

Design and Construction of Wireless Charging System Using Inductive Coupling

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ABSTRACT: Wireless charging system described by using the method of inductive coupling. In this project, oscillation circuit converts DC energy to AC energy(transmitter coil) to transmit magnetic field by passing frequency and then induce the receiver coil. The system bases on coupling magnetic field, then designed and constructed as two parts. There are transmitter part and receiver part.

KEYWORDS: filter, transmitter, rectifier, power supply.

I.INTRODUCTION

WIRELESS power transfer (WPT) refers to a family of techniques for delivering power without wires or contacts. It was demonstrated firstly by MIT using inductive coupling the summer 2007. In 2008, Intel also achieved wireless power through inductive coupling. Wireless power transfer technology has existed for a long time live in a world of technological advancement. New technologies emerge a chance everyday to make our life simpler. Despite all these, we still rely on the classical and conventional wire system to charge our every day use low power devices such as mobile phones, digital camera etc. And even midpower device such as laptops. The conventional wire system creates a mess when it comes to charging several devices simultaneously. It also takes up a lot of electric sockets and not to mention the fact that each device has its own design for the charging port. At this point a question might arise.—What if a single device can be used to charge these devices simultaneously without the use of wires and not creating a mess in the process? We gave it a thought and came up with an idea. The solution to all these dilemmas with inductive coupling, a simple and effective way of transferring power wirelessly.

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. Although the internal construction of the IC is somewhat different from that described for discrete voltage regulator circuits, the external operation is much the same. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustable set voltage. A power supply can be built using a transformer connected to the AC supply line to step the AC voltage to desired amplitude, then rectifying that AC voltage, filtering with a capacitor and RC filter, if desired, and finally regulating the DC voltage using an IC regulator. The regulators can be selected for operation with load currents from hundreds of Milli amperes to tens of amperes, corresponding to power ratings from milliwatts to tens of watts.

II.RELATED WORK

THREE-TERMINAL VOLTAGE REGULATORS

The basic connection of a three-terminal voltage regulator IC to a load. The fixed voltage regulator has an unregulated DC input voltage, V_I , applied to one input terminal, a regulated output DC voltage, V_o , from a second terminal, with the third terminal connected to ground. For a selected regulator, IC device specifications list a voltage range over which the input voltage can vary to maintain a regulated output voltage over a range of load current. The specifications also list the amount of output voltage change resulting from a change in load current (load regulation) or in input voltage (line regulation).

H BRIDGE

Bridge Circuit using transistors for bidirectional driving of DC motor. H-Bridges in IC's to reduce the drive circuit complexity. L293D is a dual H-Bridge motor driver, So with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fix direction of motion the you can make use of all the four I/Os to connect up to four DC motors.

L293D has output current of 600mA and peak output current of 1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included within the IC. The output supply (VCC2) has a wide range from 4.5V to 36V, which has made L293D a best choice for DC motor driver.

TRANSFORMER

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using a precision rectifier are it will give a peak voltage output as DC, the rest of the circuits will give only RMS output.

BRIDGE RECTIFIER

When four diodes are connected as shown in the figure, the circuit is called as a bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners.

Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. The positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time the D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through RL, through D3, through the secondary of the transformer back to point B. This path is indicated by the solid arrows. Waveforms (1) and (2) can be observed across D1 and D3. One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. The current flow will now be from point A through D4, up through RL, through D2, through the secondary of T1, and back to point A. This path is indicated by the broken arrows. Waveforms (3) and (4) can be observed across D2 and D4. The current flow through RL is always in the same direction. In flowing through RL this current develops a voltage corresponding to that shown waveform (5). Since current flows through the load (RL) during both half cycles of the applied voltage, this bridge rectifier is a full-wave rectifier.

One advantage of a bridge rectifier over a conventional full-wave rectifier is that with a given transformer the bridge rectifier produces a voltage output that is nearly twice that of the conventional full-wave circuit.

III. EXISTING SYSTEM

In transmission section, oscillation circuit operates as push-pull devices to transmit magnetic field to the receiving coil.

IV. PROPOSED SYSTEM

The hardware configuration of wireless power transfer system is basically on inductive coupling method. The complete circuit diagram of project can be divided in two different sections:

- Transmission section and
- Receiving section

In transmission section, oscillation circuit operates as push-pull devices to transmit magnetic field to the receiving coil. The system uses coupled magnetic fields as a frequency to transfer electromagnetic energy from the transmitter to receiver.

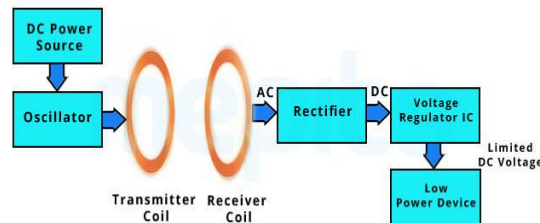


Fig 1: Block Diagram

V.RESULT

The microcontroller can be programmed by ICSP (In-Circuit Serial Programming). To each PIC belong 5 jumpers. With these EIF's own address can be set. Of course there is also a display module where two 7 segment display and four buttons can be found. With these buttons normal operating method can be simulated. Each button has a confirmation LED. With this demo system the system capacities can be tested for example the maximum polling speed. The specification requires at least 12,5ms as it was stated earlier. With this solution this can be reduced till 10ms. So the main program runs periodically and makes a query to each EIF card in every 10ms. This means for 20 EIF the system needs only 200ms which is less than the requested 250ms. In a different aspect in 1 second every EIF cards will be polled 5 times. In practice in a 20 storey building after pushing any button the user have to wait less than a half second to be confirmed his action

VI.CONCLUSION

Wireless power transfer by inductive coupling is described in this paper. In this circuit project, power transfer about 7.4watt when the transmitter and receiver are between 1.3inches. It needs to redesign and reconstruct by changing power mosfet transistor. In the paper, the design is not perfect and redesign in this journal. The components need to change.

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