

GENERATION OF ELECTRICAL ENERGY FROM SOUND ENERGY

M.Viknesh¹, S.Vinoth², M.Maheswaran³, P. Sivasakthy⁴

^{1,2,3} Student, Electrical and Electronics Engineering, JEPPIAAR SRR Engineering College, Chennai, TN.

⁴Assistant professor, Electrical and Electronics Engineering, JEPPIAAR SRR Engineering College, Chennai, TN.

Abstract - This project deals with "GENERATION OF ELECTRICAL ENERGY FROM SOUND ENERGY". Sound is known that the technological aspects are increasing at a faster pace. But the utilization of technologies are very low in various sectors. It is known that the sound pollution is increasing in urban cities due to traffic. So here we propose a system where the sound signal is gathered using, sound sensors and the obtained waves are used for production of electrical energy. We try to utilize energy from the unwanted noise pollution. This paper presents the work done on the conversion techniques and methodologies of converting sound energy to its electrical counterpart. It focuses on the feasibility and the ground zero application of the same. The prediction of the future development of these kind of sources of energy is emphasized other than commonly known ones such as solar energy, biogas, wind energy and so on. So one can imagine if we were able to convert the sound energy to electricity then we can charge our mobile phone just by talking to our friends on mobile itself.

Key Words: Electrical Energy, Sound Energy, Energy conversion, PIC Microcontroller, Sound sensing

1. INTRODUCTION

The "law of conservation of energy" states that energy cannot be created nor be destroyed. Under the consideration of this law the technological giants have discovered numerous sources to extract energy from them and use it as a source of power for conventional use. There are various so called eco-friendly sources of energy that we have discovered till the present artificial era. Some of them are implemented to great extent under the suitable circumstances to overcome the short run of the energy due to technological boom that has led the energy needs to its apex. Solar energy is one in the list that came up with the wide range of applications such as solar heaters, solar cookers and it gained success due to its easy implementation. There are various other sources of renewable energy which includes harassing energy form wind, Biomass, water etc. But the efficiency of the energy sources discussed above is the major issue over which the scientists are working since long. The efficiency of the solar cell is 20% only under the practical conditions. This is not the only problem with present sources it further extends to high cost involved in production process. Thus the researchers now are feeling the need of other kinds of sources to harass energy for our conventional uses. To add to the list there is an emerging scenario which leads us to a new renewable energy source known to us since long and that is the sound. The sound or noise in other terms is present all around us. So why not use it to satisfy our needs

of energy. In our basic applications we see sound be converted in the electrical signals to travel over the media for communication purposes. For example the sound energy is converted into electrical signals using diaphragm present in the microphone and these signals then reach to the speakers and then converted back to sound. The electrical current generated by a microphone is very small and referred to as MIC-level; this signal is typically measured in millivolts. Before it can be used for anything serious the signal needs to be amplified, usually to line level (typically 0.5 -2V). Application of sound energy as the source of electricity can be much beneficial for the human existence as compared to other sources. This is because the sound is present in the environment as a noise which forms an essential part of the environmental pollution. The concentration of noise to use it for power generation can lead to discovery of another hidden source of energy which can act as a boon to non-renewable sources such as coal, crude oil etc. which are on line of extinction.

2. EXISTING SYSTEM

The existing system is used to obtain the detection of sound waves from a place. But this fails to generate electrical voltage. Here we utilize the generation of electricity from the unwanted sound signals in various places

2.1 DRAWBACKS IN EXISTING SYSTEMS

Efficiency is very less and cost of the existing system is high.

3. PROPOSED SYSTEM

The proposed system consists of a sound sensor. That voltage is provided to the amplifier circuit. The amplifier amplifies the input from the sound sensor. The output is provided to the battery. The battery also stored the energy. The energy is produced to the DC-DC booster. The boosted voltage is provided to operating loads.

3.1 BLOCK DIAGRAM

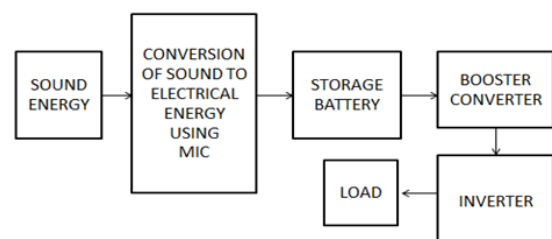


FIG 1: Block diagram of proposed system

The above block diagram fig1 shows the first method of our project. Here we are converting sound energy into an electrical energy by using sound sensor and septic converter circuit. From the converter circuit we have the sufficient dc voltage to store in the battery and by using the inverter circuit we convert the DC voltage into an AC voltage source to run the light loads such as light (10W).

and PIC microcontroller. By using this circuit we can able to run the DC light loads such as Power LED and CPU fan.

3.4 ADVANTAGES

Easy implementation. Reliable and efficient. Low cost and simple design.

4. SIMUATION

4.1 SIMULATION RESULTS

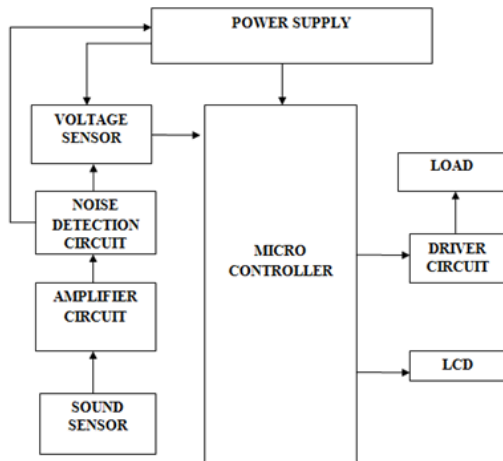


Fig 2: Block Diagram

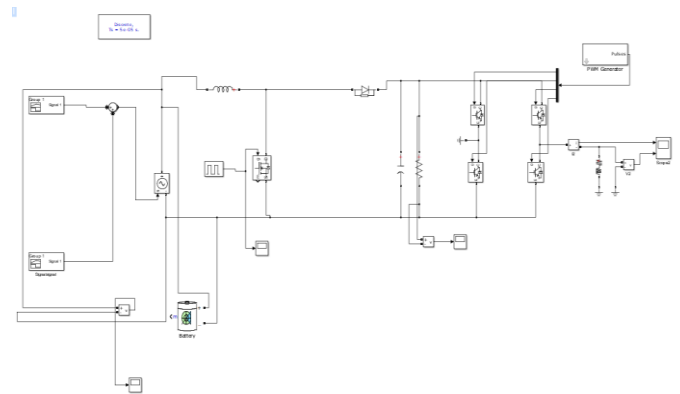


FIG 4: SIMULATION CIRCUIT

3.2 CIRCUIT DIAGRAM

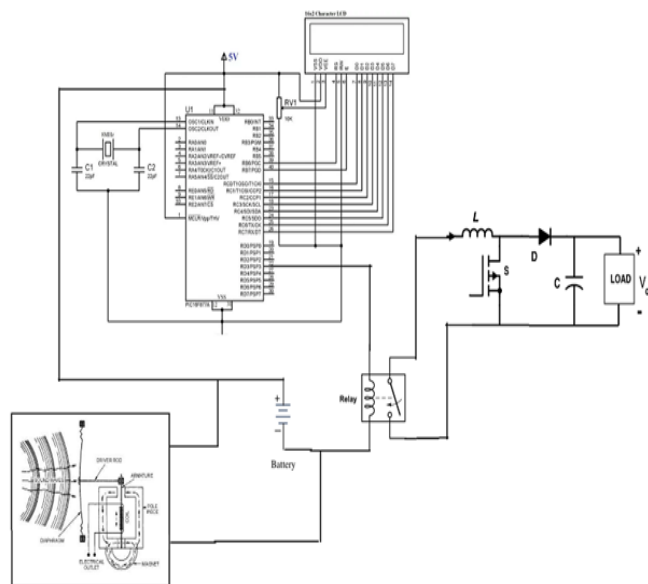


FIG 3: Circuit diagram of proposed system.

3.3 EXPLANATION:-

Sound energy from the loudspeaker or from the noisy area has been sensed by the sound sensor and by using the amplifier circuit the voltage has been produced. This voltage has boosted by septic boost converter and so we have a required voltage and current for storage purpose using battery. From battery we get DC voltage source is fed to relay

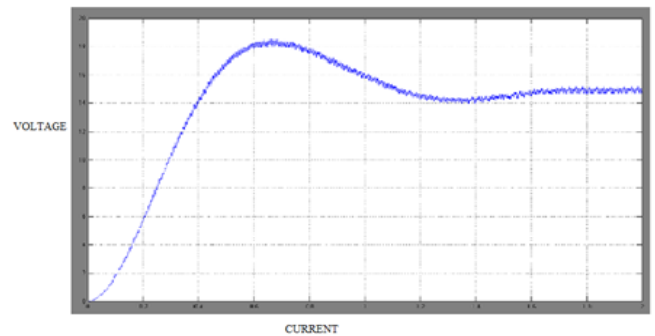


FIG 5: DC VOLTAGE SIMULATED OUTPUT

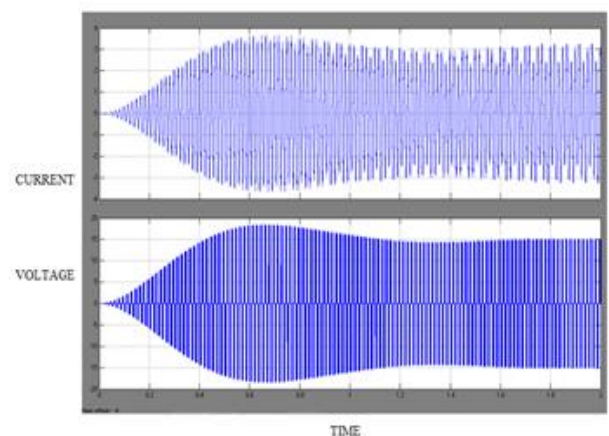


FIG 6: AC VOLTAGE SIMULATED OUTPUT

5. HARDWARE:



Fig 7 HARDWARE MODULE

5.3 SOUND SENSOR



Fig 8 SOUND SENSOR

The FC-04 sound sensor module, in my opinion, is a very sensitive sound detection module for the price. Although this sensor does not provide any ability to identify specific sounds or the frequency of a sound it does do what it is supposed to - it detects sound. The key to this sensor is the on-board potentiometer (POT) which is referenced above as the "sound set point adjust". Every reference I saw said that POT was for adjusting the "sensitivity". Well, naturally I assumed the "sensitivity" being adjusted was the microphone pickup, as in a GAIN control. Nope, just to mess with my head, that POT adjusts the "sensitivity" of the voltage trigger point (VTP). Meaning that it adjusts the level of voltage (internally on the pickup) required to trigger To successfully use this sensor you need to adjust that POT until you find the sweet spot for the VTP that works best with your project, in your environment. Do note that turning the POT a tiny, bit too far in either direction will leave the output stuck on HIGH or LOW (not forever, just till you turn the POT back), OUTPUT.

5.4 SEPIC BOOST CONVERTER

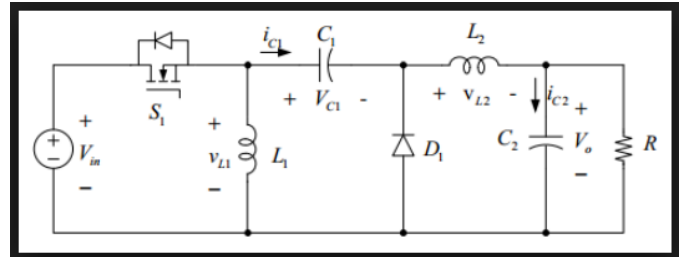


FIG 8: SEPIC BOOST CONVERTER

- The single-ended primary-inductance converter (SEPIC) is a DC/DC-converter topology that provides a positive regulated output voltage from an input voltage that varies from above to below the output voltage. This type of conversion is handy when the designer uses voltages (e.g., 12 V) from an unregulated input power supply such as a low-cost wall wart. Unfortunately, the SEPIC topology is difficult to understand and requires two inductors, making the power-supply footprint quite large. Recently, several inductor manufacturers began selling off-the-shelf coupled inductors in a single package at a cost only slightly higher than that of the comparable single inductor.

5.4 POWER LED



Fig 9 POWER LED

There are use is power led in capable is 1.5w are contained. It is three small light very low power consumption. The dc power working in power led it controlling the switch.

6. 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. There are numerous methodologies by which the sound can be converted to electricity as Method 1- This method is based on the faradays law of electromagnetic induction and as per this method conversion of sound waves to electricity can be done using mic. Method 2- It illustrates the use novel technology that uses Piezo-electric materials to convert mechanical energy to electrical voltage. This type of electricity is called as Piezo-electricity. Present scenario states that researchers are continuously trying to evolve effective methods in order to improve its efficiency. On the basis of these works it can be surely said that sound energy is the successor of the renewable and ecofriendly sources of energy.



M. Maheswaran
Pursuing B.E. in Electrical Engg. In
Jeppiaar SRR college of
engineering from Tamil Nadu,
India.

P. Sivasakthy
Assistant Professor in Electrical
Engineering in Jeppiaar SRR
Engineering College from Tamil
Nadu, India

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BIOGRAPHIES



M. Viknesh
Pursuing B.E. in Electrical Engg. In
Jeppiaar SRR college of
engineering from Tamil Nadu,
India.



S. Vinoth
Pursuing B.E. in Electrical Engg. In
Jeppiaar SRR college of
engineering from Tamil Nadu,
India.