

Home Appliances Controlled by TV Remote

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Abstract— We operate the electrical appliances such as light, fan, CPU, printer using mechanical switches and regulator. Automatic control of home appliances is highly demanding a new day. In this work, we have designed, constructed a circuit which specially meet the requirement of control the home appliances through any remote-control device that is portable within the periphery of the room. This project is specially designed for the physically disabled person so this system is designed to operate the home appliances using the TV remote. This system is based on the IR receiver and microcontroller. We send signal to the receiver with the help of TV remote. The output of the IR receiver is sent to the controller. Then operate the devices ON/OFF.

Keywords: Home Appliances Controlled By TV Remote, Transistor, IR Receiver

I. INTRODUCTION

In the coming days, as demand of signal control is increasing every moment, it will prove a great boon to the world, since it will save a lot of manual work and time which is useful for physically disordered people. Any country can only develop when it uses electricity for actual time. Now time comes when these types of innovative ideas should be brought into practice. This project can also be modified by using TV Remote and IR Receiver which help to increase the area of controlling home appliance [1]. In, our project we are control the home appliances controlling by the TV remote. This system operates the electrical load depending on the data transmitted by the TV remote. TV remote sends the coded infrared data to the infrared receiver and gives output to the microcontroller. Microcontroller compares the coded infrared data, if the coded data is matched then send the output to the relay. We use the relays to operate particular load. According to incoming signal microcontroller turns particular relay ON/OFF. In remote, different buttons having different codes and according to this code we feed the program into the microcontroller. According to the input from remote microcontroller processes the signal and output port passes the signal to the relays through transistor. Here we use the transistor for switching purpose. At the output electrical devices are connected to relay which are operating on AC signal like ON/OFF tube light, printer, CPU, and fan.

II. PROBLEM STATEMENT

This project is specially designed to reduce the efforts, save electricity and time. Before the invention of home appliances controlled by the TV remote it was difficult to handle the home appliances for physically handicapped people and also aged/old people going towards the switch board. By this system we can switch ON/OFF any appliances by sitting at one place using TV remote. That's why we have selected this project for the automation purpose.

III. BLOCK DIAGRAM

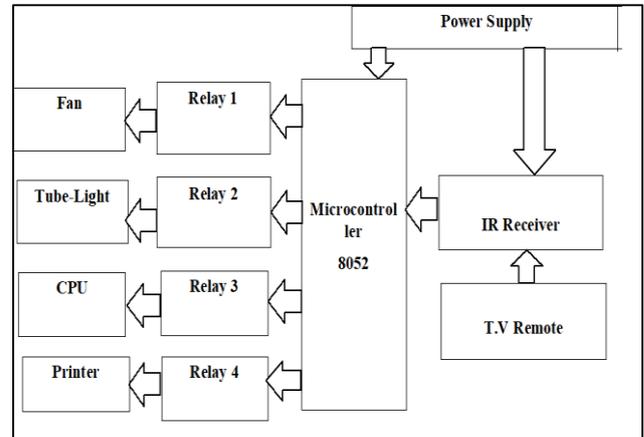


Fig. 1: Block diagram of home appliances controlled by TV remote

The block diagram consists different blocks as shown in above figure. Each block having different working according to their name. The working of different blocks is, as shown below: Above figure consist of following blocks:

A. Transmitter:

The block consists of a remote which is the transmitter of the IR radiations.



Fig. 2: Transmitter for the remote control-based home appliances

B. Receiver:

It responds to the radiations and switches the appliance ON and OFF

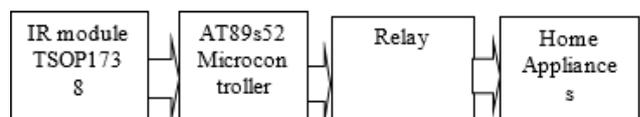


Fig. 3: Receiver for the remote control-based home appliance

C. Power Supply:

We require 5V DC for working of whole system. We use transformer to convert 230V AC into 12V AC. From this 12V AC we have generate 5V DC using voltage regulator IC 7805. This 5V is given to the microcontroller, Relay and TSOP1738.

D. TV Remote:

It is used as transmitter in this system. The whole system is dependent upon incoming signal from remote. In this system we use numerical keys of remote to operate particular device. The remote sends the infrared signal in which there is encoding data related to that particular key which we pressed.

E. IR Receiver:

TSOP1738 IR receiver is used in this system which receives 38KHz frequency signal. It has only 3 pins two pins are for power supply and one for output. The output of sensor is data in the form of 0 and 1 which is send to the controller for further process.

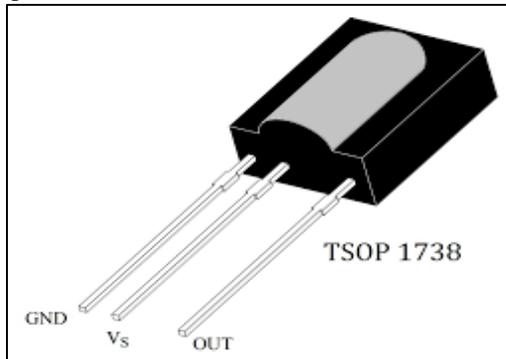


Fig. 4: TSOP1738

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. The TSOP17-series are miniaturized receives for infrared remote-control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decided by a microcontroller. TSOP1738 is the standard IR remote control receiver series, supporting all major transmission codes.

F. Microcontroller:

We have used AT89S52 microcontroller which is having 4 ports, from that we have used only two ports namely port2 and port3. The port3 is used as input and port2 is used as output. The output of sensor is given to the 4th pin of port3.

It measures the value of incoming data and compares this keycode with defined keycode and according to that particular pin get high or low as per the in program.

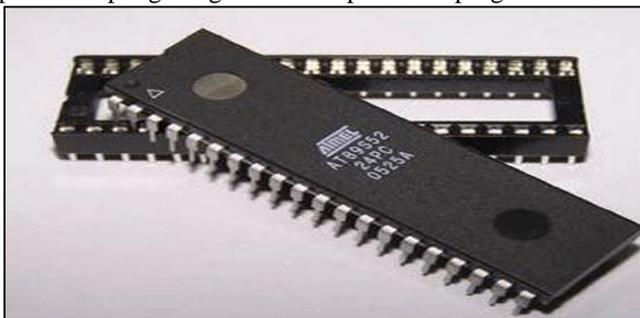


Fig. 5: AT89s52 microcontroller

It is the powerful microcontroller which provides a highly flexible and effective solution to many embedded control applications. The AT89S52 has 4 different ports, each one having 8 Input/output lines providing a total of 32 I/O lines. Those ports can be used to output DATA and orders do other devices.

The AT89S52 comes from the popular 8051 family of Atmel Microcontrollers. It is an 8-bit CMOS microcontroller with 8K Flash memory and 256 bytes of RAM. It has 32 I/O pins comprising of three 16-bit timers,

external interrupts, full-duplex serial port, on-chip oscillator and clock circuitry.

The Microcontroller also has Operating mode, Idle Mode and Power down mode which makes it suitable for battery operated applications. Few considerable drawbacks of the microcontroller are that it does not have in-built ADC and does not support SPI or I2C protocols. However, you can utilise external modules for the same.

G. Relay:

Relays are connected at port2 which are used as switch. The related electrical load is connected across particular relay. Electrical devices operate on 230V, so AC mains supply is given to the devices. In this loop relay also connected, when relay get turn ON loop is completed and device will ON or OFF.

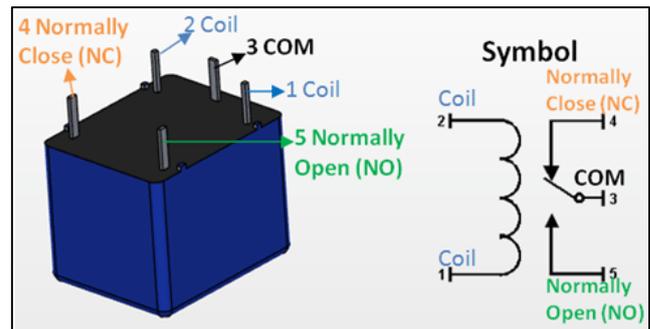


Fig. 6: Relay

Relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch.

When current exceed their limits, coil actuates which operate either to close open contacts or to open close contacts. Relay is used just like a switch and it get operated by the microcontroller. It gives high reliability, safe disconnection from the main supply. It has longer life. The advantage of relays is that it takes a relatively small amount of power to operate the relay coil, but the relay itself can be used to control motors, heaters, lamps or AC circuits which themselves can draw a lot more electrical power.

The electro-mechanical relay is an output device (actuator) which come in a whole host of shapes, sizes, designs and have many uses and applications in electronic circuits.

The design and types of relay switching circuits is huge, but many small electronic projects use transistors and MOSFETs as their main switching device as the transistor can provide fast DC switching (ON-OFF) control of the relay coil from a variety of input sources.

H. Transistor

Transistor is a semiconductor device used to amplify and switch electronic signals and electrical power. BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals. BC547 is mainly used for amplification and switching purposes. It has a maximum current gain of 800. Its equivalent transistors are BC548 and BC549. This transistor terminals require a fixed DC voltage to operate in the desired region of its characteristic curves, this is known as the biasing. For amplification applications the transistor is

biased such that it is partly on for all input conditions. The input signal at base is amplified and taken at the emitter. BC547 is used in common emitter configuration for amplifiers.

The voltage divider is the commonly used biasing mode. For switching applications transistor is biased so that it remains fully on if there is a signal at its base. In the absence of base signal, it gets completely off.

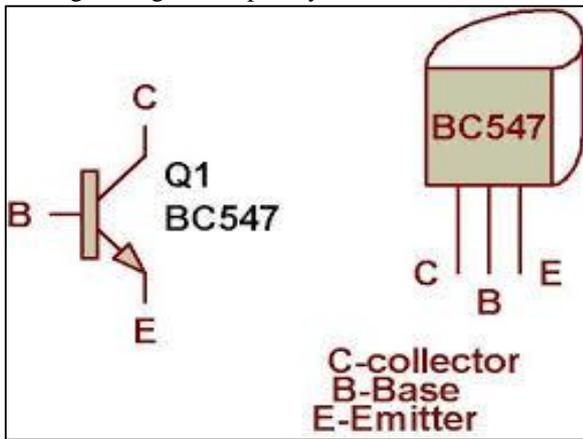


Fig. 7: Transistor (BC547)

1) Future Scope

This is very smart and intelligent instrument useful for all people of age groups and has a variety of uses in almost all the areas where instruments needed to be automated and controlled as per the human need and enhance facility.

It is possible that the operating range and the instrument operability in terms of number of instruments can be increased.

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.

A single remote control can be made to operate at different frequencies, each corresponding to a particular task to be performed by the appliance.

IV. ALGORITHM FOR MONITORING AND CONTROL

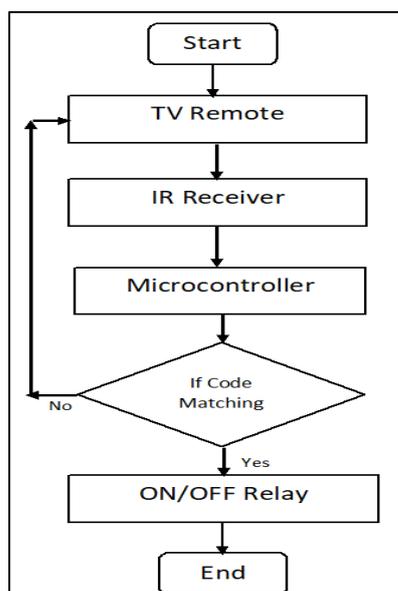


Fig. 8: Flow chart of Home Appliances Controlled by TV Remote

- 1) Step 1: Start.
- 2) Step 2: Check The Connection.
- 3) Step 3: Verify Whether The Hardware Has Provided With The Power Supply Or Not.
- 4) Step 4: Press the Button Of TV Remote.
- 5) Step 5: Take Input from IR Receiver.
- 6) Step 6: Transfer The Output Of IR Receiver To The Microcontroller.
- 7) Step 7: If The Coming Key Code Is Match With Defined Key Code Then Particular Relay Will ON/OFF.
- 8) Step 8: If Not Match Then Follow Step 4 To 7.
- 9) Step 9: Stop.

V. CIRCUIT DIAGRAM

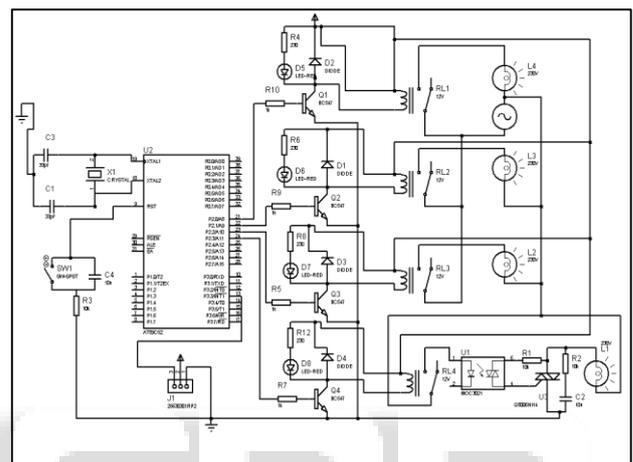


Fig. 9: Circuit diagram of home appliances controlled by TV remote

In the circuit diagram show above alternator is used as AC 230V power supply generator. Lamps are connected in parallel with alternator which are act as load. In this we have used IR receiver to receive the data from TV remote which is used for ON/OFF the particular load. The output port of the microcontroller gives to the transistor. Here transistor is used as switch. The output of the microcontroller is a given to relay through transistor. Relay is used to operate different electrical equipment's. According to incoming signal relays get turned ON/OFF.

The project is designed to operate electricals loads using the TV remote. The remote transmit the coded infrared data which is then received by a sensor interfaced to the control unit. 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.

Microcontroller process this incoming signal and gives output to the relay through transistor. Here we use transistor as a switch. The relay is used to operate the different electrical equipment. According to incoming signal to microcontroller particular relay is ON/OFF.

VI. RESULT

In this system, when we press the keys of TV Remote particular load turns ON or OFF. When we press key-1 first device will ON and when we press same button once again this device will OFF. Similarly, other loads are operating on key-2, key-3 and key-4 respectively.

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