M. V. P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik-08 SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

B.Voc EAMR

Electrical Appliances Maintenance and Repairing

Project Report

On

"Demonstration of Various Types of Sensors"

Submitted by-

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- **Kakade Jitesh Vilas**
- **Misal Ishawar Jnardhan**

Guided by- Assi. Prof. J. G. Wagh.

Department of B.Voc EAMR

Academic year

2020-2021

M. V. P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik-08

Affiliated to SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

CERTTFICATE

Certified that the project report entitled

"Demonstration of Various Types of Sensors"

Has, Been successfully completed by:

1. **Borade Ajay Laxman**
2. **Kakade Jitesh Vilas**
3. **Misal Ishawar Jnardhan**

As partial fulfilment of Degree course in B.voc EAMR under the Maharashtra State Board of Technical Education, Pune during the academic year 2020-2021.

The said work has been assessed by us and we are satisfied that the same is up to the standard envisaged for the level of the course. And that the said work may be presented to the external examiner.

Smt. J. G. Wagh

GUIDE

Smt .J. G. Wagh

HOD

EXAMINER

Prof. S. M. Pawar.

Dr. J. D. Sonkhaskar

PRINCIPAL

PRINCIPAL,
Arts, Science & Commerce College,
CIDCO, Nashik - 422 009.

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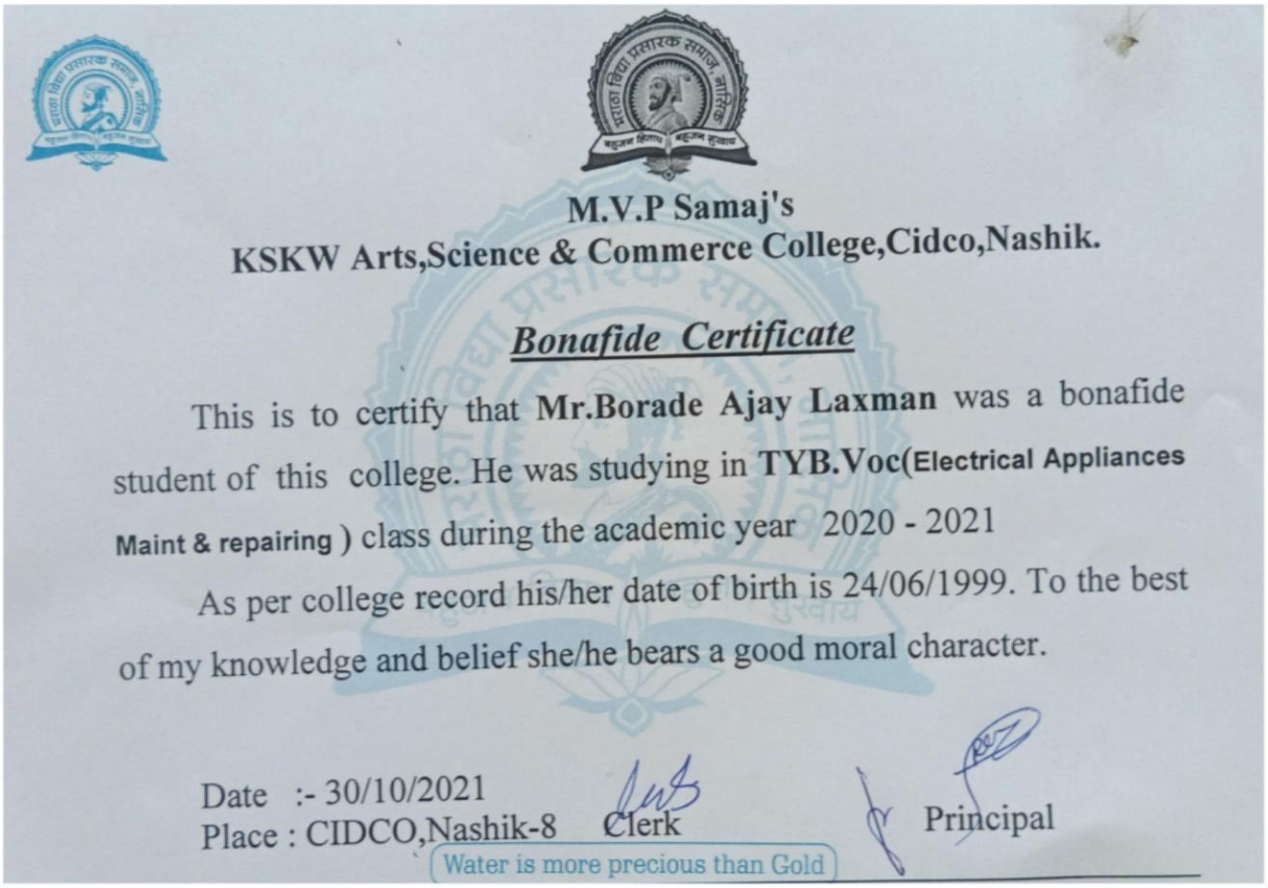
DECLARATION

I’ am hereby declare that this report is record authentic work carried out by us during the VIth semester and has not been submitted to any other university or institute.

Student name

Ajay Laxman Borade

Bonafide Certificate



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KSKW Arts,Science & Commerce College,Cidco,Nashik.

Bonafide Certificate

This is to certify that **Mr.Borade Ajay Laxman** was a bonafide student of this college. He was studying in **TYB.Voc(Electrical Appliances Maint & repairing)** class during the academic year 2020 - 2021

As per college record his/her date of birth is 24/06/1999. To the best of my knowledge and belief she/he bears a good moral character.

Date :- 30/10/2021
Place : CIDCO,Nashik-8 Clerk Principal

Water is more precious than Gold

ACKNOWLEDGEMENT

We would like to take this opportunity to express our sincere and Whole hearted thanks to my guide **Assi**. **Prof. J.G. Wagh** for his most valuable Advice, timely guidance and inspiration during each step of this Project Work.

We are thankful to **Assi. Prof. J.G.Wagh** HOD, B.voc (EAMR)Department for his most valuable advice, timely guidance and inspiration during each step of this project work.

We are very much thankful to **Dr. J.D. Sonkhaskar**, Principal as Well as Co-ordinator of Arts, Commerce And Science College Cidco Nashik, Without their support and encouragement; we would not have achieved the desired goal of completion of the project.

Also we would like to thank staff members, technical staff Members, of B.Voc Electrical Department, our colleagues and Friends who helped us directly and indirectly to complete this work.

1. Ajay Laxman Borade
2. Jitesh vilas kakade
3. Ishwar Janardhan Misal

Topics

1. CLAP SWITCH
2. WATER LEVEL INDICATOR
3. LIGHTS CONTROL USING LIGHT DEPENDENT RESISTOR

INDEX

1. Abstract

The drinking water crisis in India is reaching alarming proportions. It might very soon attain the nature of global crisis. Hence, it is of extreme importance to preserve water. In home based water tank, the one problem is very common to us that the control of water level of overhead tank, as a result the wastage of water is increasing day by day. But we all know water is very precious to us. This problem can be controlled by a simple electronic circuit consists with some cheap electronic components, that circuit is called 'Water Level Indicator'. The operation of water level controller works upon the fact that water conducts electricity. So water can be used to open or close a circuit. As the water level rises or falls, different circuits in the controller send different signals. These signals are used to switch ON or switch OFF the motor pump as per our requirements. Water Level Indicator is a simple low cost circuit. First we introduced this circuit from the web. There the circuit is made with various components like transsitors (BC547, BC548) Resistors, Leds and etc. After we discussed that how to make the circuit without transistors and after we calculate that we got the result, beside we got help from our teacher about this circuit. At last we got a simple circuit without transistor and it shows result. We removed the transsistors to make the circuit cheap and easy installation to all. The other liquid control circuits, which we have seen those are very critical than this circuit.

2. Introduction

This is a project on CLAP SWITCH which can switch on/off any electrical circuit by the sound of the clap. The basic idea of clap switch is that the electric microphone picks up the sound of your claps, coughs, and the sound of that book knocked off the table. It produces a small electrical signal which is amplified by the succeeding transistor stage. Two transistors cross connected as a bistable multi vibrator change state at each signal. One of these transistors drives a heavier transistor which controls a lamp.

This circuit is constructed using basic electronic Components like resistors, transistors, relay, transformer, Capacitors. This circuit turns 'ON' light for the first clap. The Light turns ON till the next clap. For the next clap the light turns OFF. This circuit works with 12V voltage .Therefore a step down transformer 12V/300mA is employed. This working of this circuit is based on amplifying nature of the transistor, switching nature of transistor, relay as an Electronic switch. Basically, this is a Sound operated switch.

A Water Level Indicator may be defined as a system by which we can get the information of any water reservoir. Water level indicator system is quite useful to reduce the wastage of water from any reservoir, while filling such reservoir. Water is most essential thing on earth .Safe drinking water is Essential to human and other life forms even though it provides no calories or organic nutrients.

The total amount of water available on Earth has been estimated at 1.4 billion cubic kilometres, enough to cover the Planet with a layer of about 3 km. About 95% of the Earth's Water is in the oceans, which is unfit for human consumption. About 4% is locked in

the polar ice caps, and the rest 1% constitutes all fresh water found in rivers, streams and lakes which is suitable for our consumption. A study estimated that a person in India consumes an average of 135 litres per day. This consumption would rise by 40% by the year 2025. This signifies the need to preserve our fresh water resources

LDR Light dependent resistor is a Photoresistor whose resistance increases or decreases with the intensity of light. Photoresistor is the combination of two words photon which means light particles and resistor. LDR can sense the light intensity, due to this property it is mostly used in light sensing circuits. It is also called a photoconductor. A Light Dependent Resistor (LDR) is also called a cadmium sulfide (CdS) cell or a Photoresistor. It is basically a photocell that works on the principle of photoconductivity. This LDR is mostly used in light varying sensor circuit, and light and dark activated switching circuits. LDRs are also used in solar trackers, Laser security systems, etc. In this article, I will try to cover the maximum things including its working principle and how an LDR can be used in different types of circuits and projects.

WORKING PRINCIPLE

The sound of clap is received by a small microphone that is shown biased by resistor in the circuit. The microphone changes sound wave in to electrical wave which is further amplified by .Transistor is used as common emitter circuit to amplify weak signals received by the microphone. Amplified output from the collector of transistor is then feed to the Bistable Multivibrator circuit also known as flip-flop.

Flip flop circuit is made by using 2 Transistor, in our circuit. In a flip-flop circuit, at a time only one Transistor conduct and other cut off and when it gets a trigger Pulse from outside source then first transistor is cut-off and 2ndTransistor conducts. Thus output of transistor is either logic-0 or Logic-1 and it remains in one state 0 or 1 until it gets trigger Pulse from outer source. the pulse of clap which is a trigger for flip-flop which makes changes to the output which is complementary (reverse). Output of flip-flop which is in the low current form is unable to Drive relay directly so we have used a current amplifier circuit By using which is a common emitter circuit. Output of is Connected to a Relay (Electromagnetic switch), works like a Mechanical switch. With the help of a relay it is easy for connecting other electrical appliance.

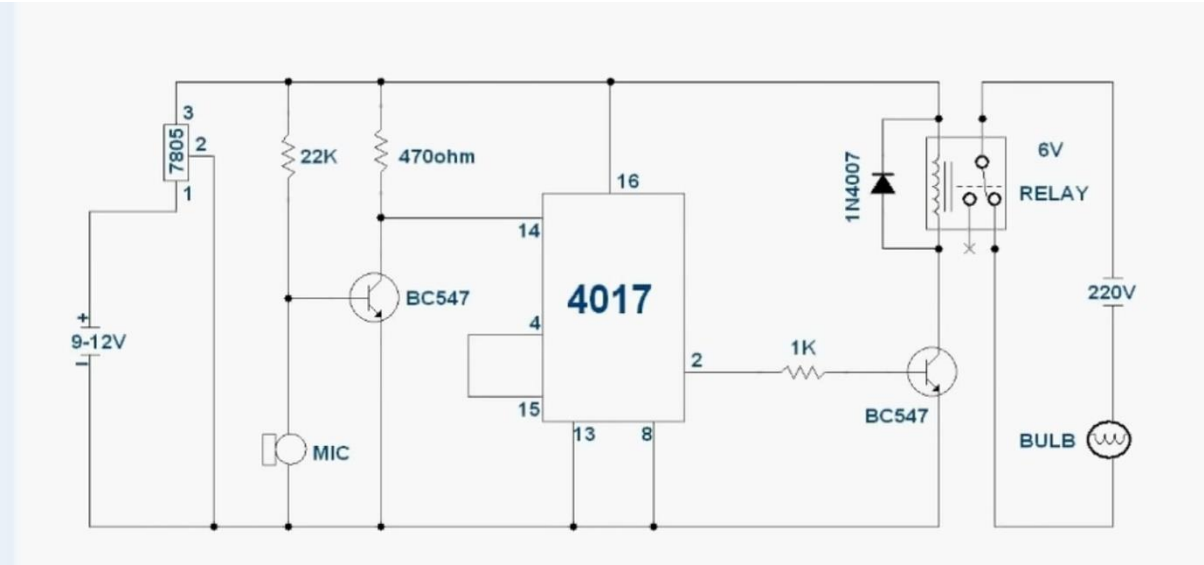
The relay contact is connected to the power line and hence turns on/off any electrical appliance connected all the way through relay.

When the water stared filling to the overhead water tank then The green led glows, next when the level reaches up to the mid-Level of the overhead water tank then yellow led glows after That the red led glows that the tank is going to be full or full at Last the buzzer sounds when tank is going to be over flow In the circuit of the

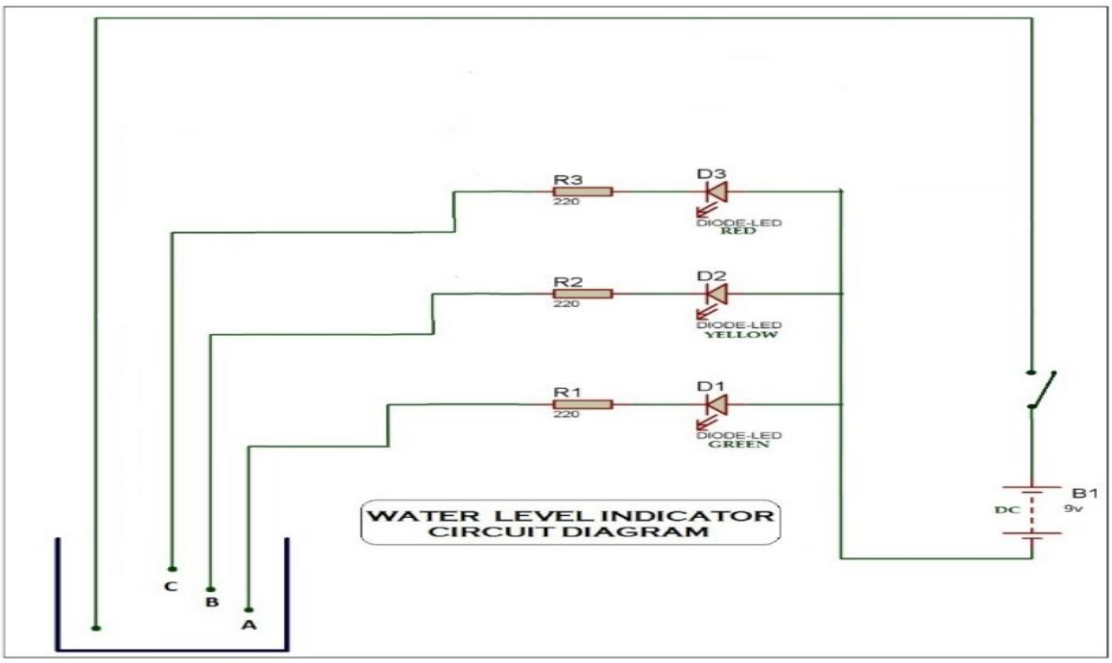
automatic light on off switch we will used LDR (Light dependent resistor or Diy dark sensor)as a sensor which sense the light in the day time .In the day time due to sunlight the resistance of LDR is very low ,so the voltage drop is high. Due to this the TRIAC remain off.BT138 is a TRAIC which is used in power controlling circuit directly.

When the night fall, the resistance of LDR increase and it turn on the TRIAC and as are result the bulb turn

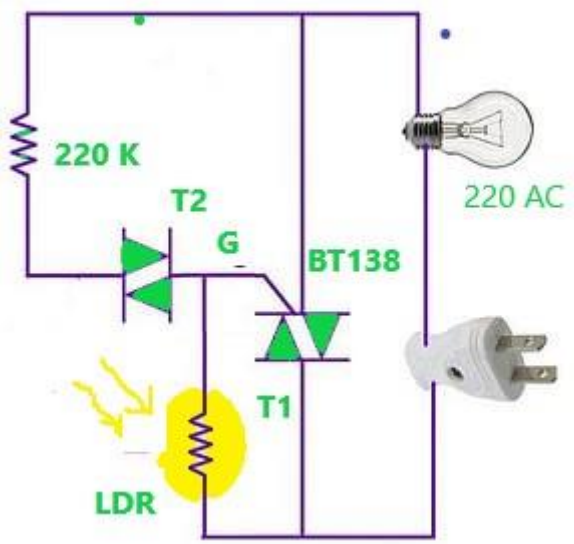
Circuit Diagram-



CLAP SWITCH CIRCUIT

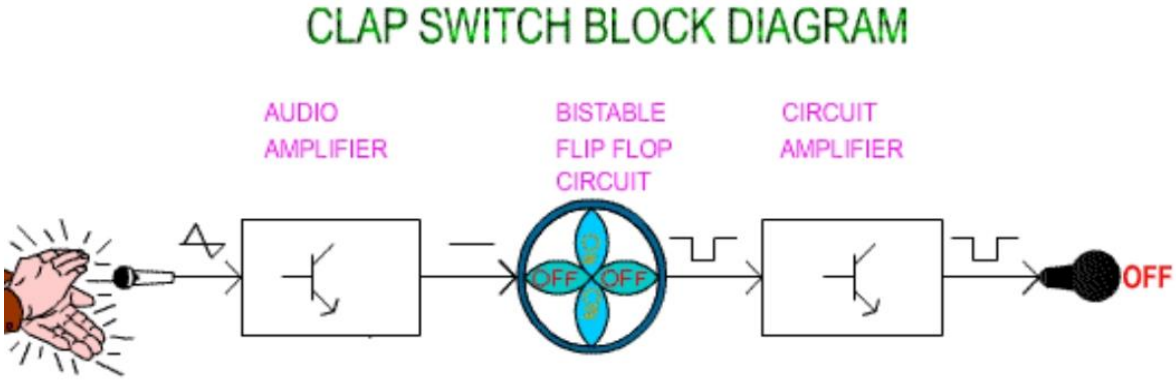


WATER TANK LEVEL INDICATOR

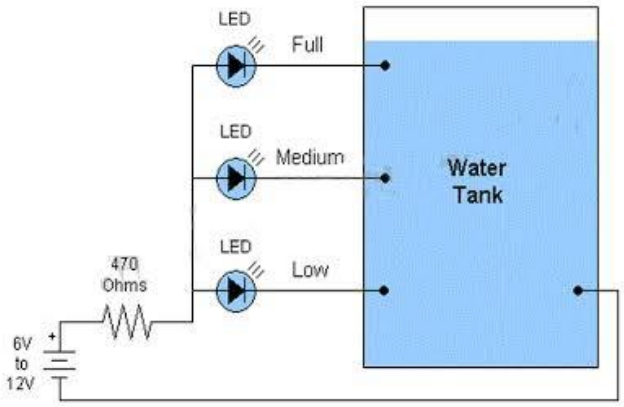


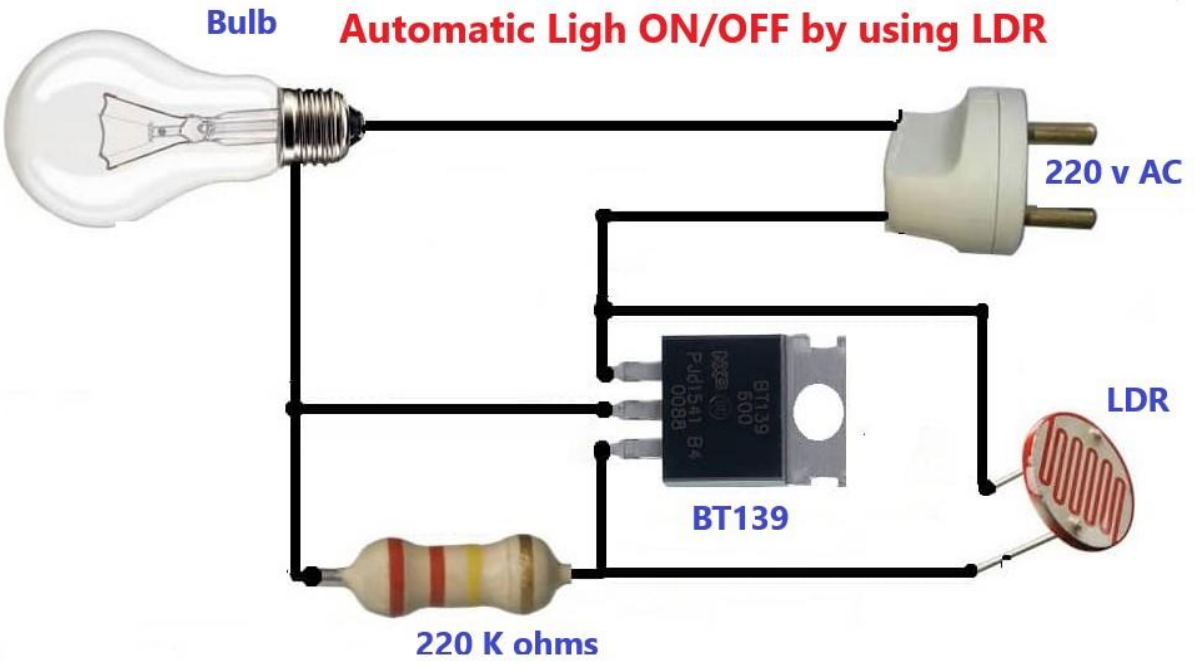
LIGHT CONTROL USING LDR

Block Diagram-



Simple Water Level Indicator





LIGHT CONTROL USING LDR

COMPONENTS LIST

Sr. No	Components	Qty.	Price
1	4017 IC	1	20
2	16 Pin IC Base	1	5
3	BC547 Transistor	5	2
4	Electret Microphone	1	9
5	22k Resistor	1	1
6	470 ohm Resistor	1	1
7	1K resistor	1	1
8	LED Light	3	2
9	220 Ohm Resistor	2	1
10	7805 Voltage Regulator IC	1	15
11	6V Relay	1	25
12	LDR	1	10
13	TRIAC BT136	1	17
14	Bulb & Holder	1	33
15	IN4070 Diode	1	1
16	Zero PCB	2	40
17	9V Battery & connector	2	24

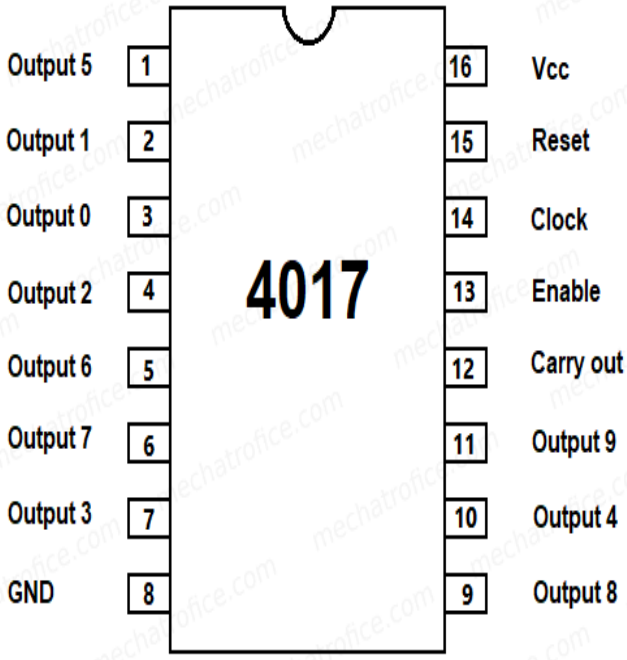
IC 4070- The CD4017 is a CMOS Decade counter IC. CD4017 is used for low range counting applications. It can count from 0 to 10 (the decade count). The circuit designed by using this IC will save board space and also time required to design the circuit. CD4017 is as 'Johnson 10 stage decade counter'.

Features

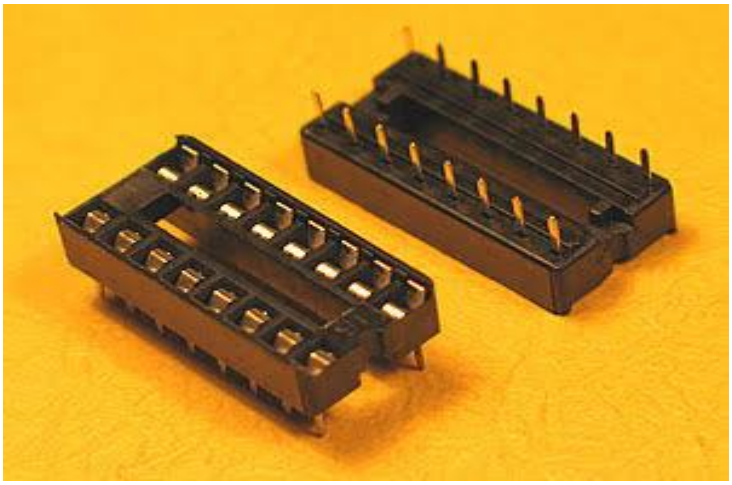
- The supply voltage of this IC is 3V to 15V.
- It is compatible with TTL (Transistor -Transistor Logic).
- The clock speed or operational speed of CD4017 IC is 5 MHz.

This IC is also used in electronic industries, automotive industries, manufacturing medical electronic devices, alarms and in electronic instrumentation devices.

CD4017 Pin Description

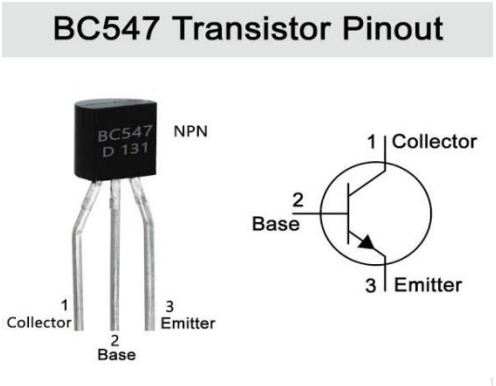


16 Pin IC Base- 16 Pin IC Socket base adaptors is a 16 pin IC holder, which can be soldered directly onto the PCB. The IC can be removed from this socket when required. ... This base acts as a removable IC holder. The socket is used when the IC is temperature sensitive and the heat from the soldering iron can damage the IC.

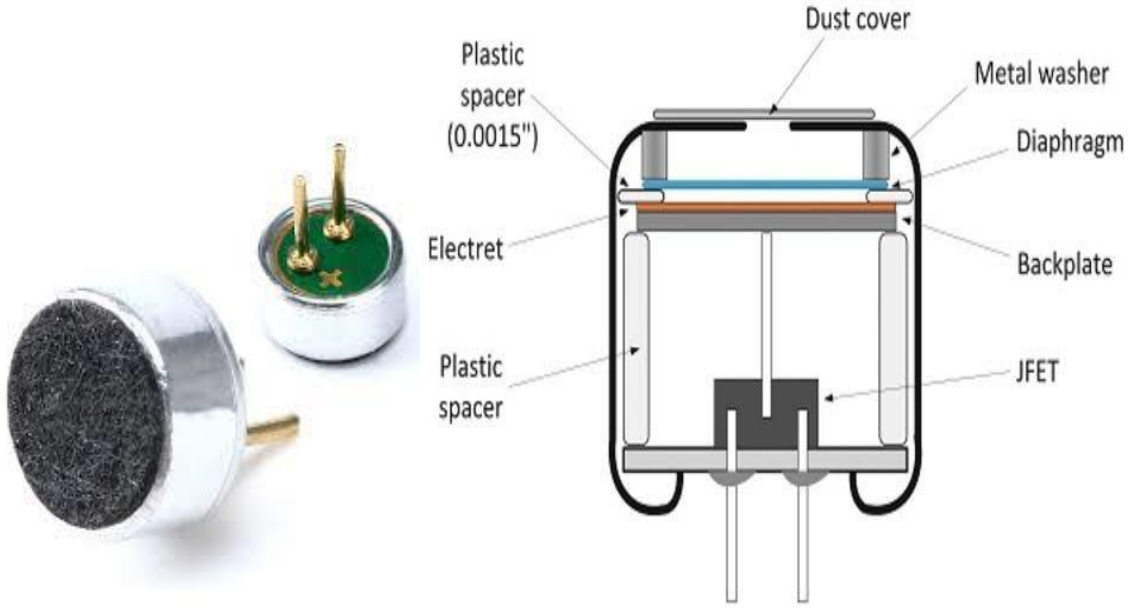


BC547- is a NPN transistor hence the collector and emitter will be left open (Reverse biased) when the base pin is held at ground and will be closed (Forward biased) when a signal is provided to base pin.

Pin Number	Pin_Name	Description
1	Collector	Current flows in through collector
2	Base	Controls the biasing of transistor
3	Emitter	Current Drains out through emitter



Electret Microphone-An electret microphone is a type of electrostatic capacitor-based microphone, which eliminates the need for a polarizing power supply by using a permanently charged material. The frequency response [11–13] of an electret condenser microphone is usually in the range of 20 Hz–20 kHz.

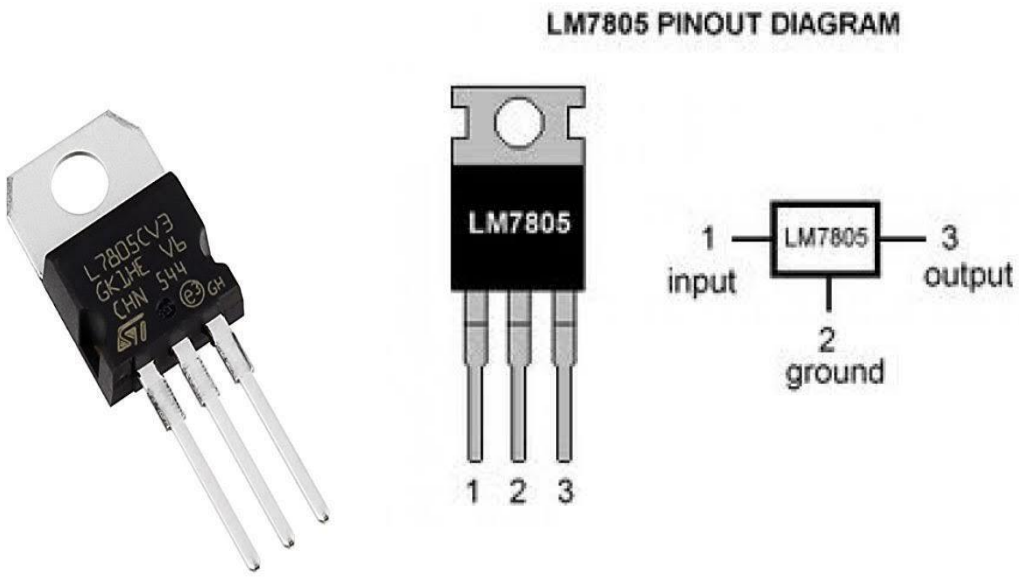


Resistor-

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

7805 Voltage Regulator IC

Voltage regulator like IC7805 belongs to the 78xx series ICs. In the 78xx series, xx represents the fixed output voltage value and 7805 is a fixed linear voltage regulator. Batteries provide a voltage of 1.2V, 3.7V, 9V, and 12V. This voltage is good for the circuits which voltage requirements are in that range. The regulated power supply in this regulator is +5V DC.



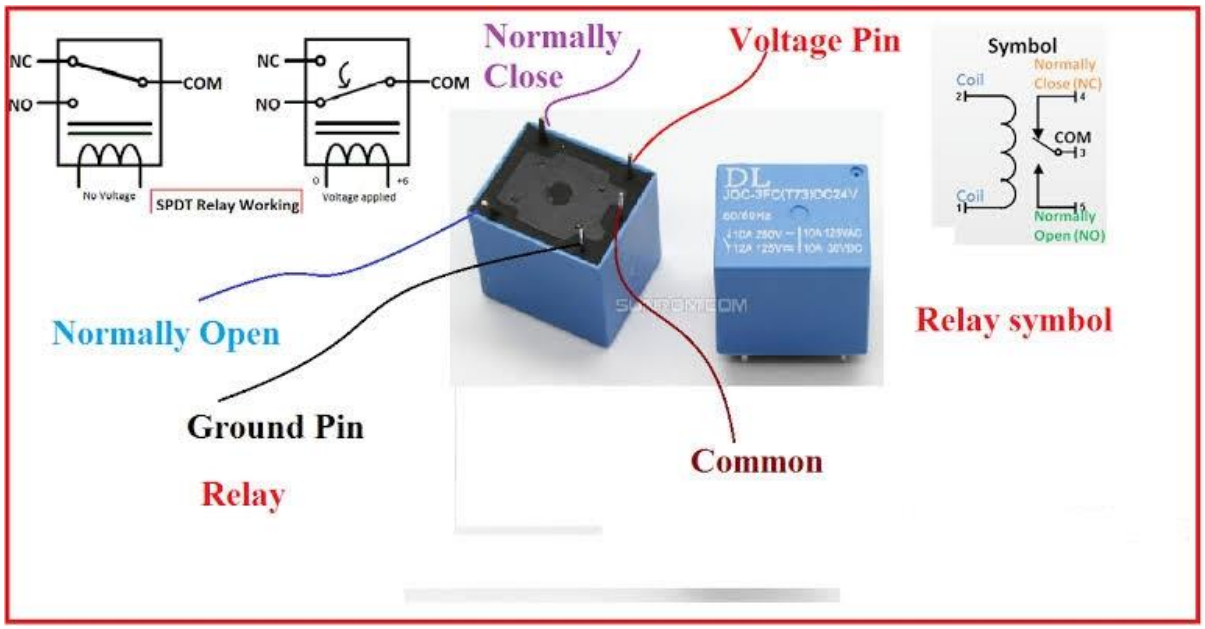
LM7805 Pin out Configuration

Pin Number	Pin Name	Description
1	Input (V+)	Unregulated Input Voltage
2	Ground (Gnd)	Connected to Ground
3	Output (Vo)	Output Regulated +5V

7805 Regulator Features

- 5V Positive Voltage Regulator
- Minimum Input Voltage is 7V
- Maximum Input Voltage is 25V
- Operating current(IQ) is 5mA
- Internal Thermal Overload and Short circuit current limiting protection is available.
- Junction Temperature maximum 125 degree Celsius
- Available in TO-220 and KTE package

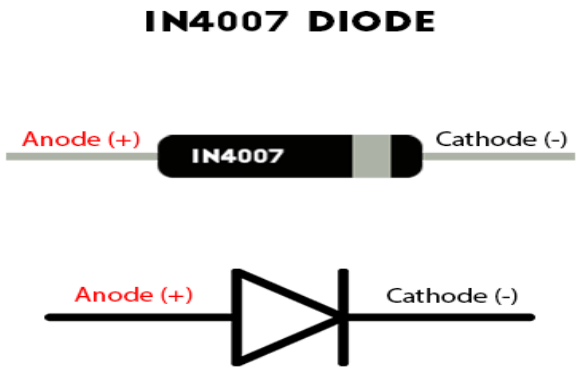
6V Relay- Relays are nothing but mechanical switches operated using electromagnetic induction technique. When you give DC supply to 2 of its terminals of electromagnet, switch is shifted from N/C position to N/O position. Now the 6V relay is operated by giving a 6V supply to the electromagnet while a 12V relay has to be operated by giving a 12V supply. So now how will you choose which relay has to be taken? Obvious choice will be a low power relay viz.



6V ones But this is not that simple. Let us say you are working on a PCB where you will require a 12V supply to power it as most of the components are requiring 12V for its operation. So now instead of stepping down the 12V to 6V using one more IC or resistor for powering the relay, which will increase the size and cost of your product or unnecessary power dissipation in the resistor respectively, you will instead preffer a 12V relay.

1N4007 Diode-

The 1N400x (or 1N4001 or 1N4000[1]) series is a family of popular one-ampere general-purpose silicon rectifier diodes commonly used in AC adapters for common household appliances. Its blocking voltage varies from 50 volts (1N4001) to 1000 volts (1N4007). This JEDEC device number series is available in the DO-41 axial package. Diodes with similar ratings are available in SMA and MELF surface mount packages.



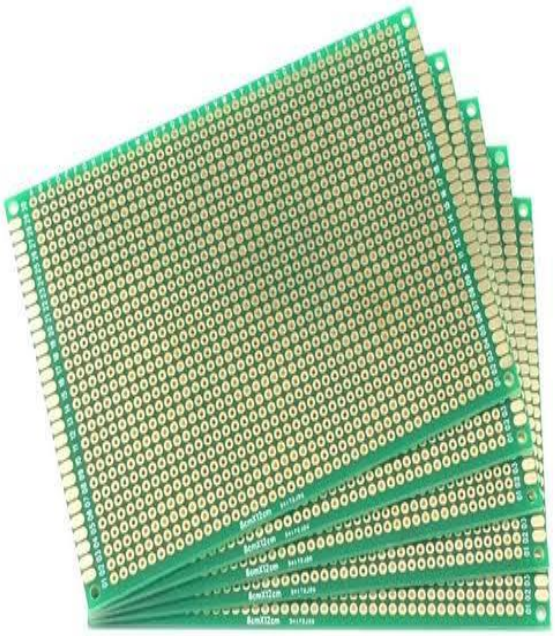
1N4007 Characteristics:

- Maximum Recurrent Peak Reverse Voltage 1000V
- Maximum RMS Voltage 700V
- Maximum DC Blocking Voltage 1000V
- Average Forward Current: 1.0A

- Peak Forward Surge Current: 30A
- Maximum Instantaneous Forward Voltage: 1.0V
- Maximum DC Reverse Current At Rated DC Blocking Voltage: 5.0µA @ 25°C
- Typical Junction Capacitance: 15pF
- Typical Reverse Recovery Time: 2.0us
- Mounting Type: Through Hole
- Operating Temperature: -55°C ~ 150°C

Zero PCB-

Zero PCB is basically a general-purpose printed circuit board (PCB), also known as perfboard or DOT PCB. It is a thin rigid copper sheet with holes pre-drilled at standard intervals across a grid with 2.54mm (0.1-inch) spacing between holes.

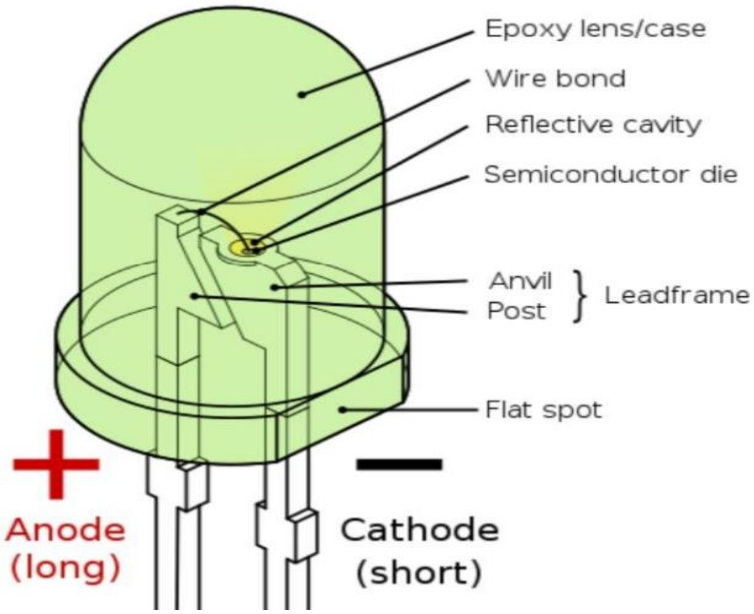


9V Battery- The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in smoke detectors, gas detectors, clocks, walkie-talkies, electric guitars and effects units.

Connectors- The battery has both terminals in a snap connector on one end. The smaller circular (male) terminal is positive, and the larger hexagonal or octagonal (female) terminal is the negative contact. The connectors on the battery are the same as on the load device; the smaller one connects to the larger one and vice versa. The same snap-style connector is used on other battery types in the Power Pack (PP) series. Battery polarization is normally obvious, since mechanical connection is usually only possible in one configuration.

9V Battery & Connector

LED Light- LED Indicator are used as indicating, warning, accidental signals and other signals of instrument circuits in the areas of electric power.



Construction of an LDR

The construction of an LDR includes a light-sensitive material such as semiconductor that is placed on an insulating substrate like as ceramic. Light dependent resistor is made up of cadmium Sulphide semiconductor having negligible free electrons in the absence of any incident radiation. When there is no light striking on LDR in its resistance is usually in mega ohms while when light is striking its resistance is in few hundred ohms. The required resistance and power is obtained by giving LDR a zigzag shape. The area of zigzag separates the metal placed areas into two regions. The whole structure is placed in a plastic case so as to have direct exposure to the incident radiation. The resistance of the photo resistor is to be kept minimum as possible to make sure that the resistance increase

or decrease due to the light effect only. The use of cadmium and lead materials is avoided as they are injurious to the environment.

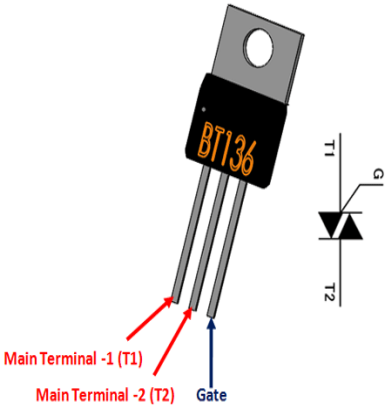
Sensitivity- Light dependent resistors have a lower sensitivity refers to the relative change in the resistance value when the Photoresistor is not illuminated by light and the resistance value when illuminated by light as compare to photo transistors and photo diodes.

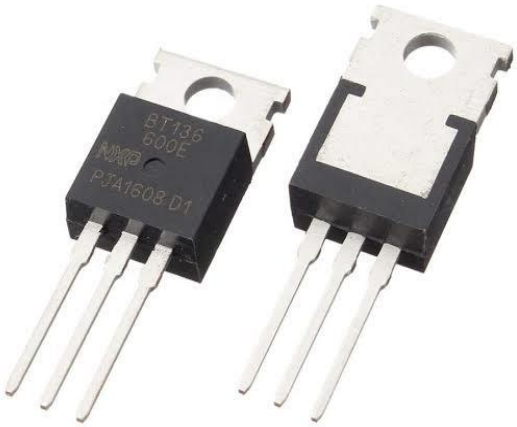
Photoresistors are not true semiconductor they are passive component because they lack PN-junction due to which its resistance will be changing however we keep the light intensity constant. Photo resistor also changes it resistance with temperature. Photo resistor should not be used where précis light intensity measurement is required because its resistance is not stable it is changing.

LDR

BT136 – TRIAC TRANSISTOR

The BT136 is TRIAC with 4A maximum terminal current. The gate threshold voltage of the BT136 is also very less so can be driven by digital circuits.





Since TRIACs are bi-directional switching devices they are commonly used for switching AC applications. So if you looking to switch of control (dim, speed control) an AC load which consumes less than 6A with a digital device like microcontroller or microprocessor then BT136 might be the right for you.

Applications

- AC Light dimmers
- Strode lights
- AC motor speed control
- Noise coupling circuits
- Controlling AC loads using MCU/MPU
- Ac/DC Power contro

Pin Configuration

Pin Number	Pin Name	Description
1	Main Terminal 1	Connected to Phase or neutral of AC mains
2	Main Terminal 2	Connected to Phase or neutral of AC mains
3	Gate	Used tit rugger the SCR

Bulb Holder- A lightbulb socket, light socket, lamp socket or lampholder is a device which mechanically supports and provides electrical connections for a compatible electric lamp.

Bulb- An incandescent light bulb, incandescent lamp or incandescent light globe is an electric light with a wire filament heated until it glows. The filament is enclosed in a glass bulb with a vacuum or inert gas to protect the filament from oxidation.

ADVANTAGE

- It's used to turn something (e.g. a lamp) on and off from any location in the room (e.g. while lying in bed) simply by clapping your hands.
- It involves an elderly.
- Also involves mobility-impaired person.
- It's also used for a light, television, radio, or similar electronic device that the person will want to turn on/off from bed.
- By using this project a lot of energy consumption in the day time due to street light remain on will reduced
- This automation system can be used up to 7 A and if we used BT 139 then this system can be used up to 18 A
- The system can be change to manual when we need according to the need.
- Save power
- Save money
- Automatic
- Easy Installation of LED Tracking
- New Monitoring Reduce Fouling and Degradation
- Maximization of Water
- Electronic Desing Reliable

DISADVANTAGE

- Unnecessary disturbances may occur while using in the Apartments
- Resistance varies continuously (analog) in photoresistor and are rugged in nature.

APPLICATIONS

Clap can be used to switch ON/OFF any electrical Appliances such as Tube Light, Fan, Television, switch, Air conditioner, Motor, etc.

Water level Indicator can be used in Hotels, Factories, Homes, Apartments, Commercial complexes, Drainage, etc. It can be Fixed for single phase motor, three phase motors, fuel level Indicator in veichles. liquid level indicator in the huge container companies on the tank walls.

Light-dependent resistors are simple and low cost devices. These devises are used where there is a need to sense the presence and absence of light is necessary. These resistors are used as light sensors and the applications of LDR mainly include alarm clocks, street lights, light intensity meters, burglar alarm circuits. For a better understanding of this concept, here we have explained one project namely; power conserving of intensity controlled street lights using LDR.

FUTURE SCOPE

In future, we want upgrade this circuit with some sensor Which can automatically stop the power supply of the driving Pump or motor. As a result the future circuit is not very Cheaper the the present one, but we try our best to

- Make it simple,
- Easy to use,
- Easy to install,
- To make Available for all,
- Try to smaller than the present one
- We can increase the range of this equipment by using better
- Mic We can use this as Remote Controller

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