NAME : Soham Manoj Pawar

ROLL NO : 71

EXPERIMENT 01

AIM :-

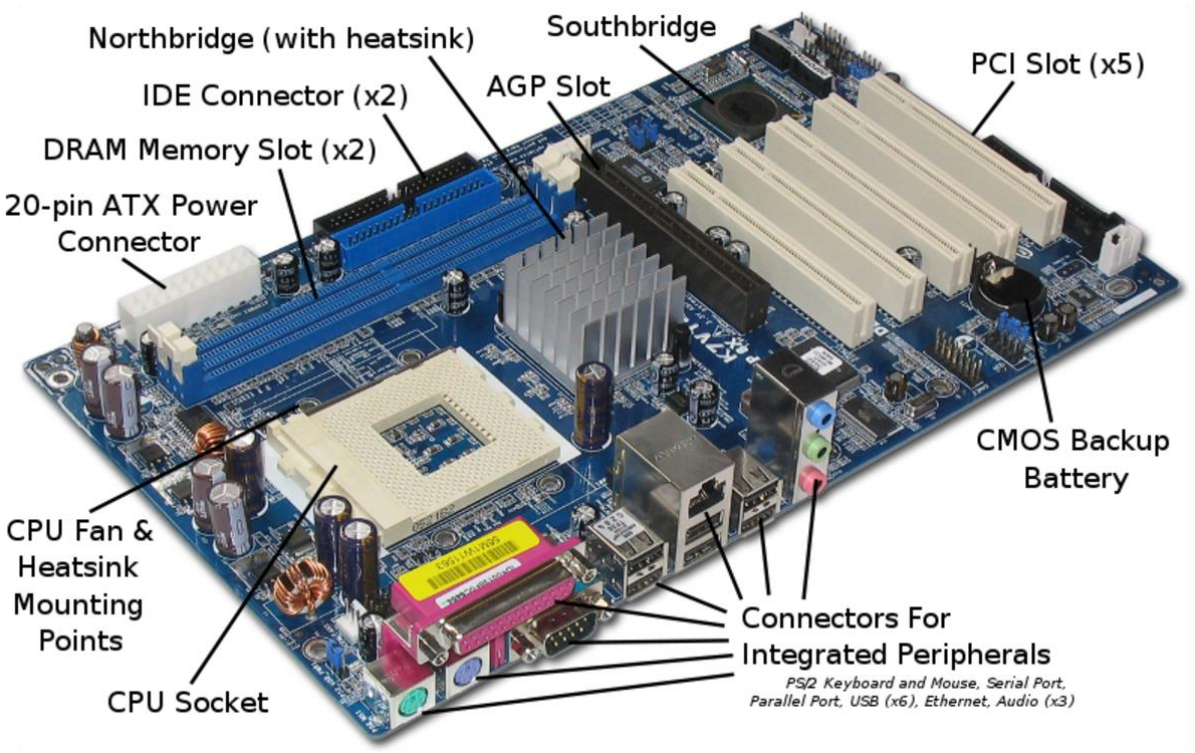
Study of PC motherboard technology (South bridge and North Bridge), various connections and parts used in computer communication.

LO No :- LO1

LO : Demonstrate various components and peripheral of computer system

Theory :-

A motherboard is one of the most essential parts of a computer system. It holds together many of the crucial components of a computer, including the central processing unit (CPU), memory and connectors for input and output devices. The base of a motherboard consists of a very firm sheet of non-conductive material, typically some sort of rigid plastic. Thin layers of copper or aluminium foil, referred to as *traces*, are printed onto this sheet. These traces are very narrow and form the circuits between the various components. In addition to circuits, a motherboard contains several sockets and slots to connect the other components.



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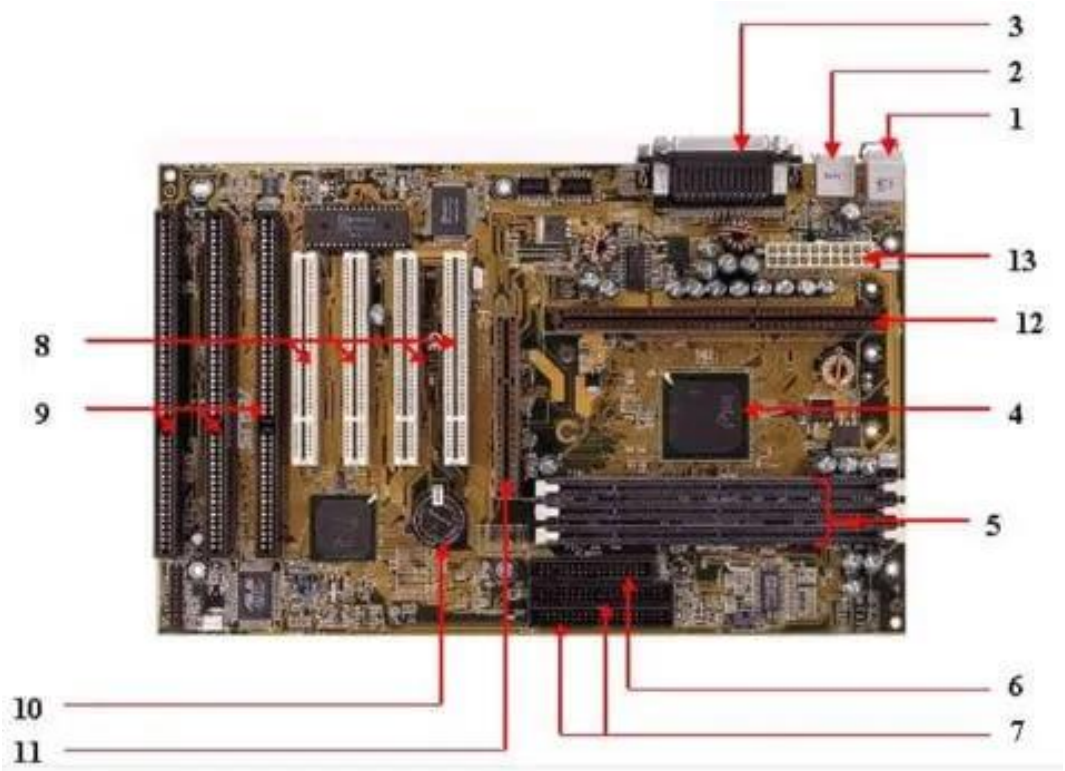
Components of Motherboard :-



I. Keyboard and Mouse.
II. Universal Serial Bus.
III. Parallel port.
IV. CPU chip.
V. RAM slots.
VI. Floppy controller.
VII. IDE controller.
VIII. PCI slot.
IX. ISA slot.
X. CMOS battery.
XI. AGP slot.
XII. CPU slot.
XIII. Power supply slot.

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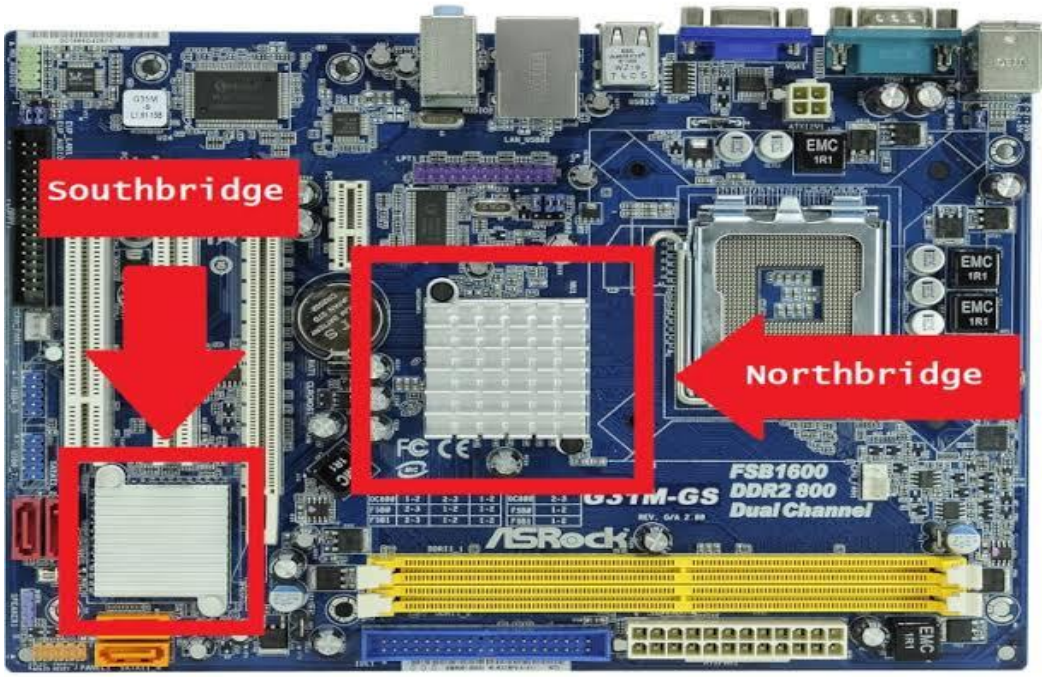
North Bridge of Motherboard :

The Northbridge is the controller that interconnects the CPU to memory via the frontside bus (FSB). It also connects peripherals via high-speed channels such as PCI Express. The Northbridge may include a display controller, obviating the need for a separate graphics card.

The northbridge is one of the two chips, or integrated circuits (ICs), within the chipset on the motherboard. The other chip is called the southbridge. Each chip has a specific set of tasks and communicates between the CPU and external devices through buses.
The northbridge connects the southbridge to the CPU. It is often referred to as the memory controller hub. It handles the faster components on the motherboard, including RAM, ROM, basic input/output system (BIOS), accelerated graphics port (AGP), PCI Express, and the southbridge chip as well as the CPU. It also controls the CPU cache if it is located on the motherboard.



The northbridge plays a vital role in bus speed and is often used as a baseline for establishing the operating frequency for overclocking (the process of running a computer component at a faster processing speed than the manufacturer's specifications).

Recent developments indicate that the northbridge may be on its way out. Memory controllers are now being integrated onto the processor die in AMD64 processors. The AMD64 architecture is also implemented in Intel's newer Pentium 4F and Xeon designs. Additionally, the creation of the PCI Express bus has made the accelerated graphics port (AGP) close to obsolete.

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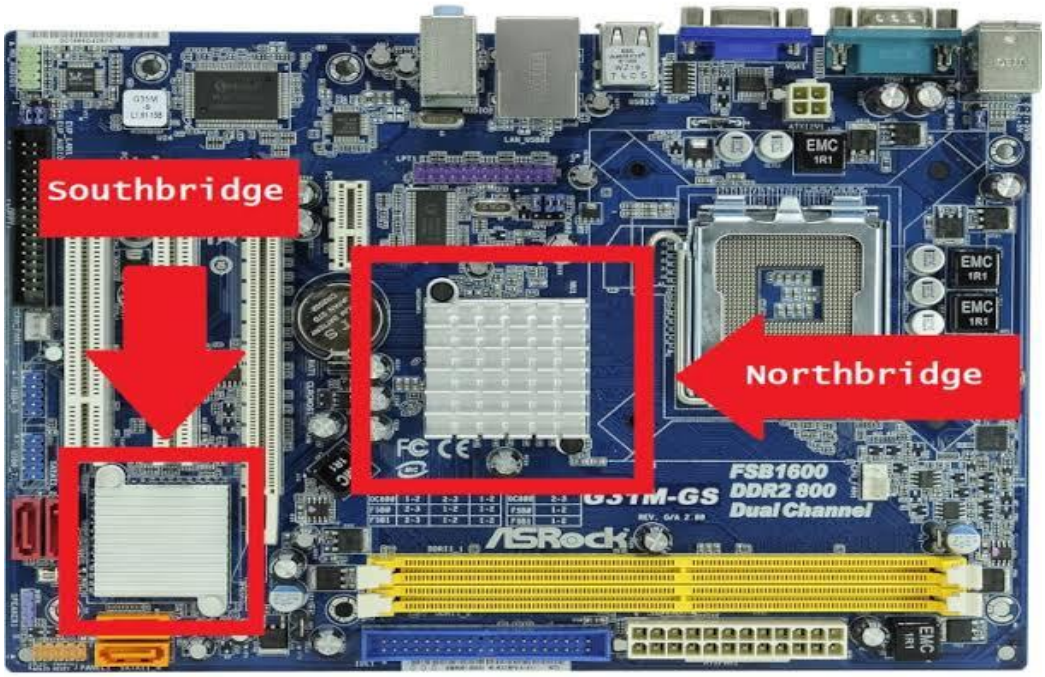
South Bridge of Motherboard :

The southbridge is an IC on the motherboard responsible for the hard drive controller, I/O controller and integrated hardware. Integrated hardware can include the sound card and video card if on the motherboard, USB, PCI, ISA, IDE, BIOS, and Ethernet.

The southbridge gets its name for commonly being South of the PCI bus. Below is a graphic illustration of the ASUS P5AD2-E motherboard with explanations of each of the major components including the southbridge. It is common for the northbridge and southbridge to have a heat sink. Also, the northbridge is usually slightly larger than the southbridge.



Southbridge is one of two chipsets commonly referred to as northbridge/southbridge. Northbridge is a chipset controlling the processor, memory, PCI bus, level 2 cache and AGP (accelerated graphics port) functions.

The name comes from the original 1991 Intel motherboard design. This design had the PCI local bus (the backbone) in the center and the CPU, memory/cache and other high performance-critical components located above or to the north. The less performance-critical components were located below, or to the south of, the PCI local bus. Bridges to these two sets of components from the backbone are often called southbridge and northbridge, even though current architecture has replaced the PCI bus backbone with faster I/O buses.

Motherboard diagrams may generally refer to the southbridge as the I/O controller hub and the northbridge as the memory controller hub.

Factors of Motherboard :-

The main form factor for the motherboard is size and shape. The other factors are physical layout, mounting holes, and board organization.

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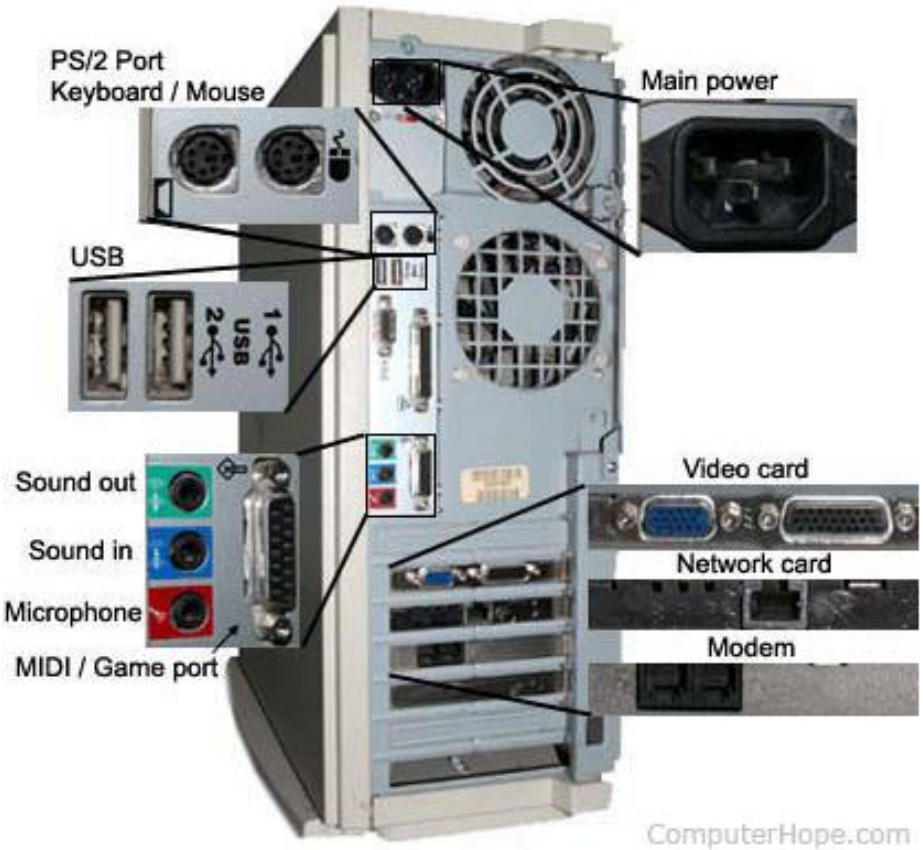
In the below section, some of the form factors are mentioned below :

- ATX.
- Micro ATX.

Other connections of computer :

A connection is a term that describes the link between a plug or connector into a port or jack. For example, your mouse, monitor and keyboard all must connect to computer before they work.



Connections on the back of a computer may be color-coded to help locate the appropriate port for a peripheral device.

- Keyboard – purple.
- Mouse – Green.
- Serial – Cyan.
- Printer – Violet.
- Monitor(VGA) – Blue.
- Monitor(DVI) – White.

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- Line out(headphones) – Lime green.
- Line in(microphone) – Pink.
- Audio in – Grey.
- Joystick - Yellow.
- Many of modem connectors are black and need to be identified by their shape and not color.

Internal Connections :

ATA : -

Advanced Technology Attachment (ATA) is a standard physical interface for connecting storage devices within a computer. ATA allows hard disks and CD-ROMs to be internally connected to the motherboard and perform basic input/output functions.

ATA is also known as Integrated Device Electronics (IDE) and is referred to as ATA with Packet Interface (ATAPI).

Expansion Slots :-

An expansion slot is a socket on the motherboard that is used to insert an expansion card (or circuit board), which provides additional features to a computer such as video, sound, advanced graphics, Ethernet or memory.

IDE/EIDE :-

Enhanced integrated drive electronics (EIDE) is the hard drive interface that succeeded integrated device electronics (IDE), also known as ATA or ATA-1. The interface acts as an intermediary between the computer and a mass storage device. EIDE provides much faster transfer rates than IDE. The term was coined by Western Digital in 1994 to refer to a set of extensions for the ATA-1 attachment standard. EIDE is sometimes called fast ATA or fast IDE or ATA-2. EIDE has since been replaced by other standards that offer faster transfer rates.

SATA :-

A serial advanced technology attachment (serial ATA, SATA or S-ATA) is a computer bus interface used to connect host bus adapters with mass storage devices like optical drives and hard drives. This interface is commonly used to connect hard disk drives to a host system such as a computer motherboard. SATA is an update to the parallel signaling (parallel ATA or PATA) standard of the 1980s used for enhanced integrated drive electronics (EIDE) and the earlier integrated drive electronics (IDE).

SCSI :-

Internet small computer systems interface (iSCSI) is a networking standard for linking data storage components over a network, usually in storage area networks (SANs).

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SCSI is an established medium of fast communication between components. It communicates with physically separated components over an Internet Protocol network. ISCI uses Transmission Control Protocol (TCP) ports 80 and 3260.

Uses of Motherboard :

The motherboard is the main component in the computer system that is used for connecting all the components of the computer system so that they can perform several tasks and functions in the system. The motherboard is considered as the spine of the system, as all components are connected to a single circuit board for performing their functions. The motherboard is a central device where all devices get connected and maintain the flow in the computer system.

Conclusion :

The motherboard is a type of circuit board installed in a computer system where all components of the computer system are getting connected. The motherboard is considered as the backbone of the computer system. There are different formations of the motherboard that can be distinguished based on budget, needs, requirements, and speed. The motherboard is considered as a central hub where all different computer devices are getting connected with it.