ISSN (Online) 2394-6849

International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 4, Issue 12, December 2017

Wireless Mobile Charger

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Abstract: **-- In this present age of information technology mobile phones are the basic need of every person. Emerging technologies are making our lives simpler these days. With the introduction of mobile phones, life has changed rapidly. This is a dream of radio engineering. Mobile phones merged land line telephone systems. These days, many advancements in the mobile phones were introduced. The services such as texts, internet etc., are provided by these advancements. We still rely on the battery charger even after the advancements are made. Thus the battery chargers are required to carry everywhere to keep the battery backup. Now just of a battery charger that charges a mobile automatically. When you sit for tea and place your mobile on table, it simply charges your mobile. In this research paper we would like to propose the concept of charging the mobile phone using wireless communication. It is the way of charging a device using microwave signals, which can eliminate the use of cables, power adapter etc. Charging is done automatically, when call connected in your mobile phone as we talk in the mobile phone. This is done by the use of microwaves.**

Keywords: -- Mobile phone, recharge, rectenna, wireless charging, microwave, power transfer, optimization, routing path, scalability.

I. INTRODUCTION

Wireless charging technology enables wireless power transfer from a power source such as charger to a load such as a mobile device conveniently across an air gap by eliminating the bunch of wire. Wireless power transmission involves the exchange of power without the need for physical connections. The development of this technology started in the late 19th and early 20th centuries, when a number of important innovations in electromagnetic research were made. These advancements established the basic principles that served as the foundation for modern electrical power transport. During the past 20 years improvements in wireless technologies have led to revival of related research. Public interest in wireless power has also increased with the application of Nikola Tesla ideas and inventions. As a result, the feasibility of technological implementation merits examination. Various scientists contributed to the development of wireless power. The inventions developed during this time were more advanced than anything that had been seen before, solving challenging problems and developing the basic theories that yielded modern technology. The forms of power transmission are conduction, induction and radiation. There are many formulae that explain the transmission of electrical power without any use of physical conductor. Every power transport has theories that govern how the electromagnetic waves carry from a transmitter to a receiver.

II. PROPOSED WORK

Research survey on wireless mobile charger.

III. DESCRIPTION

A. ELECTRO MAGNETIC INDUCTION

Electromagnetic Induction is the process where a conductor is placed in a changing magnetic field produces voltage across the conductor. This process of electromagnetic induction causes an electrical current.

B.WORKING

The basic working of wireless power involves transmission of energy from transmitter to a receiver via an oscillating magnetic field. For this, direct current (DC) supplied by a power source is converted into high frequency alternating current (AC). The alternating current energies a copper wire coil in transmitter that generates a magnetic field. Once a second receiver coil is placed within the range of the magnetic field, it can be induce an alternating current in the receiving coil. The AC signal is sent to transmitter coil. The alternating current induces magnetic field. This alternating current flows through the transmitter coil. The magnetic field generates current which flows through the receiver coil. This process of transmitting energy between transmitter coil and receiver coil is known as Magnetic Coupling or Resonant Coupling. The current flowing in the receiver coil is converted into direct current. This is done with the help of the receiver circuit. This current can further be used to power up the device.

Block diagram of wireless charger

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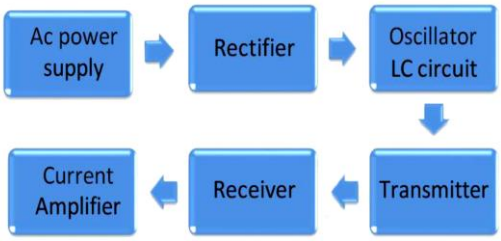

a) TRANSMITTER CIRCUIT

This transmitter circuit consists of transmitter coils. The power supply is given to the transmitter. The transmitter coil is made such that the copper coil is wound into number of turns as per the requirement. When power is supplied to the transmitter the coil gains the energy and results in magnetic coupling. Then the power is transferred. Generally the transmitter coil is of diameter 10cm and 150 turns.

Fig 1: Transmitter Coil

b) RECEIVER CIRCUIT

This receiver circuit consists of receiver coils. The secondary receiver coils are similar to the primary sending coils. Running the secondary coil at the same resonant frequency ensures that the secondary coil has low impedance at the transmitter's frequency. The energy is optimally absorbed. To remove the energy from the secondary coil, different methods can be used. The alternating current can be directly rectified and a regulator circuit can be used to generate DC voltage. The receiver coil is of same diameter as transmitter coil but the number of turns is 200.

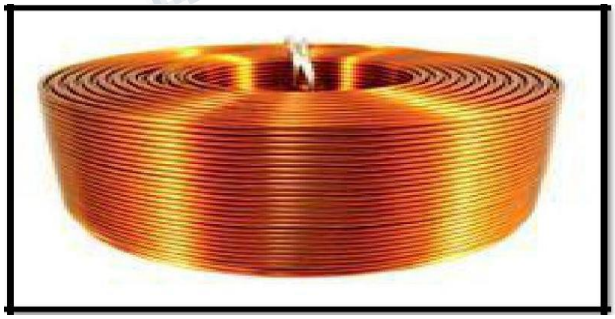

Fig 2: Receiver Coil

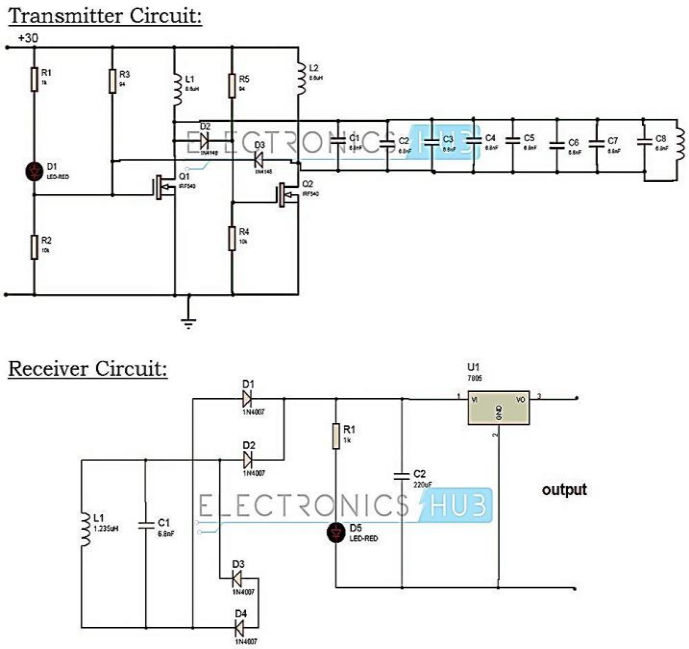

Fig 3: Transmitter and receiver circuit

c) AC TO DC CONVERTER

A rectifier is an electronic device that converts alternating current (AC) to direct current (DC). This flows in only one direction. This process is known as rectification. The full wave rectifier is used for this method. The average (DC) output voltage is higher than that for half wave rectifier. The output of the full wave rectifier has less ripple than that of the half wave rectifier. This produces a smoother output waveform.

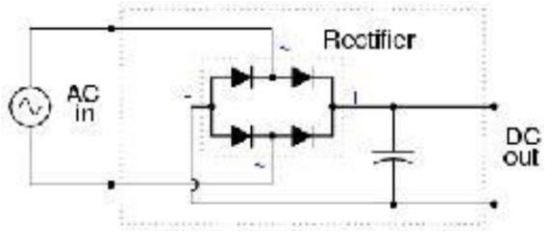

Fig 4: Rectifier Circuit

d) OSCILLATOR TANK CIRCUIT

An oscillator is an electronic device for generating an AC signal voltage. The frequency of the generated signal depends on the circuit constants. The circuit consists of an inductive coil, L and a capacitor, C. The capacitor stores energy in the form of an electrostatic field. This produces a potential (static voltage) across its plates. Then the inductive coil stores its energy in the form of an electromagnetic field. The capacitor

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is then charged up to the DC supply voltage, V by keeping the switch in position A. When the capacitor is fully charged the switch changes to position B. The charged capacitor is then connected in parallel across the inductive coil. Then the capacitor begins to discharge itself through the coil. Then the voltage across capacitor falls as the current through the coil begins to rise. It is necessary to add energy periodically to offset this loss and keep the pendulum moving. In a parallel LC circuit, electronics oscillate when the circuit is excited.

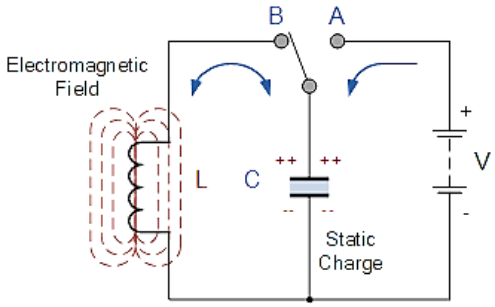

Fig 5:Oscillator Tank Circuit

e) CURRENT AMPLIFIER

A current amplifier circuit is a circuit which amplifies the input current by a fixed factor. It feeds to the succeeding circuit. A current amplifier is similar to that of a voltage buffer. The only difference is that an ideal voltage buffer will try to deliver the current required by the load. A current amplifier supplies the succeeding stage with a current. This is a fixed multiple of the input current. A current amplifier can be realized using transistors. β1 and β2 are the current gains of transistors Q1 and Q2 respectively. Iin is the input current and Iout is the output current and +Vcc is the transistor T2's collector voltage. The equation for output current is

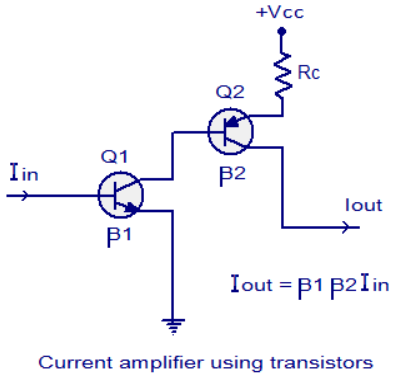

Fig 6: Current Amplifier

f) WIRELESS CHARGER

This wireless charger consists of two coils of transmitter coil and receiver coil, rectifier, oscillator tank circuit. Distance between transmitter and receiver coil is of 16cm. By using the inductive charging it can charge the 1000mAh battery phone in just 30 minutes.

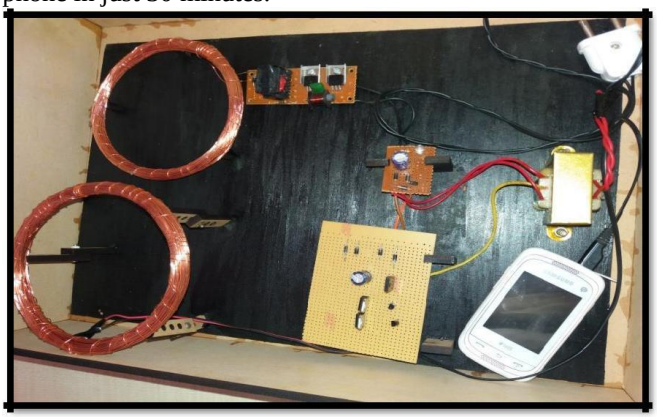

Fig 7: Wireless Charger

VI.ADVANTAGES OF WIRELESS MOBILE CHARGER

1) Use of separate chargers is eliminated.
2) Electricity is saved.
3) The phone can be charged anywhere anytime.
4) Lower risk of electrical shock because there are no exposed conductors.
5) Easier than plugging into a power cable.
6) Corrosion does not occur when exposed to atmosphere.
7) Safe for medical implants for embedded medical devices allows recharging through skin rather than having wires penetrate through skin.
8) It does not require wire for charging.

V. CONCLUSION

Wireless charging can be as efficient as a wired charging. Based on the collected data, suggests that wireless power transmission could be feasible. The present technology made it possible to use electricity without having to plug in any wires for charging. This research paper gives a clear glance of the method of using the microwave power to charge the mobile phones without the usage of wired chargers. This provides a great advantage to the mobile phone users. Hence they can carry their mobile phones everywhere even if the place is devoid of facilities for charging. It has the effect on human beings similar to that from cell phones at present. The use of Rectenna and sensor in mobile phone provides a new dimension in the revolution of mobile phone.

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