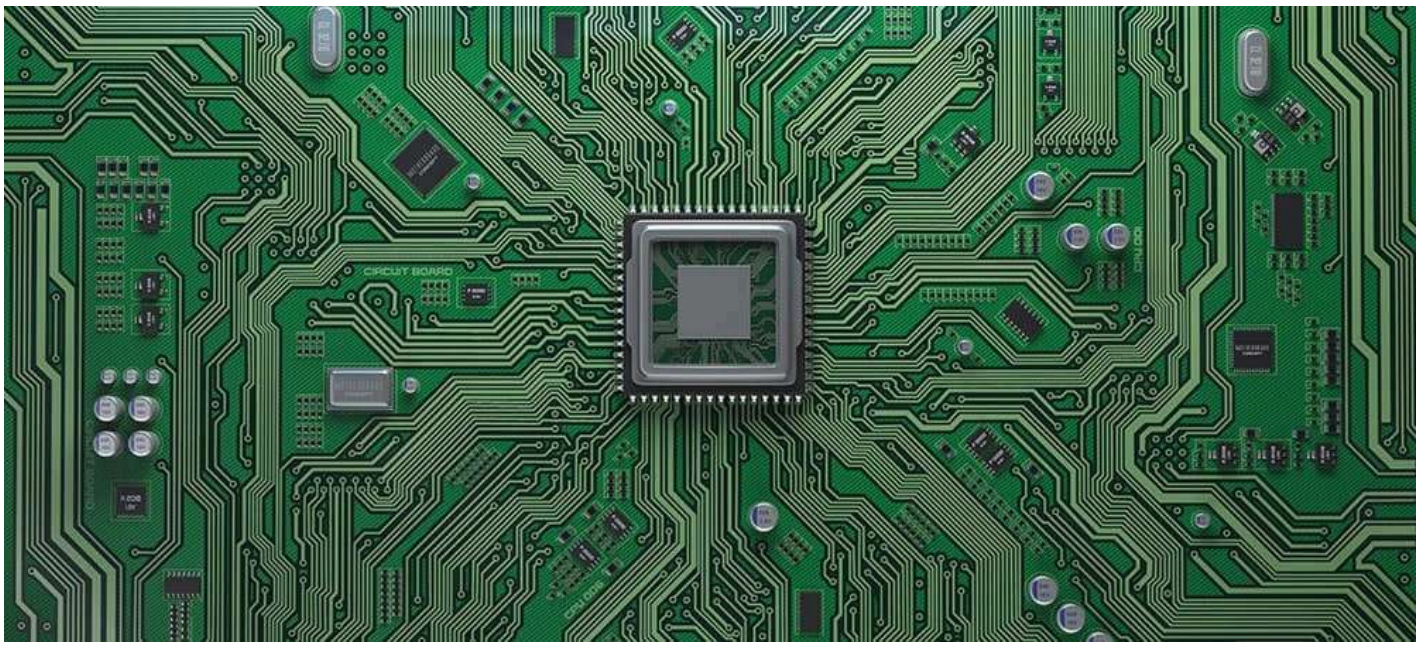
The BIOS system is also responsible for managing data flow between your computer's operating system and any attached devices including a hard drive, keyboard, video adapter, printer, or mouse.

Each time you power your PC on, BIOS runs through a process called Power-On Self Test, or POST, that determines whether your attached devices are operating correctly and are in their proper place.

Once all attachments are allocated and given the OK, your computer startup continues as usual and takes you to your load screen in a matter of seconds.

If BIOS detects any problems, an error screen will appear or a series of beep codes will sound, effectively indicating to you that something has gone wrong.

New developments in BIOS technology



BIOS software has existed within computers since the 1980s and has made plenty of leaps and strides when it comes to efficiency and improvement. However, with the rapid speed of technological evolution, BIOS has become outdated and presents a number of roadblocks for today's tech.

Newer PCs capable of handling several terabytes of storage prove to be too complex for weaker BIOS software. Limited to 16-bit processor modes and booting drives of 2.1TB or less, newer computers are usually equipped with 3TB drives or more.

Thus, the UEFI was born out of necessity for higher-powered booting. The new standard of BIOS accommodates the limitations the old BIOS system couldn't work around. UEFI, or Unified Extended Firmware Interface Forum, can run in 32-bit or 64-bit modes and theoretically handle drives up to 9.4 zettabytes.

Not only is UEFI a BIOS replacement, but it also functions as a mini operating system that runs on top of your PC's integrated firmware.

In essence, whether your computer is powered on by BIOS or UEFI, it is this software that you count on for fast boot times and proper processing functionality. Being able to access your PC's BIOS allows you to perform regular maintenance for healthy computer upkeep.

What are the basic functions of BIOS?

Now that you understand what BIOS is, let's dive into what it really does for your desktops, laptops, and tablets. BIOS's functionality can be broken down into four key responsibilities.

1. POST

As we mentioned before, POST is an acronym for the Power-On Self Test that your PC runs through the moment you turn it on. POST tests the hardware of your PC and ensures that there is nothing out of order and no errors present with your operating system.

POST goes through everything from your keyboard and disk drive to your RAM speed in a computer and integrated ports. Should everything be in order, POST will continue as usual and allow your PC to boot normally.

If there is a detected error, BIOS will issue an error message that may come in the form of displayed text or a series of error-indicating beeps.

These beeps are always signals to certain messages, so if you happen to get this result, you will need to check out what it means for your computer's hardware [1].

2. CMOS setup

Your PC stores all low-level settings like system time and hardware configuration within its CMOS.

This means that every change you make to your BIOS structure is saved on this special memory chip called the Complementary Metal-Oxide Semiconductor, or CMOS. The CMOS setup is responsible for setting your password, time, and date.

3. Bootstrap loader

The program that lives within your computer's EPROM or ROM, the bootstrap loader is tasked with reading your PC's hard drive boot sector to move along the complete operating system load.

When you restart your PC, the bootstrap loader activates the POST, then loads Windows 10 into memory. Newer PCs have replaced the bootstrap loader with an EFI, or Extensible Firmware Interface.

4. BIOS drivers

BIOS drivers are the many programs stored in your computer's many memory chips. These low-level drivers are used to boot your system and prompt basic operational controls on your PC.

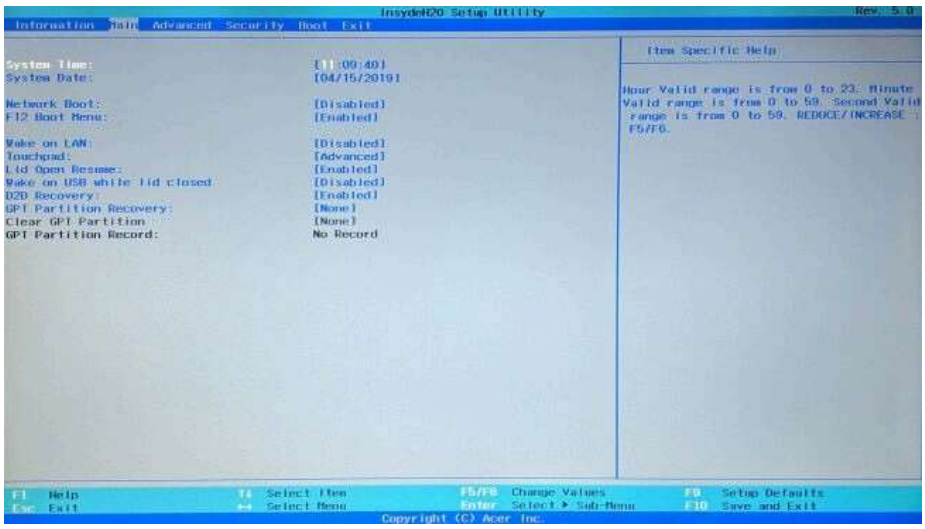
KT0702 Upgrade BIOS

How to Update Your Computer's BIOS

In general, your computer's basic input/output system shouldn't need to be updated that often, but sometimes you have to view or even edit your computer's BIOS.

Your computer's basic input/output system—or BIOS—lives in a small chip on your motherboard, and manages the most basic instructions that allow your computer to boot into an operating system. From time to time, your PC's manufacturer may offer updates to the BIOS with certain improvements. Here's how to install them.

In general, you shouldn't need to update your BIOS that often. Installing (or "flashing") a new BIOS is more dangerous than updating a simple Windows program, and if something goes wrong during the process, you could end up bricking your computer. I don't mean to be all doom-and-gloom about it. I've never had a problem updating my BIOS, and I've done it plenty of times, but it's important to be careful.



Since BIOS updates don't usually introduce new features or huge speed boosts, you probably won't see a huge benefit anyway. Unless the latest BIOS comes with security patches, support for new hardware you plan to use, or fixes a bug that's been plaguing your daily usage, you're best off leaving it alone altogether. If you fall into one of those categories and need to update your BIOS, though, here's how to do it.

KT0703 Potential issues

When you purchase a PC from SilentPC.com, you can rest assured that we not only choose the most reliable components, but we thoroughly test every part in our PCs. When our customers add products or change BIOS settings independently of us, errors can occur. SilentPC.com cannot be held responsible for parts added to systems by customers, or custom BIOS work done by customers or technicians other than ourselves.

However, if you run into BIOS problems, the following are the most common reasons for BIOS errors and computer instability that we have run into, and how to update your BIOS in order to fix the following problems.

1 | BIOS Error - Failed to Overclock

The Failed to Overclock error screen shows up whenever your BIOS settings have been cleared, and usually has nothing to do with actually overclocking your system, unless you just tried to overclock your system. Some common occurrences which cause this error to arise are:

Your system has been physically moved

Your CMOS battery is failing

Your system is having power issues

Overclocking your RAM or CPU (we do not overclock our parts)

Adding a new device which is defective

We do not recommend overclocking any part in your Quiet PC. Overclocking the RAM or CPU is not something we support, because you are basically telling your PC to send more power to the CPU or RAM than the component was designed for in order to increase speed and performance. Overclocking diminishes the life expectancy of your PC, and can damage PC components (when done incorrectly). When using a silent PC, generally speaking, you are already dealing with higher temperatures than you would with a standard build. Overclocking exponentially increases those heat levels in your PC, putting more wear and tear on your components.

2 | BIOS Error - Failed Device

Failed Device is the second most common instance of a bios error screen (besides overclocking your PC). This happens when a new flash drive, USB device, or hard drive is connected to your PC. Most of the time adding a new flash drive or hard drive to your PC should not be an issue, since all of the ports in our PCs are tested thoroughly. Yet, we cannot test every component or piece of equipment customers choose to add to their machine, later on down the road.

Failed USB drives and USB devices, or bad hard drives commonly cause this type of error screen. If you encounter this BIOS error immediately after connecting a new device to your PC, simply disconnect the device and reboot to see if the error continues. If everything works well after the new device is removed, then you can assume that the new device was defective or unstable.

If you've added a new piece of equipment, first disconnect and reboot it, to see if the error continues to reoccur. If the error is not present when the new device is removed, then there could be an incompatibility issue between the new device and your system, or the new device may be defective. Connecting the device to another computer will help you know if the device is defective or not.

If you have purchased a PC from us and you run into this type of bios error screen without adding a new device to your PC, please feel free to contact us at support@silentpc.com since there could potentially be a bigger problem behind the BIOS error screen.

How To Restore BIOS to Factory (SilentPC.com) Settings

If your BIOS settings have been reset, or if you've attempted to overclock your PC and your PC failed, you may need to set the BIOS back to its optimized default settings. Setting your BIOS back to orginal settings is also referred to as restoring your BIOS settings. SilentPC.com (Cool Tech PC) saves all of our BIOS settings under the BIOS profiles tab, which most modern motherboards support. Simply load any of the pre-saved profiles under the profiles tab (unless you have altered one of those profiles) to reset everything back to the way it was when we sent the PC out.

Load BIOS defaults

Below is a quick guide on how to load your bios profiles:

Login into the BIOS by hitting the Delete or F2 key (depending on your motherboard) during your computer's boot process (when you see the BIOS screen pop up).

Navigate to the Tools Tab.

You should see an item called Profile. Simply use one of the profiles to load the settings your machine initially had when you first received it.

Hit the F10 key or select the "Save and Reset" option. Your Bios Settings should now revert back to how it was originally setup by us.

3 | BIOS Error - CPU Fan Error

Many customers run into an error that tells them that the CPU fan has an error. This is usually just because our silent fans spin slower than normal fans. We've designed our machines to be as quiet as possible, and some of our designs have no moving parts in them at all.

This error most often occurs when the settings in the BIOS have been reset, often due to an improper shut down or a power outage. By default we disable the CPU fan speed sensors because the motherboard will think that the fans are dying (even though we are just using slower fans than a standard build). We recommend checking in the BIOS under the Hardware Monitor section to verify that the CPU fan is actually spinning if you receive this error. Yet, we still recommend turning the fan sensor off in the BIOS because all of our quiet CPU coolers.

Because there are so many different types of BIOS versions, we cannot provide step-by-step instructions on how to do this. Almost all of the fan settings in the BIOS are going to be located in the hardware/monitor section of the BIOS. Please consult your motherboard manual for detailed instructions on how to navigate your BIOS. If you have purchased your PC from us, and are not sure how to proceed when you receive this error, please contact us at support@silentpc.com, so we can further assist you.

BIOS Solutions | CPU Fan Error Solution

Seeing this CPU Fan Error should prompt you to push the F1 key which in turn will load the BIOS screen. You should make sure that all of the fans sensors are turned off in the hardware monitor section by manually turning the fan speed sensors off. The easiest way to reset everything is to load from one of the profiles which we've preset in the BIOS. This should set everything back to where we originally had it. Please note: this feature is only available on motherboards that support UEFI, and that you should still consult a technician if the problem persists or if you need help.

4 | BIOS Error - Boot Device Error

A Boot Device Error is a common occurrence among modern motherboards (which support UEFI). The DVD drive or hard drive may be set to boot as a UEFI (Unified Extensible Firmware Interface) and may not always work. UEFI utilizes the GPT partition scheme (globally unique identifiers partition table), and is far superior to that of the older MBR (master boot record). UEFI is almost always the default on modern motherboards, but this setting has been known to change when new devices are connected to the PC. Bottom line: booting

off a DVD or hard drive may not always work when set to UEFI, and it is suggested to make sure that the primary boot device is either the DVD or hard drive, and not the UEFI DVD variant if you are having issues.

BIOS Solutions | Boot Device Error Solution

There are quite a few more options in the boot menu of a modern motherboard, than that of an old generation motherboard. Scrolling down on the boot page will list the primary DVD and hard drive boot options. Scrolling down even further will list the DVD boot options and the hard drive boot options. Simply select the DVD boot option, if you're trying to boot off of the DVD drive, and make sure that UEFI is not at the top of the list. The same setting should be applied to the hard drive boot options. Once these setting are saved, you should be able to boot off of the DVD drive or hard drive, with no issues. You can almost always use the Quick Boot option (Typically the F8 key) which will allow you to quickly choose which device you would like to boot off of.

KT0704 CMOS: Complementary Metal Oxide Semiconductor

CMOS (complementary metal-oxide semiconductor) is the semiconductor technology used in the transistors that are manufactured into most of today's computer microchips. Semiconductors are made of silicon and germanium, materials which "sort of" conduct electricity, but not enthusiastically. Areas of these materials that are "doped" by adding impurities become full-scale conductors of either extra electrons with a negative charge (N-type transistors) or of positive charge carriers (P-type transistors). In CMOS technology, both kinds of transistors are used in a complementary way to form a current gate that forms an effective means of electrical control. CMOS transistors use almost no power when not needed. As the current direction changes more rapidly, however, the transistors become hot. This characteristic tends to limit the speed at which microprocessors can operate.

KT0705 CMOS setup, settings, and access

How to Access the CMOS Setup Program

The CMOS and BIOS setups are both specified in the system BIOS. Some computer manufacturers refer to this setup menu as the BIOS setup, while others refer to it as the CMOS setup. The difference between the BIOS and CMOS lies in the function of each component on the motherboard. CMOS is the component that remembers your system settings when you power the computer down, while BIOS contains the settings for the boot-up process. You configure both groups of settings through the same setup menu.

Press "Windows-C" to display the Charms menu.

Click the "Settings" icon to open the Settings menu.

Click the "Change PC Settings" link at the bottom of the menu.

Click the "General" option in the left navigation panel, and then click the "Restart Now" button in the right panel. The computer boots up and displays the Windows 8 boot screen.

Click the "Troubleshoot" option, and then click "Advanced Options" in the Troubleshooting menu.

Click the "UEFI Firmware Settings" option.

Click "Restart" to restart the computer and enter the BIOS.

Navigate through the menu to the desired settings page using the directional arrows and the Page Down and Page Up keys. Select items by highlighting the desired option, and then pressing the "Enter" key. Set the BIOS and CMOS options to your liking.

Press the “Esc” key to open the Exit dialog box. Navigate to “Save Settings and Exit” or a similar option, and then press the “Enter” key to save your BIOS/CMOS settings.

Reboot the computer to implement the modified settings.

Internal Assessment Criteria and Weight

• IAC0701 Understanding of BIOS and CMOS operations is demonstrated

(Weight 5%)

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