

**NETWORKING & SYSTEM ADMINISTRATION LAB****Name: APARNA K MANOJ****Roll No:32****Batch: Regular MCA****Date:20 March 2022****Experiment No.: 1****Aim**

Identify major component of a computer system such as:

- Motherboard
- RAM Module
- Daughter Cards
- Bus slots
- SMPS
- Internal Storage Devices
- Interfacing Ports

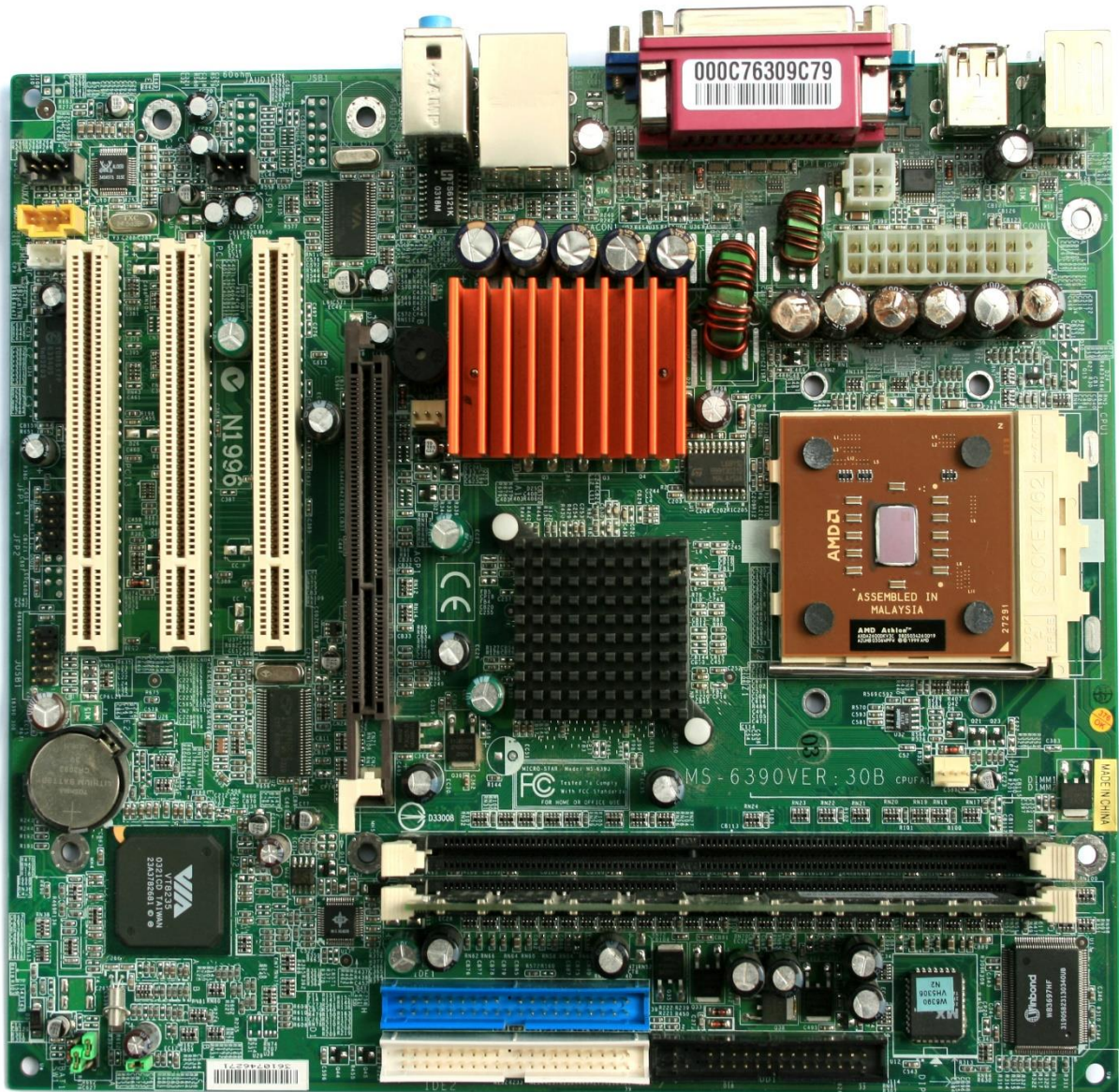
**Procedure****Motherboard**

A motherboard provides the electrical connections by which the other components of the system communicate. Unlike a backplane, it also contains the central processing unit and hosts other subsystems and devices

Desktop computer has its microprocessor ,main memory and other essential components connected to the motherboard. Other components such as external storage, controllers for video display and sound, and peripheral devices may be attached to the motherboard as plug-in cards or via cables; in modern microcomputers, it is increasingly common to integrate some of these peripherals into the motherboard itself.

Modern motherboards include:

- **CPU sockets (or CPU slots)** in which one or more microprocessors may be installed. In the case of CPUs in ball grid array packages, such as the VIA Nano and the Goldmont Plus, the CPU is directly soldered to the motherboard.
- Memory slots into which the system's main memory is to be installed, typically in the form of DIMM modules containing DRAM chips can be DDR3, DDR4 or DDR5
- The chipset which forms an interface between the CPU, main memory, and peripheral buses
- Non-volatile memory chips (usually Flash ROM in modern motherboards) containing the system's firmware or BIOS

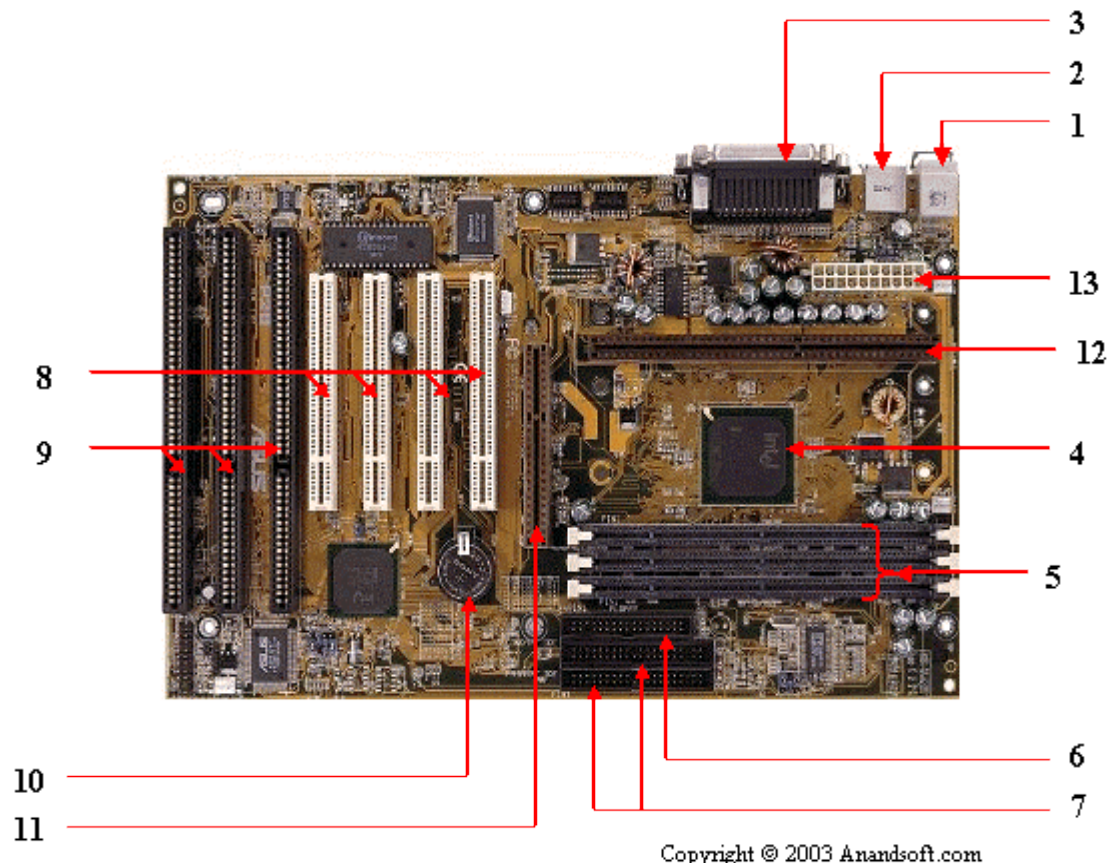


A microATX motherboard with some faulty capacitors

- The clock generator which produces the system clock signal to synchronize the various components
- Slots for expansion cards (the interface to the system via the buses supported by the chipset)
- Power connectors, which receive electrical power from the computer power supply and distribute it to the CPU, chipset, main memory, and expansion cards. As of 2007, some graphics cards (e.g. GeForce 8 and Radeon R600) require more power than the motherboard can provide, and thus dedicated connectors have been introduced to attach them directly to the power supply[4]
- Connectors for hard disk drives, optical disc drives, or solid-state drives, typically SATA and NVMe now.



## MOTHERBOARD COMPONENTS



1. **Mouse & keyboard:** Keyboard Connectors are two types basically. All PCs have a Key board port connected directly to the motherboard. The oldest, but still quite common type, is a special DIN, and most PCs until recently retained this style connector. The AT-style keyboard connector is quickly disappearing, being replaced by the smaller mini DIN PS/2-style keyboard connector.

You can use an AT-style keyboard with a PS/2-style socket (or the other way around) by using a converter. Although the AT connector is unique in PCs, the PS/2-style mini-DIN is also used in more modern PCs for the mouse. Fortunately , most PCs that use the mini-DIN for both the keyboard and mouse clearly mark each mini-DIN socket as to its correct use. Some keyboards have a USB connection, but these are fairly rare compared to the PS/2 connection keyboards.

2. **USB:** USB is the General-purpose connection for PC. You can find USB versions of many different devices, such as mice, keyboards, scanners, cameras, and even printers. a USB connector's distinctive rectangular shape makes it easily recognizable.

USB has a number of features that makes it particularly popular on PCs. First, USB devices are hot swappable. You can insert or remove them without restarting your system.

3. **Parallel port:** Most printers use a special connector called a parallel port. Parallel port carry data on more than one wire, as opposed to the serial port, which uses only one wire. Parallel ports use a 25-pin female DB connector. Parallel ports are directly supported by the motherboard through a direct connection or through a dangle.

4. **CPU Chip:** The *central processing unit*, also called the *microprocessor* performs all the calculations that take place inside a pc. CPUs come in Variety of shapes and sizes. Modern CPUs generate a lot of heat and thus require a cooling fan or heat sink. The cooling device (such as a cooling fan) is removable, although some CPU manufactures sell the CPU with a fan permanently attached.
5. **RAM slots:** Random-Access Memory (RAM) stores programs and data currently being used by the CPU. RAM is measured in units called bytes. RAM has been packaged in many different ways. The most current package is called a 168-pin DIMM (Dual Inline Memory module).
6. **Floppy controller:** The floppy drive connects to the computer via a 34-pin *ribbon cable*, which in turn connects to the motherboard. A *floppy controller* is one that is used to control the floppy drive
7. **IDE controller:** Industry standards define two common types of hard drives: EIDE and SCSI. Majority of the PCs use EIDE drives. SCSI drives show up in high end PCs such as network servers or graphical workstations. The EIDE drive connects to the hard drive via a 2-inch-wide, 40-pin ribbon cable, which in turn connects to the motherboard. *IDE controller* is responsible for controlling the hard drive.
8. **PCI slot:** Intel introduced the *Peripheral component interconnect* bus protocol. The PCI bus is used to connect I/O devices (such as NIC or RAID controllers) to the main logic of the computer. PCI bus has replaced the ISA bus.
9. **ISA slot:** (Industry Standard Architecture) It is the standard architecture of the Expansion bus. Motherboard may contain some slots to connect ISA compatible cards.
10. **CMOS Battery:** To provide CMOS with the power when the computer is turned off all motherboards comes with a battery. These batteries mount on the motherboard in one of three ways: the obsolete external battery, the most common onboard battery, and built-in battery.
11. **AGP slot:** If you have a modern motherboard, you will almost certainly notice a single connector that looks like a PCI slot, but is slightly shorter and usually brown. You also probably have a video card inserted into this slot. This is an *Advanced Graphics Port (AGP)* slot.
12. **CPU slot:** To install the CPU, just slide it straight down into the slot. Special notches in the slot make it impossible to install them incorrectly. So remember if it does not go easily, it is probably not correct. Be sure to plug in the CPU fan's power.
13. **Power supply plug in:** The Power supply, as its name implies, provides the necessary electrical power to make the pc operate. the power supply takes standard 110-V AC power and converts into 12-Volt, 5-Volt, and 3.3-Volt DC power.

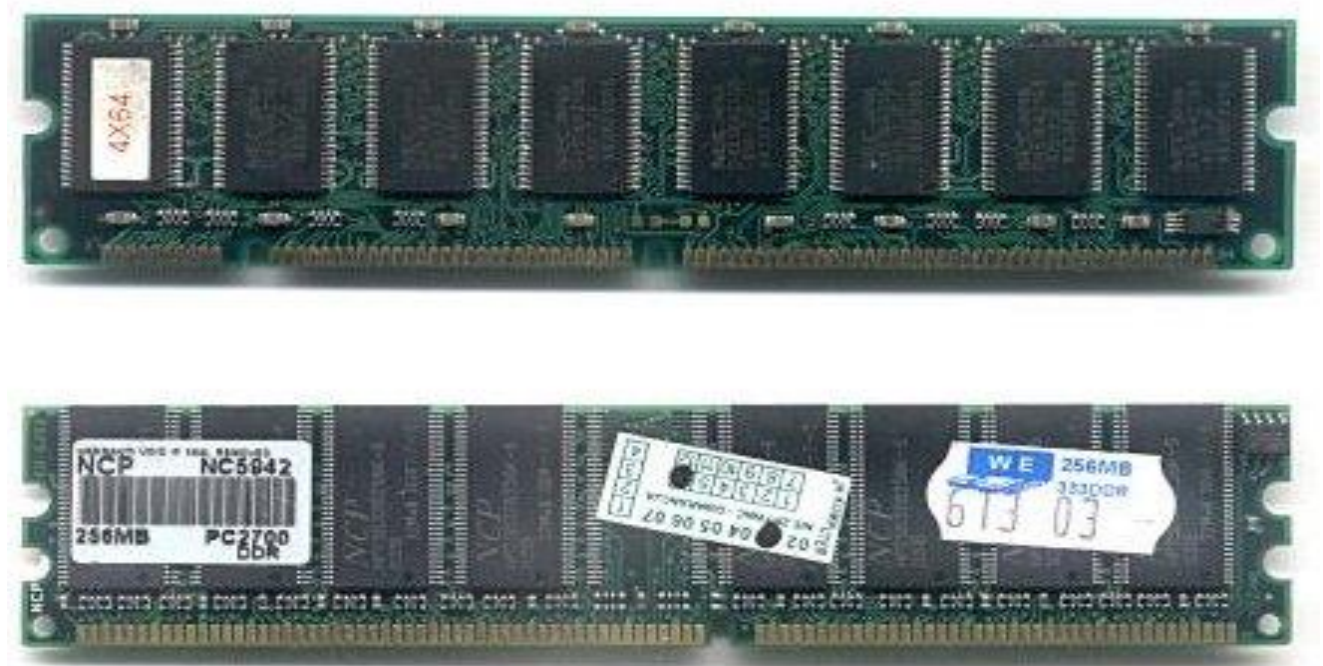
## RAM Modules

In computing, a memory module or RAM (random-access memory) stick is a printed circuit board on which memory integrated circuits are mounted. Memory modules permit easy installation and replacement in electronic systems, especially computers such as personal computers, workstations, and servers.

The first memory modules were proprietary designs that were specific to a model of computer from a specific manufacturer. memory modules were standardized by organizations such as [JEDEC](#) and could be used in any system designed to use them.

Types of memory module include:

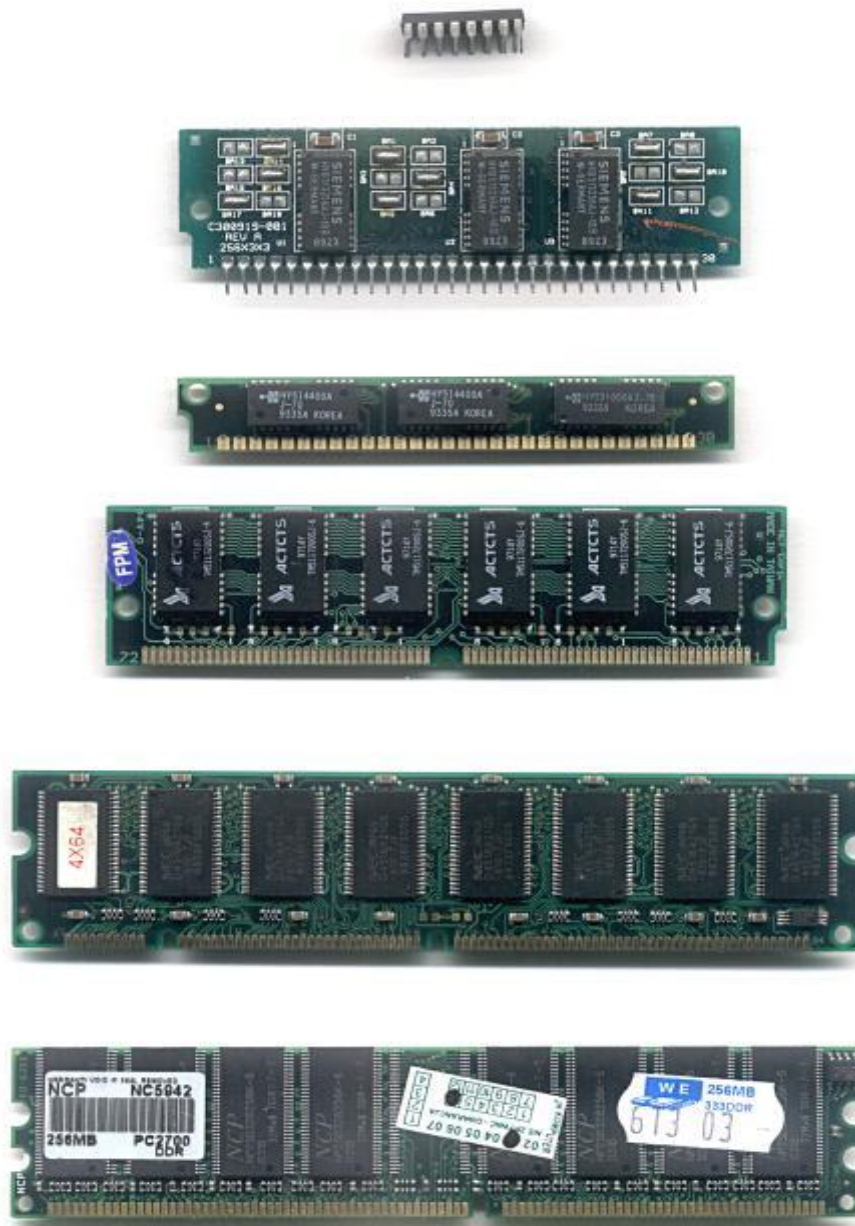
- TransFlash Memory Module
- SIMM, a single in-line memory module
- DIMM, dual in-line memory module
  - Rambus memory modules are a subset of DIMMs, but are normally referred to as RIMMs
  - SO-DIMM, small outline DIMM, a smaller version of the DIMM, used in laptops



Two types of DIMMs (dual in-line memory modules): a 168-pin SDRAM module (top) and a 184-pin DDR SDRAM module (bottom).

**Common DRAM modules**

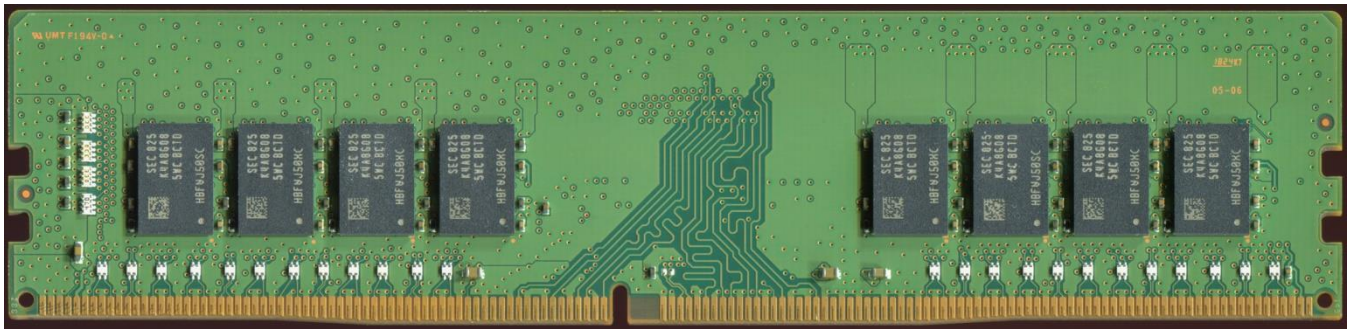
Common DRAM packages as illustrated to the right, from top to bottom



Common DRAM packages. From top to bottom: DIP, SIPP, SIMM (30-pin), SIMM (72-pin), DIMM (168-pin), DDR DIMM (184-pin).

- DIP 16-pin (DRAM chip, usually pre-fast page mode DRAM (FPRAM))
- SIPP 30-pin (usually FPRAM)
- SIMM 30-pin (usually FPRAM)
- SIMM 72-pin (often extended data out DRAM (EDO DRAM) but FPRAM is not uncommon)
- DIMM 168-pin (most SDRAM but some were extended data out DRAM (EDO DRAM))
- DIMM 184-pin (DDR SDRAM)
- RIMM 184-pin (RDRAM)
- DIMM 240-pin (DDR2 SDRAM and DDR3 SDRAM)
- DIMM 288-pin (DDR4 SDRAM)





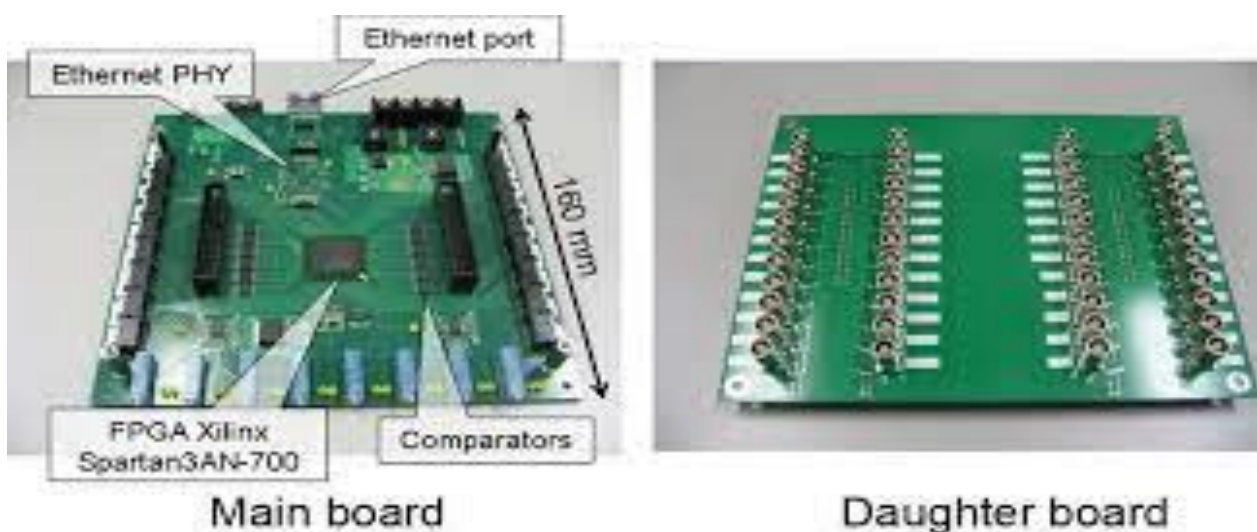
16 GiB DDR4-2666 288-pin 1.2 V UDIMMs

Common SO-DIMM DRAM modules:

- 72-pin (32-bit)
- 144-pin (64-bit) used for SO-DIMM SDRAM
- 200-pin (72-bit) used for SO-DIMM DDR SDRAM and SO-DIMM DDR2 SDRAM
- 204-pin (64-bit) used for SO-DIMM DDR3 SDRAM
- 260-pin used for SO-DIMM DDR4 SDRAM

## **Daughter Cards**

A daughterboard (or daughter board , daughter card , or daughtercard ) is a circuit board that plugs into and extends the circuitry of another circuit board. The other circuit board may be the computer's main board (its motherboard ) or it may be another board or card that is already in the computer, often a sound card. The term is commonly used by manufacturers of wavetable daughterboards that attach to existing sound cards.



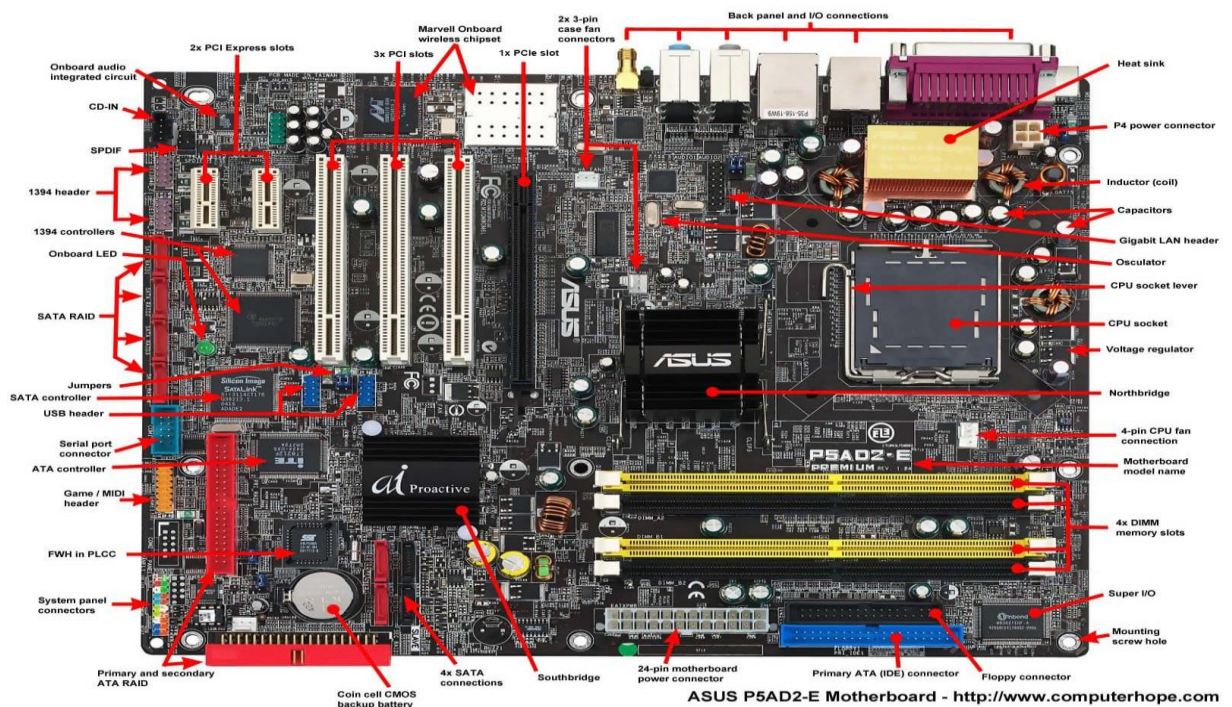
A mezzanine card is a kind of daughterboard that is installed in the same plane as but on a second level above the motherboard.

## Bus slots

A bus slot or expansion port, an expansion slot is a connection or port inside a computer on the motherboard or riser card. It provides an installation point for a hardware expansion card to be connected. For example, if you wanted to install a new video card in the computer, you'd purchase a video expansion card and install that card into the compatible expansion slot.

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



In this picture, there are three different types of expansion slots: PCI Express, PCI, and AGP.



## **SMPS**

A switched-mode power supply (SMPS) is an electronic circuit that converts power using switching devices that are turned on and off at high frequencies, and storage components such as inductors or capacitors to supply power when the switching device is in its non-conduction state.

Switching power supplies have high efficiency and are widely used in a variety of electronic equipment, including computers and other sensitive equipment requiring stable and efficient power supply. A switched-mode power supply is also known as a switch-mode power supply or switching-mode power supply.



### Advantages of switched-mode power supplies:

- Higher efficiency of 68% to 90%
- Regulated and reliable outputs regardless of variations in input supply voltage
- Small size and lighter
- Flexible technology
- High power density

### Disadvantages:

- Generates electromagnetic interference
- Complex circuit design
- Expensive compared to linear supplies

Switched-mode power supplies are used to power a wide variety of equipment such as computers, sensitive electronics, battery-operated devices and other equipment requiring high efficiency.

## **Internal Storage Devices**

Most computers have some form of internal storage. The most common type of internal storage is the hard disk. At the most basic level, internal storage is needed to hold the operating system so that the computer is able to access the input and output devices. It will also be used to store the applications software that you use and more than likely, the original copies of your data files.



Internal storage device

Internal storage allows the data and applications to be loaded very rapidly into memory, ready for use. The data can be accessed much faster than data which is stored on an external storage device. This is because internal storage devices are connected directly to the motherboard and its data bus whereas external devices are connected through a hardware interface such as USB, which means they are considerably slower to access. Internal storage also means that if the computer is moved around, it will still retain its most commonly used data.



SATA Internal storage hard disk drive

The main disadvantage of internal storage is that when the hard disk fails (and it will), all the data and applications may be lost. This can be avoided to some extent by using more than one hard disk within the machine. Each hard disk has a copy of all the data, so if one fails the other can carry on. This is called a RAID array. An alternative is to use external drives for backup

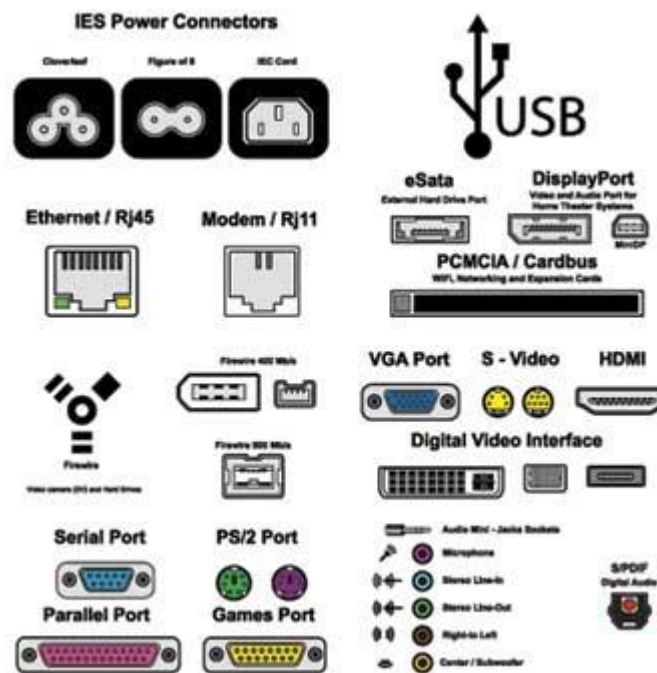
## Interfacing Ports

A port is a physical docking point using which an external device can be connected to the computer. It can also be programmatic docking point through which information flows from a program to the computer or over the Internet.

### Characteristics of Ports

A port has the following characteristics –

- External devices are connected to a computer using cables and ports.
- Ports are slots on the motherboard into which a cable of external device is plugged in.
- Examples of external devices attached via ports are the mouse, keyboard, monitor, microphone, speakers, etc.



### Serial Port

- Used for external modems and older computer mouse
- Two versions: 9 pin, 25 pin model
- Data travels at 115 kilobits per second

### Parallel Port

- Used for scanners and printers
- Also called printer port
- 25 pin model
- IEEE 1284-compliant Centronics port



**PS/2 Port**

- Used for old computer keyboard and mouse
- Also called mouse port
- Most of the old computers provide two PS/2 port, each for the mouse and keyboard
- IEEE 1284-compliant Centronics port

**Universal Serial Bus (or USB) Port**

- 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.

**VGA Port**

- Connects monitor to a computer's video card.
- It has 15 holes.
- Similar to the serial port connector. However, serial port connector has pins, VGA port has holes.

**Power Connector**

- Three-pronged plug.
- Connects to the computer's power cable that plugs into a power bar or wall socket.

**Firewire Port**

- Transfers large amount of data at very fast speed.
- Connects camcorders and video equipment to the computer.
- Data travels at 400 to 800 megabits per seconds.
- Invented by Apple.
- It has three variants: 4-Pin FireWire 400 connector, 6-Pin FireWire 400 connector, and 9-Pin FireWire 800 connector.

**Modem Port**

- Connects a PC's modem to the telephone network.

**Ethernet Port**

- Connects to a network and high speed Internet.
- Connects the network cable to a computer.

- This port resides on an Ethernet Card.
- Data travels at 10 megabits to 1000 megabits per seconds depending upon the network bandwidth.

**Game Port**

- Connect a joystick to a PC
- Now replaced by USB

**Digital Video Interface, DVI port**

- Connects Flat panel LCD monitor to the computer's high-end video graphic cards.
- Very popular among video card manufacturers.

**Sockets**

- Sockets connect the microphone and speakers to the sound card of the computer.