



What is the 2.2TB limitation?

Users upgrading a computer system with a larger hard disk drive may have problems using more than 2.2 terabytes (TB) of disk space. This size limit is based on limits introduced by the master boot record (MBR) partitioning method.

This FAQ explains the issue, outlines current workarounds using AMIBIOS8 and discusses long term solutions based on GPT, UEFI and AMI Aptio.

Why does this limitation exist?

This limitation dates back to the 1980s and the original IBM PC. This introduced the master boot record (MBR) partitioning scheme to describe hard disk partitions.

BIOS systems with MBR disks use 32-bit values to describe the starting offset and length of a partition. Due to this size limit, MBR allows a maximum disk size of approximately 2.2 TB and a maximum of four primary partitions.

How does this limitation affect today's computers?

To meet the demands of modern computer users, hard disk drive manufacturers will produce disks in excess of 2 TB in 2010. Users upgrading a computer system by adding or replacing an existing hard disk drive with a larger drive may encounter problems using more than 2.2 TB of disk space.

How will the BIOS and OS address the 2.2TB limit?

The Unified Extensible Firmware Interface (UEFI) specification defines a new model for the interface between personal-computer operating systems and platform firmware. UEFI modernizes interfaces used by the BIOS, such as MBR.

[UEFI supports a more flexible partitioning scheme using the GUID Partition Table \(GPT\)](#). GPT disks use 64-bit values to describe partitions of up to 9.4 zettabytes (ZB).

Note that early implementations of EFI & UEFI platforms use some 32-bit drivers, so an upgrade may be required to use 64-bit calculations. Operating system drivers for RAID configuration and disk controllers may also require upgrades.

Does AMIBIOS8 Support Drives Larger Than 2.2TB?

Yes, AMIBIOS8 will detect and initialize drives larger than 2.2TB. However, AMIBIOS8 does not support UEFI or boot to GPT partitions. Boot to GPT is supported by a UEFI compliant OS and BIOS. AMI Aptio uses UEFI and will boot to GPT.

Will the OS see a partition larger than 2.2TB?

The OS will not properly recognize MBR partitions larger than 2.2TB. GPT partitions larger than 2.2TB will be recognized if the OS supports GPT. Note that the OS may support GPT for the purposes of data storage only. Some OS will only boot from an MBR partition smaller than 2.2TB, but use GPT partitions to enable data drives with larger partitions.

Will the OS boot to a partition larger than 2.2TB?

Only operating systems supporting UEFI and GPT are expected to boot from partitions larger than 2.2TB. This also requires the underlying firmware to implement UEFI.

What AMI products support GPT?

Aptio is AMI's next-generation BIOS firmware based on UEFI. Aptio is specifically designed to address firmware portability and extensibility to future platforms. Aptio addresses the 2.2TB size limit by implementing GPT, while maintaining backward compatibility for MBR formatted drives.

Can MBR be modified to support more than 2.2TB?

No, this is prevented by the design of MBR. Based on the product direction of companies like Microsoft, the best approach is to adopt GPT as defined in the UEFI Specification.

How does a user work around the limitation?

There are several methods used to address the 2.2TB limit so users can take advantage of systems with larger disk drives:

1. [MBR Boot Drive + GPT Data Drive](#) – Install the OS on a MBR formatted disk under 2.2TB. The OS will use the MBR disk as the boot drive. Additional data drives may be formatted using GPT after the OS has been installed, eliminating the MBR limitation.
2. [UEFI OS Installation](#) – Using a UEFI-enabled OS installation with UEFI BIOS removes the 2.2TB limitation on boot and data disks. UEFI uses GPT to replace MBR partitioning schemes. This solution is less common now but will be the preferred industry solution moving forward.

How does Microsoft support UEFI & GPT?

The following summarizes Microsoft's support for UEFI:

- GPT is required to support partitions larger than 2.2TB
- UEFI based System BIOS, such as AMI Aptio, can be used to create and boot to a GPT formatted drive
- Microsoft Windows Vista 64 SP2, Windows Server 2008 and Windows 7 x64 support UEFI install and UEFI native boot
- No UEFI boot support exists in Microsoft Windows XP x64 or the 32 bit editions of Microsoft Windows
- A UEFI OS install and UEFI native boot are required to install Microsoft Windows to a GPT formatted drive

More recent versions of Microsoft Windows support GPT disks. This is described in an [article at the Microsoft WDHC website](#).

Does Linux Support GPT?

Yes, but not on all distributions. GPT support in Linux is affected by the kernel, boot loader and disk utilities.

Changes to Linux kernel and utility support for UEFI include support for GPT. The IBM Developerworks website features a detailed article on the subject ("[Make the most of large drives with GPT and Linux](#)").

For more information on AMIBIOS8 & Aptio ...

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