

MICROCONTROLLER : PIC18f4580

Compiler: XC8 (MPLABxIDE)

Algorithm for measurement

Step1: Convert 0V - 100V into 0V-5V (we can't feed 100V to microcontroller)

Step2: We are using VDR circuit, calculations are as follows

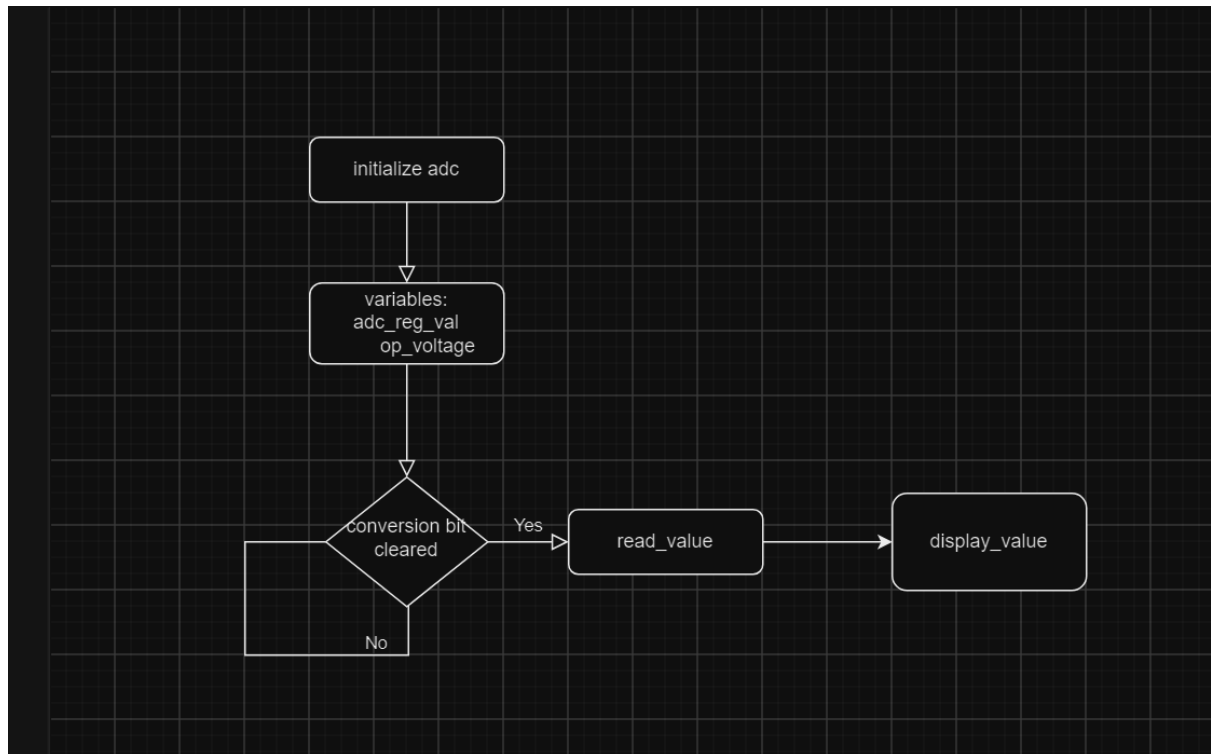
$$V_{out} = V_{in} (R_2)/(R_1 + R_2) \quad /*for reference check the circuit diagram*/$$

Step3: After calculation the resistors values are 1 ohm and 19 ohm

Step 4: For the calculation of output voltage read by the microcontroller. The value stored in ADC register is used as follows:

$$((ADC_register_value * 5) / (1024)) * 20$$

FLOWCHART:



C CODE

```
/*
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* File:   main.c
*/

#include <xc.h>

void init_adc(void);
unsigned short read_adc(void);
void init_adc(void)
{
    /* Selecting Right Justification */
    ADFM = 1;

    /* Starting the ADC Module */
    ADON = 1;

    /*select the channel 0*/
    CHS0 = 0;
    CHS1 = 0;
    CHS2 = 0;
    CHS3 = 0;
}

unsigned short read_adc(void)
{
    unsigned short adc_reg_val; // 2bytes

    /* Start the ADC conversion */
    GO = 1;

    /* Wait for the conversion to complete */
    while (nDONE); //nDONE = 0 GO = 0

    adc_reg_val = (ADRESH << 8) | ADRESL; // 11 1111 1111 -> 1023

    return adc_reg_val; // 0 to 1023
}
```

```

}

void main(void) {
    init_adc();
    unsigned short adc_reg_val; //0 to 1023
    unsigned short op_voltage; // 0 to 100 volts

    while (1) {
        adc_reg_val = read_adc(); //10 bits -> 0 to 1023
        op_voltage = adc_reg_val/10; //((adc_reg_val*5)/1024)*20 this
        formula is used but to make it short i will round it to 1/10
    }
    return 0;
}

```

CALCULATION OF THEORETICAL ACCURACY :

Accuracy(%) = (Theoretical value - Observed value) / (Theoretical value * 100)

I am taking one case where the:

Observed value = 4.40V

Theoretical value was 4.70V

So achievable accuracy will be 99.36% .