

## Automatic Solar Tracking System

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### ABSTRACT:

This paper presents the hardware style associated implementation of a system that ensures a perpendicular profile of the electrical device with the sun so as to extract most energy falling thereon renewable energy is quickly gaining importance as an energy resource as fuel costs fluctuate. The distinctive feature of the planned system is that rather than taking the world as its reference, it takes the sun as a guiding supply. Its active sensing element perpetually monitors daylight the daylight and rotates the panel towards the direction wherever the intensity of sunlight is most. the sunshine dependent resistor's do the duty of sensing the modification within the position of the sun that is dealt by the various modification within the star panel's position by shift on and off the intermeshed motor the negative feedback circuit will the duty of taking the input from the sensing element and offers command to the motor to run so as to tackle the modification within the position of the sun. With the implementation the planned system the extra energy generated is around twenty fifth to half-hour with terribly less consumption by the system itself. During this paper, associate improvement within the hardware style of the present alternative energy collector system has been enforced so as to supply higher potency at low value.

### INTRODUCTION:

The main objective of this paper is to boost star huntsman. The star huntsman are often used for many applications; these area unit star cells, star thermal arrays and star day-lighting system. Nowadays, the very best potency of electrical device is nineteen. So, the potency are often enhancing by mistreatment star huntsman. Albeit, the value of varied star huntsman area unit still price as a result of star huntsman continue to be contemporary and solely a number of countries use it as South Korean and USA. What is more, this project is taken into account for geographical region that extreme from main offer and completely low value.

### SOLAR POWER:

Solar energy may be used in 2 major ways in which. Firstly, the captured heat may be used as star thermal energy, with applications in house heating. Another different is that the conversion of incident radiation to voltage, that is that the most usable type of energy.



Fig .1 Solar Panel

Fig. 1 shows the solar panel arranged for maximum production. This could be achieved with the assistance of solar electrical phenomenon cells or with concentrating solar energy plants. The potency of a module determines the realm of a module given constant rated output – AN 8 May 1945; efficient 230 W modules can have double the realm of a 16 PF economical 230 W module. There are a unit a number of commercially out there star modules that exceed potency of twenty-two and reportedly additionally surpassing pure gold.

### TECHNIQUE USED:

Arduino is Associate in nursing open supply hardware and software Package Company, project, and user community that styles and microcontroller kits for building digital devices and interactive objects which will sense and management objects within the physical world. Arduino boards square measure obtainable commercially in preassembled type, or as homemade kits. It contains everything required to support the microcontroller; merely connect it to a laptop with a USB cable or power it with a AC- to-DC adapter or battery to induce started. The UNO differs from all preceding boards therein it doesn't use the FTDI USB-to-serial driver chip. Instead, it options the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial convertor. Revision a pair of the Uno board encompasses a electrical device propulsion the 8U2 HWB line to ground, creating it easier to place into DFU mode.

### SINGLE AXIS ROTATION:

A Single axis chase system could be a methodology wherever the solar array tracks the sun from east to west employing a single pivot purpose to rotate. underneath this technique there square measure 3 types: Horizontal single axis chase system, Vertical single axis chase system and inclined single axis chase system. Within the Horizontal system the axis of rotation is horizontal with relevancy the bottom, and also the face of the module is minded parallel to the axis of rotation. Within the Vertical system the axis of rotation is vertical with relevancy the bottom and also the face of the module is oriented at Associate in nursing angle with relevancy the axis of rotation.

### SINGLE AXIS ROTATION DISADVANTAGE:

- The main disadvantage of solely the one axis hunt is that it will only track the daily movement of the sun and not the yearly movement.
- The potency of solely the one axis chase system is additionally reduced throughout cloudy days since it will only track the east-west movement of the sun.

DUAL AXIS ROTATION:

Dual axis following system uses the electrical device to trace the sun from east to west and north to south victimization two pivot points to rotate. The twin axis following system uses four LDR's, 2 motors and a controller. The four LDR's are placed at four totally different directions. One set of sensors and one motor is employed to tilt the hunter in sun's east - west direction and therefore the different set of sensors and therefore the different motor that is mounted at all-time low of the hunter is employed to tilt the hunter within the sun's north-south direction.

### DUAL AXIS ROTATION ADVANTAGE:

- The potency of the twin axis following system over that of the static panel is calculated to be eightyone.68%.
- Dual-axis trackers follow the Sun frequently and supply constant power output throughout the day.
- These star trackers offer an inexpensive answer in cases of the restricted power capability of the affiliation to the grid

### BLOCK DIAGRAM:

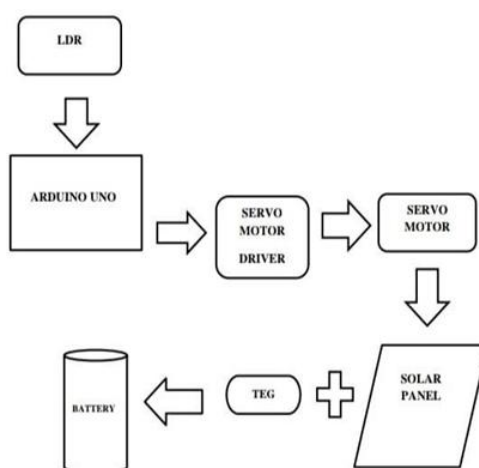


Fig.2 Block Diagram of Dual Axis Rotor System

### WORKING:

Fig.2 shows the block diagram of Dual Axis Rotor System. The basic useful blocks of this method are four sensors<sup>1</sup>, and their operation depends upon the intensity of sunshine falling on electrical device. All sensors (each with totally different functionality) send their output to microcontroller AT89c52. Then the microcontroller executes predefined task in its software package. These sensors are being employed with following names and practicality. Suntrailing Sensors (STS) These 2 sensors are mounted in "V" form specifically within the middle of the electrical device. Evening time Fault Detector (NTFD) in routine work of the system if a general fault<sup>2</sup> happens throughout nighttime then subsequent morning it'd not work. Therefore at subsequent sunrise, this detector detects whether or not the star. Panel is prepared for trailing or not. As shown in figure<sup>8</sup>, the NTFD is mounted in east of the electrical device therefore in traditional conditions it doesn't work as a result of it gets lesser intense lightweight (predefined) as compared to the center sensors STS-1 and STS-2, however because the fault arises, it starts operating. Day Time Fault Detector (DTFD) except some special conditions e.g. cloudy weather etc, the ASTS is meant to trace the sun the full day. If the panel stops rotation then DTFD detects this sort of fault. The mounting strategy of this detector is same as that of NTFD except that it's mounted within the west. Night and Cloud Detection in very cloudy day intensity is a smaller amount than a standard day.

## CIRCUIT DIAGRAM:

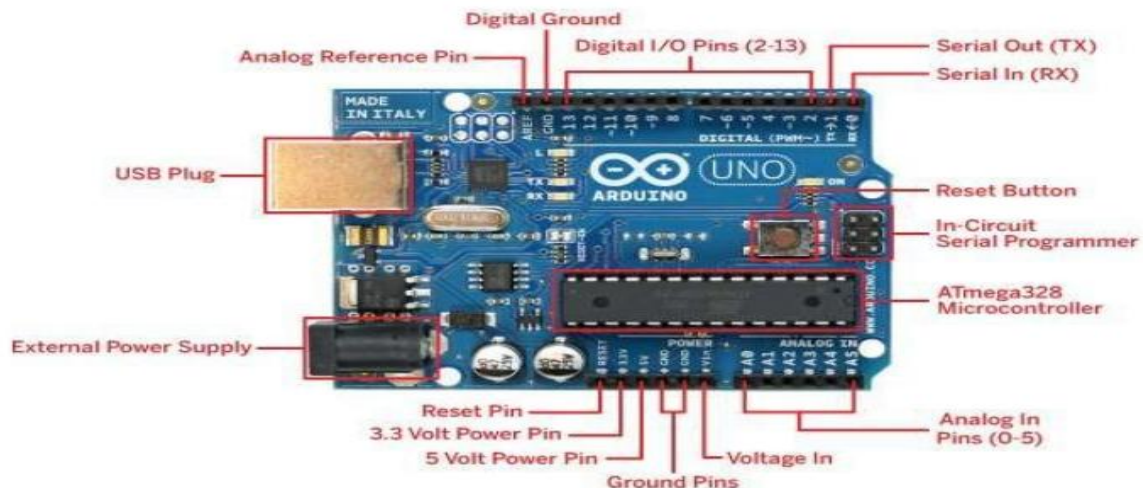


Fig .3 Arduino Controller

Fig.3 shows the Arduino Controller with various pins of the board.

## MANUAL CONTROL:

As no human created system is thus good thus haphazard fault could occur within the any system. That's why a manual management possibility was conjointly unbroken in ASTS. Whereas planning this part of management 2 objectives were unbroken in mind:

- The manual management ought to work expeditiously.
- It ought to be as user friendly as potential. Following 2 approaches are wont to accomplish the manualmanagement.
  - Stand Alone System managementUnit.

## AUTOMATIC CONTROL:

With the assistance of Associate in nursing economical algorithmic rule (written in C) only 1 Master Microcontroller<sup>1</sup> is getting used to manage the automated operation of ASTS. This controller has following functions.

- Senses all of sixsensors.
- Drives steppermotor.
- Drives alphanumericdisplay.
  - Controls the warning indicators e.g.buzzer, LED'setc.
  - Communicates (by parallel port) with the slave microcontroller.

## ADVANTAGES:

- Trackers generate lots of electricity than their stationary counterparts thanks to enhanced direct exposure to starrays.
- Solar trackers generate plenty of electricityinroughlyidenticalquantityof area required for fixed-tilt systems, creating them ideal for optimizing land usage.
- This automatic star hunter is easy to implement since its construction is simple.
- With the implementation the projected system the additional energy generatedis around twenty fifth to half-hour with terribly less consumption by the system itself.
- The device with the sun so on extract most energy falling thereonrenewableenergy is speedily gaining importance as associate energy resource as fuel costs fluctuate.

## DISADVANTAGE:

- Solar trackers area unit slightly costlier that their stationary counterparts, because of the additional complicated technology and moving elements necessaryfor his or heroperation.
- Trackers area unit a additional complicated system than mounted painful.

## HARDWARE:



Fig.4 Hardware Setup

Fig .4 shows the Hardware arrangement of the system

## APPLICATION:

- Solar electrical phenomenon plants need continuous orientation towards sun for consistent potency output. This product can prove an excellent boon forthem
- Solar water heating applications mayalso implement constant technique to heat water throughout theday.
- Concentrated applications like targeted electrical phenomenon panels need a high degree of accuracy to confirm the daylightisdirectedexactlyatthefocusof the reflector orlens.
- This system package and hardware is wont to drive a true and extremely vast electricaldevice.
- The pc and System management Unit would have a wireless communication with the mechanical structure of electricaldevice.
- To build emergency management higher additional powerfulmicrocontroller.

## FUTURE SCOPE:

Automatic star following system offers a model for implementing an oversized array kind star hunter. This may be AN enlargement of mechanical in addition as electronic system Following additions may be created to the model to maximize the facility conversion:

- By connecting the star panels in AN array additional energy may beextracted.
- Using aluminum variety of material for theassemblygotwindoftheburdenuponthe motors may be scale backed which is able to mechanically reduce the facility consumption of the system.
- WiththemonocrystallinePVpanelinuse the potency of the project may be raised. Monocrystalline PV panels have conjointly additional time period than crystallinepanels.

## CONCLUSION:

Today within the world of rampant productivity, energy is that the elementary supply upon that the entire civilization relies upon. Because it is claimed that energy will neither be created nor be destroyed and, in this response, it is often sense that it will somehow be keep. The try towards creating such goal verified, this project has been endeavored towards unraveling the trail of such sound judgment. It's quite natural that constant use of energies somehow opens the door of scarceness as per as earthbound sources area unit involved. Sun, within the stand of that, the tallest supply, spiked over for age's right from the origin of the entire universe, through that life has been formed, is that the basic and therefore the mother supply of all the energies.

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