Practical : 01

Aim: - Introduction to different hardware components of PC and assembling of PC.

Hardware components

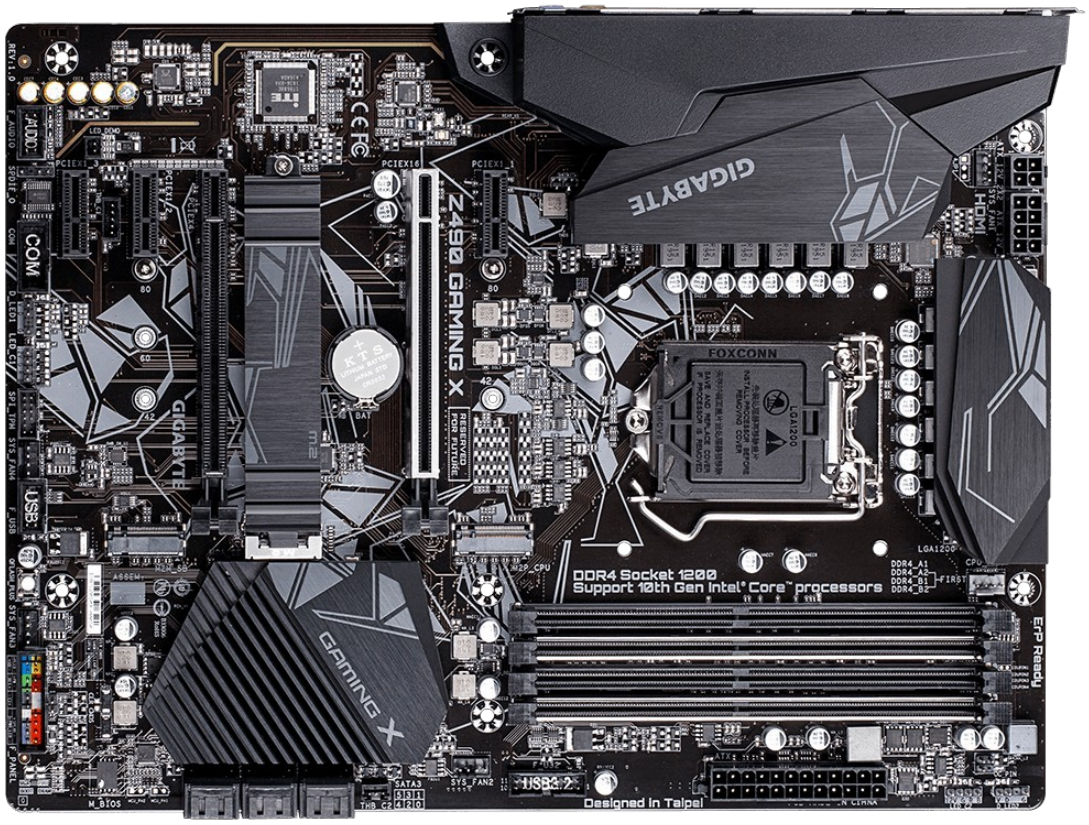
What is a Motherboard?

A motherboard can also be known as logic board or main board which is a printed circuit board that houses most of the components of a computer and also provides interconnection between them as well as power them up properly. It is a printed circuit board, usually multi-layered but it is not called just a printed circuit board as you might know that would be really confusing because there are so many other device that has printed circuit board inside of them.

Types of Motherboard

- ATX (Advanced Technology Extended)
- Micro ATX
- Mini-ITX (Information Technology eXtended)
- Nano-ITX
- Etc.

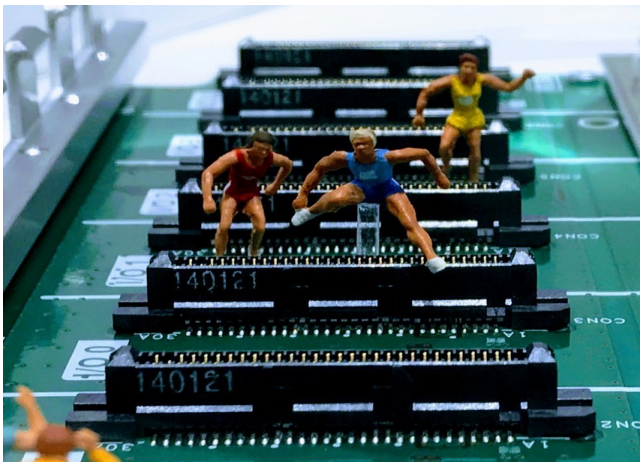
Old Motherboard have assemblies such as I/O port connectors hard drive connector Joysticks.
This motherboard is relatively cheap to produce but because of cost of manufacturing cost increases.
Any thing go wrong we can repair the problem by replacing the card with minimum cost.



Integrated Motherboard:-
All in one Motherboard.
All component are directly connected to motherboard.
Less material is involved, less installation and testing can be done at same time.
More expensive to repair.

RAM (Random Access Memory)

- RAM is used to hold programs while they are being executed, and data while it is being processed.
- RAM is *volatile.* meaning that information written to RAM will disappear when the compute r is turned off.
- RAM access speeds can be as fast as 8 nanoseconds (8 billionth of a second).The right amount of RAM depends on the software you are using.
- You can install extra RAM.



Types of RAM

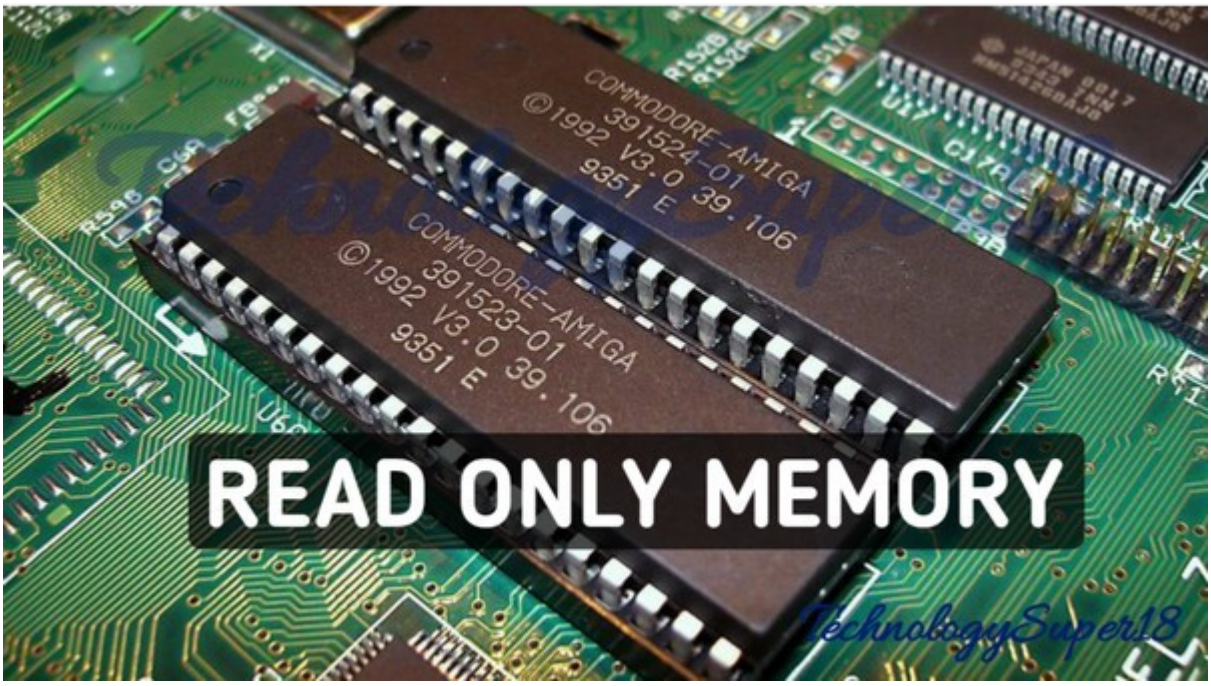
1. SRAM (Static RAM)
   - DDR
   - DDR2
   - DDR3
   - DDR4(Latest)
2. DRAM (Dynamic RAM)

ROM (Read only Memory)

- Read-Only Memory can be read but *not changed*.
- It is *non-volatile* storage: it remembers its contents even when the power is turned off.
- ROM chips are used to store the instructions a computer needs during start-up, called *firmware*.

Kinds of ROM

- PROM,
- EPROM,
- EEPROM,
- CD-ROM.

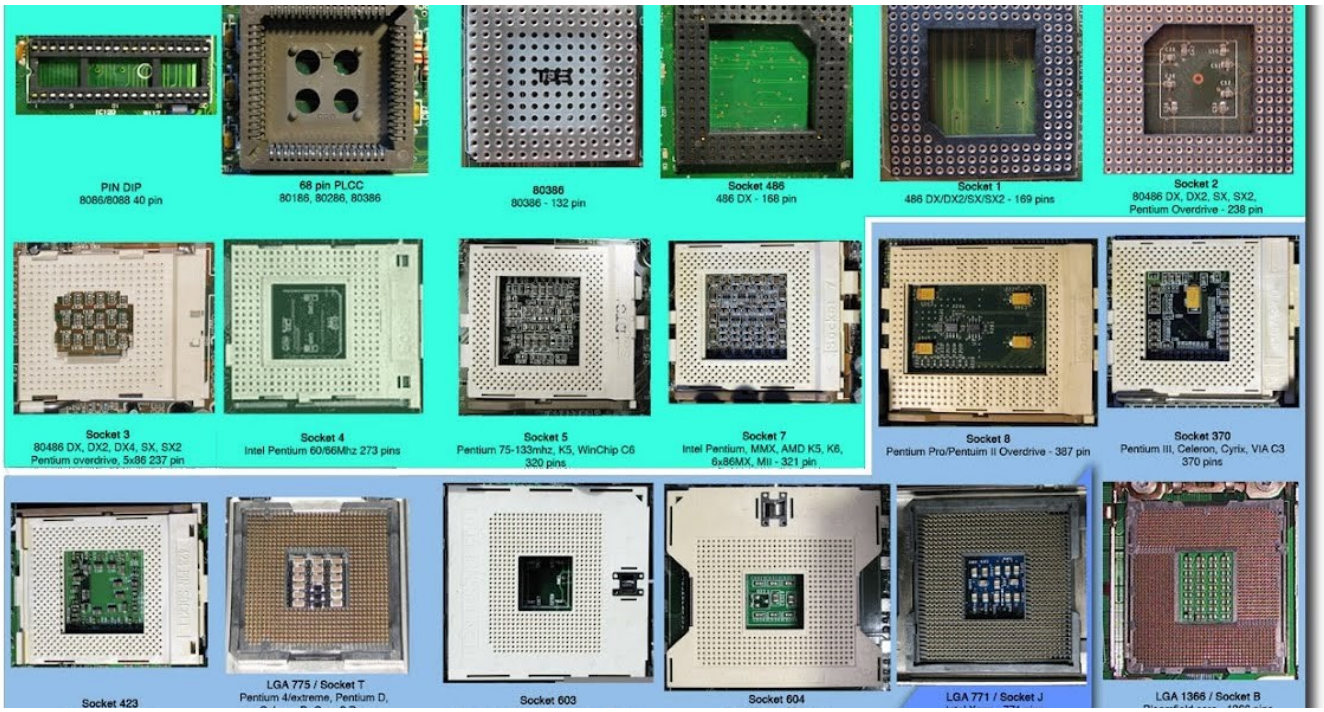


CPU socket

- CPU socket or CPU slot contains one or more mechanical components providing mechanical and electrical connections between a microprocessor and a printed circuit board. This allows for placing and replacing the central processing unit without soldering.

Processor Socket And Slot Types

- Intel
- AMD
- ZIF Socket

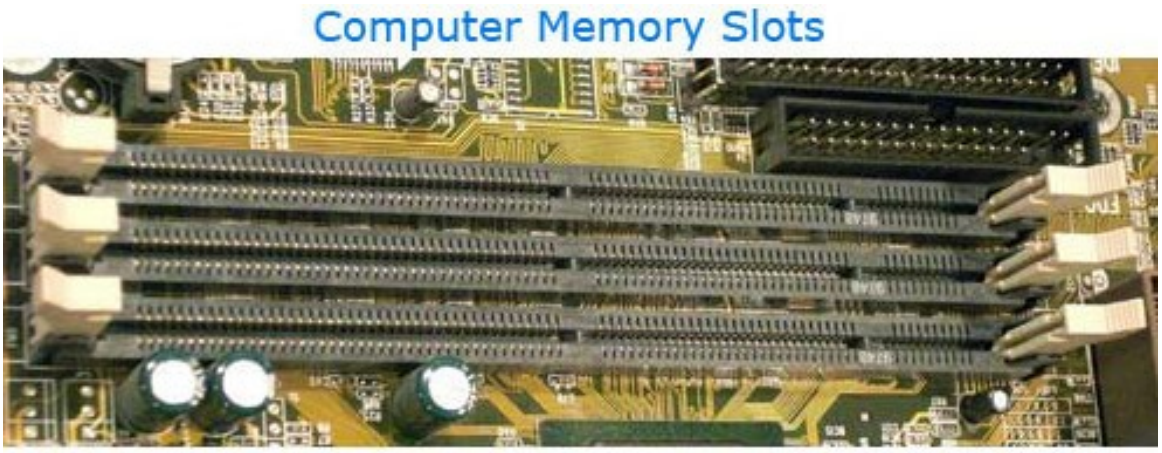


Heat sink

- heat sink is a component that increases the heat flow away from a hot device. It accomplishes this task by increasing the device's working surface area and the amount of low-temperature fluid that moves across its enlarged surface area. Based on each device's configuration, we find a multitude of heat sink aesthetics, design, and ultimate capabilities. You can see a straight fin heat sink in the image at the top of this article and a flared fin heat sink in the image below. Each heat sink is valuable in applications that may have varying:

RAM slots

A memory slot, memory socket, or RAM slot allows RAM(computer memory) to be inserted into the computer. Most Motherboards have two to four memory slots, which determine the type of RAM used with the computer. The most common RAM types are SDRAM and DDR for desktop computers and SODIMM for laptop, computers each having various types and speeds. The picture below is an example of what memory slots may look like inside a desktop computer. In this picture, there are three open and available slots for three memory sticks.

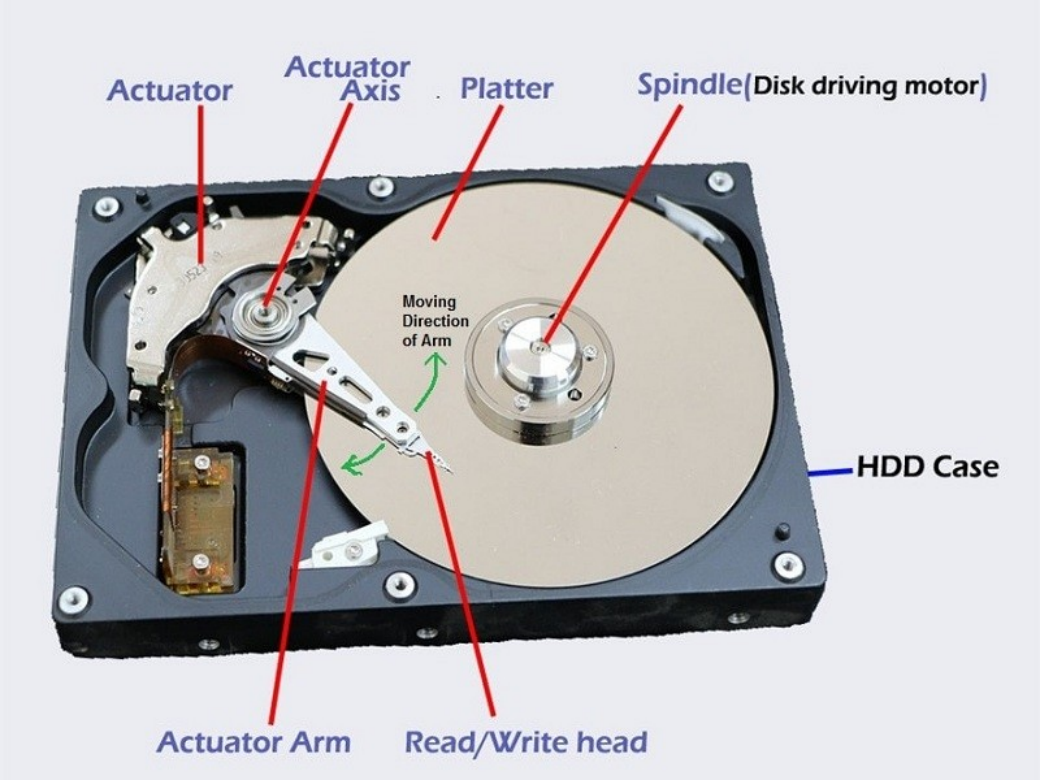


SSD(Solid State Drive)

- typically using flash memory and functioning as secondary storage in the hierarchy of computer storage.
- It is also sometimes called a solid-state device or a solid-state disk,
- SSDs generally are more expensive than HDDs.
- 120 to 512GB models were more common.
- SSDs dramatically reduce access time since users don’t have to wait for platter rotation to start up.

HDD (Hard Disk Drive)

- An HDD is a data storage device that lives inside the computer.
- It has spinning disks inside where data is stored magnetically.
- It is similar to how a turntable record player works, with an LP record (hard disk) and a needle on an arm.
- The arm moves the heads across the surface of the disk to access different data.
- HDD are considered a legacy technology, meaning they've been around longer than SSD.
- They are lower in cost and are practical for storing years of photos and videos or business files.

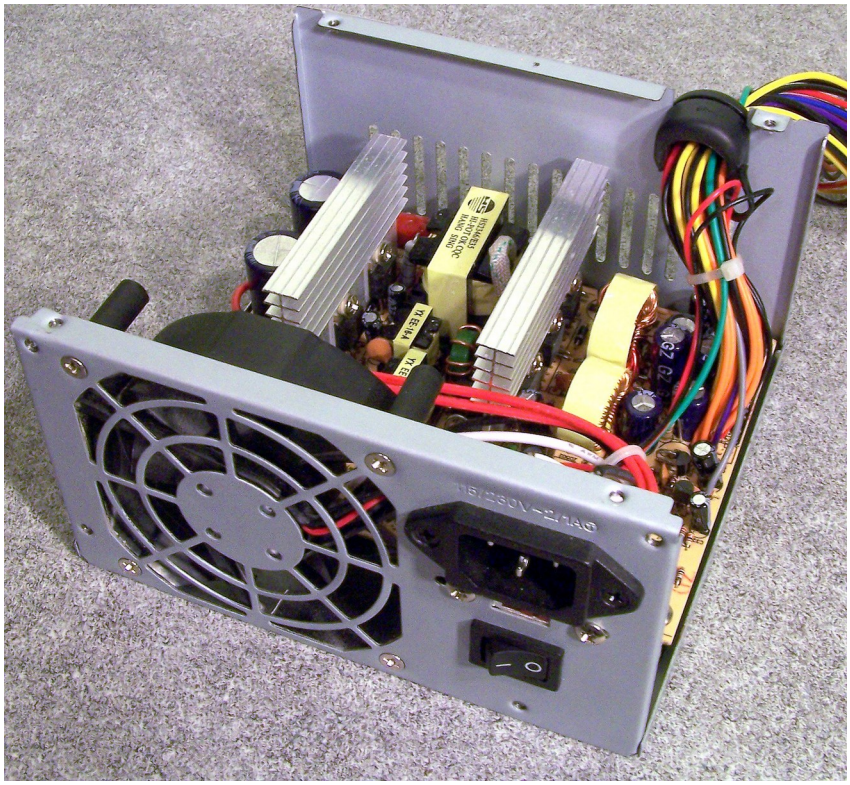


Differences between HDD and SSD

PARAMETER	SSD	HDD
Full Form	Hard Disk Drive	Solid State Drive
Components	contains moving mechanical parts	SSD does not contains,
R/W Time	HDD has longer R/W time.	SSD has shorter R/W
Latency	HDD has higher latency	SSD has lower latency.
I/O operations per second	supports fewer I/O operations per second	supports more I/O operations per second.
Fragmentation	HDD has fragmentation.	SSD do not has fragmentation.
Weight	HDD is heavier in weight.	SSD is lighter in weight.
Size	HDD is larger in size.	SSD is more compact in size
Data Transfer	In HDD the data transfer is sequential.	In SSD the data transfer is random access.
Time of Release	HDD is older and more traditional.	SSD is newer to use.
Noise	HDD can produce noise due to mechanical movements.	SSD does not produces noise.

Power supply unit

- A power supply is an electrical device that supplies electric power to an electrical load.
- A power supply unit (PSU) converts mains AC to low-voltage regulated DC power for the internal components of a computer.
- The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.



Computer Assembly

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- Attach the components to the motherboard and install the motherboard
- Install internal drives
- Install drives in external bays
- Install adapter cards
- Connect all internal cables
- Re-attach the side panels and connect external cables to the computer
- Boot the computer for the first time

Install the Power Supply

Power supply installation steps include the following:

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

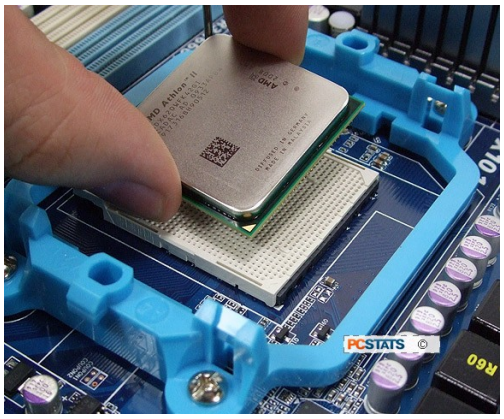
- Connect the power supply cables to the other internal components.

- Now that the power supply is sitting pretty inside your computer case, let's move to the next step.

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

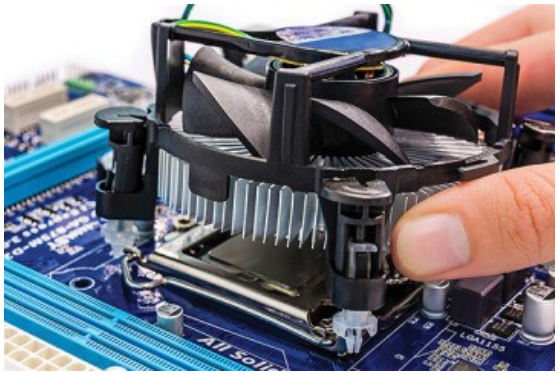


Thermal compound

- It helps to keep the CPU cool.
- To install a used CPU, clean it and the base of the heat sink with isopropyle 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.

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.
- A Solid State drive (SSD) is also 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.

SSD installation steps:

1. To install the SSD as a secondary drive (not your primary or boot drive).

2. Use a SATA cable and attach one end of the cable to the SATA connector on your motherboard.

3. Attach the other end of the SATA cable to your Crucial SSD.

Install Drives in External Bays

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:

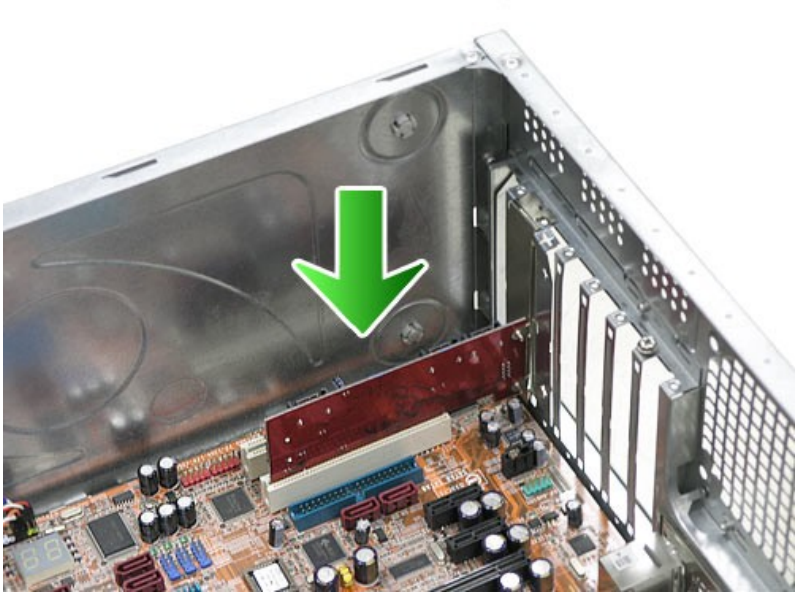
Install the Video Adapter Card

1. Align the video adapter card to the appropriate expansion slot on the motherboard.
2. Press down gently on the video adapter card until the card is fully seated.
3. Secure the video adapter card PC mounting bracket to the case with the appropriate screw.

Connect Internal Cables

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

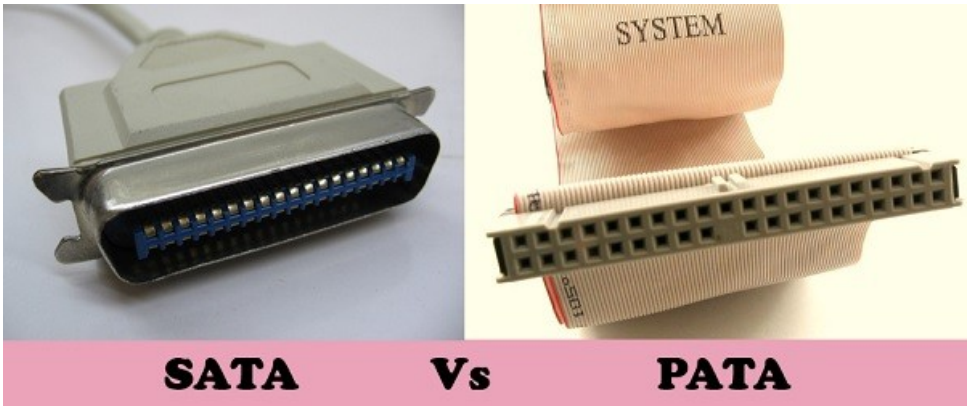
Also you can Wi-Fi, Bluetooth adapters.



Connect Internal Cables

1. 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



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.