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An Innovative System for Witricity Based Vehicle Movement on Roads

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ABSTRACT:

The project aim is to develop an innovative system for moving electric vehicles using the concept of wireless power transfer. The proposed system makes use of copper coils installed under the road as well as in the vehicle. When the vehicle enters into the zone of copper coil, the vehicle will use the energy it gets from the Roadway copper coils.The coils which produces the electricity helps the vehicle to move on roads and stores the energy in batteries. This paper utilizes the modules of wireless power transmission, controlled with the Raspberry Pi and communicated with RF.

Keywords: Witricity, RF communication, Raspberry Pi.

INTRODUCTION:

Recent developments of electric vehicle technologies have largely been driven by requirements to reduce emissions of greenhouse gases (GHG) such as CO2 and to mitigate air pollution especially in urban areas. Various electric vehicles use batteries for energy storage therefore heavily reply on the available battery products and their technology development. Hybrid electric vehicles (HEV) are also gaining popularity due to the limited use of the battery for short term energy recovery.

In contrast, roadway powered electric vehicles (RPEV) among other electric vehicles do not necessarily require battery energy storage for their traction as they are using dynamic wireless power transfer systems (WPTS) to get the power as they are moving on roads. This is seen as a promising candidate for future propulsion of small cars, taxies, buses, trams, trucks and trains. It can even be competitive with internal combustion engine powered vehicles.

2.BLOCK DIAGRAM

POWER SUPPLY:

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier.

The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any A.C components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

2.1.TRANSMITTER

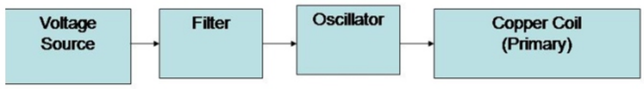


Fig.2.1.The Primary Module Of The Project

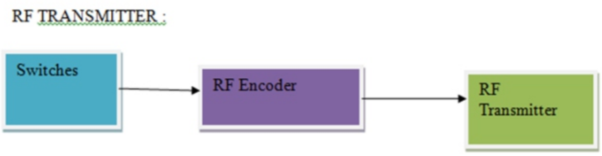


Fig.2.2. The controlling of robot.

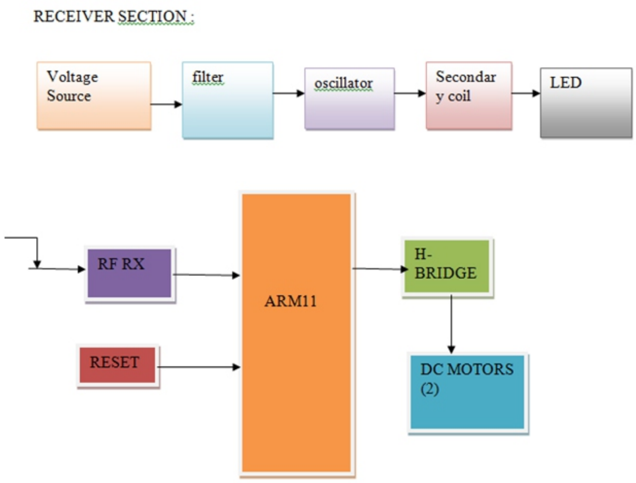


Fig.2.3. The receiver part of the project

3.RADIO FREQUENCY:

Radio frequency (abbreviated RF) is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications. . These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from nine kilohertz (9 kHz), the lowest allocated wireless communications frequency (it's within the range of human hearing), to thousands of gigahertz(GHz).

3.1.ABOUT THE TRANSMITTER:

• The STT-433 is ideal for remote control applications where low cost and longer range is required.

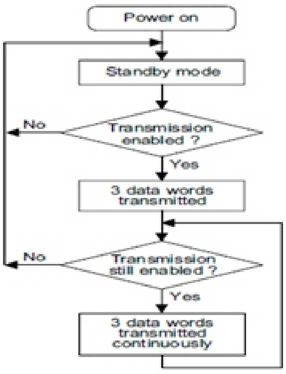
• The transmitter operates from a1.5-12V supply, making it ideal for battery-powered applications.

• The transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance.

• The manufacturing-friendly SIP style package and low-cost make the STT-433 suitable for high volume applications.

3.1.1.ENCODER:

The 318 (3 power of 18) series of encoders begins a three-word transmission cycle upon



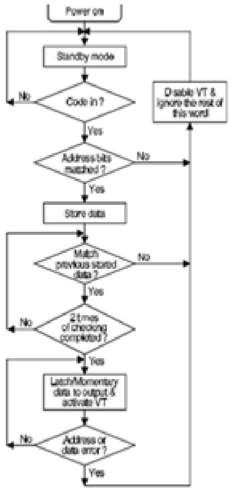
receipt of a transmission enable (TE for the HT600/HT640/HT680 or D12~D17 for the HT6187/HT6207/HT6247, active high).

3.2.RECEIVER:

The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two Data pins are provided in the receiver module. Thus, this data can be used for further applications

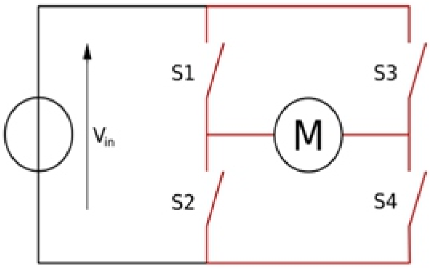
3.2.1.DECODER:

The 3^18 series of decoders receives serial address and data from that series of encoders that are transmitted by a carrier using an RF medium.



4.H-BRIDGE:

An H-bridge is an electronic circuit which enables DC electric motors to be run forwards or backwards. These circuits are used in robotics. H-bridges are available as integrated circuits, or can be built from discrete components.



5.WITRICITY:

WITRICITY is the abbreviation of Wireless Electricity which implies transmission of electricity through a wireless medium. This concept is based on oscillating magnetic fields. Two inductors isolated by air medium separated at an optimum distance when tuned at a particular frequency also called 'The Frequency Of Resonance', transfer of energy takes place from the transmitter coil to the receiver coil.

Witricity uses a "non-radiative mode of energy transfer, relying instead on the magnetic near field. Magnetic fields interact very weakly with biological organisms—people and animals—and are scientifically regarded to be safe." No actual studies or reports are claimed of the specific technology, power levels and use in home environments but it does claim that the products based on the concept of "Witricity by default are designed to comply with applicable safety standards and regulations."

Conclusion:

The limited fossil fuel availability throughout the world has allowed the electric vehicles to develop over the past decade and it will certainly be an important area of research. In this project we have designed a model of Wireless Electric Vehicle Charging System based on ICPT for which we used solar energy as input source. We have designed the system in such a way that maximum utilization of solar power can be achieved by transmitting extra power to electricity board.

This system proves that maximum efficiency can be achieved by transmitting power wirelessly. There is also a clear economic benefit to wireless charging by using solar energy. It will encourage people to build their own solar power system which can be used for multiple purposes and by which they can earn money also. With wireless electric vehicle charging system the car owners need not take the effort to plug-in and charge the vehicle, instead they can simply park the car above the transmitting (embedded in road)unit of wireless charging system so that pick- up unit can easily charge the battery of vehicle.

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