MICROCONTROLLER

UNIT-IV

Lecture-5

LCD Data Sheet

- One can put data at any location in the LCD and the following shows address locations and how they are accessed

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	A	A	A	A	A	A	A

- AAAAAAA=000_0000 to 010_0111 for line1
- AAAAAAA=100_0000 to 110_0111 for line2

The upper address range can go as high as 0100111 for the 40-character-wide LCD, which corresponds to locations 0 to 39

LCD Addressing for the LCDs of 40×2 size

	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
Line1 (min)	1	0	0	0	0	0	0	0
Line1 (max)	1	0	1	0	0	1	1	1
Line2 (min)	1	1	0	0	0	0	0	0
Line2 (max)	1	1	1	0	0	1	1	1

Sending Information to LCD Using MOVC Instruction

```
;Call a time delay before sending next data/command
; P1.0-P1.7=D0-D7, P2.0=RS, P2.1=R/W, P2.2=E
ORG 0
MOV DPTR,#MYCOM
C1: CLR A
MOVC A,@A+DPTR
ACALL COMNWRT ;call command subroutine
```

Contd.

```
ACALL DELAY ;give LCD some time
INC DPTR
JZ SEND_DAT
SJMP C1
SEND_DAT:
MOV DPTR,#MYDATA
D1: CLR A
MOVC A,@A+DPTR
ACALL DATAWRT ;call command subroutine
ACALL DELAY ;give LCD some time
```

Contd.

```
INC DPTR
JZ AGAIN
SJMP D1
AGAIN: SJMP AGAIN ;stay here
COMNWRT: ;send command to LCD
MOV P1,A ;copy reg A to P1
CLR P2.0 ;RS=0 for command
CLR P2.1 ;R/W=0 for write
SETB P2.2 ;E=1 for high pulse
ACALL DELAY ;give LCD some time
```

Contd.

```
CLR P2.2 ;E=0 for H-to-L pulse
RET
DATAWRT: ;write data to LCD
MOV P1,A ;copy reg A to port 1
SETB P2.0 ;RS=1 for data
CLR P2.1 ;R/W=0 for write
SETB P2.2 ;E=1 for high pulse
ACALL DELAY ;give LCD some time
CLR P2.2 ;E=0 for H-to-L pulse
RET
```

Contd.

```
DELAY: MOV R3,#250 ;50 or higher for fast
  CPUs
HERE2: MOV R4,#255 ;R4 = 255
HERE: DJNZ R4,HERE ;stay until R4 becomes 0
DJNZ R3,HERE2
RET
ORG 300H
MYCOM:    DB    38H,0EH,01,06,84H,0    ;
  commands and null
MYDATA: DB “HELLO”,0
END
```

Example

- Write an 8051 C program to send letters ‘M’, ‘D’, and ‘E’ to the LCD using the busy flag method.
- **Solution:**

```
#include <reg51.h>
        sfr ldata = 0x90; //P1=LCD data pins
        sbit rs = P2^0;
        sbit rw = P2^1;
        sbit en = P2^2;
        sbit busy = P1^7;
```

Contd.

```
void main()      {
lcdcmd(0x38);
lcdcmd(0x0E);
lcdcmd(0x01);
lcdcmd(0x06);
lcdcmd(0x86);      //line      1,
position 6
lcdcmd('M');
lcdcmd('D');
lcdcmd('E');
}
```

Contd.

```
void lcdcmd(unsigned char value) {
lcdready(); //check the LCD busy flag
ldata = value; //put the value on the
pins
rs = 0;
rw = 0;
en = 1; //strobe the enable pin
MSDelay(1);
en = 0;
return;
}
```