Chapter 1
Introducing Hardware
Functions of a Computer

Figure 1-1

Computer activity consists of input, processing, storage, and output.
Ports

Figure 1-4  Input/output devices connect to the computer case by ports usually found on the back of the case
Hardware Inside the Case

Figure 1-7  Inside the computer case
The Motherboard

Figure 1-8
All hardware components are either located on the motherboard or directly or indirectly connected to it because they must all communicate with the CPU.
The Motherboard (continued)

Figure 1-9  A motherboard provides ports for common I/O devices
Types of Expansion Slots

Figure 1-28  PCI bus expansion slots are shorter than ISA slots and offset farther; the one AGP slot is set further from the edge of the board.
The Electrical System (continued)

Figure 1-32  Power supply with connections
Instructions Stored on the Motherboard

ROM BIOS (most are flash ROM)

  System BIOS

  Startup BIOS

  CMOS setup

Motherboard BIOS supports ACPI, APM, and Plug and Play technologies
ROM BIOS Chip

Figure 1-34  The ROM BIOS chip on the motherboard contains the programming to start up the PC as well as to perform many other fundamental tasks
Motherboard Configuration Settings

CMOS chip

Stores setup (configuration) information

Powered by a battery on motherboard when power is off

Setup information can also be set by jumpers and DIP switches
CMOS Configuration Chip

Figure 1-35  This firmware chip contains flash ROM and CMOS RAM; CMOS RAM is powered by the coin battery located near the chip.
Setting Jumpers

Figure 1-36 Setup information about the motherboard can be stored by setting a jumper on (closed) or off (open). A jumper is closed if the cover is in place, connecting the two pins that make up the jumper; a jumper is open if the cover is not in place.
Using DIP Switches

Figure 1-37  A motherboard can use a bank of DIP switches for configuration settings
Chapter 2

How Hardware and Software Work Together
OS as a Middleman

Figure 2-1  Users and applications depend on the OS to relate to all hardware components
The Shell and the Kernel

Figure 2-2  Inside an operating system, different components perform various functions
Common Operating Systems

DOS
Windows 9x
Windows NT, Windows 2000, and Windows XP
Unix
Linux
OS/2
Mac OS
Tracks, Sectors, and Clusters

Figure 2-4 A hard drive or floppy disk is divided into tracks and sectors. Several sectors make one cluster.
Files and Directories

Figure 2-5  A hard drive is organized into groups of files stored in directories. The first directory is called the root directory. All directories can have child directories or subdirectories. Under Windows, a directory is called a folder.
Partitions and Logical Drives

Figure 2-6  A hard drive is divided and organized at several levels
How an OS Uses Device Drivers to Manage Hardware

Device drivers provide OS with software necessary to control devices

16-bit real-mode drivers

Supported by Windows 95/98

32-bit protected-mode drivers

Supported by Windows 95/98, Windows Me, and Windows NT/2000/XP
OS Tools to Examine a System

Device Manager

System Information utility

Microsoft Diagnostic Utility (MSD)
A+ Guide to Managing and Maintaining Your PC

Fifth Edition

Chapter 5

The Motherboard
Typical AT Motherboard

A typical AT motherboard with memory cache and socket 7 for the Intel Classic Pentium CPU. The CPU with a fan on top is installed as well as two SIMM memory modules.

Figure 5-1
Typical ATX Motherboard

- P1 power connector
- Two IDE connectors
- Floppy drive connector
- DIP switches
- 16-bit ISA expansion slot
- AGP slot
- Five PCI expansion slots
- Flash ROM
- Parallel port
- Two serial ports
- Two USB ports
- Keyboard and mouse ports
- Slot 1 for Pentium III with supporting braces
- Four RAM slots with one DIMM installed

Figure 5-2  An ATX motherboard with a Pentium III and one DIMM module installed
CPU Heat Sinks and Cooling Fans

Figure 5-11 A CPU cooling fan mounts on the top or side of the CPU housing and is powered by an electrical connection to the motherboard.
Combination Heat Sink and Cooling Fan

Figure 5-12 Volcano 11+ by Thermaltake is a copper PC cooler
Hardware Configuration

Setup data stored by DIP switches

Setup data stored by jumpers

Setup data stored in CMOS memory
Setup Data Stored by DIP Switches

Figure 5-22  DIP switches are sometimes used to store setup data on motherboards
CMOS Setup Main Menu

Figure 5-25  CMOS Setup Main menu
CMOS Setup Boot Menu

Figure 5-27  CMOS Setup Boot menu
Wire Connectors

Figure 5-41  Five wires from the front panel connect to the motherboard
Troubleshooting the Motherboard and CPU

Look for clues from POST

Reports errors as beep codes

Cautiously substitute good hardware components for those you suspect are bad.

Make Sure Power Supply is not bad!!!