Session 2

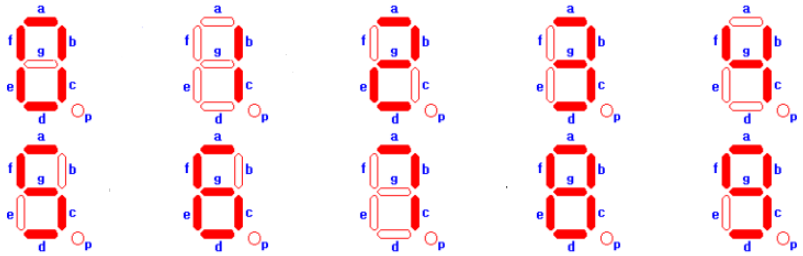
Seven Segment Display and LED Display using Array

OBJECTIVES:

- Students will be able to use array as a data structure to show output on Seven Segment Display.
- They will also be able to use array to store data in array and use it to show output on LED Display.
- Students will be able to show output using Dot Matrix Display.

Experiment No: 03

Experiment Name: Write an assembly code to display 0-9 in Seven Segment Display (SSD) with array.



- For seven segments display we use 0 for ON and 1 for OFF
- Control register value will be the column headings of the following table:

D7	D6	D5	D4	D3	D2	D1	D0
1	0	0	0	0	0	0	0
Control Register 0- BSR mode 1- I/O mode	Mode selection for group A 00- I/O 01- Handshaking		Port A 0- Output 1- Input	Upper 4 bit of port C	Mode selection for group B 0- I/O 1- Handshaking	For port B	For lower 4 bit of port C

Assembly Code:

```
SA SEGMENT PARA PUBLIC 'CODE'
ASSUME CS: SA
ORG 1000H

START:
  ;control register turn on
   MOV AL,80H
   OUT 1FH,AL
   MOV SI,OFFSET DATA
   ;LED turn on
   L1:MOV AL,BYTE PTR CS:[SI]
   OUT 19H,AL
   ;for delay
   MOV CX,0FFFFH
   L2:LOOP L2
   INC SI
   JMP L1
   DATA:
   DB 0C0H
   DB 0F9H
   DB 0A4H
   DB 0B0H
   DB 099H
   DB 092H
   DB 082H
   DB 0F8H
   DB 080H
   DB 090H
SA ENDS
END START
```

Output			g	f	e	d	c	b	a
0	=	1	1	0	0	0	0	0	0
1	=	1	1	1	1	1	0	0	1
2	=	1	0	1	0	0	1	0	0
3	=	1	0	1	1	0	0	0	0
4	=	1	0	0	1	1	0	0	1
5	=	1	0	0	1	0	0	1	0
6	=	1	0	0	0	0	0	1	0
7	=	1	1	1	1	1	0	0	0
8	=	1	0	0	0	0	0	0	0
9	=	1	0	0	1	0	0	0	0

Steps to run code in MDA-8086 through PC:

- At first copy paste the .ASM file in the mda folder of computer
- Then open cmd and write cd\ and press enter
- Then type cd mda and press enter
- Then type MASM and press enter
- Then write the file_name.ASM and press enter. For our example we will write SA.ASM
- Then write the file_name.OBJ and press enter. For our example we will write SA.OBJ
- Then write the file_name.LST and press enter. This step is used for error checking. For our example we will write SA.LST

- Then when it wants .CRF file simply press enter
- If there is any error in the file, then after this line we can see the number of errors.
- If any error is found, then type EDIT file_name.LST and press enter.
- If no error is found, then type LOD186 and press enter
- Then type file_name.OBJ and press enter. For our example we will write SA.OBJ
- Then type file_name.ABS and press enter. For our example we will write SA.ABS
- Then type COMM and press enter.
- Then a blue window will occur
- We will now turn on the kit and we will select PC mode from kit mode
- Then press RESET
- If your kit is ok, then it will show up in the blue screen
- Then type L from keyboard and press enter
- If L does not show up, then it means your PC is not connected and you have to try in different PC
- Otherwise press F3 and in the pop-up screen write filename.ABS and press enter. For our example we will write SA.ABS
- Then in the kit select kit mode from PC mode
- Then press RESET
- After that press AD
- Then Press GO
- Then you can see the output in the seven segments display

Experiment No: 04

Experiment Name: Write an assembly code to glow R1, G, Y and R2 in LED Display respectively using array.

- For LED display we use 1 for ON and 0 for OFF
- Control register value will be the column headings of the following table:

D7	D6	D5	D4	D3	D2	D1	D0
1	0	0	0	0	0	0	0
Control Register 0- BSR mode 1- I/O mode	Mode selection for group A 00- I/O 01- Handshaking		Port A 0- Output 1- Input	Upper 4 bit of port C	Mode selection for group B 0- I/O 1- Handshaking	For port B	For lower 4 bit of port C

Assembly Code:

```
LA SEGMENT PARA PUBLIC 'CODE'
ASSUME CS: LA
ORG 1000H

START:
  ;control register turn on
   MOV AL,80H
   OUT 1FH,AL
   ;segment address forcefully off
   MOV AL,0FFH
   OUT 19H,AL
   MOV SI,OFFSET DATA
   ;LED turn on
   L1:MOV AL,BYTE PTR CS:[SI]
   OUT 1BH,AL
   ;for delay
   MOV CX,0FFFFH
   L2:LOOP L2
```

```
    INC SI
    JMP L1
    DATA:
    DB 01H
    DB 02H
    DB 04H
    DB 08H
LA ENDS
END START
```

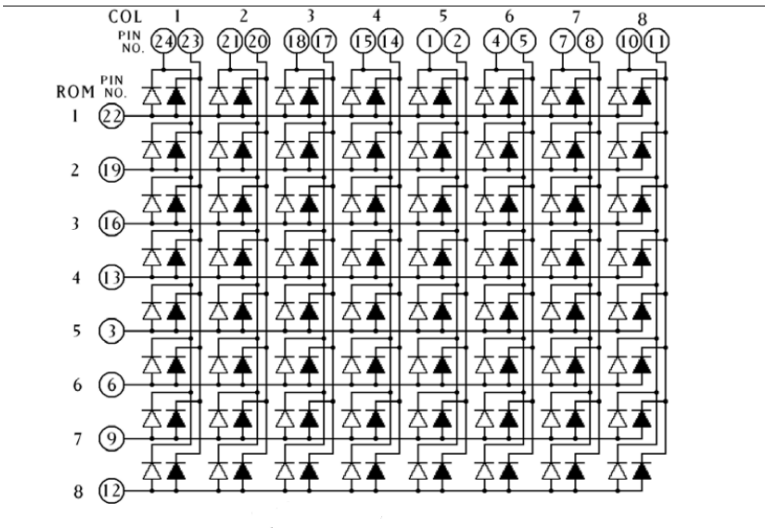
				R2	Y	G	R1
0	0	0	0	0	0	0	1
0	0	0	0	0	0	1	0
0	0	0	0	0	1	0	0
0	0	0	0	1	0	0	0

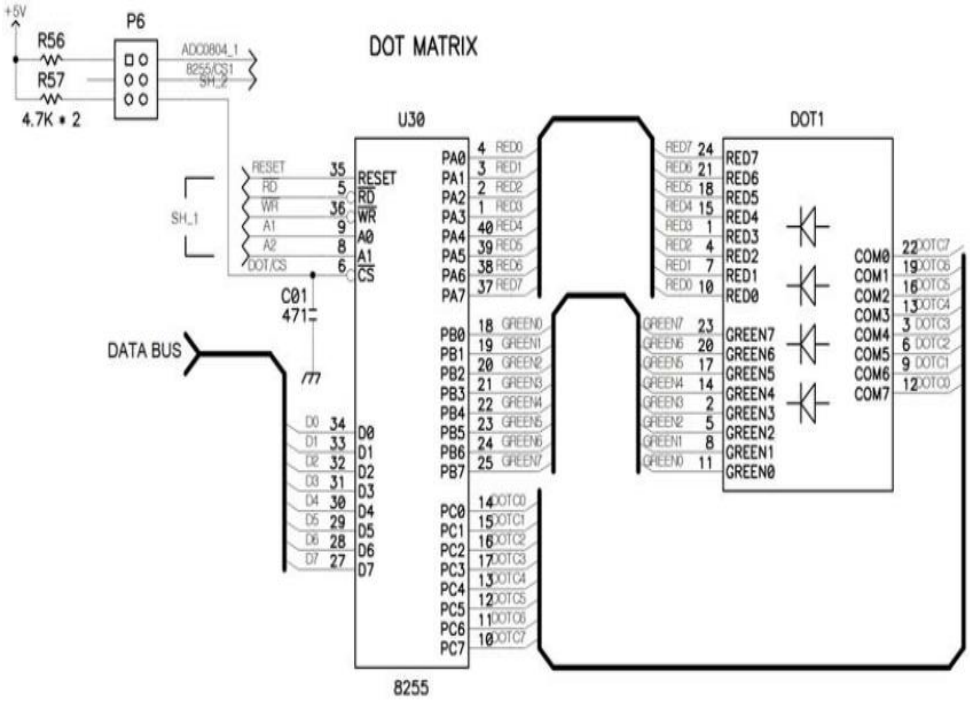
Steps to run code in MDA-8086 through PC:

- At first copy paste the .ASM file in the mda folder of computer
- Then open cmd and write cd\ and press enter
- Then type cd mda and press enter
- Then type MASM and press enter
- Then write the file_name.ASM and press enter. For our example we will write LA.ASM
- Then write the file_name.OBJ and press enter. For our example we will write LA.OBJ
- Then write the file_name.LST and press enter. This step is used for error checking. For our example we will write LA.LST
- Then when it wants .CRF file simply press enter
- If there is any error in the file, then after this line we can see the number of errors.
- If any error is found, then type EDIT file_name.LST and press enter.
- If no error is found, then type LOD186 and press enter
- Then type file_name.OBJ and press enter. For our example we will write LA.OBJ
- Then type file_name.ABS and press enter. For our example we will write LA.ABS
- Then type COMM and press enter.
- Then a blue window will occur
- We will now turn on the kit and we will select PC mode from kit mode
- Then press RESET
- If your kit is ok, then it will show up in the blue screen
- Then type L from keyboard and press enter
- If L does not show up, then it means your PC is not connected and you have to try in different PC
- Otherwise press F3 and in the pop-up screen write filename.ABS and press enter. For our example we will write LA.ABS
- Then in the kit select kit mode from PC mode
- Then press RESET
- After that press AD
- Then Press GO
- Then you can see the output in the LED display

Dot Matrix Display

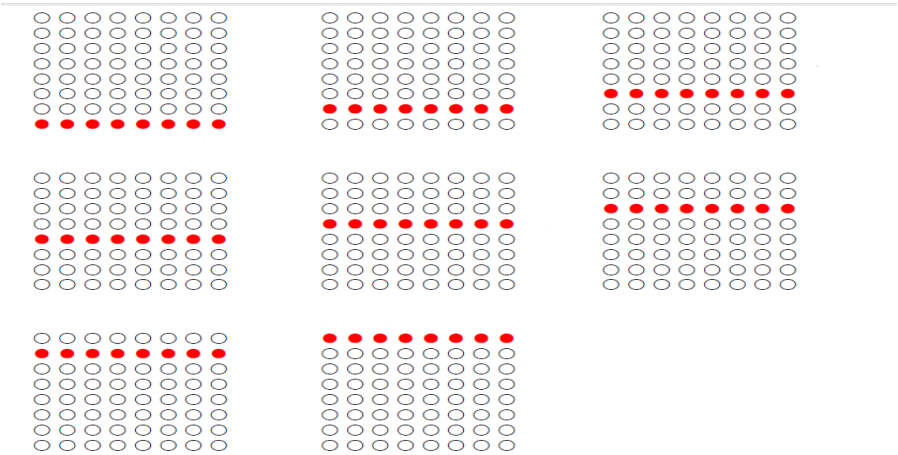
The KMD D1288C is 1.26inch height 3mm diameter and 8 × 8 dot matrix LED displays. The KMD D1288C are dual emitting color type of red, green chips are contained in a dot with milky and white lens color.





Experiment No: 05

Experiment Name: Write an assembly code to glow dots on Dot Matrix Display scroll bottom to top having red color.



- For dot matrix display color combinations are:

Color	Combinations
Green	A=0
	B=1
	C=1
Red	A=1
	B=0
	C=1
Orange	A=0
	B=0
	C=1
Off	A=1
	B=1
	C=0

- Control register value will be the column headings of the following table:

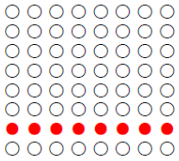
D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
1	0	0	0	0	0	0	0
Control Register 0- BSR mode 1- I/O mode	Mode selection for group A 00- I/O 01- Handshaking		Port A 0- Output 1- Input	Upper 4 bit of port C	Mode selection for group B 0- I/O 1- Handshaking	For port B	For lower 4 bit of port C

Assembly Code:

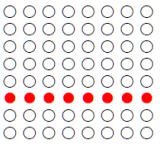
```
DM SEGMENT PARA PUBLIC 'CODE'
ASSUME CS: DM
ORG 1000H
START:
        MOV AL,80H
        OUT 1EH,AL
L1:
        MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,FEH
        OUT 1AH,AL          ;PORT B
        MOV AL,01H
        OUT 1CH,AL          ;PORT C
       ;for delay
       MOV CX,0FFFFH
       L0:LOOP L0
       MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,FDH
        OUT 1AH,AL          ;PORT B
        MOV AL,02H
        OUT 1CH,AL          ;PORT C
       ;for delay
       MOV CX,0FFFFH
       L1:LOOP L1
       MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,FBH
        OUT 1AH,AL          ;PORT B
        MOV AL,04H
        OUT 1CH,AL          ;PORT C
       ;for delay
       MOV CX,0FFFFH
       L2:LOOP L2
       MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,F7H
        OUT 1AH,AL          ;PORT B
        MOV AL,08H
        OUT 1CH,AL          ;PORT C
       ;for delay
       MOV CX,0FFFFH
       L3:LOOP L3
       MOV AL,FFH
```

Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	1	1	1	1	1	0
C		0	0	0	0	0	0	0	1

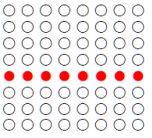
Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	1	1	1	1	0	1
C		0	0	0	0	0	0	1	0



Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	1	1	1	0	1	1
C		0	0	0	0	0	1	0	0

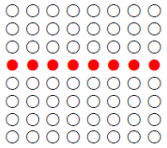


Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	1	1	0	1	1	1
C		0	0	0	0	1	0	0	0

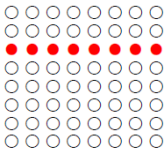


```
        OUT 18H,AL          ;PORT A
        MOV AL,EFH
        OUT 1AH,AL          ;PORT B
        MOV AL,10H
        OUT 1CH,AL          ;PORT C
       ;for delay
        MOV CX,0FFFFH
        L4:LOOP L4
        MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOVAL,DFH
        OUT 1AH,AL          ;PORT B
        MOV AL,20H
        OUT 1CH,AL          ;PORT C
       ;for delay
        MOV CX,0FFFFH
        L5:LOOP L5
        MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,BFH
        OUT 1AH,AL          ;PORT B
        MOV AL,40H
        OUT 1CH,AL          ;PORT C
       ;for delay
        MOV CX,0FFFFH
        L6:LOOP L6
        MOV AL,FFH
        OUT 18H,AL          ;PORT A
        MOV AL,7FH
        OUT 1AH,AL          ;PORT B
        MOV AL,01H
        OUT 1CH,AL          ;PORT C
       ;for delay
        MOV CX,0FFFFH
        L7:LOOP L7
DM ENDS
END START
```

Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	1	0	1	1	1	1
C		0	0	0	1	0	0	0	0

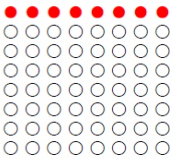


Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	1	0	1	1	1	1	1
C		0	0	1	0	0	0	0	0



Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		1	0	1	1	1	1	1	1
C		0	1	0	0	0	0	0	0

Port		7	6	5	4	3	2	1	0
A		1	1	1	1	1	1	1	1
B		0	1	1	1	1	1	1	1
C		1	0	0	0	0	0	0	0



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- Then type file_name.OBJ and press enter. For our example we will write DM.OBJ
- Then type file_name.ABS and press enter. For our example we will write DM.ABS
- Then type COMM and press enter.
- Then a blue window will occur
- We will now turn on the kit and we will select PC mode from kit mode
- Then press RESET
- If your kit is ok, then it will show up in the blue screen
- Then type L from keyboard and press enter
- If L does not show up, then it means your PC is not connected and you have to try in different PC
- Otherwise press F3 and in the pop-up screen write filename.ABS and press enter. For our example we will write DM.ABS
- Then in the kit select kit mode from PC mode
- Then press RESET
- After that press AD
- Then Press GO
- Then you can see the output in the LED display