IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified
Vol. 7, Issue 3, March 2018

Solar Induction Wireless Roadways

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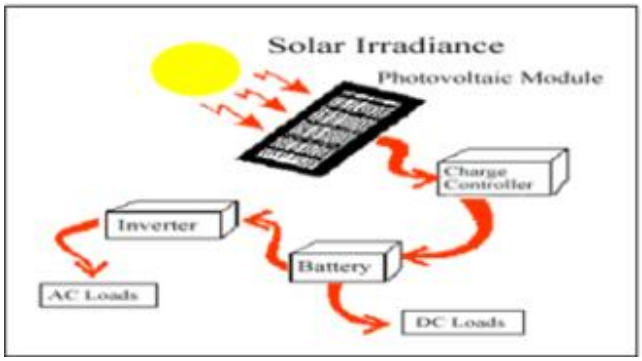
Abstract: In the age of wireless technology and increasing use of renewable energy there's a continuing increase within the demand for wireless technology that is environment friendly. the primary step in wireless power is providing power to any device wirelessly. If the efficiency of transmitting the power wirelessly is magnified slightly more, then wireless power transmission may become a regular means for charging any electronic appliance, and conjointly if it's by the means of a renewable and a clean power supply comparable to solar power it'd be a cherry of the cake. This paper presents the design of a wireless power transfer system with road embedded transmitter coils to facilitate dynamic charging of EVs. A transmitter coil, that is comparatively long compared with the circular receiver coil, has been designed to cut back the price of the transmitter circuit. A model transmitter coil has been embedded into a road for analysis of its characteristics. we had designed a high-efficiency charging system that uses magnetic fields to wirelessly transmit massive electrical currents between metal. The long-run goal of the analysis is to develop an all-electric road that wirelessly charges cars and trucks as they cruise down the road. The new technology has the potential to dramatically increase the practice range of electrical vehicles and eventually remodel road travel, per the researchers. Our vision is that you're going to be able to drive onto any road and charge your automobile. Large-scale preparation would involve revamping the complete transit and will even have applications beyond transportation.

Keywords: Wireless electricity, Roads, Solar energy , Battery, Electric vehicles

I. INTRODUCTION

Transmission of electricity without the use of wires that depends upon electrical conduction was 1st introduced by Sir Nikola Tesla within the year 1891. Witricity, an abbreviation of wireless transfer of electricity, may be a term introduced at first by Dave Gerding within the year 2005.This principle of wireless electricity transfer works on the principle of using coupled resonant objects for the transferring electricity. Wireless energy transfer will be helpful in such applications as providing power to autonomous electrical and electronic devices. This energy that is transferred will be derived from a renewable source; the most effective offered possibility is that the solar power. solar power is controlled by the means that of solar Cells. The solar cells are made from semiconductor crystals that are combined with different materials in such the way that there are additional electrons in one a part of the cell, and missing electrons in another a part of the cell. once the sunlight strikes the cell, photons within the light-weight knock a number of the additional electrons loose from the semiconductor, and that they flow to the a part of the cell that's missing electrons. This flow produces an electrical current that eventually reaches the electrical converter, wherever it gets reborn into usable electricity. the general goal of this paper is to style and implement a clean power generation and a wireless power transmission



Wireless power transmission is that the means that to power devices without a inbuilt power supply resembling a generator or battery. On a bigger scale as expendableenergy sources on the earth are dwindling in variety it remains a crucial task to seem to the longer term. If it had been potential to transmit power wirelessly it'd be economical to retrieve power from space and easily transmit it back to the planet's surface as an endless power supply. In our

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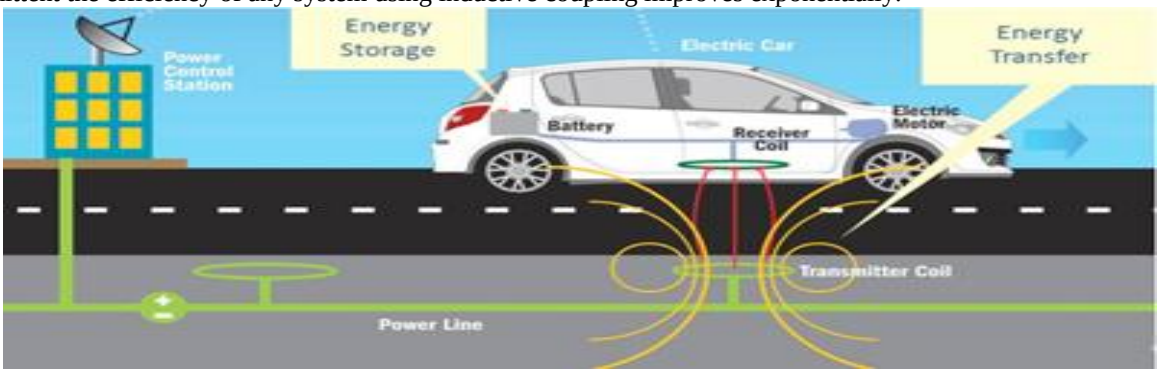
initial analysis we tend to discovered severalhave looked into the practicability of wireless power transmission and there ar several solutions that each one provide promise. Our team selected to analysis the practicability of wireless power transmission through inductive coupling. This consists of employing a transmission and receiving coils because the coupling antennas. though the coils don't need to be magnet they need to be within the sort of closed loops to each transmit and receive power.

To transmit power an electrical energy should be knowledgeable a control system coil. The electrical energy can produce a time varied field of force. The flux generated by the time varied field of force can then induce a voltage on a receiving coil control system . This ostensibly straightforward system outlines the foremost principle that our analysis investigated. the first advantages to using inductive coupling are the simplicity of the transmission and receiving antennas, in addition for tiny power transmission this is often a far safer suggests that of conveyance. To demonstrate the success of our the groups analysis we tend to created a receiving circuit to maximise the number of received power and lightweight an semiconductor diode at a distance up to 2 feet. at intervals some months of analysis as half time employeeswe tend to were ready to produce each transmission and receiving circuits capable of sending the mandatory power to light-weight an semiconductor diode in a very periodical mode. on the average with transmitting one watt of power the receiving circuit was ready to receive a hundred micro-watts of power. whereas the efficiency of the system is very low, some zero.01% with some enhancements we tend to feel sure the potency may be greatly improved. Moreover, because the transmission distance is remittent the efficiency of any system using inductive coupling improves exponentially.



II. LITERATURE REVIEW

Several attempts are recently made to guage the likelihood of using highways to get useable energy. an outsized variety of them are undertaken with the aim of gathering alternative energy from pavement.

Kang-Won et al. (2010) investigated the practicableness of using cell or electrical phenomenon technologies as a gathering system in roadways. Current challenges in scheme ar their condition to sustain harsh conditions in pavement from excessive traffic loading and condition changes [14]. The electrical phenomenon energy systems ar capable of up pavement performance and sturdiness as they decrease temperature in summer and increase it throughout winter seasons. This results in cut back temperature-related distresses in pavement like rut injury and thermal cracking, severally [15-17]. From an environmental purpose of read, using the electrical phenomenon systems in areas like urban roads and parking heaps will decrease the urban heat island impact [18].

Similarly, In 2011, Baldwin et. al. conducted a hunt study on energy gathering on main road bridges with using electricity materials supported the traffic-induced loading. The researchers were able to get the best quantity of energy of one.2 μWh. They reportable that the implementation of the model was undefeated however the number of output power wasn't enough to drive a modest electrical load [23].

The use of electricity in gathering energy from road pavements is much a brand new approach that has not been studied completely however. numerous factors like the impact of traffic speed, traffic volume and vehicle kind on electricity materials ar still unknown. Therefore, there's a press have to be compelled to study the impact of those factors on the potential of energy gathering from roadways.

III. PIEZOELECTRIC THEORY

The electricity has been discovered in a very range of ceramic materials like leadzirconate (PbZrO3), lead-titanate (PbTiO2), barium-titanate (BaTiO3), and lead-zirconate-titanate (PZT). These materials show a polarized

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electrostrictive result [30]. There are 2 forms during which electricity functions; the primary is that the direct electricity during which the materials are able to seven rework mechanical strain into electrical charge. this applications of direct electricity are within the type of sensors producing and energy gather. The second type is that the reverse result, during which the electricity materials convert electrical charge into mechanical strain. Nowadays, totally different technologies profit of the reverse electricity within the production of actuators [1].

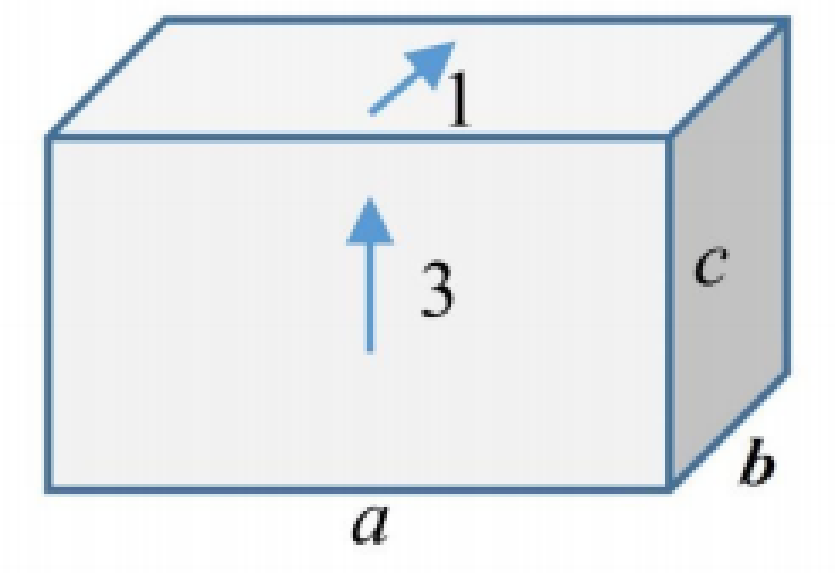


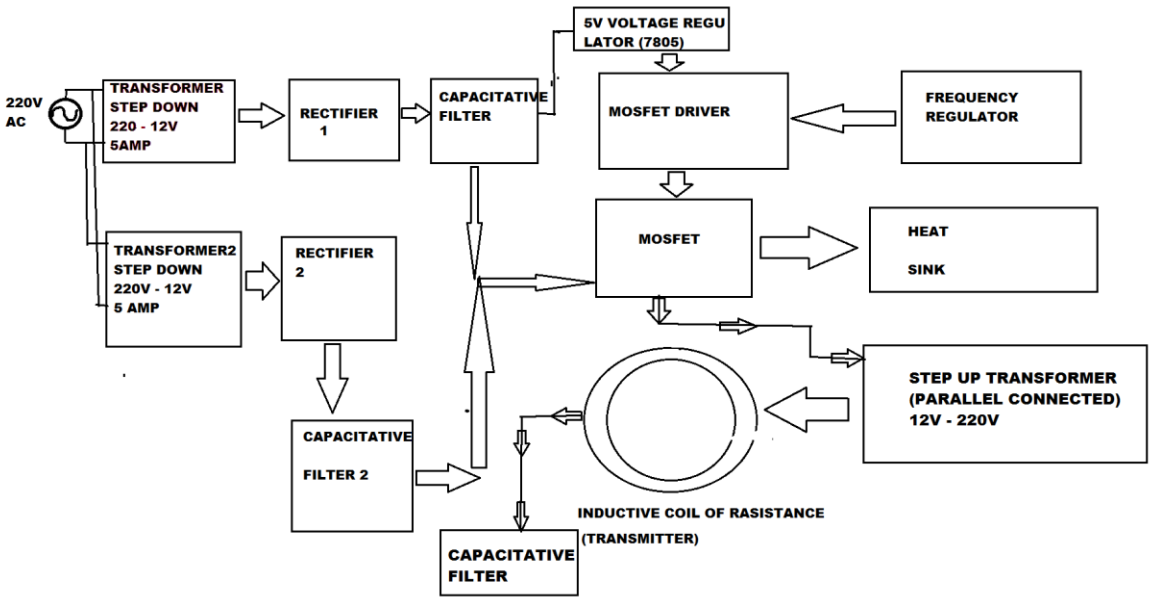
Fig 3 – Piezoelectric Component

IV. WORKING PRINCIPLE

This contactless transfer of energy is enabled by taking advantage of the Maxwell electromagnetic laws, whereby an electric current flowing through a conductor generates a magnetic field. In the case of an alternating current, this induces a voltage in a second conductor, even though the two conductors are not in contact with one another. Using precisely controlled frequencies of the applied alternating current, high-efficiency energy transmission from the sending to the receiving electrical circuits is ensured.

V. BLOCK DIAGRAMS

1) TRANSMITTER CIRCUIT



WIRELESS POWER TRANSMISSION TRANSMITTER CIRCUIT

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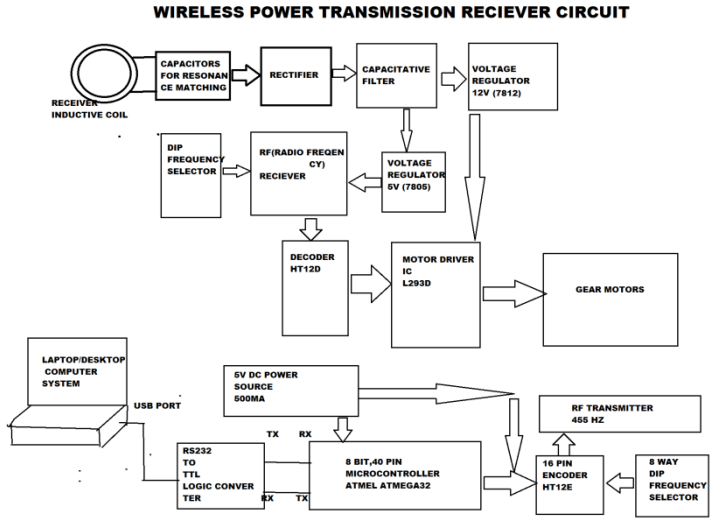
2) RECEIVER SECTION

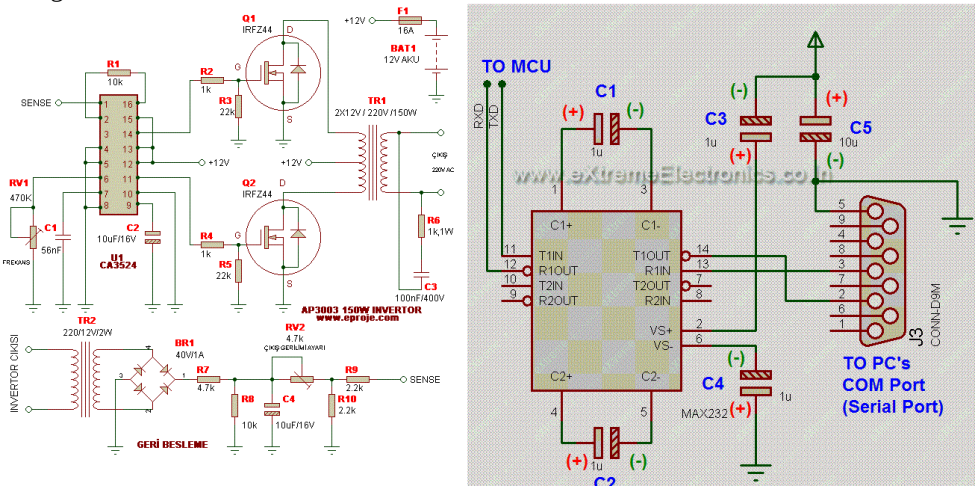


VI. HIGHLIGHTS OF THE PROJECT

1) Self-powered wireless sensors(devices) that do not require battery maintenance.
2) Wireless battery charging of all kinds of mobile devices such as digital cameras and smart phones.
3) Automatic Wireless Charging - wireless charging of mobiles and laptops i.e. devices that use batteries for operation.
4) Industrial - Direct wireless power for wireless sensors and actuators. (An actuator is a type of motor for moving or controlling a mechanism or system. It is operated by a source of energy, usually in the form of an electric current, hydraulic fluid pressure or pneumatic pressure, and converts that energy into some kind of motion. An actuator is the mechanism by which an agent acts upon an environment. The agent can be either an artificial intelligence agent or any other autonomous being (human, other animal, etc.).
5) Transportation - Automatic wireless charging for existing electric vehicle classes: normal vehicles, industrial vehicles.
6) Automatic Wireless Charging—when a device with rechargeable batteries charges itself while still in use or at rest, without requiring a power cord or battery replacement. This mode is for a mobile device that may be used both in and out of range of its Wireless power source.

VII. RESULT AND CONCLUSION

Through this principle, this system is pushing towards a future where roadways would be fitted with buried electrical conductors to generate a magnetic field, while the floorpan of the electric car would be fitted with their counterpart, a non-contacting inductive pickup. This would allow current to be induced to provide power for the vehicle while it is in motion, or stockpiled until the battery is fully charged when the vehicle is parked. Electromagnetic induction also has the benefits of being insensitive to weather conditions and free of mechanical wear.



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