

Experiment No: 05

BECS 31421

INTERFACING A 16×2 LCD WITH A PIC MICROCONTROLLER

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DISCUSSION

In this experiment We explored how to interfaced a 16x2 LCD display with the PIC16F628A microcontroller using MikroC Pro software and Proteus for simulation. We learnt how to connect and control an LCD using a microcontroller and display text in various ways. We used the 4-bit communication mode, which saved microcontroller pins by using only four data lines (DB4 to DB7) instead of all eight. This mode slightly reduces the speed of communication but is often more practical for embedded systems with limited I/O availability.

The LCD was programmed to display the messages “WELCOME” and “BECS 31421” first. These were shown on the LCD for a short time before the screen was cleared. Then, the second set of messages, “EX:LCD” and “NO:06,” was displayed with movement effects, such as shifting to the left and right. This helped us understand how to use LCD commands to create dynamic visual outputs. During the Proteus simulation, the timing for the text's shifting effects also posed a challenge. We had to fine-tune the delays to ensure smooth text movement.

Through this experiment, we also became more familiar with MikroC Pro library functions like `Lcd_Init()`, `Lcd_Out()`, and `Lcd_Cmd()`, which simplify LCD handling and how to add them to MikroC project. The hardware part of the experiment involved using a potentiometer to adjust the contrast and a voltage regulator to supply a stable 5V to the circuit.

SOURCE CODE

```
sbit LCD_RS at RB0_bit;
sbit LCD_EN at RB1_bit;
sbit LCD_D4 at RB4_bit;
sbit LCD_D5 at RB5_bit;
sbit LCD_D6 at RB6_bit;
sbit LCD_D7 at RB7_bit;

sbit LCD_RS_Direction at TRISB0_bit;
sbit LCD_EN_Direction at TRISB1_bit;
sbit LCD_D4_Direction at TRISB4_bit;
sbit LCD_D5_Direction at TRISB5_bit;
sbit LCD_D6_Direction at TRISB6_bit;
sbit LCD_D7_Direction at TRISB7_bit;
```

```
char txt1[] = "Wellcome";
char txt2[] = "BECS 31421";
char txt3[] = "EX:LCD";
char txt4[] = "NO:06";
char i;
```

```
void Move_Delay() {
    Delay_ms(500);
}
```

```
void main(){
    CCP1CON = 0x00;
    T1CON = 0x00;
    VRCON = 0x00;
    INTCON = 0x00;
```

```
CMCON = 0x07;
```

```
Lcd_Init();
```

```
Lcd_Cmd(_LCD_CLEAR);
```

```
Lcd_Cmd(_LCD_CURSOR_OFF);
```

```
Delay_ms(10);
```

```
Lcd_Out(1,5,txt1);
```

```
Lcd_Out(2,3,txt2);
```

```
Delay_ms(1000);
```

```
Lcd_Cmd(_LCD_CLEAR);
```

```
Lcd_Out(1,6,txt3);
```

```
Lcd_Out(2,6,txt4);
```

```
Delay_ms(1000);
```

```
for(i=0; i<4; i++) {
```

```
    Lcd_Cmd(_LCD_SHIFT_RIGHT);
```

```
    Move_Delay();
```

```
}
```

```
while(1) {
```

```
    for(i=0; i<9; i++) {
```

```
        Lcd_Cmd(_LCD_SHIFT_LEFT);
```

```
        Move_Delay();
```

```
    }
```

```
    for(i=0; i<5; i++) {
```

```
        Lcd_Cmd(_LCD_SHIFT_RIGHT);
```

```
        Move_Delay();
```

```
    }
```

```
}
```

```
}
```

SIMULATION SCREENSHOTS



