

BREAKING DOWN THE BARRIERS

WHAT ARE CAPACITY BARRIERS?

Capacity barriers are encountered when a computer system BIOS and/or operating system is unable to identify (address) physical locations on hard drives. This is not a limitation of the design or structure of the hard drive, but rather a limitation of the BIOS or operating system. For the BIOS, it is not capable of translating the addresses of the sectors beyond a specific limit established in the BIOS, thus limiting the capacity of the hard drive to less than its full amount. For the operating system, the file structure (File Allocation Table (FAT)) is limited in the number of physical locations (addresses) that can be entered in the FAT.

Maxtor first encountered BIOS limitations in 1994 with the release of 540 MB hard drives; and the operating system limitations with the release of hard drives larger than 2.1 GB. Limitations vary depending on the BIOS and the operating system. Currently, newer BIOS' may have limitations at 2.1 and 4.2 GB. Operating systems like DOS and Windows 95 have a 2.1 GB partition size limitation and Windows NT has a 4.2 GB partition size limitation.

THE BIOS CYLINDER LIMITATION

There are two major BIOS limitations:

1. SYSTEMS WITH BIOS DATED PRIOR TO JULY 1994. Typically these BIOS will have a 504 megabyte (1024 cylinder) limitation, as prior to this date, BIOS did not provide the Logical Block Address (LBA) mode capability.

2. SYSTEMS WITH BIOS DATED AFTER JULY 1994. Typically, these BIOS provide support for hard drives with capacities larger than 504 megabytes. However, depending on the date and version number, different limitations may be encountered. The major limitation that surfaces in this realm is the 4093 - 4096 cylinder limitation. This barrier is derived from the fact that some BIOS manufacturers implemented Logical Block Addressing (LBA) translation in their BIOS with a 4093 - 4096 cylinder limitation.

NOTE: Maxtor hard drives have a cylinder limitation jumper to assist in the resolution of BIOS limitation issues. When this jumper is installed the MaxBlast™ software must be used to complete the installation of the hard drive.

OPERATING SYSTEM PARTITION LIMITATIONS

Any operating system that uses the File Allocation Table 16 (FAT-16) method to identify the locations of files on the drive have a 2.048 GB (4093 - 4095 cylinders), 4.2 GB (8190 cylinders) and 8.4 GB (16380 cylinders) partition limitation for defining partitions on a hard drive. The following operating systems are known to have these limitations:

- DOS
- Windows 95 (FAT-16)
- Windows NT™ using FAT-16
- OS/2 using FAT-16

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OTHER OPERATING SYSTEM PARTITION LIMITATIONS

Window NT using NTFS has a partition limitation of 4 GB per partition.

THE DOS PARTITION LIMITATION

The DOS partition limitation is derived from the File Allocation Table (FAT). DOS uses the FAT to keep track of hard disk space. The FAT is only capable of working with 32,768 bytes per cluster and no more than 65,536 clusters. If you multiply the two numbers together, you get the maximum partition size that DOS can use (2,147,483,648 bytes or 2048 Mbytes (2,147,483,648 ÷ 1024²)). Reference the Maxtor Installation Guide obtained from MaxFax™ or a DOS system manual for detailed instructions on partitioning and formatting the hard drive.

BREAKING THE CAPACITY BARRIERS

504 MB BARRIER

Prior to 1994, system and Interface card BIOS' had a limitation of 1024 cylinders, 16 heads and 63 sectors. This limited hard drive capacities supported by systems to 504 megabytes. Systems built in the latter half 1994 and later generally have an enhanced BIOS setting called LBA (logical block addressing) that allows systems to support hard drives to their full size.

LBA translation provides the BIOS with the ability to translate sector addresses on large capacity hard drives. LBA translation occurs when the operating system provides the BIOS with a specific address (e.g. cylinder 1654, head 12, and sector 34) and the translations provide the hard drive with the logical address that equates to this physical address on the hard drive. To determine if a BIOS is enhanced, look for these terms:

- LBA
- MODE
- IDE TRANSLATION
- LOGICAL BLOCK

The ability of a BIOS to calculate a hard drive capacity greater than 504 MB does not necessarily mean that the BIOS is "translating" the addresses of the sectors to obtain the true capacity of the drive. There are times when a user needs to enable the BIOS "translation" (i.e., user might need to change a hard drive's MODE from Normal to LBA); moreover, there are times when the BIOS may not support its own calculations.

The best way to keep track of these BIOS are by their respective copyright dates. The major vendors that support "translation" are the easiest to trace:

- American Megatrends™ Inc. (AMI) dated 7/25/94 and newer
- Phoenix™ v4.03
- AWARD™ with 4.50G

HARDWARE SOLUTION

Upgrade the system BIOS or use an Enhanced IDE (EIDE) Interface or BIOS extender card that provides the correct LBA support for large capacity hard drives. If this solution is not selected then the Software Solution must be used.

SOFTWARE SOLUTION

For those systems that do not provide the LBA BIOS feature, Maxtor has a solution, in 1993 Maxtor developed MaxBlast software. Software translation is an effective, non-conventional means of translating sector addresses of large capacity hard disk drives. Instead of loading a driver in the start-up files, MaxBlast loads drivers before the operating system is loaded. If the user experiences difficulties accessing the software, a new copy be obtained from:

- Maxtor BBS (303) 678-2222
- Maxtor Internet <http://www.maxtor.com> OR [ftp.maxtor.com](ftp://ftp.maxtor.com)
- Via US Mail

NOTE: Contact Maxtor Technical Assistance or Customer Service at 1-800-2MAXTOR to receive MaxBlast diskette by mail.

2.1 AND 4.2 GB BARRIERS

Systems encountering these barriers are plentiful; however many of these systems will be able to obtain the full capacity of the Maxtor hard drive through use of the MaxBlast software. MaxBlast is included in Maxtor's Retail Kits and MaxBlast is also available for downloading from Maxtor's Internet home page or our BBS should the user need it.

The most common symptom that a user will see on a system with a BIOS that does not support the size of the drive is a hang condition during POST (Power on Self Test) when the BIOS tries to AUTO DETECT the drive. This may occur on systems built from 1994 to 1997, and possibly beyond.

NOTES:

1. Some systems will AUTO DETECT as a built-in feature to the BIOS and is unalterable by the end user.
2. If the system has a BIOS restriction that requires the use of the cylinder limitation jumper and the user plans to install the Windows NT 4.0 operating system, the system BIOS must be upgraded. This is required as Windows NT 4.0 will only see the drive as a 2.1 GB hard drive with this jumper installed. The remaining capacity of the hard drive will be unavailable to Windows NT 4.0. An alternate to the system BIOS upgrade is an Enhanced IDE interface card with a BIOS providing correct LBA support for hard drives with capacities exceeding 2.1 GB. This is a limitation of the BIOS and not the Maxtor hard drive. Other operating systems may also experience these symptoms.

SYMPTOMS

The effects of drive installation in a system with the 4095 cylinder BIOS limitation are:

1. TRUNCATION OF CYLINDERS. Cylinder truncation is when the BIOS limits the number of cylinders reported to the operating system to 4095. The BIOS may display the drive as having more than 4095 cylinders, but it still only reports a total of 4095. When this occurs, the operating system is limited to 2.1GB and cannot access the remainder of the drive.

2. SYSTEM HANG AT POST. System hang occurs when the BIOS has a problem truncating the cylinders and locks the system up during Power On Self Test (POST). This can be caused by the AUTO DETECT feature some BIOS have implemented.

3. CYLINDER WRAP. Cylinder wrapping is when the BIOS takes the remaining number of cylinders from the maximum allowed (4095) and reports it to the operating system. For example, if the drive listed 4096 cylinders, the BIOS would report only 1 cylinder to the operating system.

4. SYSTEM HANG AT BOOT. (This is only for drives larger than 4.2 GB). A system hang is when the operating system hangs during initial loading, either from floppy diskette or existing hard drives. This can be caused by the BIOS reporting the number of heads to the operating system as 256 (100h). The register size DOS/Windows 95 uses for the head count has a capacity of two hex digits. This is equivalent to decimal values 255.

HARDWARE SOLUTION

Upgrade the system BIOS or use an Enhanced IDE (EIDE) Interface or BIOS extender card that provides the correct LBA support for large capacity drives. If this solution is not selected then the Software Solution must be used.

SOFTWARE SOLUTION

For those systems that do not provide the LBA BIOS feature, Maxtor has had a solution since 1993, that is to use the MaxBlast software. Software translation is an effective, non-conventional means of translating sector addresses of large capacity hard disk drives. Instead of loading a driver in the start-up files, MaxBlast loads drivers before the operating system is loaded. If the user experiences difficulties accessing the software, a new copy can be obtained from:

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- Via US Mail

NOTE: Contact Maxtor Technical Assistance or Customer Service at 1-800-2MAXTOR to receive MaxBlast diskette by mail.

BARRIER NOTES:

1. Currently Maxtor has only tested the Promise EIDE interface card. The Promise EIDEMAX™ does provide LBA support for hard drives greater than 4.2 GB. Maxtor continues to evaluate new controllers for this function.

2. Set the BIOS to the UDT and set the cylinders to 1024, heads to 16 and sectors to 63. Complete the installation using the MaxBlast software.

3. For drives larger than 2.1 GB, users will have to partition the drive into more than one drive letter to get the full size. This is a limitation imposed by the operating system and not the drive or the computer. Operating systems using FAT 16 based file management (such as DOS and Windows 95) are limited to 2.048 GB per drive letter (partition).

4. 4.2 GB or larger drives. The user will have to partition the drive into more than two drive letters to get the full size. This is a limitation imposed by the operating system and not the drive or the computer. Operating systems using FAT 16 based file management (such as DOS and Windows 95) are limited to 2.048 GB per drive letter.

OPERATING SYSTEM PARTITION LIMITATIONS

There are currently two basic file tracking structures in use, FAT 16 and FAT 32. The FAT or File Allocation Table is the table of contents that identifies the addresses of the sectors/cluster where files are stored on the hard drive. The capacity of the FAT is what determines the storage cluster size and the partition size limitations for the operating system.

PARTITIONS/VOLUMES USING FAT 16

It is necessary to create more than one partition if you are using FAT 16 and exceeding 2048 MB for the drive capacity. If the drive is larger than 4096 MB, users must create three partitions. The following table identifies the cluster sizes for FAT 16.

FAT 16 CLUSTER SIZES

<u>VOLUME (PARTITION) SIZE (MB)</u>	<u>CLUSTER SIZE</u>	<u>SECTORS PER CLUSTER</u>
16 - 127	2 k or 2048 bytes	4
128 - 255	4 k or 4096 bytes	8
256 - 511	8 k or 8192 bytes	16
512 - 1023	16 k or 16384 bytes	32
1024 - 2048	32 k or 32768 bytes	64

PARTITIONS/VOLUMES USING FAT 32

For operating systems using FAT 32, it is not necessary to create additional partitions due to the drive capacity. The following table identifies the cluster sizes for FAT 32.

FAT 32 CLUSTER SIZES

<u>VOLUME (PARTITION) SIZE</u>	<u>CLUSTER SIZE</u>	<u>SECTORS PER CLUSTER</u>
512 MB - 8 GB	4 k or 4096 bytes	8
8 GB - 16 GB	8 k or 8192 bytes	16
16 GB - 32 GB	16 k or 16384 bytes	32
> 32 GB	32 k or 32768 bytes	64

SYSTEMS AND BIOS THAT DO NOT SUPPORT DRIVES > 4.2 GB

The following table lists the known systems and BIOS that do not support hard drive with capacities exceeding 4.2 GB as of the date of publication.

<u>SYSTEM MANUFACTURER</u>	<u>MODEL/TYPE</u>	<u>BIOS/DATE</u>
ACER	All	ACER BIOS
Compaq	All	Compaq BIOS
IBM	All	IBM BIOS
Packard Bell	All	All
Generic	Phoenix	All
Generic	AMI	Prior to 7/25/94
Generic	Award	Prior to 10/94

NOTES:

1. Currently all OEM systems that use Phoenix BIOS core will exhibit the same problems with 4.2 and larger drives.
2. AMI BIOS which support drives larger than 2 GB will support 4.2 GB and larger drives.

DIFFERENCES BETWEEN IDE AND EIDE

WHAT IS IDE/ATA?

Integrated Drive Electronics, IDE, is a storage device where most of the disk controller is integrated into the disk drive, resulting in a less expensive product and an easier implementation of firmware. ATA is simply a set of rules or guidelines to which an IDE drive should conform.

WHAT IS ATA-2?

ATA-2 is an enhanced version of the ATA standard. It essentially adds performance and features like:

1. Lists the drives abilities and sets operating characteristics.
2. Faster transfer rates for both PIO and DMA.
3. Improves drive compatibility.

WHAT IS ENHANCED-IDE (EIDE) AND FAST-ATA?

Drive manufacturers started investigating ways to make improvements to the ATA interface, EIDE was developed by one and Fast-IDE by another. The enhancements affected two areas, the BIOS and the hard drives. These improvements were designed to overcome the 504 MB limitations and provide support for much larger hard drive capacities. These efforts were turned over to the ANSI committee for development as an industry wide standard. The revisions were first incorporated in the ATA-2 specification and amplified in ATA-3 and ATA-4/ATAPI ANSI standards. The term Enhanced IDE (EIDE) interface was a development of these actions. Both are now incorporated into the ANSI standards.

WHAT ARE THE MAIN FEATURES OF EIDE?

These are the main features:

1. Faster transfer modes- PIO modes 3&4 and DMA mode 2
2. Multiple Read/Write commands
3. LBA mode, translation for drives larger than 504 MB
4. Four devices on the ATA controller (secondary port)
5. CD ROM and Tape support

ATA-2, ATA-3 AND ATA-4 / ATAPI COMPATIBILITY

The ANSI standards are designed to ensure that all devices covered under the standards in the same family are to be both backward and forward compatible. This means that drives and interface cards developed under one standard is designed to be compatible with older devices and also support devices under the new standards. When devices developed under different levels of these standards are integrated in a system the system will operate at an overall performance based upon the design limitations of the oldest device that affects system performance. Therefore, a hard drive designed under ATA-4 attached to an ATA-2 interface will be restricted to the performance capability of the ATA-2 interface. Devices attached to newer design interfaces will operate to their design limitations and not affect the performance of other devices attached to the interface. An ATA-4 interface will support an ATA-2, ATA-3 and ATA-4 hard drives, and each hard drive will operate at it's designed performance level. Therefore, overall system performance is affected by the oldest device in the system.

WHAT IS ATAPI?

AT Attachment Packet Interface (ATAPI) is a proposed standard for implementing SCSI like other removable media.

The advantages of ATAPI are:

1. It's inexpensive
2. Easy to implement in current systems

The disadvantage is that it requires the use of drivers for operability.

WHAT IS LOGICAL BLOCK ADDRESSING (LBA)?

LBA is a mathematical scheme for addressing sectors, beginning at cylinder 0, head 0 and sector 1, is equal to LBA0. This scheme linearly maps the drive until the final physical sector is reached. LBA is efficient because system overhead is reduced by not having to convert the OS's LBA to the BIOS CHS and then back to drive LBA.

WHAT IS CHS?

CHS stands for cylinders, heads, sectors, and is the conventional means for BIOS to communicate to the Drive. CHS has a limitation of 1024 cylinders, 16 heads and 63 sectors per track resulting in a maximum capacity of 504 MB.

NEW ENHANCEMENTS TO MAXBLAST VERSION 9.00M

- Diskette is bootable with an independent operating system (MHOS). If a BIOS is controlling a drive with 256 logical heads, DOS (even if loaded from a floppy) will cause the system to hang. The MHOS eliminate this problem.
- Makes a backup of track zero for easy recovery in the case of a virus or inadvertent writes to the MBR. The bootable (MHOS) diskette may then be used as an emergency diskette if the user needs to restore track zero of their hard drive.
- EZ-MAX displays system and drive information so the user can easily give this information to technical support if the need arises. It also gives the user tips on how to access and properly setup their system BIOS.
- Works with systems that do not support drives with more than 8192 cylinders (4.2GB).
- If the drive is moved in the future to a system that supports large drives, MaxBlast 9.00M may be removed with *NO* data loss.
- Gives the option to copy the entire contents of existing drives in the system to the new hard drive during the installation.

STEP-BY-STEP INSTALLATION PROCEDURE FOR MAXBLAST VERSION 9.00M

1. Boot the system. Use the MaxBlast diskette included with the hard drive or the bootable diskette created with the downloaded software to *boot* the system. The MaxBlast installation program will load and the first screen.
2. The Maxtor Logo screen is displayed while the MaxBlast program is loading.
3. The first time the MaxBlast program is executed, the sequence is as follows. If the MaxBlast software was previously executed proceed to step 4.
 - a) A message will be displayed directing you to copy the drive and system information to the table provided on the Installation Sheet.

NOTE: The drive information sheet is inside the static bag with the hard drive. This sheet contains a table that the information displayed on the System Configuration screen is to be copied into.

Press the [Enter] key to continue.

- b) The System Configuration information screen is displayed. The information contained in this screen will vary based upon the number and type of ATA devices attached to the system. The information displayed on this screen matches in sequence the information contained in the table on the drive information sheet. Please enter this information into that table.
 - c) After the information on the System configuration screen has been copied to the table on the Installation Sheet, *press* the [Enter] key.
 - d) The System Notes screen is displayed. This screen provides general information regarding setting the system BIOS and how to access different BIOS. *Press* the [Enter] key.
 - e) The Maxtor Logo screen is displayed while the MaxBlast program is loading.
 - f) The License Screen is displayed. This screen provides a summary of the license agreement. To view the complete license agreement *press* the [F1] key. Pressing the [Esc] key will terminate the installation program. *Press* the [Enter] key to continue with the installation.
 - g) The Main Menu is displayed, proceed to step 5.
4. For subsequent executions of the MaxBlast program the following sequences are followed:
- b) The Maxtor Logo screen is displayed while the MaxBlast program is loading.
 - c) The EZMax options screen is displayed. To review the system configuration information press the [F1] key. *Press* the [Enter] key to continue with the installation.
 - d) The Maxtor Logo screen is displayed while the MaxBlast program is loading.
 - e) The License Screen is displayed. This screen provides a summary of the license agreement. To view the complete license agreement *press* the [F1] key. Pressing the [Esc] key will terminate the installation program. *Press* the [Enter] key to continue with the installation.
 - f) The Main Menu is displayed
5. If the hard drive does not contain data, a screen with the option "Setup drive (0,1,2,3) now" will be displayed.
- b) *Press* the [Y] key to continue with the installation. Proceed to step 6.
 - c) If the main menu is displayed, *highlight* "Setup Hard Drive".
 - d) A list of devices found is displayed. *Select* the device to be installed.

NOTE: This software is provided for use with Maxtor hard drives. Use on any other manufacturers hard drives is exclusively at the users risk.

- e) If there is existing data on the hard drive, a partial list of files is displayed. *Type* the complete word "YES" to continue with the installation.

NOTE: All data on this drive will be lost.

6. System files are required to make the hard drive bootable. If this is the primary drive, a screen appears asking for a system disk to be placed in the A:> drive. Once the disk is inserted, *press* the [Y] key.

7. A menu with partition options is displayed. The partition sizes shown are the minimum default sizes for the operating system. If these are acceptable, *highlight* "Use these partition sizes" and *press* the [Enter] key. If the user wants to change the sizes of the partitions *highlight* "Enter new partition sizes" and *press* the [Enter] key. Then *enter* the size of each partition in megabytes until all available space is used.

8. A screen giving the user a last chance to cancel the setup is displayed. *Highlight* "Continue Setup" and *press* the [Enter] key.

9. MaxBlast will keep you informed of the installation process. Once the process is complete, a screen informing the user that the installation is complete is displayed.

10. Remove the floppy diskette from the A:> drive.

11. *Press* the [ESC] key to re-boot the system.

NOTE: If this is the primary drive, an operating system needs to be installed on the drive. Follow the on-screen instructions to boot to the #1 setup diskette for the operating system installation, otherwise the installation is complete.

USING FDISK TO PARTITION A HARD DRIVE WITH A CAPACITY >2.048 GB IN A SYSTEM THAT HAS A BIOS OR EIDE INTERFACE CARD THAT SUPPORTS LARGE CAPACITY HARD DRIVES

1. At the "FDISK Options" screen, *select "4. Display partition information"* and *press* the [Enter] key, if the partition information display indicates that there are existing partition(s) on the Maxtor hard drive, these partitions must be deleted before proceeding. Follow the on screen procedures for "3. Delete partition information" on the "FDISK Options" screen to remove any extended partitions. If there are no partitions on the Maxtor drive go to step 2.

2. At the "FDISK Options" screen, *select "1. Create DOS partition or Logical DOS drive"* and *press* the [Enter] key.

3. The "Create DOS partition or Logical DOS Drive" menu screen is displayed. *Select "1. Create Primary DOS partition"* and *press* the [Enter] key.

4. The message "Do you wish to use the maximum available size for a Primary DOS Partition and make the Partition active (Y/N).....?" is displayed. *Type "N"* and *press* the [Enter] key.

NOTE: When "Do you wish to use the maximum available size for a Primary DOS Partition and make the Partition Active?" is displayed you *MUST* respond to the prompt with "n". If you reply "y", a primary partition of 2.048 GB will be created and the system will not be able to access the remainder of the capacity of the Maxtor hard drive unless the partition is deleted.

5. When prompted, type in the value of the Primary Partition in Megabytes, this value can be anywhere from 1 to 2048 (default), and *press* the [Enter] key.

6. The message "Primary DOS Partition created" is displayed. *Press* the [ESC] key to continue.

7. At the "FDISK Options" screen, *select "1. Create DOS partition or Logical DOS drive"* and *press* the [Enter] key.

8. The "Create DOS partition or Logical DOS Drive" menu screen is displayed. *Select "2. Create Extended DOS partition"* and *press* the [Enter] key.

9. The "Create Extended DOS Partition" screen is displayed. *Press* the [Enter] key to place the remaining space available on the Maxtor hard drive into the Extended DOS partition.

NOTE: If all of the remaining space on the Maxtor hard drive is not placed into the DOS Extended partition the total capacity of the Maxtor hard drive will not be available to the computer system.

10. *Press* the [ESC] key to continue when the FDISK message "Extended DOS Partition created" appears on the monitor screen.

11. The FDISK utility will now prompt you to create logical drives for the Extended DOS partition. The message "Enter logical drive size in megabytes or percent of disk space (%)." is displayed. *Type* the value desired for the capacity value of the logical drive size and *press* the [Enter] key. If you choose a value less than the displayed total size, you must continue entering drive sizes until all of the available space has been assigned Logical volume drive letters.

NOTE: Logical DOS Volumes have a maximum capacity of 2.048 GB. Do not create a Logical DOS drive with a size greater than 2048 MB. Each logical DOS drive created represents a drive letter (C:, D:, E:, F:, etc.) to the system.

12. *Press* the [ESC] key to continue when the FDISK message "All available space in the Extended DOS Partition is assigned to logical drives".

13. *If the drive is going to be the primary boot drive, continue with this step, otherwise proceed to Step 16.* At the "FDISK Options" screen, *select "2. Set active partition"* and *press* the [Enter] key.

14. The "Set Active Partition" screen is displayed and the message "Enter the number of the partition you want to make active....." is displayed. *Press* the "1" key, then *press* the [Enter] key.

15. The message "Partition 1 made active" is displayed. *Press* the [ESC] key to continue. This will return operations to the main menu.

16. *Press* the [ESC] to exit FDISK. Exiting FDISK under DOS will cause the system to re-boot, under Windows 95 the system will return to the "C:\WINDOWS\COMMAND>" prompt and the user will have to manually re-boot the system.

17. After the system re-boots each drive letter assigned to the Maxtor hard drive must be formatted.

SUMMARY AND ADDITIONAL INFORMATION

The following describes the FAT 32 file system included with Windows 95 OEM Service Release 2 (OSR2).

MORE INFORMATION

Windows 95 OSR2 provides an updated version of the File Allocation Table file system, called FAT32. This updated file system allows for a default cluster size as small as 4K, as well as support for EIDE hard disk sizes in excess of 2 GB.

FEATURES

FAT 32 provides the following enhancements over previous implementations of the FAT file system:

- Supports drives up to 2 terabytes in size. Uses space more efficiently.
- FAT 32 uses smaller clusters (4K clusters for drives up to 8 GB in size) resulting in a 10% to 15% increase in efficient use of disk space relative to large FAT 16 drive. More robust.
- FAT 32 has the ability to relocate the root directory and use the backup copy of the FAT instead of the default copy. In addition, the boot record on FAT 32 drives has been expanded to include a backup of critical data structures. This means that FAT32 drives are less susceptible to a single point of failure than existing FAT 16 volumes.
- The root directory on a FAT 32 drive is now an ordinary cluster chain, so it can be located anywhere on the drive. For this reason, the previous limitations on the number of root directory entries no longer exist. In addition, FAT monitoring can be disabled, allowing a copy of the FAT other than the first one to be active. These features allow for dynamic resizing of FAT 32 partitions.

NOTE: however, that while the FAT 32 design allows for this capability, Microsoft will not implement it in the initial release.

COMPATIBILITY CONSIDERATION

In order to maintain the greatest compatibility possible with existing programs, networks, and device drivers, FAT 32 was implemented with as little change as possible to Windows 95's existing architecture, internal data structures, Application Programming Interfaces (APIs) and on-disk format. However, because 4 bytes are now required to store cluster values, many internal and/or on-disk data structures and published APIs have been revised or expanded. In some cases, existing APIs will not work on FAT 32 drives. Most programs will be unaffected by these changes. Existing tools and drivers should continue to work on FAT 32 drives. However, MS-DOS block device drivers (for example, ASPIDISK.SYS) and disk tools will need to be revised to support FAT 32 drives.

All of Microsoft's bundled disk tools (Format, FDISK, Defrag, and MS-DOS based and Windows based ScanDisk) have been revised to work with FAT 32. In addition, Microsoft is working with leading device driver and disk tool vendors to support them in revising their products to support FAT 32.

NOTE: A FAT 32 volume cannot be compressed using Microsoft DriveSpace or DriveSpace 3.

PERFORMANCE

For most users, FAT 32 will have a negligible performance impact. Some programs may see a slight performance gain from FAT 32. In other programs (particularly those heavily dependent on large sequential read or write operations), FAT 32 may result in a modest performance degradation.

DUAL BOOT PERSONAL COMPUTERS

At this time, Windows 95 OEM Service Release 2 (OSR2) is the only operating system capable of accessing FAT 32 volumes. MS-DOS and the original version of Windows 95 do not recognize FAT 32 partitions, and are unable to boot from a FAT 32 volume.

Windows 95 OSR2 can still be booted to real mode (for example, to run a game) and can use FAT 32 volumes.

NOTE: FAT 32 volumes cannot be accessed properly if the computer is started using another operating system (i.e., Windows 95 or MS-DOS boot disk.)

CREATING FAT 32 DRIVES

In OSR2, if you run the FDISK tool on a system with a drive over 512 MB, it asks whether to enable large disk support. If you answer "Yes", any partition you create that is larger than 512 MB is marked as a FAT 32 partition.

SUPPORT BOUNDARIES

Microsoft will support the functionality of the FAT 32 file system for error free reading and saving of files either in real mode or protect mode. Microsoft supports the real and protected mode tools included with Windows 95. Microsoft will not provide support for programs that will not run on the FAT 32 file system. For legacy programs that will not install on a FAT 32 volume, or will not properly save files or read them, you will have to contact the manufacturer of the software package.

NOTE: Cluster sizes of less than 4K on FAT 32 volumes are not supported by Microsoft.

MTA CALL CENTER TOP QUESTIONS AND ANSWERS

- | | | | |
|--|---|---|--|
| <ul style="list-style-type: none"> • 2.1GB • Disk Manager • DOS • EIDE | <ul style="list-style-type: none"> • IDE Compatibility • OS2 & Disk Manager • Windows & Disk Manager • Windows NT | <ul style="list-style-type: none"> • BIOS • Disk Manager v7.12 • SCSI • IDE | <ul style="list-style-type: none"> • Novell • PCMCIA • Windows 95 |
|--|---|---|--|

MAXTOR CUSTOMER MAY ACCESS MTA TOP Q&A'S IN THE FOLLOWING WAYS:

WEBSITE = www.maxtor.com
 BBS = 303-678-2222
 MAXFAX = 800-262-9867 option #3
 AUTOMATED SYSTEM = 800-262-9867

SYSTEM BIOS & OPERATING SYSTEM CAPACITY LIMITS

<u>SYSTEM TYPE</u>	<u>DRIVES BETWEEN 504 MB & 2.048 GB¹</u>	<u>DRIVES BETWEEN 2.1 GB & 4.2 GB¹</u>	<u>DRIVES LARGER THAN 4.2 GB¹</u>
OLD SYSTEM BIOS LIMITED TO			
504 MB (PRE SEPT. 1994)			
DOS / Win 95 (Fat 16)	MaxBlast / 2.1 GB / 2.1 GB	MaxBlast / 2.1 GB / 4.2 GB	MaxBlast / 2.1 GB / 8.4 GB
Win 95 OSR2 (Fat 32)	MaxBlast / 2.1 GB / 2.1 GB	MaxBlast / 2.1 GB / 4.2 GB	MaxBlast / 2 TB / min 2 TB
SYSTEMS LIMITED TO 2.1 GB			
DOS / Win 95 (Fat 16)	OK	MaxBlast / 2.1 GB / 4.2 GB	MaxBlast / 2.1 GB / 8.4 GB
Win 95 OSR2 (Fat 32)	OK	MaxBlast / 2.1 GB / 4.2 GB	MaxBlast / 2 TB / min 2 TB
SYSTEMS LIMITED TO 4.2 GB			
DOS / Win 95 (Fat 16)	OK	OK	MaxBlast / 2.1 GB / 8.4 GB
Win 95 OSR2 (Fat 32)	OK	OK	MaxBlast / 2 TB / min 2 TB

1-Information presented in these columns are: Solution / Partition Limit / Capacity Limit
 Legend: MB=Megabyte, GB=Gigabyte, TB=Terabyte

SOLUTIONS TO REPLACE MAXBLAST

1. Use an EIDE Interface Card or BIOS Extender Card
2. Upgrade the system BIOS

IMPORTANT NOTES:

1. MaxBlast installation software only loads drivers when the System BIOS does not support large capacity hard drives, or when this support feature is not enabled. For system BIOS' that are capable of large capacity hard drive support and the feature is enabled, the MaxBlast installation software partitions and formats the hard drive without the use of drivers
2. Based on extensive testing, there is no drive performance degradation when MaxBlast installation software is used. Benchmark testing shows an increase when using Maxtor's MaxBlast (version 9.00M) installation software for systems that do not support large capacity hard drives.

TO OBTAIN MAXBLAST INSTALLATION SOFTWARE

INTERNET = www.maxtor.com filename = maxblast.exe
 BBS = 303-678-2222 filename = maxblast.exe
 Maxtor Customer Service = 1-800-2MAXTOR (262-9867)
 to have a copy mailed to you

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