Memory Unit: Its ~~used~~ used to store data & programs. Intermediate results are stored in the memory.

→ A computer system uses various types of memory as semiconductor memories FD, HD and CD - ROM,

→ Different address schemes & memory controllers are in use.

Input/output Unit :→ This unit communicate with outside world. It allows the instructions & data to be fed into machine. Keyboard is input unit without which system has no utility. The o/p unit communicate to users the result of processing & allows orderly exchange of information to take place. The most common output unit are Video monitors & Printers.

Serial Port :→ This is the port which transmit/receive the data bit by bit. Serial ports are designed using a chip called UART (Universal asynchronous Receiver Transmitter).

Parallel Port :→ When its desired to transmit/receive the entire data bits at a time, all the bits are transferred together parallel ports are used.

- This port acts as basic - interface for the printers.
- This port are of 2 types — (1) Unidirectional
  (2) Bi directional
- EPP (Enhanced Parallel Port); Support high speed of data flow

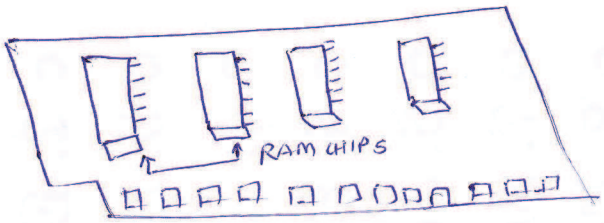
BIOS (Basic Input/Output System) :- Its the low level system software that determine the compatibility of the computer system.

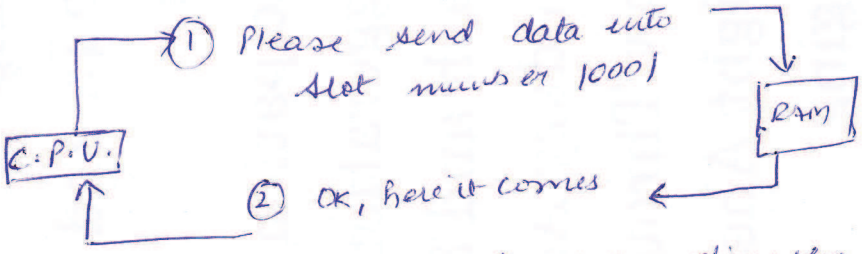
→ Its a set of mini programs & functions that reside on a ROM chip.

→ Its program enable the C.P.U. & other components in the P.C. to communicate the function.

→ It Processes all KBD input, communication through the P.C's ports,

→ memory addresses start at zero & go upto one less than the number of bytes of memory in the computer





⇒ The ability to access each byte of data directly is the reason that this type of memory is referred to as "Random Access".

Cache Memory :→ Moving data back & forth between RAM & C.P.U's registers is one of the most time consuming operations a C.P.U must perform simply because RAM is much slower than the C.P.U.

→ An alternative to this problem is to include a cache memory in the C.P.U.

→ Cache is just like a RAM but its very fast & expensive as compared to normal memory.

How Cache Memory works :→

(1) When a program is running & the C.P.U needs to read the data / instructions from RAM, the CPU first checks to see whether the data is in Cache Memory.

(2) If the data that it needs is not there, it reads the data from RAM into its registers, but it also loads a copy of data into Cache memory.

(3) The Next time the C.P.U needs the same data, it is in the Cache memory & saves the time needed to load the data from RAM.

Program instructions & loop are a good example of the kind

Types of Cache →

L1 Cache is integrated into the processor & runs at processor speed.

To increase the "hit rate" designers implemented a second level of cache called L2, which can be integrated on to either the MBD or C.P.U.

How ~~Many~~ Memory Works:-

→ A large grid of cells is designed into the ckt, laid out in rows & columns.

→ These ~~cells~~ all depending on the type of memory involved, may include transistors, transistors coupled with capacitors or a simple diode.

→ To access data stored in memory, circuitry known as MCC (Memory Control Circuit) is activated by the prefetch registers on the C.P.U.

→ The MCC keeps tracks of address locations for all data stored in memory & also control refresh cycles & data acquisition.

→ The Methods by which rows & columns of memory can be accessed are determined by signals generated by the MCC. Known as Row acken strobe (RAS) and the column acces strobe (CAS).

DRAM:- Internally, the circuit grid of a single dynamic RAM (DRAM) chip consists of an array of microscopic transistors coupled with capacitors.

- When fully charged one of these capacitors represents a 1 in binary.
- A discharge cell represents a 0.

the character that appear on the display.

→ BIOS serves as a middleman btn. your PC's hardware & its S/W.

→ It enable your S/W to access the PC's Hardware.

→ Because the BIOS sits midway btn. your hardware its called firmware (a software residing in H/W).

There are 2 types of built in Memories :-

(1) Volatile
(2) Non-volatile

Volatile :- Memory chip always lose their contents when the computer's power is shut-off (RAM).

Non volatile :- Memory chip always retain the data even after switching off the power (ROM).

ROM :- Non Volatile chips always hold the same data - the data is then can't be changed.

→ In fact putting data permanently into this kind of memory is called "Burning the data".

→ A computer needs ROM to know what to do when the power is first turned on.

→ ROM contains a set of startup instructions that check to see that the rest of memory is functioning properly, check for H/W devices & check for an O.S. on the computer's disk drives.

RAM :- The Memory that can be changed during operation is called RAM.

→ The Purpose of RAM is to hold programs & data while they are in use.

→ RAM chips are normally mounted on a small ckt board which is plugged into MB.

→ A computer doesn't have to search its entire memory each time it needs to find data because the CPU stores & retrieves each piece of data using a memory address.

Memory Types :→

DRAM :→ dynamic RAM (DRAM) chip.

- array of microscopic transistors coupled with capacitors.
- fully charged capacitor = 1
  " discharged " = 0

It is in a grid form, which consists of rows & columns.
The rows represent how many bits "deep" a particular chip is.
Refresh rate :- how many columns a array has.
Capacity of a chip = bit width X Columns X rows.
Most chip manufacturers refer to this as density.

Dram chip itself is major part of timing consists of 2 fixed parameters RAS & CAS.

- When CPU first initialises a request for data, it initialises the RAS to locate the particular row in which required information is stored.

SRAM :- Static RAM, used as cache memory.

- more expensive.
- Takes more space.
- require more power.
- dissipates more heat.
- uses only transistors in its circuitry
- Charge representing a bit is always stored as long as power is supplied to circuit

Memory chips & Modules:-

DIPP :→ dual inline pin package.
- In earlier days, it was in use.
-

DIP:- Most memory chips are packaged in to small plastic or ceramic packages, called dual inline package or DIPS.
- A DIP is a rectangular package with rows of pins running along its longer edges.

SIMM :- Single inline Memory Module (SIMM) is a small circuit board that can hold a group of memory chips.
- Typically, SIMMs hold up to eight or nine RAM chips.

SIPP :- Single inline Pin Package (SIPP) is consisting of a small printed circuit board that holds a number of memory chips.
- It holds 30 pins along one edge which mated with matching holes in the motherboard of the computer.

DIMM :- Dual inline Memory Module (DIMM) is a small circuit board that holds memory chips that are used as a package for SDRAM family : SDRAM and DDR.

RIMM :→ The Rambus RIMM module is a new class of general purpose high performance memory subsystem suitable for use in a broad range of applications including computer memory, personal computers, workstations & other applications where

high bandwidth & low latency are required.
- It's mainly adapted for Intel Pentium 4 motherboards.

- Notebook computers & other computers that require much smaller components don't use standard RAM packages like SIMM or DIMM. Instead, they can use much smaller memory form factor called Small Outline DIMM (SODIMM).

- SODIMMs are available in many physical implementations, including the older 32-bit (72-pin) configuration & newer 64-bit configuration

Micro DIMM:-
- The newest & smallest RAM form factor is MicroDIMM.
- The MicroDIMM is an extremely small RAM form factor. In fact, it is over 50% smaller than SODIMM, only 45.5 millimeter long and 30 millimeters wide.
- It was designed for the ultra light & portable sub notebook style of computer. These modules have 144 pins or 172 pins & are similar to a DIMM in that they use 64-bit data bus

RAM :-
SRAM :- Static RAM is generally used for Cache Memory, which can be accessed more quickly than DRAM.
- Static RAM doesn't need refreshing which makes it faster
- It is also more expensive than DRAM

FPM RAM :→ - Fast Page mode or FPM memory is slightly faster than conventional DRAM.
- FPM works by sending the row address just once for many accesses to memory in locations near each other, improving access time.

EDORAM :→ Extended Data output RAM (EDO RAM) is a type of random access memory (RAM) chip that improves the time to read from memory on faster microprocessors such as the Intel pentium.

- EDORAM has initially optimised for 66 MHZ Pentium.

SDRAM :- Synchronous DRAM, are synchronised with the clock speed that the microprocessor is optimised for.

- This tends to increase the number of instructions that the processor can perform in a given time.
- The speed of SDRAM is rated in MHz, rather than (ns).

DDR SDRAM :- Double Data rate SDRAM, earns its name by doubling the transfer rate of ordinary SDRAM by double pumping the data which means transferring it on both the rising & falling edges of the clock signal.

- DDR-SDRAM also consumes less power, which makes it well-suited to notebook computers.
- DDR-SDRAM is also called SDRAM II & DDRAM.

INSTALLING MEMORY :→

Step 1 :- Determine what kind of RAM you need & whether your computer has enough open slots to hold it. The new RAM should match the existing RAM's specifications and configuration.

Step 2 :- Shut down the computer & disconnect power supply.

Step 3 :- Disconnect all peripheral devices such as Monitor from computer. Wait for 10 sec. before cracking open your case to allow motherboard's capacitors to discharge.

Step 4 :- Remove Computer Cover.

Step 5 :- Remove any cards or internal components to give yourself unobstructed access to RAM socket

Step 6 :- RAM retaining clips need to be opened up in order for RAM to be installed.

Step 7 :- pick up SIMM or DIMM by the ends without touching pins.

Step 8 :- Press the RAM until it is seated securely in the socket. If your socket has retaining clips, press down until clips snap back into place.

Step 9 :- Make sure the small holes on each side of a SIMM fit into holders.

Step 10 :-
- Gently try to pull the module out to ensure it.
- Replace all internal components
- Leave cover off & Reconnect the monitor, keyboard & mouse.

Step 11 :- Turn on the Computer

Step 12 :- Check the amount of RAM by right-clicking the My Computer icon in Windows & choosing properties. On a Mac, Use the about this Macintosh command in the Apple-Menu.

Step 13 :- If you don't see the right amount of RAM, turn off the computer & try "reseating" the SIMM or DIMM & reboot. If that doesn't work, call a Technician.

Step 14 :- Replace the cover & reconnect all peripherals.

Power Supply :→ C.P.U. is brain of a system, Power Supply is equivalent to heart - delivering the system's lifeblood, electricity, to each & every component. If the supply is overloaded, overheated or otherwise ill, then it may lead to physical damage.

3 Issues :→

1) Power Supply ↓ determine whether the power supply is acceptable quality & sized correctly for the system.

2) System Cooling ↓ assure good airflow including powercooling size, cooling fan placement, cable-routing.

3) Power Protection ↓ continuous flow of power through UPS.

(1) Power Supply :→ Designed to take AC power from the wall outlet and convert it in to much lower DC voltages needed by the system.

→ Conversion is reliably & efficiently.

→ Must shutdown system if overloaded, overheated.

Powersupply function & operation :→

The actual fun. is to supply voltages needed by the system.

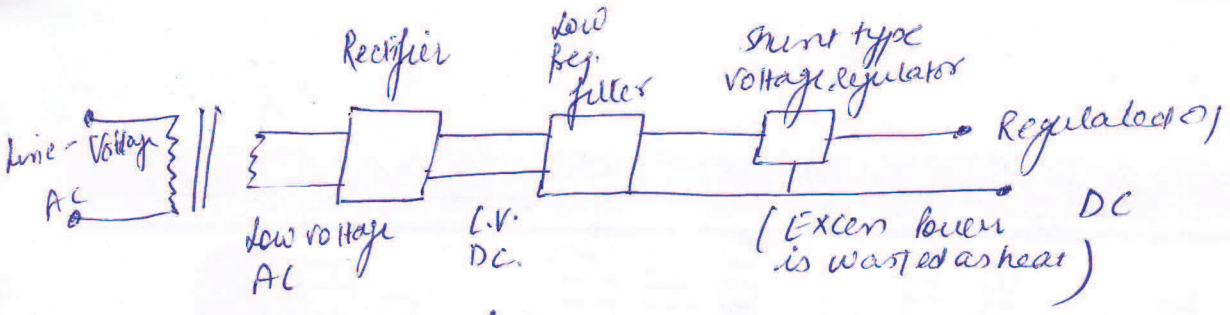
- Converting AC to DC Power :→

Methods

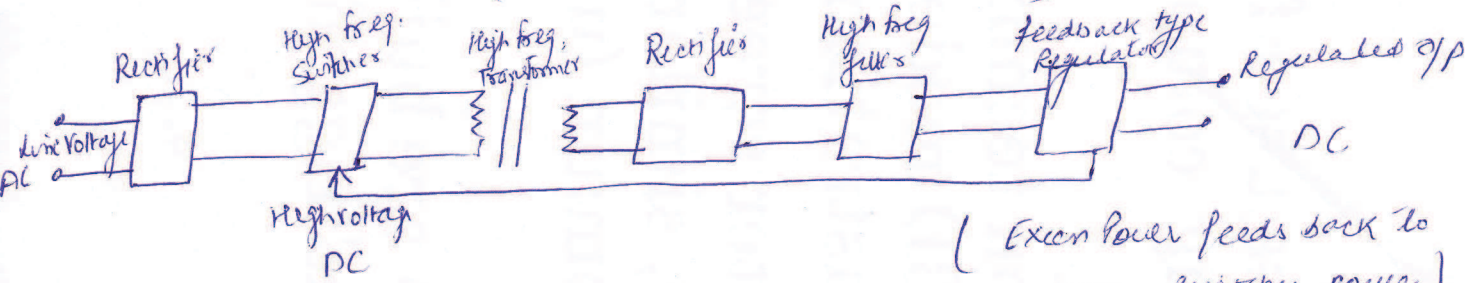
Linear mode

Switching mode power supply. (more lighter & efficient)

Load fluctuations are fed back to the ~~transformer~~ input in such a way as to cause "The switcher" circuit to adjust the input power to Transformer so that it can maintain same O/P voltage to final regulator circuit.

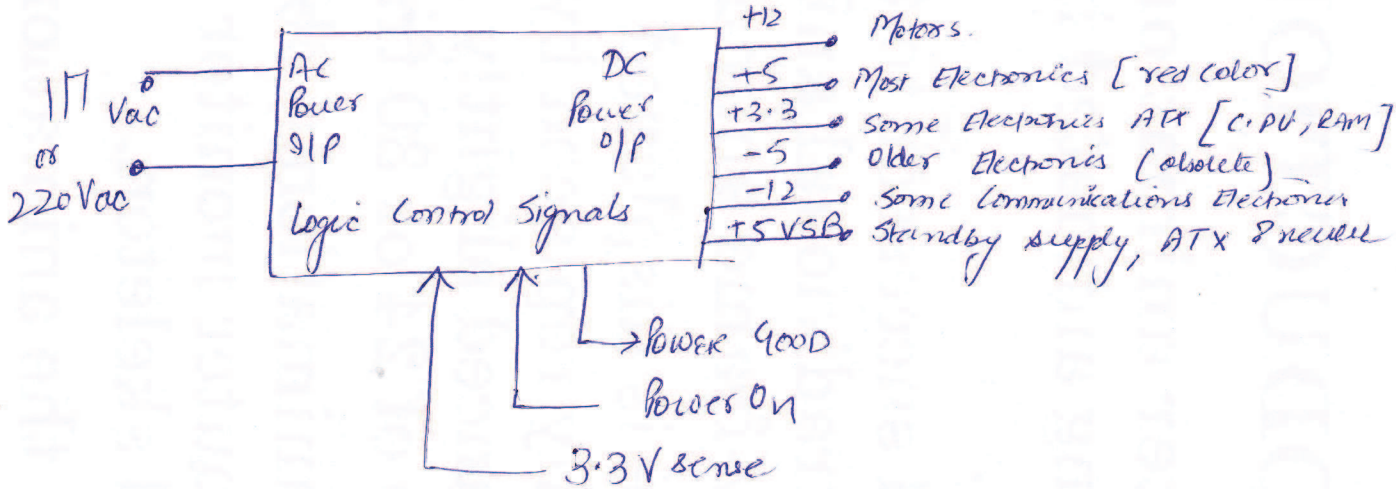


(Linear Mode Power Supply)



(Switching Mode Power Supply)

- O/P supply Voltage Lines :→ The voltage delivered by power supply to the motherboard & other components are, of course, the primary purpose of power supply.



+5 Volt :→ all electronic components.
Sometimes used by motors, only in smaller devices.

3.3 volt :- C.P.U & RAM.

+12 volt :→ all motors from drive motors to cooling fans
Big motors use up 50% more power for starting than while Running
+12 volt supply may show adequate operation.

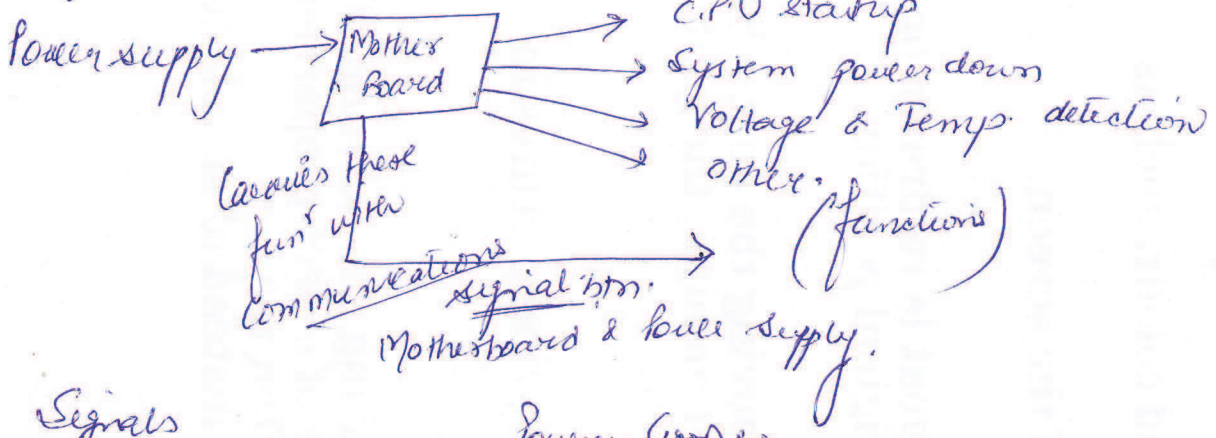
-12 volt : by Communication Ports (Serial Comm ports)

-5 volt :→ Purpose of backward compatibility with older ISA slots

+3.3 volt :→ ATX design.

- Power Supply Control Signals :→

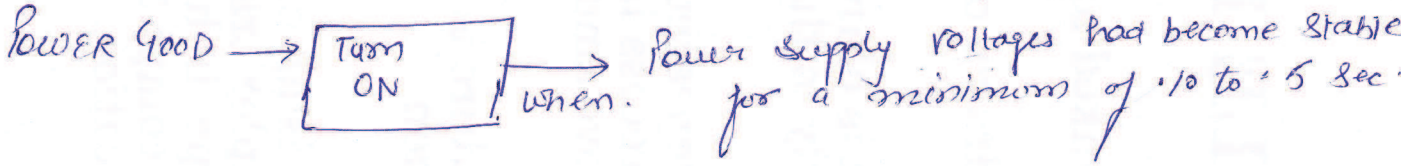
Fun is to supply clear electrical power to system.



- Signals

Power Good :→

POWER_GOOD POWER-ON : is a logic level signal designed as power supply o/p signal to the C.P.U. circuitry, to start the C.P.U. running.



Power-On :- Prior to ATX standard, AT compatible power supplies either had power switch mounted on back or side of power supply itself or had a remote switch mounted on front panel. In case of remote switch always disconnect the power cord from the power supply before removing or inspecting the switch.

Power On is part of ATX standard carries only low voltage logic level signal from the motherboard to power supply, telling it when to turn on & when to turn off.

With this power supply is always turned on, but in Standby mode, when the front panel - on/off switch is activated through the motherboard, the motherboard uses PS_ON signal to tell power supply to power up fully.

Called as — Wake ON LAN
- Remote Ring ON

To implement PS_ON signal, a special 2 pin connection on motherboard exist. — called Soft-On switch on front panel.

+5VSB (+5V, Standby) : is active anytime the AC power input is active, regardless of whether the system is turned on.

Purpose :- to power standby circuitry, such as PS_ON;

+3.3 Sense :→ about with ATX power standard. It is used to sense actual voltage of 3.3 volt supply after it has reached the motherboard, which allows power supply to actively adjust 3.3 volt O/P to compensate for line losses btn power supply & motherboard.

It is an optional signal.

Power Supply Quality & Specifications :→

A poor quality power supply ⟶ Trouble shooting nightmare
Coz voltage goes to every component & a little fluctuation may lead to damage

To evaluate better a power supply when selecting a replacement unit, the various terminologies are :→

Power Terminology :→

Voltage, VAC, VDC, Current, load, Voltage regulation, AC-Ripple, OV, OC, Holdup time, Watt-rating, VA, PF, PFC.

Voltage :- an electric pressure that causes electrical current to flow through the load circuit. All circuit use 5 Volt.

VAC (Volts alternating Current) :→ It is 117 Vac available at wall outlet.

AC :- voltage follows a sine wave.

VDC (Volts, direct Current) :- It is output supply voltages generated by the power supply for components inside the PC.

Current :- Amount of electricity actually flowing through the wire.

Load :- The devices attached to power supply that turn the supplied current in to useful work.

Voltage Regulation :→ It refers to the output voltage variation over the whole range of supplied current from 0 amps upto limit specified in power supply documentation.

AC Ripple → amount of AC voltage "riding on top of" DC output voltage.

eg :- background hum that is often present in Audio system.

OV (over-voltage) protection :→ - backup protection.

OC protection → To shutdown the entire power supply if a short circuit is detected on any of supply lines.

Power Supply Specifications :→

Certifications :→ Certifications are required to sell power supply in many countries around the world, & to have atleast a bare minimum assurance of safety.