



# Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science (AI&DS)

---

|                             |                         |
|-----------------------------|-------------------------|
| <b>Name:</b>                | Rohan Ganpat Mangaonkar |
| <b>Roll No:</b>             | 27                      |
| <b>Class/Sem:</b>           | SE/IV                   |
| <b>Experiment No.:</b>      | 9                       |
| <b>Title:</b>               | To implement            |
| <b>Date of Performance:</b> |                         |
| <b>Date of Submission:</b>  |                         |
| <b>Marks:</b>               |                         |
| <b>Sign of Faculty:</b>     |                         |



# Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science (AI&DS)

**Aim:** 8255 is configured in mode 0 is simple Input / Output Mode. Ports A,B,C are in mode 0. All the ports 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<br>for I/O | Group A<br>mode 0 | Port A<br>(output) | Port C1<br>(output) | Group B<br>(output) | Port B<br>(output) | Port C2<br>(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.



# Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science (AI&DS)

## 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.