

Memory Mapped IO and IO Mapped IO

The microprocessor cannot do anything by itself therefore, It needs to be linked with memory, extra peripherals, or IO devices. This linking is called Interfacing.

The interfacing of the I/O devices in 8085 can be done in two ways :

1. Memory-Mapped I/O Interfacing :

In this kind of interfacing, we assign a memory address that can be used in the same manner as we use a normal memory location.

2. I/O Mapped I/O Interfacing :

A kind of interfacing in which we assign an 8-bit address value to the input/output devices which can be accessed using IN and OUT instruction is called I/O Mapped I/O Interfacing.

Difference between Memory-Mapped I/O Interfacing and I/O Mapped I/O Interfacing :

Features	Memory Mapped IO	IO Mapped IO
Addressing	IO devices are accessed like any other memory location.	They cannot be accessed like any other memory location.
Address Size	They are assigned with 16-bit address values.	They are assigned with 8-bit address values.
Instructions Used	The instruction used are LDA and STA, etc.	The instruction used are IN and OUT.
Cycles	Cycles involved during operation are Memory Read, Memory Write.	Cycles involved during operation are IO read and IO writes in the case of IO Mapped IO.
Registers Communicating	Any register can communicate with the IO device in case of Memory Mapped IO.	Only Accumulator can communicate with IO devices in case of IO Mapped IO.

Space Involved	2^{16} IO ports are possible to be used for interfacing in case of Memory Mapped IO.	Only 256 I/O ports are available for interfacing in case of IO Mapped IO.
IO/M [̂] signal	During writing or read cycles (IO/M [̂] = 0) in case of Memory Mapped IO.	During writing or read cycles (IO/M [̂] = 1) in case of IO Mapped IO.
Control Signal	No separate control signal required since we have unified memory space in the case of Memory Mapped IO.	Special control signals are used in the case of IO Mapped IO.
Arithmetic and Logical operations	Arithmetic and logical operations are performed directly on the data in the case of Memory Mapped IO.	Arithmetic and logical operations cannot be performed directly on the data in the case of IO Mapped IO.