

# COMPUTER WORKSHOP

## CSP-155

### Experiment 6



# Marking Positions Of various Components Of Motherboard

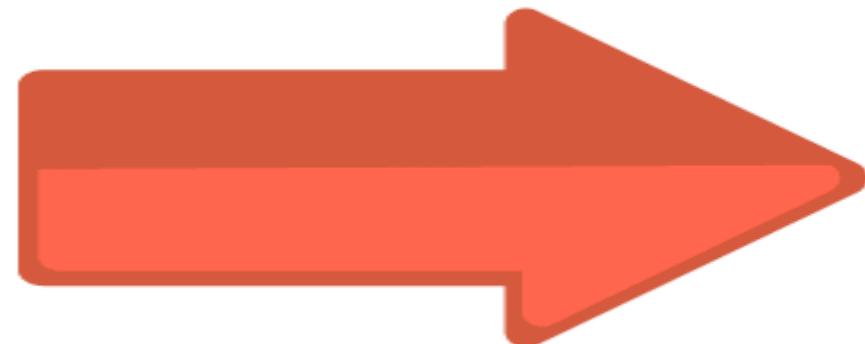




# LESSON OBJECTIVE

To get insights into working of a computer system by figuring out working and marking positions of its motherboard components.

# LET'S BEGIN





# MOTHERBOARD

- According to Wikipedia, a motherboard (also called mainboard, main circuit board, system board, baseboard, planar board, logic board, or mobo) is the main printed circuit board (PCB) in general-purpose computers and other expandable systems.
- It holds and allows communication between many of the crucial electronic components of a system, such as the central processing unit (CPU) and memory, and provides connectors for other peripherals.



# MOTHERBOARD

- Unlike a backplane, a motherboard usually contains significant sub-systems, such as the central processor, the chipset's input/output and memory controllers, interface connectors, and other components integrated for general use.
- This board is often referred to as the "mother" of all components attached to it, which often include peripherals, interface cards, and daughter cards: sound cards, video cards, network cards, host bus adapters, TV tuner cards, IEEE 1394 cards; and a variety of other custom components.



# MOTHERBOARD

- Each type of motherboard is designed to work with specific types of processors and memory, so they don't work with every processor and type of memory.
- However, hard drives are mostly universal and work with the majority of motherboards, regardless of the type or brand.
- <https://youtu.be/b2pd3Y6aBag>
- Please play this video in class



# MOTHERBOARD

In essence, it serves two purposes:

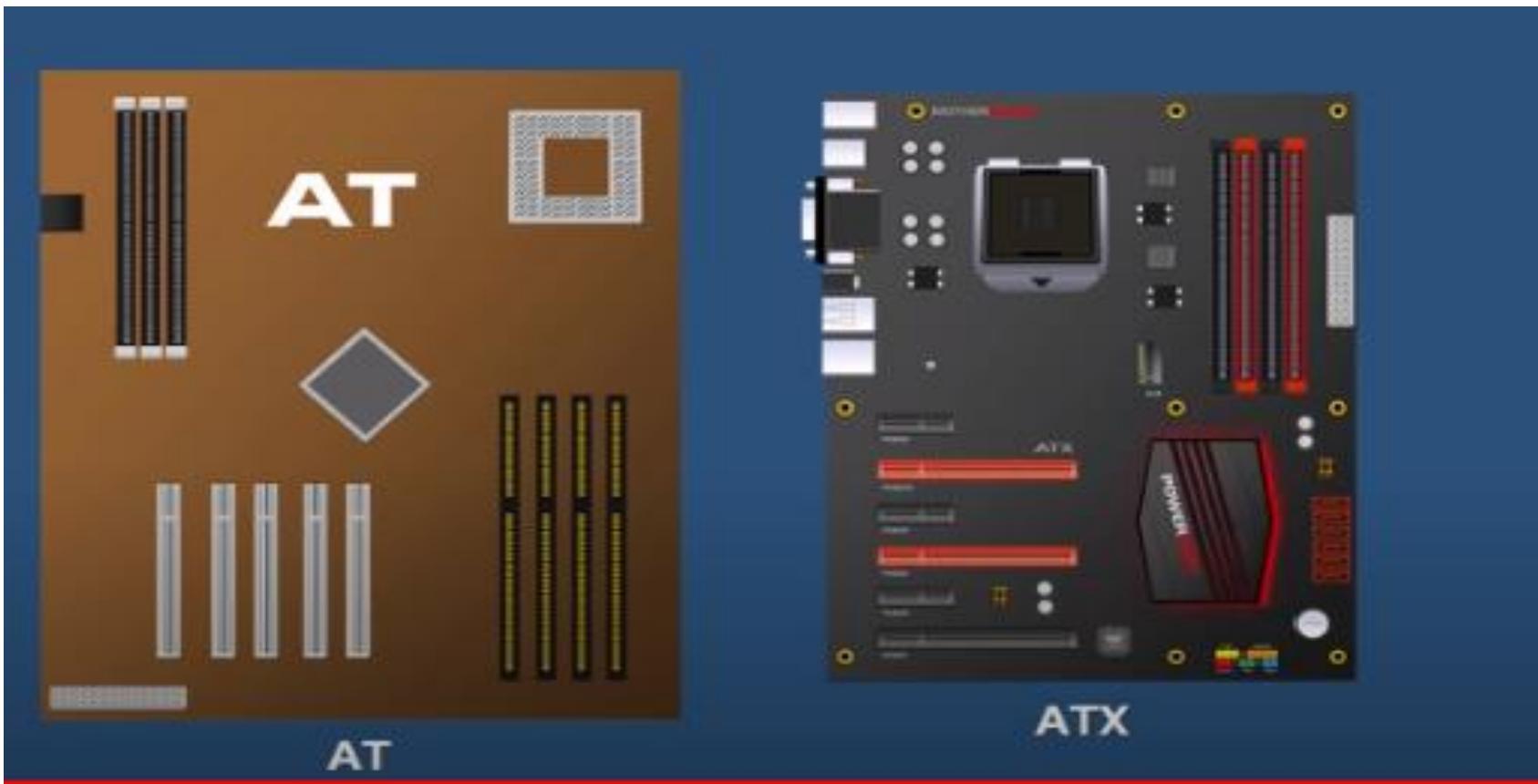
- Provide electrical power to the individual components
- Provide a route to allow the components to communicate with each other.

The main sizes you're likely to come across are:

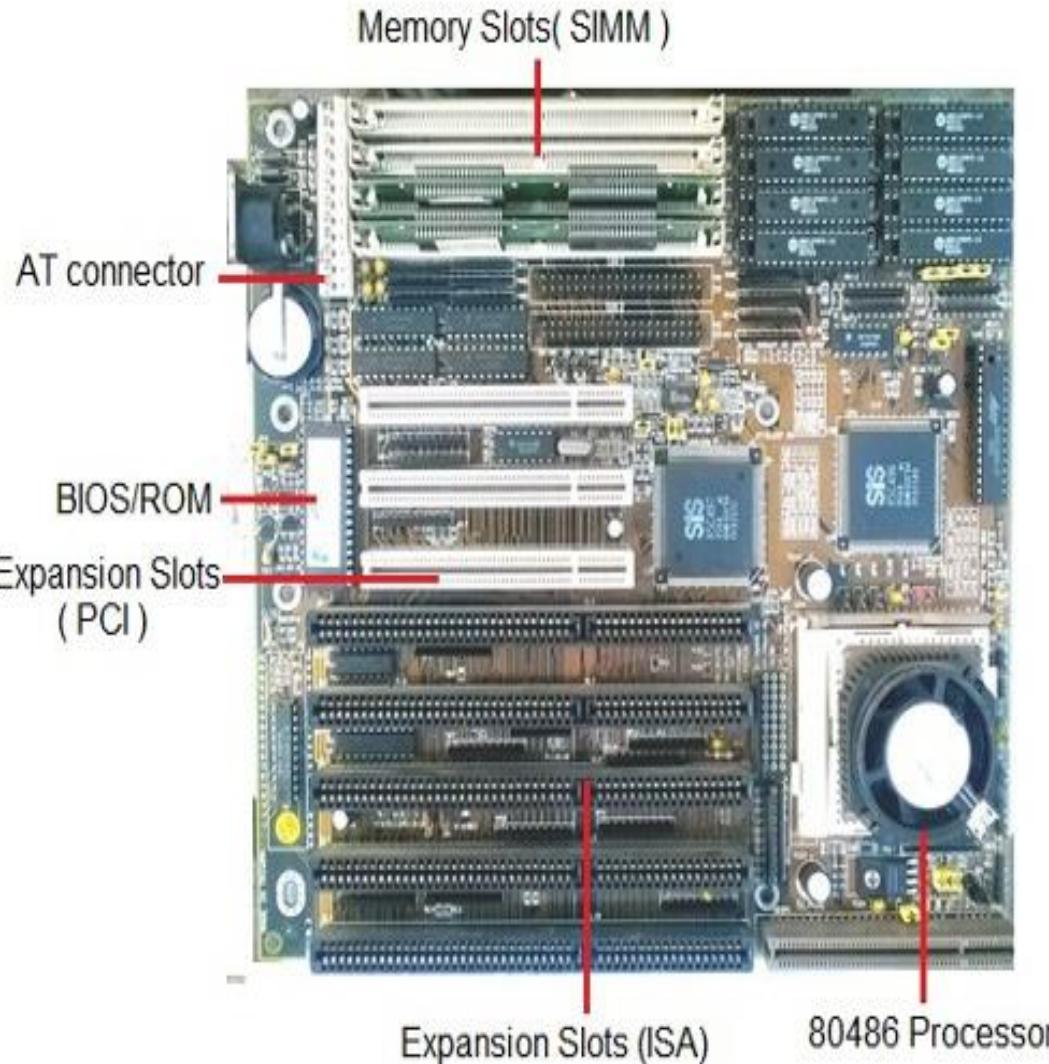
- Standard ATX -  $12 \times 9.6$  inches ( $305 \times 244$  mm)
- Micro ATX -  $9.6 \times 9.6$  inches ( $244 \times 244$  mm)
- Mini ATX -  $5.9 \times 5.9$  inches ( $150 \times 150$  mm)

# MOTHERBOARD FORM FACTOR

1. AT Motherboards (No longer used)
2. ATX Motherboards

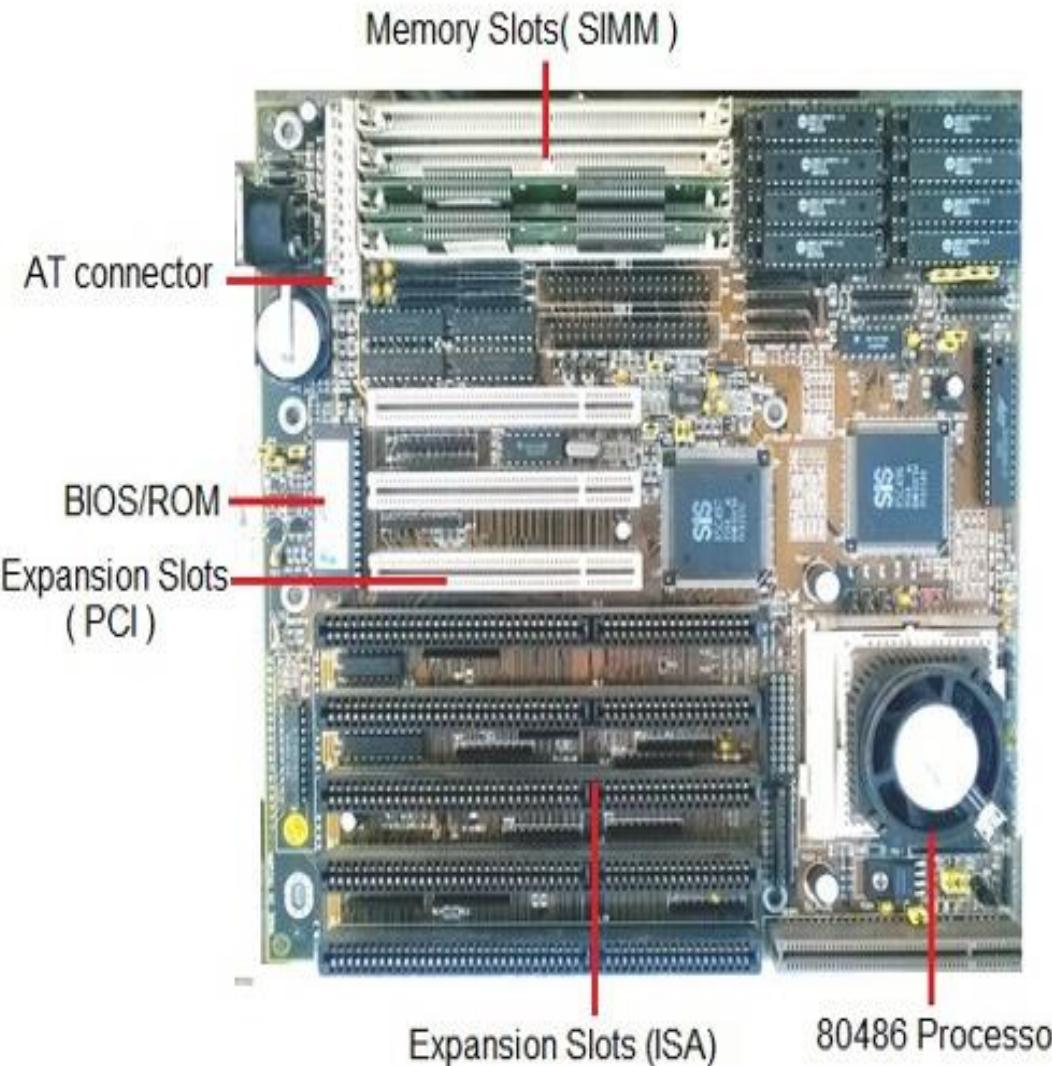


# AT MOTHERBOARD



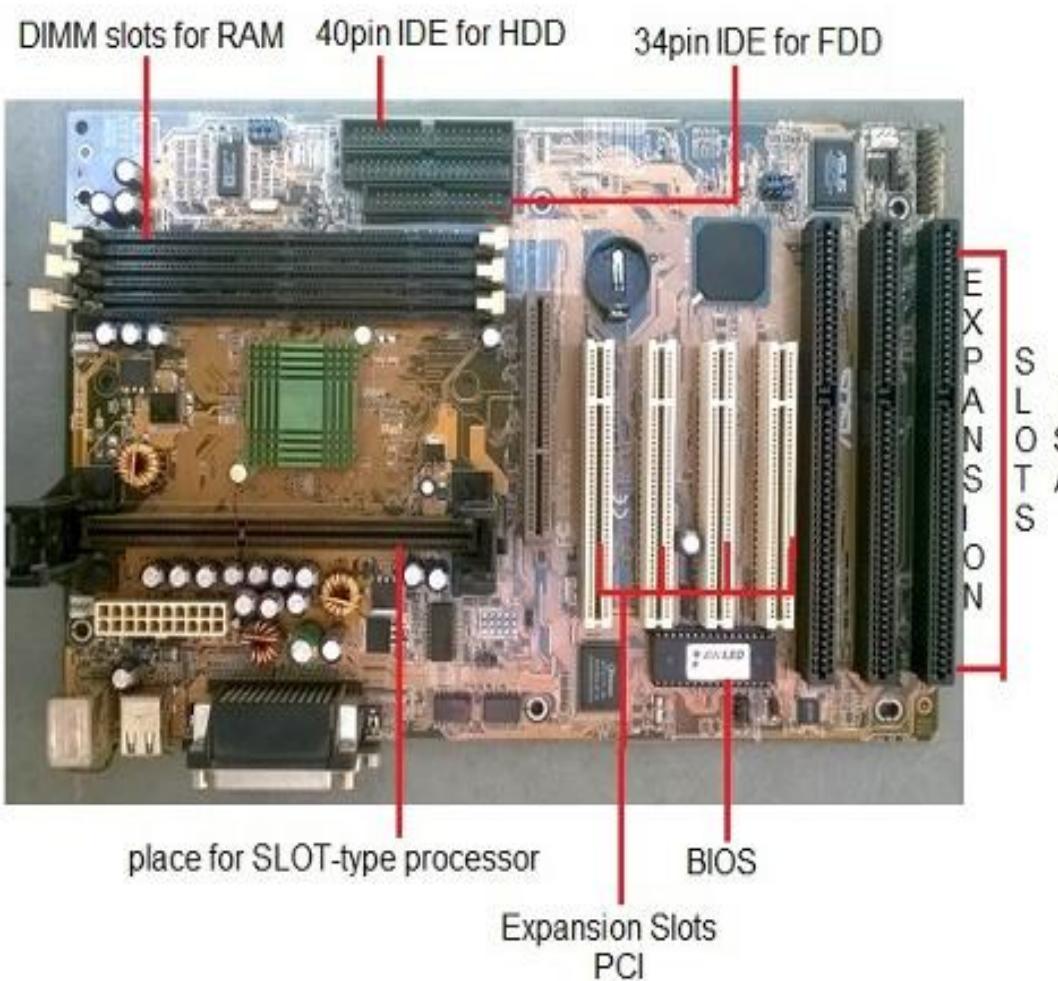
- The oldest of the main boards, these motherboards were used in earlier 286/386 or 486 computers.
- The AT means the board consists of advanced technology(AT) power connectors.
- There are two power connectors of 6 pin each mounted on the AT motherboards.
- The AT motherboards were available in the early 80's.

# AT MOTHERBOARD

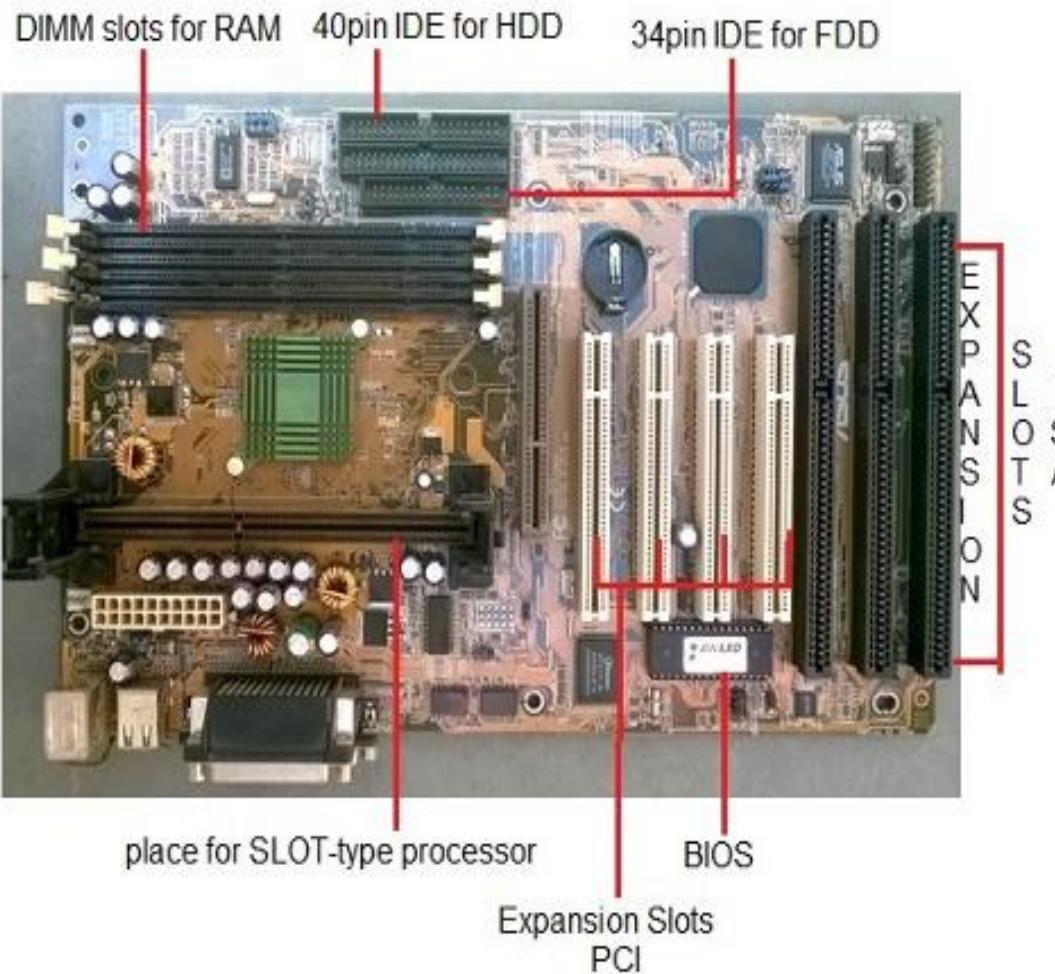


- The AT Motherboards were used in the mid-'80s with size ranging 13.8 x 12 inches.
- This Motherboard made it difficult for new drives to get installed

# ATX MOTHERBOARD



- The ATX motherboards started in 90's and are still available.
- The ATX connector on the motherboard consists of a single connector.
- These boards are used for P2/P3 or P/4 processors.
- These boards come in size of 12 X 9.6 inches.
- ATX is the most common Motherboard design which is used in smaller boards (including micro-ATX, FlexATX, nano-ITX, Mini-ITX).



# ATX MOTHERBOARD

- The ATX Motherboards seem to have gone through lots of upgrades in recent times.

## Features:

- More power phases for cleaner and more stable power.
- More clearance around the CPU socket to accommodate those huge after-market heatsinks.
- Wider gaps between expansion slots for better graphics card cooling.

# MOTHERBOARD TYPES



Standard-ATX



Micro-ATX



Mini-ITX



Pico-ITX



Nano-ITX



PCI Express  
PCI  
AGP  
CD-IN  
SPDIF  
1394 headers  
Integrated circuit  
SATA RAID  
Jumpers  
USB headers  
Serial port connector  
Southbridge  
FWH in PLCC

System panel connectors  
ATA RAID  
CMOS Battery  
4 SATA connections

3-pin fan Connectors  
Back panel and I/O connectors

Heatsink  
P4 power connector  
Inductor  
Capacitors  
CPU Socket  
Northbridge  
CPU Fan connection  
Screw hole  
4 memory slots  
Super I/O  
Floppy connector  
ATA (IDE) connector  
24-pin ATX power connector

# MOTHERBOARD COMPONENTS

ASUS P5AD2-E Motherboard

ComputerHope.com

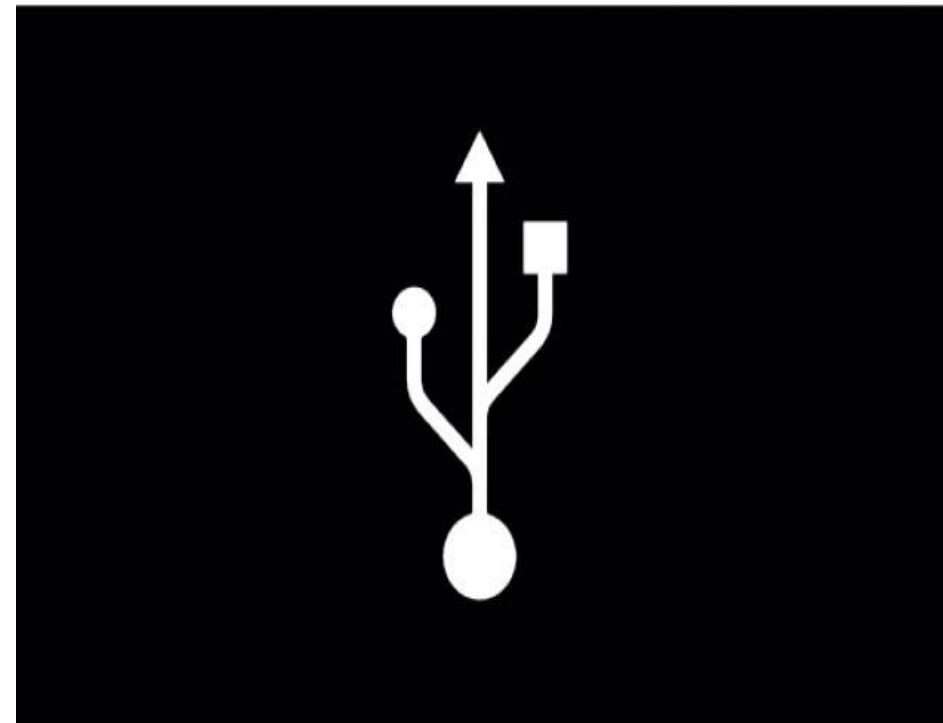
# USB ports

## Universal Serial Bus Port

A USB port is a standard cable connection interface on personal computers and consumer electronics. USB ports allow stand-alone electronic devices to be connected via cables to a computer (or to each other).

## Features of USB Ports

- It can connect all kinds of external USB devices such as external hard disk, printer, scanner, mouse, keyboard, etc.
- It was introduced in 1997.
- Most of the computers provide two USB ports as minimum.
- Data travels at 12 megabits per seconds.
- USB compliant devices can get power from a USB port.



USB ICON [[https://image.freepik.com/free-icon/computer-screen-with-usb-port-symbol\\_318-39406.jpg](https://image.freepik.com/free-icon/computer-screen-with-usb-port-symbol_318-39406.jpg)]

# Types of USB Ports

The USB ports are classified into two categories:

## USB types on basis of Speed

USB 1.1

USB 2.0

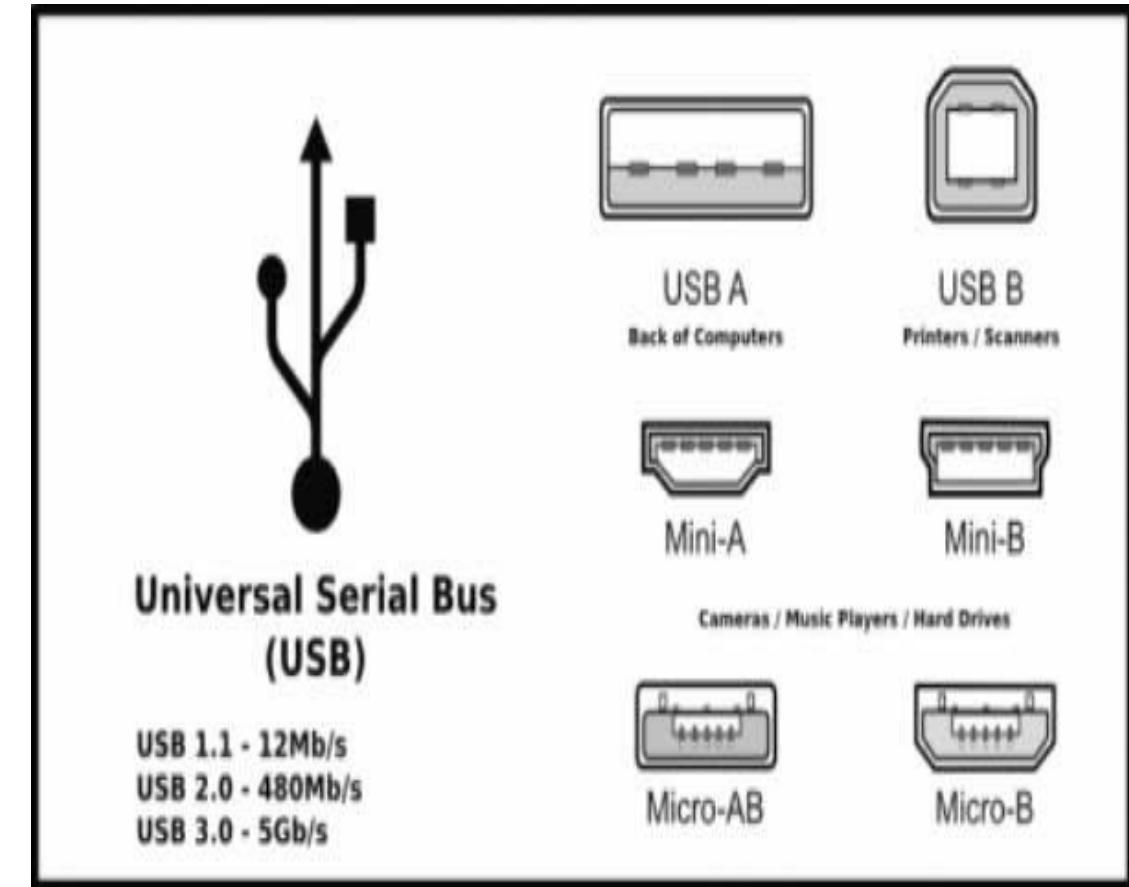
USB 3.0

## USB types on basis of Size and Connector

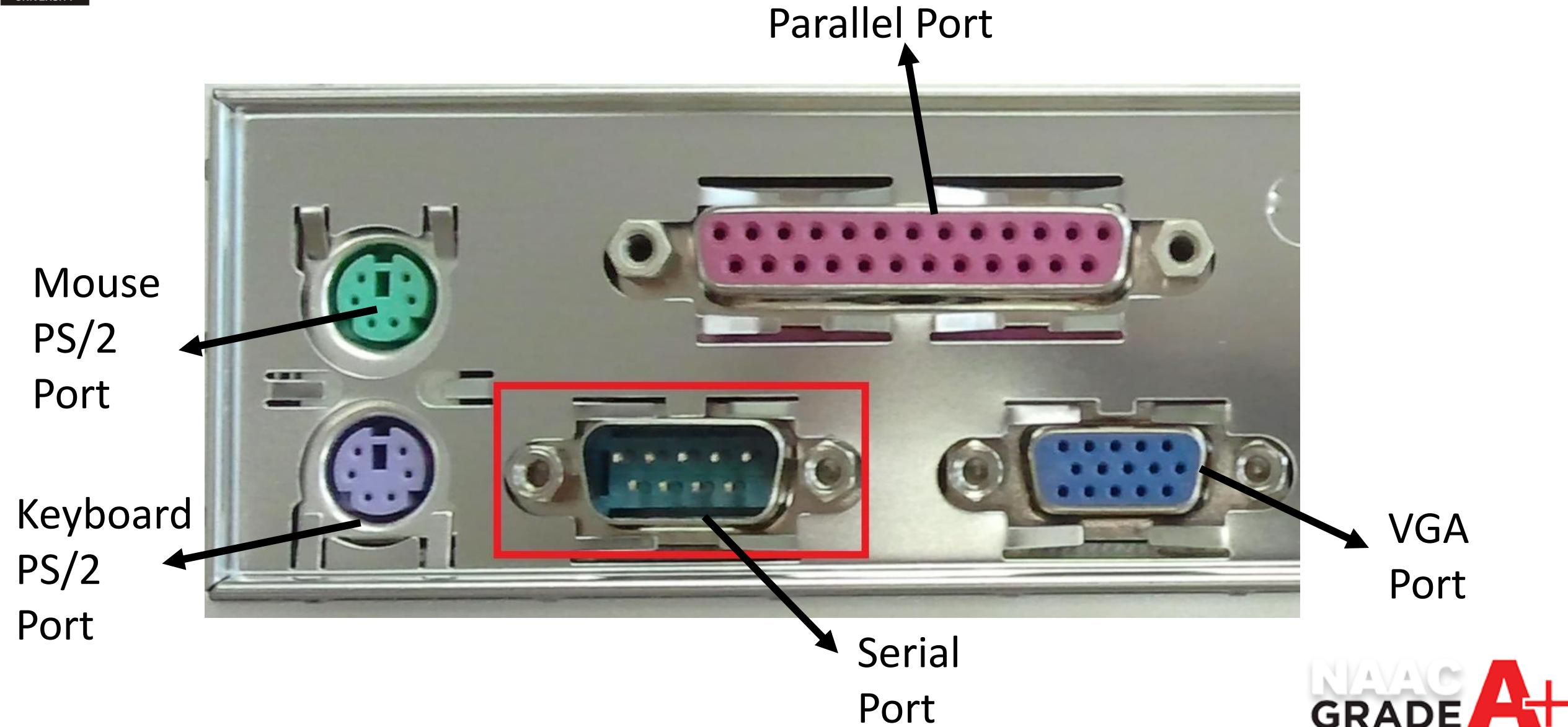
USB A

USB B

Micro & Mini USB and variations

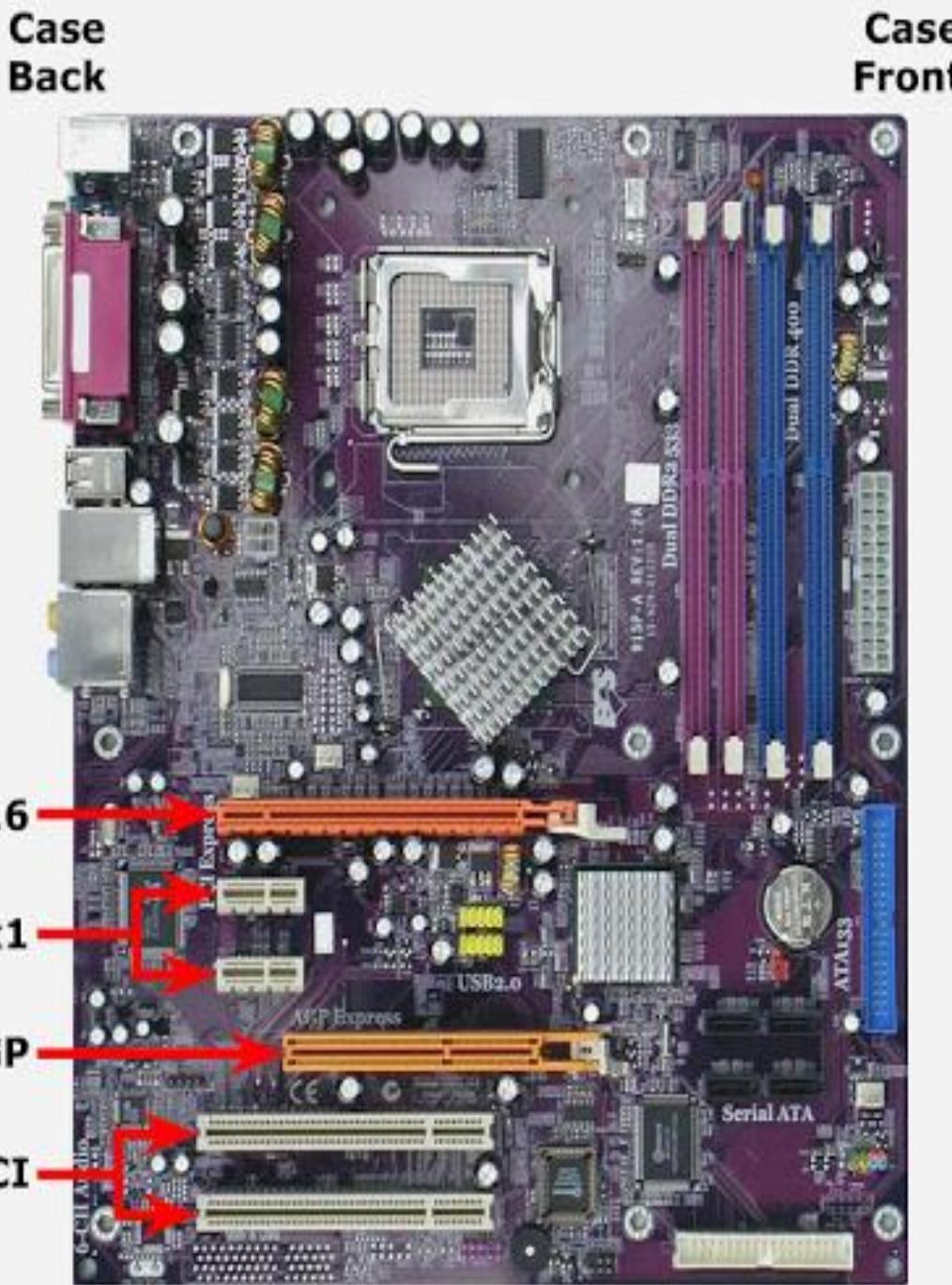


# Back Panel I/O Ports



# Back Panel I/O Ports

- The main difference between a serial port and a parallel port is that a serial port transmits data one bit after another, while a parallel port transmits all 8 bits of a byte in parallel.
- Parallel ports were first used in the 1970s to connect computer printers.
- While parallel ports are used by a variety of devices, including **printers, scanners, dongles and disk drives**, serial ports are used to connect modems, another computer, Bar code scanners, and GPS receivers.



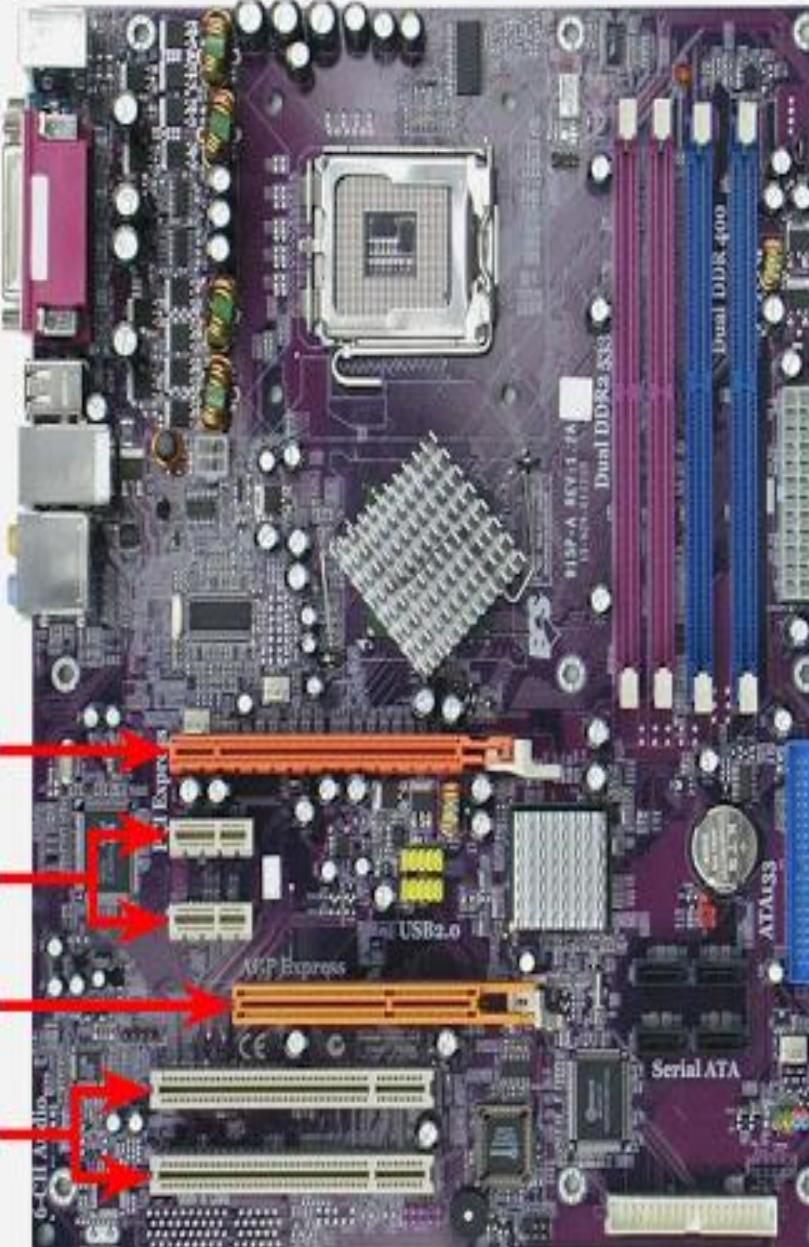
# EXPANSION SLOTS

- Alternatively referred to as a bus **slot** or **expansion** port, an **expansion slot** is connection or port located inside a computer on the motherboard or riser board that allows a computer hardware **expansion** card to be connected to add functionality to a computer system via the expansion bus.

# EXPANSION SLOTS

## Why do computers have expansion slots?

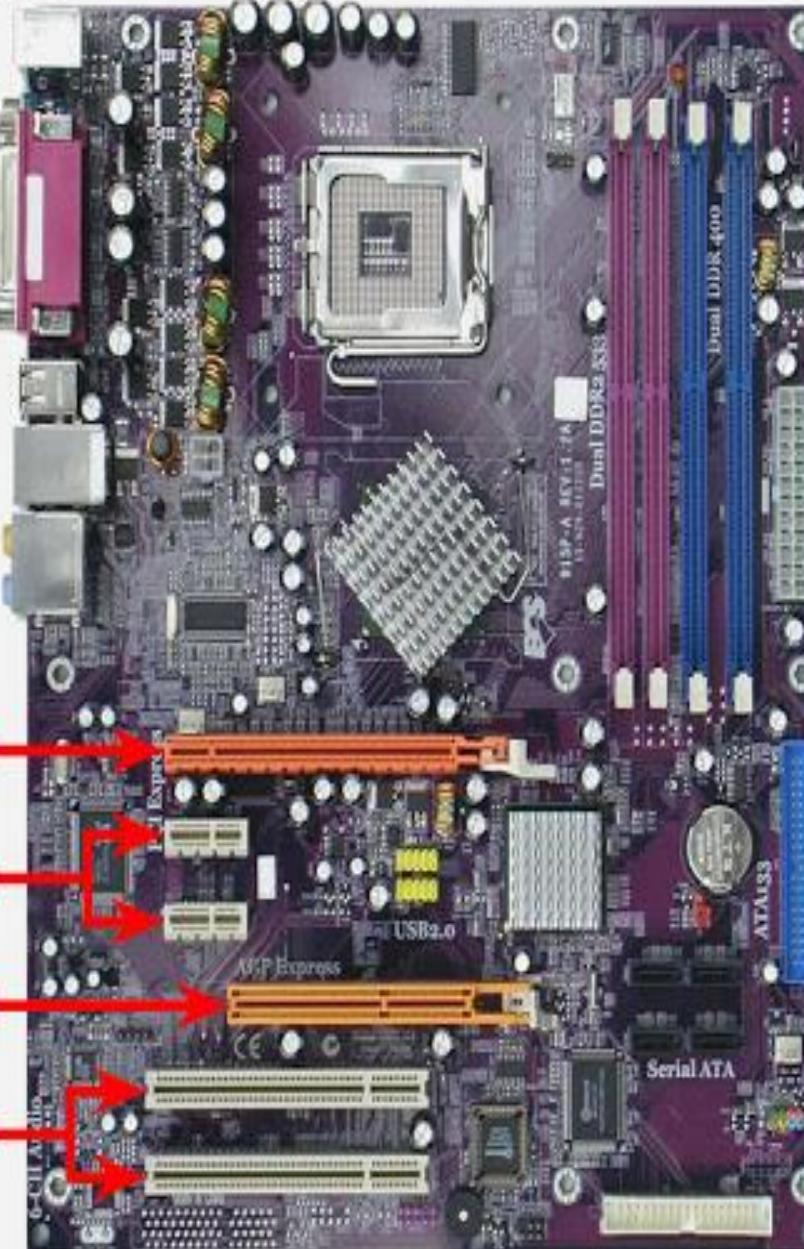
- Computers have expansion slots to give the user the ability to add new devices to their computer.
- For example, a computer gamer may upgrade their video card to get better performance in their games.
- An expansion slot allows them to remove the old video card and add a new video card without replacing the motherboard.

Case  
BackCase  
Front

# EXPANSION SLOTS

Below is a listing of expansion slots commonly found in a computer and the devices associated with those slots.

- **AGP** - Video card.
- **AMR** - Modem, sound card.
- **CNR** - Modem, network card, sound card.
- **EISA** - SCSI, network card, video card.
- **ISA** - Network card, sound card, video card.

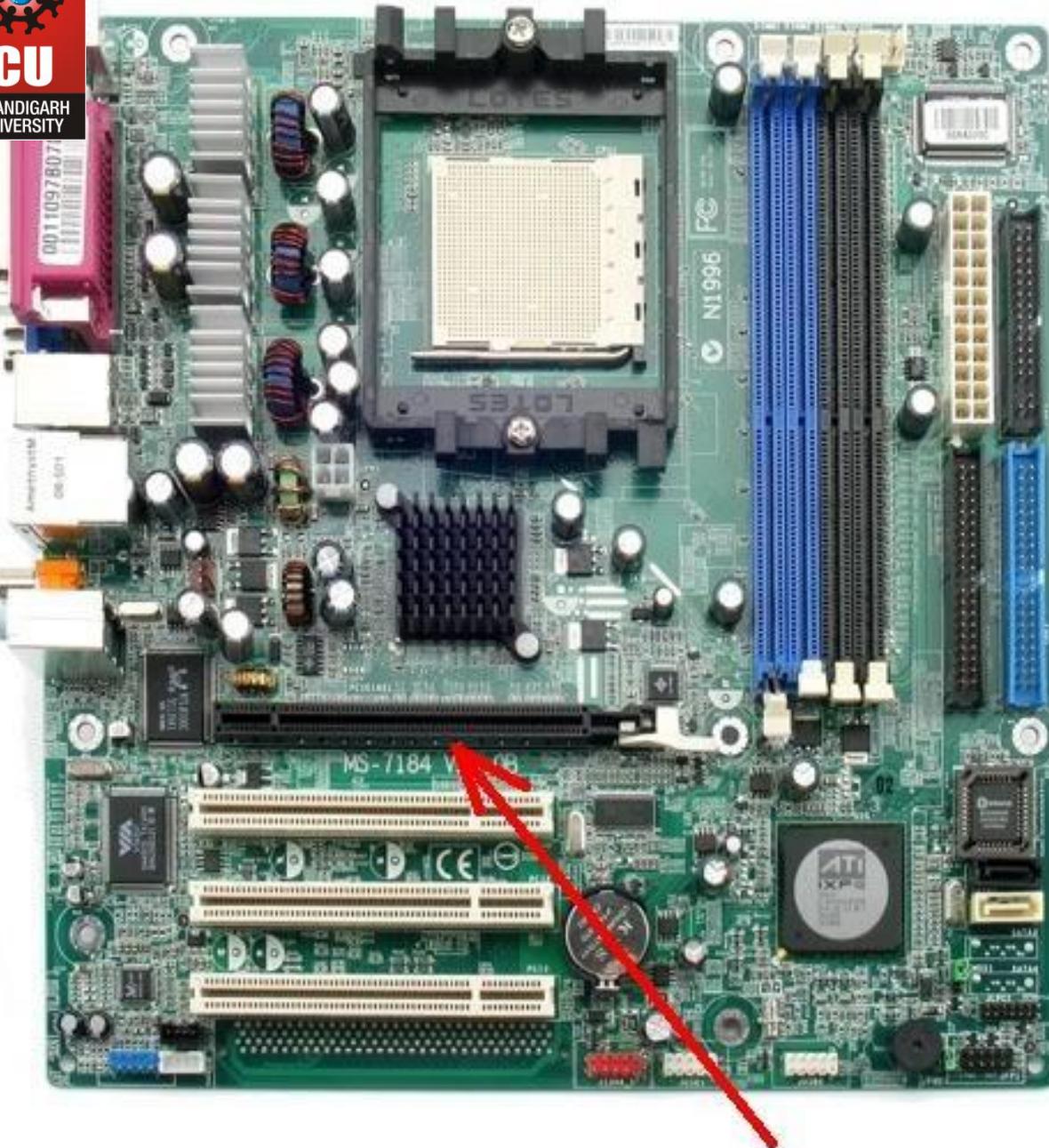
Case  
BackCase  
Front

# EXPANSION SLOTS

- **PCI** - Network card, SCSI, sound card, video card.
- **PCI Express** - Video card, modem, sound card, network card.
- **VESA** - Video card.

Many of the above expansion card slots are obsolete.

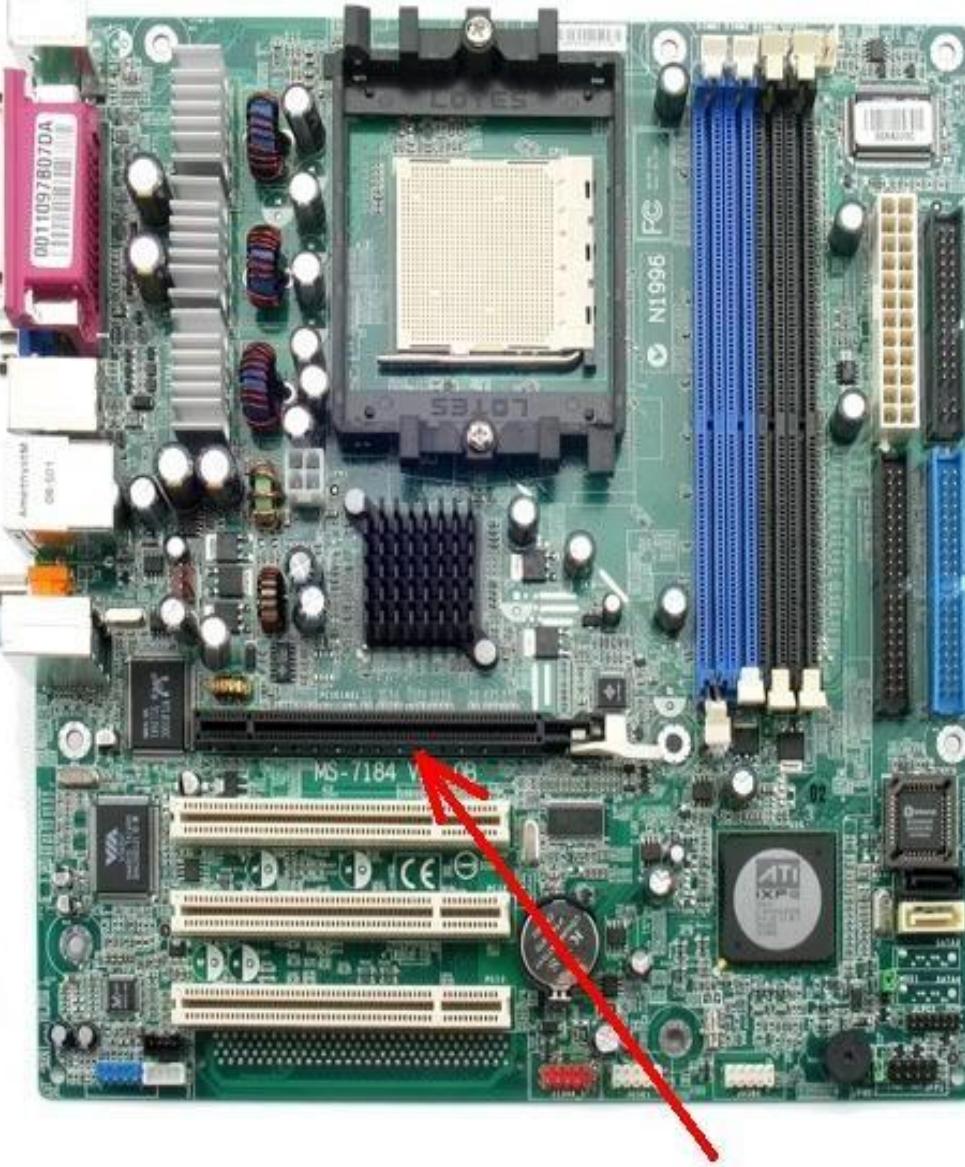
You're most likely only going to encounter AGP, PCI, and PCI Express when working with computers today.



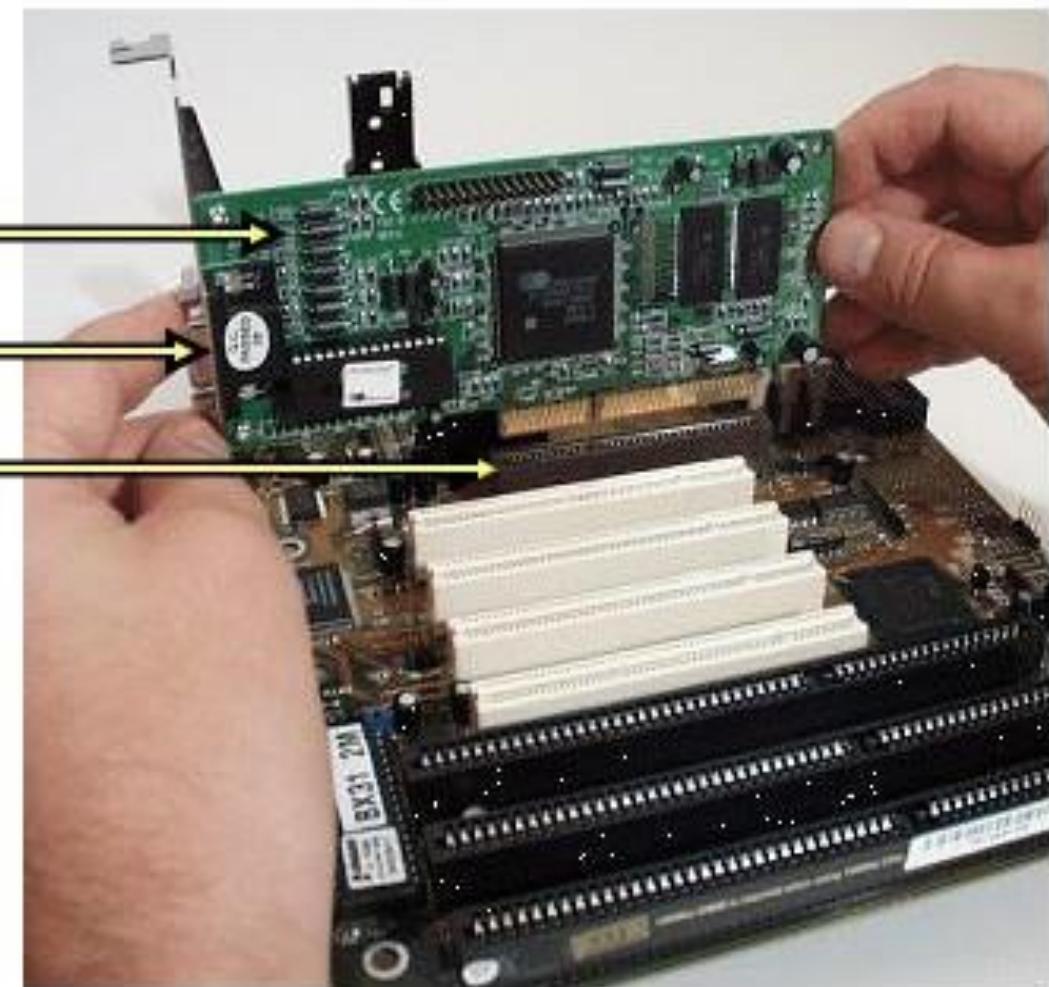
# AGP SLOT

- Short for **accelerated graphics port**, **AGP** is an advanced port designed for video cards and 3D accelerators.
- Developed by Intel and introduced in August 1997, it was designed as a high-speed point-to-point channel for attaching a video card to a computer system, primarily to assist in the acceleration of 3D computer graphics.
- The image shows an illustration of what the AGP slot may look like on your motherboard.

# INSERTION OF VIDEO CARD IN AGP SLOT



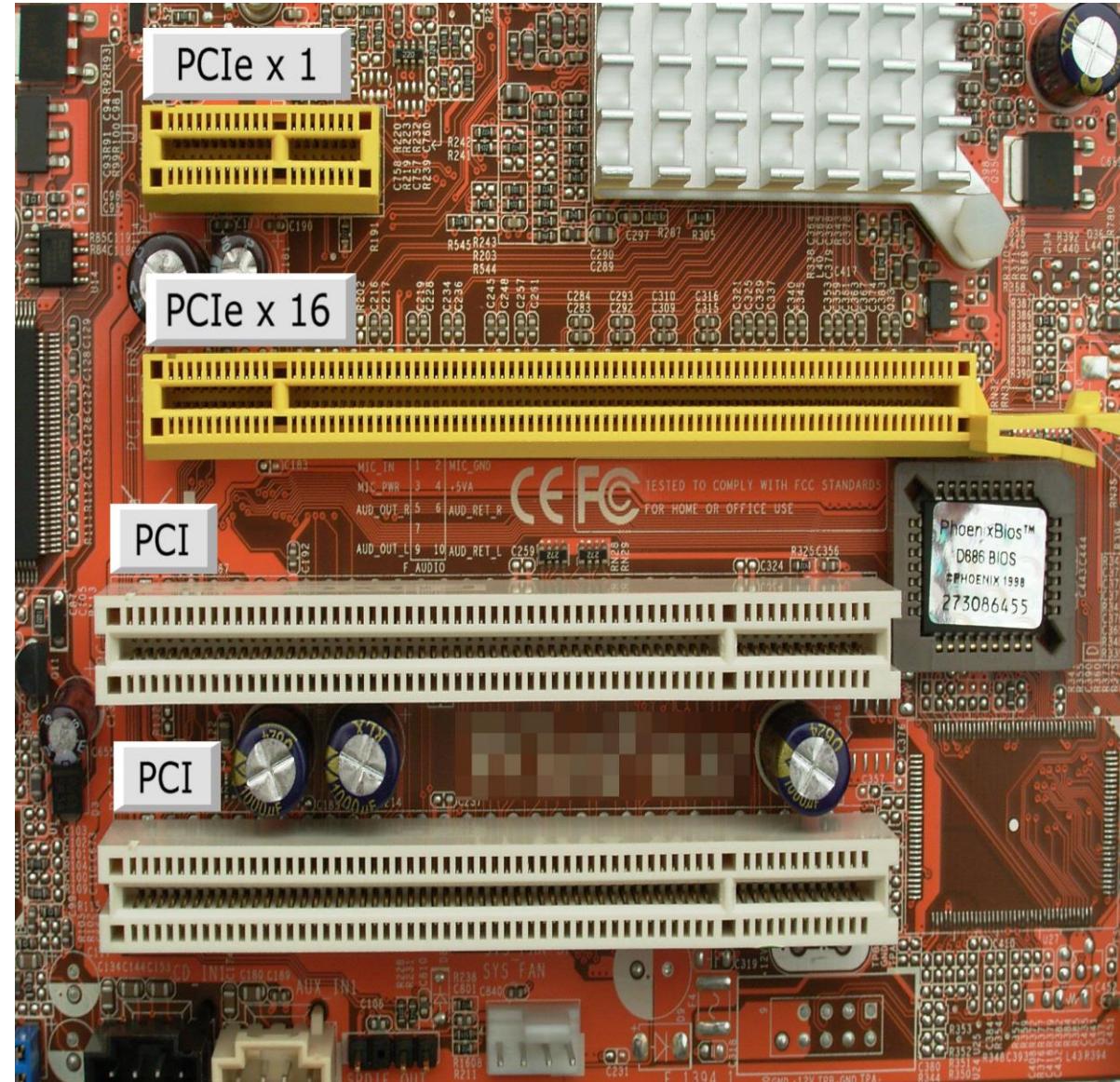
Expansion card  
Port  
Expansion slot



# 32 BIT V/S 64 BIT

- A data bus is a cable that carries information to and from the computer's memory to the CPU.
- A CPU of sixty four bits has a data bus that is 64 bit wide, which can transfer sixty four bits at a time.
- While a CPU of thirty two bits has a data bus that is thirty two bits wide, which can work with thirty two bits at a time.
- Thus, the former can carry in more information than the latter. Remember that this is the size of the data bus, not the address bus, which is much more in each case.
- For instance, the Pentium Pro has a 36 bit address bus even though its data bus is thirty two bits wide.

# PCI SLOT



- Short for **peripheral component interconnect**, PCI was introduced by Intel in 1992.
- The PCI bus came in both 32-bit (133 MBps) and 64-bit versions and was used to attach hardware to a computer.
- Although commonly used in computers from the late 1990s to the early 2000s, PCI has since been replaced with PCI Express.

# PCI SLOT

- It allows you to insert expansion cards into your computer.
- These can come in the form of sound cards, RAID cards, SSDs, graphics cards, Coprocessors, and several other functional computer parts.
- Basically, in the old days of computers, if you wanted to expand the functionality of your computer, you had to buy a part made specifically for that computer.
- Even different generations of the same computer sometimes didn't work together. Hence the PCI slot.
- The function of a PCI slot is to provide a common interface that can be adapted for virtually any use.
- It allows you to design an expansion card and have it work out of the box with a computer (assuming you don't have any conflicts on the software side).

# PCI SLOT

- PCI has begun to die out quite a bit though, and has been succeeded by PCI Express.
- There is a very big difference between the two.
- PCI was a parallel interface, which means that it dealt with large amounts of data by splitting them up and sending them at a low speed.
- PCI Express, in contrast, is a serial interface, which means that it sends them one at a time, really fast. Imagine that you have 20 people who all have to cross a river.
- In a parallel interface, 10 of the people will cross at once. Each one has a very specific landing point.
- However, when they are crossing, inevitably some will get mixed up in their landing spot, and will have to cross again.

# PCI SLOT

- This makes the crossing faster, even though in theory parallel communication is faster.

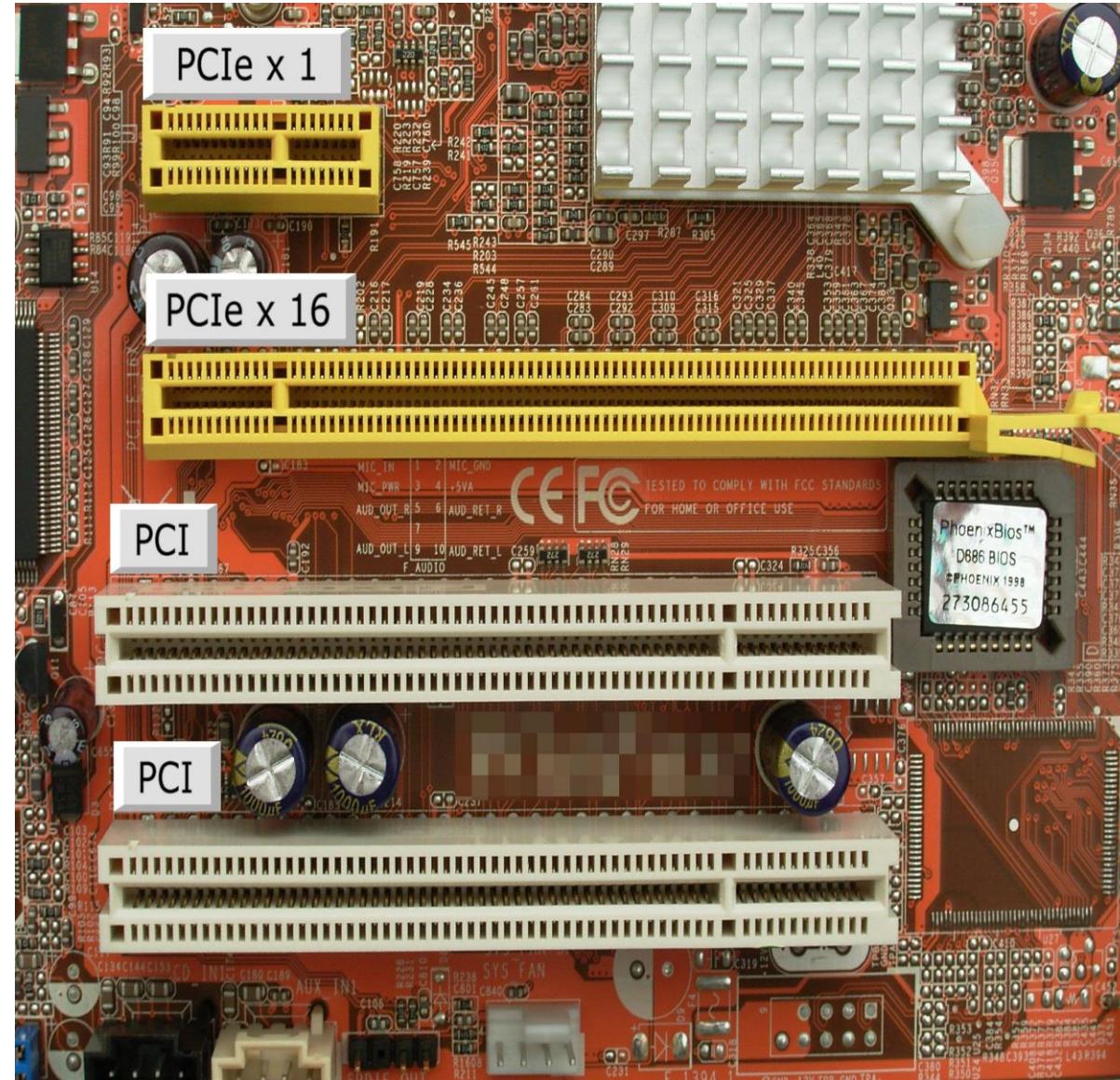
## Examples of PCI devices

- Modem
- Network card
- Sound card
- Video card

## PCI device drivers

- If you are looking for PCI drivers, you most likely need to download them for a specific PCI device. For example, if you need a PCI Ethernet adapter driver, install the drivers for the network card.

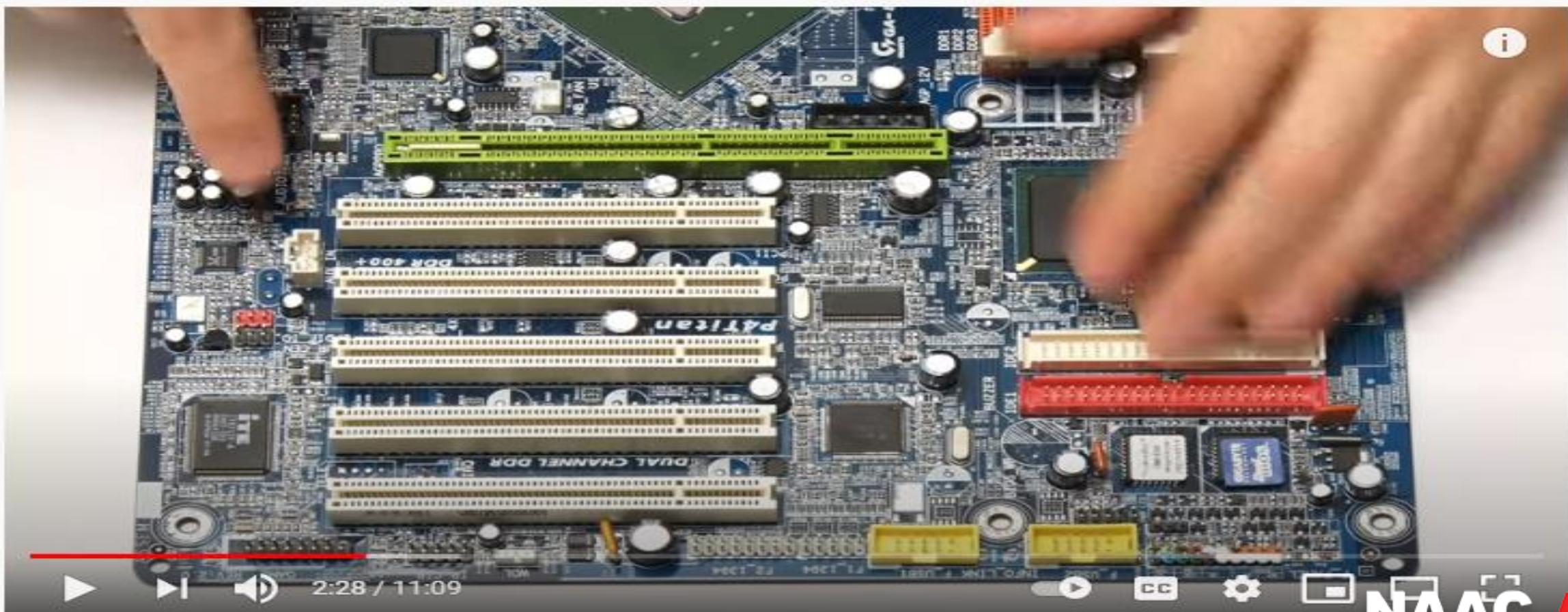
# PCI EXPRESS



- Originally known as 3rd Generation I/O (3GIO), PCI Express, or PCIe, was approved in July 2002 as a serial computer expansion bus standard.
- PCI Express was designed as a high-speed replacement for the aging PCI and AGP standards and is available in different formats.
- The data transmitted over PCI Express is sent over wires (called lanes) in full duplex mode (both directions at the same time).

# EXPANSION SLOTS

<https://youtu.be/PrXwe21biJo> (Play this video)



# EXPANSION SLOTS

*Important links for your reference*

1. [How do I install an expansion card?](#)
2. [How to install a computer network card.](#)
3. [How to install a computer sound card.](#)
4. [How to install a computer video card.](#)
5. [Motherboard help and support.](#)

*Just click on the above links to read about these topics.*

# EXPANSION SLOTS

## How many expansion slots does my computer have?

- Every computer motherboard is different, to determine how many expansion slots are on your computer motherboard identify the manufacturer and model of the motherboard.
- Once you've identified the model of motherboard, you can find complete information about the motherboard in its manual.

## What is the most common expansion slot today?

- Today, the most commonly used expansion slot used and found on computer motherboards is the PCI Express expansion slot.

# EXPANSION SLOTS

## Does a laptop have an expansion slot?

- Laptops do not have expansion slots like a desktop computer.
- However, some laptops do have PC Cards that can be inserted into the side of the laptop.
- They may also have a Cardbus slot for an ExpressCard to be added.

## How many PCI slots are on a motherboard?

- The number of PCI slots depend on the manufacturer and model of the motherboard.
- Today, very few motherboards come with any PCI with the introduction of PCI-E. Those few motherboards that do come with PCI slots have between one and three PCI slots.

# CASE FAN

NZXT Case Fan



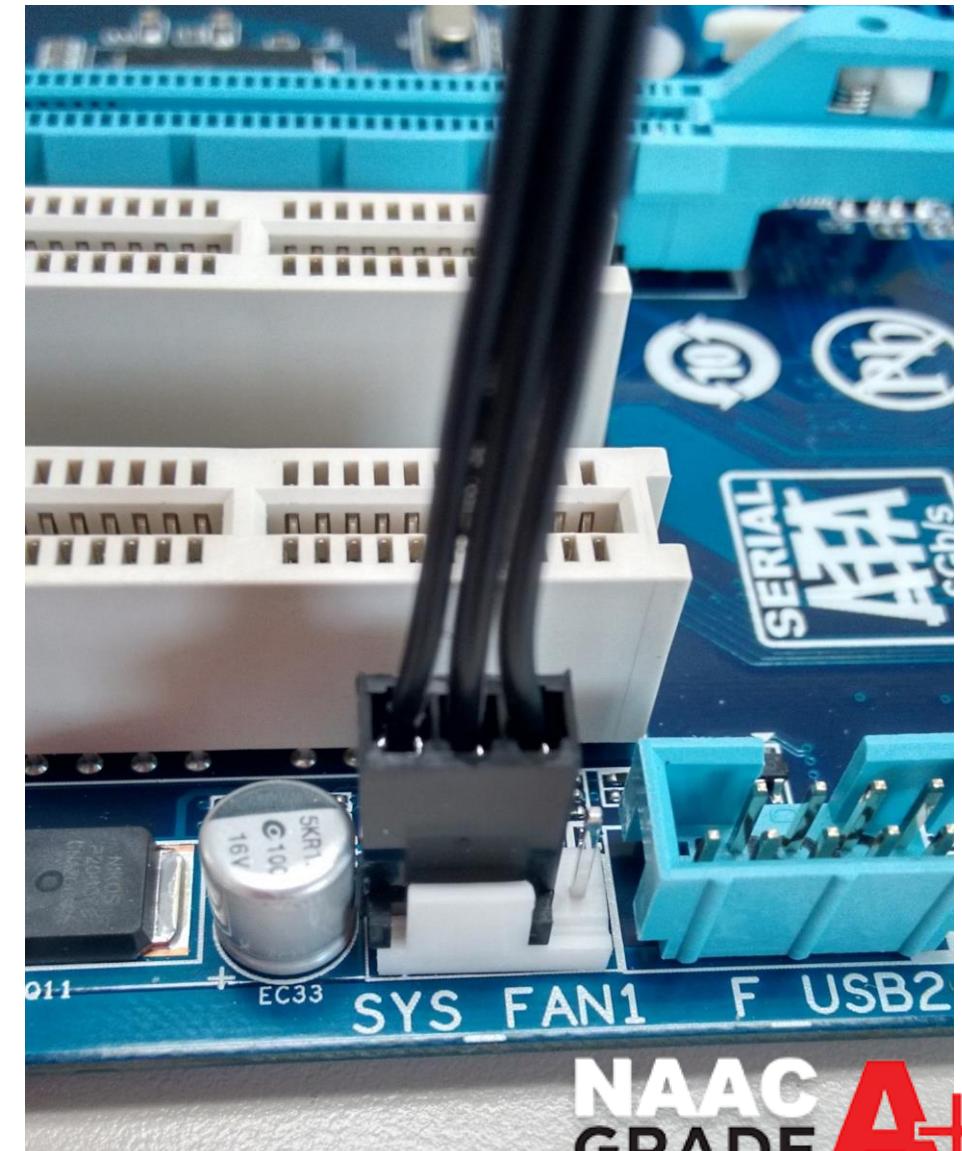
ComputerHope.com

- Alternatively referred to as a **system fan**, a **case fan** is located inside a computer, attached to the front or back of its case.
- Case fans help bring cool air into and blow hot air out of the case.
- They are available in a wide variety of sizes, but 80mm, 92mm, and 120mm (12cm) with a width of 25mm are the most common.
- <https://youtu.be/egaCMJ4rFOw>

# CASE FAN CONNECTORS

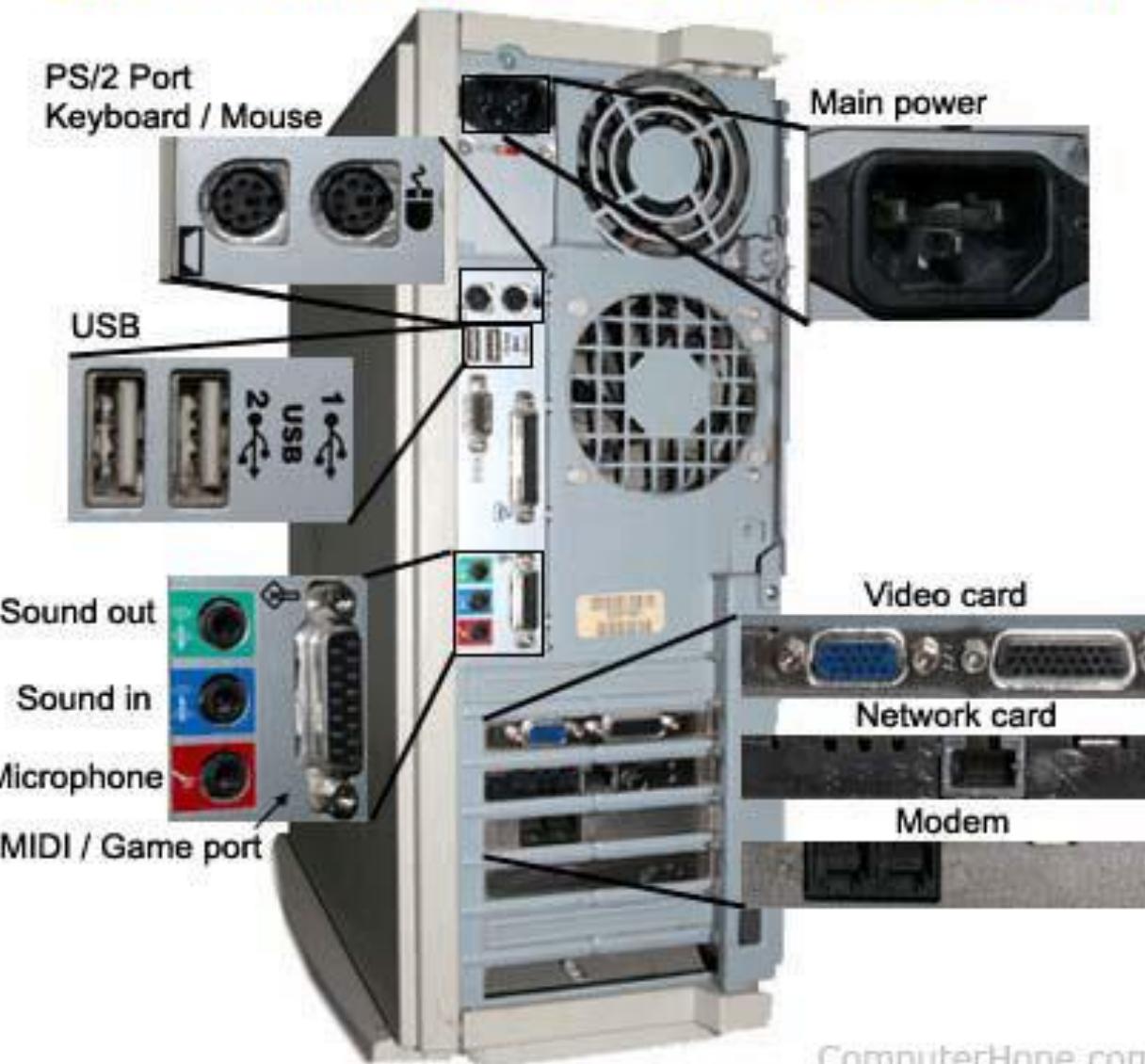


The image below displaying is the difference between a 4 Pin PWM fan connector (Left) and a 3 Pin fan connector (Right)



# CONNECTIONS

Back of computer case with each section



- Below is a picture of the back of a desktop computer and each of the connections and ports.
- Although your desktop computer's layout may be different, this diagram gives you a better understanding of where everything connects.

# CONNECTIONS

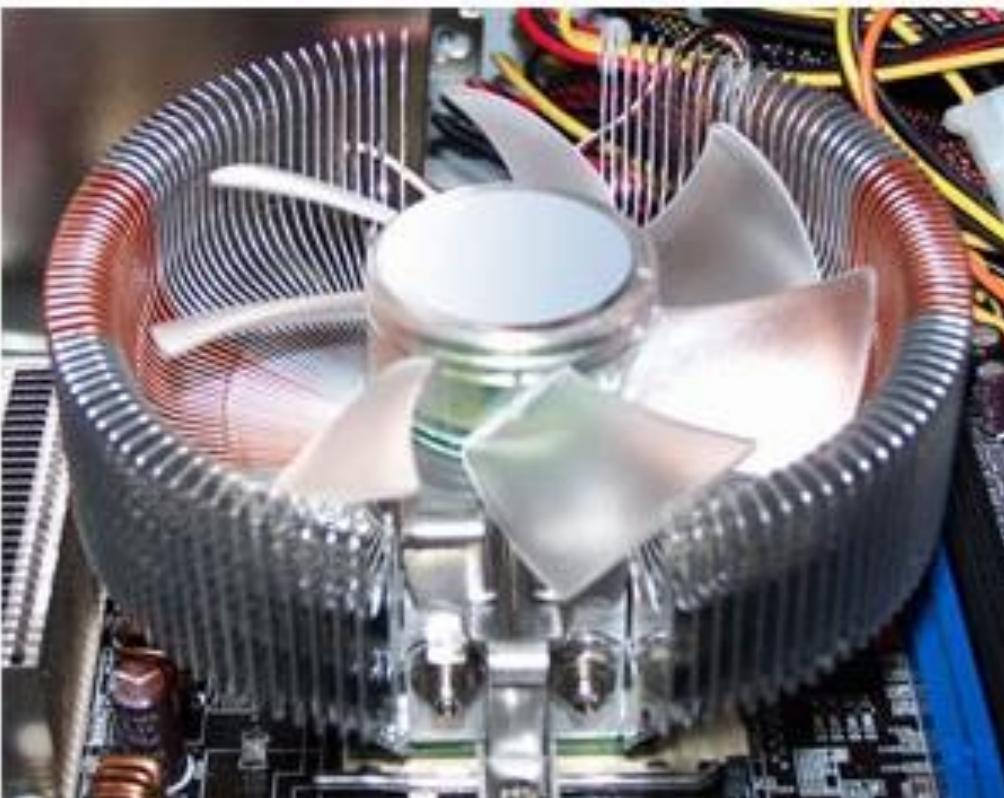
## Why are the colors on connections different?

Connections on the back of a computer may be color-coded to help locate the appropriate port for a peripheral device. The list below includes many ports and their associated colors.

- Keyboard (PS/2) - Purple
- Mouse (PS/2) - Green
- Serial - Cyan
- Printer - Violet
- Monitor (VGA) - Blue
- Monitor (DVI) - White
- Line out (headphones) - Lime Green
- Line in (microphone) - Pink
- Audio in - Grey
- Joystick - Yellow

# HEAT SINK

## Active and Passive Heat Sink



- A heat sink is a device that incorporates a fan or another mechanism to reduce the temperature of a hardware component (e.g., processor).
- There are two heat sink types: active and passive. The picture is an example of a heat sink that has both active and passive cooling mechanisms.

# HEAT SINK

## Active heat sink

- Active heat sinks utilize the computer's power supply and may include a fan.
- Sometimes these types of heat sinks are referred to as an HSF, which is short for heat sink and fan.
- There are also liquid cooling systems, which have become popular in recent years.
- **Active heat sinks** are often used in conjunction with passive **heat sinks**.

# HEAT SINK

## Passive heat sink

Passive heat sinks are those that have no mechanical components. Consequently, they are 100% reliable.

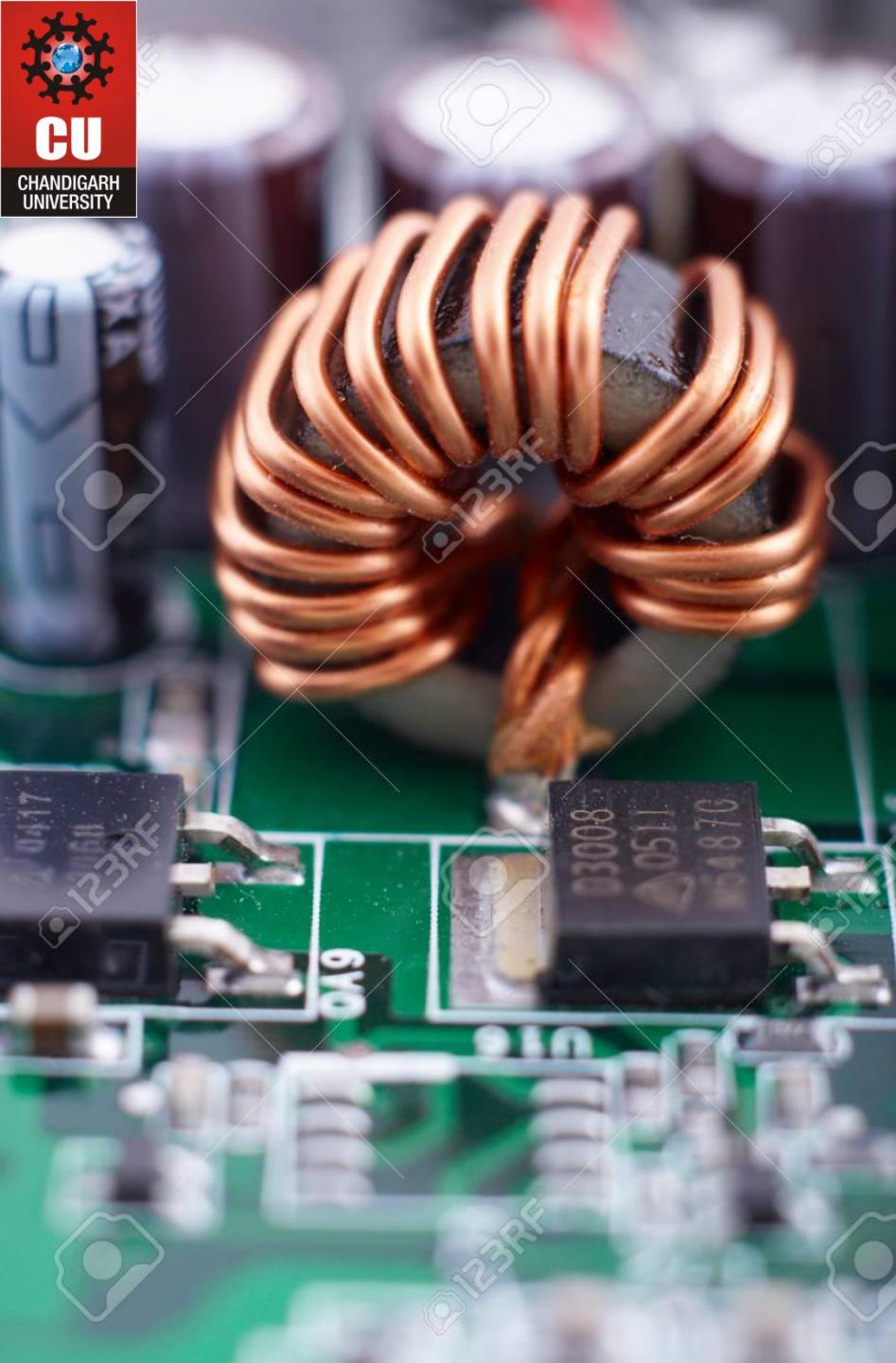
Passive heat sinks are made of an aluminium finned radiator that dissipates heat through convection.

For passive heat sinks to work to their full capacity, there should be a steady airflow moving across the fins.

# HEAT SINK

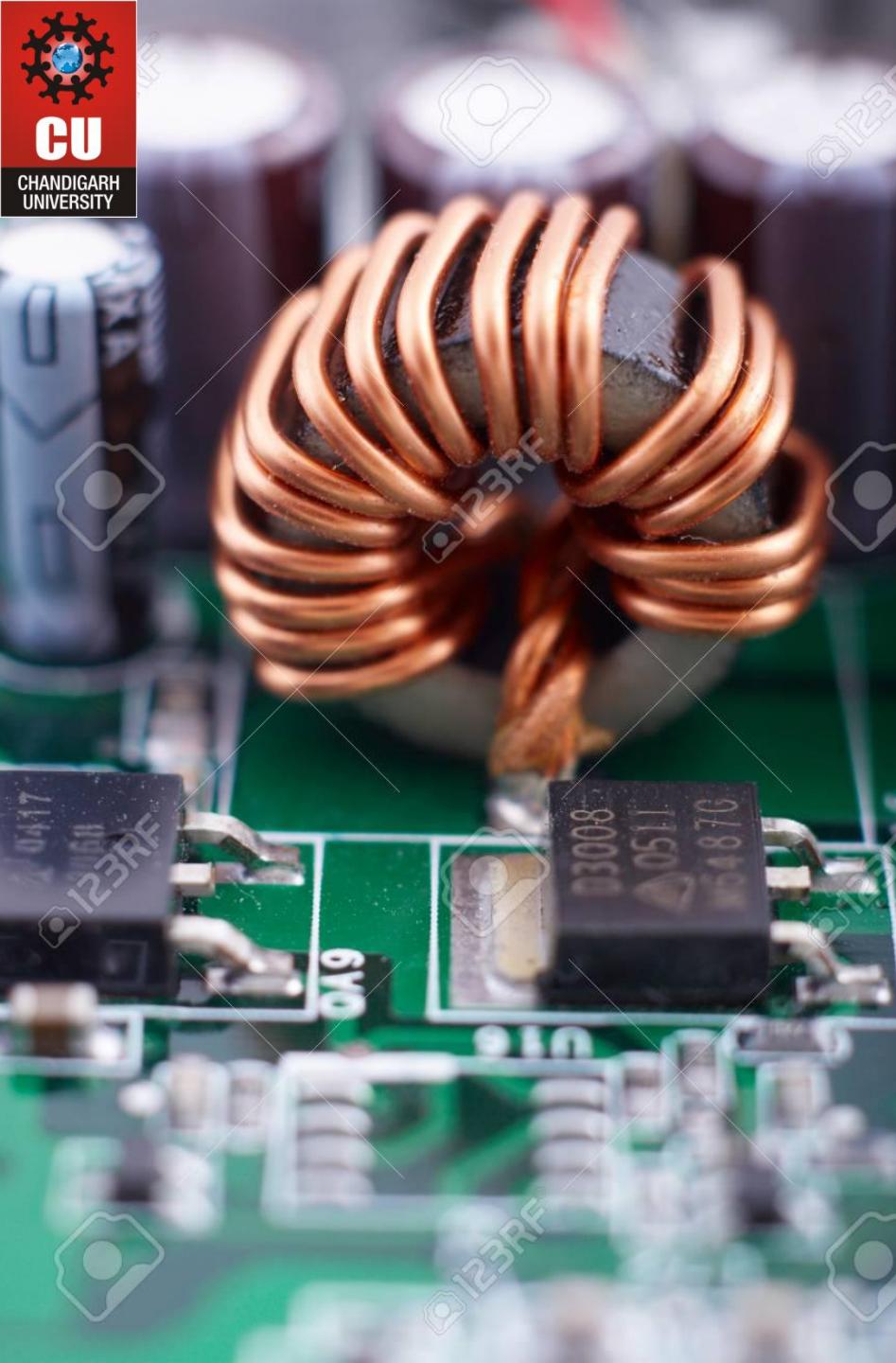
## What devices in a computer use a heat sink?

- The components that generate the most heat in your computer are the CPU (central processing unit), video card (if your computer has one), and the power supply.
- They always have some cooling, usually a fan.
- Other components that may have a heat sink include the north bridge, south bridge, and memory.
- It is also not uncommon to find heat sinks on other expansion cards and hard drives.



# INDUCTOR

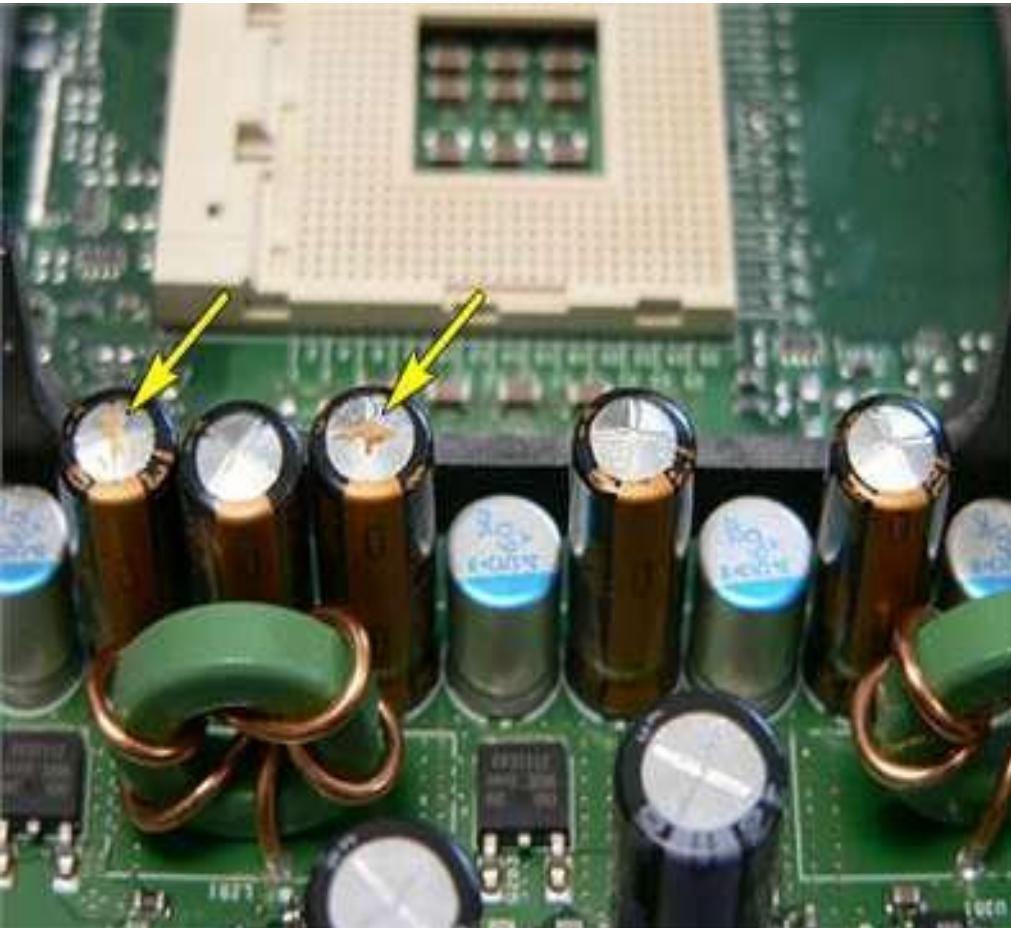
- Short for electromagnetic coil, a coil is conducting wire such as copper shaped in a helical form around an iron core.
- The coil creates an inductor or electromagnet to store magnetic energy. Coils are often used to remove power spikes and dips from power.
- The picture is an example of an inductor on a computer motherboard.



# INDUCTOR

- An inductor is essentially a coil of wire. When current flows through an inductor, a magnetic field is created, and the inductor will store this magnetic energy until it is released.
- In some ways, an inductor is the opposite of a capacitor.
- While a capacitor stores voltage as electrical energy, an inductor stores current as magnetic energy.
- Thus, a capacitor opposes a change in the voltage of a circuit, while an inductor opposes a change in its current.

# CAPACITOR



- In layman's terms, a capacitor is a tiny electrical component soldered to the motherboard. Capacitors perform a couple of different functions.
- First, a capacitor conditions DC voltage to other components (e.g. the video card, hard drive, sound card etc) as a way to provide a steady stream of power.
- Finally, a capacitor can also hold or store an electric charge to be discharged at a later time, such as in the case of a camera flash.

# CAPACITOR

- So, that's what capacitors are, but what do they do? As we already mentioned, one of the functions of a capacitor is that it conditions power to be sent to other components.
- The reason for this is that, while components rely on electricity to run, they're also very sensitive to swings in voltage.
- For instance, a voltage surge or spike could completely fry all of the components within your PC.
- After spending a good amount of money on hardware, that's not something you really want.
- Unfortunately, voltage amounts change all the time — they aren't constant. So, how do you stop it from frying your components? With a capacitor.

# CAPACITOR

- Another common type of capacitor is an electrolytic capacitor, which is a higher capacitance capacitor in a smaller package.
- The picture to the bottom right is an example of these types of capacitors.
- Like any other component in a computer, capacitors can fail, and when they do can cause the computer or the component to fail. When a motherboard capacitor fails the computer will no longer boot.
- Either the capacitor needs to be replaced or a new motherboard needs to be put in the computer.

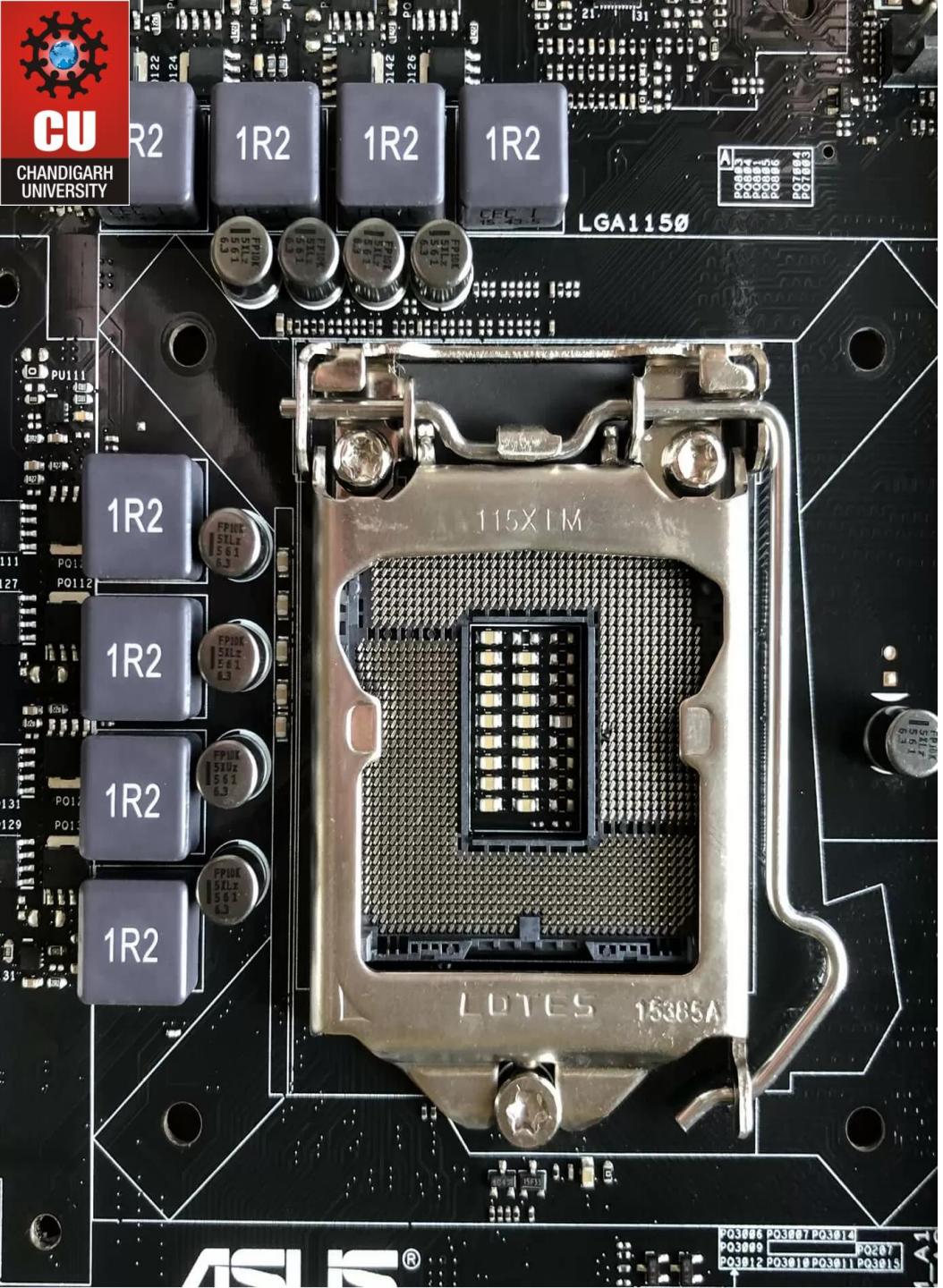
Electrolytic Capacitor





# CPU SOCKET

- When referring to a processor, a CPU socket or processor socket is a connection that allows a computer processor to connect to a motherboard.
- For example, the Socket 370 is an example of such a socket.
- The picture shows an example of what a socket may look like on a motherboard.
- Although there were computers that used the slot processor, most computers today and in the past have used socket processors.

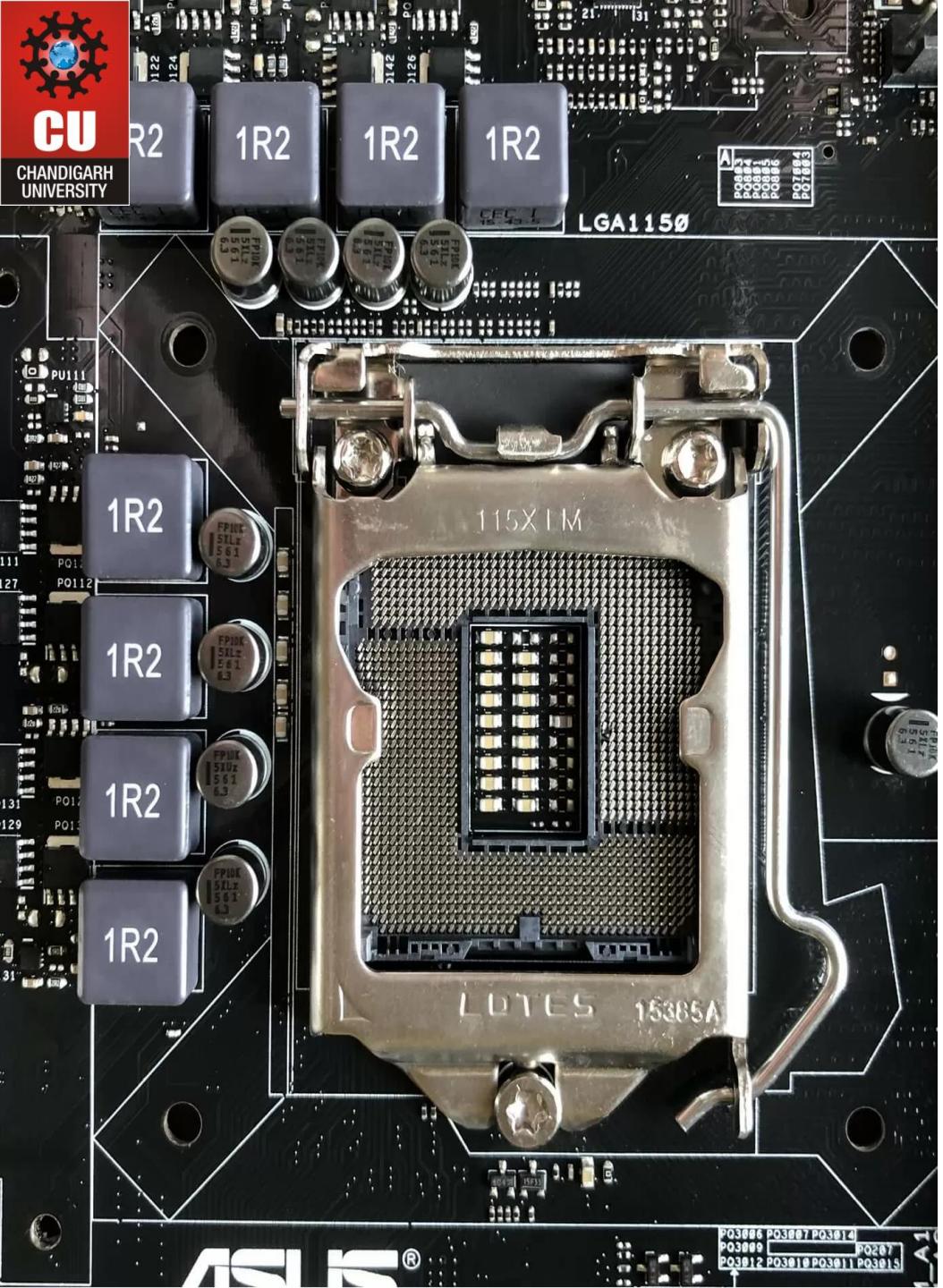


# CPU SOCKET

- When referring to a processor, a CPU socket or processor socket is a connection that allows a computer processor to connect to a motherboard.
- For example, the Socket 370 is an example of such a socket.
- The picture shows an example of what a socket may look like on a motherboard.
- Although there were computers that used the slot processor, most computers today and in the past have used socket processors.

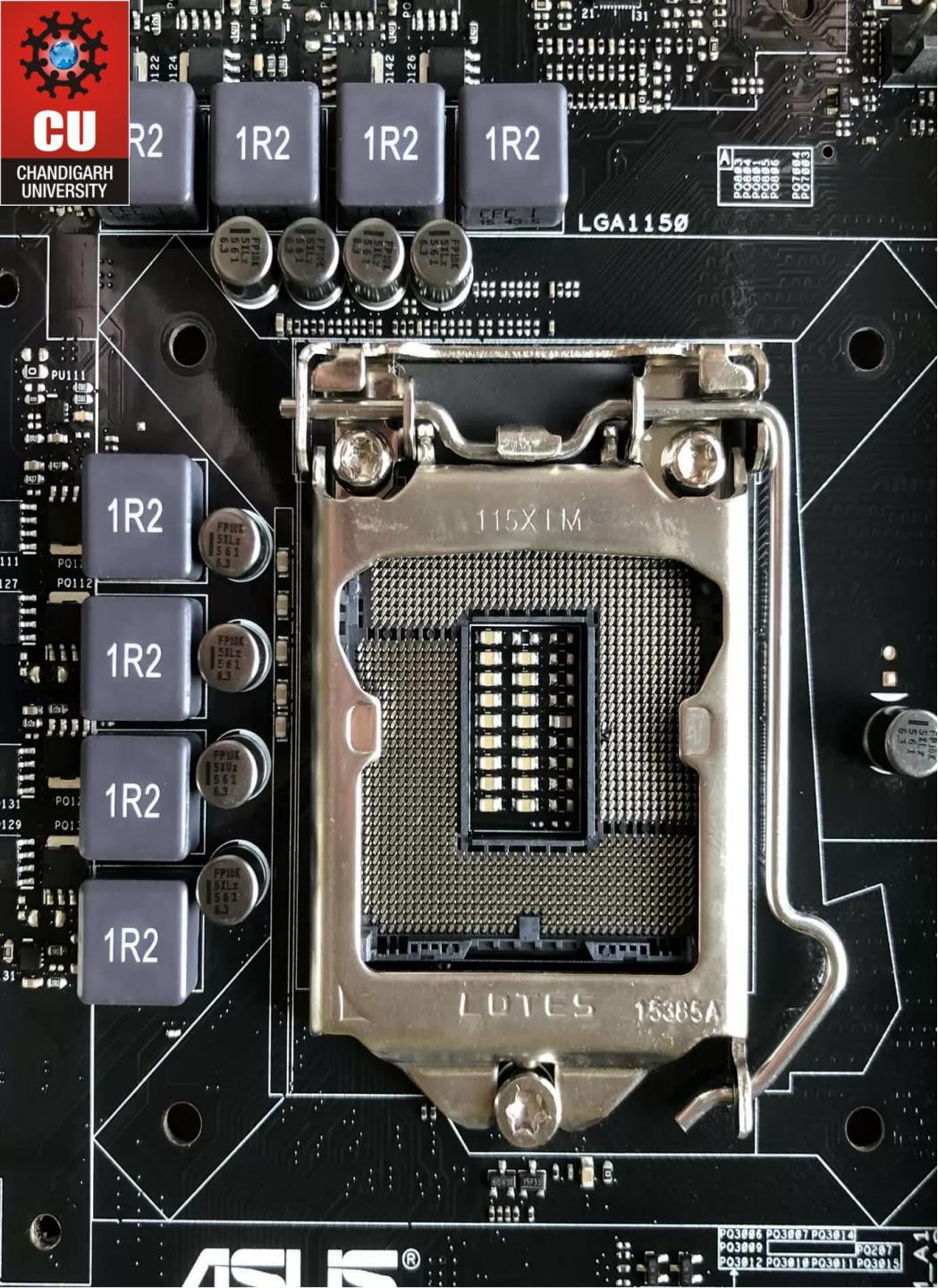
# CPU SOCKETS

- Socket 1
- Socket 2
- Socket 3
- Socket 4
- Socket 5
- Socket 6
- Socket 7
- Socket 8
- Socket 370
- Socket 423
- Socket 462
- Socket 478
- Socket 603
- Socket 604
- Socket 939
- Socket A
- Socket AM2
- Socket F



# CPU SOCKET

- Why would I need to know the socket on my motherboard?
- The processor socket helps determine what computer processors your computer motherboard is capable of accepting.
- For example, a socket 1 processor is not compatible with a Socket 370 because of the pin layout and the technology differences used in each socket.



# CPU SOCKET

- In general, the more capable the CPU (in terms of number of cores, amount of cache, etc), the more pins will be found in the socket.
- A large number of these connections will be used to send and receive data to the next important feature on a motherboard.

# NORTH BRIDGE



- North bridge is one of the two chips located in the direction towards North in the motherboard.
- The main function of North bridge is to manage the communications between the Central Processing Unit and parts of motherboard.
- North bridge is directly towards Front Side Bus (FSB). Other names for North bridge are host bridge and Memory Controller Hub (MCH).

# SOUTH BRIDGE



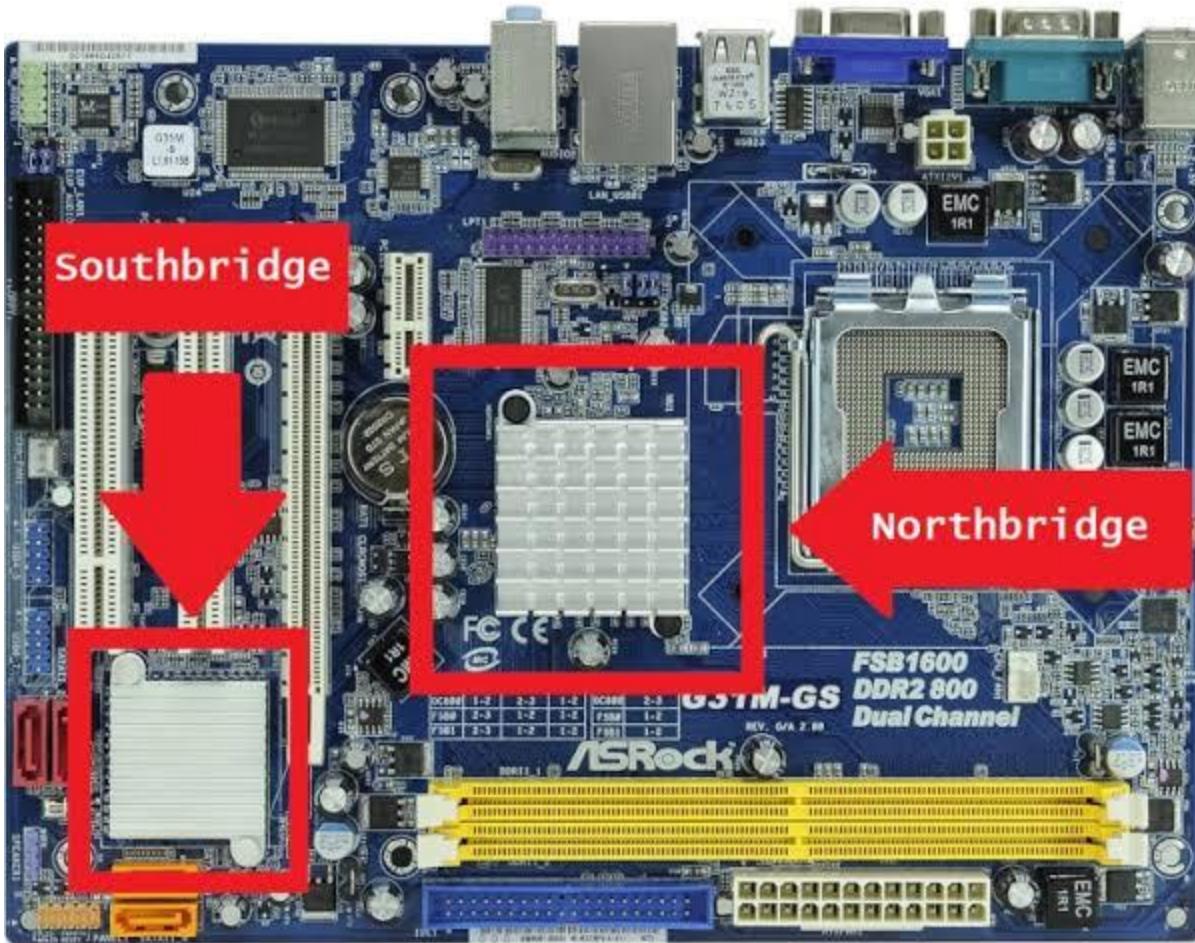
- South bridge is the another chip of the logical chipset architecture. It is located to the South of Peripheral Component Interconnect (PCI) bus in the motherboard.
- The main function of South bridge is to control the IO functioning. The North bridge is the medium that connects South bridge and Central Processing Unit.
- IO Controller Hub is the other name given to South bridge for its functionality.

# SOUTH BRIDGE

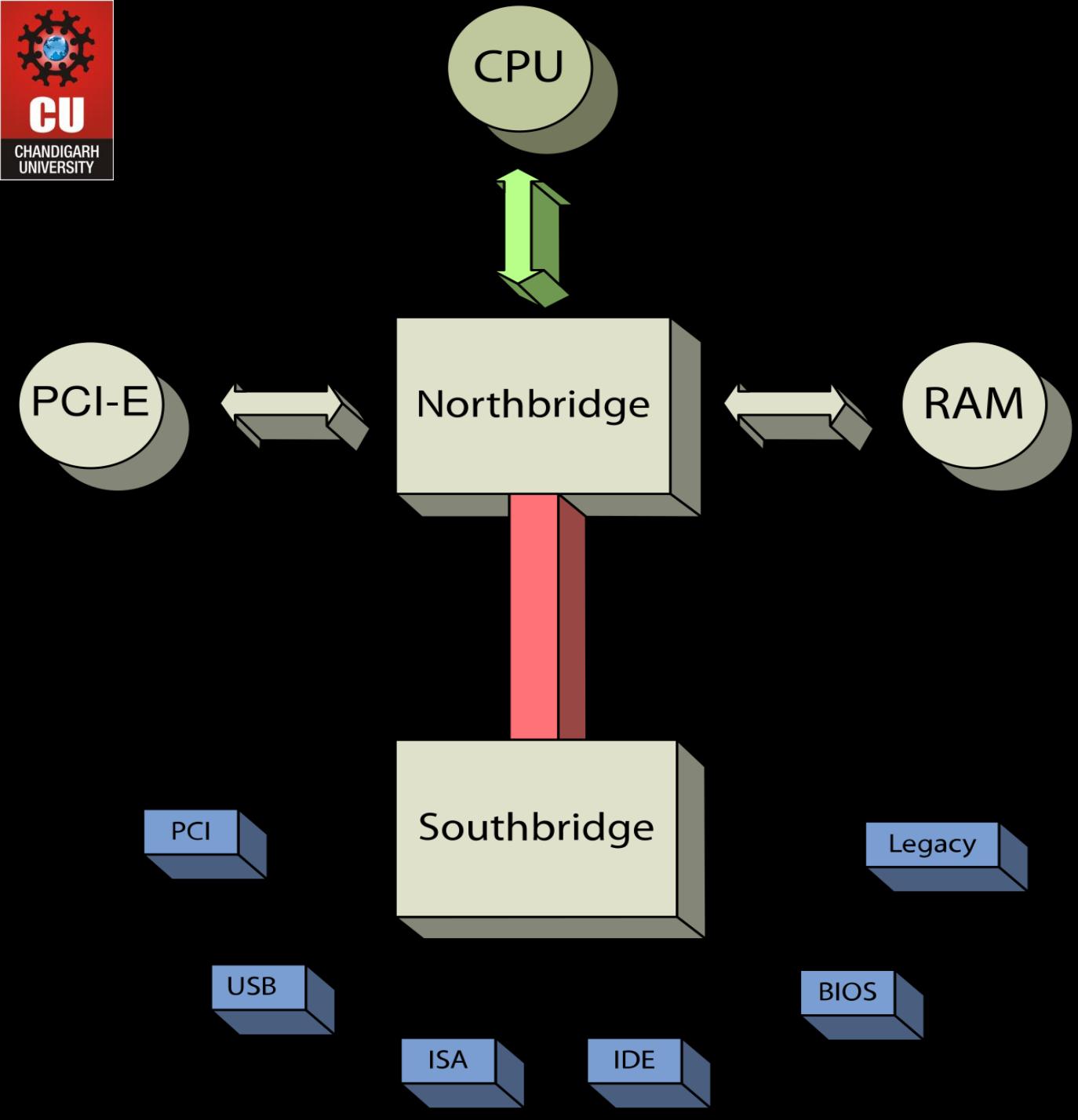


- The south bridge was replaced by PCH or Platform Controller Hub architecture.
- It was replaced by introducing Intel 5 chip-sets which had numerous features in the year 2008.

# NB AND SB



- The term **chipset** often refers to a specific pair of chips on the **motherboard**: the **north bridge** and the **south bridge**.
- The north bridge links the CPU to very high-speed devices, especially RAM and graphics controllers, and the **south bridge** connects to lower-speed peripheral buses (such as PCI or ISA).



# NB AND SB

- Northbridge is connected directly to the CPU via the front-side bus (FSB) and is thus responsible for tasks that require the highest performance. The north bridge is usually paired with a south bridge, also known as I/O controller hub.
- The south bridge typically implements the slower capabilities of the motherboard in a north bridge/ south bridge chipset computer architecture.

# NB V/S SB

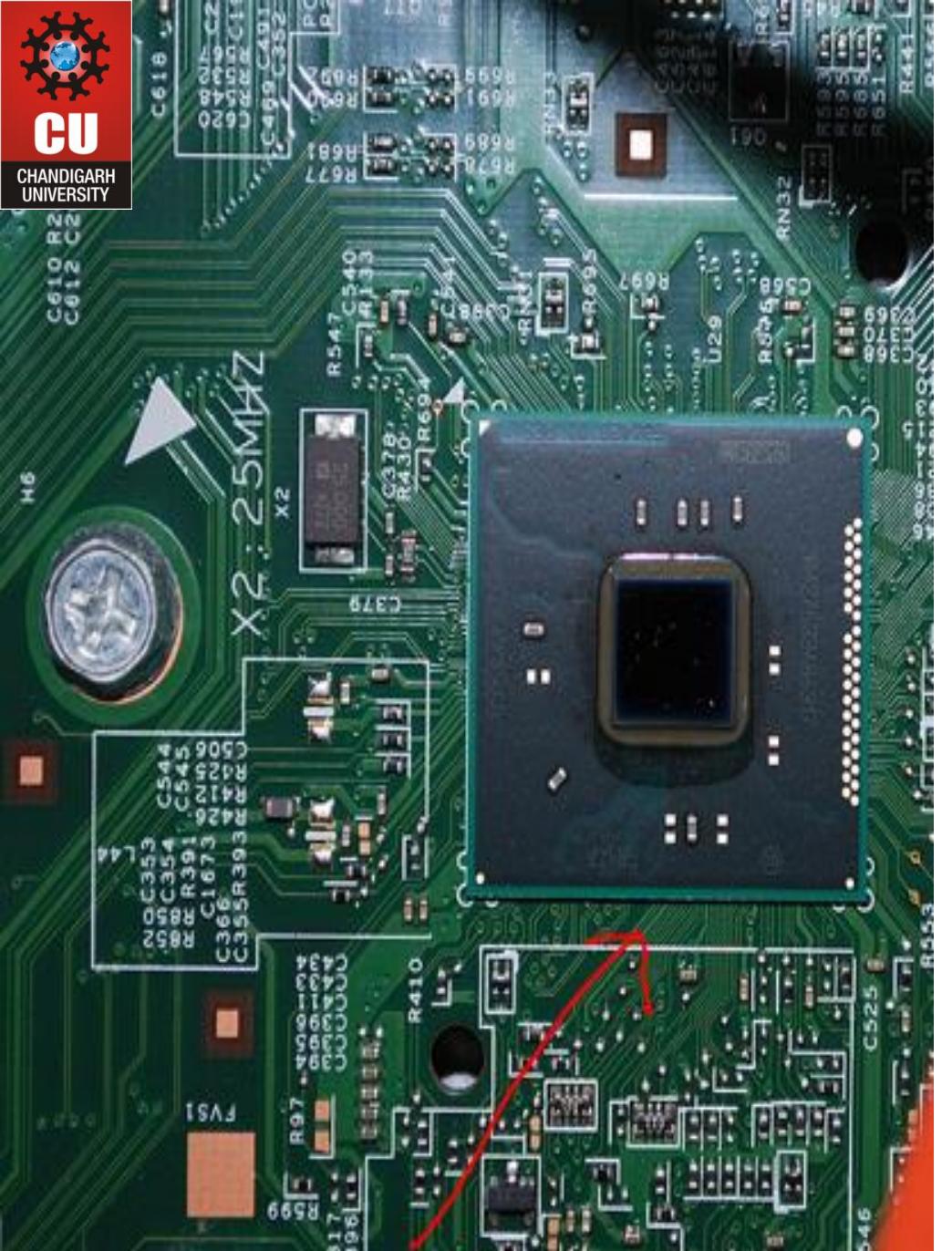
S.NO	North Bridge	South Bridge
1.	North bridge is located towards the north of motherboard.	South bridge is located towards South of PCI bus of the motherboard.
2.	North bridge is directly connected to the CPU.	South bridge is connected via North bridge to the CPU.
3.	It manages the communications between the CPU and other parts of the motherboard.	It manages the Input and Output functions.
4.	The North bridge is placed near to processor for easy access.	The South bridge is placed near PCI.

# NB V/S SB

S.NO	North Bridge	South Bridge
5.	North bridge communicates faster.	South bridge communicates slower.
6.	Other names for North bridge include Memory Controller Hub, host bridge.	IO Controller Hub is the other name for South bridge.
7.	The North bridge is hub for memory control.	The South bridge is a hub for input and output functioning.
8.	The North bridge connects the buses that work faster like the AGP bus.	The South bridge connects the buses that work slower like ISA.

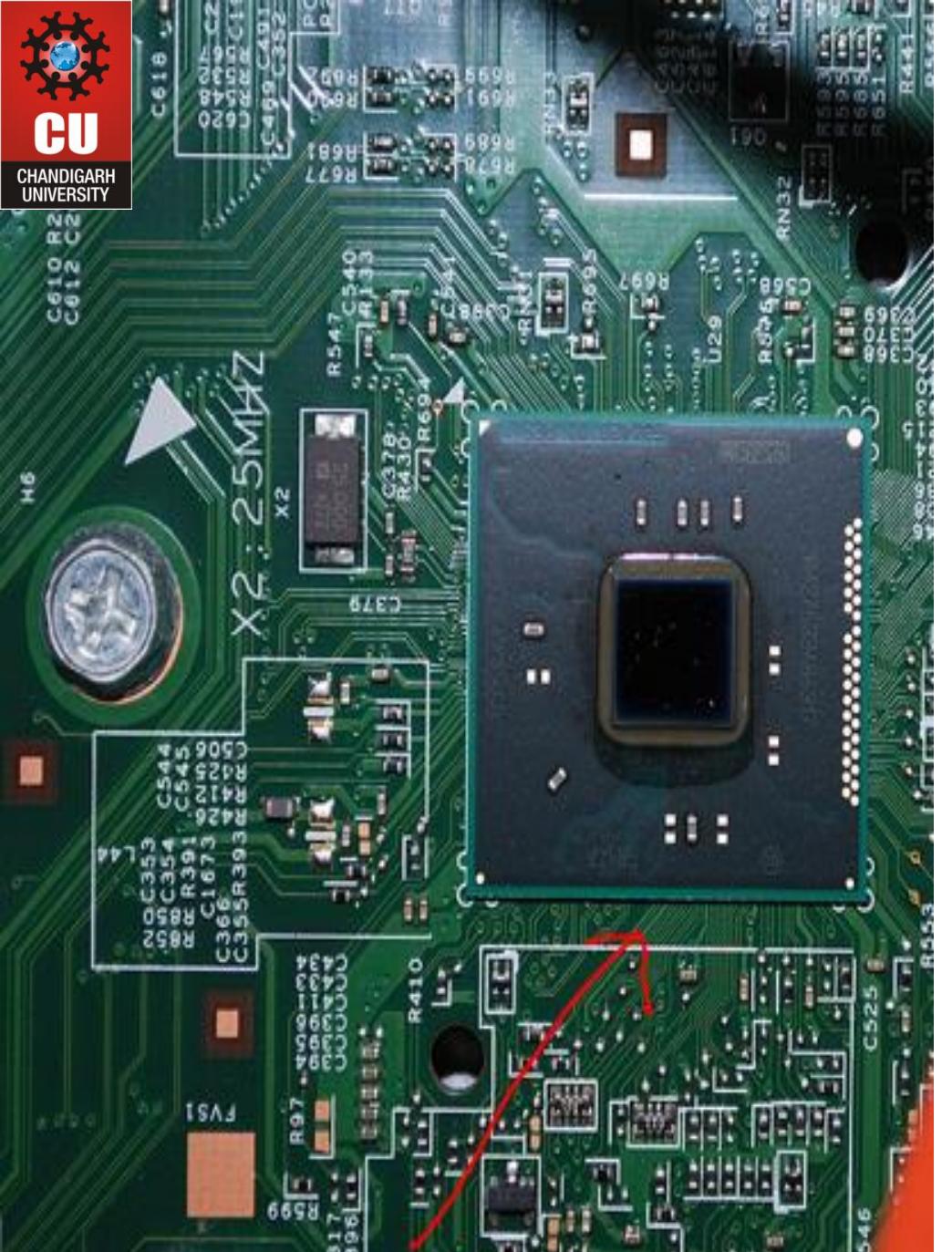
# NB V/S SB

S.NO	North Bridge	South Bridge
9.	North bridge looks bigger.	South bridge looks smaller.
10.	North bridge connects components like RAM, AGP.	South bridge connects components like PCI, USB.



# PCH (PLATFORM CONTROLLER HUB)

- Intel has been offering another architecture for a few years called Platform Controller Hub ( PCH ).
- The two chipsets are replaced by a single chipset said to Platform Controller Hub (PCH )
- Part of the north bridge MCH is integrated into the processor.
- Thus in modern PCs, very fast peripherals such as the graphics card or the SSD are connected directly to the processor.



# PCH (PLATFORM CONTROLLER HUB)

- So the slot and port PCI-express the fastest has a BUS connected directly to the processor (CPU).
- Slower devices like the card Ethernet , WiFi ,Audio or SATA interface have a BUS connected to the chipset.
- This is the south bridge part.
- Finally the PCH is then connected to the CPU via something called Direct Media Interface , or DMI.

# PLATFORM CONTROLLER HUB ARCHITECTURE

- Some north bridge functions, including the memory controller, the integrated GPU (Intel HD Graphics), the graphics card interface (PCIe x16), were integrated into the CPU, while the PCH took over the remaining functions in addition to the traditional roles of the south bridge. The north bridge was therefore eliminated.
- Other north bridge functions and all south bridge functions were migrated to a new Platform Controller Hub. These included clocking (the system clock), Flexible Display Interface (FDI) and Direct Media Interface (DMI). The FDI is only used when the chipset requires supporting a CPU with integrated graphics.

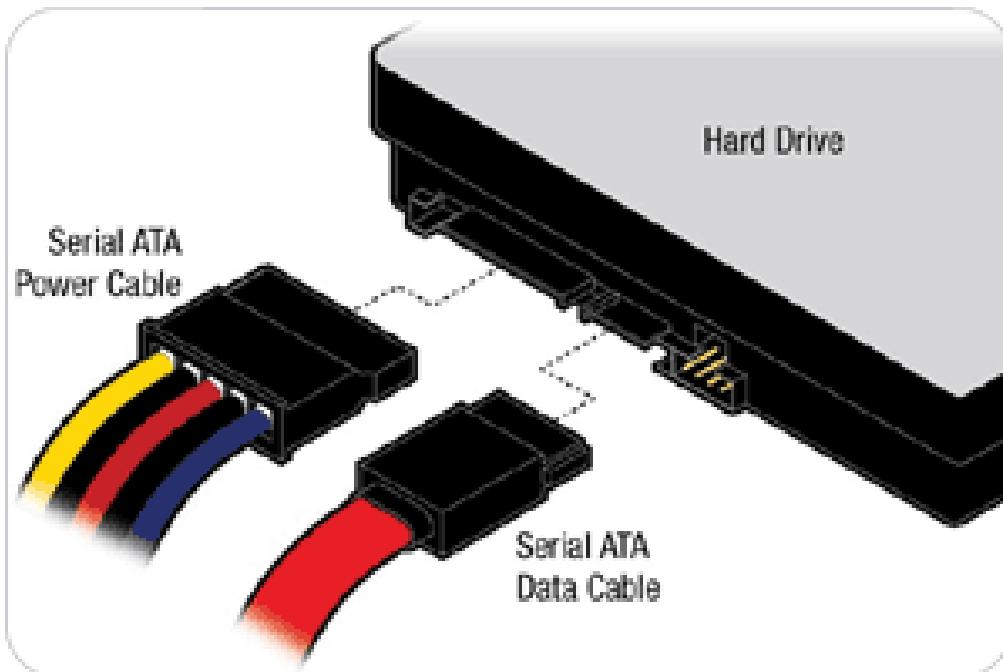
# MEMORY SLOTS

- 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.
- It is also important to note how many available memory slots are available in your computer.
- It is not uncommon for computers to have all memory slots occupied. If all slots are full and you want to upgrade the computer memory, you need to remove some or all of the existing memory.

# MEMORY SLOTS



- Along the bottom edge of the memory module are lots of gold plated connectors, and this type of memory has 240 of them in total (120 each side). These provide the power and data signals for the chips.
- The most modern kind of RAM is DDR4, which proceeded DDR3. DDR3 proceeded DDR2, DDR2 to DDR, and DDR to SDRAM -- each iteration being faster and more capable of a higher capacity of random access storage.



# SATA

- Serial ATA (Serial Advanced Technology Attachment or SATA)
- SATA is a computer bus interface that connects host bus adapters to mass storage devices such as hard disk drives, optical drives, and solid-state drives.
- Serial ATA succeeded the earlier Parallel ATA (PATA) standard to become the predominant interface for storage devices.



## SATA

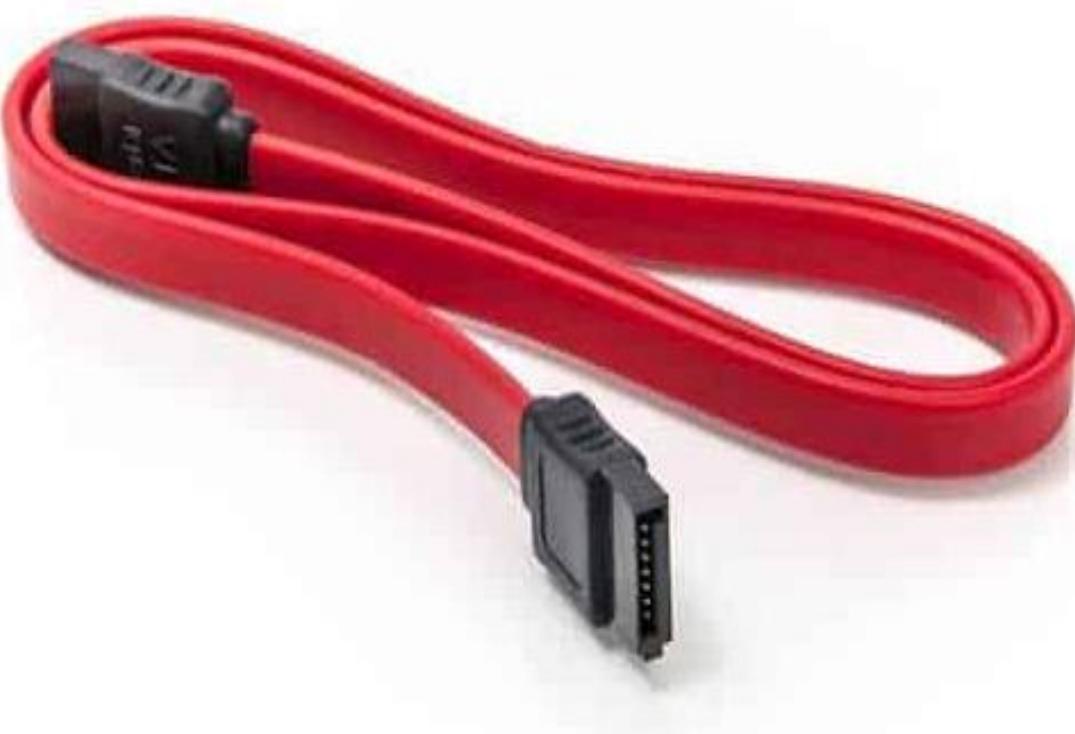
- The SATA cable comes with every computer that has been released as of June 2010.
- These cables are known for transferring data at high rates (from 1.5 to 6 gigabytes per second) The cable comes with a few specific purposes that are used by every computer for some form of data access.
- A SATA Cable can also be used to connect an external hard drive to the computer.



# SATA

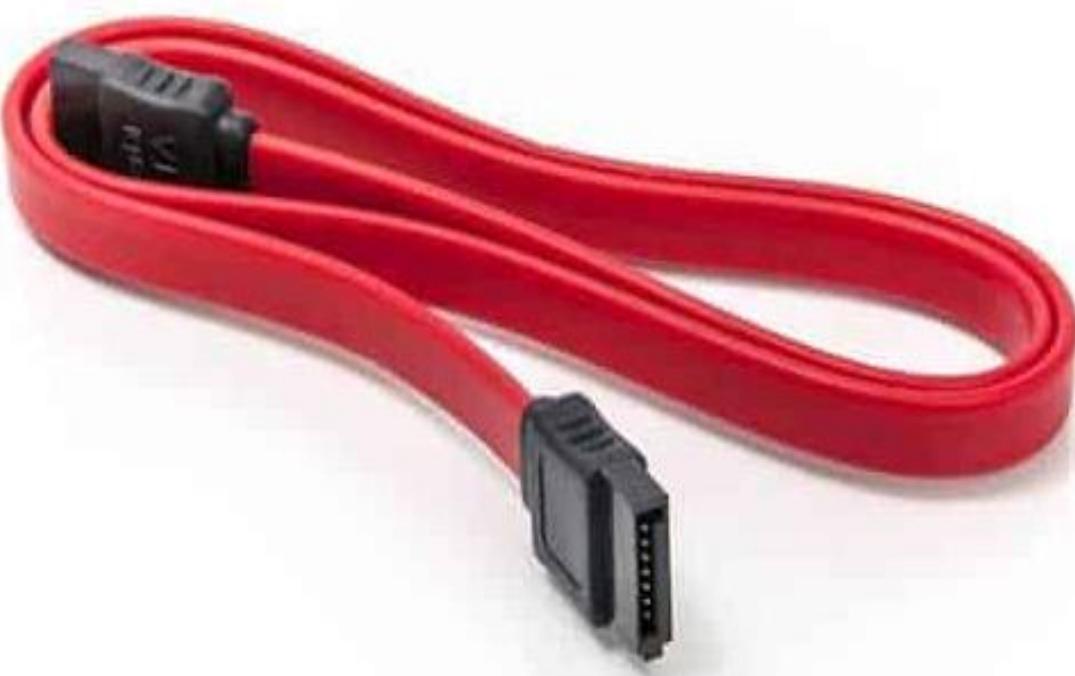
- Primarily, the SATA cable is used so that a motherboard can communicate with an internal hard drive, but there are other devices that can make use of the SATA cable as well.
- A SATA hard drive cable has seven conductors and is smaller than an IDE/PATA cable.
- A SATA cable connects a single hard drive to a single connector on the SATA controller, which is usually found on the computer's motherboard.

# SATA



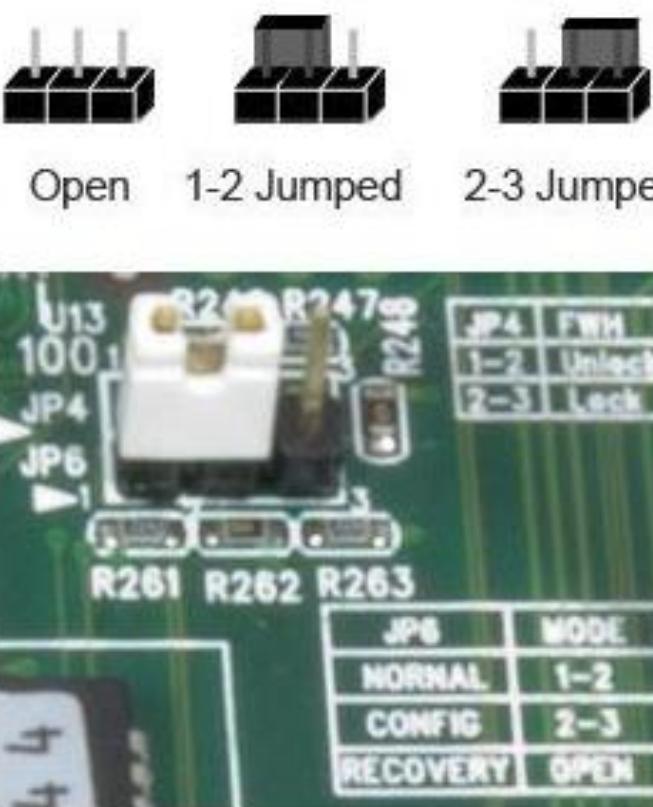
- Compared to the 40-pin and 80-wire PATA, **SATA uses a seven-wire cable**.
- Not only does it reduce cost, but also eases **cable** routing and improves the airflow and cooling.
- SATA also supports hot plugging in the devices, which means that one can remove a device without switching off the computer. But the entire computer needs to shut down before plugging off a PATA device.

# SATA for Laptop



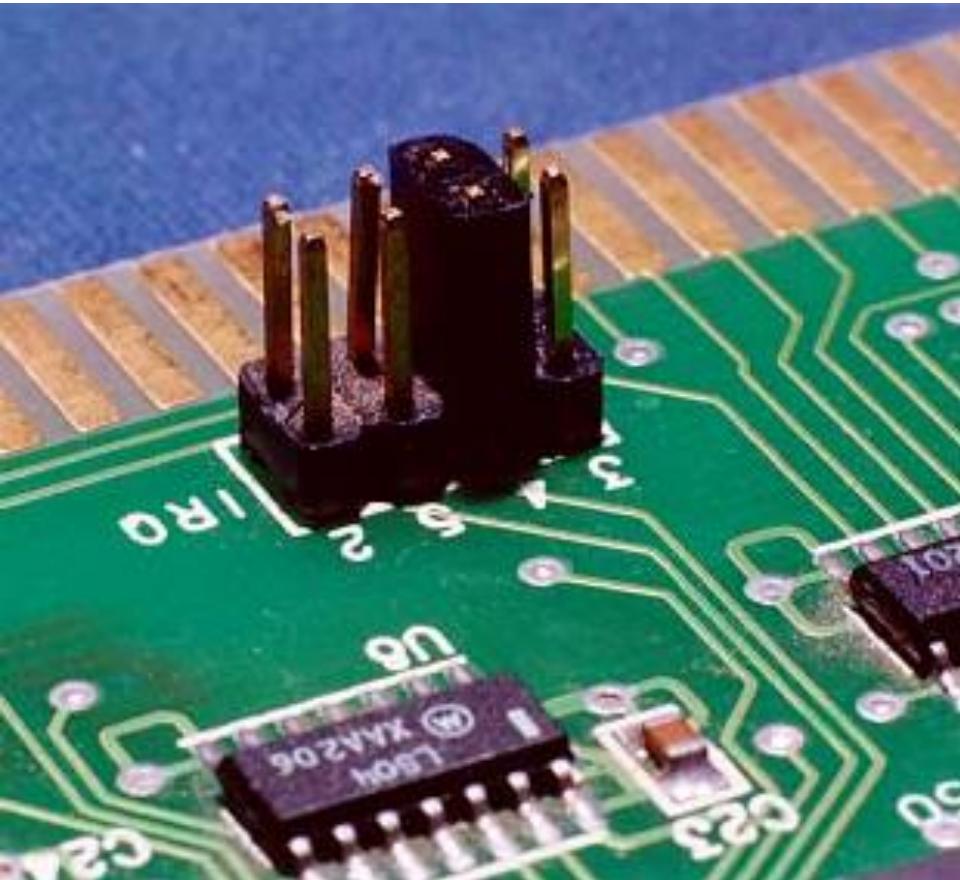
- In most laptops, the storage devices are directly attached to the motherboard.
- Therefore, a traditional SATA cable isn't required.
- The storage devices in the laptops like HDD, SSD, etc. are connected to the breakout boards.
- These boards are connected to the motherboard with a ribbon-like SATA cable. These cables are thin and flat, allowing airflow in the laptop.

# JUMPERS



- Jumpers allow the computer to close an electrical circuit, allowing the electricity to flow on a circuit board and perform a function.
- Jumpers consist of small pins that can be covered with a small plastic box (jumper block), as shown in the illustration.
- Picture shows the illustration of what jumpers may look like on your motherboard.

# JUMPERS



- Jumpers manually configure computer peripherals, such as the motherboard, hard drives, modems, sound cards, and other components.
- For example, if your motherboard supported intrusion detection, a jumper can be set to enable or disable this feature.

# BIOS



- The full form of BIOS is Basic Input Output System. It is a motherboard component in the form of a Integrated chip.
- This chip contains all the information and settings of the motherboard which you can modify by entering the BIOS mode from your computer.
- The BIOS firmware is the first software to run when powered on; it is re-installed on a PC's system board.

# BIOS



- The BIOS software has a number of different roles, but its most important role is to load the operating system.
- When you turn on your computer and the microprocessor tries to execute its first instruction, it has to get that instruction from somewhere.
- It cannot get it from the operating system because the operating system is located on a hard disk, and the microprocessor cannot get to it without some instructions that tell it how. The BIOS provides those instructions.

# BIOS

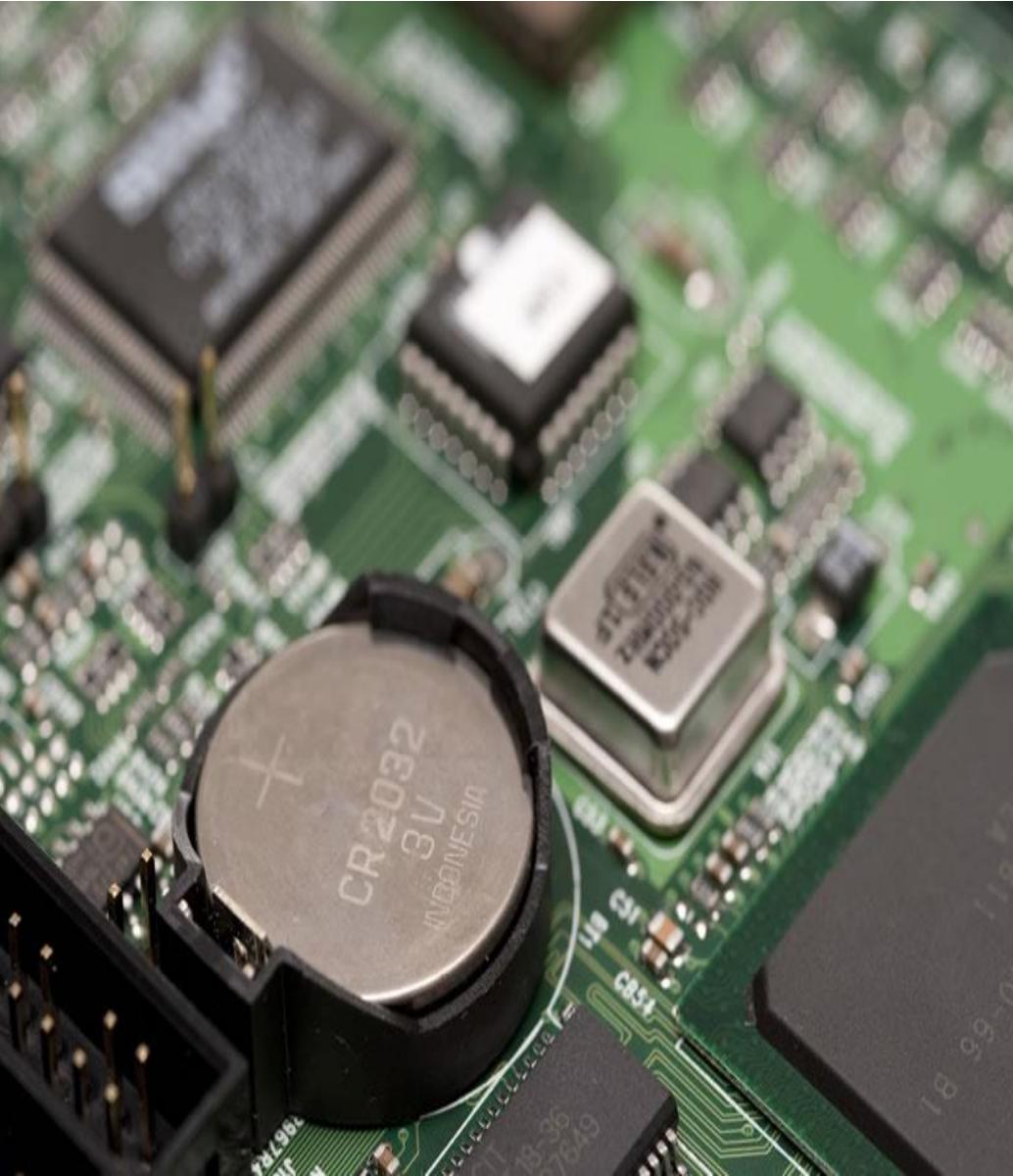
- A power-on self-test (POST) for all of the different hardware components in the system to make sure everything is working properly
- Activating other BIOS chips on different cards installed in the computer - For example, SCSI and graphics cards often have their own BIOS chips.
- Providing a set of low-level routines that the operating system uses to interface to different hardware devices - It is these routines that give the BIOS its name. They manage things like the keyboard, the screen, and the serial and parallel ports, especially when the computer is booting.
- Managing a collection of settings for the hard disks, clock, etc.

# BIOS

When you turn on your computer, the BIOS does several things. This is its usual sequence:

1. Check the CMOS Setup for custom settings
2. Load the interrupt handlers and device drivers
3. Initialize registers and power management
4. Perform the power-on self-test (POST)
5. Display system settings
6. Determine which devices are bootable
7. Initiate the bootstrap sequence

# CMOS BATTERY



- BIOS needs to remain operational even when your computer isn't plugged into a power source.
- That's where the battery comes in. When your computer gets unplugged, BIOS relies on the CMOS battery for power.
- The battery or a cell is a 3.0 Volts lithium type cell. The cell is responsible for storing the information in BIOS and the full form is Complementary Metal Oxide Semiconductor. CMOS Battery also store date and time.
- The CMOS battery powers the BIOS firmware in your laptop.

# CMOS BATTERY

- You'll find CMOS batteries in both laptops and desktop PCs, but it's used more frequently in a laptop. That's because laptops are usually unplugged for a longer amount of time than desktop PCs. Most desktop PCs are unplugged from their power source very infrequently.
- The CMOS battery gets charged whenever your laptop is plugged in. It's only when your laptop is unplugged that the battery loses charge. Most batteries will last 2 to 10 years from the date they're manufactured. The more you leave your laptop plugged in, the longer your battery will last.

# REFERENCES :

1. [Competitive programming – Wikipedia](#)
2. [What is the function of PCI slots on motherboards? – Quora](#)
3. [What is PCI \(Peripheral Component Interconnect\)? \(computerhope.com\)](#)
4. [North And South Bridges Of A Motherboard: Explained – Tech.78 \(wordpress.com\)](#)
5. [Chipset northbridge and southbridge, PCH, FCH: role and definition \(hebergementwebs.com\)](#)

