



Chapter 3: Computer Assembly – Step by Step



IT Essentials: PC Hardware and Software v4.1

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Chapter 3 Objectives

- 3.1 Open the case
- 3.2 Install the power supply
- 3.3 Attach the components to the motherboard and install the motherboard
- 3.4 Install internal drives
- 3.5 Install drives in external bays
- 3.6 Install adapter cards
- 3.7 Connect all internal cables
- 3.8 Re-attach the side panels and connect external cables to the computer
- 3.9 Boot the computer for the first time

Open the Case

- Computer assembly is a large part of a technician's job.
- Prepare the workspace before opening the computer case.
- There are different methods for opening cases. To learn how, consult the user manual or manufacturer's website.



Install the Power Supply

Power supply installation steps include the following:

1. Insert the power supply into the case
2. Align the holes in the power supply with the holes in the case
3. Secure the power supply to the case using the proper screws



Attach Components to the Motherboard

■ CPU on Motherboard

- The CPU and **motherboard** are sensitive to electrostatic discharge.
- The CPU is secured to the **socket** on the motherboard with a **locking assembly**.
- **CAUTION:** When handling a CPU, do not touch the CPU contacts.



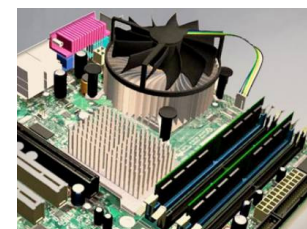
■ Thermal compound

- It helps to keep the CPU cool.
- To install a used CPU, clean it and the base of the heat sink with isopropyl alcohol to remove the old thermal compound.



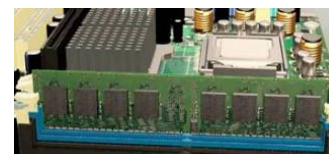
■ Heat Sink/Fan Assembly

- The **Heat Sink/Fan Assembly** is a two-part cooling device.
- The heat sink draws heat away from the CPU.



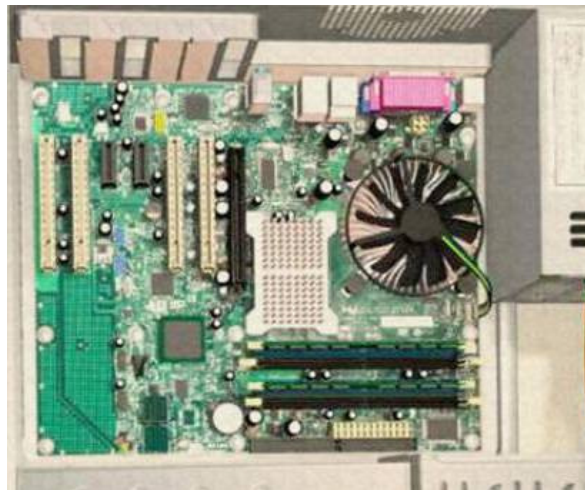
■ Install RAM

- **RAM** provides temporary data storage for the CPU and should be installed in the motherboard before the motherboard is placed in the computer case.



The Motherboard

- After installing the previous components the motherboard is now ready to install in the computer case.
- Plastic and metal **standoffs** are used to mount the motherboard and to prevent it from touching the metal portions of the case.



Install Internal Drives

- Drives that are installed in internal bays are called internal drives.
- A hard disk drive (**HDD**) is an example of an internal drive.
- HDD installation steps:
 1. Position the HDD so that it aligns with the 3.5-inch drive bay.
 2. Insert the HDD into the drive bay so that the screw holes in the drive line up with the screw holes in the case.
 3. Secure the HDD to the case using the proper screws.



Install Drives in External Bays

- Drives in **external bays** allow access to the media without opening the case.
- Some devices that are installed in this type of drives are:
 - An **optical drive** is a storage device that reads and writes information to CDs or DVDs.
 - A floppy disk drive (**FDD**) is a storage device that reads and writes information to a floppy disk.



Install Adapter Cards

- Adapter cards are installed to add functionality to a computer.
- Some examples of these adapters are:
 - A **NIC** which enables a computer to connect to a network. It uses **PCI** and **PCIe** expansion slots on the motherboard.
 - A **wireless NIC** which enables a computer to connect to a wireless network. Wireless NICs use **PCI** and **PCIe** expansion slots on the motherboard. Some wireless NICs are installed externally with a **USB** connector.
 - A **video adapter card** is the interface between a computer and a display monitor. An upgraded video adapter card can provide better graphic capabilities for games and graphic programs. Video adapter cards use **PCI**, **AGP**, and **PCIe** expansion slots on the motherboard.

Connect Internal Cables

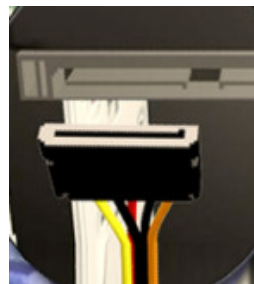
- **Power cables** are used to distribute electricity from the power supply to the motherboard and other components.



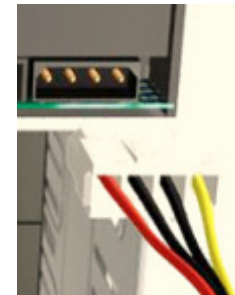
ATX



AUX



SATA



Molex



Berg



Connect Internal Cables

- **Data cables** transmit data between the motherboard and storage devices, such as hard drives. Some of examples of this type of cables are:
 - PATA cable
 - SATA cable
 - Floppy drive data cable

- Additional cables connect the buttons and link lights on the front of the computer case to the motherboard.

Complete Physical Installation

- Now that all the internal components and the power supply have been installed and connected to the motherboard, the following tasks should be completed:
 - **Re-Attach the side panels:** Most computer cases have two panels, one on each side. Some computer cases have one three-sided cover that slides down over the case frame.
 - **Connect External Cables:** These cables are normally connected to the back of the computer. Here are some common external cable connections: Monitor, Keyboard, Mouse, USB, Ethernet Power.

Boot Computer for the First Time

- When the computer is booted, the basic input/output system (**BIOS**) will perform a power-on self test (**POST**) to check on all of the internal components.
- The **BIOS** contains a setup program used to configure settings for hardware devices. The configuration data is saved to a special memory chip called a complementary metal-oxide semiconductor (CMOS).
- **POST** checks to see that all of the hardware in the computer is operating correctly. If a device is malfunctioning, an error or a beep code alerts the technician that there is a problem.

Chapter 3 Summary

Computer Assembly – Step by Step

- Installation of all computer components
- Connection of all cables
- Description of BIOS
- Description of POST



