

Experiment No: 07

Name of the Experiment: LM35 Temperature sensor

Data Read and Display using LCD Module.

Objective(s):

1. To know about LM35 temperature sensor data.
2. To know about the ~~Micro~~ PIC Microcontroller.

Theory: LM35 is a temperature measuring device having an analog output voltage proportional to the temperature. It provides output in centigrade (Celsius). It does not require any external calibration circuitry. The sensitivity of LM35 is  $10\text{mV/degree Celsius}$ . As temperature increases, output voltage also increases  $250\text{mV}$  means  $25^\circ\text{C}$ . It is a 3-terminal sensor used to measure surrounding temperature ranging from  $-55^\circ\text{C}$  to  $150^\circ\text{C}$ . LM35 gives temperature output which is more precise than thermistor output.

Apparatus Required: PIC16F877A, crystal, capacitor, resistor, LM35 temperature sensor.

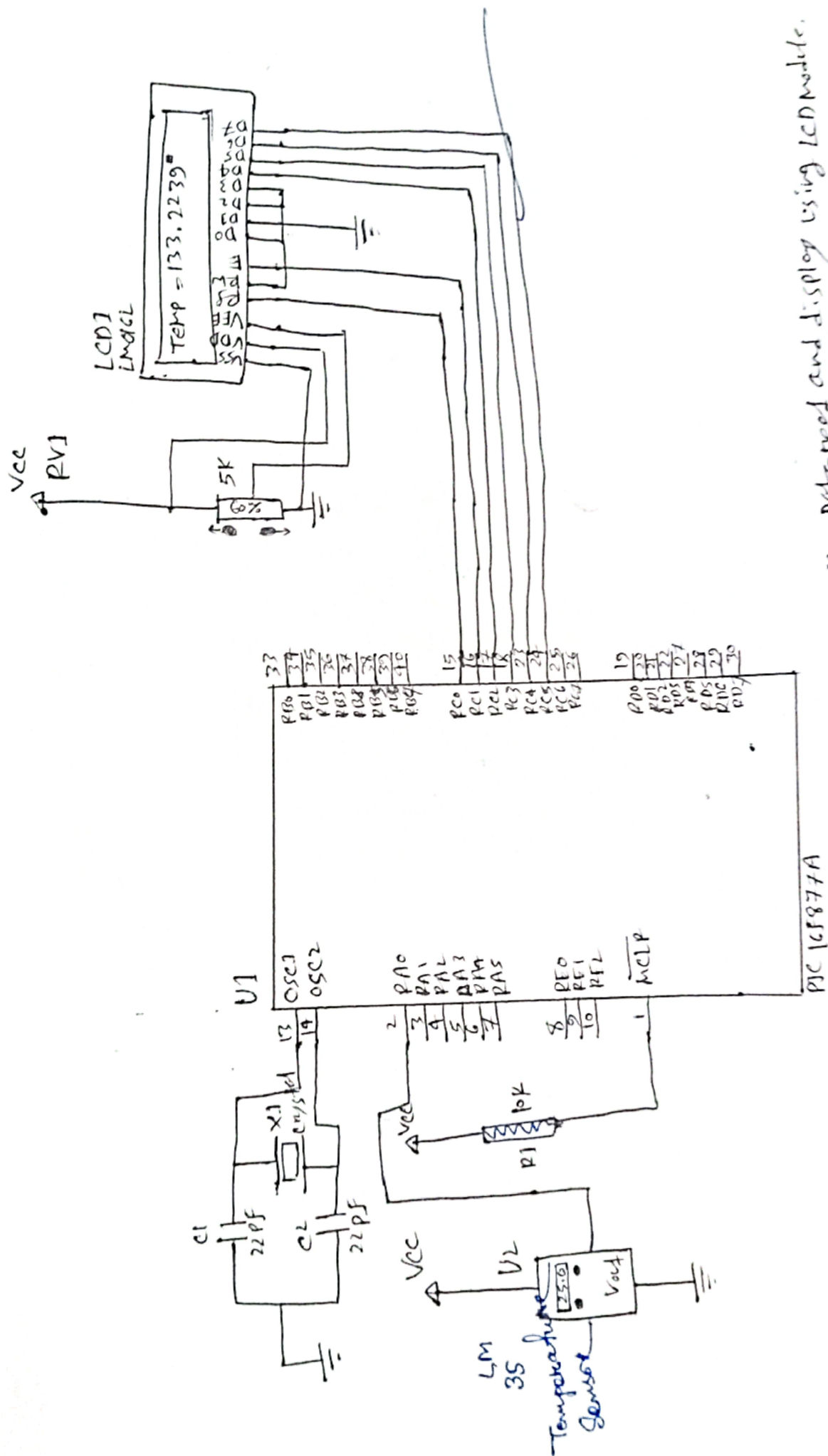


Figure 1 LM35 Temperature sensor

source code 1

```

sbit LCD_RS at RB0_bit;
sbit LCD_EN at RB1_bit;
sbit LCD_D4 at RB2_bit;
sbit LCD_D5 at RB3_bit;
sbit LCD_D6 at RB4_bit;
sbit LCD_D7 at RB5_bit;

```

```

sbit LCD_RS_Direction at TRISB0_bit;
sbit LCD_EN_Direction at TRISB1_bit;
sbit LCD_D4_Direction at TRISB2_bit;
sbit LCD_D5_Direction at TRISB3_bit;
sbit LCD_D6_Direction at TRISB4_bit;
sbit LCD_D7_Direction at TRISB5_bit;

```

```

char display[16] = " ";

```

```

void main()

```

```

{
    unsigned int result;

```

```

    float volt, temp;

```

```

    trisb = 0x00;

```

```

    trisa = 0xFF;

```

```

    adccon1 = 0x80;

```

```

    lcd_init();

```

```

    lcd_cmd(-lcd_clear);

```

```

    lcd_cmd(-LCD_CURSOR_OFF);

```

```

    while(1)

```

```

    {
        result = adc_read(0);

```

```

        volt = result * 4.88;

```

```

        temp = volt / 10;

```

```

        lcd_out(1, "TEMP=");

```

```

        floatToStr(temp, display);
    }
}

```

lcd\_out\_cp(display);

lcd\_chn(1,16,223);

lcd\_out\_cp("c");

}

}

