



Computer Maintenance

Unit Subtitle: Basic Input/Output System
(BIOS)

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BIOS Introduction

- One of the most common uses of Flash Memory is for the **basic input/output system** of your computer, commonly known as the BIOS (pronounced "bye-ose").
- On virtually every computer available, the BIOS makes sure all the other chips, hard drives, ports and CPU function together.
- The BIOS is the third type of software your computer needs to operate successfully.



How the BIOS Works

- The BIOS software has a number of different roles, but its most important role is to load the operating system. Common tasks that the BIOS performs include:
 - A power-on self-test (POST) for all of the different hardware components in the system to make sure everything is working properly

How the BIOS Works Cont.



- Providing a set of low-level routines that the operating system uses to interface to different hardware devices - It is these routines that give the BIOS its name. They manage things like the keyboard, the screen, and the serial and parallel ports, especially when the computer is booting.
- Managing a collection of settings for the hard disks, clock, etc.

How the BIOS Works Cont.



- Activating other BIOS chips on different cards installed in the computer - For example, SCSI and graphics cards often have their own BIOS chips.



How the BIOS Works Cont.



When you turn on your computer, the BIOS does several things. This is its usual sequence:

1. Check the CMOS Setup for custom settings
2. Load the interrupt handlers and device drivers
3. Initialize registers and power management
4. Perform the power-on self-test (POST)
5. Display system settings
6. Determine which devices are bootable
7. Initiate the bootstrap sequence

How the BIOS Works Cont.



The first thing the BIOS does is check the information stored in a tiny (64 bytes) amount of RAM located on a **complementary metal oxide semiconductor** (CMOS) chip. The CMOS Setup provides detailed information particular to your system and can be altered as your system changes. The BIOS uses this information to modify or supplement its default programming as needed.



Booting the Computer

- Whenever you turn on your computer, the first thing you see is the BIOS software doing its thing. On many machines, the BIOS displays text describing things like the amount of memory installed in your computer, the type of hard disk and so on. During this boot sequence, the BIOS is doing a remarkable amount of work to get your computer ready to run.

Booting the Computer Cont.



- After checking the CMOS Setup and loading the interrupt handlers, the BIOS determines whether the video card is operational. Most video cards have a miniature BIOS of their own that initializes the memory and graphics processor on the card. If they do not, there is usually video driver information on another ROM on the motherboard that the BIOS can load.

Booting the Computer Cont.



- Next, the BIOS checks to see if this is a **cold boot** or a **reboot**. If it is a cold boot, the BIOS verifies RAM by performing a read/write test of each memory address. It checks the PS/2 ports or USB ports for a keyboard and a mouse. It looks for a **peripheral component interconnect (PCI)** bus and, if it finds one, checks all the PCI cards. If the BIOS finds any errors during the POST, it will notify you by a series of beeps or a text message displayed on the screen. An error at this point is almost always a hardware problem.

Booting the Computer Cont.

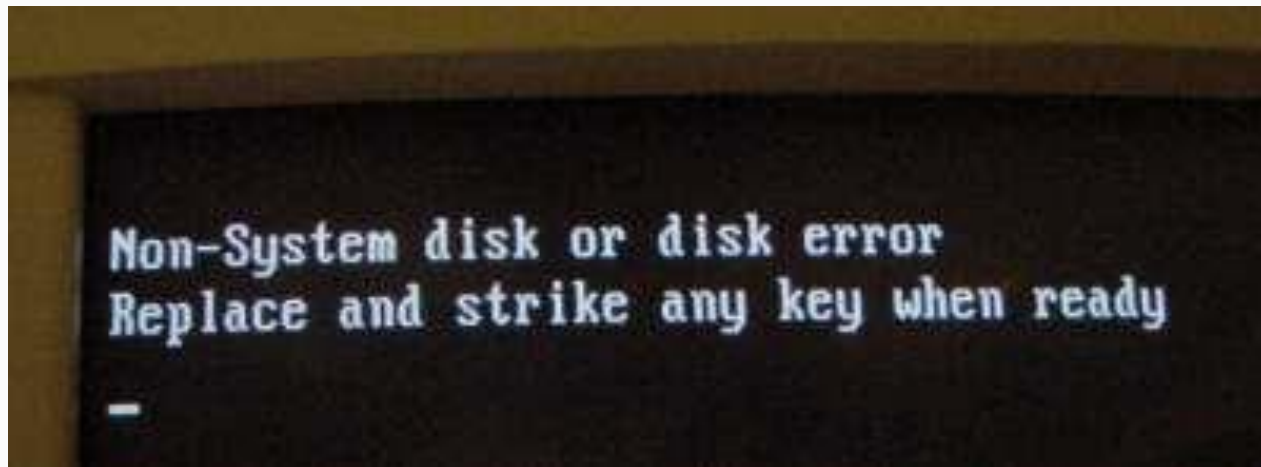


- The BIOS then displays some details about your system. This typically includes information about:
 - The processor
 - The floppy drive and hard drive
 - Memory
 - BIOS revision and date
 - Display

Booting the Computer Cont.



- The BIOS has tried to boot the computer off of the floppy disk left in the drive. Since it did not find the correct system files, it could not continue. Of course, this is an easy fix. Simply pop out the disk and press a key to continue.





Configuring the BIOS

- The BIOS uses **CMOS** technology to save any changes made to the computer's settings. With this technology, a small lithium or Ni-Cad battery can supply enough power to keep the data for years. In fact, some of the newer chips have a 10-year, tiny lithium battery built right into the CMOS chip!



Updating the BIOS

- Occasionally, a computer will need to have its BIOS updated. This is especially true of older machines. As new devices and standards arise, the BIOS needs to change in order to understand the new hardware. Since the BIOS is stored in some form of ROM, changing it is a bit harder than upgrading most other types of software.



Updating the BIOS cont.

- To change the BIOS itself, look at the BIOS revision and date information displayed on system startup or check with your computer manufacturer to find out what type of BIOS you have. Then go to the BIOS manufacturer's Web site to see if an upgrade is available. Download the upgrade and the utility program needed to install it. Copy the program, along with the BIOS update, onto a floppy disk. Restart your computer with the floppy disk in the drive, and the program erases the old BIOS and writes the new one. You can find a BIOS Wizard that will check your BIOS at BIOS Upgrades.



Updating the BIOS cont.

- As with changes to the CMOS Setup, be careful when upgrading your BIOS. Make sure you are upgrading to a version that is compatible with your computer system. Otherwise, you could corrupt the BIOS, which means you won't be able to boot your computer. If in doubt, check with your computer manufacturer to be sure you need to upgrade.