3 to create a **Logical DOS Drive in an Extended Partition**. Be sure to do this step or you will have only 2 GB usable space.



Press **ESC** to return to FDISK and **ESC** again to restart the system. The system must be restarted for partitioning to take effect.

### **Step 11: Formatting**

The drive will need to be formatted before an operating system can be loaded. Format the Primary partition and any Extended partitions that have been made.

Refer to FDISK, option 4 to display the partition information. This is helpful to review drive letter assignments. Note the drive letters to ensure proper formatting.

Press *ESC* to return to the main menu and exit FDISK. At the *A:\* prompt type *format x: /s* (where x is the drive letter). The */s* option will make your hard drive bootable by copying the system files to the hard drive. If you do not want this drive to be bootable, do not use the */s* command. You will see the following warning:

```
WARNING: ALL DATA ON NON-REMOVABLE DISK
DRIVE C: WILL BE LOST!
Proceed with Format (Y/N)?
```

Type *Y* for yes. There should be no data on the new drive. The time it takes to format the drive is dependent upon it's size. When the drive has finished formatting, format the next logical drive, in this case *D*: by typing *format d*: You will get the same message. Select *Y*.

### **File Systems**

#### **FAT 16/FAT 32**(File Allocation Table)

The file allocation table is a group of specific sectors in a hard drive that contain an "address book" for the files on a hard disk drive. In other words, it keeps track of the physical location of files on each platter. There are usually two FATs (kept in different locations) on a hard drive. One is kept as a backup in case data corruption occurs on the other FAT. FAT32 is used in the Windows® 95 & Windows® 98 operating systems. FAT32 receives its designation because it allows 32 bits of data to be read as opposed to 16 bits at a time as in FAT16.

#### **HPFS** (High Performance File System)

HPFS is the file system used by OS/2. HPFS is more efficient, give better performance and resists fragmentation better that FAT.

#### **NTFS** (NT File System)

NTFS is an advanced file system used by Windows® NT. NTFS provides built-in compression, large partition support and better performance.

### **Step 12: Operating System Installation**

After the drive has been formatted, install an operating system. You may encounter some of the following issues.

#### **Windows® 95 / Windows® 98**

Windows® 95 must be version OSR2 or later in order to create a single partition greater than 8.4GB.

In Windows® 98 the system may hang-up when trying to self-restart. A reset or power cycle is required.

#### **OS/2 and OS/2 Warp**

OS/2 Warp 4.0 with Fixpack 5 can see the full capacity of the drive, no fix is required.

#### **Windows® NT**

Windows® NT 4.0(service pack 3) can see the full capacity of the drive, no fix is required.

## *IBM storage products*

*Note:* Some controllers, systems, or operating systems may expect ANSI SCSI-2 devices. The Ultrastar 9LZX and 18ZX report themselves as SCSI-3 devices. Contact the Technical Support Center for a fix if you encounter this issue.

### **TECHNICAL SUPPORT**

**Before calling technical support make sure you have your drive part number, serial number and system information.**

Contact technical support via:

**Web** [www.ibm.com/harddrive](http://www.ibm.com/harddrive)

**Voice** 888.426.5214 or 507.286.5825

**Fax** 507.253.DRIVE

**E-mail** [drive@us.ibm.com](mailto:drive@us.ibm.com)

Support is also available in Singapore via:

**Voice** 1800.418.9595 or (65) 65.6.418.9595

**E-mail** [drive@sg.ibm.com](mailto:drive@sg.ibm.com)

#### ***Automated Fax Back Service***

U.S.A. 408.256.5218

Singapore 800.418.9696

England 0800.96.6948

Germany 0130.82.6089

France 0800.902229

Italy 167.875148

## **MAKING A BOOTABLE DOS DISKETTE**

If you do not have a DOS bootable diskette, you may want to make one. This will be necessary for installing your new hard disk drive and in case of system failure. The DOS bootable diskette will contain files necessary to boot your system. These files are called **system** files. You will also want some utilities on your bootable diskette. Following are the instructions needed to add both the system files and the other helpful utilities.

- 1) Make sure your computer is on and insert a diskette in drive A.
- 2) At the C:\ prompt, type *FORMAT A: /S* and press ENTER.
- 3) Press *ENTER* again unless you want to label your diskette.
- 4) Add the utilities. To do so, use some simple **copy** commands.
  - a) Type at the C:\ prompt - *cd dos*
  - b) Type *copy fdisk.exe a:*
  - c) Type *copy format.com a:*
  - d) Type *copy sys.com a:*
  - e) Type *copy chkdsk.exe a:*
  - f) Type *copy debug.exe a:*
- 5) Type *cd..*
- 6) Remove diskette from drive A:.
- 7) Write protect the diskette by sliding the small plastic tab on the diskette into the up position.
- 8) Test the diskette.
  - a) Turn off your computer.
  - b) Insert the diskette in drive a
  - c) Turn on your computer.
  - d) When you get to the A:\ prompt *type c:*
- 9) If any of these steps failed, remake your DOS bootable diskette.

## **JUMPER BLOCK INFORMATION**

The jumper block is a block of pins located on the hard drive that when shorted with a **shunt (jumper)** will make the drive behave in certain ways. The **shunt** is a small piece of plastic with metal inside that shorts out the connection between 2 pins when placed over the pins. These can be purchased at any local computer store. The pin pitch is 2 mm.

### **Additional Jumper Description**

#### ***Auto Start Delay***

The Auto Start and Auto Start Delay pins control when and how the drive can spin up and come ready. When configured for Auto-Startup, the motor spins up after power is applied without the need of a SCSI Start Unit command. For no Auto-Startup, a SCSI Start Unit command is required to make the drive spin and be ready for media access operations. When in Auto-Start Delay mode, the drive will delay its start time by a period of time multiplied by its SCSI address.

#### ***External Activity (LED) Pins***

The LED pins can be used to drive an external Light Emitting Diode.

#### ***Write Protect Pin***

If the Write Protect pin is jumpered to ground the drive will prohibit SCSI commands that alter the customer data area portion of the media from being performed.

#### ***Disable Synchronous Negotiation Pin***

If a Disable Target Initiated Synchronous Negotiation pin is grounded, an Initiator is required to start a negotiation handshake if wide transfers (16 bit) are desired.

#### ***Disable SCSI Parity Pin***

Grounding this pin will disable SCSI parity checking.

#### ***Disable Unit Attention Pin***

Grounding this pin will disable the drive from building Unit Attention Sense information for commands immediately following a Power On Reset or SCSI Bus Reset.

#### ***Disable Wide Negotiations***

Jumpering the pins will cause the drive to operate in single byte mode. The drive will not negotiate wide operation.

#### ***Force Single-Ended Mode***

Jumpering pin 23 to pin 24 will cause the 68 pin and 80 pin SCA LVD drives to operate in single ended mode only. The drive will not use the DIFFSENS line to determine SE or LVD modes.

## **CONTROLLER INFORMATION**

An Adaptec controller was used in the examples in this guide. You may have a chipset embedded into your motherboard. Simply plug the cable into the port on the motherboard instead of onto the controller as stated above. If you are purchasing an add-on controller card, you will need to install the controller into one of the empty slots in your computer. Simply remove the screw holding the metal plate intact, insert the controller into the PCI, EISA or ISA slot on the motherboard, making sure that the metal plate from the controller fits into the grooves allotted on the computer frame. Replace the screw and proceed by connecting the SCSI cables to the controller and then to the hard drive. If you have any questions, refer to the installation manual that came with your controller.

## **BACKUP & RESTORE**

One of the most common methods of backup is tape backup. Tape drives are available from IBM and other major manufacturers. This method is preferred for overnight backups that run while your business is closed or while you sleep.

Another method of backup is a removable drive. There are several brands of removable drives. IOMEGA is one manufacturer. They manufacture the ZIP drive which is very popular and also the JAZ drive. These drives can be used simply for backup and hooked up and removed at any time with very little trouble. This is the preferred way to backup and restore when attaching new peripherals to your current setup.

DOS has a "Backup and Restore" command. To backup critical files (files that you do not want to lose) from the directory your files are in type: *backup*. This will prompt you to add more diskettes as necessary. In case of a failure, you will simply need to insert the first of your backup diskettes and type: *restore*.

## **UTILITIES**

Your Ultrastar drive comes low-level formatted and free of defects. **NOTE: DO NOT ATTEMPT TO LOW-LEVEL FORMAT YOUR ULTRASTAR DRIVE.** In the rare case where data needs to be removed from the drive, there are 2 utilities available from the HDDTech FTP site at: <http://index.storsys.ibm.com/hddtech>

### **ZAP**

Zap is a utility that will 'zap' your boot sector by writing 0's to the first 128 sectors of your drive.

### **WIPE**

Wipe goes one step further and writes 0's to the entire drive.

These utilities should be sufficient to return your drive to factory shipped condition.

## **DRIVE COPY**

If you are replacing an older smaller capacity hard drive with the Ultrastar drive, you may want to copy all your files from the smaller drive to the new drive. There are several software programs available that copy one drive to another.

Power Quest ([www.powerquest.com/product/dc.index.html](http://www.powerquest.com/product/dc.index.html)) Drive Copy 2.0. Supports all operating systems, has mouse support, selective partitioning, selective sector copying, and automatically creates a new DOS reboot disk. Not limited by drive size.

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Quarter Deck Systems ([www.qdeck.com/qdeck/products/diskclone/indexreg.html](http://www.qdeck.com/qdeck/products/diskclone/indexreg.html)) Disk Clone. Supports all operating systems, has mouse support.

ITS Systems ([www.itechs-systems.com/](http://www.itechs-systems.com/)) Transfer EZ. For use only with Windows® 3.1 and Windows® 95.

Image Systems Solutions ([www.img-systems.com/d2ddesc.htm](http://www.img-systems.com/d2ddesc.htm)) Drive to Drive. For use with all operating systems, but limited to copying drives with similar physical geometry.

FWB software ([www.FWB.com/](http://www.FWB.com/)) Drive Up. For Windows® OS only.

## COMPATIBILITY MATRIX

The IBM SIT Lab thoroughly tests Ultrastar drives for compatibility with a wide variety of systems, SCSI controllers, operating systems, and BIOS versions. Testing was done to demonstrate compatibility with the following hardware and software. Other combinations of hardware and software may function but were not tested.

### **Systems**

Compaq DeskPro  
Compaq DeskPro 2000  
Compaq DeskPro 6000  
Compaq Professional Workstation 6000  
Compaq Proliant 1500  
Data General  
Dell Dimension XPS D300  
Dell OptiPlex GA P2-266  
Dell Power Edge 4100  
Dell Power Edge 4200  
Digital Alpha Server 800 5/333  
EMC  
Gateway G6-200  
Gateway 2000  
Gateway 2000 NS-8000  
Hewlett Packard  
IBM Systems  
Micron Client Pro XLU  
Micron P2300NT  
NEC Direction 266  
NEC Powermate Enterprise  
Siemens Nixdorf Informationssystem Primergy 400  
Silicone Graphics Octane  
Sun Sparc Station 20

### **SCSI Controllers**

Adaptec 2940  
Adaptec 2940U2W  
Adaptec 3940/W  
Adaptec 3950U2B  
Adaptec PCI Ultra2 2940U2W  
AMI MegaRaid 428  
AMI MegaRaid 438  
BusLogic BT-956  
Compaq 32-bit PCI Ultra SCSI  
Compaq Wide/Ultra  
Compaq Wide/Ultra LVD  
Diamond Fireport  
IBM Serv RAID  
IBM Serv RAID II  
Integral  
Mylex  
Qlogic  
Symbios C810 PCI  
Symbios Logic

### **Operating Systems**

AIX, V.4  
EMC  
MS DOS 6.20  
OS2/Warp V.4.20  
SCO Unix 3.  
SCO Unix 5.  
Sun Solaris  
Unix  
Windows95  
Windows95 (R2, V4.00.1111)  
Windows98  
Windows NT 4.0

### **BIOSs**

AlphaBios 5.64 971212.1414  
AMI 1.00.02.DT05  
AMI 1.00.04.CS1T  
AMI 1.00.07.CD0  
AMI 1.00.08.CS1T  
AMI 1.00.13.CD0  
Compaq 05/05/97  
Compaq E12 04/05/96  
Compaq E12 07/17/96  
Compaq Rev. 5 06/25/97  
Compaq Rev. 5 09/03/97  
Compaq Rev. 5 11/18/97  
IBM SurePath 01/24/97  
Phoenix 1.10 A04  
Phoenix 4.0 Rel 5.12  
Phoenix 4.0 Rel 6  
Phoenix 4.04  
Phoenix 4.05  
Phoenix 4.05 A06  
Phoenix 4.05 1.01.92  
PowerPC  
SGI 6.4 02/05/97

## **GLOSSARY**

### **ANSI** (American National Standards Institute)

ANSI is the lead organization for encouraging and developing technological standards. ANSI represents the United States in the IEC (International Electrotechnical Commission) and the ISO (International Standards Organization).

### **Backup**

Storing information from a hard drive on another storage area in order to prevent data loss. Tape drives and Zip drives are two common mediums for saving vital information contained on a hard drive.

### **BIOS** (Basic Input/Output System)

The BIOS is the first level of software contained in a computer. It provides basic, low-level control for keyboards, video, hard disk drives, and floppy drives. The BIOS provides the initial intelligence allowing the computer system to find an operating system to run.

### **Boot/Boot-up**

To prepare a computer system for operation by loading an operating system.

### **Capacity**

The amount of information, expressed in bytes, that can be stored on a hard drive. Also known as storage capacity.

### **Compatibility**

The capability of a hardware or software component to conform with the interface requirements of a given data processing system without adversely affecting its functions.

### **Cylinder**

(1) In an assembly of magnetic disks, the set of all tracks that can be accessed by all the magnetic heads of a comb in a given position.

(2) The tracks of a disk storage device that can be accessed without repositioning the access mechanism.

### **Disk Drive**

The primary data storage device used by computers. Disk drives are used to record, store and retrieve digital information in a computer system.

### **Electrostatic Discharge**

The rapid change in electrical energy caused by static electricity. This can damage or destroy electronic equipment or hardware. Prevention consists of grounding oneself before handling any electronic equipment.

### **FAT16/FAT32** (File Allocation Table)

The file allocation table is a group of specific sectors in a hard drive that contain an "address book" for the files on a hard disk drive. In other words, it keeps track of the physical location of files on each platter. There are usually two FATs (kept in different locations) on a hard drive. One is kept as a backup in case data corruption occurs on the other FAT. FAT32 is used in the Windows® 95 & Windows® 98 operating systems. FAT32 receives its designation because it allows 32 bits of data to be read as opposed to 16 bits at a time as in FAT16.

### **FDISK**

FDISK is a program run in DOS that allows a user to partition a hard disk drive. Partitioning your hard disk drive is essential for it to work properly.

### **Format**

When a hard disk is formatted, the computer writes a magnetic track pattern onto a disk surface, specifying the locations of the tracks and sectors. This information must exist on a hard disk before it can store data.

### **FTP (File Transfer Protocol)**

In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

### **Hard Disk Drive (HDD)**

A stand alone disk drive that reads and writes data on rigid disks and can be attached to a port on the system unit. Synonymous with fixed disk drive, hard drive.

### **Head**

The tiny electromagnetic coil and metal pole used to create and read back magnetic patterns on the disk.

### **HPFS (High Performance File System)**

HPFS is the file system used by OS/2. HPFS is more efficient, gives better performance and resists fragmentation better than FAT.

### **Interface**

A hardware or software protocol (contained in the electronics of the disk controller and drive) that manages the exchange of data between the hard disk drive and the computer. The most common interfaces for small computer systems are ATA (IDE) and SCSI.

### **Jumpers and Jumper Settings**

Jumpers are small pieces of plastic with a conductive center. Jumpers are used to connect pins on a device to provide settings that are changeable by the user, but remain constant during operation.

### **LVD(Low Voltage Differential)**

Also known as Ultra2SCSI. A highly compatible computer disk drive interface that is faster and more reliable than previous SCSI.

### **Motherboard**

The Motherboard holds the computer's main processors and circuitry. It also contains the memory, BIOS, interconnection circuitry and the expansion slots.

### **Multi-mode**

The drive can operate on an LVD bus or a single-ended bus.

### **NTFS (NT File System)**

NTFS is an advanced file system used by Windows NT. NTFS provides built-in compression, large partition support and better performance.

### **Operating System**

Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible.

### **OS/2**

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OS/2 is an IBM operating system. It is a fully preemptive, multi-tasking operating system. OS/2 also supports HPFS, a very advanced file system.

### **Partition**

A portion of a hard drive dedicated to a particular operating system or application and accessed as a single logical volume.

### **SCSI** (Small Computer System Interface)

Pronounced “scuzzy”, this is an intelligent parallel peripheral interface characterized by its use of high level communication between devices.

### **Sector**

On a hard drive, the minimum segment of track length that the hard disk drive can assign to store information.

### **Termination**

The signals on a SCSI bus must be terminated at both ends of the bus. This is generally done automatically by the controller and will require an “external” terminator on the last connector of the bus.

### **Track**

One of the many concentric magnetic circle patterns written on a disk surface as a guide for storing and reading data.

### **Wipe**

Wipe is a software utility that writes zeros to every sector on a hard disk drive up to 8 GB.

### **Windows® NT**

Microsoft’s 32-bit server operating system.

### **Windows® 98**

Microsoft operating system.

### **Zap**

A utility in which the first 128 sectors of a hard drive are overwritten with zeros.

### **Zip Drive**

A Zip drive uses increased real density on floppy disk technology to increase storage capacity. Zip diskettes have a storage capacity of 100 MB and therefore are an attractive backup option.



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**[www.ibm.com/harddrive](http://www.ibm.com/harddrive)**

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Printed in the United States of America

11-98

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Produced by the IBM Hard Disk Drive Technical Support Center.

Date: 19th November, 1998