

# 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

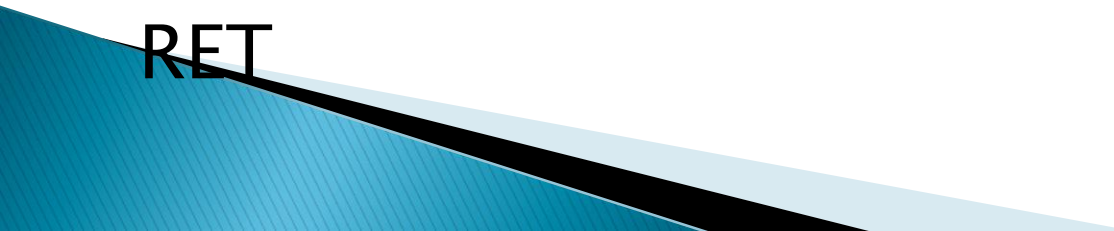
CLR P2.1 ;R/W=0 for write

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.

position 6

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

# Contd.

pins

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