Experiment No. 08

8.1 Experiment Name

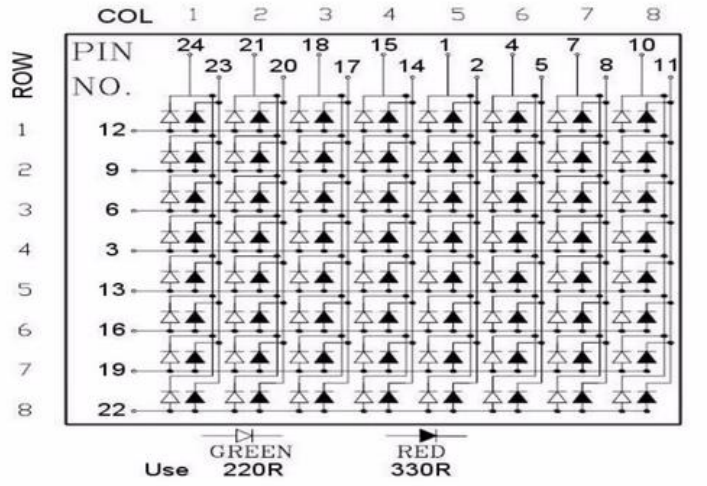
8255 PPI interfacing: Dot matrix

8.2 Objectives

- To get acquainted with the "MDA 8086" Trainer Board and its operation
- To understand the operation of Dot matrix in 8255 PPI interfacing
- To learn how to implement program in “MDA 8086” Trainer Board and interconnect it with “Emu 8086”

8.3 Theory

A dot Matrix consists of an array of LED's which are inter connected such that the positive terminal (anode) of each LED in the same column are connected together and the negative terminal (cathode) of each LED in the same row are connected together.



Here, the 8255 port address in accordance with the dot matrix are as follows,

Port name	Port address
Port A	18H
Port B	1AH
Port C	1CH
Control register	1EH

8.4 Apparatus

- MDA 8086 - Trainer Board

8.5 Code for column wise operation

```
CODE SEGMENT
      ASSUME CS: CODE, DS: CODE, SS: CODE, ES: CODE
CNTRL EQU 1EH
PORTC EQU 1CH
PORTB EQU 1AH
PORTA EQU 18H
      ORG 1000H
      MOV AL, 100000000B
      OUT CONTRL, AL
```

```
        MOV AL, 100000000B
        OUT PORTB, AL
        MOV AL, 000000001B
        L1;
        OUT PORTC, AL
        ROL AL, 1
        CALL TIMER
        JMP L1
        INT
TIMER:
        MOV CX, 0FFFFH
        LOOP2:
        NOP
        NOP
        NOP
        NOP
        LOOP LOOP2
        RET
        CODE ENDS
END
```

8.6 Output for column wise operation

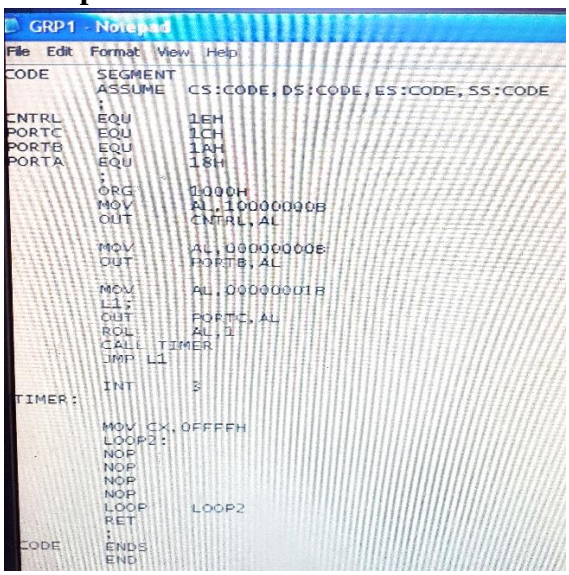


Fig. 8.1: Writing program on notepad

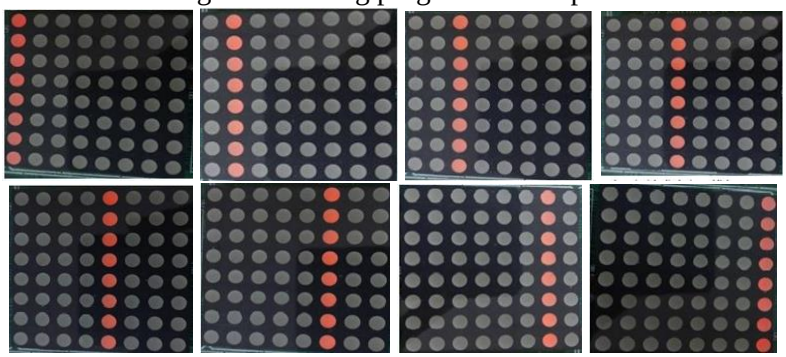


Fig. 8.2: Output

8.7 Code for row wise operation

```
CODE SEGMENT
        ASSUME CS: CODE, DS: CODE, SS: CODE, ES: CODE
```

```
CNTRL EQU 1EH
PORTC EQU 1CH
PORTB EQU 1AH
PORTA EQU 18H
ORG 1000H
MOV AL, 100000000B
OUT CONTRL, AL
MOV AL, 11111111B
OUT PORTC, AL
MOV CL, 8
MOV AL, 01111111B
L1;
OUT PORTB, AL
ROL AL, 1
CALL TIMER
JMP L1
INT
TIMER:
      MOV CX, 0FFFFH
      LOOP2:
      NOP
      NOP
      NOP
      NOP
      LOOP LOOP2
      RET
      CODE ENDS
END
```

8.8 Output for row wise operation

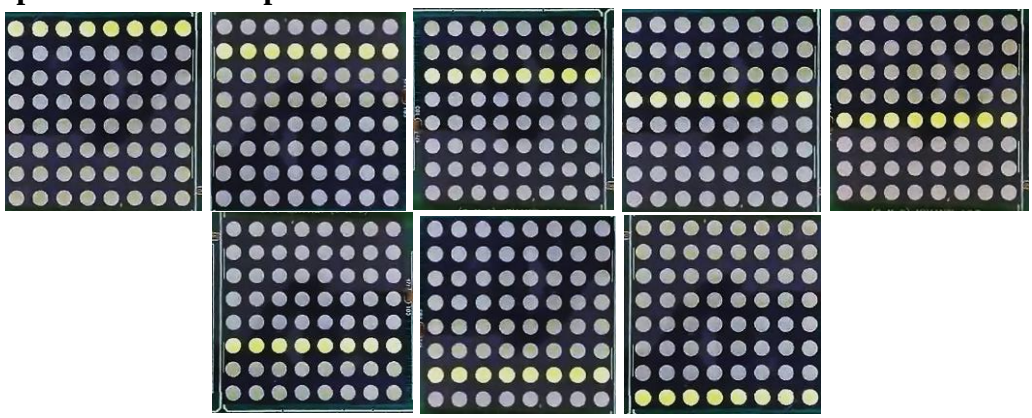


Fig. 8.3: Output

8.9 Discussion & Conclusion

The procedure of working in serial monitor mode or PC mode with the 8086 MDA kit was introduced in this experiment. We used code to perform the dot matrix. A program was developed in notepad and saved as '.**asm**' file, which was then translated to '.**obj**' which was then translated into a '.**abs**' file. This was then executed by following the instructions, and the output was observed using both single-step execution and direct execution.

By using programming, the row-wise LEDs were turned on after the column-wise LEDs. Therefore, it may be concluded from all of the foregoing talks that the experiment was a success.