

# What Happens Inside Your Computer?

Let's go through the steps of the events that occur from the time you first push the power button on your computer to the time you click the "shut down" button.

1. You press the buttons to turn on your monitor and computer.
2. A signal is sent to your power supply telling it to turn on. The power supply is what keeps your entire computer system running; it is what makes the difference between a box with a whole bunch of odd-looking devices connected to it and a working computer system! The power supply changes the electrical current from the outlet in your wall into a voltage that can be used by your computer.
3. The fans found in the power supply will begin working. These fans are vital to your computer system. They circulate the air inside the computer case to make sure that the devices do not overheat!
4. Your computer's BIOS goes to work. BIOS is the software that gives your CPU its first instructions when the computer is turned on. Your BIOS will:
  - Perform a power-on self-test (POST), an inspection checking to make sure that all of your computer's components are working properly.
  - Check to see if a reboot is necessary. If not, then it will perform a read/write test for your computer's random-access memory (RAM), it will check the keyboard and the mouse, and it will also check the PCI bus and expansion cards. You will see a string of text on your computer screen as your computer's BIOS checks everything.
  - Check the CMOS (Complementary Metal Oxide Semiconductor) for your system settings. It will check for what components are installed in your computer system as well as for important information concerning your computer's operating system.
  - Usually, you will see a string of words on a black screen when your computer first turns on. This is your BIOS system displaying information about your computer's central processing unit, information about how much memory your computer has, as well as information about your hard disk drives and floppy disk drives.
5. The bootstrap loader will load the your computer's operating system into the computer's memory. Bootstrap, or boot, for short, is the process of loading the operating system. The whole process of loading your operating system is called booting up your computer.
6. The operating system will go to work. At this point, all control of your computer system is transferred from the BIOS to the operating system. The tasks your operating system must perform can be broken up into six major categories:

- Processor Management: The operating system breaks tasks down into chunks that your CPU can handle and it prioritizes the tasks before sending them off to the processor.
- Memory Management: The OS coordinates the information as it flows in and out of the computer's random-access memory.
- Device Management: The operating system will let the numerous devices that are part of your computer system communicate with each other and with the central processing unit.
- Storage Management: The OS will direct data and information to the places where they are to be stored.
- Application Interface: The operating system lets your computer's hardware interface, or talk to, the software.
- User Interface: Of course, now you'll need some way to communicate with your computer. This is controlled by your operating system.

7. You open up and run certain programs or applications. First, let's say you open up a word document to type a letter to your Great-Aunt Betty.

- Your operating system will realize that you have a word processor open, so when you use either the keyboard or the mouse to input information, it will know to accept the information you input for the word document. Sometimes, if you have more than one program open at a time, your operating system will have to determine which program it is that you are using at the given time, but for now, we will just concentrate on the word processor.

8. Let's say you wanted to type in the letter "D"

- You press the "D" key on the keyboard
- Your keyboard will send an electrical signal to your computer telling it that you have just pressed a button
- The keyboard controller will send an interrupt to the central processing unit telling it to take a look at the key you just pressed. The "D" will be temporarily stored in a special memory until your CPU is ready to deal with it.
- Most often, your CPU also has to deal with other tasks. Your operating system will prioritize these tasks. Finally, it is time for your CPU to deal with the key you just pressed.
- The CPU determines which program you were using when you pressed the key. In this case, you were in a word processor.
- The CPU will tell your operating system to display the letter "D" on the screen. The letter is displayed by adding it to your graphics card, which tells your monitor what to display on the screen! This seems like a long and complicated process, but it occurs almost instantaneously! That shows how fast a computer is!

9. Now, you've finished typing your letter to Great-Aunt Betty, and you want to save it. When you press the "save" button in your word processor, a message will be sent to the operating system. A window will pop up, in which you can choose where you want to save the

document to. Then, the operating system will transfer the document from the computer's RAM to the specified storage device.

10. After you have saved your letter, you decide that you want to print it out. Your operating system will translate the file from its present form into a form that your printer can comprehend. Then, your printer will go to work!

11. Now, that you've finished your letter, you decide that you want to go online to chat with some friends. You open up a web browser. Once again, it is your operating system that controls everything. This time, you can either type in the URL of the website you want to go to, or click on a link. By using a modem, your browser software can direct you to the right website, which will be displayed on your monitor!

12. After you've finished chatting, you're done using your computer. You click on the "shut down" button.

13. The operating system will close any programs that you have left open. However, if it finds that you have left a word document open, and that the document contains unsaved information, a prompt will come up asking if you would like to save the file before you exit. How convenient!

14. The operating system will save your current settings for your computer system. This way, it will remember them the next time you turn on your computer.

15. Usually, your computer has special software that will automatically shut down its power supply. If not, you will have to manually press a button.