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SINGLE PHASE DIFFERENTIAL VOLTAGE GENERATION USING MICROCONTROLLER & KEYBOARD- A REVIEW

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ABSTRACT

Normally a single-phase voltage varies through analog strategies which include a dimmer however we can't get precise voltage through a dimmer also. To acquire a smart/precise voltage stage VFD drives are used. To range voltage by converting the firing perspective of the Thyristor a variable ac voltage may be obtained. Thyristor conducts in both cycles of ac. If conduction perspective is managed through the firing perspective of the Thyristor. For 1/2 of ac cycle firing perspective modifications from zero degrees to one hundred eighty degrees in accordance to that conduction perspective modifications. As conduction perspective and firing perspective are inversely proportional to every other. Means that if firing perspective much less then conduction perspective is greater and vice versa. A 0 crossing detector circuit is used to know the 0 crossing of ac voltage. While 0 crossing phase offers output of common sense 1 then from this factor ac voltage begins to rise/fall. This is the reference factor from that factor to most one hundred eighty degree factor firing perspective may be managed. In this manner a variable output voltage is generated.

Keywords: Firing Angle, Conduction Angle, Thyristor, Zero Crossing Detector, Microcontroller.

I. INTRODUCTION

Ac voltage in Asian countries has a frequency of fifty Hz. It offers a time amount of twenty-time units. For 0.5 ac cycle time is ten milliseconds. P89V51RD2 has the minimum measurable time of one microsecond. Therefore it's a giant resolution. Therefore to manage the firing angle between 0 degrees to a hundred and eighty° then equivalently we've to alter the time from 0 milliseconds to 10 milliseconds for half ac cycle. Output voltage consistent with firing angle is given by following equation no.1. Figure 1 shows the thought of firing angle, physical phenomenon angle & time period.

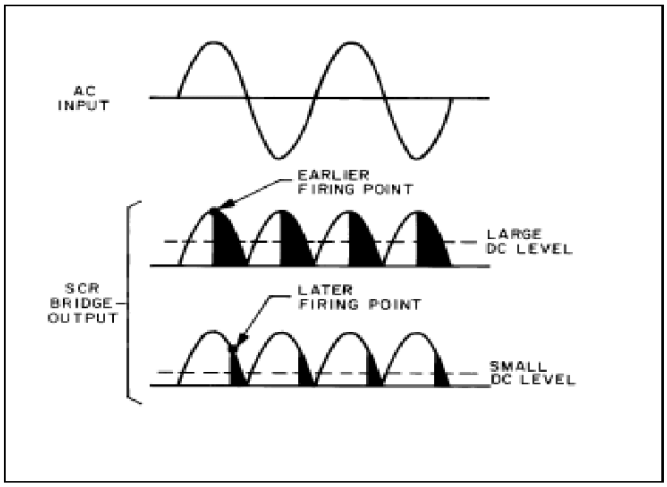

Fig 1: Firing angle of thyristor.

$$V_{load} = V_{rms} \cos(\alpha) \quad \text{--------- (1)}$$

The P89V51RD2 is an 80C51 microcontroller with sixty four kB Flash and 1024 bytes of information RAM. A key characteristic of the P89V51RD2 is its X2 mode option. The layout engineer can pick to run the software with the traditional 80C51 clock rate (12 clocks in keeping with device cycle) or pick the X2 mode (6 clocks in keeping with device cycle) to attain two times the throughput on the equal clock frequency. Another manner to advantage from this selection is to maintain the equal overall performance through decreasing the clock

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frequency through half, for this reason dramatically decreasing the EMI. The Flash software reminiscence helps each parallel programming and in serial In-System Programming (ISP). Parallel programming mode gives gang-programming at excessive speed, decreasing programming fees and time to market. ISP lets in a tool to be reprogrammed in the long run product below software program control. The functionality to field/replace the software firmware makes a extensive variety of programs possible. The P89V51RD2 is likewise In-Application Programmable (IAP), permitting the Flash software reminiscence to be reconfigured even whilst the software is running

II. RELATED WORK

Rohan s. khode et.al [1] labored on thyristor firing angle-managed reactive electricity adjustment the use of the MATLAB Simulink model. They used the MATLAB Simulink model. P.A.Kharade et.al [2] labored on Power Factor development in unmarried segment excessive electricity rectifier through the use of interleaved improve technology. Mohammad khan et.al [3] labored on compensating strategies to lower harmonics added through thyristor. S.A.Harprasad et.al [4] labored on ac electricity manage the use of a microcontroller and electricity MOSFET. PWM strategies have been implemented. Pallavi R. Burje et.al [5] labored on a PIC microcontroller-primarily based totally CAN system. They determined that PIC IC affords higher balance in electricity sector.

III. DESIGNED SYSTEM

Figure 2 indicates the block diagram of variable output voltage era with the aid of using the usage of microcontroller. P89V51RD2 microcontroller is used. It offers solid operations. Total virtual circuit works on five volt DC electricity supply. Zero crossing detection is a circuit which runs on bridge community ruined with the aid of using ac voltage. Zero crossing detector offers output good judgment 1 each time ac crosses 0 voltage factor and this can be the reference factor. Input price for voltage to be generated is given from alphanumeric keyboard. According to this price firing perspective is controlled. Keyboard enter price is displayed on LCD display. To power thyristor a gate pulse is given from microcontroller. It is coupled thru Opto isolator to isolate ac electricity from dc electricity. Generated ac electricity is measured with the aid of using multi meter

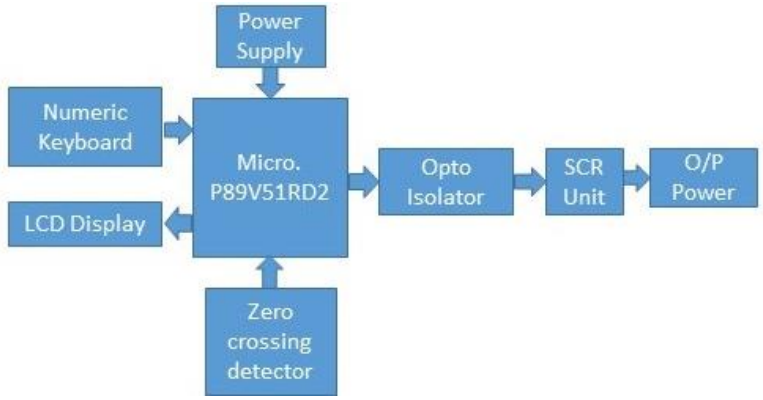

Fig 2: Block Diagram.

IV. EXPERIMENTAL SET UP

Figure three suggests the real experimental installation for variable voltage generation. Figure four suggests PCB layout. Figure five suggests the programing flowchart of the module.

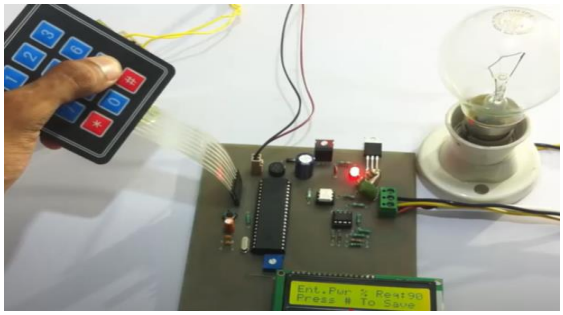

Fig 3: Experimental Set up

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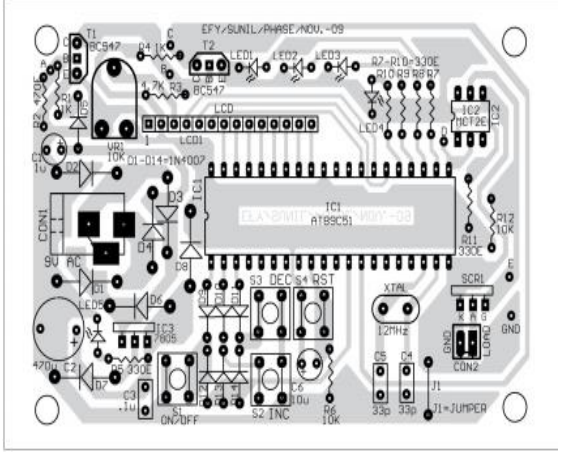

Fig 4: PCB layout with component

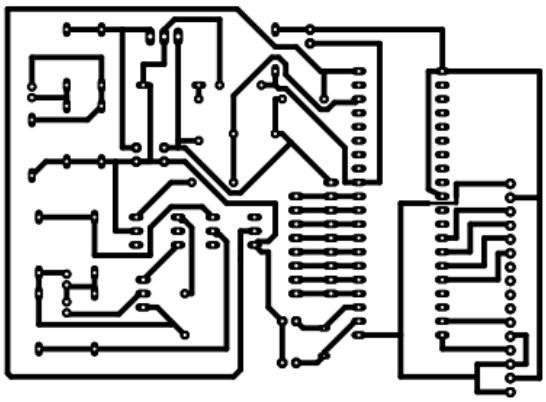

Fig 5: PCB layout with track

Sample Program code:

```
// ************************************************************
#include<reg51.h>
//Function declarations
void cct_init(void);
void delay(int);
void lcdinit(void);
void writecmd(int);
void writedata(char);
void Return(void);
char READ_SWITCHES(void);
char get_key(void);
void msdelay(int);
//*******************
//Pin description
/*
P2 is data bus
P3.7 is RS
P3.6 is E
P1.0 to P1.3 are keypad row outputs
P1.4 to P1.7 are keypad column inputs
*/
//*********************
// Define Pins
```

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```
//********************
sbit RowA = P3^0;    //RowA
sbit RowB = P3^1;    //RowB
sbit RowC = P3^2;    //RowC
sbit RowD = P3^3;    //RowD
sbit C1   = P3^4;    //Column1
sbit C2   = P3^5;    //Column2
sbit C3   = P3^6;    //Column3
sbit C4   = P3^7;    //Column4
sbit E    = P1^6;    //E pin for LCD
sbit RS   = P1^7;    //RS pin for LCD
sbit sw   = P1^0;
sbit relay = P1^2;
//*********************************************************
// Main program
//
int main(void)
{
char key; //key char for keping record of presed key
unsigned int d1,d2,d3;
relay = 0;
cct_init();  // Make input and output pins as require. lcdinit(); // Initilize LCD
sw = 1;
relay = 0;
//lcdinit();            // Initilize LCD
 //writecmd(0x01);
 key = get_key();      // Get pressed key
 d1 = key;
 writedata(d1);
 key = get_key();      // Get pressed key
 d2 = key;
 writedata(d2);
 key = get_key();   // Get pressed key
d3 = key;
 // Clear screen
 //writedata(key);    // Echo the key pressed to LCD
writedata(d3);
// while(sw==1);
  while(1)
{
if((d1=='1'&&d2=='1')&&d3=='0'||d3=='1'||d3=='2'||d3=='3'||d3=='4'||d3=='5'||d3=='6'||d3=='7'||d3=='8'||d3=
='9')
{
while(1)
{
while(sw == 1);
msdelay(9);
relay = 1;
relay = 1;
relay = 1;
relay = 1;
```

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```
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 0;
while(sw == 0);
msdelay(9);
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 1;
relay = 0;
}
}
```

……..

Following are the extraordinary figures of firing perspective changed. Figure 6 suggests firing perspective of 110˚. Figure 7 suggests firing perspective of 130˚. Figure eight suggests firing perspective of 150˚. Figure nine suggests firing perspective of 170˚.

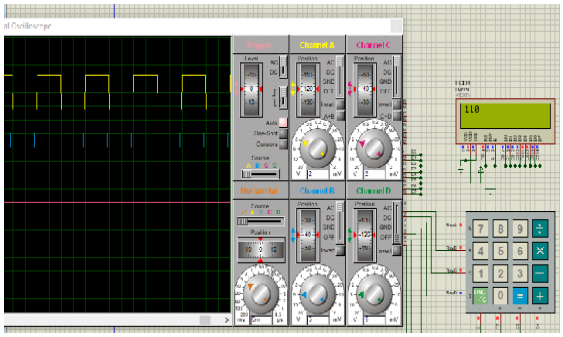

Fig 6: shows firing angle of 110˚

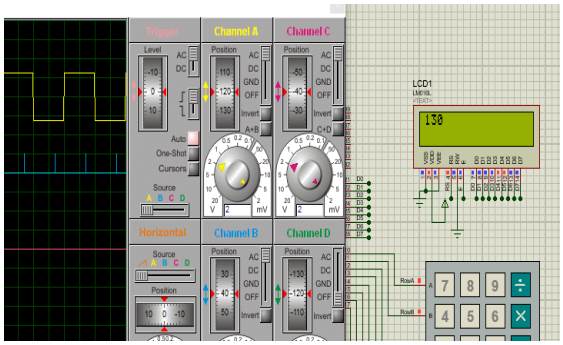

Fig 7: shows firing angle of 130˚

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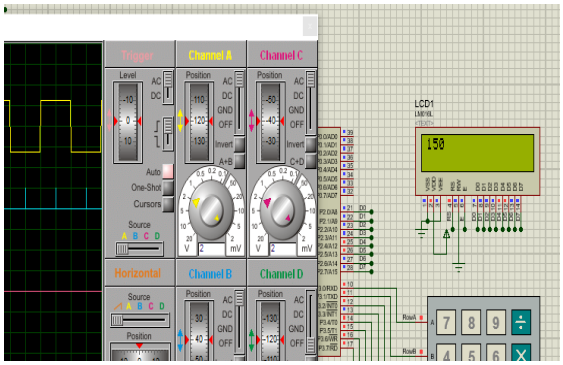

Fig 8: shows firing angle of 150˚

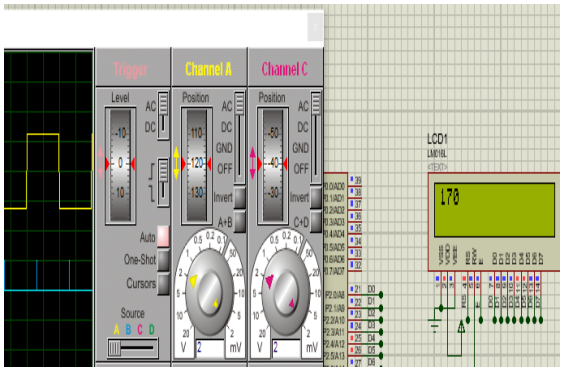

Fig 9: shows firing angle of 170˚

V. CONCLUSION

It is nearly found that a most quantity of decision made in 1/2 of cycle is 10 method that a minimal measurable /seen bulb depth is one hundred ten volt then a hundred and twenty volt as much as 230 volt. The voltage under one hundred ten volt isn't always seen i.e. bulb doesn't glow to voltage decrease than one hundred ten volt. We implemented & nearly found the ten unique firing angles in line with this firing perspective depth of bulb have been changed. To control/generate satisfactory ac voltage VFD technique is excellent suited. Microcontroller technique generates 10 to twelve decision factors of ac voltage, dimmer can generate five factor decision however VFD pressure can generate round two hundred factor decision. But for know-how firing, conduction perspective idea we implemented & nearly studied the systems.

VI. REFERENCE

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