

An Introduction to the BIOS

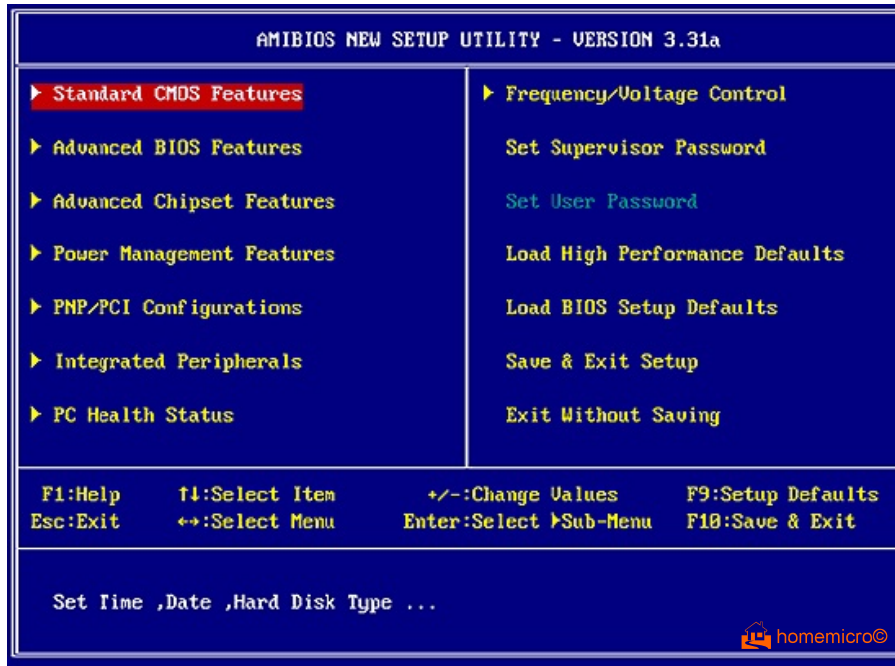
IN THIS GUIDE

The BIOS is a key component in all computers. Understanding a little about its function is essential to successful computer construction, maintenance and repair. This guide provides a quick insight to the BIOS to get you started. Also see our guides 02_003 BIOS Limitations and 02_007 BIOS Explained.

File: 02_001 Introduction to the bios

Rev: 4.0 Essential reading

PDF version (123kb)



a typical BIOS screenshot

Every computer motherboard includes a special chip referred to as the BIOS or ROM BIOS (Read Only Memory Basic Input/Output System). The BIOS includes instructions on how to load basic computer hardware. These instructions are saved in non-volatile memory (NVRAM) to preserve the data when the computer is off. This is as opposed to regular system memory, which is cleared each time you turn off the PC. The memory is called CMOS (Complementary Metal Oxide Semiconductor) memory, and a tiny battery is used to trickle a small charge to it to make sure that the data it holds is always preserved. Over time, it is possible to find that a PC may begin to forget its settings when it is booted. This usually means the battery has reached the end of its life.

The BIOS also includes a test referred to as a POST (Power On Self Test) which ensures that the computer meets requirements to boot up properly. If the computer does not pass the POST a combination of beeps indicate what is malfunctioning within the computer.

The BIOS (Basic Input Output System) contains basic sets of programmed instructions put into ROM (Read Only Memory) by the motherboard manufacturer. It is used to boot up a computer and establish the communication between the various components. Upon power-on the BIOS will perform the POST (Power On Self Test), during this time, press the < del > key to enter the BIOS setup. You should see a screen like the one above.

You cannot do any harm looking at the bios menus. If you make a change in error simply select the “Exit Without Saving” option to cancel the change.

TIP

Do take a look at the BIOS and check all settings. It is a good idea to write down any settings before making changes. When you first build a new PC you will probably have to make alterations to settings in the bios such as the frequency for the CPU and memory, your 'first boot device' and your video card AGP multiplier as appropriate.

BIOS Upgrades

Computers which were released after 1996 should have the capability of being updated with a Flash program. Which essentially allows the computer to have new instruction and capabilities. Unfortunately it is possible to damage (burnout/destroy) a computer BIOS if care is not taken.

Most motherboards nowadays use Flash BIOS. This is a special type of BIOS ROM chip called an EEPROM (Electrically Erasable Programmable Read-Only Memory). This is a ROM that can be erased and re-written using a special program. This procedure is called flashing the BIOS.

Reasons to upgrade a computer BIOS:

1. Known issue. Such as none compatibility with certain hardware devices.
2. Support for larger Hard Disk Drives.
3. Support for a new model of Processor.
4. Other Limitations which will be resolved with BIOS upgrade.

WARNING

DO NOT under any circumstances upgrade your BIOS if you have no reason to. If you need to upgrade DO take care and follow instructions provided by the manufacturer very carefully. Always make sure you obtain your BIOS upgrade from the motherboard manufacturer.

Before Upgrading

Before upgrading the BIOS it is recommended you ensure there is a recovery jumper on the motherboard which will allow you to recover your original BIOS if the computer does not run through the BIOS properly.

NEED TO KNOW

Take a look at your instruction manual and find the jumper for "Clear CMOS". It may be labelled JP1 or JBAT1. There should be 3 pins. You can clear the CMOS by shorting pins 2-3 for a few seconds while the system is off, returning the jumper to pins 1-2 position before rebooting. On some motherboards you may need to disconnect the power cables before doing this. Whilst with certain boards it may be necessary to boot the PC with pins 2-3 shorted to enable the clearing process.

Always read the instructions carefully. Avoid clearing the CMOS while the PC is on as this will damage the motherboard.

If your motherboard has no jumper you will have to remove the battery for a period of 10 minutes or more in order to erase the CMOS. It is important that you remove the PC power supply before attempting to do this.

Although it is not common that you will lose data on your hard drive, it's also a good idea to backup information on your computer in case of possible issues with the boot process.

How to Upgrade your BIOS

To flash a BIOS follow these procedures step by step:

1. Check your BIOS for BIOS Flash Protection & disable it. Remember to enable on successful completion of the BIOS upgrade.
2. Create a directory on your hard drive called "BIOS".
3. Download the necessary file from the motherboard manufacturer into the new BIOS directory. Ensure you download the BIOS that matches your particular motherboard and version number. Remember there are likely to be many variants.
4. The files are usually self-extracting *.exe zip files. You should therefore unzip the file to the BIOS directory. Now there should be one file called awdf flash.exe or some similar file name, this is the flash utility software. Another file in the directory should be the actual BIOS file which is named e.g. 54321.bin.
5. Take a piece of paper and write down the name of the flash utility file and the name of the BIOS file including the .bin extension (it can also be a .rom extension).
6. Turn off the computer, DO NOT just reset the PC.
7. Boot the system with a Win98 or WinME boot disk.
8. At the A:\ prompt type C: enter, then type cd\BIOS to get you to the BIOS directory.
9. Type the name of the flash utility (awdf flash.exe or similar). This will get you to a dialog box in which the system will first examine your CMOS.
10. The dialog box will give you an O.k. message and ask you to enter the name of the file to program. Type in the name of the file as you have it written down on your piece of paper, USE CAPITAL LETTERS and do not forget the .BIN extension.
11. You will be asked if you want to save the old bios in a file, The answer is YES, call it OLDBIOS.BIN and do not forget the .BIN extension.
12. Finally you will see a progress bar and the messages: Programming BIOS, do not disturb and do not turn off the computer.
13. When completed you will be asked to restart your computer.

If everything is fine you should be able to enter the BIOS and configure any necessary settings such as the frequency speed.

BIOS Recovery Feature

If all goes wrong you may need to recover the original BIOS file.

For Award BIOS

1. Make a bootable floppy disk.
2. Copy the Award flash utility & BIOS file to the said floppy disk.
3. Create an autoexec.bat with "awdf l535 biosfilename" in the content e.g. awdf l535 a619mj21.bin.
4. Boot up system with the floppy.
5. Re-flash the BIOS & reboot.

For AMI BIOS

1. Rename the desired AMI BIOS file to AMIBOOT.ROM and save it on a floppy disk. e.g. Rename A569MS23.ROM to AMIBOOT.ROM.
2. Insert this floppy disk in the floppy drive. Turn On the system and press and hold Ctrl-Home to force update. It will read the AMIBOOT.ROM file and recover the BIOS from the A drive.
3. When 4 beeps are heard you may remove the floppy disk and restart the computer.