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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 :**

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

SELECTION ADDRESS

Port A 30 H

Port B 31 H

Port C 32 H

Command Port 33 H

* 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

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **D7** | **D6** | **D5** | **D4** | **D3** | **D2** | **D1** | **D0** |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Always 1 Group A Port A Port C1 Group B Port B Port C2

for I/O mode 0 (output) (output) (output) (output) (output)

* The LED’s connected to the pins at Port A glow according to the data transmitted on port A.
* The LED’s connected to the pins of port B glow according to the data transmitted on Port B.
* 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 :**

* Explain the modes of 8255.

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

* Mode 0 (Basic Input/Output Mode):
* Port A acts as an 8-bit input or output port.
* Port B serves as a bidirectional 8-bit port.
* 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.
* Mode 1 (Strobed Input/Output Mode):
* Similar to Mode 0 but with additional handshaking features.
* Control logic enables Port A and Port B only when the CPU sends a specific signal (STB A and STB B).
* Useful for interfacing devices that require synchronization with the CPU.
* Mode 2 (Bi-directional Bus Configuration):
* All three ports function as bi-directional 8-bit ports.
* Supports interconnection between multiple processors or systems via shared buses.
* 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.

* 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:

* Bit 7 (D7): Mode Selection Bit
* Determines the operating mode of the 8255.
* D7 = 0: Mode 0 or Mode 1 selected.
* D7 = 1: Mode 2 selected.
* Bit 6 and Bit 5 (D6 and D5): Group Selection Bits
* Used to select the group of I/O ports for operation in Mode 1.
* D6 and D5 select the group as follows:
* 00: Group A selected.
* 01: Group B selected.
* 10: Group C selected.
* 11: Not used.
* Bit 4 (D4): Port Selection Bit
* Used to select between Port A and Port C in Mode 1.
* D4 = 0: Port A selected.
* D4 = 1: Port C selected.
* Bit 3 to Bit 0 (D3-D0): I/O Mode Selection Bits
* Used to configure the direction of each individual port.
* In Mode 0 or Mode 1, each pair of bits corresponds to the direction of the respective port:
* 00: Input mode.
* 01: Output mode.
* 10: Bidirectional mode.
* 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.