EMBEDDED LAB

Project Report

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AC Voltmeter

Objective:

- To create an AC Voltage meter, that could measure the AC voltage across the AC terminals.

Software Used:

- Proteus
- MikroC
- PIC C complier

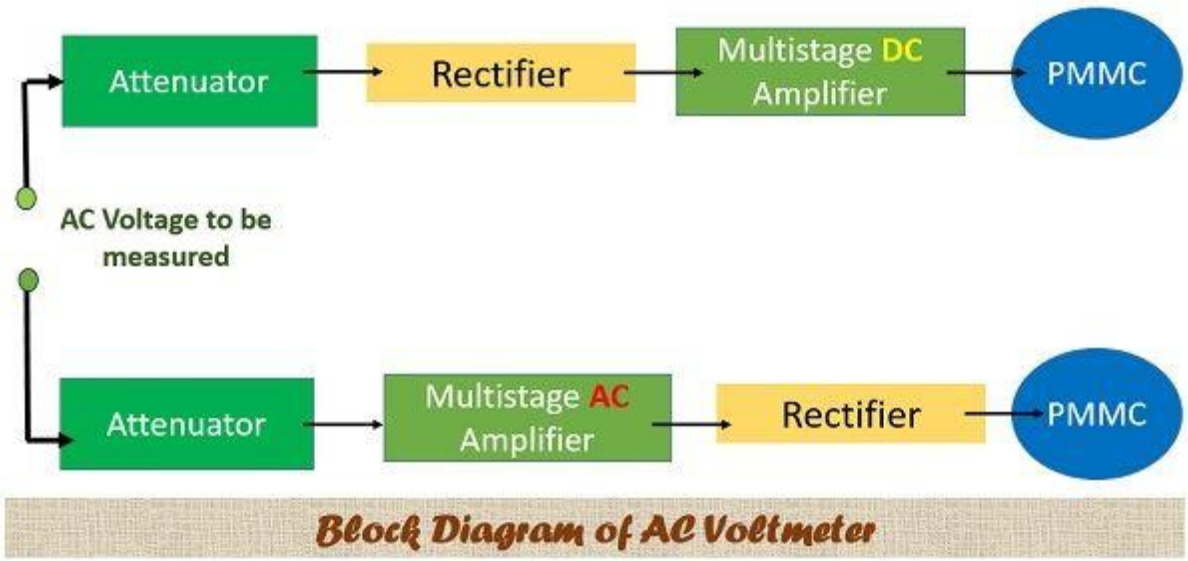
Hardware Used:

- PIC 16F877A
- LCD 16x2
- Diodes 1n4007
- Resistors
- Capacitors
- Crystals
- Potentiometer
- Signal Generator

Introduction:

AC voltmeters are planned in a way with the goal that they can quantify the AC voltage under estimation. The primary distinction between AC voltmeter circuit and DC voltmeter circuit is the utilization of a rectifier. The rectifier is utilized to change the AC voltage into DC voltage.

To foster a fundamental comprehension of AC voltmeter, it is urgent to have a concise thought of the block chart of AC voltmeter circuit. The block graph of AC voltmeter looks like the block chart of DC voltmeter with the exception of the way that rectifier is utilized in the event of AC voltmeter.



Working:

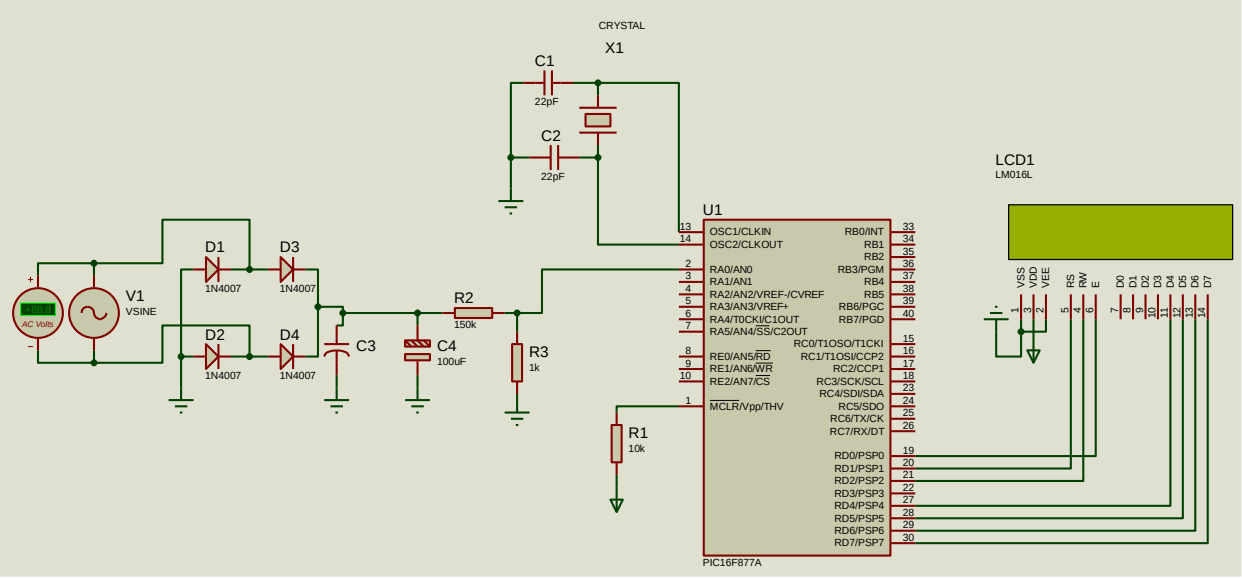
We can use a Potential Transformer so that if we give 220V, it steps it down. But we will be giving a small AC Voltage. We will give 6V 7V. After that bridge rectifier changes over step down AC into DC voltage. Voltage divider further partitions the voltage into two sections. Voltage under 5 volt show

up across simple to advanced converter pin of pic16f877a microcontroller. Microcontrollers are fundamentally little miniature PCs which see just advanced values. Underlying simple to advanced converter module of pic16f877a microcontroller changes over simple upsides of AC voltage into computerized values. These advanced qualities are utilized in handling of information with in microcontroller. Bits of directions written through coding guided microcontroller. Microcontroller itself sit idle.

Procedure:

- First make the circuit in the software proteus.
- Give the inputs at the diodes.
- Code in the software MikroC.
- Now, we have to work on the Hardware.
- Burn the Code on the PIC 16f877A.
- Make the Circuit on Breadboard.
- Give input of almost 6V, 7V AC on the terminals of the diodes.
- Check on the LCD the Voltage is being showed.

Circuit diagram:



Code:

```
int16 rd_adc();//Defining function of 16 bit analog to digital conversion

//Main body of the program


void main()

{

  int16 x;//Declaring int variable of 16 bit

  set_tris_a(0xff);//Configuring port A as an input

  adcon0=0b01000000;//Moving binary literal value to adc register
```

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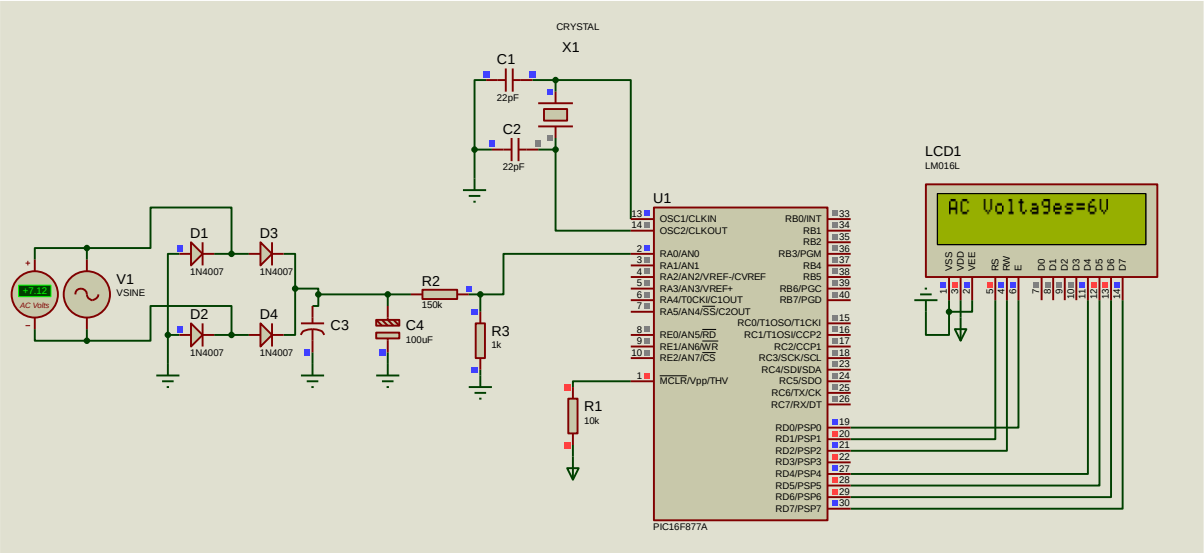
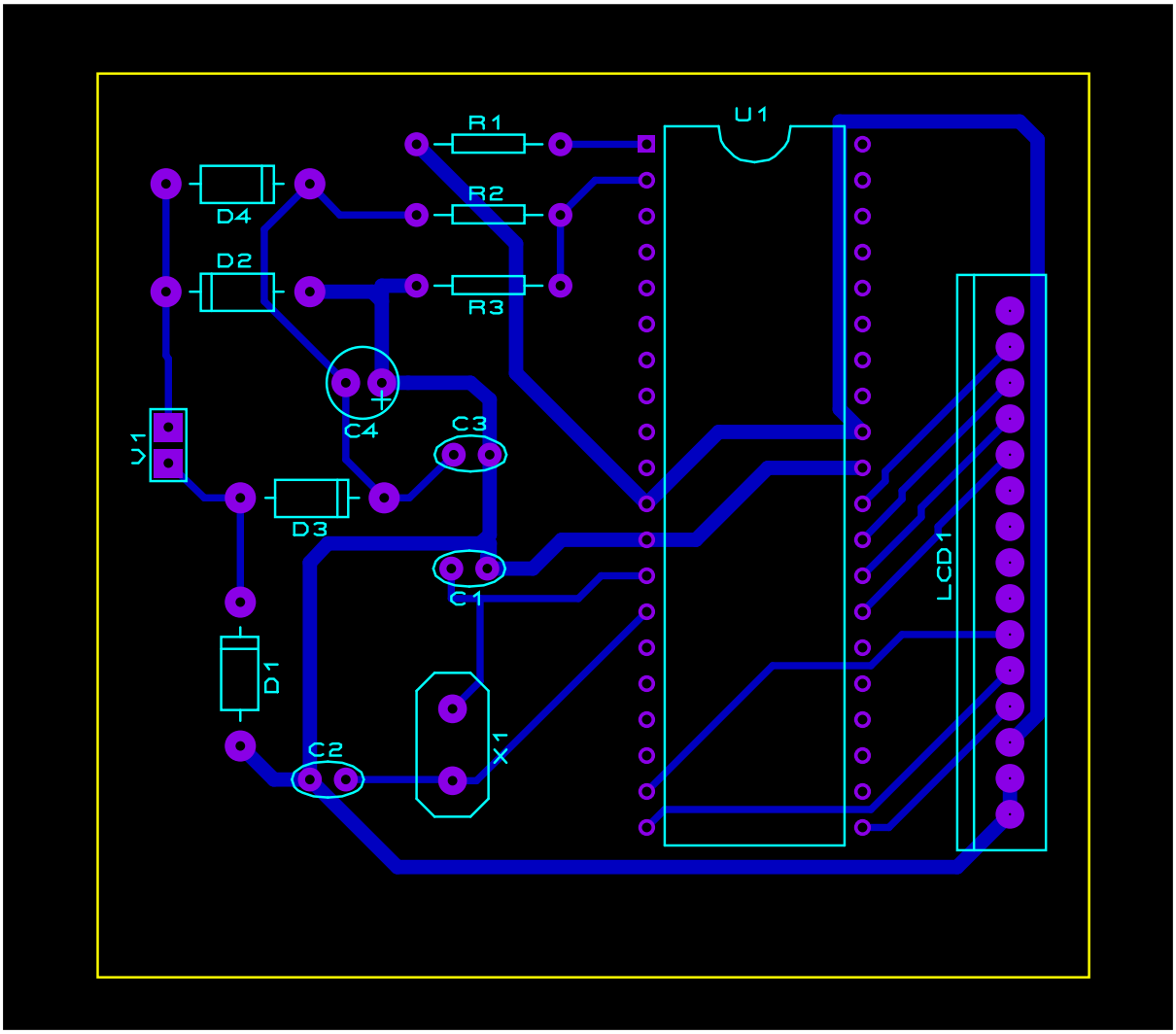
```
  adcon1=0;//Moving decimal literal value to adc register

  lcd_init();       //Initializing lcd

  while(1)          //Infinite while loop
  { //Performing arithmetic operations and storing result in x variable
    x=rd_adc();
    x=(x/121);
    printf(lcd_putc,"\fAC Voltages=%LUV",x);//Giving command to display float data on the lcd
    delay_ms(1900);//Giving command for delay
  }
}

int16 rd_adc()//Body of return type function
{
int16 value = 0;
bit_set(ADCON0,0);     //Turn on ADC
bit_set(ADCON0,2);     //Start AD Conversion
while(bit_test(ADCON0,2)){}    //wait untill conversion is done
value = make16(ADRESH,ADRESL);    //Read result
return value;       //return value
}
```

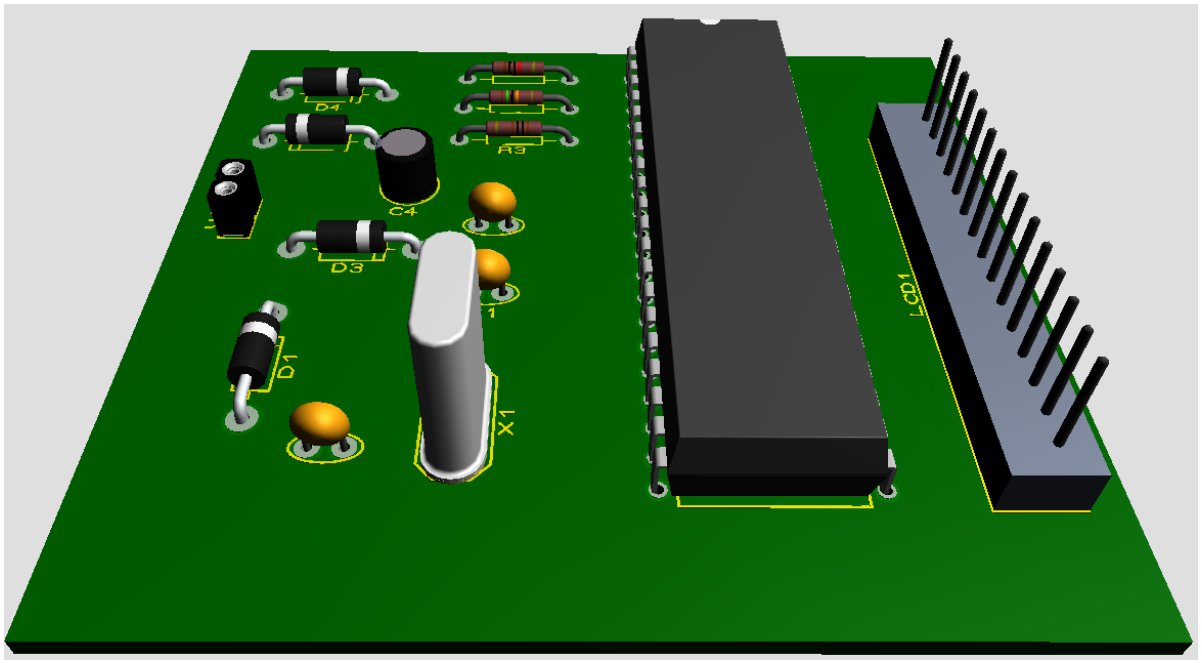
Result:



PCB Design:



3D Visualizer:



Conclusion:

In this project, we made an AC Voltmeter by using a bridge rectifier. It basically converts the AC volt to DC volt. And then it is given to the ADC pin of the Microcontroller. And then the output is given to the LCD.