A TOOL FOR SOLAR PANEL TRACKING SYSTEM USING 8051 MICROCONTROLLER

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Abstract- In the recent years, the energy sources like fossil fuel, gas, crude oil, coal, nuclear fuel etc. are becoming scared due to excessive use of it for domestic as well as commercial purpose. These are non-renewal sources of energy. The situation was energy resources are scared, it is vital to use renewable source of energy for example solar energy, Wind power, Tides, Hydroelectricity, Geothermal power. This paper gives the design and construction of 8051 microcontroller for solar panel tracking system to produce solar energy. Solar tracking system produces more energy since the solar panel remains aligned to the sun.

Keywords- Renewal, Non-renewable, Solar Energy, Microcontroller, Signal, Tracker.

I. INTRODUCTION

Non-renewable resources are resources for which there is a limited supply. The supply comes from the Earth itself and, as it typically takes millions of years to develop, is finite. A renewable resource is defined as a natural resource that renews itself at a rate that is faster, or equal to the rate of consumption. Solar energy is renewable source of energy. Solar energy is rapidly gaining notoriety as an important means of expanding renewable energy resources.

The paper explores the aim of solar panel tracking system which is to keep the solar photovoltaic panel perpendicular to the sun throughout the year in order to make it more efficient. The fuzzy control is used to control the position of DC motor. Solar tracker is a device which follows the movement of the sun as it rotates from east to west every day.

Trackers are used to keep solar collectors/solar panels oriented directly towards the sun as it moves through the sky every day.

II. REVIEW OF RELATED WORKS

Fundamentals, Design, Modelling and Applications of solar energy provides a platform to the scientists and engineers to understand the fundamentals of solar energy, and its applications and basic heat transfer. It describes the design, construction and performance of solar thermal devices and photovoltaic system.

The solar thermal devices include flat plate collector, air heaters, crop drying, solar house, water heating system, solar distillation, solar concentrator and a controlled environment greenhouse etc. A number of related works exist in literature, application of solar energy to different areas where the electric energy is required. Instead of electric energy we can make the use solar energy.

III. MATERIALS AND METHOD

Solar Panel Tracking System consists of Motors. Motors are allowed to run continuously when any one of Light Dependent Resistor (LDR) offers low resistance, allowing potential divider to high voltage output. Any one of the Light Dependent Resistor (LDR) signal conditioning circuit generates high output. Accordingly motor further allowed to rotate till panel assembled on motor driver (L293D) will be fixed perpendicular. Solar cell kept perpendicular to sunlight so as to offers maximum output show in Figure 3.1.Light Dependent Resistor(LDR) is used to sense directions of perpendicular rays. Motion to solar panel in perpendicular direction of sunrays is imparted with help of DC motors.

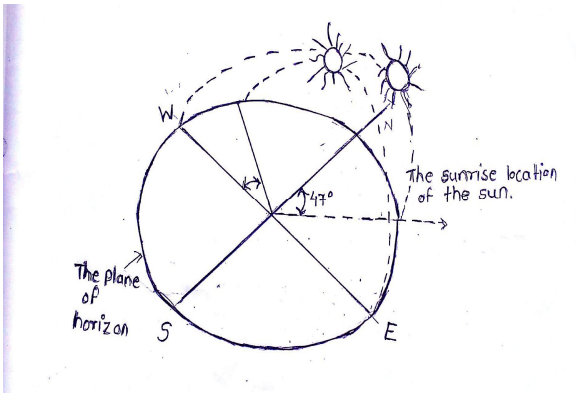

Figure 3.1 Solar PanelTracking systems with the rotation of Sun

In Solar Panel Tracking system two LDRs (LDR1,LDR2) are connected to 8051 microcontroller for movement of panel and motor is connected using motor driver(L293D) as shown if Figure 3.2.

Two LDRs (LDR1, LDR2) work according to the position of sun, the panel moves in the direction of sun and when sunlight is perpendicular to the panel then movement of the panel stops automatically. In

the morning when the light is on LDR1 the panel stop movingand gains the maximum energy. At noon, sunlight is perpendicular to the panel, then panel stops moving and gains maximum energy.In theevening whenthe light is on LDR2 then panel stops and gains maximum energy.

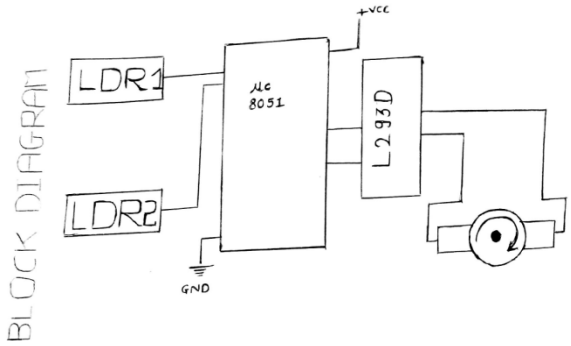

Figure 3.2 Block diagram of LDR with Microcontroller 8051

IV. HARDWARE DESIGN CONSIDERATION

Figure 4.1 shows the circuit diagram for Solar Panel Tracking System in which following components are used:

1. Two IC 555 - A Timer IC
2. Registers R1, R2 each of 120K
3. Capacitors C1, C2,C3,C4 each of 0.01MicroF
4. Two Light Dependent Registers(LDR) each of 50k dark register
5. ICL293D – Motor driver
6. IC AT89C51 – Atmel Make

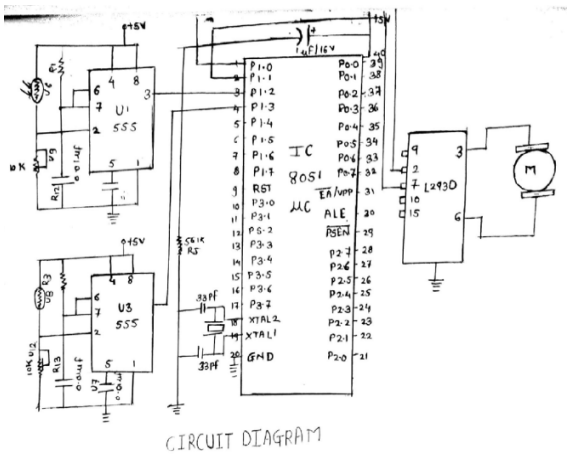

Figure 4.1 Block diagram circuit diagram for Solar Panel Tracking System

V. SOFTWARE DESIGN SPECIFICATIONS

Code is written in 'C' language andeditor keilµvision4 is used.

```
#include<reg51.h>
sbit en1=P1^4;
sbit mtr1=P1^0;
sbit mtr2=P1^1;
sbit LDR1=P1^2;
sbit LDR2=P1^3;
void delay(unsigned int);
void clockwise();
void anticlockwise();
void stop();
void main()

{
        mtr1=0;
        mtr2=0;
        LDR1=0XFF;
        LDR2=0XFF;
while(1)
{
        if(LDR1==1 && LDR2==0)
                clockwise();
        elseif(LDR1==0 && LDR2==1)
                anticlockwise();
        else
                stop();
        }
}
void clockwise(void)
{
        mtr1=1;
        delay(25);
        mtr2=0;
        delay(75);
}
void anticlockwise(void)
{
        mtr1=0;
        delay(25);
        mtr2=1;
        delay(75);
}
void stop(void)
{
        mtr1=0;
        mtt2=0;
}
void delay(unsigned int value)
{
        unsignedinti.j;
        for(i=0;i<value;i++)
        for(j=1;j<1275;j++)
}
```

CONCLUSION

This tool provides the design and construction of 8051 microcontroller for solar panel tracking system to produce solar energy. Solar tracking system produces more energy since the solar panel remains aligned to the sun.

FUTURE IMPLEMENTATION

This tool can be used in solar cooker, solar heater, solar cell, etc. where the electric energy is required. Instead of electric energy we can make the use solar energy.

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REFERENCES

[1] Kenneth J. Ayala, the 8051 Microcontroller: Architecture, Programming and Applications, 2nd Edition, Thomson Delmar Learning 1997.

[2] Muhammad Ali Mazidi,Janice GillispieMazidi,Rolin D. McKinlay, The 8051 Microcontroller and Embedded Systems Using Assembly and C 2nd Edition Pearson Education 2004

[3] http://examples.yourdictionary.com/

[4] http://greenliving.lovetoknow.com/

[5] www.engineersgarge.com

[6] www.datasheet.com

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