

# An Approach for Mobile Charging System using Power of Sound

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**Abstract**— the basic concept of our research is to utilize the excess of noise present in our surrounding for charging our mobile phones. This method will also be useful for reducing the noise pollution present in the surrounding, as this will be utilized to charge a mobile handset and in general can also be used for other purposes later on, once this method becomes a successful one.

Generally in this method, the user voice will be absorbed by the microphone and will be converted to electrical energy by itself and this electrical current will be fed to the charging circuit to charge up the battery.

This method would be helpful in charging the mobile batteries at any place and any time conveniently where there is enough noise pollution present like railway station, airports and roads etc.

**Index Terms**—Amplifiers, Bridge rectifiers, DC-DC step-up converter, Dynamic microphone, Transducer, Voltage regulator

## I. INTRODUCTION

Sound that always exists in our everyday life and environment is overlooked as a source. This source can be converted to electrical form with the help of well-designed circuit.

Sound in the acoustical waveform can be converted into electrical waveform where it can be amplified, mixed and recorded.

Sound waveform converted to electrical waveform is of the same shape.

Amplitude becomes voltage- (V), and air particle motion becomes the electric current (I)-electron playing the role of air particles.

Current's direction of flow changes with cycles of compression and rarefaction creating an Alternating current [1]. This is done by the help of a microphone.

Microphone is the example of a transducer, device that changes information from one form to another form.

In this microphone, sound information exists as pattern of compression and rarefaction.

## 2. PROPOSED METHODOLOGY

In mobile phones, microphone and speaker are one of the main components for voice communication. Here the microphone converts sound to electrical signals and speaker converts the signals from receiver to sound.

So for this work my idea is to add a small circuit which can use the converted electrical signal from sound to charge up the mobile battery.

This circuit will consist of amplifiers, filter circuit, rectifiers, dc-dc step up converter, voltage regulator.



Figure (1):- Image showing the concept

In this method, the users voice will be absorbed by the microphone and will be converted to electrical by itself and this electrical current will be fed to the charging circuit to charge up the battery .

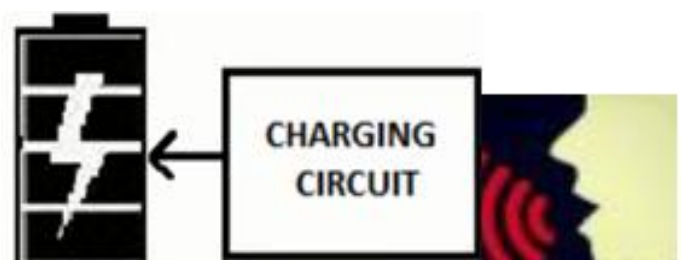


Figure (2):- Schematic representation of the concept

### 3. BLOCK DIAGRAM FOR PROPOSED METHODOLOGY



### 4. DESCRIPTION OF PROPOSED METHODOLOGY

a) Sound is received by the microphone which converts it to the electrical signals. For this we will use DYNAMIC MICROPHONE.

*Dynamic microphone:-*

- Dynamic microphone consists of a diaphragm suspended in front of a magnet to which a coil of wire is attached.
- The coil sits in the gaps of the magnet. Vibrations of the diaphragm make the coil move in the gap causing an AC to flow.
- Coils of wire are used to increase the magnitude of the induced voltage and current [1].

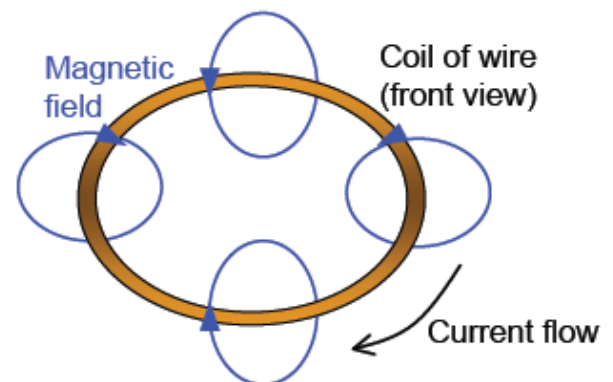
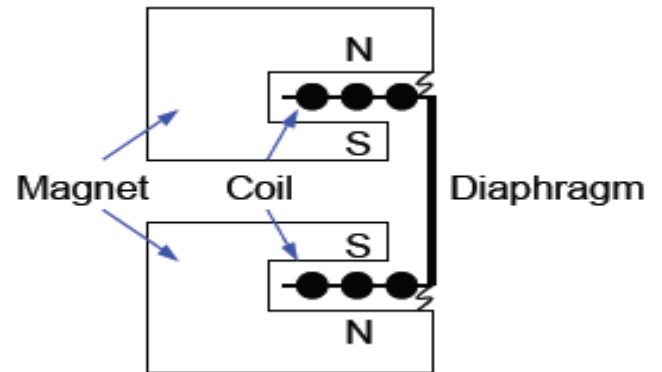


Figure (3):- Internal mechanism of the microphone

b) The AC voltage is fed to the amplifier which amplifies the AC voltage received at the output of the microphone.

In this we will make use of operational amplifiers. *Operational amplifiers* are the versatile device that can be used to amplify DC as well as AC voltage. Op-Amp is a multistage amplifier. It consists of input stage, intermediate stage, level shifting stage and output stage [2].

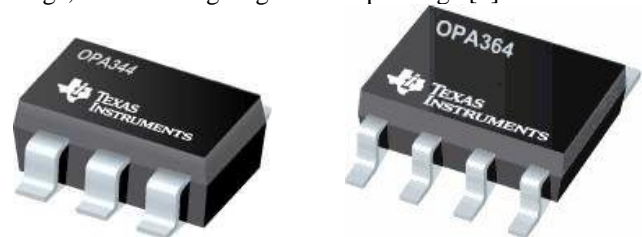


Figure (4):- Operational Amplifiers OPA344 & OPA364

c) The voltage from the output stage of the amplifier is fed to the *bridge rectifier* where the AC voltage is converted into

DC voltage. Here we will make use of half wave rectifier since it is simple also it is used in the battery charger.

d) Now this DC-DC step up converter is used to boost up the DC voltage from the output of the bridge rectifiers. A booster converter is a DC to DC power converter with an output voltage greater than its input voltage.

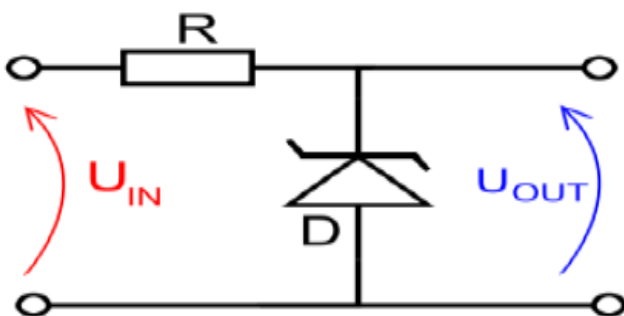


**Figure (5): The above DC booster is to boost 2.4V to 9V**

e) Now this boosted voltage from the DC-DC step-up converter is regulated with help of voltage regulator. Normally a cell phone requires 3.7v for getting charged up. But the variable in sound power cannot constantly supply 3.7v. Though it would not go below the mark of 3.7v, there are sure possibilities of exceeding this limit [3].

This demands another unit that will regulate the voltage and maintain it at the constant level of 3.7 volts. This unit must be designed such that it neither adds to the cost nor to the size of the cell phone.

Zener diode is an efficient voltage regulator which could regulate the incoming voltage and give a constant output of 3.7v.



**Figure (6):-Zener voltage regulator**

f) After the regulation, the regulated voltage is fed to the charging circuit to charge up the battery. Lastly the battery gets charged up using the power of sound.

## 5. CONCLUSION

This work on mobile charging system will eliminate the adapter wired charging system. The main advantage of the

proposed system is it will use surrounding noise instead of power supply. Also this system can be mount on the Indian railway station and local train for the passenger to charge up the mobile. Also this system can be installed in a small case with a rechargeable battery for power bank. So when the user travel on road can hold the power bank so that it can be charged up for battery power storage. This whole methodology is a way for enhancing the use for renewable resource for electricity for a clean, greenhouse gas free world.

## 6. REFERENCE

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