Microprocessor & Interfacing
Lecture 23
8255
Programmable Peripheral Interface--2

ECS DEPARTMENT
DRONACHARYA COLLEGE OF ENGINEERING

Contents

- Group A and Group B Control
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Group A and Group B Control

- Group A and B get the Control Signal from CPU and send the command to the individual control blocks.
- Group A send the control signal to port A and Port C (Upper) PC7-PC4.
- Group B send the control signal to port B and Port C (Lower) PC3-PC0.

Ports

- Port A
  - This is a 8-bit buffered I/O latch.
  - It can be programmed by mode 0 , mode 1, mode 2.
- Port B
  - This is a 8-bit buffer I/O latch.
  - It can be programmed by mode 0 and mode 1.
- Port C
  - This is a 8-bit Unlatched buffer Input and an Output latch.
  - It is split into two parts.
  - It can be programmed by bit set/reset operation.

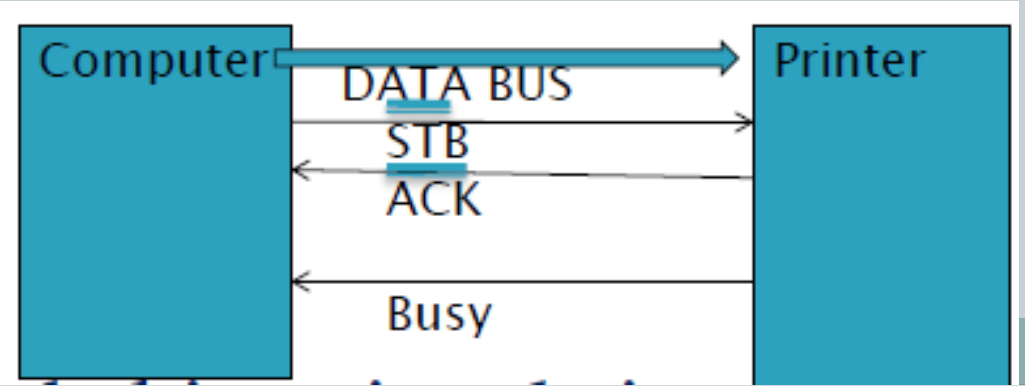
Operation Modes

- BIT SET/RESET MODE:

  The PORT C can be Set or Reset by sending OUT instruction to the CONTROL registers.

I/O MODES

- MODE 0 (Simple input / Output):
  - In this mode , port A, port B and port C is used as individually (Simply).
  - Features:
    - Outputs are latched , Inputs are buffered not latched.
    - Ports do not have Handshake or interrupt capability.
- MODE 1 (Input/output with Hand shake)
  - In this mode, input or output is transferred by Handshaking Signals.
  - Handshaking signals is used to transfer data between whose data transfer is not same.



Example

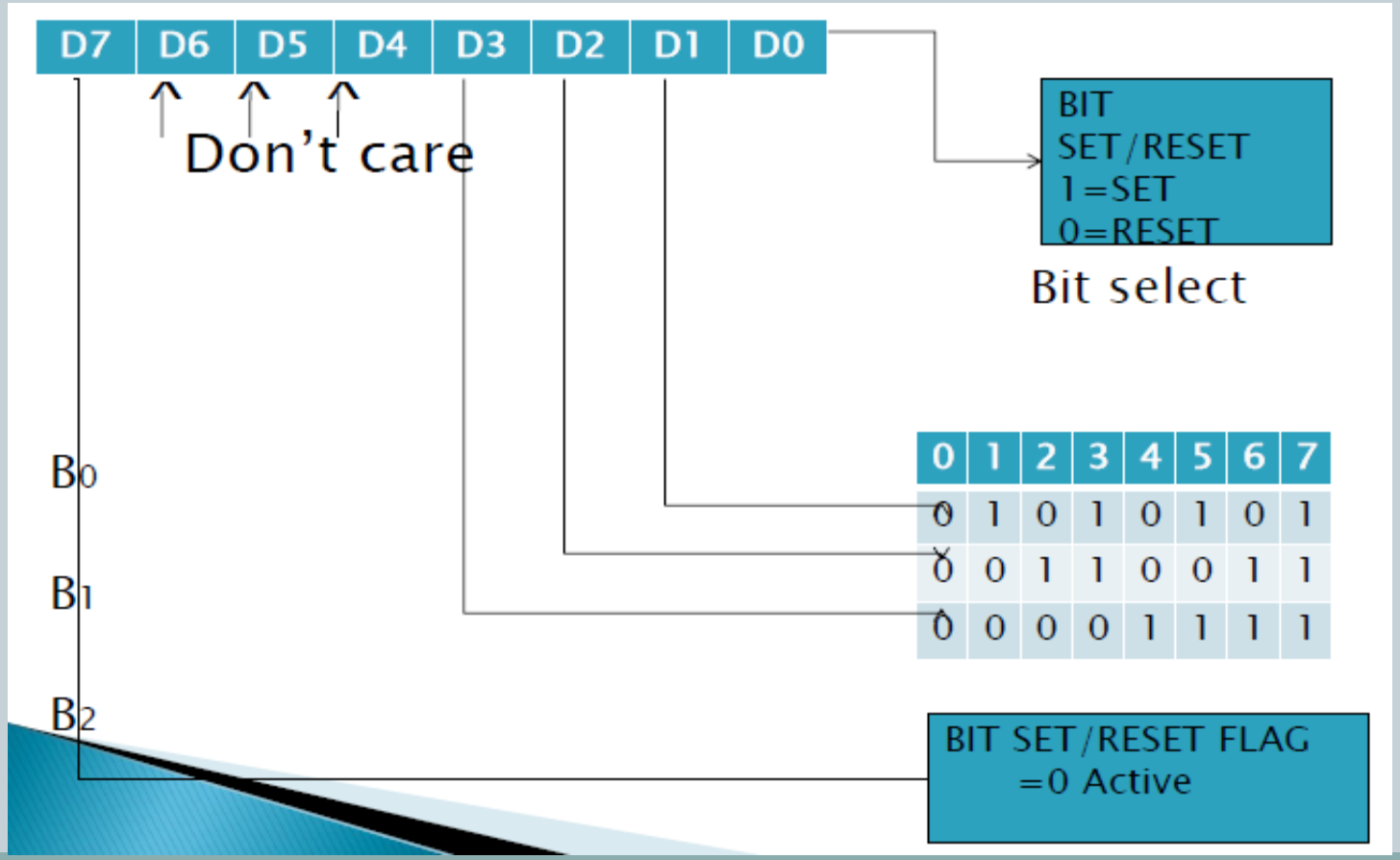
- The computer send the data to the printer large speed compared to the printer.
- When computer send the data according to the printer speed at the time only, printer can accept.
- If printer is not ready to accept the data then after sending the data bus , computer uses another handshaking signal to tell printer that valid data is available on the data bus.
- Each port uses three lines from port C as handshake signals

I/O MODES Cont..

- MODE 2:bi-directional I/O data transfer:
  - This mode allows bidirectional data transfer over a single 8- bit data bus using handshake signals.
  - This feature is possible only Group A.
  - Port A is working as 8-bit bidirectional.
  - PC3-PC7 is used for handshaking purpose.
  - The data is sent by CPU through this port, when the peripheral request it.
  - CONTROL WORD FORMATS:
  - In the INPUT mode , When RESET is High all 24 pins (3-ports) be a input mode. i.e all flip flops are cleared and the interrupts are reset.
  - This condition is maintained even after RESET goes low.
  - This can be avoid by writing single control word to the control registers, when required.

For BIT SET/RESET MODE

- This is bit set/reset control word format.

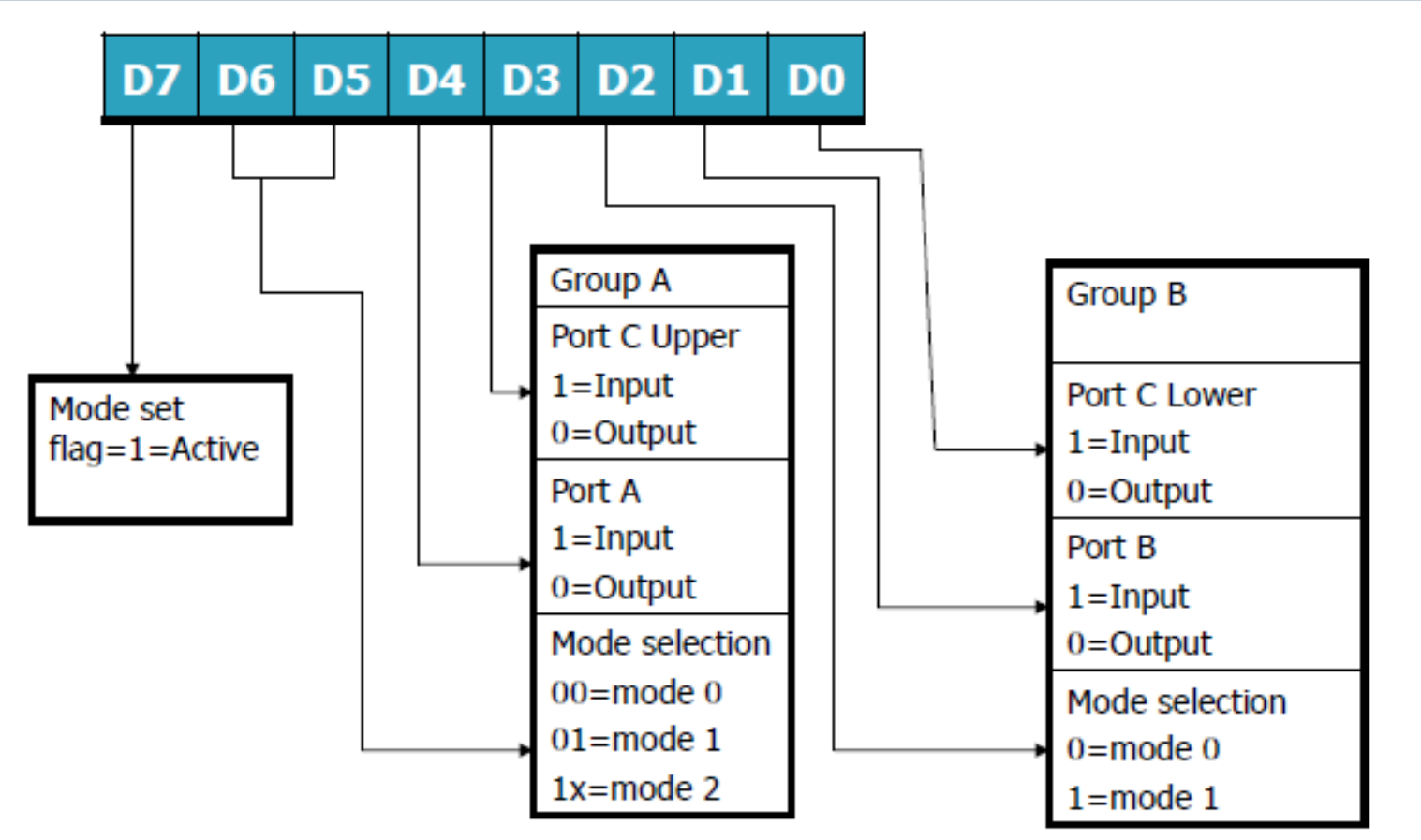


Cont..

- PC0-PC7 is set or reset as per the status of D0.
- A BSR word is written for each bit
- Example:
- PC3 is Set then control register will be 0XXX0111.
- PC4 is Reset then control register will be 0XXX01000.
- X is a don’t care.

FOR I/O MODE

- The mode format for I/O as shown in figure



- The control word for both mode is same.
- Bit D7 is used for specifying whether word loaded in to Bit set/reset mode or Mode definition word.
- D7=1=Mode definition mode.
- D7=0=Bit set/Reset mode.

Scope of Research

- Designing a device which can connect peripheral devices to the microprocessor with less hardware support and more data transfer speed.