

WIRELESS POWER TRANSMISSION SYSTEM

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1 INTRODUCTION

Contactless power transmission or transmitting power from a transmitter to a receiver without having any physical contact between them is achievable through an oscillating magnetic field. The term used to describe this process is the principle of electromagnetic mutual induction.

In the early 1893, Nikola Tesla demonstrated the idea of wireless power transmission by illuminating vacuum bulbs with no wires. Nikola Tesla is known as the father of wireless power transmission systems as he was the first to have thought of such an idea.

In our present day, this technology has numerous advantages over the wired system with the obvious being the elimination of transmission cables. Secondly, the cost of transmission is less as compared to using the wired system. Faults such as short circuits which can lead to power failure could never occur in a wireless transmission system and power can be transmitted to places where it is impossible in the case of using transmission cables.

2 PROJECT OBJECTIVES

- Design, build and test a cost effective wireless power transfer circuit that supplies power to multiple loads.
- Make a cost analysis for the prototype.

3 PROJECT DESCRIPTION

A prototype of a wireless power transmission system which works under the principle of electromagnetic mutual induction is built. A 230VAC is stepped down by the 220V/12V transformer. This 12VAC is fed to the full bridge rectifier circuit. Here, the AC voltage is converted to a pulsating DC voltage by the four 1n4007 diodes and the 2200uF capacitor. The rippled output of the rectifier is smoothened by the 2200uF capacitor into a more DC output voltage.

A 12V voltage regulator is used to maintain a constant voltage. Also, there is an led used as an indicator to show that the circuit functions properly. The TTC5200 transistor generates a high frequency AC current across the coil thus creating a magnetic field around it. This magnetic field is transferred to the coil at the receiver side by the Faraday's law of induction. Another rectifier circuit is installed at the receiver side to ensure the AC voltage is converted to DC. The EMF generated is used to light the LEDs and power the USB charger by the help of 5V voltage regulator. A 2-way switch is used to switch between the two loads.

4 ITEM LIST

ITEM	QUANTITY
220V/12V Transformer	1
1N4007 Diodes	8
Capacitor 2200Micro-Farad, 50 volt	1
Heat Sink	2
7812 Voltage Regulator	1
1.5Kilo-ohm Resistor	1
TTC5200 Transistor	1
6pin DC 2way Switch	1
5W5k6J Resistor	1
24 Gauge Copper Wire	As per required
LED Lights with 15Kilo-ohm resistors and USB charging port	As per required
Perfboard	4
Support board	1

Table 1: List of components used and the number required.

5 COST

Below is a quote on the components required for this project;

INVENT ELECTRONICS LTD
Plot 18, Block 7, Ayeduase New Site, Kumasi

TEL: +233553479020

Receipt

To

Buyer: Kofi Annan
Shipping Address:
Ghana
Phone Number: +233 204 203 405
Date: 2022-01-22

Item No.	Item	Part No/Description	Unit Price(GHS)	Qty	Amount(GHS)
1	Transformer	15/12v	GHS35.00	1	GHS35.00
2	Diode	1n4007	GHS1.00	8	GHS8.00
3	Capacitor	2200uF	GHS1.00	1	GHS1.00
4	Heat sink		GHS6.00	2	GHS12.00
5	Voltage Regulator	7812	GHS5.00	1	GHS5.00
6	Resistors	1.5k	GHS5.00	1	GHS5.00
7	Tic5200		GHS20.00	1	GHS20.00
8	6pin dc 2way switch		GHS7.00	1	GHS7.00
9	5w 5k6j		GHS5.00	1	GHS5.00
10	24 gauge copper wire		GHS40.00	-	GHS30.00
11	led		GHS0.50	10	GHS5.00
12	15k		GHS0.30	10	GHS3.00
13	Perfboard		GHS7.00	3	GHS21.00
14	Connecting Wires		GHS10.00	3	GHS30.00
15	Platform (stand board)		GHS20.00	1	GHS20.00

Total	GHS207.00
Received(GHS)	
Balance(GHS)	

Eric Heckford Bryan

Figure 1: shows the prices of each component

6 PROTOTYPE

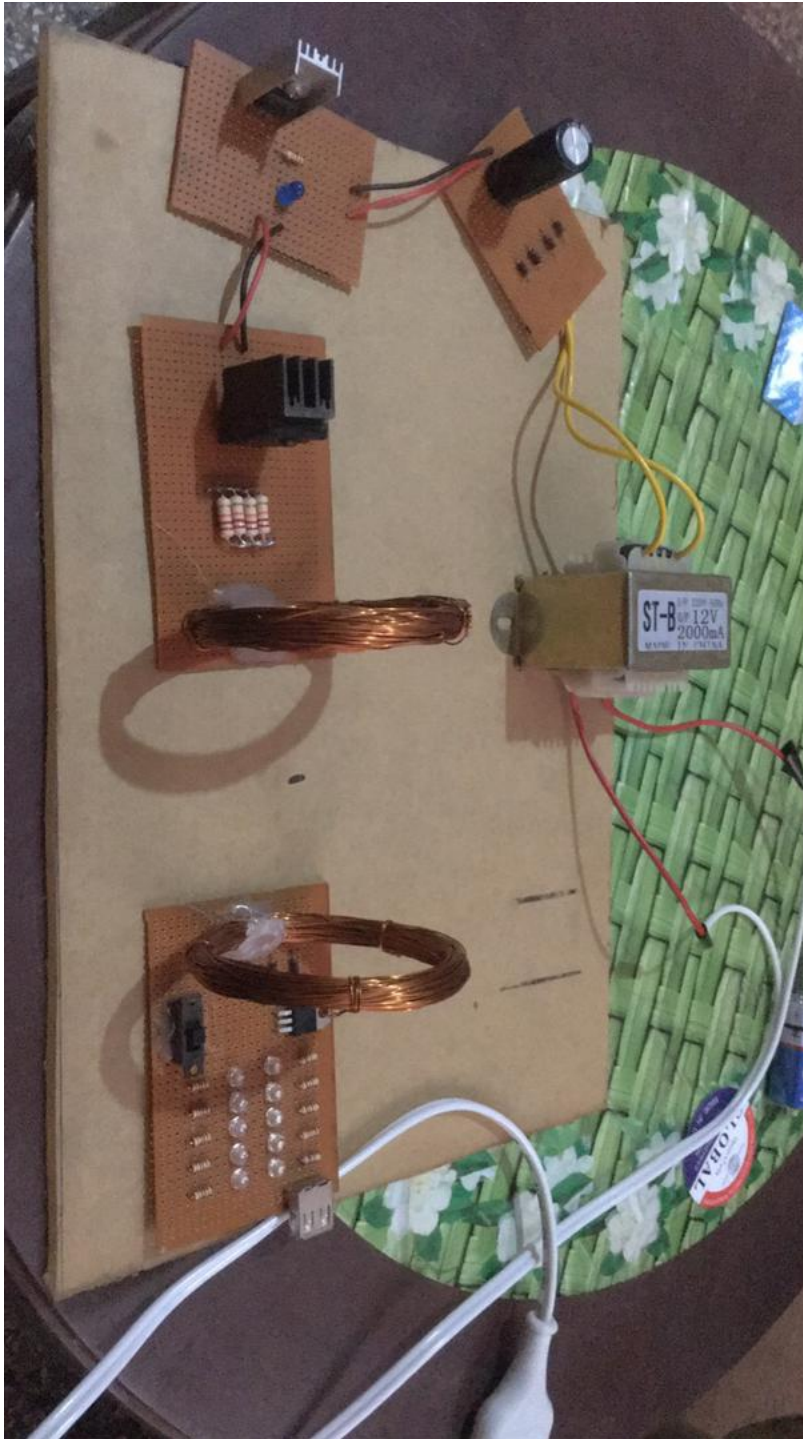


Figure 2: shows the prototype of the WPT system