# St. Francis Institute of Technology

**Class: SE-ITA/ITB Semester: IV; A.Y. 2023-2024**
**Subject: Microprocessor Programming Lab**

## Experiment – 1: Study of PC Motherboard Technology

1. **Aim**: To study different components on the PC motherboard.

2. **Requirements**: 915GLM-V motherboard.

3. **Pre-Experiment Exercise:**

**Brief Theory:**

A motherboard is the main printed circuit board (PCB) in a computer. The motherboard is a computer's central communications backbone connectivity point, through which all components and external peripherals connect.

**Components of the motherboard:**

a. Chipset Type: Intel 915GL Express / Intel ICH6
b. Compatible Processors: Pentium 4, Pentium 4 Extreme Edition, Celeron D
c. Processor Socket: LGA775 Socket
d. Max Bus Speed: 800 MHz, Max Processors Qty
e. Interfaces Provided:
   i. Storage Interfaces: Intel ICH6: ATA-100 -connectors: 1 x 40pin IDC - 2 devicesIntel ICH6: SATA-150 -connectors: 4 x 7pin Serial ATA - 4 devices
   ii. Connector Type: Mini jack
   iii. Type: LAN, PS/2 keyboard, PS/2 mouse, USB 2.0, VGA, audio line-in, audioline-out, microphone, parallel, serial
f. Video and Graphics: Intel GMA 900
g. Memory: Dynamic Video Memory Technology 3.0
h. Network Intefaces: Ethernet, Realtek RTL8100C

4. **Laboratory Exercise**

Perform a case study of motherboard based on the following points: Motherboard technology (South Bridge & North Bridge), Internal Components and Connections, Types/Versions and Features of any one type of motherboard.

5. **Post-Experiment Exercise:**

**A. Conclusion/Comments:**

Write the comments based on the experiment performed.

**B. Post Lab Questions:**

1. List out the common general precautions given in reference to a PC.
2. What are the steps involved for the removal of the motherboard from the computer?

**6. References:**


a. https://icecat.biz/en-in/p/msi/915glm-v/motherboards-915glm-v-344128.html
b. https://www.cnet.com/products/msi-915glm-v-motherboard-micro-atx-lga775-socket-i915gl/
c. https://www.youtube.com/watch?v=ctAVC2JwEwI
d. https://www.youtube.com/watch?v=cNN_tTXABUA

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# MOTHERBOARD CASE STUDY

## What is a motherboard?

A motherboard is the main printed circuit board (PCB) in a computer. The motherboard is a computer's central communications backbone connectivity point, through which all components and external peripherals connect.


*Fig 1: ASUS P5AD2-E Motherboard (Source)*

## Components of the Motherboard:

### 1. Central Processing Unit (CPU)

Also known as the microprocessor or the **processor**, the CPU is the computer's brain. It is responsible for fetching, decoding, and executing program instructions. It also performs mathematical and logical calculations.

## 2. Random Access Memory (RAM)

Random access memory, or RAM, usually refers to computer chips that temporarily store dynamic data to enhance computer performance while you are working.
In other words, it is the working place of your computer, where active programs and data are loaded so that any time the processor requires them, it doesn't have to fetch them from the hard disk.

## 3. Basic Input/Output System (BIOS)

BIOS stands for basic input/output system. BIOS is a "read-only" memory, which consists of low-level software that controls the system hardware and acts as an interface between the operating system and the hardware.

Most people know the term BIOS by another name—device drivers or drivers. BIOS is essentially the link between computer hardware and software in a system.

## 4. Complementary Metal Oxide Semiconductor Random Access Memory (CMOS RAM)

Motherboards also include a small separate block of memory made from CMOS RAM chips, which are kept alive by a battery (known as a CMOS battery) even when the PC's power is off. This prevents reconfiguration when the PC is powered on.

## 5. Cache Memory

Cache memory is a small block of high-speed memory (RAM) that enhances PC performance by pre-loading information from the (relatively slow) main memory and passing it to the processor on demand.

## 6. The Expansion Buses

An expansion bus is an input/output pathway from the CPU to peripheral devices. It is made up of a series of slots on the motherboard. Expansion boards (cards) plug into the bus.

PCI is the most common expansion bus in a PC and other hardware platforms. Buses carry signals such as data, memory addresses, power, and control signals from component to component. Other types of buses include ISA and EISA.

## MOTHERBOARD TECHNOLOGY: (NORTH-BRIDGE AND SOUTH-BRIDGE)

### 1. **NORTH-BRIDGE**:The High-Speed Hub

- Location: Situated near the CPU, like the central traffic circle.
- Function: Handles high-speed communication between the CPU, RAM, and graphics card.Think of it as the main highway for critical data traffic
- Components: Memory controller, graphics bus controller, and sometimes the PCI Express bus controller.

### 2. **SOUTH-BRIDGE**:The I/O Maestro

- Location: Typically below the PCI Express slots, like the bustling side streets.
- Function: Manages slower input/output (I/O) devices like hard drives, USB ports, and audio interfaces. Imagine it as the network of smaller roads connecting various destinations.
- Components: SATA and IDE controllers, USB controllers, audio controller, and various legacy interfaces.

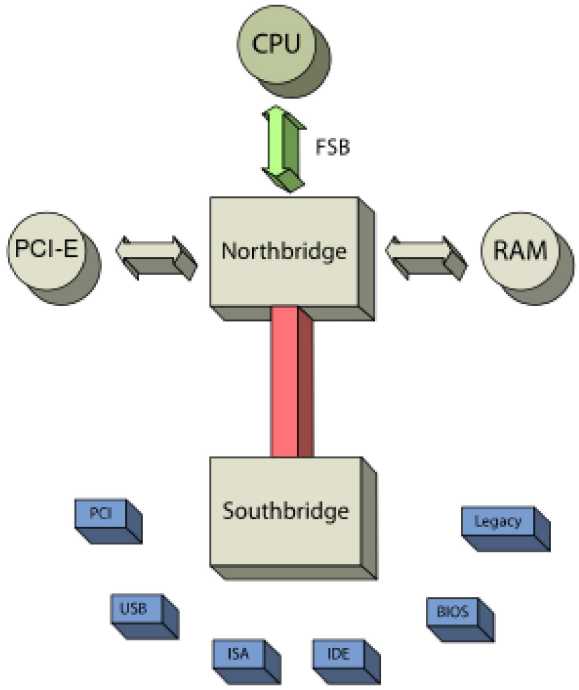


*Fig 2: North-Bridge and South-Bridge Block Diagram (Source)*

## Types/Versions and Features of Asus P5AD2-E Motherboard

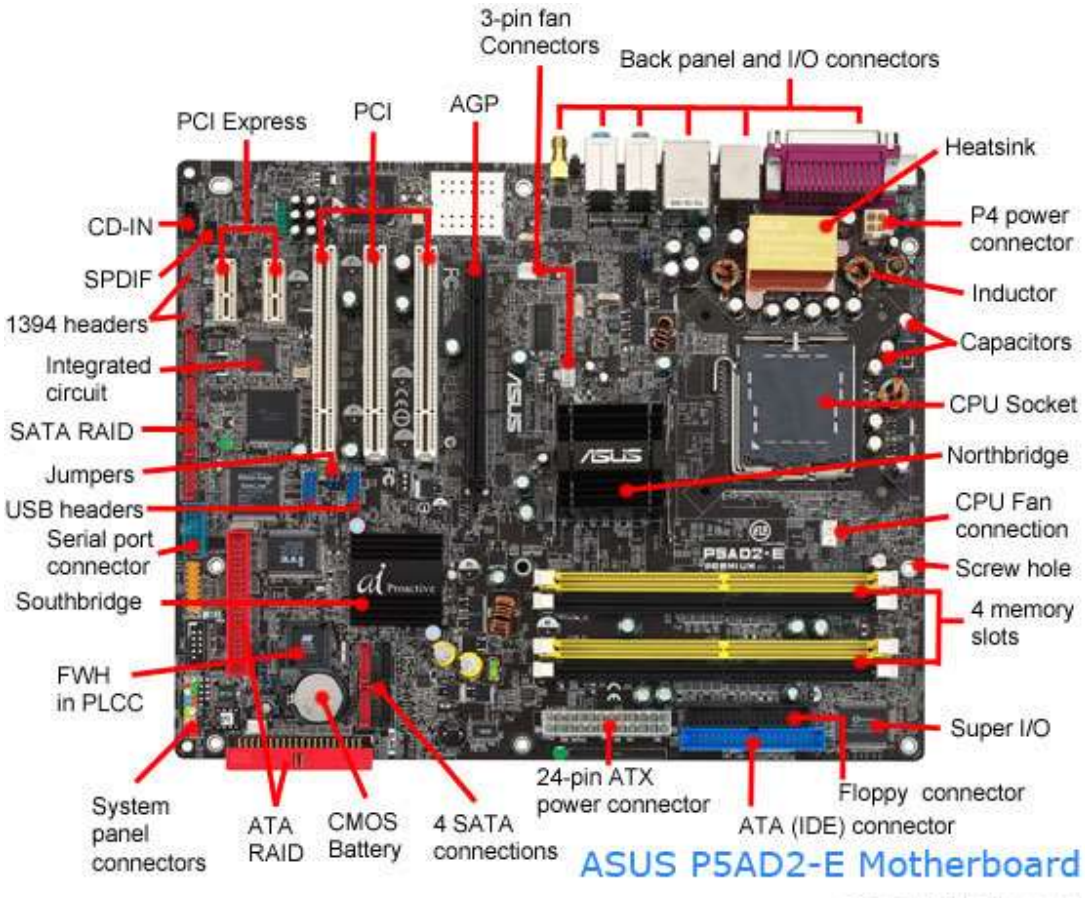


*Fig 3:A labeled ASUS P5AD2-E Motherboard* *(Source)*

The Asus P5AD2-E is a motherboard that was released around the mid-2000s and is based on the Intel 925XE chipset. Here are some details about the Asus P5AD2-E motherboard:

| Feature | Specification |
|---|---|
| Chipset | Intel 925XE |
| Socket | LGA 775 |
| Northbridge | Intel 925XE |
| Southbridge | Intel ICH6R |
| Memory | Dual-channel DDR2 533/400/333 non-ECC, unbuffered |

| | |
|---|---|
| DIMM Slots | 4 |
| Max. Memory Capacity | 8GB |
| BIOS | 2Mb AMI BIOS with ACPI, PnP, C.I. Feature, DMI 2.3 |
| Audio | 8 Channel onboard audio (ALC882D) |
| LAN | Gigabit Ethernet (Marvell 88E8053) |
| Slots | 1 x PCI Express x16, 2 x PCI Express x1, 3 x PCI |
| Storage | 4 x SATA II 300MB/s connectors, 2 x IDE connectors |
| Expansion | 1 x Floppy connector, 1 x Parallel port, 6 x USB 2.0 ports, 1 x Firewire port |
| Form Factor | ATX (305mm x 225mm) |
| Operating System | Windows XP, Vista, 7 |

*Table 1: Specifications of ASUS P5AD2-E Motherboard*