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Aim: 8255 is configured in mode O is simple Inuput / Output Mode. Ports A,B,C are in mode 0. All the posts are in output mode and data is transmitted to the respective ports.

Apparatus : Microprocessor 8086 and 8255 PPI experimental setup kit

Theory:

The programmable Peripheral Interface chip 8255 has three 8-bit Input / Output ports i.e. Port A, Port B, Port C upper (PCU) and Port C lower (PCL). Direct bit set/reset capability is available for port C. 8255 is a very powerful tool for interfacing peripheral equipment to the microprocessor. It is flexible enough to interface with any I/o device without the need of external logic.

Procedure :

1. Connect 8086 kit to 8255 PPI kit using 50 pin FRU cable.
2. Default I/O address ranges are :

SELECTION	ADDRESS
Port A	30 H
Port B	31 H
Port C	32 H
Command Port	33 H

3. 80 H is the control word for 8255. It is set in simple I/O mode and all the ports are in output mode 0

D7	D6	D5	D4	D3	D2	D1	D0
1	0	0	0	0	0	0	0
Always 1 for I/O	Group A mode 0		Port A (output)	Port C1 (output)	Group B (output)	Port B (output)	Port C2 (output)

4. The LED's connected to the pins at Port A glow according to the data transmitted on port A.
5. The LED's connected to the pins of port B glow according to the data transmitted on Port B.
6. The LED's connected to the pins of port C glow according to the data transmitted on Port C.

Program :

Segment : C000
Offset : C000

Memory	Opcode	Instructions	Comments
C000	B0	MOV AL,80H	Mode 0, All ports in output mode
C001	80		
C002	E6	OUT CWR, AL	
C003	33		
C004	B0	MOV AL, 55H	Data for Port A
C005	55		
C006	E6	OUT PORT A,AL	
C007	30		
C008	B0	MOV AL,AAH	Data for port B
C009	AA		
C00A	E6	OUT PORT B,AL	
C00B	31		
C00C	B0	MOV AL,0FH	Data for port C
C00D	0F		
C00E	E6	OUT PORTC,AL	
C00F	32		
C010	CC	INT 3	Stop

Conclusion :

1. Explain the modes of 8255.

Ans. The 8255 Programmable Peripheral Interface (PPI) offers three operational modes, each serving distinct input/output configurations:

a) Mode 0 (Basic Input/Output Mode):
   a. Port A acts as an 8-bit input or output port.
   b. Port B serves as a bidirectional 8-bit port.
   c. Port C is divided into two 4-bit ports: Port C upper (PC7-PC4) and Port C lower (PC3-PC0), independently configurable as inputs or outputs.

b) Mode 1 (Strobed Input/Output Mode):
   a. Similar to Mode 0 but with additional handshaking features.
   b. Control logic enables Port A and Port B only when the CPU sends a specific signal (STB A and STB B).
   c. Useful for interfacing devices that require synchronization with the CPU.

c) Mode 2 (Bi-directional Bus Configuration):
   a. All three ports function as bi-directional 8-bit ports.
   b. Supports interconnection between multiple processors or systems via shared buses.
   c. Offers versatility for various data transfer configurations.

Each mode offers flexibility in configuring input/output ports, catering to diverse interfacing requirements in embedded systems and peripheral device control.

2. Explain the format of control word of 8255 PIC

Ans. The control word of the 8255 Programmable Peripheral Interface (PPI) is a configuration command used to set the operational mode and various parameters of the device. Here's the format of the control word:

a) Bit 7 (D7): Mode Selection Bit
   a. Determines the operating mode of the 8255.
   b. D7 = 0: Mode 0 or Mode 1 selected.
   c. D7 = 1: Mode 2 selected.

b) Bit 6 and Bit 5 (D6 and D5): Group Selection Bits
   a. Used to select the group of I/O ports for operation in Mode 1.
   b. D6 and D5 select the group as follows:
   c. 00: Group A selected.
   d. 01: Group B selected.
   e. 10: Group C selected.
   f. 11: Not used.

c) Bit 4 (D4): Port Selection Bit
    a. Used to select between Port A and Port C in Mode 1.
    b. D4 = 0: Port A selected.
    c. D4 = 1: Port C selected.

d) Bit 3 to Bit 0 (D3-D0): I/O Mode Selection Bits
    a. Used to configure the direction of each individual port.
    b. In Mode 0 or Mode 1, each pair of bits corresponds to the direction of the respective port:
    c. 00: Input mode.
    d. 01: Output mode.
    e. 10: Bidirectional mode.
    f. 11: Mode dependent.

This format allows precise configuration of the 8255 device, enabling the selection of operating modes, I/O port directions, and group settings as per the specific requirements of the system.