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Implementation of Infrared Remote Control System for Home Appliances

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***Abstract*---The Home automation is mainly used to control home appliances using a wireless communication link which controls the home appliances remotely. Recently, we are using various high-tech devices and equipment's to complete our job easy. These types of home appliance controlling equipments used to turn on / off appliance from remote located area. Commercially products are available in markets which allow home appliance controlling through TV remote. The infrared remote transmits a signal an infrared light-emitting diode. This signal is decoded by a receiver having a TSHOP, since the receiver only switches via relay when the signal is received.**

***Keywords*—Infrared Remote Control System, TSMP4138, IR LED, SPDT.**

I. INTRODUCTION

Home automation which is not a newest one in today's world, but it is used to provide ease for user to remotely control and observe the appliances and it provides a better use of electricity. by using ir remote, controlling home appliance is most effective way .of course, a lot of research has been done and many resolutions have been taken to remotely access the home appliances. Some of these peoples have been using wireless technology via internet for controlling home appliances, some others using GSM and Bluetooth technology to control the home appliances.

But those are all not a effective way, if there is no internet or weak signal. Our proposed method reduces this kind of difficulty. It has no limitation of network, coverage and any GSM network. It provides portability to the system. The elderly people, disables and for the people who are unable to stand up or face difficulties in speaking whose are all conveniently use this to control home appliances. It is affordable to everyone, cheap and easy to install. The electronic devices used to control are easily available making it a cost effective solution.

In this research paper, a circuit is designed to turn on/off any home appliance by using the TV/DVD remote controller. The circuit can be operated within a distance of 5-10 meter which depending on the remote used. the circuit consists of a step-down transformer x1 (6v-0-6v, 250ma secondary), 5v regulator 7805 (IC1), two 5v, 1 change-over (c/o) relay, a timer NE555 IC (IC2), an IR receiver module (IRX1 TSOP1738) and some distinct components.

This system can be connected to any of the home appliances like lamp, fan, radio, etc to make the appliance turn on/off from a TV, VCD, and VCR, air conditioner or DVD remote control. The circuit can be activated from up to 10 meters. It is too easy to build and can be assembled on a general-purpose PCB.

We can save our time, energy and work to take actions on switch over of all the room appliances. some peoples expects to get someone help them to turn on appliances so that they would relax for a while; mostly those who are unable to stand , deaf ,disables persons and senior citizens just to wait for getting the service. Home appliances to control through radio waves around your home automatically it are not an imagination now this dream is come to a reality. The paper has been discussing by the radio waves how to control power line devices using embedded system. In this paper

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work we considered the power line devices as the home appliances. Hence the

II. BLOCK DIAGRAM

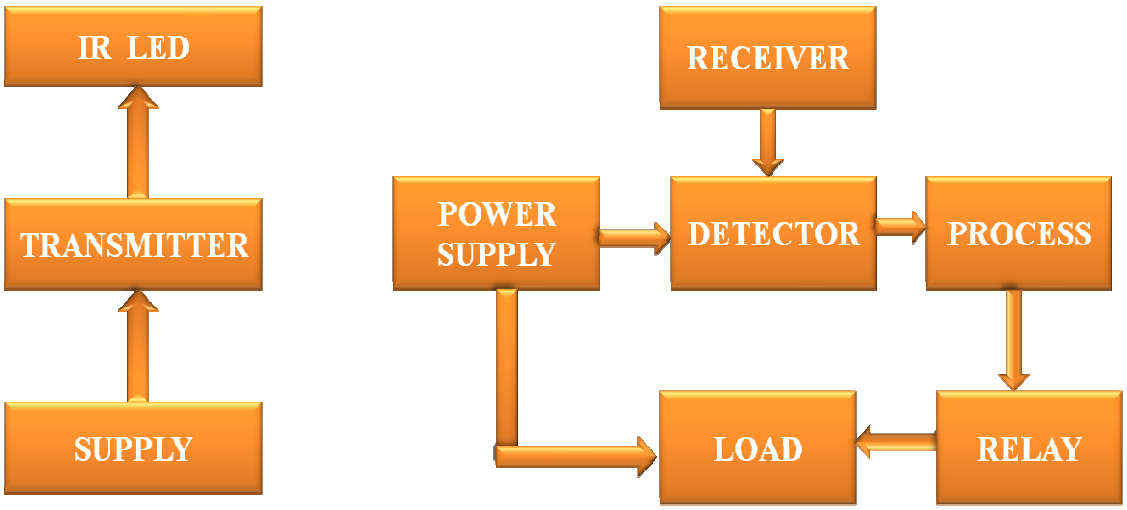

Fig.1. Block Diagram

The home appliances has been contolling here through using remote control .the block diagram in this paper has been drawn based on the ciruit diagram of transmitter and receiver.In this trasmitter ciruit works .

when a dc supply of 5V fed to that which will begin to operate as well as generating a signal of 38 Khz frequency that cause blink IR led through that signal has sent to receiver.Receiver circuit consist of a detector(counter),processor(timer),relay atlast load,first of all ac supply of 230v 50 HZ fed to relay which output given to the step down transformer those are all connected with a 5V connected circuit which contains IR receiver sensor,IC555 timer and counter.

SPDT relay

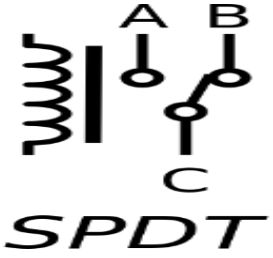

Fig. 2. Equivalent circuit of SPDT relay

Generally relays are electrically operated switches. Spdt stands for single pole double throw relay. It has five terminals i)coil, ii) normally open, iii) coil, iv) normally closed, v) normally open. This relay is used to switch between two circuits. Whenever the current flows through the coil it will create an magnetic field which in turn attracts the lever to chang the switch contacts.

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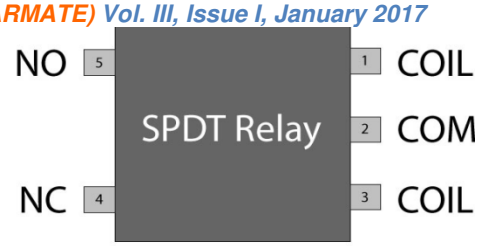

Fig. 3. Single Pole Double Throw Relay

Receiver

The receiver used in remote control system is TSMP4138 it is a sensor which is used for receiving the signal from the infrared remote control system. The infrared remote control system has become a part of home appliances nowadays. The remote control receivers must be highly sensitive to absorb/receive the signals from the transmitter. The maximum distance between the transmitter and receiver depends on the strength of the signal.

III. CIRCUIT DIAGRAM

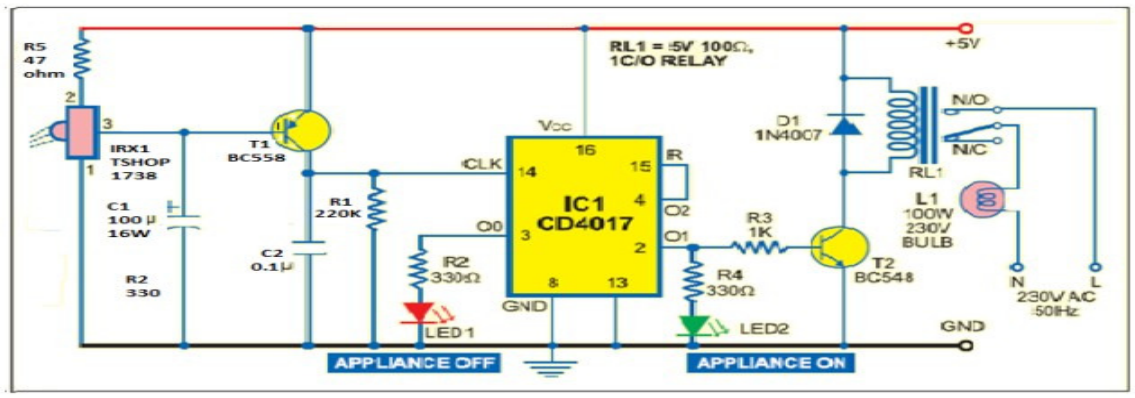

Fig. 4. Circuit diagram

By using TV or DVD remote control as well as connect this circuit to home appliance we can control it within 5 to 10 meters range. The 38 kHz infrared (IR) rays generated by the remote control which signal received by ir receiver module tsop1738 of the circuit. Pin 1 of tsop1738 is connected to ground, power supply is connected to the pin 2 through resistor r5 and the output is taken from pin 3. The amplified signal is given to clock pin 14 of decade counter IC CD4017 (ic1). Pin 3 is connected to led1 (red), whenever its glows that are mean that appliance is off. Pin 8 of ic1 is grounded; VCC is connected in pin 16. LED2 (green) connected to pin 2, whenever its glows that's mean that appliance is on state. The output signal is amplified by transistor T1 (BC558).transistor t2 (BC548) connected to pin 2 of ic1 drives relay RL1 Diode 1N4007 (D1) which is connected across step down transformer as a freewheeling diode. If the appliance is connected between the NORMALLY CLOSED PART OF the relay and neutral terminal of mains then it to be controlled. It gets connected to live terminal of AC mains via normally opened (N/O) contact.

Table. 1. Technical specifications

S.NO	COMPONENTS USED	RATINGS
1	Step-Down Transformer	6V-0-6V, 250mA secondary
2	5V Regulator	IC7805
3	Timer	NE555 IC

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4	Receiver Module	TSMP4138
5	Resistor	220 KΩ, 330Ω, 1KΩ, 45Ω
6	Decade Counter	IC 4017B
7	Relay	SPDT Relay
8	Capacitance	100 µF, 0.1µF
9	Transistor	BC558
10	Diode	IN4007

IV. CONCLUSION

From this paper it is clearly illustrated that the home appliances can be controlled using television remote by wireless transmission method. This system can be implemented easily with minimum economic value. It will create a great impact on elders those who cannot able to walk/roam inside their houses. They can control/operate the turn on and turn off of the home appliances like fan, led, and so on. Similarly the human work and time can be reduced. Several operations can be done by using a single remote and is helpful to the user in day to day activities.

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