

## **MINI PROJECT REPORT**

### **REMOTE CONTROL FOR HOME APPLIANCES**

**SUBMITTED BY**

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## CHAPTER 01

### INTRODUCTION

Electronics is employed nowadays in home appliances for a large purpose together with the motor regulation of washer, the management of household appliance, the sunshine dimming of lamp and therefore the This permeation speedily will increase as a result of appliances need increased options, straightforward to engineered and modify as physics primarily based solutions become cheaper and a lot of refined.

Within this evolution, the microcontrollers (MCU) increasingly replace analog controllers and distinct solutions even in low value applications. They are a lot of versatile, usually want less elements and supply quicker time to promote. With associate analog IC, the designer is restricted to a set perform frozen within the device.

Remote control facilitates type of operation round the home or workplace from a distance like fan regulators and mains power offer. It provides a system that's straightforward to grasp and additionally to work, a system that will be low cost and reasonable, reliable and simple to take care of the system of It adds a lot of comfort to everyday living by removing the inconvenience of getting to maneuver around to work an exponent regulator. The first device, referred to as “lazy bones” was developed in 1950 by celestial point physics Corporation (then referred to as celestial point Radio Corporation). Mahmud Shehu AHMED and team introduced remote controlled mains power offer in 2007 and fan regulator in 2006 [2, 3].

Their style was supported some analog and digital elements that were less compact and needed to style dedicated infrared remote transmitter, besides the system was less versatile to By suggests that of a result abundant vital has been given to the current side and a spread of device are prevailing nowadays one amongst the foremost common is that which build use of IR radiations at specific frequencies .The circuit is connected to any of the house appliance (lamp, fan, radio, etc.) to form the appliance flip on/off from a TV, VCD, VCR, cooling system or videodisk device. The circuit will be activated from up to ten meters. It is terribly straightforward to make and might be assembled on a general purpose PCB.

## CHAPTER 02

### LITERATURE SURVEY

In this project about the remote control for the home appliances with their features and these appliances are connected through remote via signal. The remote control for the home appliances is connected to the remote through signal the home appliances uses with these remote consist of various components PCB sensors uses the technology application through the internet using the data through mobile. These applications are based on the signal the appliances can be controlled through remote or can be controlled by remote installing remote control application in this mobile these applications are based on android (or) iOS interface card will be kept in the application in the application and that application is run by the coding.

The home appliances were controlled and developed and to take information from the remote through signal to provide function. It has been developed to control the home appliances the home appliances controlled by several ways for EX: - through signal it is best advantage to control the application through remote from a finite distance.

In terms of the total smart solutions several efforts have done most of the work points on the alarm system special AMIGO similarly these projects have control solutions high cost of seems becomes main solutions and easier work from the home appliances to controlled by the GSM and also controlled by the IR, GSM on home

Mobile is the greatest invention in the country and it was designed to make calls and receive calls and we can also control the home appliances without the remote by the phone in this no smart phone is needed to control head pieces we can use just old GSM phone to switch ON or OFF to any home appliances

#### WORKING OF GSM

Here we use GSM for controlling home appliances we send some command like # A LIGHTON #A FANON IR Remote Controlled for Home Appliances .

In this project, we are using IR based wireless communication for controlling home appliances. In this project, Arduino is used for controlling whole the process. We send some commands to the controlling system by using IR TV/DVD/MP3 remote for controlling AC home appliances. After receiving signal from IR remote, Arduino sends related signal to relays which are responsible for switching ON or OFF of the home appliances through a relay driver.

## CHAPTER 03

### PROPOSED METHODOLOGY

Connect this circuit to any of your household appliance (lamp fan radio etc) to form the appliance flip on/off from a TV VCD or optical disc device. The circuit are often activated from up to ten meters.

The 38KHz infrared(IR) rays generated by the device are received by IR receiver module TSOP1738 of the circuit. Pin one of TSOP1738 is connected to ground pin2 is connected to the ability offer through electrical device R5 and also the output is taken from pi3. The sign is amplified by semiconductor unit T1 (BC558).

The amplified signal is fed to clock fourteen of decede counter IC CD7493 (IC). Pin eight of IC1 is grounded pin sixteen is connected to Vcc and pin three is connected to LED1 (red) that glow to point that the appliance is off.

The output of IC1 is taken from its pin2. LED2 (green) connected to pin a pair of is employed to point the on state of the appliance. semiconductor unit T2 (BC548) connected to pin a pair of of IC1 drives relay RL1. Diode 1N4007 (D1) acts as a freewheeling diode. The appliance to be controlled is connected between the pole of relay and neutral terminal of mains. It gets connected to measure terminal of AC mains via ordinarily opened(N/O) contact once the relay energises.

## Circuit diagram

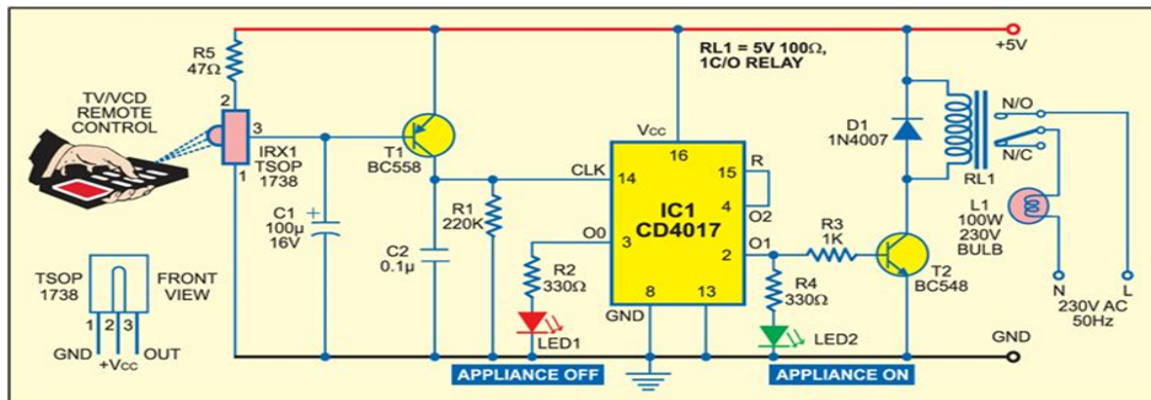


Figure.1 Complete circuit diagram of Remote control for home appliances

## Circuit diagram description:

The 38kHz infrared rays generated by the device are received by the IR receiver module TSOP1738 of the circuit. Pin one of TSOP1738 is connected to ground, pin a pair of is connected to the ability offer through R5 and also the output is taken from pin three. The sign is amplified by Q1. The amplified signal is fed to clock pin fourteen of decade counter IC CD4017 (IC1). Pin eight of IC1 is grounded, pin sixteen is connected to vcc and pin three is connected to D2 (Red LED), that glows to point that the Appliance is off

The output of IC1 is taken from its pin a pair of. D3 connected to pin a pair of is employed to point the 'on' state of the appliance. Q2 connected to pin a pair of of IC1 drives relay RL1. D1 acts as a freewheeling diode. The appliance to be controlled is connected between the pole of the relay and neutral terminal of mains. It gets connected to measure terminal of AC mains via ordinarily opened (N/O) contact once the relay energizes. If you would like to control a DC twelve V relay then use a regulated DC twelve V power offer for DC twelve V Relay and bear in mind that the circuit voltage not be exceeded quite DC five volts.

## CHAPTER 04

### PROJECT DESCRIPTION

#### 4.1 HARDWARE DESCRIPTION

##### Components used

##### 4.1.1 IC 4017

The IC 4017 could be a versatile IC of the CMOS family that has big selection of applications. Internally it consists of a ten stage decade counter/divider. once a clock pulse is applied to that outwardly, its outputs become logic 'hi' and 'lo' consecutive (one when the other). it's got various applications, for instance in circuits wherever consecutive shift ar needed and additionally in ornamental decorative lighting, wherever the lights ar switched on and off consecutive giving it a 'running' result.

##### Pin Configurations of IC 4017

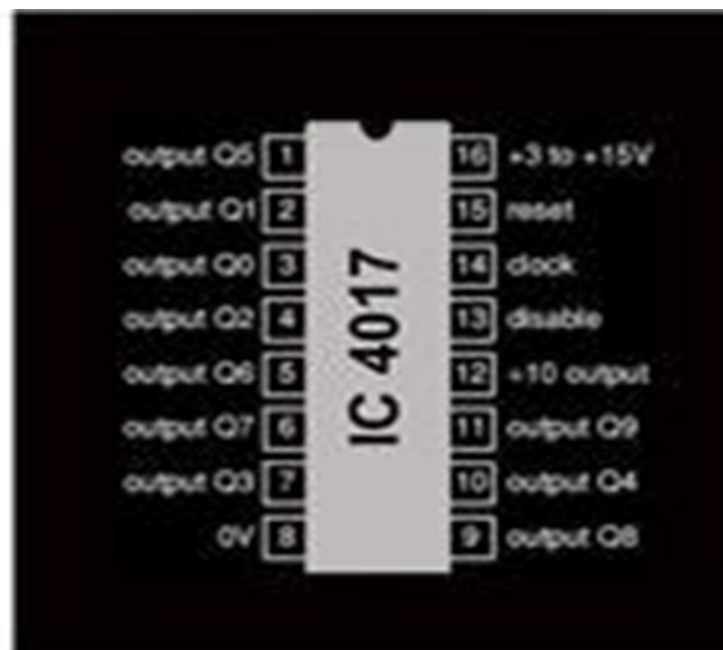


Figure.2 Pin Configuration of IC 4017

As are often from the diagram higher than, the IC 4017 may be a sixteen pin twin in line package IC. Pin one are often known from a tiny low depressed circle at the intense left corner of the IC, or just one will invariably bear in mind, the written aspect of the IC facing towards you, the pin starting from the left aspect of the semi circle notch of each IC is pin one.

Pin one to pin seven and pins eight, 9, ten square measure all the outputs of the IC. Pin sixteen is for the positive offer and pin eight is ground. Pin fifteen is that the reset purpose of the IC. A logic '0' to the present pin (or by connecting it to the ground), provides a inexperienced signal to the IC, in order that it will perform. A logic '1' or a positive offer here can bring its proceedings to a stand still and can reset it. At this position pin three of the IC4017 stays at logic '1' wherever as all alternative outputs square measure logic 'lo'.

Pin fourteen is that the clock input of the IC 4017. associate external clock signal to the present purpose can build a logic '1' to proceed consecutive, starting from pin three and ending at pin eleven.

The cycle is recurrent as long because the clock persists at pin fourteen. the amount of your time every output stays logic '1' can rely upon the fundamental measure of the positive peaks of the clock signal. With the rising fringe of each clock pulse, the 'logic 1' can shift from one output to the opposite serially.

Pin thirteen is that the clock change purpose. A logic '1' to the present pin can stop the IC 4017 from continuing and its output can freeze at that instant at the actual output. albeit the clock signal at pin fourteen is ON, the output can't shift as long as pin thirteen is command at logic '1', thus now ought to be grounded. On the contrary if pin fourteen is command at logic '1' and clock signal is applied at pin one, each falling fringe of the heart beat can build the outputs to alter state consecutive.



#### 4.1.2 LED:



Figure.3 LED Representation

A semiconductor diode (LED) may be a semiconductor light. LEDs square measure used as indicator lamps in several devices and square measure more and more used for alternative lighting. showing as sensible electronic elements early LEDs emitted low-intensity red lightweight, however trendy versions square measure obtainable across the visible, ultraviolet, and infrared wavelengths, with terribly high brightness.

When a semiconductor diode is forward-biased (switched on), negatrons square measure ready to recombine with electron holes inside the device, cathartic energy within the sort of photons. This result is named electroluminescence and therefore the color of the sunshine (corresponding to the energy of the photon) is set by the energy gap of the semiconductor. A LED is commonly little in space (less than 1 mm<sup>2</sup>), and integrated optical elements could also be wont to form its pattern. LEDs gift several benefits over incandescent lightweight sources together with lower energy consumption, longer period of time, improved physical lustiness, smaller size, and quicker change. LEDs powerful enough for area lighting square measure comparatively pricy and need a lot of precise current and warmth management than compact lamp sources of comparable output.

Light-emitting diodes square measure employed in applications as various as aviation lighting, automotive lighting, advertising, general lighting, and traffic signals. LEDs have allowed new text, video displays, and sensors to be developed, whereas their high change rates also are helpful in advanced engineering. Infrared LEDs also are employed in the device units of the many industrial merchandise together with televisions, optical disk players and alternative domestic appliances.

### 4.1.3 Diodes:

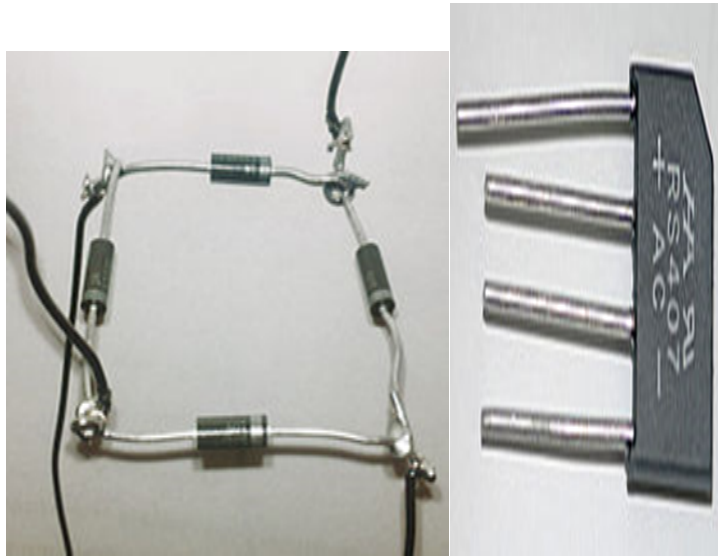


Figure.4 Diodes

A diode bridge is a rendezvous of 4 (or more) diodes in a bridge circuit configuration that gives the same polarity of output for either polarity of input. once employed in its commonest application, for conversion of an alternating current (AC) input into a direct current (DC) output, it's referred to as a bridge rectifier. A bridge rectifier provides full-wave rectification from a two-wire AC input, leading to lower price and weight as compared to a rectifier with a 3-wire input from a transformer with a center-tapped secondary winding

The essential feature of a diode bridge is that the polarity of the output is that the same in spite of the polarity at the input. The diode bridge is additionally referred to as the Graetz circuit after its creator, physicist Leo Graetz.

#### Basic Operation:

According to the conventional model of current flow originally established by Benjamin Franklin and still followed by most engineers nowadays, current is assumed to flow through electrical conductors from the positive to the negative pole. In beingness, free electrons in a conductor nearly invariably ensue the negative to the positive pole. within the overwhelming majority of applications, however, the actual direction of current flow is orthogonal. Therefore, within the discussion below the standard model is preserved.

In the diagrams below, once the input connected to the left corner of the diamond is positive, and therefore the input connected to the correct corner is negative, current flows from the higher offer terminal to the correct on the red (positive) path to the output, and returns to the lower offer terminal via the blue (negative) path.

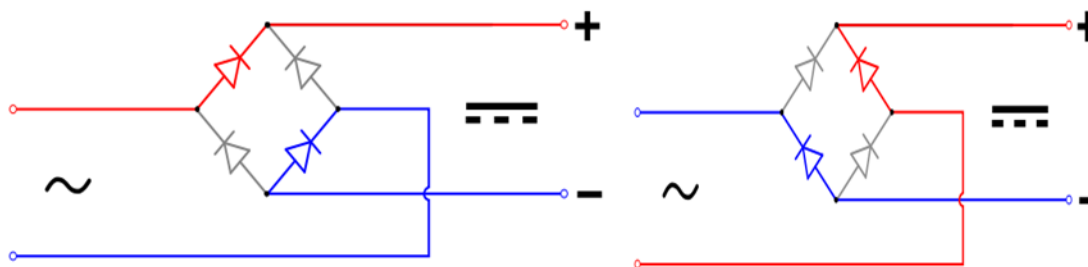


Figure.5 Flow of current in diodes

In every case, the higher right output remains positive and lower right output negative. Since this can be true whether or not the input is AC or DC, this circuit not solely produces a DC output from associate AC input, it may also give what's typically referred to as "reverse polarity protection".

#### 4.1.4 Resistor

Resistor may be a passive part wont to management current in an exceedingly circuit. Its resistance is given by the quantitative relation of voltage applied across its terminals to this passing through it. therefore a specific price of electrical device, for fastened voltage, limits this through it. they're ubiquitous in electronic circuits.

the various price of resistances square measure wont to limit the currents or get the specified fall in step with the current-voltage rating of the device to be connected within the circuit. for instance, if an LED of rating two.3V and 6mA is to be connected with a provide of 5V, a fall of two.7V ( $5V - 2.3V$ ) and limiting current of 6mA is needed. this could be achieved by providing a electrical device of 450 connected serial with the light-emitting diode.

Resistors are often either fastened or variable. The low power resistors square measure relatively smaller in size than high power resistors. The resistance of an electrical device are often calculable by their color codes or are often measured by a multimeter. There square

measure some non linear resistors additionally whose resistance changes with temperature or light weight. Negative temperature constant (NTC), positive temperature constant (PTC) and light weight dependent electrical device (LDR) square measure some such resistors. These special resistors square measure normally used as sensors. browse and find out about internal structure and dealing of a resistor.

#### Pin Diagram:

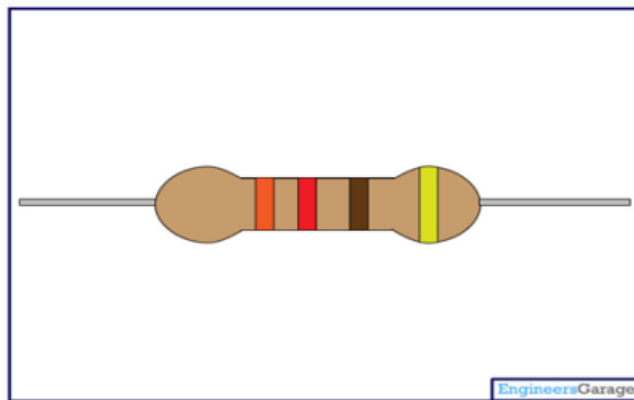


Figure.6 Pin diagram of a resistor

#### 4.1.5 Transistors:



Figure.7 Transistor picture

The 2N2222 is a common NPN bipolar junction transistor used for general purpose low-power amplifying or switch applications. it's designed for low to medium current, low power, medium voltage, and might operate at moderately high speeds. it's created within the TO-18

metal will as shown in the image. Replacements square measure normally obtainable currently within the cheaper TO-92 packaging, wherever it's called the PN2222 or P2N2222, that has similar specifications aside from the lower most collector current.

The 2N2222 is taken into account a awfully common semiconductor unit, AND is employed as AN model of an NPN semiconductor unit. it's often used as a small-signal semiconductor unit, and it remains a little general purpose semiconductor unit of putting up with quality.

The 2N2222 was a part of a family of devices represented by Motorola at a 1962 IRE convention. Since then it's been created by several semiconductor corporations, for instance, Lone-Star State Instruments.

#### **4.1.6 Relay**

A relay is AN electrically operated switch. electrical phenomenon through the coil of the relay creates a magnetic flux that attracts a lever and changes the switch contacts.

SPST Relay : (Single Pole Single Throw Relay) AN magnetic force switch, contains a coil (terminals eighty five & 86), one common terminal (30), and one commonly open terminal (87). It doesn't have a commonly closed terminal just like the SPDT relay, however could also be utilized in place of SPDT relays altogether diagrams shown on this website wherever terminal 87a isn't used.

When energizing the coil of a relay, polarity of the coil doesn't matter unless there's a diode across the coil. If a diode isn't gift, you will attach positive voltage to either terminal of the coil and negative voltage to the opposite, otherwise you need to connect positive to the aspect of the coil that the cathode aspect (side with stripe) of the diode is connected and negative to aspect of the coil that the anode aspect of the diode is connected.

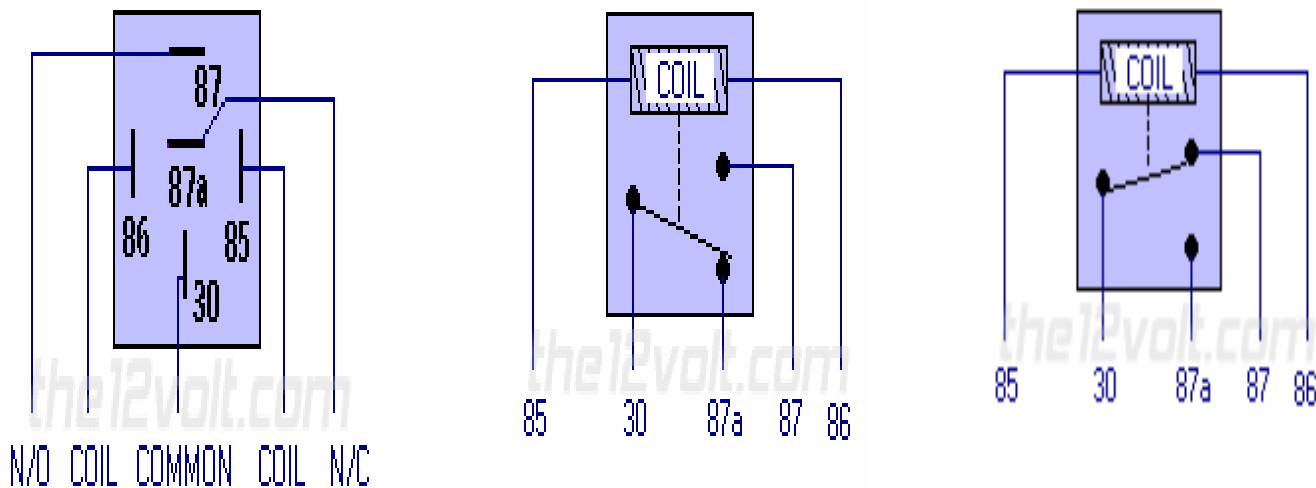


Figure.8 Relay Representation

Diodes square measure most frequently used across the coil to produce a path for current once this path to the relay is interrupted (i.e. transitioned, coil now not energized). this enables the coil field to collapse while not the voltage spike that will somewhat be generated. The diode protects switch or relay contacts and different circuits which will be sensitive to voltage spikes. (JimR, contributor, install bay member)

Why do would like} to use a relay AND do i actually need to? Anytime you would like to modify a tool which attracts additional current than is provided by an output of a switch or part you will need to use a relay. The coil of AN SPDT relay that we tend to most typically use attracts little current (less than two hundred milliamps) and also the quantity of current that you just will undergo a relay's common, commonly closed, and commonly open contacts can handle up to thirty or forty amps. this enables you to modify devices like headlights, parking lights, horns, etc., with low electrical phenomenon outputs like those found on keyless entry and alarm systems, and different parts. In some cases you will have to be compelled to switch multiple things at identical time victimization one output. one output connected to multiple relays can permit you to open continuity and/or shut continuity at the same time on multiple wires.

#### 4.1.7 Capacitors

It is AN electronic device whose operation is to accumulate charges so unleash it.

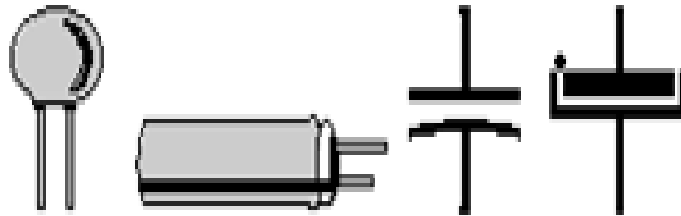


Figure.9 Capacitors

To understand the conception of capacitance, think about a combine of metal plates that all square measure placed around one another while not touching. If A battery is connected to those plates the positive pole to at least one and therefore the negative pole to the opposite, electrons from the battery are going to be attracted from the plate connected to the positive terminal of the battery. Capacitors square measure of 2 sorts: - (1) fastened type like ceramic, polyester, electrolytic capacitors-these names discuss with the fabric they're fabricated from tin foil. (2) Variable sort like gang condenser in radio or trimmer. In fastened sort capacitors, it's 2 leads and its price is written over its body and variable sort has 3 leads. Unit of activity of a electrical condenser is capacitance unit denoted by the image F. It is a unit of capacitance. Small unit electrical condenser square measure pico-farad denoted by pf ( $1\text{pf} = 1/1000,000,000,000\text{ f}$ ) in particular, just in case of electrolytic capacitors, it's 2 terminal square measure marked as (-) and (+) thus check it whereas mistreatment capacitors within the circuit in right direction. Mistake will destroy the electrical condenser or entire circuit in operational.

#### 4.1.8 TSOP1738 - Infrared Sensors :

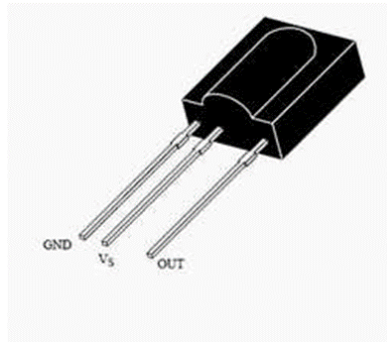


Figure.10 TSOP1738 -Infrared sensors

The TSOP 1738 is a member of IR device receiver series. This IR sensing element module consists of a PIN diode and a pre electronic equipment that square wave measure embedded into one package. The output of TSOP is active low and it offers 5V in off state. When IR waves, from a supply, with a centre frequency of thirty eight kHz incident thereon, its output goes low. It may cause disturbance to that and end in undesirable output even once the supply isn't transmitting IR signals. A bandpass filter, an audio measuring device stage AND an automatic gain management square wave generator went to suppress such disturbances.

## 4.2 TEST operating

Check the availability voltage and polarity of the batteries with a multimeter then insert the batteries into the battery holder and proceed.

Check the proper position of the all parts.

### 4.2.1 How to build

Preparing the attachment iron: Place the hand tool in its stand and infix. the iron can take a number of minutes to succeed in its operative them. Preparing the attachment iron: place the hand tool in its stand and infix. within the iron can take a number of minute to succeed in its operative temperature of regarding 400°C. dampen the sponge within the stand. Wait a number of minutes for the damp sponge. this may clean the tip. Wipe the tip of the damp sponge. this may clean the trip. soften a solder on the tip of the iron.



Attachment the components:

Use the parts overlay on the RCB to inset the parts and solder them within the following order:

1. capacitors
2. Resistors
3. transistors
4. IC
- 5 battery connexion
6. Then copper wire sensing loop.

## **4.3 PCB FABRICATION**

### **4.3.1 FABRICATION PROCESS:**

The materials needed for PCB fabrication square measure copper clad sheet, paint, drilling machine and metallic element chloride answer.

#### **Steps concerned in creating a PCB:**

Preparing the layout of the track: The track layout of the electronic circuit could also be drawn on a report. The layout ought to be created in such the way that methods square measure in every routes. this allows PCB to be a lot of compact and economical.

Transferring the layout to the copper: The layout created on report ought to be redrawn on the copper clad victimisation paint or cosmetic.

III. Etching: metallic element chloride answer is popularly used etching answer. The metallic element chloride powder is formed into an answer victimisation water and unbroken in an exceedingly plastic receptacle. Immerse the marked copper clad during this for 2 hours. thanks to reaction, the answer can become weak. The copper within the unmarked space are going to be incised out. dispose of the incised sheet from the receptacle and dry.

**Drilling:** The holes square measure created employing a drilling machine, for element insertion.

**Troubleshooting:**

If the circuit isn't operating as desired the then the subsequent procedures ought to be followed.

It is desirable to start hassle shooting method from output stage ahead and so proceed to the input aspect. to start apply a voltage of twelve v to the loudspeakers directly. If it's operating fine then proceed below.

Next check the connections of the resistances being employed square measure of the specified price. Verify that you simply have the proper parts within the right place.

## CHAPTER 05

# RESULT AND DISCUSSION

### How Remote Controls Work

. While there have been many different designs of remote control throughout history, for the most part each one has been a relatively simple concept. Considering how simple the modern remote is, it is amazing what it has been able to do, and in many ways remotes are now a fundamental part of millions of people's lives. The following is a brief look at remote controls and how they work.

### The first remote

The earliest successful attempt at a remote control was when Nikola Tesla unveiled his 'Method of an Apparatus for Controlling Mechanism of Moving Vehicle or Vehicles' back in 1898. Tesla's system involved controlling a boat via radio waves, a system he described as 'teleautomaton'.

### The Zenith Space Command

In 1956, Robert Alder released an impressive remote control system that worked via sound frequency. Each button on the remote control emitted a different frequency, which was then detected and interpreted by a receiving device. The Zenith Space Command was used mostly for TVs and home stereo systems, with its main drawback being the price, as it wasn't cheap to make.

### Infrared remote controls

The vast majority of remote controls these days work via an infrared system, which involves sending coded pulses of infrared light to a receiving device via light emitting diodes or LEDs. A different code is sent depending on which button on the remote you press, equating to

long or short flashes of light, and a decoder on the receiving appliance receives the message, decodes it and tells the machine what to do.

One of the big disadvantages of IR remote controls is that they usually need an uninterrupted line of sight in order to work, however you can often bounce a signal off the ceiling or a wall, and they generally operate within a range of up to 20 meters.

### **Radio frequency remote controls**

These remote controls work by sending radio waves to a receiver, which then decodes the message and directs the machine or device to carry out the function. Radio Frequency remote controls are able to go through walls and around corners, with a range of just over 30 meters, making them far more useful and flexible than their infrared counterparts. Most garage door openers and alarm systems use radio frequency remote controls, and they have been widely used for years by military forces around the world.

### **Controlling the controls**

As modern homes have accumulated an increasing amount of home appliances in recent years, there has been a sharp increase in the amount of remote controls each home has, ranging from sound and security systems to the garage remote. Having so many remotes has naturally made them easy to lose track of, often meaning you spend so much time looking for your remotes that you lose the advantage of having them in the first place.

Thankfully, universal remotes have come to the rescue, as they are able to essentially learn the commands of other remotes and take over their function themselves, meaning you only need the one remote.

### **Mobile phones**

These days, some mobile phones have become fully capable of operating as remote control devices, using software and the Internet to control anything from your home security system to your climate control. One of the big advantages of using remote control capabilities via the Internet is that it enables you to drastically increase your range of function, because as long as you have Internet access you will still be able to control those remotes.

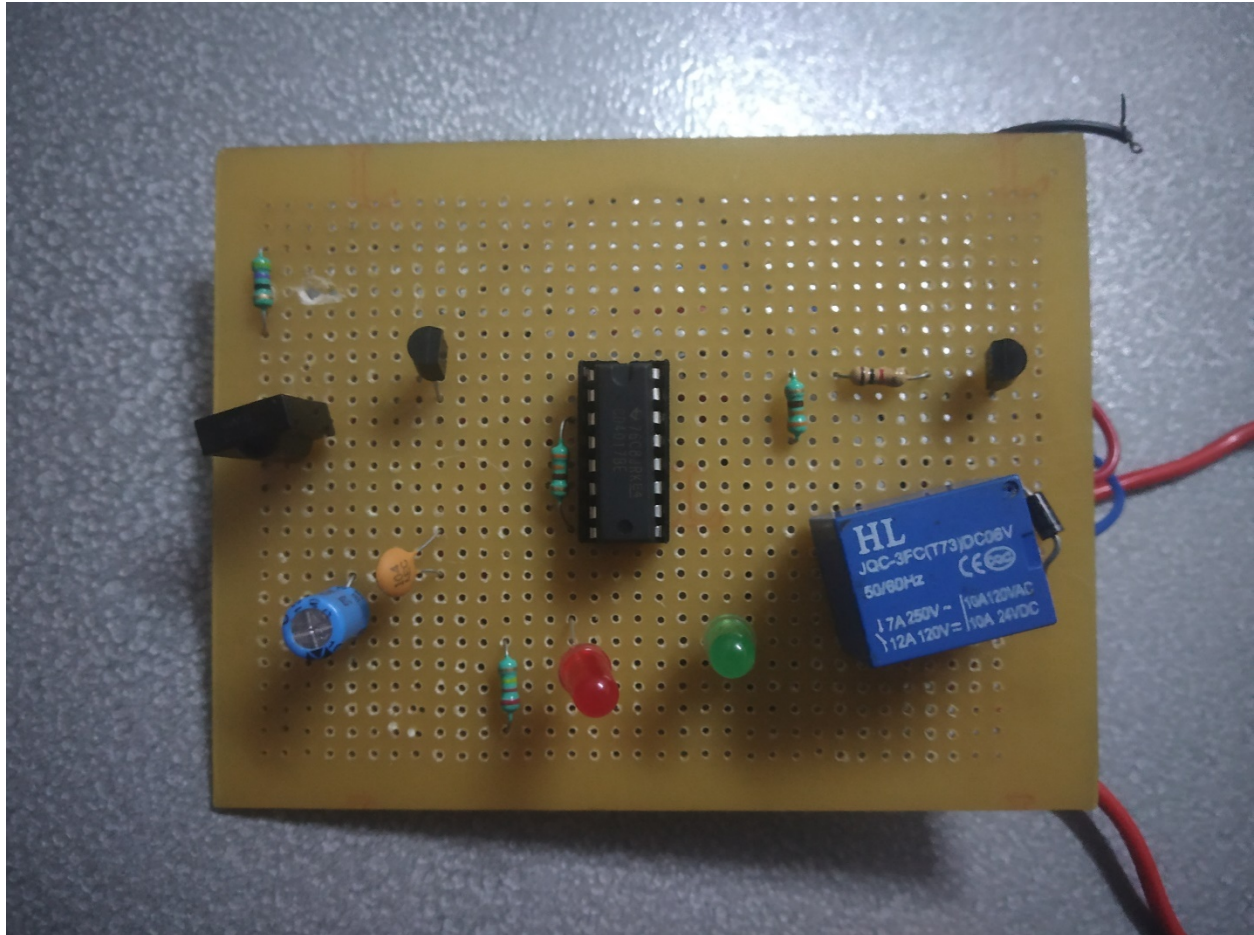
**PICTURE OF THE PROJECT**

FIGURE.11 Picture of the project

## CHAPTER 06

### CONCLUSION AND FUTURE SCOPE

The product to demonstrate the remote controlled operation of home appliances has been with success enforced and favorable results are obtained. this is often a commercially viable product and its application is widespread currently with most home appliances. Since IR radiations square measure created use of here, every task may be designed to be performed at totally different frequencies, every specific to a specific task. As a results of that many operations may be performed on one appliance, as within the case of tv. the merchandise finds nice scope futuristically, as a part of AN surroundings wherever man restricts his motion and performs his regular activities on a distant controlled basis.

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