INPUT & OUTPUT INTERFACE :

Computer System include special hardware Components between the CPU and peripherals to supervise & Synchronise all input and output transfers. These Components are Called Interface Unit
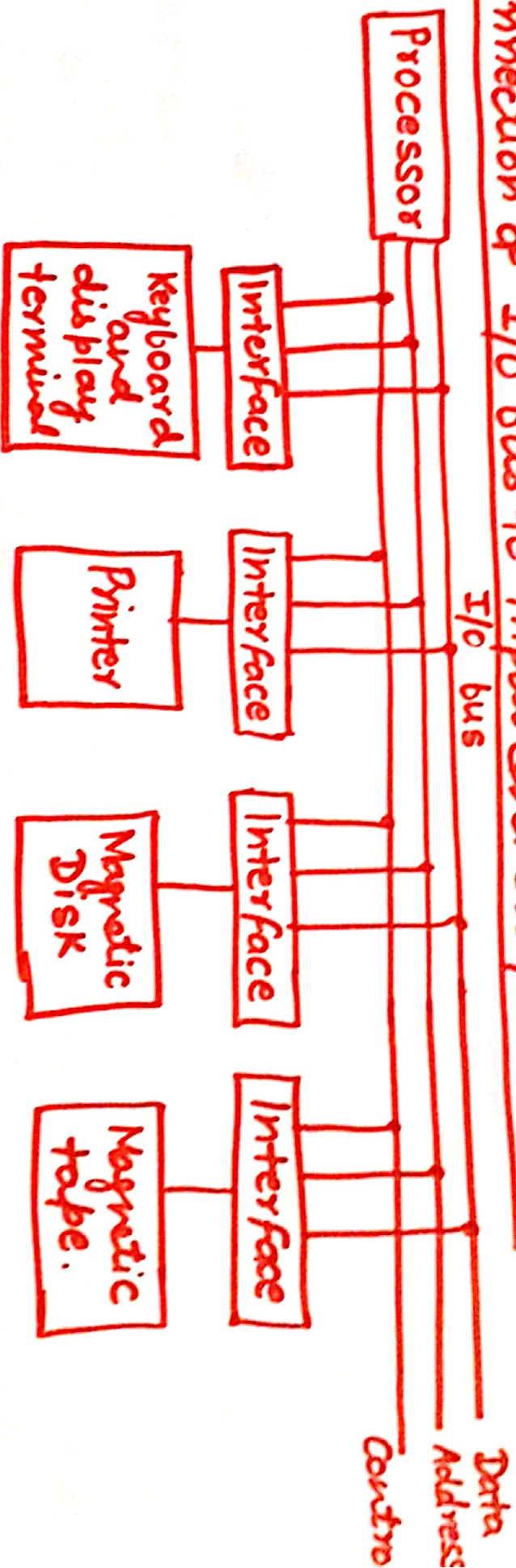
Why interface is required?

1. Operation Method : - 1) Peripherials are electromechanical & electromagnetic devices and their
2. Data transfer Rate   manner of operation is different
3. Data Code and Formats   from the operation of the CPU and
4. Operating mode &   memory, which are electronic device.
Therefore, a Conversion of Signal value is required.

2) The data transfer rate of peripherals is usually slower than the transfer rate of the CPU, a Synchronization mechanism is needed.

3) Data Code and formats in peripherals differ from the word format in the CPU and memory.

4) The Operating modes of the peripherals are different from each other and each must be controlled so as not to disturb the operation of other peripherals Connected to the CPU.

Connection of I/O bus to Input and output devices:

Processor

I/O bus

Interface — Keyboard and display terminal

Interface — Printer

Interface — Magnetic Disk

Interface — Magnetic tape.

Data
Address
Contro

- Each peripheral device has associated with an interface unit.

- Each Interface decodes the address and control received from the I/o bus, interprets them for the peripheral, and provide signals for the peripheral Controller.

- It also Synchronizes the data flow and Supervises the transfer between peripheral and processor.

- Each peripheral has its own Controller that operates the particular electromechanical device.

- The I/o bus from the processor is attached to all peripheral Interface.

→ When processor wants to **Communicate** with a particular device, the processor places a device address on the address lines.

+ Each Interface Contains an address decoder that monitors the address lines.

+ When the Interface detects its own address, It activates the path between the bus lines and the device that it control

+ All other peripherals are disabled by their interface whose address does not Correspond to the address in the bus.

The processor provides a function Code in the Control lines.

The Function Code is referred to as an I/o Command and is an instruction that is executed in the interface and its attached peripherals Unit.

I/o Commands are classified as

1) Control Command
2) Status Command
3) Output Command
   data
4) data Input Command.

+ A Control Command is issued to activate the peripherals and to inform it what to do.

+ A Status Command is used to test various Status Condition in the interface and the peripheral.

+ A data Output Command causes the interface to respond by transferring data from the bus into one of its registers.

+ The data Input Command causes the interface to receive an item of data from the peripherals and place it in its buffer register. The processor checks it data are available by means of a Status Command and then issue a data input Command. The Interface places the data on data lines, where they are accepted by the processor.

I/O Versus Memory Bus

There are 3 ways that computer buses can be used to communicate with **memory** and **I/O**.

1) Use two separate buses, one for memory and the other for I/O.

(Example: IO processor)

2) Use one common bus for both memory and I/O but have separate control lines for each.

(Example: Isolated Mapped) I/O).

3) Use one common bus for memory and I/O with common control bus.

(Example: Memory Mapped I/O)