Computer Maintenance

PC Disassembly and Reassembly
Enabling Objectives

- Computer Chassis (Cases)
- Power Supplies
- Configuring the Motherboard
- Configuring the Connectors
- CPU Interfaces
- RAM
- Installing a Hard Drive or CD-ROM
- Connecting Floppy Drives
- First Boot After Assembly
Computer Chassis (Cases)

• There are four main types of computer cases:
  • Desktop
  • Mini-tower
  • Mid-tower
  • Full tower

• Whether buying a tower or desktop, it is recommended that it conforms to the ATX standard and has at least a 250-watt power supply (300 watts is ideal.)

• The desktop case is considered the most difficult to upgrade.
Power Supplies

• The power supply is one of the most important parts that needs to be understood. The power supply unit provides electrical power for every component inside the system unit.

• The power supply plays the critical role of converting commercial electrical power (AC) into the DC power required for the components of the computer.

• There are two basic types of power supplies:
  • AT power supplies – Designed to support AT-compatible motherboards.
  • ATX power supplies – Designed according to newer ATX design specifications to support the ATX motherboard.
Power Supplies (Continued)

- There are two major distinctions between the legacy AT and the new ATX power supplies.
  - The AT power supply has two 6-pin motherboard power connectors (P8/P9)
    - The black ground wires of these connectors must be in the middle of the motherboard connector
  - The ATX power supplies use a single 20-pin power connector (P1).
• In the ATX-compatible power supply, the cooling fan pulls air through the case from the front, and exhausts it out the rear of the power supply unit.

• The AT design pulls air in through the rear of the power supply unit and blows it directly onto the AT motherboard.

• The power supply produces four (five in the ATX) different levels of well-regulated DC voltage for use by the system components:
  • +5V, -5V, +12V, and -12V.

• In ATX power supplies, the +3.3V level is also produced, and is used by the second-generation Intel Pentium processors.
Configuring the Motherboard

- Always wear an anti-static wrist strap when working on the electronic components of a PC
  - An exception would be when working on the monitor – this could be very dangerous.
- Configuring the motherboard typically means the following:
  - Installing the CPU
  - Installing the heat sink and fan
  - Installing RAM
  - Connecting the power supply cables to the motherboard power connectors, and connecting miscellaneous connectors to the correct switches and status lights on the front case panel.
  - Setting the system BIOS
Configuring the Connectors

• For the disk controllers, always remember that a colored stripe on the data cable is pin-1.

• Most modern connectors are "keyed" by a missing pin or a blocked connector, so they cannot be fitted the wrong way.

• Usually, the colored wires in a power cable are positive and the white or black wires are ground or negative.
  • Ground wires are usually black
  • 5 volt wires are usually red
  • 12 volt wires are usually yellow
CPU Interfaces

• There are two main types of CPU interfaces.
  • Socket type (e.g., socket 7) - Socket 7 has been the standard interface, although the newer systems are now using different sockets. It is the only interface used by at least one generation of Intel Pentium processors (Pentium I), as well as AMD and Cyrix chips.
  • AMD Athlon series CPUs require a Socket A connector.
CPU Interfaces (Continued)

• There are two main types of CPU interfaces (cont.)

  • Slot type (e.g., slot 1) – slot-type interfaces use a slot similar to expansion cards. Slot 1 is the Single Edge Contact (SEC) interface used only by the Intel Pentium II processor family.

  ![Slot Type](image-url)
There are two types of memory modules used on most PCs.

- 72-pin Single In-line Memory Module (SIMM) cards.
  - Currently the most common SIMM size
- 168-pin Dual In-line Memory Module (DIMM) cards

**Important**

- When DIMM sizes are mixed on the motherboard, it is important to remember to put the DIMM with the largest memory size in the first bank.
- Each bank of memory for a SIMM has two sockets. You must fill the first bank before moving onto the next.
  - Additionally, each bank must be filled with RAM modules that have the same access time and size.
When using other types of memory modules such as Rambus Inline Memory Modules (RIMMs), know that other considerations have to be taken into account.

Unlike DIMMs and SIMMs, RIMM modules use only the Direct Rambus Memory Chips (RDRAM).

Some systems require that RIMM modules be added in identical pairs, and others allow single RIMMs to be installed.

Information on specific memory types can be found in their manuals, the motherboard manual, or the manufacturer websites.
Installing a Hard Drive or CD-ROM

• Attaching the hard drive and CD-ROM are basically similar.

• Connection to the primary or secondary IDE interface is with a 40-pin ribbon cable.

• First, the jumper settings should be properly set.

• The designation of a hard drive or CD-ROM drive as either master or slave is generally determined by the jumper configuration, not by the order in which the drive is daisy-chained to the other drive.
Installing a Hard Drive or CD-ROM (Continued)

• The only exception to the master or slave designation is if the drive has its jumper set to "cable select," and both the system and ribbon cable support the cable select option.

• A cautionary note: moving the computer with the power on can damage the hard drive.

• If after you assemble a PC and load the operating system, you notice the hard drive activity LED is not lit up; you may have the LED plug connected incorrectly or not connected at all.
Connecting Floppy Drives

• The floppy drive exchanges data with the motherboard devices, including the microprocessor, via a 34-pin flat ribbon (data) cable.

• Usually, a red stripe on the edge of the cable identifies pin 1. Lining the red-stripe edge with pin 1 of the drive connector, or drive controller interface, assures a correct alignment.

• The FD LED light will remain on if the colored stripe is not connected to pin 1.
Connecting Floppy Drives

- Current system BIOS versions can support up to two floppy drives on one controller via a daisy chain cable arrangement.

- Cable pin-outs 10 through 16 are cross-wired between the middle drive connector and end drive connector, producing a twist that reverses the Drive Select (DS) configuration of the drive plugged into the end connector of the ribbon cable.

- This feature, called **cable select**, automatically configures the drive on the middle connector as **Drive B** and the drive on the end connector as **Drive A**.
First Boot After Assembly

• Post codes may be displayed indicating problems with boot-up. An example might be Post Code 3xx [indicates keyboard error].

• Entering the CMOS setup utility can vary from one BIOS manufacturer to another some examples are:
  • Delete key
  • F1 key
  • Alt + F1 key

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First Boot After Assembly

- If you need to clear a password set, and forgotten, in CMOS, you can usually use the CMOS reset jumper on the motherboard to clear the unwanted password.

- You may need to set the boot sequence in the CMOS. If you want the PC to look for a bootable floppy first
  - Select: A, C, CD-ROM as the sequence
Summary

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