SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19ECT221 – MICROPROCESSORS AND MICROCONTROLLERS

II YEAR - IV SEM

UNIT 2 – 8257 DMA Controller

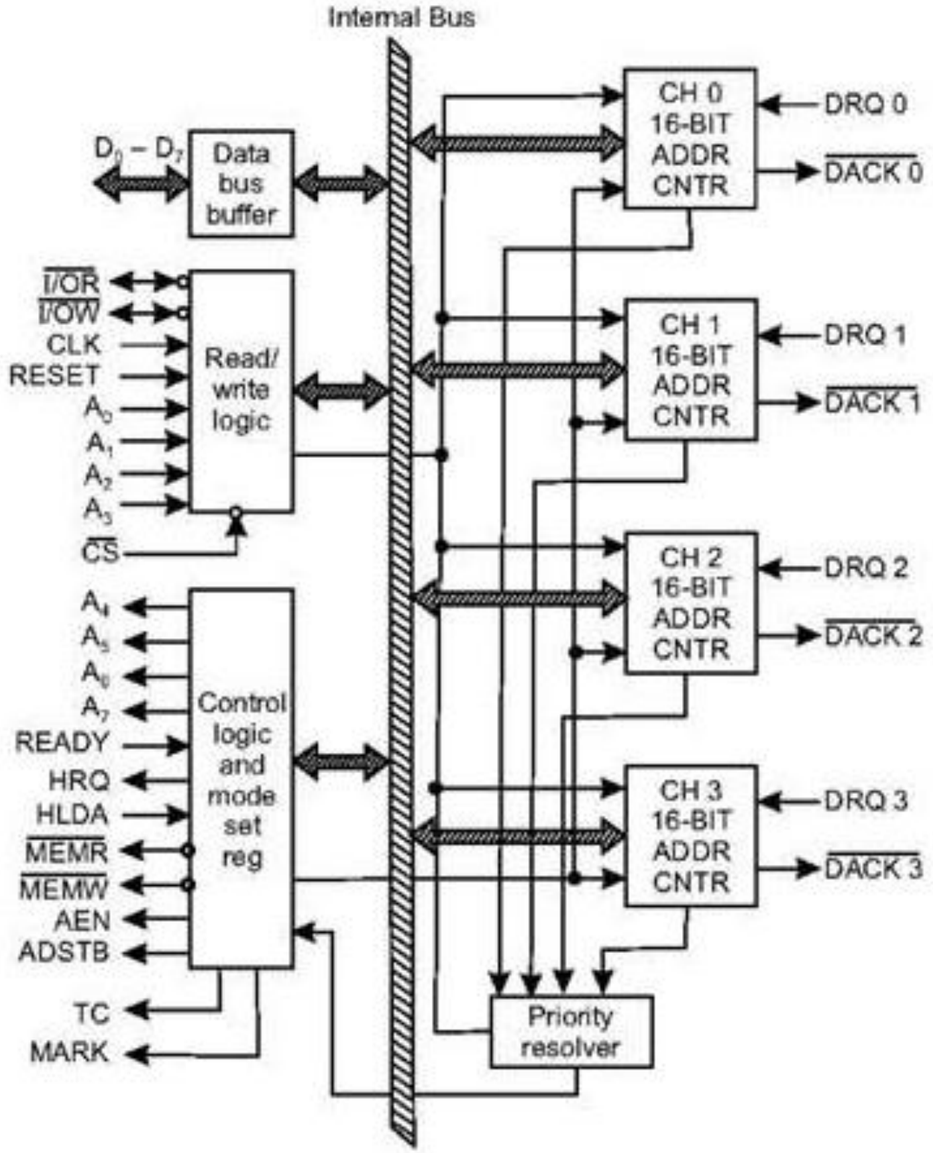
8257- DMA Controller

- DMA stands for Direct Memory Access designed by Intel to transfer data at the fastest rate.
- It allows the device to transfer the data directly to/from memory without any interference of the CPU.
- Using a DMA controller, the device requests the CPU to hold its data, address and control bus, so the device is free to transfer data directly to/from the memory.
- The DMA data transfer is initiated only after receiving HLDA signal from the CPU.

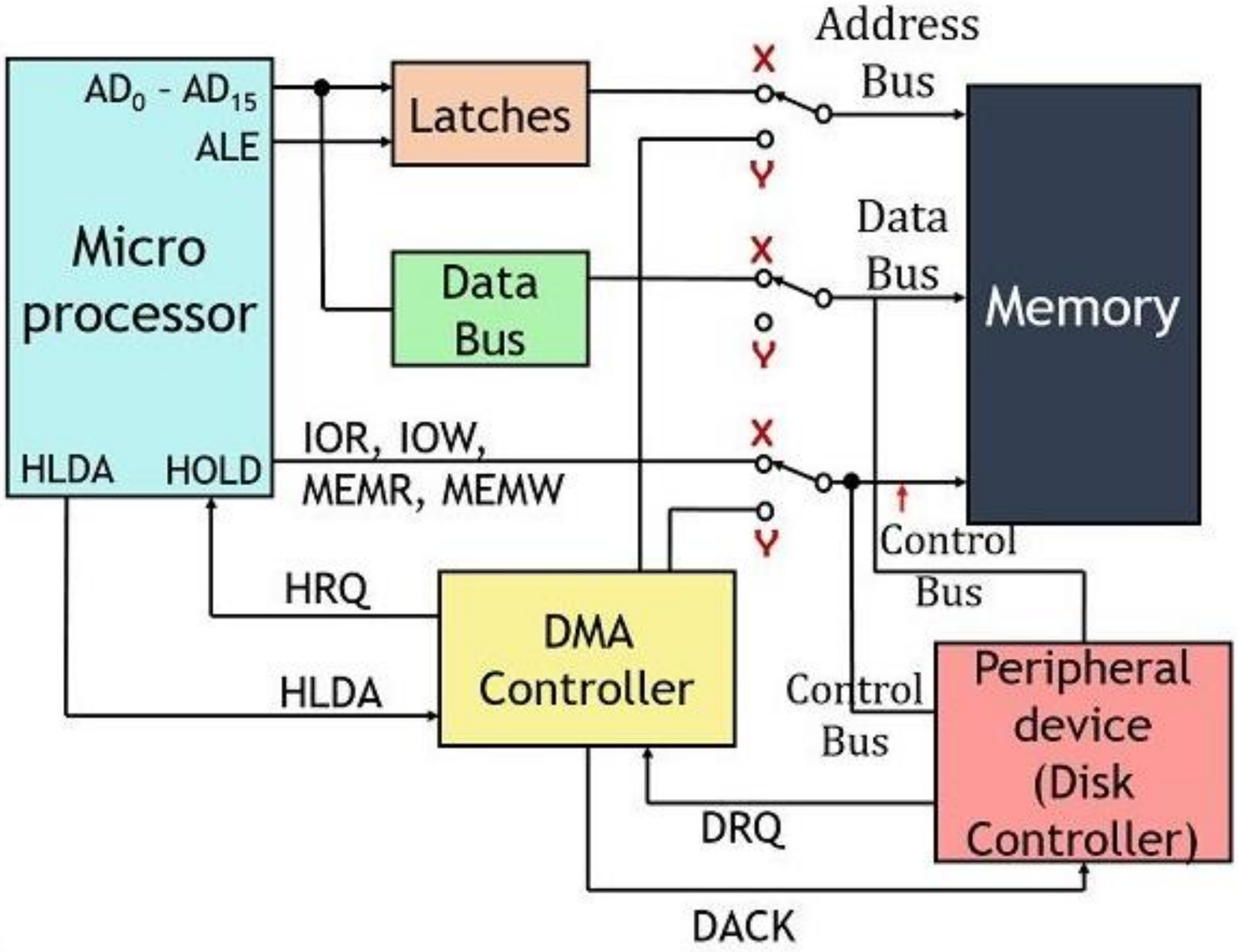
Sequence of DMA Operation

- Initially, the device has to send DMA request (DRQ) to DMA controller.
- The DMA controller sends Hold request (HRQ) to the CPU and waits for the CPU to assert the HLDA.
- Then the microprocessor tri-states all the data bus, address bus, and control bus. The CPU leaves the control over bus and acknowledges the HOLD request through HLDA signal.
- Now the CPU is in HOLD state and the DMA controller has to manage the operations over buses between the CPU, memory, and I/O devices.

Architecture of 8257

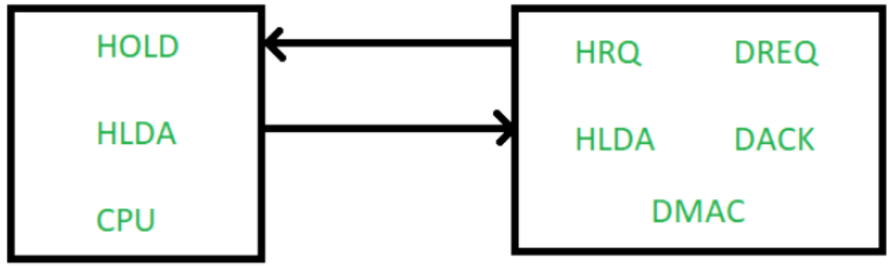


Architecture of 8257

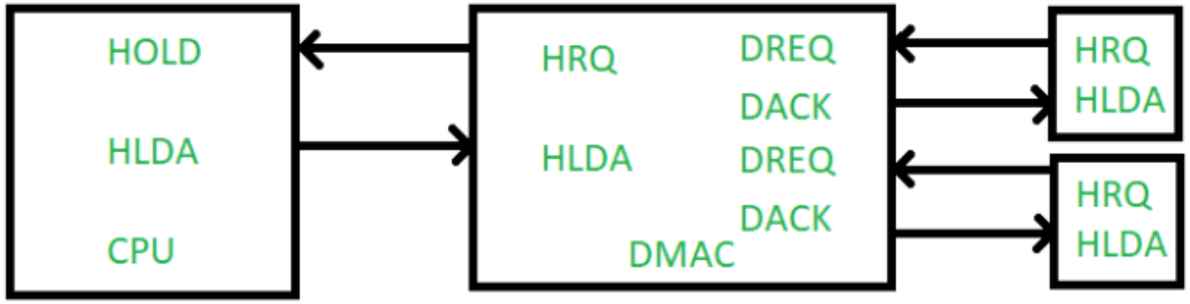


Modes of DMAC

1. Single Mode – In this only one channel is used, means only a single DMAC is connected to the bus system.



2. Cascade Mode – In this multiple channels are used, we can further cascade more number of DMACs.



Features of 8257

- Four independent DMA channels
- **Address and Data Bus-** Separately available for DMA
- **Burst Mode Transfer –** transfer the data blocks quickly
- **Priority Schemes –** Assign priorities based on the device preferance
- **Auto Initialization-** automatically reload the DMA address and count register after every transfer.
- **Compatible with diff processor-** with 8085, 8086, z80

References

https://www.tutorialspoint.com/microprocessor/microprocessor_8257_dma_controller.htm

https://electronicsdesk.com/dma-controller.html

Ramesh S.Gaonkar," Microprocessor – Architecture, Programming and Applications with the 8085", Penram International Publisher,7th Ed., 2016