EXPERIMENT NUMBER- 1.1

STUDENT NAME :
STUDENT'S UID –
CLASS AND GROUP –
SUBJECT- WORKSHOP TECHNOLOGY
SEMESTER – 2nd

AIM OF THE EXPERIMENT –

To draw a sketch of motherboard, showcasing the PCI slots, Memory slots, Processor, CPU Fan, Heat Sink, Capacitors, Inductors and fan connector and explainthe importance and requirement of these devices.

1. Motherboard:

DESCRIPTION:

Let us begin with the main role of a 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**

There are other things a motherboard does (e.g., holds the components in place, or provides feedback as to how well everything is functioning) but the aforementioned aspects are critical to how a PC operates, that almost every other part that makes up the motherboard, is related to these two things.

- Nearly every motherboard used in a standard desktop PC today will have sockets forthe central processing unit (CPU), memory modules (nearly always a type of DRAM), add-in expansion cards (such a graphics card), storage, input/outputs, and a means to communicate with other computers and systems.
- Standard motherboards initially differ in terms of their size, and there are industry- wide standards that manufacturers tend to adhere to (and plenty of others that don't)
- 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, andprovides connectors for other peripherals.
- 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, whichoften 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.

2. 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.

2(a) . Why do computers have expansion slots?

- Computers have expansion slots to give the user the ability to add new devices totheir 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 videocard without replacing the motherboard.

3. PCI Slots:

- Short for peripheral component interconnect, PCI was introduced by Intel in 1992.
- The PCI bus came in both32- bit(133 MBps)and64-bitversions and was used to attach hardware to a computer.
- Although commonly used in computers from the late 1990s to the early 2000s, PCIhas since been replaced with PCI Express.
- 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 atime, 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 landingspot, and will have to cross again.

4. 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 heatsink that has both active and passive cooling mechanisms.

4 (a). 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 forheat 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.

4(b) . Passive heat sink

- Passive heat sinks are those that have no mechanical components. Consequently,they are100% 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 airflowmoving across the fins.

5. 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 alater time, such as in the case of a camera flash.
- So, that's what capacitors are, but what do they do? As we already mentioned, one ofthe 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 alsovery sensitive to swings in voltage.
- For instance, a voltage surge or spike could completely fry all of the componentswithin your PC.
- After spending a good amount of money on hardware, that's not something you reallywant.
- Unfortunately, voltage amounts change all the time — they aren't constant. So, howdo you stop it from frying your components? With a capacitor.

6. Inductors

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

7. CPU

- Central processing unit is to computer what brain is to our body. It is the masterorgan of a computer.
- No computer can exist without a CPU.
- It is composed of two simpler hardware units - Arithmetic Logic Unit (ALU) and Control Unit (CU).
- CU controls all the activities of other hardware units while ALU performs all the calculations.
- Computer CPUs are very fast in their calculations and swift in control.
- The architecture of CPU was given by Von Neumann and most modern CPU's are primarily Von Neumann in architecture.
- Then with the advent of the Transistor, transistorized CPU's were built.
- Earlier CPU's were built out of bulky, unreliable and fragile switching elements like vacuum tubes and relays.
- Control Unit: It tells the computer's memory, arithmetic logic unit and input andoutput devices how to respond to the instructions that have been sent to the processor. It provides timings and control signals.
- ALU: It is responsible for arithmetic (add, subtract, 2's complement, decrement, increment operations), logical(and,or,ex-or,1's complement) and bit shift operations.
- Registers: Memory Address Register, Memory Data Register, Program Counter and Accumulator.
- Memory: The storage component of the CPU.

LEARNING OUTCOMES

- Remember the concepts related to fundamentals of C language, draw flowcharts and write algorithm/pseudo code.
- Understand the way of execution and debug programs in C language.
- Apply various constructs, loops, functions to solve mathematical and scientific problem.
- Analyze the dynamic behavior of memory by the use of pointers.
- Design and develop modular programs for real world problems using control structure and selection structure.

EVALUATION COLUMN (To be filled by concerned faculty only)

Sr. No.	Parameters	Maximum Marks	Marks Obtained
1.	Worksheet Completion including writing learning objective/ Outcome	10	
2.	Post-Lab Quiz Result	5	
3.	Student engagement in Simulation/ Performance/ Pre-Lab Questions	5	
4.	Total Marks	20	