

BIOS Barriers

Technology for Enhanced Performance

With the personal computer industry becoming a way of life in both business and homes worldwide, the availability and complexity of PC applications have grown proportionately, increasing the demand for larger, faster hard drives. As vendors manufactured drives with increased capacities, it was found that system BIOSs had limitations which did not allow them to recognize larger capacities. The first capacity barrier in older BIOSs was 528 MB. With the release of IDE drives, a 2.1 GB barrier was discovered.

To handle these barriers and make other improvements, Enhanced IDE was developed. EIDE removes the four primary limitations of the IDE interface by:

- Breaking the 528 MB and 2.1 GB capacity barriers
- Overcoming the IDE transfer bottleneck, resulting in faster performance
- Increasing connectivity to support up to 4 IDE devices
- Providing support for other IDE peripherals, such as CD-ROMs and tape drives.

528 MB Barrier

A typical system BIOS dated before August 1994 does not recognize drives larger than 528 MB as a result of the cylinder, head, and sector definitions of both BIOS Interrupt 13 and the IDE interface.

Can Your System Do It?

If your system is not recognizing the full capacity of your drive, you can determine whether or not it can by performing the following steps:

1. Enter your CMOS setup and look for options like "LBA," "Large Disk Access" or "Translation;" enable these options.
2. Try selecting an "Auto Config" drive type. If you see a value greater than 16 heads, you probably have a translating BIOS. A translating BIOS allows your system to recognize drive capacities greater than 528 MB.
3. Contact your system or BIOS manufacturer and verify that your system recognizes capacities greater than 528 MB. Some common BIOS suppliers are:

BIOS Source	USA Phone Number	Internet Address
Micro Firmware (Phoenix only)	(405) 321-8333	www.firmware.com
Phoenix	(617) 551-4000	www.phoenix.com
Unicore (Award and AMI BIOS)	(508) 686-6468	www.unicore.com

Yes, It Can!

If you have determined your system can recognize hard drives over 528 MB, try the following steps. If you purchased a Western Digital hard drive with more than 4095 cylinders, go to the section *Hard Drives Larger than 2.1 GB*.

1. Enter CMOS. (See your system manual.)
2. Verify that options like "LBA," "Large Disk Access," or "Translation" are enabled.
3. Select the Hard Disk Type option for your Western Digital drive. Select auto config. If your system BIOS does not have auto config, select user defined and enter 1023 cylinders, 16 heads, and 63 sectors for the drive parameters. If your system BIOS does not have auto config or user defined, select Type 9.
4. Save changes, exit CMOS and restart the computer.

528's the Max!

If your system BIOS cannot recognize hard drives larger than 528 MB, you can use EZ-Drive, an installation software package used to overcome the system BIOS limitations preventing you from accessing the full capacity of your hard drive. You can download EZ-Drive from Western Digital's web site at www.wdc.com.

If you choose not to use EZ-Drive, contact your system or BIOS manufacturer to obtain an updated BIOS, either a "translating BIOS" or Enhanced IDE BIOS that will recognize the full capacity of your drive. These will be either a BIOS chip upgrade or an EIDE controller card with onboard BIOS.

Hard Drives Larger than 2.1 GB

When the size of drives exceeded 2 GB capacities, another barrier was discovered—some translating BIOSs are limited to 4095 cylinders. These BIOSs can only recognize drive capacities up to 2.1 GB. Other system BIOSs limit the cylinder number to 12 bits, reducing the drive capacity to approximately 400 MB.

Some systems lock up at boot time when the BIOS detects a drive with 4096 or more cylinders. This makes it impossible to even boot to the floppy drive or enter CMOS setup, thereby eliminating the possibility of using software device drivers to correct the problem.

Not Dealing With a Full Disk...

If your operating system shows your drive has a smaller capacity than it really does, use EZ-Drive to overcome the 2.1 GB BIOS limitation.

System Locked Up?

If you cannot access the CMOS setup because your system locks up on initial boot, do the following:

1. Turn off your system power, check the IDE interface cable and power supply cable.
2. Check jumper settings.

3. Turn on your system power.
4. Try to enter your CMOS setup and set the drive to auto config.

If your system still does not respond, your system BIOS may not support drives with more than 4095 cylinders. If so, try these solutions:

Use EZ-Drive. If the system locks up and prevents entry to CMOS, do the following:

1. Turn off the system power, and disconnect the IDE interface cable from the system.
2. Turn the power back on, and enter CMOS. Refer to your system manual. Select the Hard Disk Type option for the new Western Digital hard drive. Select a user defined type and enter: 1023 cylinders, 16 heads, and 63 sectors. If your system does not have a user defined drive type, select Type 9.
3. Reconnect your IDE interface cable to the system.
4. Install EZ-Drive. These new settings should allow your system to boot so that you can install EZ-Drive to access the full capacity of the drive.

If you don't have a user defined or Type 9 drive type, use one of the options below to change the parameters reported to the BIOS.

- Upgrade your system BIOS.
- Install an EIDE controller card with an onboard BIOS supporting hard drives larger than 2.1 GB.
- Rejumper the drive as described in the Western Digital Installation Guide that accompanied your hard drive.
Note: This solution works with Windows 3.1 and Windows 95. It does not work for Novell NetWare or Unix.

Windows NT Users: If the system locks up, you have a 4.3 GB or larger hard drive, and are using Windows NT, you cannot use alternate jumper settings. Use the standard jumper settings and select a user defined drive type in CMOS, or upgrade the BIOS to support the drive's full capacity.

For service and literature:

714.932.4900 USA
714.932.5000 Outside USA
714.932.4300 DocuFAX
www.wdc.com Internet

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Western Digital Corporation
8105 Irvine Center Drive
Irvine, California 92618

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