Home Appliances Controlled by TV Remote

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Abstract—**We operate all the electrical and electronic appliances such as light, fan, CPU and printer using mechanical switches and regulator. This manual switching of any home appliance is very difficult and tedious method for those people who are physically disabled so this system helps them to operate all home appliances using single TV remote. This system is based on IR receiver and microcontroller. We send signal to the receiver with the help of TV remote. It sends out the code to the controller. Then the respective device will get turned ON/OFF.**

Index Terms—**Microcontroller (AT89s52), Relay driver IC (ULN2003), Relays, IR receiver (TSOP1738).**

I. Introduction

We have selected this project to help the old as well as physically handicapped people. In this project we switch the electrical equipment like tube light, fan, CPU, printer etc. We use TV remote for switching purpose using logic of infrared rays which are transmitted from remote [1]. In this project we use IR receiver to receive binary coded data from TV remote. The output signal of IR receiver is given to the Microcontroller. According to the input from remote Microcontroller processes the signal and gives output to the relay driver. Relay driver operates the relay according to incoming signal. Finally, we turn home appliances ON/OFF using remote.

II. Problem Statements

Before the invention of home appliances controlled by TV remote, it was difficult to physically handicapped and old turn person to ON/Off the electrical appliances by going towards the switch board. Also, sometimes we forgot to switch OFF all switches in home when we leave from home, so there is wastage of electricity. Hence to reduce the efforts and to save electricity, we have designed this system. In that we can switch ON/OFF any electrical appliances by sitting at one place using TV remote.

III. Block Diagram

The system is designed to operate electrical loads using a TV remote. Remote transmits coded infrared data which is then received by interfaced sensor at the control unit [2]. The system operates electrical loads depending on the data transmitted from the TV remote .IR receiver receives this coded data and gives output to the microcontroller.

We use relays to operate the particular load. When button of remote is pressed, this signal is processing in microcontroller and gives output to the Relay Driver IC. The Relay Driver IC is used to operate number of relays for different electrical equipment. According to incoming signal to microcontroller particular relay get turned ON/OFF. We can turn ON all the loads at a time and also OFF all the loads at a time using the different button of remote.
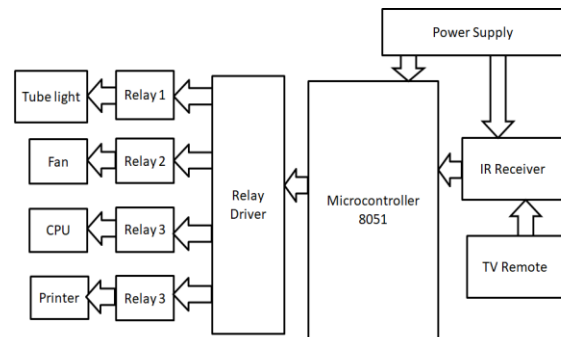

Fig. 1. Block Diagram of Home Appliances Controlled by TV Remote
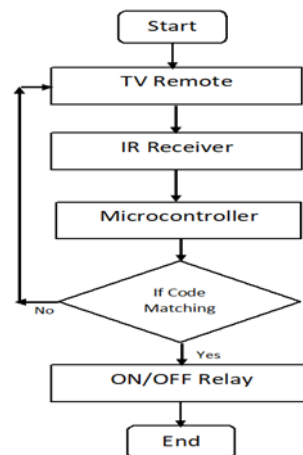
IV. Proposed Method

Fig. 2. Flowchart for turn ON/OFF relay

Reducing efforts of physically handicapped people and old people, saving electricity, avoiding accidents due to short circuit etc. are the objectives of the system. We have used Proteus software for circuit simulation, Keil software for programming the controller and Eagle software for designing PCB layout. The system is expected to turn ON/OFF the

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electrical home appliances according to the incoming signal from remote. The system is also expected to send the values sensed by IR receiver to the microcontroller and controller processes the signal and operate the particular relay
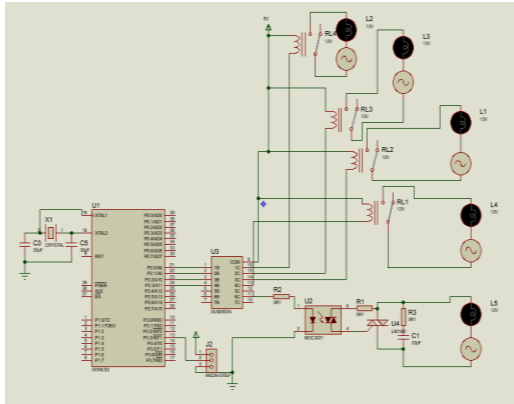
V. CIRCUIT DIAGRAM

Fig. 3. Circuit diagram

In the circuit diagram shown above alternator is used to generate 230V power supply. Lamps are connected in parallel with alternator which are act as a load. In this we use IR receiver to receive the data from TV remote which is used for switching particular load. Relay Driver IC is used at the output port of microcontroller to operate particular relay. According to incoming signal relays get operated. The TRIAC is used to control the speed of fan and the MOC3021 TRIAC IC is used to drive the TRIAC. When we press the button of TV remote, it sends coded data which is received by IR receiver. In remote different buttons having different codes and according to these codes we feed program in microcontroller. We decide that the particular button of remote for particular load and when we press decided button for that particular load, it will turn ON/OFF.

A. Component Used

1. Step down transformer (230/ 12V)
2. Power supply circuit
3. AT89s52 microcontroller
4. IR Receiver (TSOP1738)
5. Relay Driver IC (ULN2003)
6. Relays
7. TRIAC
8. TRIAC Driver IC (MOC3021)

VI. PRINCIPLE COMPONENT

A. Microcontroller (AT89s52)

The AT89s52 is a low power, high performance CMOS 8-bit microcontroller with 8K bytes in-system programmable flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80c51 instruction set and pin out. On-chip flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.

This powerful microcontroller is suitable for many embedded control applications.

Fig. 4. AT89s52 microcontroller

B. Relay Driver IC (ULN2003)

The ULN2003 is an array of seven NPN Darlington transistors capable of 500mA, 50V output. It features common cathode fly-back diodes for switching inductive loads. It can come in PDIP, SOIC, SOP or TSSOP packaging.
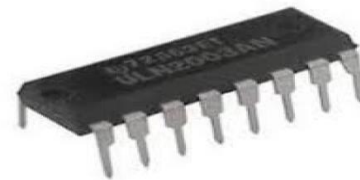

Fig. 5. Relay driver IC (ULN2003)

C. IR Receiver

An infrared receiver, or IR receiver, is hardware that sends information from an infrared remote control to another device by receiving and decoding signals. In general, the receiver outputs a code to uniquely identify the infrared signal that it receives.
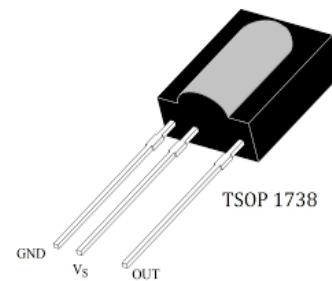

Fig. 6. IR Receiver (TSOP1738)

D. Relay

It is an electrically operated switch. When current exceed their limits, coil actuates which operate either to close open contacts or to open close contacts. It gives high reliability, safe disconnection from the main supply. It has longer life.

E. Triac

The TRIAC is a three terminal semiconductor device for controlling current. It gains its name from the term TRIODE for Alternating Current. It is effectively a development of the SCR

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or thyristor, but unlike the thyristor which is only able to conduct in one direction, the TRIAC is a bidirectional device.
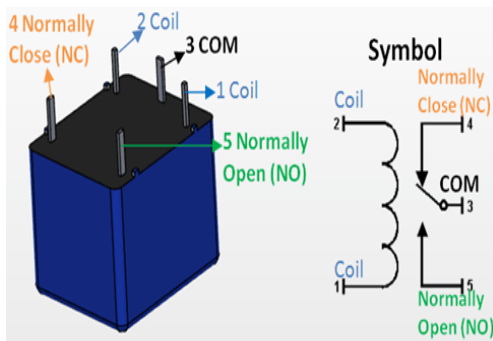

Fig. 7. Relay

Fig. 8. Triac (BT136)

VII. FUTURE SCOPE

The system has following future scopes which makes system more reliable and effective:

1. This is very smart an intelligent instrument useful for all the age groups and has a variety of uses in almost all the areas where instruments need to be automated and controlled as per the human need and enhance facility.
2. It is possible that the operating range and the instrument operability in terms of number of instruments can be increased.
3. It can be used in the case of number of devices and applications such as Tube light, CPU, Fan, Printer or even tasks such as simply opening a door.
4. A single remote control can be made to operate at different frequencies, each corresponding to a particular task to be performed by the appliance.

VIII. CONCLUSION

This system provides simple switching of electrical home appliances using TV remote based on microcontroller. Since it is based on microcontroller and relay it has high efficiency reliability, mostly this system saves human efforts and electricity with the help of TV remote. Thus, this proposed system is economical cheap and favorable for physically handicapped, old as well as for all age people.

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