

Generation of Electrical Energy from Sound and Light

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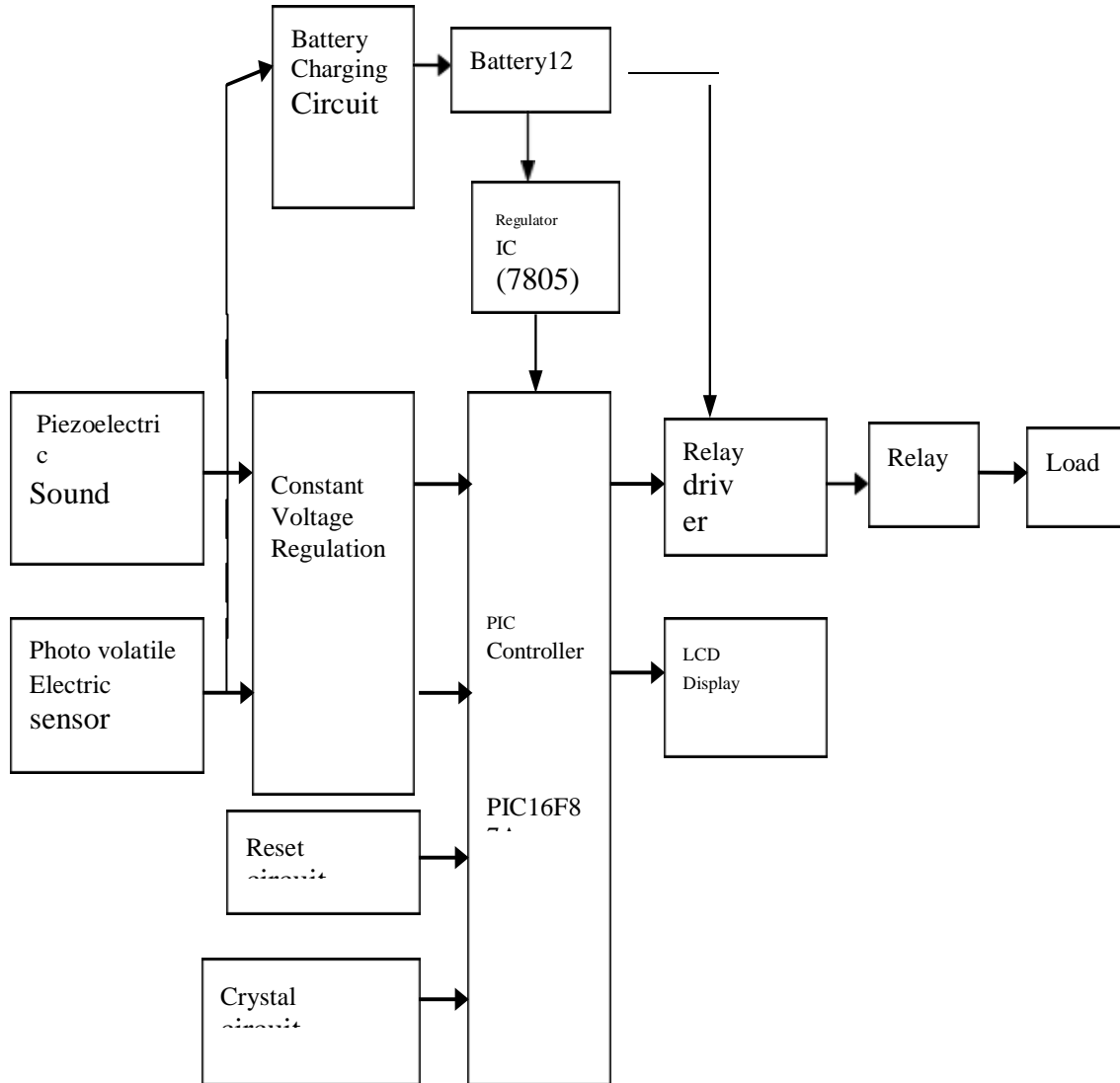
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ABSTRACT: We need electricity in our day to day life for running most of appliances. To day there is a lot of noise pollution on roads, airports, industries etc. In this paper we are trying to convert this noise pollution to electric energy. The concept of this project deals with the conversion of sound signal into electrical energy. Sound is a mechanical form of energy which can be converted into electric energy using laws of thermodynamics. Piezoelectric transducer which senses the sound signal and convert it into its equivalent electrical energy. The output of piezo plate is given to the ADC for analog to digital conversion and then to microcontroller in order to monitor the value of energy generated. The output of transducer are also given to boost Controller and given to DC-DC converter. The output of the DC-DC converter is stored in a storage device. The stored energy is inverted to AC voltage and is given to the relay and utilized for other purposes for lighting lamps for example. Light is electromagnetic radiation which can be converted into electric energy. Photovoltaic cell converts light energy into electrical energy. The All the natural wastage energies are used for production of electricity reveals a new step.

I. INTRODUCTION

In this 21st century electric power has very deeply indulged in our society. Can you imagine your life without computers, mobiles, lights and other daily used appliances? It is really very hard to imagine our life without electrical appliances and all these appliances requires electricity to operate. Day by day the electricity consumption is increasing drastically; on the other hand the production of electric power is limited. In this century, the most common thing we encountered everywhere (roads, airports, industries...) is a noise pollution, so a point comes in our mind whether it is possible to convert sound energy to electrical and this waste form of sound could be converted and used for some productive purpose. Light intensity measured in Lux can also be converted into electrical energy by using Photovoltaic sensor and then stored in battery and can be utilized. We can operate output devices such as LED or electric devices directly through these sensors. By increasing complexity and power of sensors, we would be able to generate massive electrical power which can be stored in large batteries and utilized later.

II. BLOCK DIAGRAM



MICROCONTROLLER: A microcontroller is a small computer on a single integrated circuit consisting internally of a relatively simple CPU, clock, timers, I/O ports and memory. Microcontrollers are used in automatically controlled products and devices. Microcontrollers are designed for small or dedicated applications. By reducing the size and cost compared to a design that uses a separate microprocessor, memory and input/output devices, microcontrollers make it economical to digitally control even more devices and processes.

CRYSTAL CIRCUIT: This circuit gives the required clock pulses to the microcontroller to give it the sense of the reference time. When a voltage source is applied to a small thin piece of quartz crystal, it begins to change shape producing a characteristic known as the Piezo-electric effect. This Piezo-electric Effect is the property of a crystal by which an electrical charge produces a mechanical force by changing the shape of the crystal and vice versa, a mechanical force applied to the crystal produces an electrical charge.

RELAY: Relay acts as a switch which is used to control the AC/DC supply. This relay can be used

to turn ON the electrical appliances like Mobile, fan, tubes etc.

RESET CIRCUIT: This circuit gives the microcontroller the starting pulse required to start the operation from the start. Unless this pulse is given, the microcontroller doesn't start functioning. The circuit gives the required starting pulse to the microcontroller to start the operation from the very beginning. The 89S52 microcontroller requires the active high reset pulse. So the capacitor is connected to positive supply and the resistor is grounded.

LCD: Liquid Crystal Display which is commonly known as LCD is an Alphanumeric Display. It means that it can display Alphabets, Numbers as well as special symbols. LCD is a user friendly Display device which can be used for displaying various messages unlike seven segment display which can display only numbers and some of the alphabets.

PIEZO ELECTRIC SOUND SENSOR: These sensor converts sound energy into electrical that means acts as transducer. The nature of the piezoelectric effect is closely related to the occurrence of electric dipole moments in solids. Strain is measured in terms of the charge generated by the element as a result of the direct piezoelectric effect.

BATTERY: Batteries store energy being produced by given generating source and when this source is

unavailable this energy can be used by loads. The inclusion of storage in any energy generating system will increase the availability of the energy.

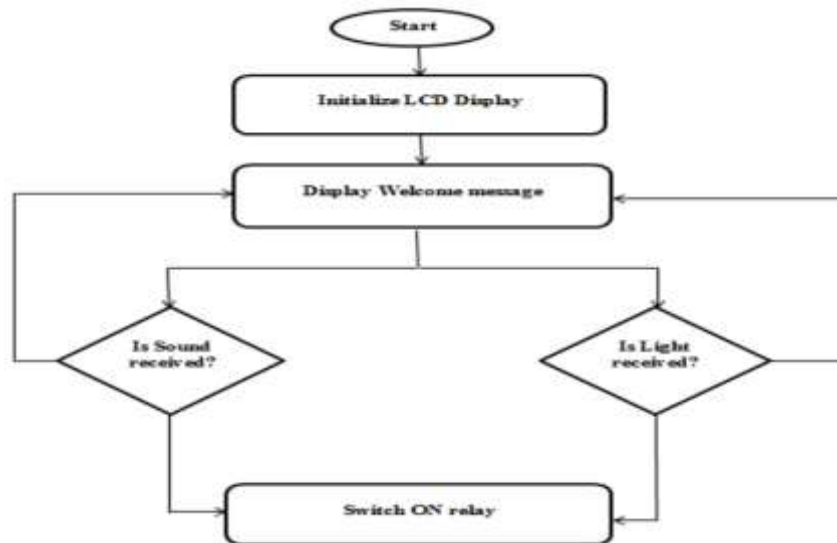
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PHOTO VOLATILE ELECTRICSENSOR: These sensor converts light energy into electrical. By using photovoltaic materials it is used to convert the radiant energy directly into electrical. Photovoltaic power has a number of advantages

- It is noiseless and pollution free
- It is renewable

III. FLOW CHART



Algorithm for Flow Chart:

- Start
- Initialize LCD Display
- Display welcome message(A)
- Check If Sound Sensor Output Detected, If Yes Switch on Relay ,If NO-Back to“A”
- Check If Light Sensor Detected, If Yes Switch ON Relay, If No-Back to”A”
- Check If Pressure Detected, If Yes Switch On Relay, If No-Back to”A”
- STOP

IV. USED SOFTWARE

MPLAB SOFTWARE: MPLAB is the proprietary freeware integrated development environment for the development of embedded application on PIC and dsPIC microcontrollers, and is developed by Microchip Technologies. MPLAB X is the latest edition of MPLAB, and is developed on the Net Beans platform. MPLAB and MPLAB X support project management, code editing, debugging and programming of Microchip 8 bit PIC and AVR microcontrollers, 16 bit PIC24 and dsPIC microcontrollers, as well as 32 bit SAM and PIC32 microcontrollers.

PROTEUS SOFTWARE: The Proteus Design Suite is a proprietary software tool suite used primarily for automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards. It was developed in Yorkshire, England by Lab Centre Electronics Ltd and is available in English, French, Spanish and Chinese languages. The Proteus Design Suite is a Windows application for schematic capture, simulation, and PCB (Printed Circuit Board) layout design. It can be purchased in many configurations, depending on the size of designs being produced and the requirements for microcontroller simulation. All PCB Design products include an auto router and basic mixed mode SPICE simulation capabilities.

V. CONCLUSION

The sound energy is the unexplored source which has enormous potential to meet the future growing requirements of the electricity and serve as the eco-friendly and renewable source of energy. This technology is not practically usable up till now due to efficiency concerns but the present work on this field makes its future quiet promising. Phonons are the particles of sound that provide the mechanical energy as the output which could be utilized for conversion as per the laws of

thermodynamics. The results show that as noise level increases, the corresponding voltage that was measured at the multi meter also increased. The results further show that there is a non-linear relation between sound energy and developed voltage. These results can be furthered using higher quality equipment.

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