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180 DEGREE SUN TRACKING WITH AUTOMATED CLEANING SYSTEM FOR SOLAR POWER MODULES USING LPC2148

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ABSTRACT

This paper demonstrates a novel method which will automatically track the sun's position and accordingly change the direction of the solar panel to get the maximum output from the solar cell. As solar energy becomes increasingly popular in all parts of the world, all kinds of solar powered products are flooding the renewable energy market. One of them is the solar panel battery charger, the environment-friendly equivalent to a conventional battery charger. It converts light into a direct current, using solar cell modules i.e. a solar panel of varying volts for different uses

Keywords: Arm7 ,relay, solar panel, LCD, motor.

I. INTRODUCTION

Generally, solar panels are stationary and do not follow the movement of the sun. So here is a solar tracker system that tracks the sun's movement across the sky and tries to maintain the solar panel perpendicular to the sun's ray, ensuring that the maximum amount of sunlight is incident on the panel throughout the day till evening. Photovoltaic is the field of technology and research related to the application of solar cells as solar energy. Solar cells have many applications.Individual cells are used for powering small devices such as electronic calculators. Photovoltaic arrays generate a form of renewable electricity, particularly useful in situations where electrical power from the grid is unavailable such as in remote area power systems, Earth-orbiting satellites and space probes, remote radiotelephones and water pumping applications. Photovoltaic electricity is also increasingly deployed in grid-tied electrical systems. Solar Energy has been the power supply of choice for Industrial applications, where power is required at remote locations. Most systems in individual uses require a few kilowatts of power. The examples are powering repeater stations for microwave, TV and radio, telemetry and radio telephones. Solar energy is also frequently used on transportation signaling e.g. light houses and increasingly in road traffic warning signals. Solar's great benefit here is that it is highly reliable and requires little maintenance. While the output of solar cells depends on the intensity of sunlight and the angle of incidence, it means to get maximum efficiency; the solar panels must remain in front of sun during the whole day. But due to rotation of earth those panels can't maintain their position always in front of sun. This problem results in decrease of their efficiency. Thus to get a constant output, an automated system is required which

should be capable to constantly rotate the solar panel. The Solar Tracking System is made as a prototype to solve the problem, mentioned above. It is completely automatic and keeps the panel in front of sun where we get maximum output.

II. EXISTING SYSTEM

Present days the sunlight based board is broadly utilized however we can't get the full vitality from sun because of stable position of board. Guarantee to get the full vitality from sun we are going for proposed framework.

III. PROPOSED SYSTEM:

This paper has proposed a programmed daylight changing framework utilizing sun oriented power for the sun based board control with help of RTC. The proposed framework can keep sunlight based board direct to the daylight, in view of RTC. Microcontroller read the time and in view of time the sunlight based board position is changed. Subsequent to getting the position, the board will take after the daylight to get greatest power by changing over to the following quadrant. At the point when the sun sets down the sun powered board will go to the reset position. This component in deed broadens the green power applications and is extremely practical for general offices that require no substantial power.

IV. BLOCK DIAGRAM:

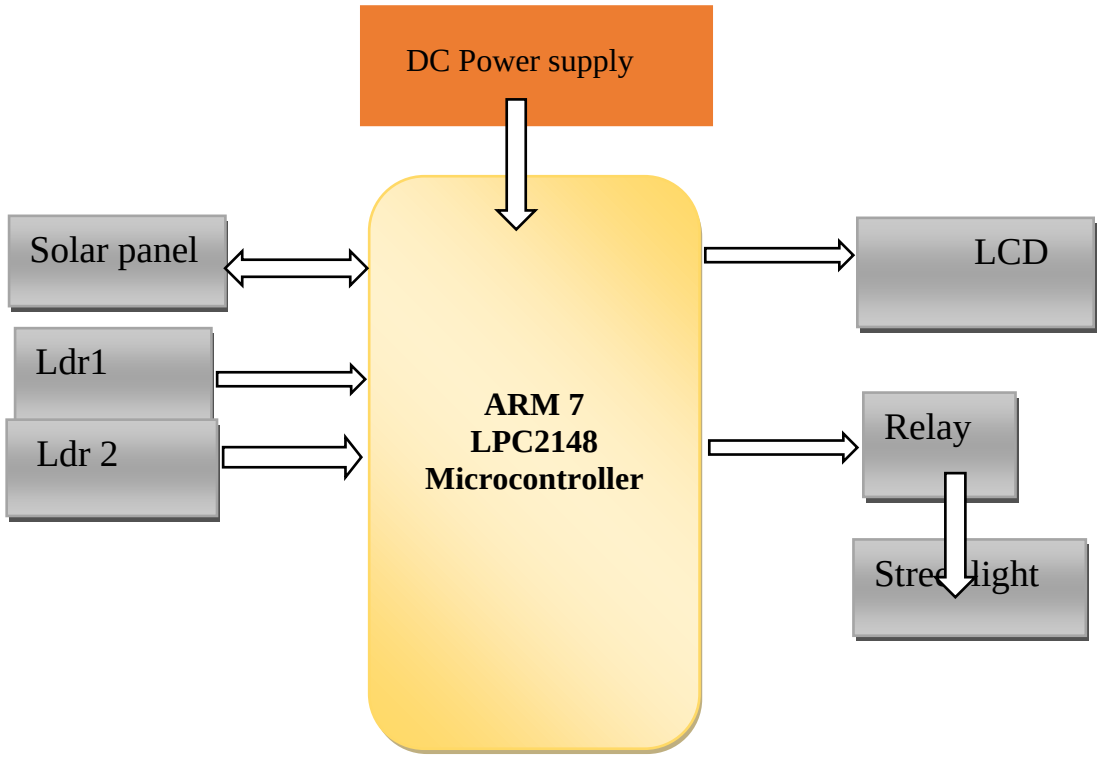

Fig 1: BLOCK DIAGRAM

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V. HARDWARE REQUPIREMENTS

LPC2148 MICROCONTROLLER

The ARM7 (advanced RISC gadget) pressers board primarily based complete on a 16/32-bit ARM7 its method of sixteen/32-bit ARM7 TDMI-S microcontroller, 8 computer reminiscence unit to forty pc reminiscence unit of on-chip static RAM and 32 laptop memory unit to 512computer reminiscence unit on-chip flash memory; 128-bit In- gadget Programming (ISP). 32-bit timers/out of doors occasion counters, PWM pulse width modulation unit (six outputs) and watchdog, Low electricity of actual-Time Clock (RTC), a couple of serial interfaces which has 2 UARTs , fast I2C-bus (400kbit/. There are sixty 4 pins of ARM7 processer and a couple of ports (port0, port1) forty five pins are enter/output.

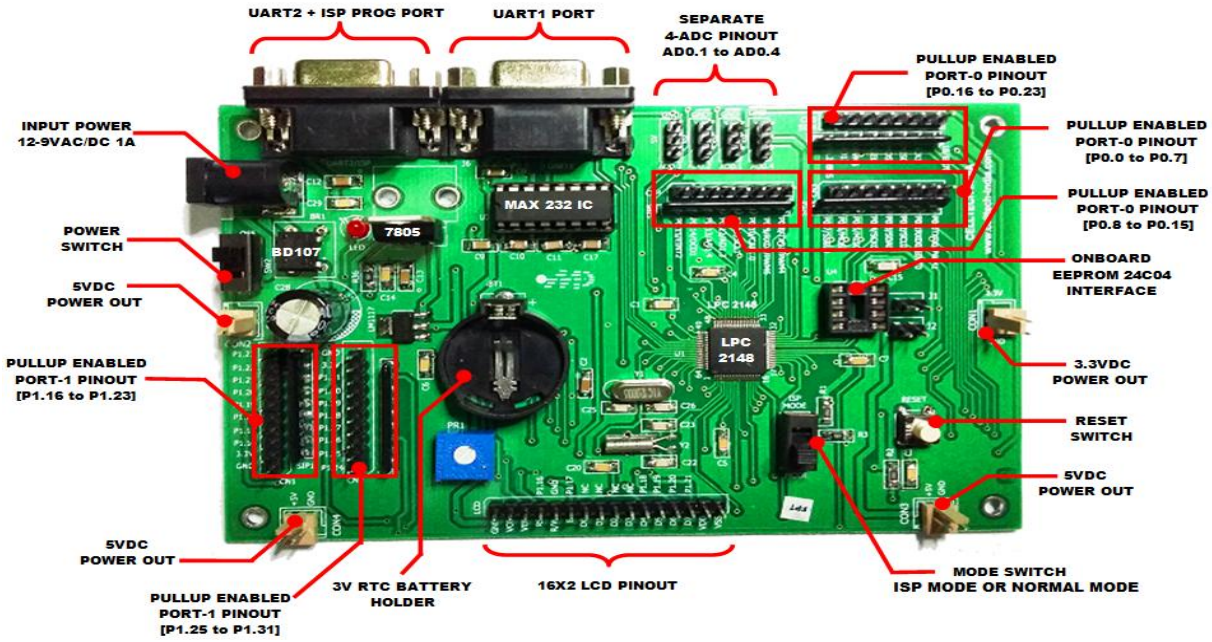


Fig2:-LPC2148 board

LCD (LIQUID CRYSTAL DISPLAY):

LCD stands for liquid crystal displays. Digital display is finding wide unfold use substitution LEDs (seven phase LEDs or different multi-phase LEDs) thank to the subsequent reasons:

1. The declining costs of LCDs.
2. The power to show numbers, characters and graphics. This is overcome the disadvantages of LEDS, that area unit restricted to numbers and a couple of characters.
3. controller into the digital display, thereby relieving the processor of the task of refreshing the digital display. In distinction, the crystal rectifier should be reinvigorated by the processor to stay displaying the info.
4. Simple programming for characters and graphics.

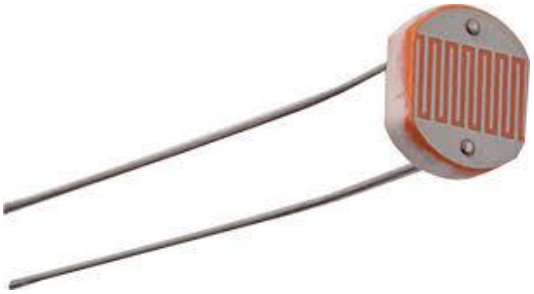
These parts area unit "specialized" for being employed with the microcontrollers,

Figure: Liquid crystal display

A model represented here is for its low value and nice potentialities most often utilized in follow. It show the messages in 2 lines with sixteen characters every. It displays all the alphabets, Greek letters, and punctuation marks, mathematical symbols etc. additionally; it's attainable to show symbols that user makes informed its own .Automatic shifting message on show (shift left and right), look of the pointer, backlight etc. area unit thought of as helpful characteristics.

LDR(Light Dependent Resistor)

Light Dependent Resistor or CdS (Cadmium Sulphide) Cell is a resistor whose resistance decreases with growing incident light intensity. It also can be known as a photoconductor.A image resistor is product of a high resistance semiconductor. If light falling at the device is of excessive sufficient frequency, photons absorbed via the semiconductor give certain electrons enough strength to leap into the conduction band. The ensuing unfastened electron (and its hollow associate) conduct energy, thereby decreasing resistance.



A photoelectric device will be intrinsic or extrinsic. An intrinsic semiconductor has its personal rate carriers and isn't always an green semiconductor, example: Silicon. In intrinsic devices within the valence band, the electrons will be available and subsequently the photon ought to have enough electricity to excite the electron throughout the whole band gap. Extrinsic devices have impurities, also called dopants, brought whose ground nation energy is in the direction of the conduction band; because the electrons do not have as a long way to leap, decrease energy photons (i.E., longer wavelengths and lower frequencies) are enough to cause the device. If a sample of silicon has a number of its atoms changed by phosphorus atoms (impurities), there may be more electrons available for conduction. This is an instance of an extrinsic semiconductor.

Relay:

Relay is a current amplification device. Micro controller will give only 50uamp current to the output. This current is not sufficient for an output device. By using relays we can increase the current from 50uamp to 1Amp. These will be possible with EMF, which will be generated through coils in relay.

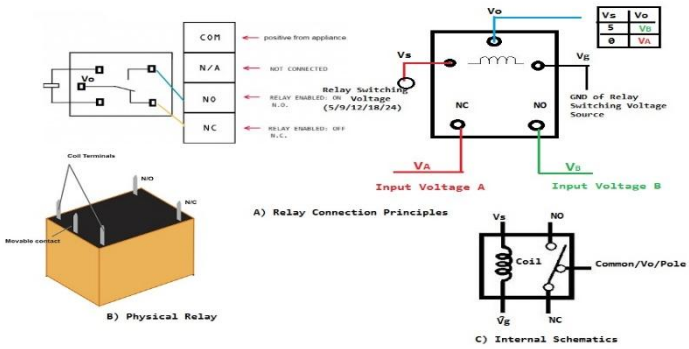
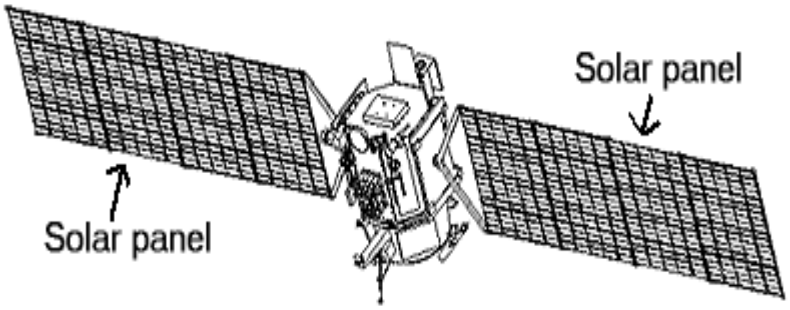


Figure 2.3: Relay

Solar Panel

The solar is an infinitely renewable, absolutely pollutants-loose supply of strength. Instead of burning fossil fuels dug up from the floor in a massive electricity plant – a totally 19th century, industrial age approach, when you reflect onconsideration on it – solar panels convert daylight directly into electricity, and not using a dangerous emissions.The basic unit of a solar panel is a solar mobile, which commonly consists of one or two layers of silicon-primarily based semiconductor wafers. When struck by means of the photons in sunlight, the sun cellular generates an electrical price because of the "photovoltaic effect" – that is a quite right call, because it produces voltage from photons. The drift of these electrons actions in a steady electrical modern from one facet of the cellular to the opposite.Dozens of those PV cells are packaged collectively into sun modules, which in flip are packaged into sun panels which are mounted on a rooftop and arranged to maximize their hours of publicity to direct daylight. Because the power generated with the aid of all the ones solar cells is direct contemporary (DC), it is then dispatched to an inverter that transforms the energy into the equal alternating cutting-edge (AC) utilized by the home equipment in your private home and the nearby software electricity distribution grid. Increasingly, those inverters have become "smart," supplying statistics tracking for solar set up overall performance and different grid integration services.

This compatibility with the grid is important, because for a spread of reasons maximum solar houses most effective use sun to offer an element in their electricity needs, counting on neighborhood software elements for backup while the sun isn't always shining or if more strength is needed. The electricity produced with the aid of those panels is included seamlessly into your present power provider, so that you can move solar while not having to fear about your lighting dimming each time a cloud passes overhead.Solar panels are devices that convert mild into energy. They are called "sun" panels because maximum of the time, the maximum effective source of light available is the Sun, called Sol by way of astronomers. Some scientists name them photovoltaic because of this, basically, "mild-electricity."



VI. SOFTWARE DESIGN

In this proposed contrivance, as we tend to used LPC2148 we wish to use following software package instrumentation to program for it.

1. Keil4 Vision
2. Flash Magic

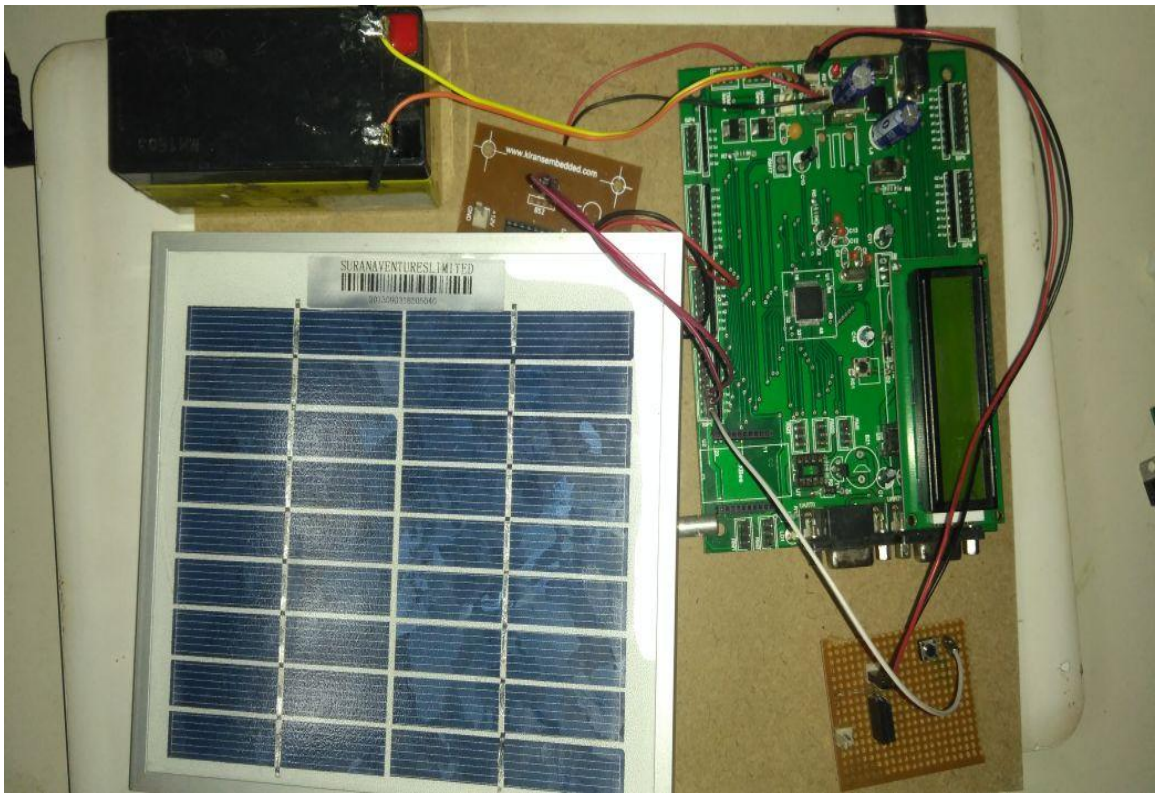
The Keil4 Vision an IDE for Embedded c language. In this IDE, we desire to import the utilities and libraries consistent with the controller. This IDE may be very more without difficulty and in consumer pleasant thanks to apply, assemblers, and debuggers in it. It simplifies the manner of embedded simulation and trying getting into conjunction with Hex file generation. The flash magic is a programming software. The C/C++ software written in IDE could be processed into Hex record i.e. In .Hex layout. By the use of hex report we have a tendency to products the code into microcontroller and carry out utility.

VII. WORKING PROCEDURE Inside the automatic cleansing machine, whilst the dust accumulates at the solar panel, the resistance of the LDR will increase due to which more than 0.7V is provided to the bottom and current begins flowing from collector to emitter. The LED that's in collection with the resistor indicates the presence of dirt on the panel. The continuous sparkling of LED shows, that the contemporary is flowing from collector to emitter, this is taken as input pulse for the rotating the motor in both the directions for special time, until the panel is unfastened from the dirt. As the day started the sun rays falling on the panel and on LDR. So, the motor axis will not rotate .As soon as the sun changes its position from time to time, the rays falling on panel and LDR will get decrease. Once there is no light on LDR the motor rotates until the light falls on the LDR in 180 degree angle. If the motor axis is at 180 degree that means the evening time has taken place. Afterturning 180 the motor again comes to its 0^{th} position. The rays fallen on panel converts from light energy into electrical energy. The electrical energy is stored in a battery. In night time the street lights uses this stored electrical energy by the help of relay. Every time the information will be displayed on LCD which is given the programmer.

VIII. RESULT

The project "**180 DEGREE SUN TRACKING WITH AUTOMATED CLEANING SYSTEM FOR SOLAR POWER MODULES"** was successfully implemented and output was verified on the hardware. The presented tracking-cu cleaning scheme provides about 30% more energy output as compared to the flat PV

module (module kept stationary on ground) and about 15% more energy output as compared to PV module with single axis tracking.



IX. CONCLUSION

In this paper we present a solar tracking system which is applied to a robotic vehicle. This system also consist of battery switching system with a pack of two batteries in which one battery is connected to solar panel and other battery is connected to the load. This paper is also deals with an optimal charging system based on sliding mode controller based maximum power point tracking algorithm

REFERENCES

[1] Mousazadeh, H., Keyhani, A., Javadi, A., Mobli, H., Abrinia, K., Sharifi, "A Review of Principle and Suntracking Methods for Maximizing Solar Systems Output". Renewable and Sustainable Energy Reviews. January , (2009).

[2] Romy Kansal,Regn, "PIC Based Automatic Solar Radiation Tracker, No: 80651017" Department of Electrical and Instrumentation Engineering, Thapar University Patiala (Punjab) -147004, June , (2008).

[3] Larard, E., "Sun Tracking Solar Array System", University of Queensland Undergraduate (Pass) Thesis, (1998).

[4] Johnson, J., "Working with Stepper Motors", [online]. http:// eio.com /jasstep.htm, (1998).

[5] Kais I. Abdul-lateef, "A Low cost single-axis sun tracking system using PIC microcontroller", Diyala Journal of Engineering Sciences, Vol. 05, No. 01, pp.65-78, June 2012.

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