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STUDY OF WIRELESS ENERGY TRANSMISSION

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ABSTRACT

This article deals with the perception of communicating power without cables. A recent trend in power supply design is the development of charging systems that are capable of wireless power transfer. In this the charging device is not connected to the power supply. Various technology are available for wireless transmission of electricity. The new technology for wireless energy transmission is the resonance inductive coupling. With the help of this technology energy is transferred to the middle distances.

In this technology we use two coils ,one is the transmitting coil and other is the receiving coil. An alternating current is passed through the transmitting coil and generates the magnetic field , due to this voltage is induced in the receiver coil. This can be used to power devices. In this paper we discussed the phenomenon of wireless energy transfer, its applications, advantages and disadvantages.

Key Terms : Power supply, resonance,

INTRODUCTION

Technology has been developed to a greater extent now a day. This century has witnessed the wireless transfer of energy, using this phenomenon energy can be transferred to the receiver device without using wires. The advantages of portability and wireless communication are greatly hindered by the fact that the devices themselves must be plugged into the walls to transfer energy to the receiving device

The definition of Wireless energy Transmission can be given as a way of efficient transmission of electric power from one point to another through vacuum or an atmosphere without the use of wire. This can be used for applications where an instantaneous amount or a continuous delivery of energy is needed, but where conventional wires are not affordable, inconvenient, exclusive, perilous, unsolicited or impossible. The power can be transmitted using microwaves or lasers. Wireless Energy Transfer is a technology that can transport power to locations, which are not possible or impractical to reach.

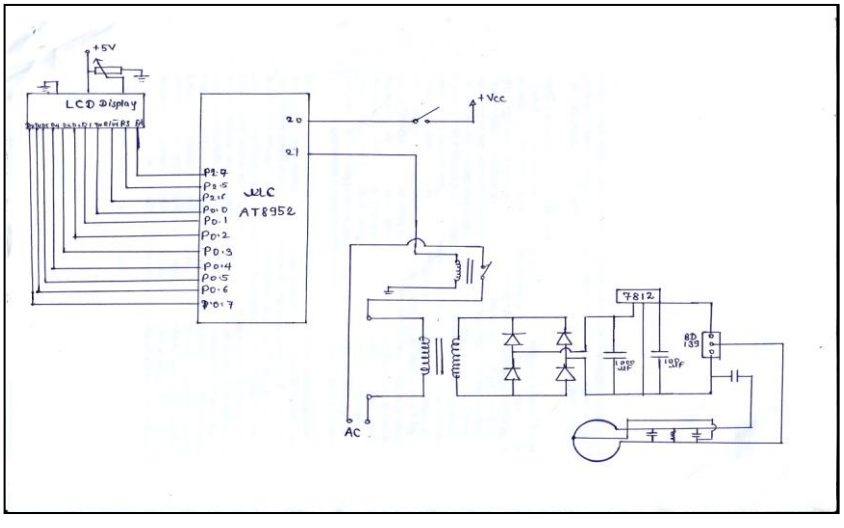
LITERATURE REVIEWS

A review of existing literature was performed to support the study undertaken in this thesis .A general survey was first performed by NICOLA TESL. A Wireless Power Transmission from the time of Tesla has been an underdeveloped technology. Tesla had always tried to introduce worldwide wireless power distribution system. But due to lack of funding and technology of that time, he was not able to complete the task. Then onwards this technology has not been developed up to the level which would be completely applicable for practical purpose.

WIRED POWER TRANSMISSION

In wired transmission electrical power or signals are transmitted by using only a electrical conductor instead of using a pair of wires which provides a complete circuit. This includes transmission using optical fibre cable.

CIRCUIT DIAGRAM :



SYSTEM OPERATION:

The System will work by transferring energy to a small receiver.the system consist of two parts, one is the transmitter and other is the receiver. The basic principle on which the wireless power transfer works is the resonant inductive coupling.

WORKING OF TRANSMITTER:

Transmitter consists of microcontroller board, LCD, resonant tank circuit. The tank circuit consist of inductor and capacitor. So it is called LC tank circuit. This combination of L & C in the transmitter tank provides resonant frequency with the help of microcontroller.

The input power to the LC tank circuit comes from regulated DC power supply. This regulated DC power supply consist of transformer, bridge rectifier, filter capacitor & 7812 voltage regulator IC.The microcontroller generates a frequency which is fed to the LC tank transmitter circuit, which is in the range of 20 to 30 KHz .thus frequency linked with the capacitor & inductor and forms resonating frequency circuit.

The magnetic field is generated by the inductive coil. The strength of magnetic field decreases with the distance that's why output of the circuit decreases as we increase the distance.

WORKING OF RECEIVER:

The receiver circuit consist of same L&C as in the transmitter circuit, that is the value of inductor and capacitor are same. Therefore both the coil has same frequency. The receiver works on the principle of Faraday's law of electromagnetic induction this means that whenever the magnetic field linking with the coil changes an emf is induced in it. The magnitude of the induced emf depends upon the strength of the linking magnetic field. Strong the magnetic field more is the induced emf. In this way the power is induced in the receiver circuit.

ADVANTAGES:

- Protected connections - when the electronics are all enclosed, away from water or oxygen in the atmosphere.
- Safer for medical implants - for embedded medical devices, allows recharging/powering through the skin rather than having wires penetrate the skin, which would increase the risk of infection.
- Durability - Without the need to constantly plug and unplug the device, there is significantly less wear and tear on the socket of the device and the attaching cable.

DISADVANTAGES:

- Slower charging - due to the lower efficiency, devices can take longer to charge when supplied power is equal.

- More costly - Inductive charging also requires drive electronics and coils in both device and charger, increasing the complexity and cost of manufacturing.
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CONCLUSION :

- Wireless energy is an exciting technology that the entire world can one day benefit.
- To prove that wireless energy transfer is possible, this system will power a wireless device by projecting a magnetic field using the fundamental idea of "resonant inductive coupling" for optimizing power transfer.

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