Control Unit

The control unit is a component of computer's central processing unit that directs the operation of the processor. It tells the computer's memory, arithmetic logic unit and input and output devices how to respond to the instructions that have been sent to the processor.

The control unit performs two basic tasks:

(i) Sequencing:- The control unit causes the processor to step through a series of micro-operations in the proper sequence, based on the program being executed.

(ii) Execution:- The control unit causes each micro-operation to be performed.
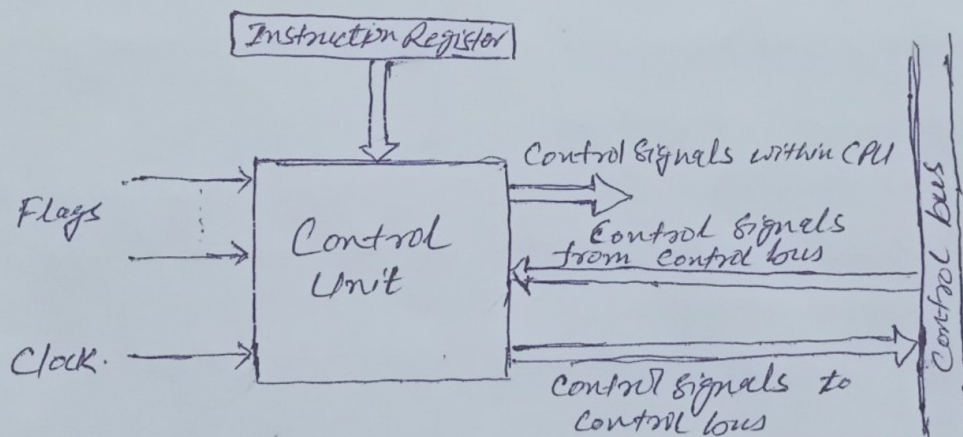
Block-Diagram of Control Unit:

Figure above is a general model of the control unit, showing all of its inputs and outputs. The inputs are

Clock :- This is how the control unit "keeps time". The control unit causes one micro-operation (or a set of simultaneous micro-operations) to be performed

for each clock pulse. This is sometimes referred to as the processor cycle time or the clock cycle time.

Instruction Register :— The opcode and addressing mode of the current instruction are used to determine which micro-operations to perform during the execute cycle

Flags :— These are needed by the control unit to determine the status of previous ALU operations. For example, for the increment-and skip-if-zero (ISZ) instruction, the control unit will increment the PC if the zero flag is set.

Control Signals from Control Bus :— The control bus operation of the system bus provides signals to the control unit.

The outputs are as follows:

Control Signals within the Processor :— There are two types
(i) Those that cause data to be moved from one register to another
(ii) Those that activate specific ALU functions.

Control Signals to Control Bus :— There are also two types
(i) Control signals to memory
(ii) Control signals to I/O modules.