What is BIOS?

BIOS, pronounced "BYE-oss," stands for Basic Input Output System and is software stored on a small memory chip in your system's motherboard. When you boot up your system and look at the screen at the right time, you may see a startup message that uses the term "BIOS."

You may have possibly heard variations of the term "BIOS." But, for example, if you're wondering, "Then what is a BIOS?" no worries. It's the same thing. BIOS is alternately called ROM BIOS, PC BIOS, and System BIOS.

BIOS is the first software that runs when you power on your system, performing an initial pack of diagnostic tests (POST, or Power On Self-Test) to see if there are any issues with the hardware. POST is the first step in your hardware's boot sequence. The machine won't continue with the boot sequence if the POST fails.

So, to recap, BIOS is firmware (in other words, software embedded in a piece of hardware) stored on a ROM chip that lets you access and set up your system at its most basic level.

What is a BIOS and What's Included?

A BIOS contains the instructions your computer needs to load its basic hardware, including the POST mentioned above. If your system fails the POST, you will hear a series of beeps; different beep sequences indicate various issues.

BIOS firmware is non-volatile, meaning that the settings are saved and can be recovered even if the machine no longer has power.

What is BIOS: The Functions of a BIOS

BIOS has four main functions:

- POST: The POST function tests the hardware before loading the operating system; we already discussed this function earlier.

- Bootstrap loader: This function locates a capable operating system. If the loader finds that system, the BIOS passes control over to it.

- BIOS drivers: These are low-level drivers that give your system basic control over its hardware.

- BIOS setup: This function is a configuration program that lets you configure your system's hardware settings. This configuration includes system settings like time, date, and passwords.

And here's a list of functions you can do with most BIOS systems:

- Change the boot order

- Load BIOS setup defaults

- Flash (Update) BIOS

- Create/Delete a BIOS password

- Change the date and time

- Change floppy drive settings*

- Change hard drive settings

- Change CD/DVD/BD drive settings

- View the amount of memory Installed

- Change the boot up num lock status

- Enable or disable the computer logo

- Enable or disable the quick Power On Self Test (POST)

- Enable or disable the CPU internal cache

- Enable or disable the BIOS caching

- Change the CPU settings

- Change the memory settings

- Change system voltages

- Enable/disable RAID

- Enable/disable the onboard USB

- Enable/disable the onboard IEEE1394

- Enable/disable the onboard audio

- Enable/disable the onboard floppy controller*

- Enable/disable the onboard serial or parallel ports

- Enable/disable ACPI

- Change the ACPI suspend type

- Change the power button function

- Change the power-on settings

- Change which display gets initialized first on the multi-display setups

- Reset the Extended System Configuration Data (ESCD)

- Enable or disable the BIOS control of system resources

- Alter the fan's speed settings

- View CPU and system temperatures

- View the fan speeds

- View system voltages

*not relevant in modern systems

When you want to make any changes to the above configurations, save the changes, then restart your system. This process will ensure the changes stick.

Can a BIOS Chip Be Upgraded?

If you want to upgrade your BIOS chip to add more memory to it, you must completely replace the old BIOS chip with a newer, more advanced model.

You can update the data on your BIOS chip, but only if it's a flash BIOS. Older BIOS chips don't have this capability and must be completely replaced. A flash BIOS lets you update the BIOS by booting with a special disk or executing a particular set of instructions. This way, you don't even have to open the case!

So, if you have an older BIOS chip, you will have to replace the entire chip. However, if you have a flash BIOS, you're in luck.

BIOS Availability

Every modern system motherboard has BIOS software. It's like the computer equivalent of an automobile's starter; you must have one to get going. The BIOS is part of the motherboard's hardware, making it independent of any machine's operating system.

So, whether you're running Windows, Unix, Linux, or no operating system at all, BIOS doesn't rely on them, as it operates independently of your computer's environment. Incidentally, Mac systems technically don't use BIOS; they're supported by a comparable firmware known as Open Firmware, a boot firmware used by Apple and Sun.

What Is a BIOS: Types of BIOS

There are two main types of BIOS:

- Legacy BIOS: Legacy BIOS is used in older motherboards to turn on the computer, and it controls how the CPU and different computer components talk to each other. Unfortunately, the Legacy BIOS has limitations. For example, it can't handle or recognize data drives larger than 2.1 TB.

- UEFI: The acronym stands for Unified Extensible Firmware Interface. Unlike the Legacy BIOS, the UEFI can accommodate 2.2 TB or larger drives. In addition, UEFI handles drives with the aid of the Master Boot Record rather than GPT technology, the latter being a more modern GUID Partition Table.

BIOS vs. UEFI

Although we've already called out a chief difference between BIOS and UEFI in the previous section, let's compare them more closely.

UEFI is the newest of the two boot software offerings, released in 2002. Compared to BIOS, UEFI has greater scalability, higher performance, better programmability, and higher security. In addition, UEFI doesn't require a separate bootloading program to load the operating system. UEFI also has a better user interface and overall faster speeds

IT tech giants such as Intel, AMD, AMI, Apple, Dell, HP, IBM, Lenovo, and Microsoft have phased out BIOS or are in the process of doing so in favor of UEFI. So it looks like BIOS is slowly going away.