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ABSTRACT

The designed project measures different solar cell parameters like light intensity, voltage, current and temperature by using multiple sensor data acquisition. The project uses a solar panel to monitor sunlight and a PIC microcontroller. The project requires an LDR sensor for measuring light intensity, a voltage divider to measure voltage and a temperature sensor to measure the temperature. These measurements are then displayed by the microcontroller to a LCD screen.

The light intensity is monitored using an LDR sensor, voltage by voltage divider principle, current by current sensor and temperature by temperature sensor. All these data are displayed on a 16X2 LCD interfaced to 8051 family microcontroller.

Keywords: Prevents damage, solar power.

INTRODUCTION

The project system to measure solar power is meant to display and calculate different solar power parameters in one place. This project is based on embedded system. The circuit uses a standard power supply comprising of a step-down transformer. This helps to power the whole circuit. This system is important as it displays various parameters. And this can be useful to prevent damage to the panels with the help of this system one can understand easily how and when to rotate the panels. This project can be made for large scale as this will cost low and advancement can be done easily in this.

METHOD

A. Stages:

The initial stage requires various components to detect the parameters such as light intensity, temperature, current and voltage. The second stage includes connection and working of the circuit using the 8051 micro controller. The last step includes the coding of micro controller using the kiel compiler. These stages help to run the circuit properly and run the whole system .these will be further displayed with the help of the LCD display.

B. Product Testing

This is the important factor in any project. And especially required, when the aim is to assist individuals to make sure the panels are working and are not damaged .Subsequently, the project will be tested on a small solar panel before being made public.

C. Characteristics:

There are various function of this project which are very useful. These function are run by various component which are used to calculate the output. The LDR is use to calculate the temperature of the surrounding, With the help of voltage divider it is used to calculate voltage.LM35 is used to calculate the light intensity of the sun. The current is calculate with the help of the ammeter.

D. Methodology:

The Voltage from the solar panel is fed to the MC pin no 4 through a potential divider comprising of R4 & R5. Zener diode D6 is used to protect the input to the microcontroller exceeding 5V. a 100ohm, 5W resistor R6 is used as load in series with another resistor R7 of 10ohm, 10W. a variable resistor 100K is used for setting/ calibrating the current parameters. The voltage drop across the resistor R7 is proportional to the load current which is fed to pin 5 of MC in a small portion by the variable resistor. Light input is sensed by LDR1 in combination with resistor R3 the common point of which is fed to MC pin 2. A temperature sensor LM35 (U3) delivers the output in analog voltage proportional to the heat on its surface being connected to pin 3 of MC. Thus, four analog varying voltage parameters are fed to the internal ADC of the MC out of total availability of 8 channels. A LCD is used to display all the output parameters such as light intensity, temperature, voltage and current of solar panel. The unit can be used either from the power supply comprising of TR1, D1-D4, C1, 7805, C2 R1 & D5 or can be directly fed from 6V source of the solar panel.

CONCLUSION

We measured parameters of solar panels such as Voltage, current, power, temperature and intensity of light using 8051 microcontroller. Digital display can be used to display values of these parameters. 8051 microcontroller can be used to measure analog values of these sensed parameters and analog to digital to converter which is in built in 8051 microcontroller can be used to measure values of these parameters. There are many ways to sense voltage. But in this proposed work we can easily measure voltage of solar panel using voltage divider. By seeing all this parameters solar energy is the future and this system will play a major role to give information to the user so that it can used in better way and there is less chances of damaging the panel

REFERENCES

[1]. M.R. Al Rashidi, M.F. Al Hajri, K.M. El Naggar, A.K. Al-Othman, "*A new estimation approach for determining the I–V characteristics of solar cells*", Electrical Engineering Department, College of Technological Studies (PAAET), Shuwaikh, Kuwait, (2011).
[2]. V. Ryan, *what is solar energy*? (2016, September 20), http://www.technologystudent.com/energy1/solar1.htm
[3]. John Balfour, "*Introduction to Photovoltaic*", United States of America, (2013).
[4]. Arindam Bose, Sounak Sarkar, Sayan Das, "*Helianthus-a Low Cost High Efficient Solar*
[5]. *Tracking System Using AVR Microcontroller*", International Journal of Scientific & Engineering Research, **Volume 3**, Issue 10, October (2012).
[6]. Mohsen Taherbaneh, A. H. Rezaie, H. Ghafoorifard, K. Rahimi and M. B. Menhaj, "*Maximizing Output Power of a Solar Panelvia Combination of Sun Tracking and Maximum Power Point Tracking by Fuzzy Controllers*", Hindawi Publishing Corporation, International Journal of Photoenergy, **Volume 2010**, (2010).
[7]. Yi-Hua Liu, Jia-Wei Huang, " *A fast and low cost analog maximum power point tracking method for a low power photovoltaic systems*", Department of Electrical Engineering, National Taiwan University of Science and Technology, 13 September (2011).