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Investigations on Experimental Analysis by P-V Modules V-I Characteristics on different semiconductor Materials

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Abstract

The aim of this paper, is a power generating method from sunlight. This method of power generation is simple and is taken from natural resource. The renewable energy has increased much attraction these days as it can be recycled. The solar energy can be able to transform solar energy in to electrical energy, which is more efficient than other renewable sources. PV module is characterized by its V-I and P-V characteristics. The output power of PV system is always changing with whether condition. This need only maximum sunlight to generate power. It helps for power generation by setting the equipment to get maximum sunlight automatically. In this work the V-I characteristics of PV modules, which made up of different semiconductor materials have been evaluated. The semiconductor materials used in the design of solar photovoltaic cell are mono crystalline silicon and polycrystalline silicon.

Keywords- Characteristic, V-I, P-V, PV module, Temperature, semiconductor materials.

Introduction

This is a power generating method from sunlight. This method of power generation is simple and is taken from natural resource. This need only maximum sunlight to generate power. This project helps for power generation by setting the equipment to get maximum sunlight automatically.

Overview of the Technologies Used

Embedded systems:

An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware

to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement.

The embedded software is also called “firm ware”. The desktop/laptop computer is a general purpose computer. You can use it for a variety of applications such as playing games, word processing, accounting, software development and soon.

In contrast, the software in the embedded systems is always fixed listed below:

Embedded systems do a very specific task; they cannot be programmed to do different things. Embedded systems have very limited resources, particularly the memory. Generally, they do not have secondary storage devices such as the CDROM or the floppy disk. Embedded systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low. Some embedded systems have to operate in extreme environmental conditions such as very high temperatures and humidity.

Following are the advantages of Embedded Systems:

1. They are designed to do a specific task and have real time performance constraints which must be met.
2. They allow the system hardware to be simplified so costs are reduced.
3. They are usually in the form of small computerized parts in larger devices which serve a general purpose.
4. The program instructions for embedded systems run with limited computer hardware resources, little memory and small or even non-existent keyboard or screen.

Hardware Implementation of the Project

This chapter briefly explains about the Hardware Implementation of the project. It discusses the design and working of the design with the help of block diagram and circuit diagram and explanation of circuit diagram in detail. It explains the features, general purpose input output (GPIO) configuring as input of atmega8 microcontroller. It also explains the various modules used in this project. The block diagram of the project is as shown in the figure 3.1

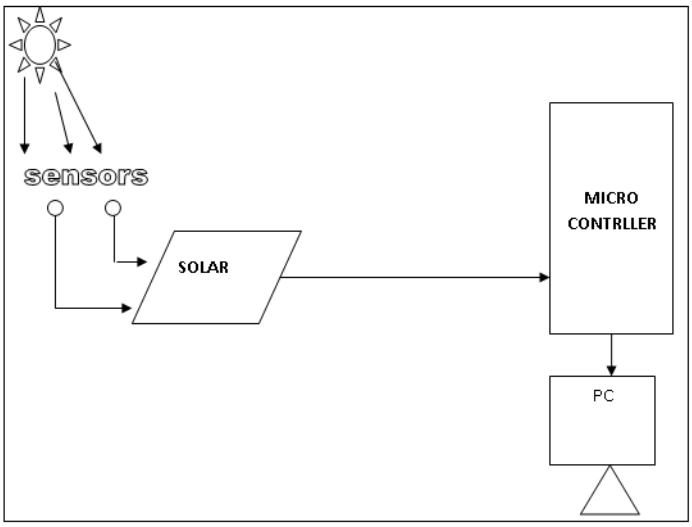
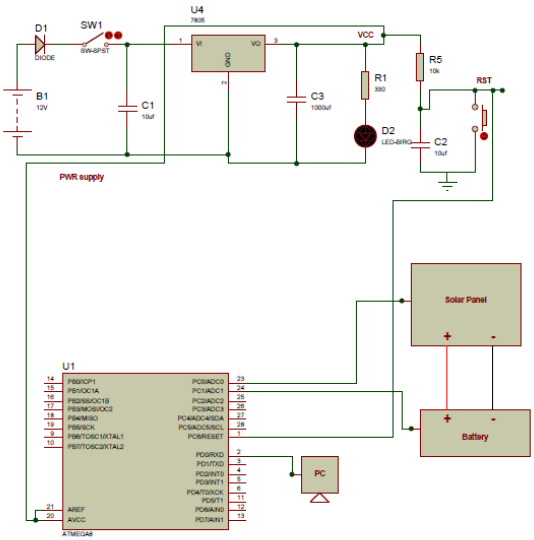


Fig 3.1: block diagram

System wiring diagram and working procedure:



Experimental Work:

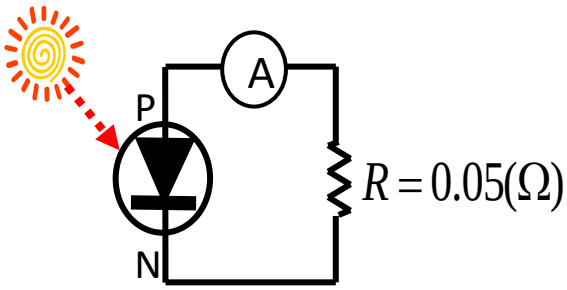
Firmware Implementation of the project design

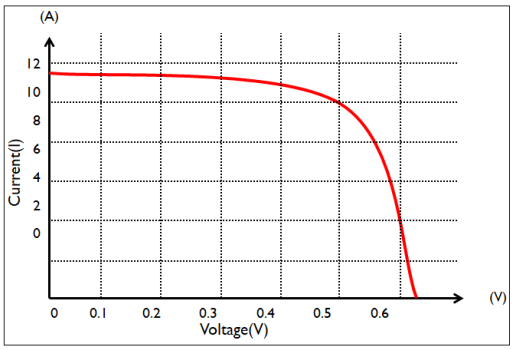
The firmware programmed in ATMEGA8 is designed to communicate with LIGHT sensor and operates according to the LDR sensor. Therefore, the main firmware programmed can be divided into three parts:

1. Receive the Data from LDR sensor and processing and validating.
2. And take the data from SENSOR and comparing
3. Rotate The Motor.

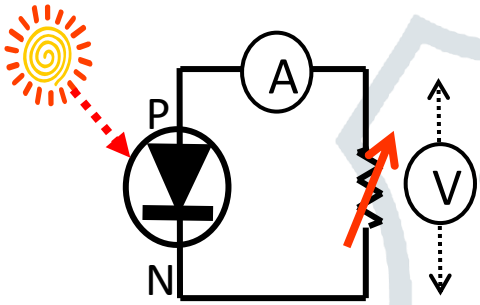
AVR STUDIO Is Used for the SOLAR TRACKER

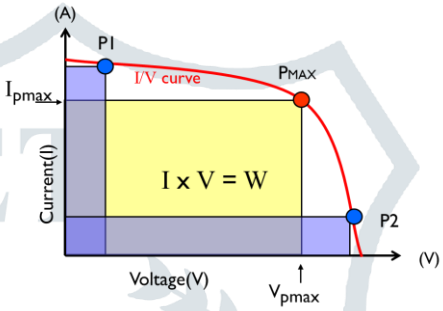
V-I Characteristic (polycrystalline)





V / I curve and P-Max control





- To obtain maximum power, current control (or voltage control) is very important.
- "Power conditioner" will adjusts to be most suitable voltage and current automatically.

P- Max control

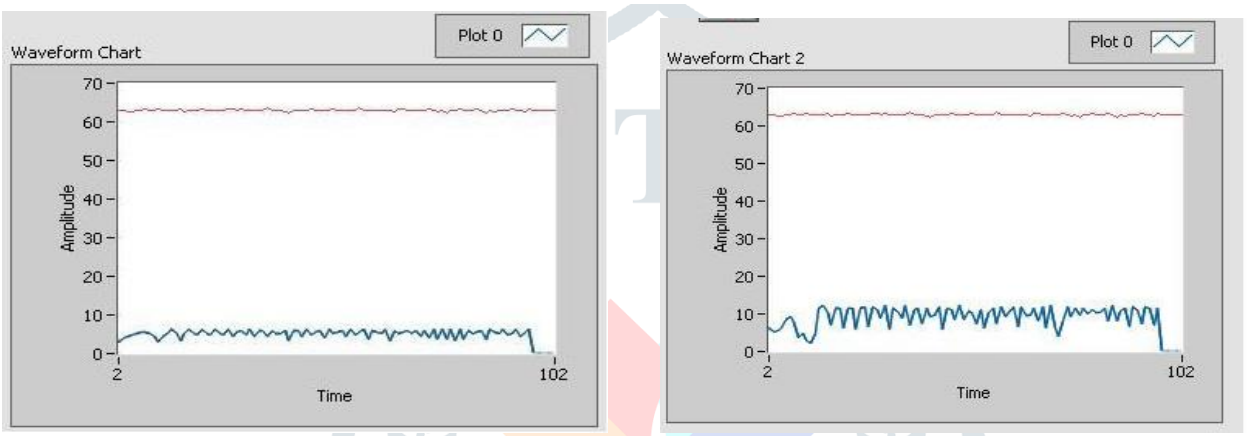
Results and Discussions

Results

Assemble the circuit on the PCB as shown in Fig 5.1. After assembling the circuit on the PCB, check it for proper connections before switching on the power supply.

- The Solar Tracker consists of a controller and switching unit, ldr sensor module, both the units are working independently and in collaboration with each other as well.
- The CU is scans the ldr sensor output.
- Switches ON motor depending on intensity.
- Switches OFF the engine depending on intensity.

In total, the complete system (including all the hardware components and software routines) is working as per the initial specifications and requirements of our project. Because of the creative nature of the design, and due to lack of time, some features could not be fine-tuned and are not working properly. So certain aspects of the system can be modified as operational experience is gained with it. As the users work with the system, they develop various new ideas for the development and enhancement of the project.



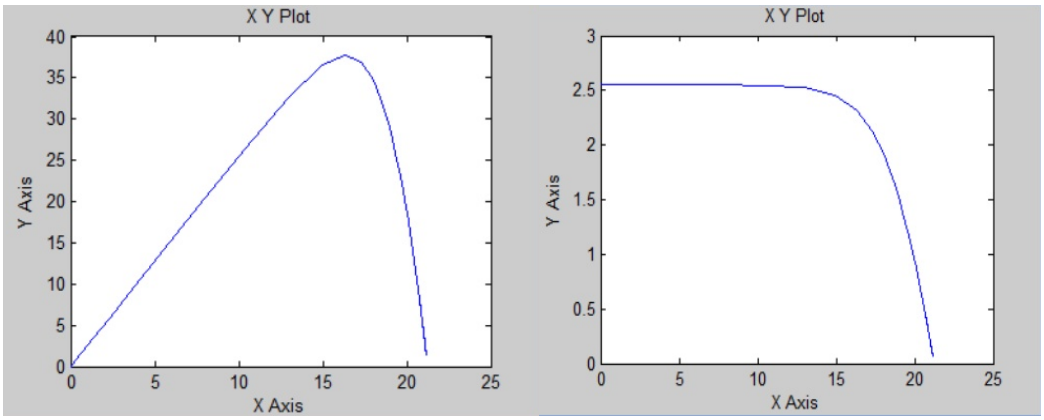


Fig: P-V characteristics

Fig: I-V characteristics

Table: Comparison on Polycrystalline and Monocrystalline Modules in (volts)

Time	Voltage of Polycrystalline module (volts)	Voltage of Monocrystalline module (volts)
09:30 AM	8.55	9.45
11:30 AM	9.8	10.2
02:30 PM	10.3	10.8
04:30 PM	8.6	9.8

Conclusion

The implementation of **SOLAR TRACKER** is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. Software tools like AVR STUDIO, PROGISP to dump the source code into the microcontroller, Proteus Professional is used for the schematic diagram have been used to develop the software code before realizing the hardware.

The performance of the system is more efficient. Reading the Data and verifying the information and perform the specified task is the main job of the microcontroller. The mechanism is controlled by the microcontroller.

Circuit is implemented in Proteus Professional and implemented on the microcontroller board. The performance has been verified both in software simulator and hardware design. The total circuit is completely verified functionally and is following the application software. It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

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