Wireless AC Supply On-Off System

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Abstract— This work includes the information to develop and fabricate a wireless ac supply on-off system. Our motivation of doing this project is physically differently abled individuals who face the difficulty in on-off of their room appliances like fan, tube light. This project is also being successfully tested and implemented for motion of 60kg robot in Robowars at Techfest, IIT Bombay and Robowars at Cognizance, IIT Roorkee. This is a simple type remote control by using RF communication without microcontroller. In this project a remote has been designed for various home appliances like television, fan, lights, etc. It gives lot of comfort to the user since we can operate it by staying at one place. We can control any of the appliances by using this remote within the range of 400 foots.

Key words: Wireless AC Supply On-Off System, Transmitter Section, Receiver Section

I. INTRODUCTION

The motivation behind doing this project is Physically Differently Abled Individuals who face difficulties in operating the room appliances like television, fan, lights etc. Till yet there are several techniques which are being used like infrared remote system, GSM based Remote System but there are certain disadvantages like for the former it is based on line of sight (LOS) communication and later is not cost effective. This project overcomes the both disadvantages. It is a radio based remote system hence it is not based on Line of Sight (LOS) and the manufacturing cost is very less as compared to GSM Based Remote System. In order to reduce the manufacturing cost we used Analog Integrated circuits in place of micro controllers and single layer PCB copper Board. The complete system is divided into three parts i.e. transmitter(remote), receiver and driver section .The encoder integrated circuit used at the transmitter end is HT-12E and decoder integrated circuit used at the receiver end is HT-12D. In the driver section we simply used transistor as a switch which is coupled with the relay. Firstly device testing and troubleshooting is done on the breadboard and driver section is simulated on Proteus. Proteus is also being used for the designing of schematic and PCB layout. For the printing of layout we used glossy paper and print was taken on the single layer copper board by using the electric press. The etching is being done by using Ferrous Chloride Solution. This project is being manufactured at home hence the manufacturing cost is less. This project enhances the self-esteem of the Differently Abled individual by making them self-dependent.

II. WORKING

Now day's design of remote control circuit is very easy due to easy availability of the RF module in the market.
It mainly consists of three sections:

A. Transmitter Section:

Remote section consists of mainly an encoder i.e. HT-12E and a transmitting antenna i.e. ASK transmitter. This design allows us to operate four devices simultaneously. The encoder generates 4 bit of data and 8 bit of address. We need to set the same address at encoder and decoder IC pins A0 to A7 (pin 1 to 8) at transmitter and receiver. Every time on pressing any key at the transmitter, a 4 bit data is generated correspondingly by the encoder and sends this data with 8bit address by using ASK transmitter. The transmission frequency is 433MHz. The output of the transmitter is up to 8mW at 433.92MHz with a range of approximately 400 foot (open area) i.e. outdoors and 200 foot indoors approximately.

B. Receiver Section:

Receiver section consists of a decoder i.e.HT12D and a receiving antenna i.e. ASK receiver. The operating frequency of the receiver is same as the transmitting frequency i.e. 433.92MHz, with a sensitivity of 3uV. The DC voltage required for ASK receiver to operate ranges from 4.5 to 5.5 volts, and gives both linear and digital outputs. Through RF transmission medium, the data and addresses are received by the receiver serially which are transmitted by a carrier, the incoming address and data are decoded when the oscillator is activated by a signal on the DIN pin. The received address is checked by the decoder three times in continuation. If the received address is matches with the local address then it will enable the corresponding output pin (pin 10, 11, 12, 13). To indicate the valid transmission, the VT (pin 17) goes high otherwise it will always be low.
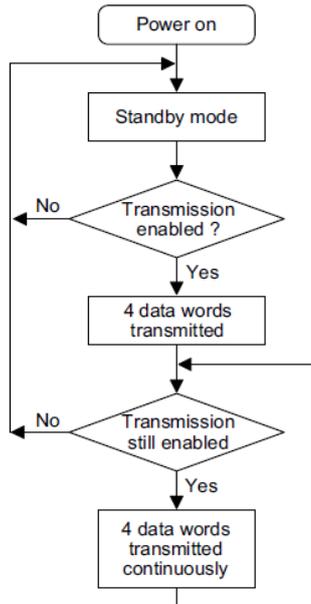
C. Flow Chart

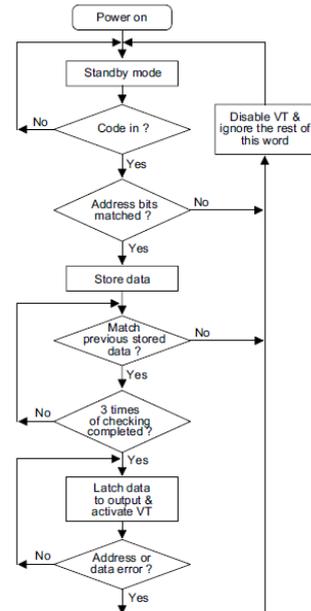Fig. 1: Flow chart of Transmitter Section

Fig. 2: Flow chart of Receiver Section

D. Driver Section:

Driver section is basically designed to control the appliances that are operating at different voltages. Driver section consist of mainly transistors, diodes and relays. Relays are used here to interface the circuits that are running at low voltage to the circuit running at high voltages. Each output signal at the reciever section is not capable to drive a relay directly. So we have used transistor to activate the relays. Fly back diodes are also used across the relays to prevent voltage spikes when the supply voltage is suddenly reduced or removed as it contains the inductive component.
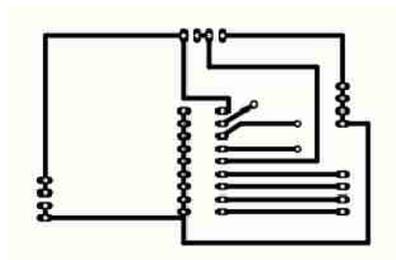
III. PCB LAYOUT
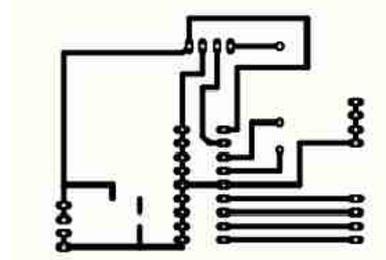

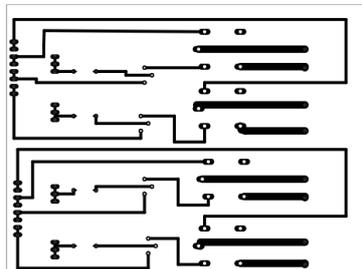Fig. 3: Pcb Layout of Transmitter

Fig. 4: Pcb Layout of Receiver

Fig. 5: Pcb Layout of Driver Section

We have made this project mainly concerning about the cost factor so that it becomes cost effective.The manufacturing cost of the project is 780 INR(approx.) andwhile doing Market survey, the estimation cost of this module is about 1800 INR.

IV. ORIGINAL PCB

Fig. 6: Original view of Transmitter circuitFig. 7:Original view of Receiver & Driver circuit

V. CONCLUSION

This project has been successfully designed and verified on A.C and D.C appliances. This project is being manufactured at home hence the manufacturing cost is less. This project enhances the self-esteem of the Differently Abled individual by making them self-dependent. This project can also be extended to various applications like controlling Heavy Robots.

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