NEAR EAST UNIVERSITY

Faculty of Engineering

Department of Electrical and Electronic Engineering

WATER ACTIVITY ALARM

Graduation Project
EE- 400

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Good luck to all students who are studying in our university, Near East University I wish a good life after gradation.

ABSTRACT

The water activity alarm is a project worked to detect from the water by a simple sensor. The audio alarm signal it is a tone we hared by a speaker which is slowly varied up and down in frequency.

The applications for this unit it is use to detector a rain or any losses of water from any place. In the project we will development by added some component to get a new unit may we need it in our home or as well in the future as possible.

This project contains electronic components, we will explain all them one by one from resistor to loudspeaker and capacitor as we will see later, we use type of switch (spst) we will applied explain it, and as we will see I will find some component to development my circuit project .

A last component it is a simple sensor, it can consist of tow non-insulating wire placed on plastic or other insulating base, with the smallest possible gap between the two wires.

TABLE OF CONTENENTS

INTRODUCTION

This project is about developing circuit Water Activity Alarm (WAA) that is designed for detecting waters presence or lack of waters. This alarm produces a warning sounds tones loudspeaker when activated.

In output device (speaker), the tones will be as police alarms. Also we will see a red signal with same times by LED, we have in the circuit. This project is contents four chapters.

The first chapter presented information about electronic components by showing photo about it, which we used in structure our project, as well as we have been described safety guidelines in this chapter.

But about second chapter, it is presented information about systems alarm in general; where we focused on waters systems alarm types, by describe all types which it is used in alarm systems.

In chapter three we explain circuit of water activity alarms in by helping circuit maker programs, where we presented some photos about circuit water activity alarm which take it from that program.

Now in last chapter we showing modification and result which it makes development in my project, also we presented some photos about this project. As well as, we have been enclosed in this chapter the conclusion and references about project.

The aims of work presented within this project are:

- Knowing aim, from through the searching and development.
- The benefit in the practical life, as we may be able to use it in our homes.
- The modification and searching, as we doing that on the project.
- Modifications and searching, as we have done that on Original project.

CHAPTER ONE

ELECTRONIC COMPONENTS

1.1 Overview

This chapter will presents general background on electronic components. Safety guidelines will also be described by this chapter.

1.2 Resistors

These one off components which we have in my project, we Present that's parts from my project by this text, as we see below in fig 1.1 these are small cylindrical components the diagram shows the construction of a carbon film resistor: in fig 1.2 during manufacture, a thin film of carbon is deposited onto a small ceramic rod. The resistive coating is spiraled away in an automatic machine until the resistance between the two ends of the rod is as close as possible to the correct value. Metal leads and end caps are added; the resistor is covered with an insulating coating and finally painted with colored bands to indicate the resistor value. Carbon film resistors are cheap and easily available, with values within ±10% or ±5% of their marked or 'nominal' value. Metal film and metal oxide resistors are made in a similar way, but can be made more accurately to within ±2% or ±1% of their nominal value. There are some differences in performance between these resistor types, but none which affect their use in simple circuits.

Wire wound resistors are made by winding thin wire onto a ceramic rod. They can be made extremely accurately for use in MultiMate's, oscilloscopes and other measuring equipment. Some types of wire wound resistors can pass large currents without overheating and are used in power supplies and other high current circuits.

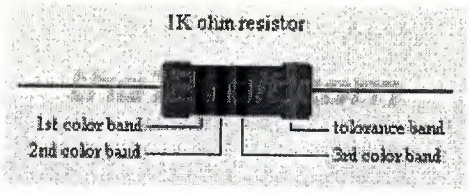


Figure 1.1 Normal Resistors [1]

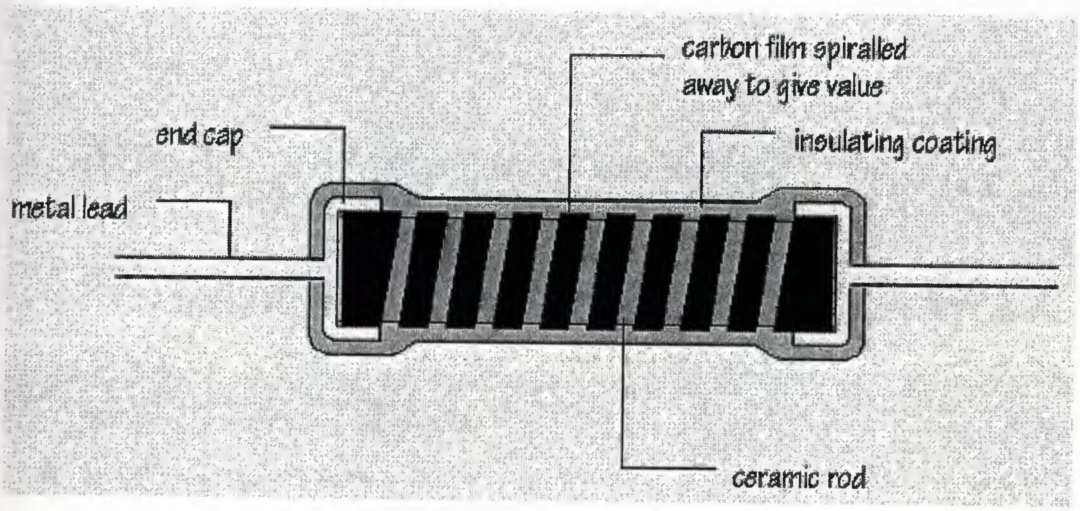


Figure1.2 A Carbon Resistor [1]

1.2.1 Color Code

How can the value of a resistor be worked out from the colors of the bands? Each color represents a number according to the following scheme: Table 1.1 the first band on a resistor is interpreted as the FIRST DIGIT of the resistor value. For the resistor shown below, the first band is yellow, so the first digit is 4:

Table 1.1 Color Codes [1]

Band color	1 st band #	2 nd band #	3 rd band #	Multiplier x	Tolerances ± %
Black	0	0	0	1	
Brown	1	1	1	10	±1 %
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Orange	3	3	3	1000	
Yellow	4	4	4	10,000	
Green	5	5	5	100,000	±0.5%
Blue	6	6	6	1,000,0000	±0.25%
Violet	7	7	7	10,000,000	±0.10 %
Grey	8	8	8	100.000,000	± 0.06%
White	9	9	9	1,000,000,000	
Gold				0.1	±5 %
Silver				0.01	±10%
None					±20 %

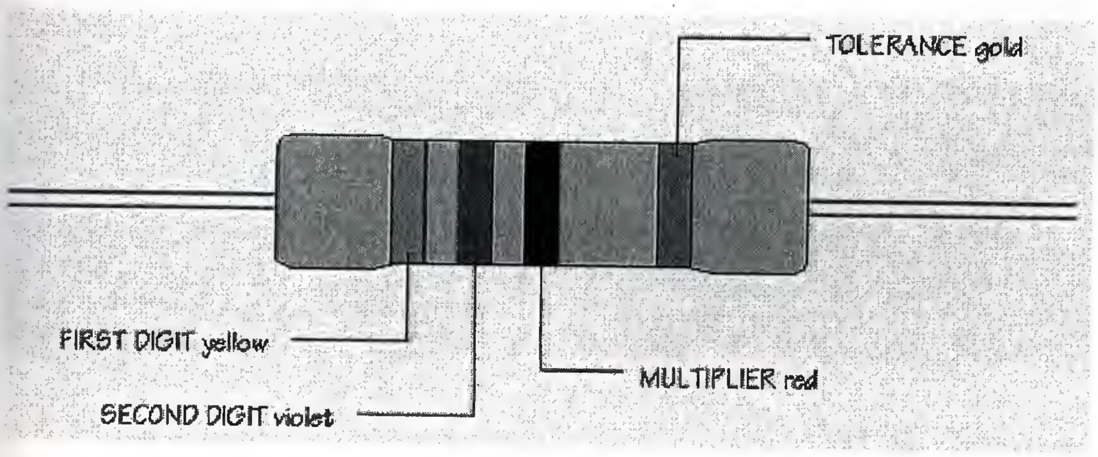


Figure 1.3 Color Codes for Resistor [1]

If you look to the table no: 1.1there is colors could is a present as we see the first band gives the first digit the second band gives the SECOND DIGIT. This is a violet band, making the second digit 7. The third band is called the MULTIPLIER and is not interpreted in quite the same way. The multiplier tells you how many noughts you should write after the digits you already have. A red band tells you to add 2 noughts as we see in (fig 1.3). The remaining band is called the TOLERANCE band. This indicates the percentage accuracy of the resistor value. Most carbon film resistors have a gold-colored tolerance band, indicating that the actual resistance value is with + or - 5% of the nominal value. : As we see in (Table 1.2) other tolerance colors are when you want to read off a resistor value, look for the tolerance band, usually gold, and hold the resistor with the tolerance band at its right hand end. Reading resistor values quickly and accurately isn't difficult, but it does take practice.

Table 1.2 Tolerance Bands [1]

Tolerance	Color
± 1%	Brown
± 2%	Red
± 5%	Gold
± 10%	Silver

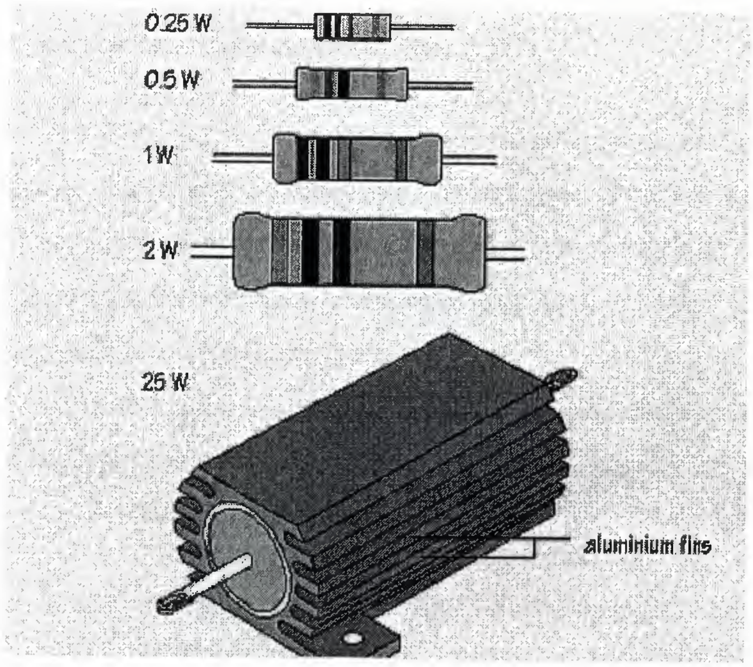


Figure 1.4 Some Resistors and Power Resistor [1]

The standard size of carbon film resistor used in most circuits has a power rating of 0.5 W. This means that a resistor of this size can lose heat at a maximum rate of 0.5 W. calculated rate of heat loss, so that a resistor with a higher power rating, 1 W or 2 W, would be needed. Some resistors are designed to pass very large currents and are cased in aluminum with fins to increase surface area and promote heat loss. As we see up (fig 1.4) Input and signal processing subsystems in electronic circuits rarely involve large currents, but power rating should be considered when circuits drive output transducers, such as lamps, LED s, and loudspeakers.

1.3 Capacitors

The capacitors it means that's part from electrical components which use that to storing the electrical power. the most capacitors use to look much the same as resistors but were normally a little larger and had the vale written on their body rather than marked using a color code .modern capacitors are still generally somewhat larger then resistors, but they often have both lead out wires coming from the same end of the component as this makes them more convenient for use with printed circuit boards. My project featured in this book use several types of capacitor, including electrolytic type.

What exactly is a 'Capacitor'? A capacitor is a device that stores an electrical charge or energy on its plates. These plates positive and a negative plate are placed very close together with an insulator in between to prevent the plates from touching each other, as we see (fig 1.5). A can carry a voltage equal to the battery or input voltage. Usually a capacitor has more than two plates depending on the capacitance or dielectric type. The 'Charge' is called the amount of stored electricity on the plates, or actually the electric field between theses plates, and is proportional to the applied voltage and capacitor's 'capacitance.

The capacitors can be manufactured by your specifications. They also come in a variety of materials, to name a few: Aluminum foils, Polypropylene, Polyester (Mylar), Polystyrene, Polycarbonate, Kraft Paper, Mica, Teflon, Epoxy, Oil-filled, Electrolyte, Tantalum, and the list goes on. Latest product (in research) is Niobium. The value of a capacitor can vary from a fraction of a Pico-Farad to more than a million μFarad (μ means 'micro'). Voltage levels can range from a couple to a substantial couple Hundred thousand volts. The basic unit of capacitance is the Farad. Clumsy and not very practical to work with, capacitance is usually measured in microfarads, abbreviated μF, or Pico Farads (pF). The unit Farad is used in converting formulas and other calculations. A μF (microfarad) is on millionth of a Farad (10-6 F) and a pF Pico Farad is one-millionth of a microfarad (10-12 F).

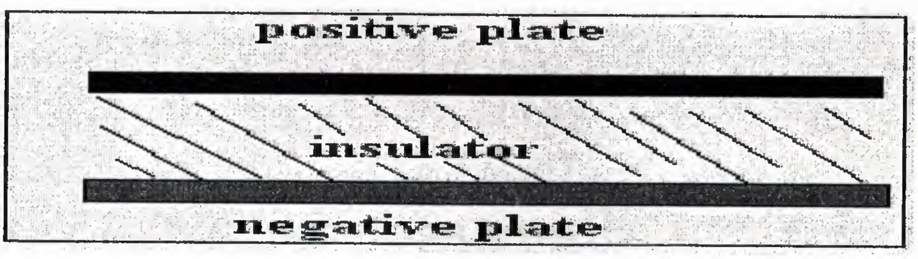


Figure 1.5 Capacitor Parts [2]

Table 1.3 Capacitor Value Cades [2]

3 Rd Digit	Multiplier	Letter	Tolerance
0	1	D	0.5 PF
1	10	F	1%
2	100	G	2%
3	1000	H	3%
4	10.000	J	5%
5	100.000	K	10 %
6.7	Not Used	M	20 %
8	.01	P	+ 100, -0 %
9	.1	Z	+80, – 20%

1.3.1 Capacitor Code

I guess you really like to know how to read all those different codes. Not to worry, it is not as difficult as it appears to be. Except for the electrolytic and large types of capacitors, which usually Have the value printed on them like 470μF 25V or something, most of the smaller caps have two Or three numbers printed on them, some with one or two letters added to that value. Check out the little table up (Table 1.3) capacitor value Cades Capacitor with 474J printed on it means: 47+4zeros = 470000 = 470.000pF, J=5% tolerance. (470.000pF = 470nF = 0.47μF) Pretty simple, huh? The only major thing to get used to is to recognize if the code is μF nF or pF. Other capacitors may just have 0.1 or 0.01 printed on them. If so, this means a value in μF. Thus 0.1 means just 0.1 μF. If you want this value in nanoFarads just move the comma three places to the right which makes it 100nF Easy huh? "NPO" is standard for temperature stability and 'low-noise', it does *not* mean non-polarized even though you might think so because the abbreviation looks similar. Polarized ceramic capacitors do not exist. The abbreviation "NPO" stands for "Negative-

Positive-Zero" (what is read as an 'O' is actually zero), and means that the negative and positive temperature coefficients of the device are zero--that is the capacitance does not vary with temperature. ONLY the black top indicates NPO qualification and the values are in the range from 1.8pF to 120pF, unless manufactured with different values for Military and/or industrial purposes on special request. They feature 2% tolerance which comes down to about 0.25pF variation, and all are 100V types. You may sometimes find NPO-type caps marked with him EIA (Electronic Industrial Association) code "COG". The EIA has an established set of specifications for capacitor temperature characteristics (EIC 384/class 1B). Thus, a capacitor labeled "Y5P" would exhibit a plus/minus tolerance of 10%variation in capacitance over a temperature range of -30°C. To +85°C. Or it may say N12 which translates to 120pF. Or 2P2 (2.2pF) [2].

Most common type, polarized capacitor Applications: Ripple filters, timing circuits. Cheap, readily available, good for storage of charge (energy).Not very accurate, marginal electrical properties, leakage, drifting, not suitable for use in hf circuits, available in very small or very large values in μF.

Tantalum - Made of Tantalum Pent oxide. They are electrolytic capacitors but used with a material called tantalum for the electrodes. Superior to electrolytic capacitors, excellent temperature and Frequency characteristics when tantalum powder is baked in order to solidify it, a crack forms inside an electric charge can be stored on this crack. Like electrolytic, tantalums are polarized so watch the '+' and '-' indicators. Mostly used in analog signal systems because of the lack of current-spike-noise. Small size fits anywhere, reliable, most common values readily available. Expensive, easily damaged by spikes, large values exists but may be hard to obtain. Largest in my own collection is 220μF/35V, beige color Super Capacitors - The Electric Double Layer capacitor is a real miracle piece of work. Capacitance is 0.47 Farad (470,000 μF) Despite the large. As we see in (Table 1.4).

Capacitance value, its physical dimensions are relatively small. It has a diameter of 21 mm (almost an inch) and a height of 11 mm (1/2 inch). Like other electrolytic the super capacitor is also polarized so exercise caution in regards to the break-down voltage. Care must be taken when using this capacitor. It has such large capacitance that, without precautions, it would destroy part of a power supply such as the bridge rectifier, volt regulators, or whatever because of the huge inrush current at charge. For a brief moment, this capacitor acts like a short circuit when the capacitor is charged. Protection circuitry is a must for this type.There are some pictures about capacitors as we see in fingers (1.6 & 1.7).

Figure 1.6 Some of Capacitors [2]

Figure 1.7 Capacitors Collection [2]

Table1.4 Capacitance Conversion [2]

Microfarads (µF)	Microfarads (µF)	Microfarads (µF)
0.000001µF	0.001nF	1pF
0.00001µF	0.01nF	10pF
0.0001µF	0.1nF	100pF
0.001µF	1nF	1000pF
0.01µF	10nF	10,000pF
0.1µF	100nF	100,000pF
1µF	1000nF	1,000,000pF
10µF	10,000nF	10,000,000pF
100µF	100,000nF	100,000,000pF

1.4 Integrated Circuits

As with many inventions, two people had the idea for an integrated circuit at almost the same time. Transistors had become commonplace in everything from radios to phones to computers, and now manufacturers wanted something even better. Sure, transistors were smaller than vacuum tubes, but for some of the newest electronics, they weren't small enough.

But there was a limit on how small you could make each transistor, since after it was made it had to be connected to wires and other electronics. The transistors were already at the limit of what steady hands and tiny tweezers could handle. So, scientists wanted to make a whole circuit -- the transistors, the wires, everything else they needed -- in a single blow. If they could create a miniature circuit in just one step, all the parts could be made much smaller.

1.5 Diodes

Here's another installer component you should always have handy. Blocking diodes are one way valves used in electrical circuits. These are very simple devices that are often real time savers .As we see in fig (1.8), rating of the diode, there are only three basic things to remember.

Cathode (side with the stripe), anode (side without the stripe), anytime the cathode is more positive than the anode, no current will flow.

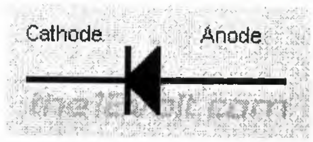


Figure 1.8 Diode Types [4]

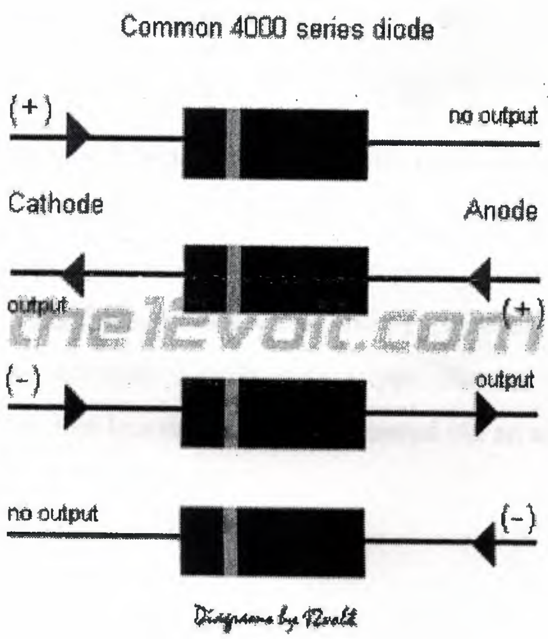


Figure 1.9 Diodes [4]

1.5.1 Diode across the Coil of a Relay:

The diode provides a path for current when the current path to the is interrupted (i.e. switched off). This allows the coil field to relay collapse without the voltage spike that would otherwise be generated. The diode protects switch or relay contacts and other circuits that may be sensitive to voltage spikes.

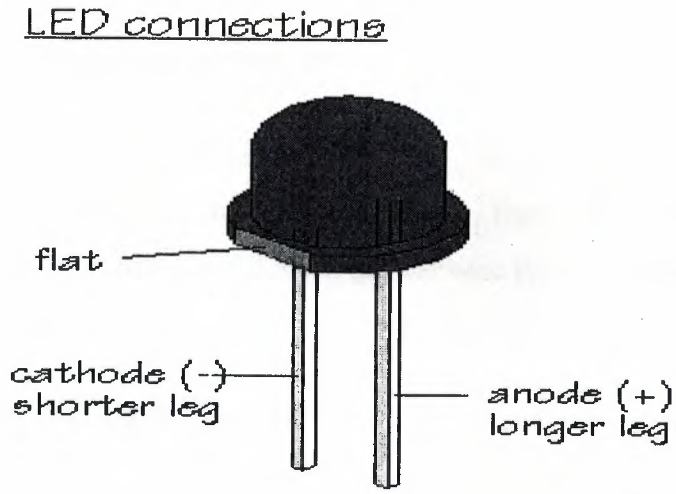
1.6 Switches

Only one type of switches is used in the project. And here is little chance of confusion since one is a push-bottom type. And there is other is a miniature toggle switch (i.e. it is operated via small lever).

The push-button switch must be a push-to-make type, and it must not be a latching type. In other words, the tow tags are connected together when the switch is operated, and disconnected when the push button is released there should be no problem in obtaining a switch of the correct type as these are the most common and cheapest type of push button switch.

A standard size toggle switch is also Suitable, but a much larger mounting hole will be required (usually about 13 mm or 1/2 in Diameter).in the component list the toggle switch is specified as an SPST type, and this means a Single pole, single -throw type switch, and switch of this type are sometimes advertised as on/off switches rather than SPST type. Some of the projects uses rely with a push-bottom type. But we will use just that's type (SPST) in my project. Then this is a switch that is operated via an electromagnet, and is not operated manually.

1.7 Photocell



Finger 1.10 LED Connections [7]

The photocell used in the light activated circuits is an RPYA which is small cadmium supplied photo-resistor, and physical is flat, about 5mm square, and has the two lead-out wires coming from one edge. It looks very much like small ceramic plate capacitor, in fact. Like an ordinary resistor, a cadmium supplied photocell is not a polarized component and can be connected into circuit either way round. The light –sensitive surface of the component is the one having a gold patterned surface, and not the one to which the two lead out wires can be clearly seen to connect. This device is a light-dependent resistor. It is most sensitive to visible light in the red.

1.7.1 Infrared Reflectance Sensor

This device combines an infrared LED light source and a phototransistor light detector into a single package. The LED and the detector point out of the package, almost parallel to each other. The detector will measure the light scattered or reflected by a surface a short distance away. The package also contains an optical filter (colored plastic) that transmits primarily only the infrared light from the LED; this reduces, but does not eliminate, the sensitivity to ambient light.

1.7.2 Infrared Slotted Optical Switch

This device is similar to the IR reflectance sensor, in that it contains both an infrared source and a filtered infrared phototransistor detector. However, the two are mounted exactly opposite each other with a small, open gap between them. The sensor is designed to detect the presence of an object in the gap that blocks the light.

1.7.3 Modulated Infrared Light Detector

This device senses the presence of infrared light that has been modulated (e.g., blinks on and off) at a particular frequency. These devices are typically used to decode the signals of TV remote controls, Application to detect the infrared beacon of the opponent robot. Photocells are made from a compound called cadmium sulfide (CdS) that change in resistance when exposed to varying degrees of light. Cadmium sulfide photocells are most sensitive to visible red light, with some sensitivity to other wavelengths. Photocells have a relatively slow response to changes in light. The characteristic blinking of overhead fluorescent lamps, which turn on and off at the 60 Hertz line frequency, is not detected by photocells. This is in contrast to phototransistors, which have frequency responses easily reaching above 10,000 Hertz and more. Therefore, if both sensors were used to measure the same fluorescent lamp, the photocell would show the light to be always on and the phototransistor would show the light to be blinking on and off [7].

Photocells are commonly used to detect the incandescent lamp that acts as a contest start indicator. They are also used to find the light beacons marking certain parts of the board, such as the goals. While they can be used to measure the reflectivity of the game board surface if coupled with a light source such as a red LED or an incandescent lamp, the IR reflectance sensors are usually better at this function. Photocells are sensitive to ambient lighting and usually need to be shielded. Certain parts of the game board might be marked with polarized light sources. An array of photocells with polarizing filters at different orientations could be used to detect the polarization angle of polarized light and locate those board features.

1.8 Sensors

For example a robot without sensors, is just a machine. Robots need sensors to deduce what is happening in their world and to be able to react to changing situations. This chapter introduces a variety of sensors and explains their electrical use and practical application. The sensor applications presented here are not meant to be exhaustive, but merely to suggest some of the possibilities. Please do not be limited by the ideas contained in this chapter.

1.8.1 Sensors as Transducers

The basic function of an electronic sensor is to measure some feature of the world, such as light, sound, or pressure and convert that measurement into an electrical signal, usually a voltage or current. Typical sensors respond to stimuli by changing their resistance (photocells), changing their current flow (phototransistors), or changing their voltage output (the Sharp IR sensor). The electrical output of a given sensor can easily be converted into other electrical representations.

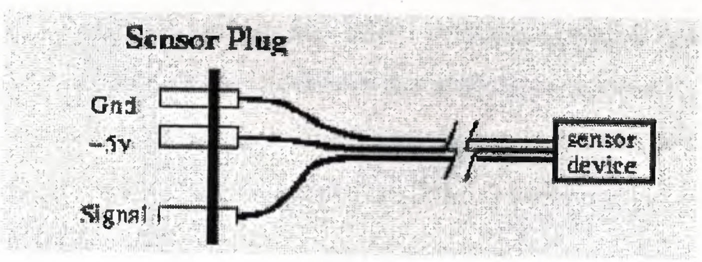


Figure 1.11 Type of Sensor [5]

1.9 Loudspeaker

Figure 1.12 Loudspeakers [6]

Loudspeaker history: Ernst W. Siemens was the first to describe the "dynamic" or moving-coil transducer, with a circular coil of wire in a magnetic field and supported so that it could move axially. He filed his U. S. patent application for a "magneto-electric apparatus" for "obtaining the mechanical movement of an electrical coil from electrical currents transmitted through it" on Jan.20, 1874, and was granted patent No. 149,797 Apr14, 1874. However, he did not use his device for audible transmission, as did Alexander G. Now the last generator of loudspeaker The Verity Group in Britain formed , now known as the develop the Distributed-Mode Loudspeaker (DML) based on the 1991 patent by Dr Ken Heron of Britain's [6] .

1.10 Potentiometer

A potentiometer (or "pot," for short) is a manually-adjustable, variable resistor. It is commonly used for volume and tone controls in stereo equipment. On the Rob Board a 10k pot is used as a contrast dial for the LCD screen, and the Rob Knob of the board is also a potentiometer. In robotics, a potentiometer can be used as a position sensor.

This will yield readings of greater precision (although they will not be linear) than if the pot were used as a two-terminal variable resistor. You may want to try different circuits to determine which works best for your application.

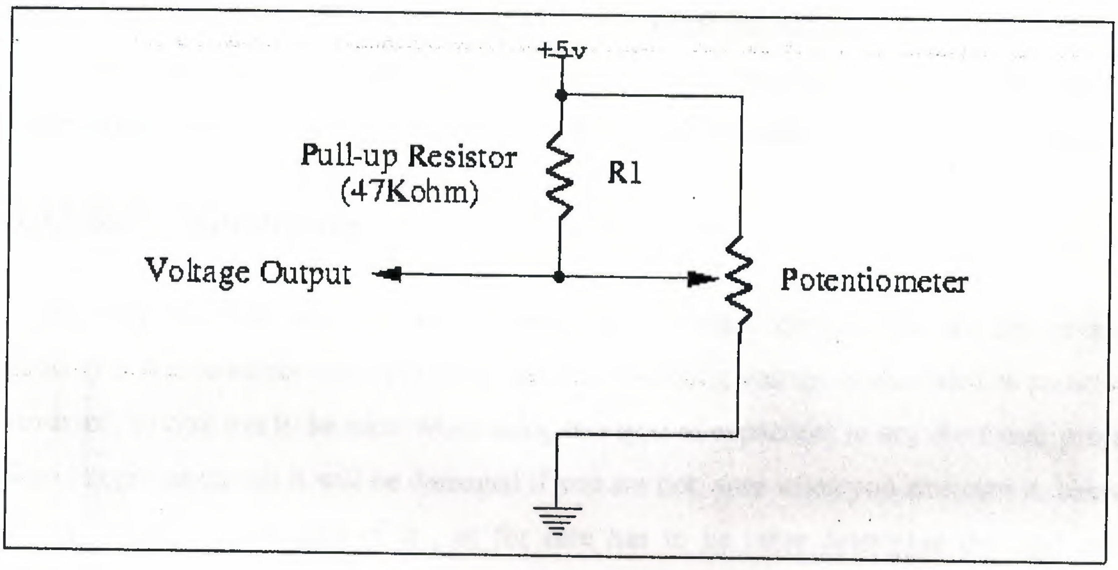


Figure 1.13 Potentiometer Circuits [5]

1.11 Semiconductors

The transistor was probably the most important invention of the 20th Century In 1906; the eccentric American inventor Lee De Forest developed a triode in a vacuum tube.

It was a device that could amplify signals, including, it was hoped, signals on telephone lines as they were transferred across the country from one switch box to another. AT&T bought De Forest's patent and vastly improved the tube. It allowed the signal to be amplified regularly along the line, meaning that a telephone conversation could go on across any distance as long as there were amplifiers along the way but the vacuum tubes that made that amplification possible were extremely unreliable, used too much power and produced too much heat. In the 1930s, Bell Lab's director of research, Mervin Kelly, recognized that a better device was needed for the telephone business to continue to grow. He felt that the answer might lie in a strange class of materials called semiconductors. Transistors it has three lead-out wires which are called the base, emitter, and collector [5].

1.12 Safety Guidelines

We will see how we may destroy sensitive integrated circuits that are not properly protected, the capacitor will explode if the rated working voltage is exceeded or polarity is reversed, so care has to be taker when using this type of capacitors in any electronic project. For integrated circuit it will be damaged if you are not sure when you structure it, because it may damage some pins of it , as for care has to be taker determine the lead-out of transistors because we may not be able to distinguish between them. The (Ohmmeter device) it will use to determine all points (lead-out) in our electrical components. As for diodes we will use the (ohmmeter device) to make determine the (lead-out) input and output about it in structure by properly, not inversed on the Board. When we make weld the components on the board we will take care in this step. We will be in the safe side if you apply these steps properly.

1.13 Summary

This chapter presented general background on electronic components. We have seen how the resistors are working, as well as how can we determine their values through the color code. And for the capacitors we have seen how it's working and from what they are made. We have seen some information about the history of loudspeakers since its beginnings up to today. Also we have explained about each of the following: potentiometer, sensor, and photocell and how are working. We should not ignore the importance the diode; we have included some pictures about it.

CHAPTER TWO

INFORMATION ABOUT ALARM SYSTEMS

2.1 Overview

This chapter will present general information about alarm systems.

2.2 Alarm System Categories

The Alarm System it's a detection signaling system that is considered to be the combination of interrelated signal initiating devices, signal indicating devices, control equipment, and interconnecting wiring installed for a particular application monitored Alarm System.

An alarm system which reports detected conditions to a monitoring facility monitoring facilities are usually located off-site from the protected premises. When a monitoring facility is located within the building or complex that includes the protected premises, the alarm system is called a Proprietary system. Protected Premises the physical site at which an alarm system is installed and operational [9].

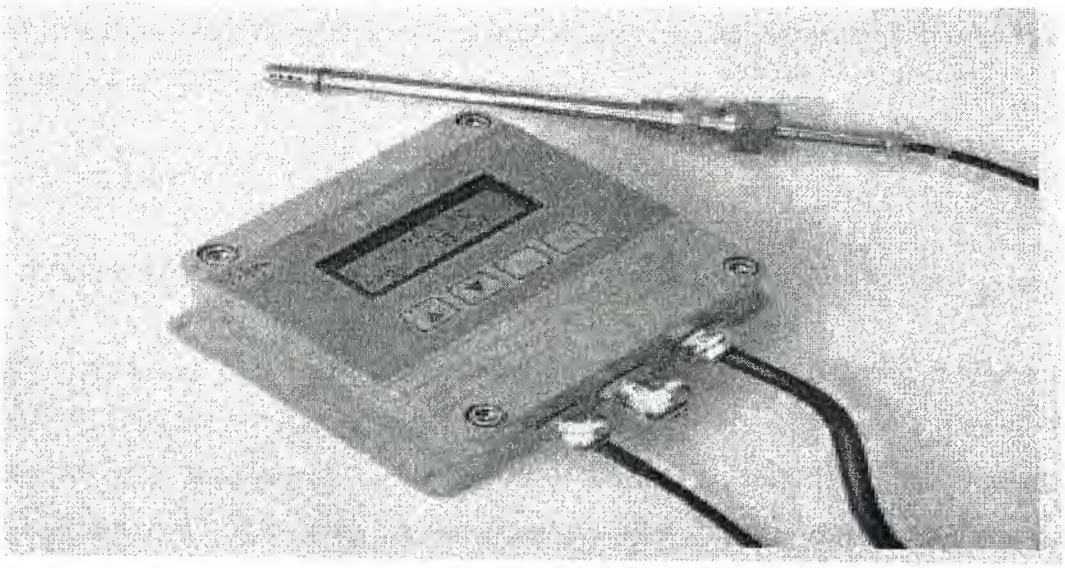


Figure 2.1 It Presented Water Activity Alarm Device [10]

2.3 Types of Alarm Systems

Alarm systems are divided into several broad categories, as listed below. The terms used to identify each type may vary, depending on who is using the term; however, the system we will description as we see later.

2.3.1 Fire Alarm

A system that detects and reports a fire in the protected premises, detects and reports water flowing in a sprinkler system, or detects and reports dangerous conditions such as smoke or overheated materials that may combust spontaneously. Household Fire Alarm: A fire alarm system that protects a household, as opposed to any other type of occupancy.

2.3.2 Hold-Up Alarm

A system that reports the presence of one or more criminals attempting to take goods or funds with implied or actual threat of force.

2.3.3 Duress Alarm

A system that reports the presence of one or more persons trying to force an individual to enter, or re-enter, a facility against the individual's will. Note: Although the triggering devices for hold-up, duress, and panic alarms are often the same or similar, police response may differ. A duress alarm, for example, may be designed to detect and silently report an employee being forced back into a protected facility to provide access to a safe, vault, drug storage area, or area containing confidential records. The intent is generally not to make the criminal aware that a call for help is being triggered to the monitoring facility. In a residential environment, a duress alarm could signal an abduction or rape attempt [9].

2.3.4 Panic Alarm

A system that reports a more general type of perceived emergency, including the presence of one or more unruly or inebriated individuals, unwanted persons trying to gain entry, ob-served intruders in a private yard or garden area, or a medical emergency. Provides police with little specific information, but is often the only way a user can call for assistance under abnormal conditions.

2.3.5 Medical Emergency (Service) Alarm

A system that reports a medical problem for response by relatives, friends, neighbors, or by a community's EMS personnel, paramedics, or ambulance, depending on arrangements made with the monitoring facility.

2.3.6 Heating, Ventilation, Air Conditioning (HVAC) Alarm

These systems are reports heating and ventilation as well as the air conditioning system problems, rather than life-threatening emergencies.

2.3.7 Single Sensor Alarm

Those types from (2.3.7-2.3.9) are important in my project because it is including some information about it.

A sensor detects the emergency condition and causes an alarm to be transmitted to the monitoring facility or to be indicated audibly or visually. Some sensors use single switches to trigger the alarm; other sensors require that two switches activate before the alarm is triggered. Some sensors use two or more detection technologies and require that two or more technologies sense the emergency condition before the alarm is triggered. All of these are single sensors.

2.3.8 Multiple Sensor Alarm

An alarm generated when at least two separate sensors detect the condition before the alarm is triggered. In some instances, redundant sensors in different system zones must trip before the alarm is triggered. However, activation of one sensor may trigger a trouble or pre-alarm signal.

For example: Smoke detectors that is cross-zone-wired so that two or more zones must detect the smoke before an alarm condition is created.

Public emergency response or dispatch personnel are not normally contacted when these alarm systems detect a problem; protected property maintenance personnel tend to be notified by the monitoring facility.

2.3.9 Sequential Alarm

When two or more sensors sequentially detect a condition and each triggers an alarm. When this happens, there is a high probability that a real emergency exists.

2.3.10 Industrial Process Alarm

A system that provides supervision for a wide variety of commercial and industrial processes, including sump-pump operations, water levels, pressures and temperatures, chemical processes, and special furnace operations, to name but a few. Normally, user employees or sub-contractors are notified when these systems report problems. in this type we will focus on it because this type it important about my project.

2.4 Event Types

We will presents some information about event types alarms it is including explaining all types. The Event is one or more related alarm or trouble signals.

Alarm an electronic signal, transmitted to the monitoring facility. Indicates that an emergency requiring follow-up has been detected. When an alarm system is not monitored, the alarm condition activates one or more sounding or visual indicating devices.

2.4.1 Dispatch able Event

An unexpected alarm that triggers an event. An alarm does not become a dispatch able event until the monitoring facility has followed its established procedures such as verification or other confirmation that the alarm requires further action. Subsequent signals from the same type of alarm system are part of the original dispatch able event until the event is resolved and the system has been reset. When an alarm is determined to be a dispatch able event, a request for response is made to the appropriate response agency or agencies.

2.4.2 False Alarm

An alarm event indicating the presence of an emergency condition when none exists. Please visit our False Alarm Information page for more information.

2.4.3 Test

The act of activating one or more sensors, devices, controls, communicating devices, or other components of an alarm system in an effort to confirm proper operation of the equipment.

2.4.4 Transmission Test

Verification of the ability of a system control to send signals to the monitoring facility which it is intended to notify.

2.4.5 Inspection

A visual survey of the appearance of an alarm installation intended to discover any obvious problems. Typically these might be alarm system wires that have been covered up during building construction or remodeling, loose doors or windows that may cause false alarms during storms, sprinkler risers and controls that may be blocked by merchandise making fire department access difficult or impossible during emergencies, etc. An inspection may include actual tests of alarm system sensors, controls, or transmitters.

2.4.6 Reset

A return to normal operation for an alarm system that has been in a trouble condition, out of service, or in an alarm condition. When a system has been "reset" it is back in full operation and subsequent signals received from the system will be treated normally. A reset is more than merely the restoration-to-normal of a sensor, or an abort message or call from the user. With a reset event, the system is back in full and normal operation

NEAR EAST UNIVERSITY

Faculty of Engineering

Department of Electrical and Electronic Engineering

WATER ACTIVITY ALARM

Graduation Project
EE- 400

Student: Bajess Al-manaseer (20020759)

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Nicosia –2005

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Good luck to all students who are studying in our university, Near East University I wish a good life after gradation.

ABSTRACT

The water activity alarm is a project worked to detect from the water by a simple sensor. The audio alarm signal it is a tone we hared by a speaker which is slowly varied up and down in frequency.

The applications for this unit it is use to detector a rain or any losses of water from any place. In the project we will development by added some component to get a new unit may we need it in our home or as well in the future as possible.

This project contains electronic components, we will explain all them one by one from resistor to loudspeaker and capacitor as we will see later, we use type of switch (spst) we will applied explain it, and as we will see I will find some component to development my circuit project .

A last component it is a simple sensor, it can consist of tow non-insulating wire placed on plastic or other insulating base, with the smallest possible gap between the two wires.

TABLE OF CONTENENTS

INTRODUCTION

This project is about developing circuit Water Activity Alarm (WAA) that is designed for detecting waters presence or lack of waters. This alarm produces a warning sounds tones loudspeaker when activated.

In output device (speaker), the tones will be as police alarms. Also we will see a red signal with same times by LED, we have in the circuit. This project is contents four chapters.

The first chapter presented information about electronic components by showing photo about it, which we used in structure our project, as well as we have been described safety guidelines in this chapter.

But about second chapter, it is presented information about systems alarm in general; where we focused on waters systems alarm types, by describe all types which it is used in alarm systems.

In chapter three we explain circuit of water activity alarms in by helping circuit maker programs, where we presented some photos about circuit water activity alarm which take it from that program.

Now in last chapter we showing modification and result which it makes development in my project, also we presented some photos about this project. As well as, we have been enclosed in this chapter the conclusion and references about project.

The aims of work presented within this project are:

- Knowing aim, from through the searching and development.
- The benefit in the practical life, as we may be able to use it in our homes.
- The modification and searching, as we doing that on the project.
- Modifications and searching, as we have done that on Original project.

CHAPTER ONE

ELECTRONIC COMPONENTS

1.1 Overview

This chapter will presents general background on electronic components. Safety guidelines will also be described by this chapter.

1.2 Resistors

These one off components which we have in my project, we Present that's parts from my project by this text, as we see below in fig 1.1 these are small cylindrical components the diagram shows the construction of a carbon film resistor: in fig 1.2 during manufacture, a thin film of carbon is deposited onto a small ceramic rod. The resistive coating is spiraled away in an automatic machine until the resistance between the two ends of the rod is as close as possible to the correct value. Metal leads and end caps are added; the resistor is covered with an insulating coating and finally painted with colored bands to indicate the resistor value. Carbon film resistors are cheap and easily available, with values within ±10% or ±5% of their marked or 'nominal' value. Metal film and metal oxide resistors are made in a similar way, but can be made more accurately to within ±2% or ±1% of their nominal value. There are some differences in performance between these resistor types, but none which affect their use in simple circuits.

Wire wound resistors are made by winding thin wire onto a ceramic rod. They can be made extremely accurately for use in MultiMate's, oscilloscopes and other measuring equipment. Some types of wire wound resistors can pass large currents without overheating and are used in power supplies and other high current circuits.

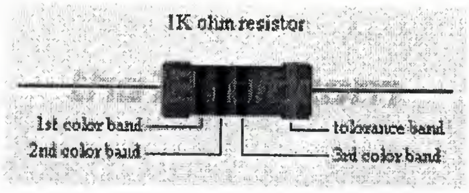


Figure 1.1 Normal Resistors [1]

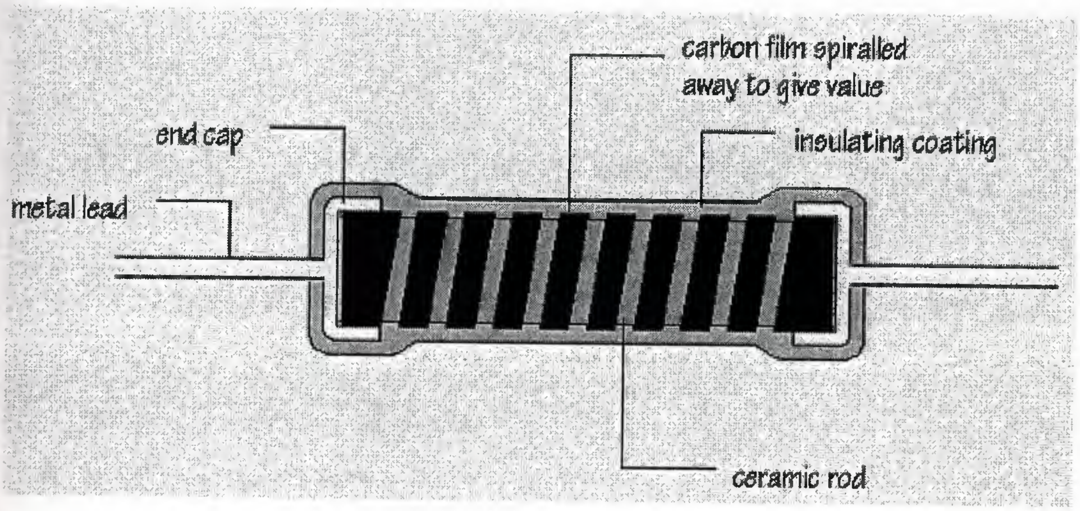


Figure1.2 A Carbon Resistor [1]

1.2.1 Color Code

How can the value of a resistor be worked out from the colors of the bands? Each color represents a number according to the following scheme: Table 1.1 the first band on a resistor is interpreted as the FIRST DIGIT of the resistor value. For the resistor shown below, the first band is yellow, so the first digit is 4:

Table 1.1 Color Codes [1]

Band color	1 st band #	2 nd band #	3 rd band #	Multiplier x	Tolerances ± %
Black	0	0	0	1	
Brown	1	1	1	10	±1 %
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Orange	3	3	3	1000	
Yellow	4	4	4	10,000	
Green	5	5	5	100,000	±0.5%
Blue	6	6	6	1,000,0000	±0.25%
Violet	7	7	7	10,000,000	±0.10 %
Grey	8	8	8	100,000,000	± 0.06%
White	9	9	9	1,000,000,000	
Gold				0.1	±5 %
Silver				0.01	±10%
None					±20 %

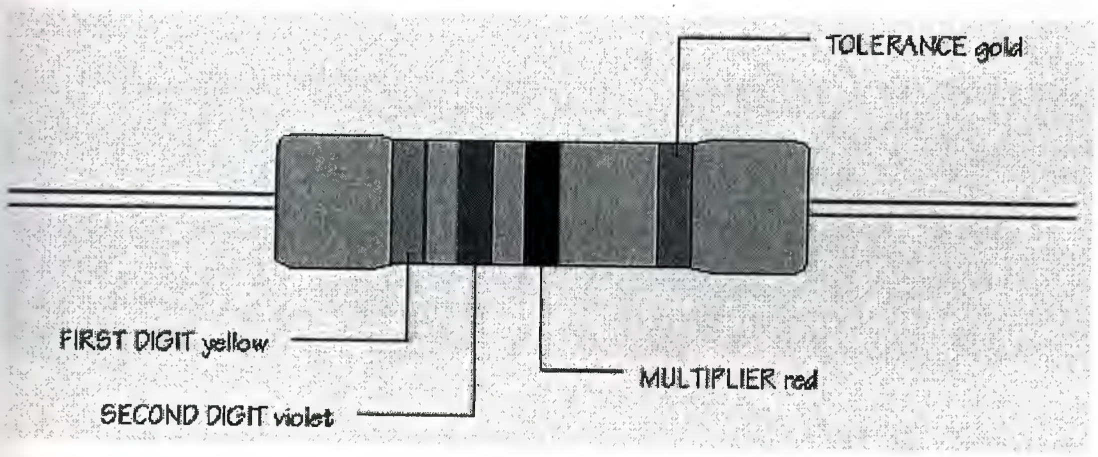


Figure 1.3 Color Codes for Resistor [1]

If you look to the table no: 1.1there is colors could is a present as we see the first band gives the first digit the second band gives the SECOND DIGIT. This is a violet band, making the second digit 7. The third band is called the MULTIPLIER and is not interpreted in quite the same way. The multiplier tells you how many noughts you should write after the digits you already have. A red band tells you to add 2 noughts as we see in (fig 1.3). The remaining band is called the TOLERANCE band. This indicates the percentage accuracy of the resistor value. Most carbon film resistors have a gold-colored tolerance band, indicating that the actual resistance value is with + or - 5% of the nominal value. : As we see in (Table 1.2) other tolerance colors are when you want to read off a resistor value, look for the tolerance band, usually gold, and hold the resistor with the tolerance band at its right hand end. Reading resistor values quickly and accurately isn't difficult, but it does take practice.

Table 1.2 Tolerance Bands [1]

Tolerance	Color
± 1%	Brown
± 2%	Red
± 5%	Gold
± 10%	Silver

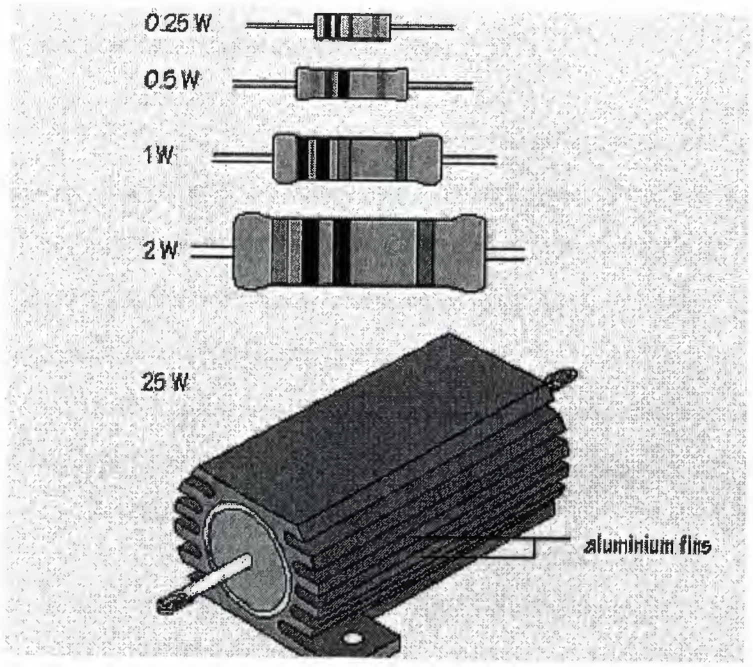


Figure 1.4 Some Resistors and Power Resistor [1]

The standard size of carbon film resistor used in most circuits has a power rating of 0.5 W. This means that a resistor of this size can lose heat at a maximum rate of 0.5 W. calculated rate of heat loss, so that a resistor with a higher power rating, 1 W or 2 W, would be needed. Some resistors are designed to pass very large currents and are cased in aluminum with fins to increase surface area and promote heat loss. As we see up (fig 1.4) Input and signal processing subsystems in electronic circuits rarely involve large currents, but power rating should be considered when circuits drive output transducers, such as lamps, LED s, and loudspeakers.

1.3 Capacitors

The capacitors it means that's part from electrical components which use that to storing the electrical power. the most capacitors use to look much the same as resistors but were normally a little larger and had the vale written on their body rather than marked using a color code .modern capacitors are still generally somewhat larger then resistors, but they often have both lead out wires coming from the same end of the component as this makes them more convenient for use with printed circuit boards. My project featured in this book use several types of capacitor, including electrolytic type.

What exactly is a 'Capacitor'? A capacitor is a device that stores an electrical charge or energy on its plates. These plates positive and a negative plate are placed very close together with an insulator in between to prevent the plates from touching each other, as we see (fig 1.5). A can carry a voltage equal to the battery or input voltage. Usually a capacitor has more than two plates depending on the capacitance or dielectric type. The 'Charge' is called the amount of stored electricity on the plates, or actually the electric field between theses plates, and is proportional to the applied voltage and capacitor's 'capacitance.

The capacitors can be manufactured by your specifications. They also come in a variety of materials, to name a few: Aluminum foils, Polypropylene, Polyester (Mylar), Polystyrene, Polycarbonate, Kraft Paper, Mica, Teflon, Epoxy, Oil-filled, Electrolyte, Tantalum, and the list goes on. Latest product (in research) is Niobium. The value of a capacitor can vary from a fraction of a Pico-Farad to more than a million μFarad (μ means 'micro'). Voltage levels can range from a couple to a substantial couple Hundred thousand volts. The basic unit of capacitance is the Farad. Clumsy and not very practical to work with, capacitance is usually measured in microfarads, abbreviated μF, or Pico Farads (pF). The unit Farad is used in converting formulas and other calculations. A μF (microfarad) is on millionth of a Farad (10-6 F) and a pF Pico Farad is one-millionth of a microfarad (10-12 F).

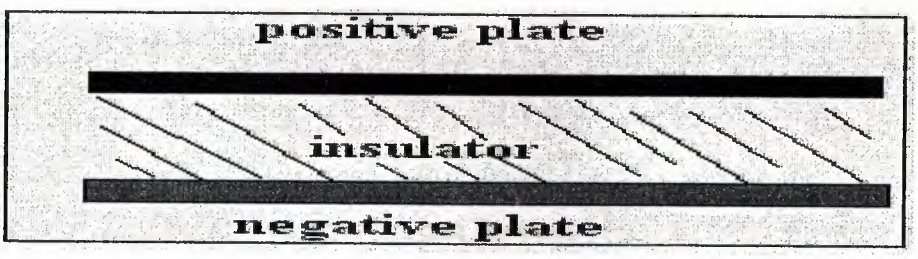


Figure 1.5 Capacitor Parts [2]

Table 1.3 Capacitor Value Cades [2]

3 Rd Digit	Multiplier	Letter	Tolerance
0	1	D	0.5 PF
1	10	F	1%
2	100	G	2%
3	1000	H	3%
4	10.000	J	5%
5	100.000	K	10 %
6.7	Not Used	M	20 %
8	.01	P	+ 100, -0 %
9	.1	Z	+80, – 20%

1.3.1 Capacitor Code

I guess you really like to know how to read all those different codes. Not to worry, it is not as difficult as it appears to be. Except for the electrolytic and large types of capacitors, which usually Have the value printed on them like 470μF 25V or something, most of the smaller caps have two Or three numbers printed on them, some with one or two letters added to that value. Check out the little table up (Table 1.3) capacitor value Cades Capacitor with 474J printed on it means: 47+4zeros = 470000 = 470.000pF, J=5% tolerance. (470.000pF = 470nF = 0.47μF) Pretty simple, huh? The only major thing to get used to is to recognize if the code is μF nF or pF. Other capacitors may just have 0.1 or 0.01 printed on them. If so, this means a value in μF. Thus 0.1 means just 0.1 μF. If you want this value in nanoFarads just move the comma three places to the right which makes it 100nF Easy huh? "NPO" is standard for temperature stability and 'low-noise', it does *not* mean non-polarized even though you might think so because the abbreviation looks similar. Polarized ceramic capacitors do not exist. The abbreviation "NPO" stands for "Negative-

Positive-Zero" (what is read as an 'O' is actually zero), and means that the negative and positive temperature coefficients of the device are zero--that is the capacitance does not vary with temperature. ONLY the black top indicates NPO qualification and the values are in the range from 1.8pF to 120pF, unless manufactured with different values for Military and/or industrial purposes on special request. They feature 2% tolerance which comes down to about 0.25pF variation, and all are 100V types. You may sometimes find NPO-type caps marked with him EIA (Electronic Industrial Association) code "COG". The EIA has an established set of specifications for capacitor temperature characteristics (EIC 384/class 1B). Thus, a capacitor labeled "Y5P" would exhibit a plus/minus tolerance of 10%variation in capacitance over a temperature range of -30°C. To +85°C. Or it may say N12 which translates to 120pF. Or 2P2 (2.2pF) [2].

Most common type, polarized capacitor Applications: Ripple filters, timing circuits. Cheap, readily available, good for storage of charge (energy).Not very accurate, marginal electrical properties, leakage, drifting, not suitable for use in hf circuits, available in very small or very large values in μF.

Tantalum - Made of Tantalum Pent oxide. They are electrolytic capacitors but used with a material called tantalum for the electrodes. Superior to electrolytic capacitors, excellent temperature and Frequency characteristics when tantalum powder is baked in order to solidify it, a crack forms inside an electric charge can be stored on this crack. Like electrolytic, tantalums are polarized so watch the '+' and '-' indicators. Mostly used in analog signal systems because of the lack of current-spike-noise. Small size fits anywhere, reliable, most common values readily available. Expensive, easily damaged by spikes, large values exists but may be hard to obtain. Largest in my own collection is 220μF/35V, beige color Super Capacitors - The Electric Double Layer capacitor is a real miracle piece of work. Capacitance is 0.47 Farad (470,000 μF) Despite the large. As we see in (Table 1.4).

Capacitance value, its physical dimensions are relatively small. It has a diameter of 21 mm (almost an inch) and a height of 11 mm (1/2 inch). Like other electrolytic the super capacitor is also polarized so exercise caution in regards to the break-down voltage. Care must be taken when using this capacitor. It has such large capacitance that, without precautions, it would destroy part of a power supply such as the bridge rectifier, volt regulators, or whatever because of the huge inrush current at charge. For a brief moment, this capacitor acts like a short circuit when the capacitor is charged. Protection circuitry is a must for this type.There are some pictures about capacitors as we see in fingers (1.6 & 1.7).

Figure 1.6 Some of Capacitors [2]

Figure 1.7 Capacitors Collection [2]

Table1.4 Capacitance Conversion [2]

Microfarads (µF)	Microfarads (µF)	Microfarads (µF)
0.000001µF	0.001nF	1pF
0.00001µF	0.01nF	10pF
0.0001µF	0.1nF	100pF
0.001µF	1nF	1000pF
0.01µF	10nF	10,000pF
0.1µF	100nF	100,000pF
1µF	1000nF	1,000,000pF
10µF	10,000nF	10,000,000pF
100µF	100,000nF	100,000,000pF

1.4 Integrated Circuits

As with many inventions, two people had the idea for an integrated circuit at almost the same time. Transistors had become commonplace in everything from radios to phones to computers, and now manufacturers wanted something even better. Sure, transistors were smaller than vacuum tubes, but for some of the newest electronics, they weren't small enough.

But there was a limit on how small you could make each transistor, since after it was made it had to be connected to wires and other electronics. The transistors were already at the limit of what steady hands and tiny tweezers could handle. So, scientists wanted to make a whole circuit -- the transistors, the wires, everything else they needed -- in a single blow. If they could create a miniature circuit in just one step, all the parts could be made much smaller.

1.5 Diodes

Here's another installer component you should always have handy. Blocking diodes are one way valves used in electrical circuits. These are very simple devices that are often real time savers .As we see in fig (1.8), rating of the diode, there are only three basic things to remember.

Cathode (side with the stripe), anode (side without the stripe), anytime the cathode is more positive than the anode, no current will flow.

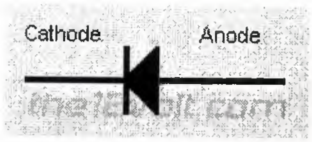


Figure 1.8 Diode Types [4]

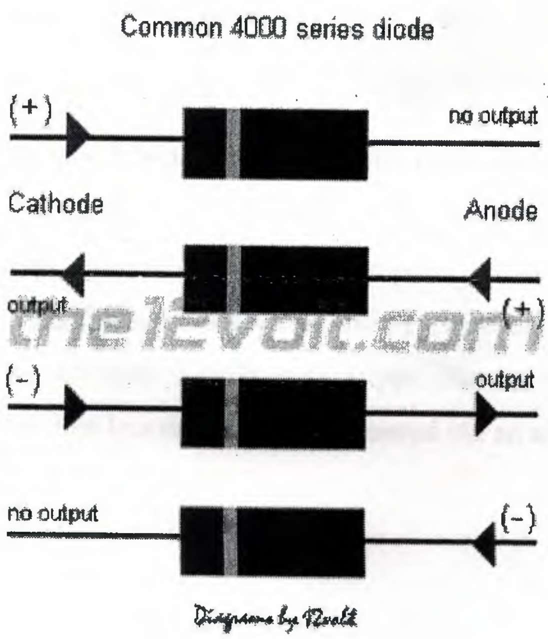


Figure 1.9 Diodes [4]

1.5.1 Diode across the Coil of a Relay:

The diode provides a path for current when the current path to the is interrupted (i.e. switched off). This allows the coil field to relay collapse without the voltage spike that would otherwise be generated. The diode protects switch or relay contacts and other circuits that may be sensitive to voltage spikes.

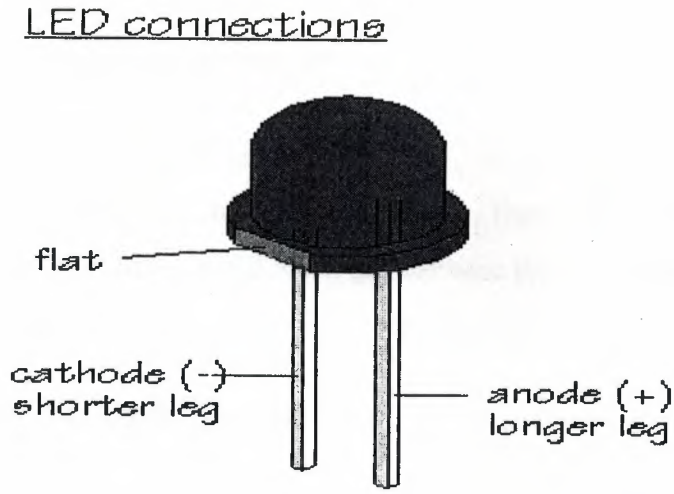
1.6 Switches

Only one type of switches is used in the project. And here is little chance of confusion since one is a push-bottom type. And there is other is a miniature toggle switch (i.e. it is operated via small lever).

The push-button switch must be a push-to-make type, and it must not be a latching type. In other words, the tow tags are connected together when the switch is operated, and disconnected when the push button is released there should be no problem in obtaining a switch of the correct type as these are the most common and cheapest type of push button switch.

A standard size toggle switch is also Suitable, but a much larger mounting hole will be required (usually about 13 mm or 1/2 in Diameter).in the component list the toggle switch is specified as an SPST type, and this means a Single pole, single -throw type switch, and switch of this type are sometimes advertised as on/off switches rather than SPST type. Some of the projects uses rely with a push-bottom type. But we will use just that's type (SPST) in my project. Then this is a switch that is operated via an electromagnet, and is not operated manually.

1.7 Photocell



Finger 1.10 LED Connections [7]

The photocell used in the light activated circuits is an RPYA which is small cadmium supplied photo-resistor, and physical is flat, about 5mm square, and has the two lead-out wires coming from one edge. It looks very much like small ceramic plate capacitor, in fact. Like an ordinary resistor, a cadmium supplied photocell is not a polarized component and can be connected into circuit either way round. The light –sensitive surface of the component is the one having a gold patterned surface, and not the one to which the two lead out wires can be clearly seen to connect. This device is a light-dependent resistor. It is most sensitive to visible light in the red.

1.7.1 Infrared Reflectance Sensor

This device combines an infrared LED light source and a phototransistor light detector into a single package. The LED and the detector point out of the package, almost parallel to each other. The detector will measure the light scattered or reflected by a surface a short distance away. The package also contains an optical filter (colored plastic) that transmits primarily only the infrared light from the LED; this reduces, but does not eliminate, the sensitivity to ambient light.

1.7.2 Infrared Slotted Optical Switch

This device is similar to the IR reflectance sensor, in that it contains both an infrared source and a filtered infrared phototransistor detector. However, the two are mounted exactly opposite each other with a small, open gap between them. The sensor is designed to detect the presence of an object in the gap that blocks the light.

1.7.3 Modulated Infrared Light Detector

This device senses the presence of infrared light that has been modulated (e.g., blinks on and off) at a particular frequency. These devices are typically used to decode the signals of TV remote controls, Application to detect the infrared beacon of the opponent robot. Photocells are made from a compound called cadmium sulfide (CdS) that change in resistance when exposed to varying degrees of light. Cadmium sulfide photocells are most sensitive to visible red light, with some sensitivity to other wavelengths. Photocells have a relatively slow response to changes in light. The characteristic blinking of overhead fluorescent lamps, which turn on and off at the 60 Hertz line frequency, is not detected by photocells. This is in contrast to phototransistors, which have frequency responses easily reaching above 10,000 Hertz and more. Therefore, if both sensors were used to measure the same fluorescent lamp, the photocell would show the light to be always on and the photo-transistor would show the light to be blinking on and off [7].

Photocells are commonly used to detect the incandescent lamp that acts as a contest start indicator. They are also used to find the light beacons marking certain parts of the board, such as the goals. While they can be used to measure the reflectivity of the game board surface if coupled with a light source such as a red LED or an incandescent lamp, the IR reflectance sensors are usually better at this function. Photocells are sensitive to ambient lighting and usually need to be shielded. Certain parts of the game board might be marked with polarized light sources. An array of photocells with polarizing filters at different orientations could be used to detect the polarization angle of polarized light and locate those board features.

1.8 Sensors

For example a robot without sensors, is just a machine. Robots need sensors to deduce what is happening in their world and to be able to react to changing situations. This chapter introduces a variety of sensors and explains their electrical use and practical application. The sensor applications presented here are not meant to be exhaustive, but merely to suggest some of the possibilities. Please do not be limited by the ideas contained in this chapter.

1.8.1 Sensors as Transducers

The basic function of an electronic sensor is to measure some feature of the world, such as light, sound, or pressure and convert that measurement into an electrical signal, usually a voltage or current. Typical sensors respond to stimuli by changing their resistance (photocells), changing their current flow (phototransistors), or changing their voltage output (the Sharp IR sensor). The electrical output of a given sensor can easily be converted into other electrical representations.

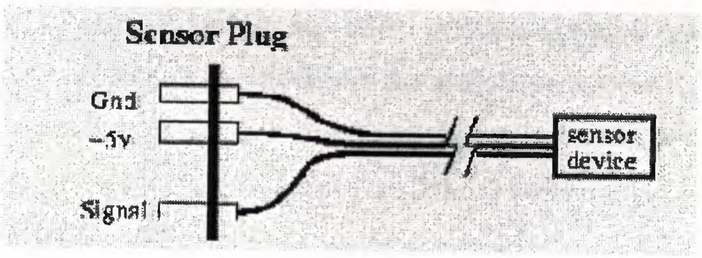


Figure 1.11 Type of Sensor [5]

1.9 Loudspeaker

Figure 1.12 Loudspeakers [6]

Loudspeaker history: Ernst W. Siemens was the first to describe the "dynamic" or moving-coil transducer, with a circular coil of wire in a magnetic field and supported so that it could move axially. He filed his U. S. patent application for a "magneto-electric apparatus" for "obtaining the mechanical movement of an electrical coil from electrical currents transmitted through it" on Jan.20, 1874, and was granted patent No. 149,797 Apr14, 1874. However, he did not use his device for audible transmission, as did Alexander G. Now the last generator of loudspeaker The Verity Group in Britain formed , now known as the develop the Distributed-Mode Loudspeaker (DML) based on the 1991 patent by Dr Ken Heron of Britain's [6] .

1.10 Potentiometer

A potentiometer (or "pot," for short) is a manually-adjustable, variable resistor. It is commonly used for volume and tone controls in stereo equipment. On the Rob Board a 10k pot is used as a contrast dial for the LCD screen, and the Rob Knob of the board is also a potentiometer. In robotics, a potentiometer can be used as a position sensor.

This will yield readings of greater precision (although they will not be linear) than if the pot were used as a two-terminal variable resistor. You may want to try different circuits to determine which works best for your application.

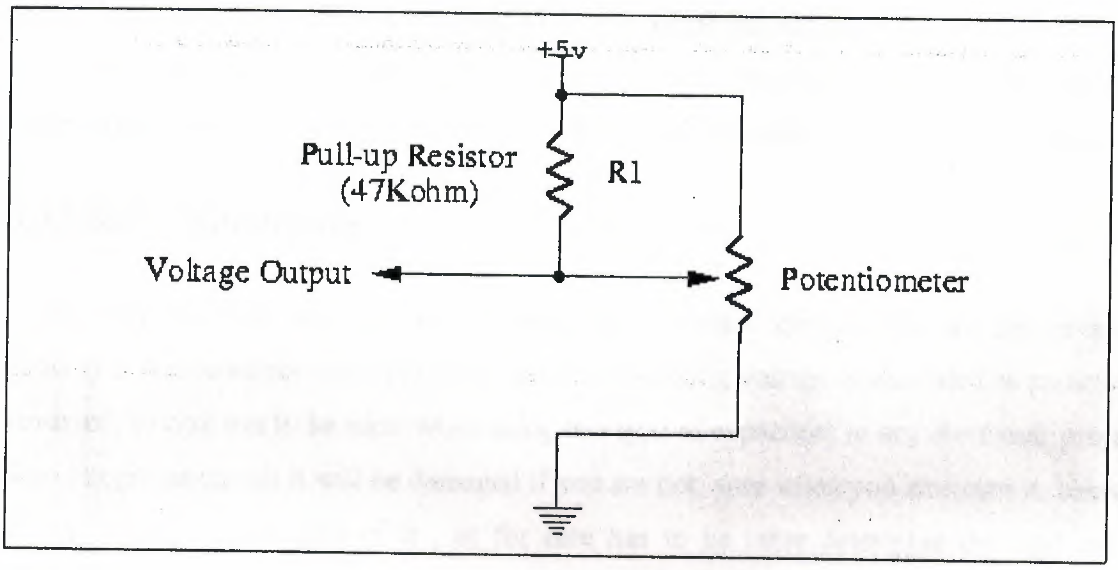


Figure 1.13 Potentiometer Circuits [5]

1.11 Semiconductors

The transistor was probably the most important invention of the 20th Century In 1906; the eccentric American inventor Lee De Forest developed a triode in a vacuum tube.

It was a device that could amplify signals, including, it was hoped, signals on telephone lines as they were transferred across the country from one switch box to another. AT&T bought De Forest's patent and vastly improved the tube. It allowed the signal to be amplified regularly along the line, meaning that a telephone conversation could go on across any distance as long as there were amplifiers along the way but the vacuum tubes that made that amplification possible were extremely unreliable, used too much power and produced too much heat. In the 1930s, Bell Lab's director of research, Mervin Kelly, recognized that a better device was needed for the telephone business to continue to grow. He felt that the answer might lie in a strange class of materials called semiconductors. Transistors it has three lead-out wires which are called the base, emitter, and collector [5].

1.12 Safety Guidelines

We will see how we may destroy sensitive integrated circuits that are not properly protected, the capacitor will explode if the rated working voltage is exceeded or polarity is reversed, so care has to be taker when using this type of capacitors in any electronic project. For integrated circuit it will be damaged if you are not sure when you structure it, because it may damage some pins of it , as for care has to be taker determine the lead-out of transistors because we may not be able to distinguish between them. The (Ohmmeter device) it will use to determine all points (lead-out) in our electrical components. As for diodes we will use the (ohmmeter device) to make determine the (lead-out) input and output about it in structure by properly, not inversed on the Board. When we make weld the components on the board we will take care in this step. We will be in the safe side if you apply these steps properly.

1.13 Summary

This chapter presented general background on electronic components. We have seen how the resistors are working, as well as how can we determine their values through the color code. And for the capacitors we have seen how it's working and from what they are made. We have seen some information about the history of loudspeakers since its beginnings up to today. Also we have explained about each of the following: potentiometer, sensor, and photocell and how are working. We should not ignore the importance the diode; we have included some pictures about it.

CHAPTER TWO

INFORMATION ABOUT ALARM SYSTEMS

2.1 Overview

This chapter will present general information about alarm systems.

2.2 Alarm System Categories

The Alarm System it's a detection signaling system that is considered to be the combination of interrelated signal initiating devices, signal indicating devices, control equipment, and interconnecting wiring installed for a particular application monitored Alarm System.

An alarm system which reports detected conditions to a monitoring facility monitoring facilities are usually located off-site from the protected premises. When a monitoring facility is located within the building or complex that includes the protected premises, the alarm system is called a Proprietary system. Protected Premises the physical site at which an alarm system is installed and operational [9].

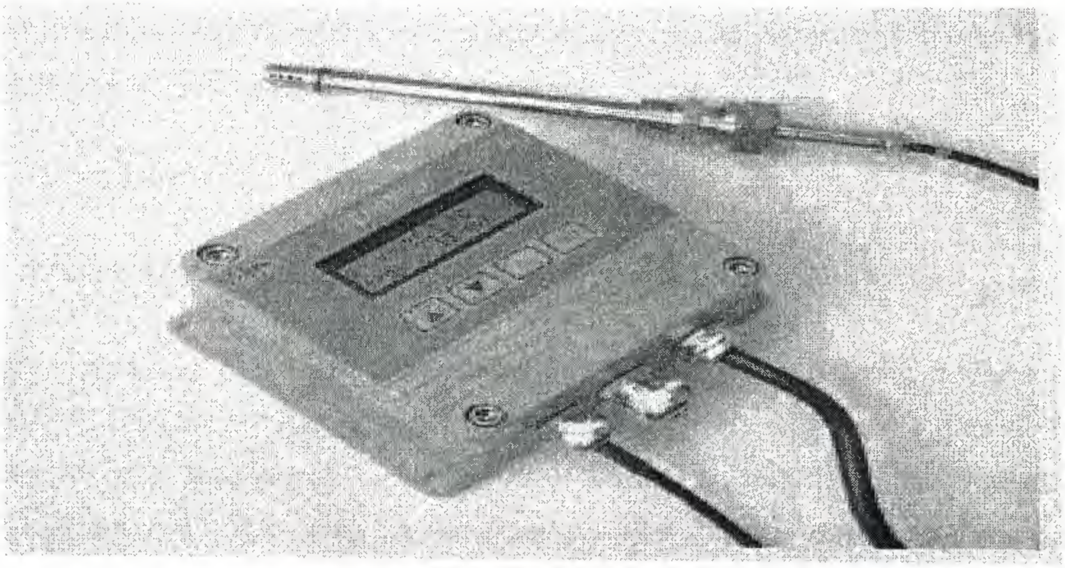


Figure 2.1 It Presented Water Activity Alarm Device [10]

2.3 Types of Alarm Systems

Alarm systems are divided into several broad categories, as listed below. The terms used to identify each type may vary, depending on who is using the term; however, the system we will description as we see later.

2.3.1 Fire Alarm

A system that detects and reports a fire in the protected premises, detects and reports water flowing in a sprinkler system, or detects and reports dangerous conditions such as smoke or overheated materials that may combust spontaneously. Household Fire Alarm: A fire alarm system that protects a household, as opposed to any other type of occupancy.

2.3.2 Hold-Up Alarm

A system that reports the presence of one or more criminals attempting to take goods or funds with implied or actual threat of force.

2.3.3 Duress Alarm

A system that reports the presence of one or more persons trying to force an individual to enter, or re-enter, a facility against the individual's will. Note: Although the triggering devices for hold-up, duress, and panic alarms are often the same or similar, police response may differ. A duress alarm, for example, may be designed to detect and silently report an employee being forced back into a protected facility to provide access to a safe, vault, drug storage area, or area containing confidential records. The intent is generally not to make the criminal aware that a call for help is being triggered to the monitoring facility. In a residential environment, a duress alarm could signal an abduction or rape attempt [9].

2.3.4 Panic Alarm

A system that reports a more general type of perceived emergency, including the presence of one or more unruly or inebriated individuals, unwanted persons trying to gain entry, ob-served intruders in a private yard or garden area, or a medical emergency. Provides police with little specific information, but is often the only way a user can call for assistance under abnormal conditions.

2.3.5 Medical Emergency (Service) Alarm

A system that reports a medical problem for response by relatives, friends, neighbors, or by a community's EMS personnel, paramedics, or ambulance, depending on arrangements made with the monitoring facility.

2.3.6 Heating, Ventilation, Air Conditioning (HVAC) Alarm

These systems are reports heating and ventilation as well as the air conditioning system problems, rather than life-threatening emergencies.

2.3.7 Single Sensor Alarm

Those types from (2.3.7-2.3.9) are important in my project because it is including some information about it.

A sensor detects the emergency condition and causes an alarm to be transmitted to the monitoring facility or to be indicated audibly or visually. Some sensors use single switches to trigger the alarm; other sensors require that two switches activate before the alarm is triggered. Some sensors use two or more detection technologies and require that two or more technologies sense the emergency condition before the alarm is triggered. All of these are single sensors.

2.3.8 Multiple Sensor Alarm

An alarm generated when at least two separate sensors detect the condition before the alarm is triggered. In some instances, redundant sensors in different system zones must trip before the alarm is triggered. However, activation of one sensor may trigger a trouble or pre-alarm signal.

For example: Smoke detectors that is cross-zone-wired so that two or more zones must detect the smoke before an alarm condition is created.

Public emergency response or dispatch personnel are not normally contacted when these alarm systems detect a problem; protected property maintenance personnel tend to be notified by the monitoring facility.

2.3.9 Sequential Alarm

When two or more sensors sequentially detect a condition and each triggers an alarm. When this happens, there is a high probability that a real emergency exists.

2.3.10 Industrial Process Alarm

A system that provides supervision for a wide variety of commercial and industrial processes, including sump-pump operations, water levels, pressures and temperatures, chemical processes, and special furnace operations, to name but a few. Normally, user employees or sub-contractors are notified when these systems report problems. in this type we will focus on it because this type it important about my project.

2.4 Event Types

We will presents some information about event types alarms it is including explaining all types. The Event is one or more related alarm or trouble signals.

Alarm an electronic signal, transmitted to the monitoring facility. Indicates that an emergency requiring follow-up has been detected. When an alarm system is not monitored, the alarm condition activates one or more sounding or visual indicating devices.

2.4.1 Dispatch able Event

An unexpected alarm that triggers an event. An alarm does not become a dispatch able event until the monitoring facility has followed its established procedures such as verification or other confirmation that the alarm requires further action. Subsequent signals from the same type of alarm system are part of the original dispatch able event until the event is resolved and the system has been reset. When an alarm is determined to be a dispatch able event, a request for response is made to the appropriate response agency or agencies.

2.4.2 False Alarm

An alarm event indicating the presence of an emergency condition when none exists. Please visit our False Alarm Information page for more information.

2.4.3 Test

The act of activating one or more sensors, devices, controls, communicating devices, or other components of an alarm system in an effort to confirm proper operation of the equipment.

2.4.4 Transmission Test

Verification of the ability of a system control to send signals to the monitoring facility which it is intended to notify.

2.4.5 Inspection

A visual survey of the appearance of an alarm installation intended to discover any obvious problems. Typically these might be alarm system wires that have been covered up during building construction or remodeling, loose doors or windows that may cause false alarms during storms, sprinkler risers and controls that may be blocked by merchandise making fire department access difficult or impossible during emergencies, etc. An inspection may include actual tests of alarm system sensors, controls, or transmitters.

2.4.6 Reset

A return to normal operation for an alarm system that has been in a trouble condition, out of service, or in an alarm condition. When a system has been "reset" it is back in full operation and subsequent signals received from the system will be treated normally. A reset is more than merely the restoration-to-normal of a sensor, or an abort message or call from the user. With a reset event, the system is back in full and normal operation

2.4.7 Abort

A telephoned voice call or an electronically transmitted message, with appropriate safeguards as to authenticity that indicates a just-transmitted alarm event is not to be reacted to as an emergency. An abort is also a procedure to prevent an alarm signal from being sent to the monitoring facility.

2.5 Users of Alarm Systems

User: The person responsible for the correct operation of the alarm system (the boss, the buyer). Not necessarily the person who actually operates the alarm system. System Operator: A person who operates an alarm system. Such person is assumed to have been taught how to arm, or how to arm and disarm the system, and how to prevent alarm signals from being transmitted to the monitoring facility unnecessarily or by mistake. A system operator may, or may not, be an authorized user agent.

2.6 Control Equipment at Protected Location

Equipment and devices that make the system at the user location function properly. We will explain about control equipment start by keypad.

Keypad: The portion of the arming station containing numbered push buttons similar to those on telephones or calculators. These control the arming or disarming of the system. They may also perform other functions. And about key switch it is used an alternate device used to arm or disarm the alarm system, instead of a keypad.

2.6.1 Signal Indicating Device

A device that provides an audible or visual indication that an emergency condition has been detected. Audible devices include electronic sounders, bells, horns, and sirens. Visual devices include incandescent or strobe lights. Signal indicating devices also include panels that provide lamps or schematic building diagrams to identify the specific location of the sensor or sensors that detected an emergency, or that are in.

2.6.3 Delay Zone

One or more sensors in an alarm circuit that are wired so that, when triggered, a specific time delay results before an alarm condition is generated. Delay zones are often created for the most frequently used exit and entry doors to allow for sufficient time for normal entry and exit without causing alarm conditions.

2.6.4 Zone (with sensors)

An identifiable sensor or group of sensors, connected to an alarm control that can be addressed and manipulated from the control, from the monitoring facility, or from an arming station.

2.7 Sensors (In Alarm Systems)

Double-Action Trigger: A sensor that requires separate simultaneous actions, or closely-spaced sequential actions before an alarm is transmitted to the monitoring facility. If only one action is taken, a trouble signal may be transmitted or logged and annunciated. Dual-Technology Trigger: A sensor that uses two or more separate technologies, two of which must sense the designated condition before the device triggers an alarm signal. If only one technology senses the condition, a trouble signal may be transmitted or logged and annunciated.

Multiple-Activation Trigger: This is not really a special type of sensor. Rather it is a system-designed feature that requires two or more sequential activations of the sensor before an alarm signal is transmitted to the monitoring facility.

The mercury Switch: A set of electrical contacts that are opened or closed as a sphere of liquid mercury encompasses them or is re-moved from them inside a hermetically sealed enclosure. Usually the enclosure is tilted in one direction to close the switch and in the opposite direction to open it. The Capacity Sensor: A sensor that detects a change in capacitance when a person touches or comes in close proximity to an object, such as a safe or file cabinet, insulated from electrical ground potential. Vibration Sensor: A sensor that detects vibrations generated during forced entry or an attempted forced entry.

2.7.1 Fire Alarm Sensors

Flame Detector: A sensor that "sees" the flicker of light emanating from a fire. Manual Fire Alarm Station: A device that permits a fire alarm signal to be triggered manually.

2.7.2 Sprinkler System Water Flow Sensors

A sensor that detects the flow of water in a sprinkler system this type is present a one applied important in my project, so we will explain this in chapter three , The Wet-Pipe Flow Sensor, A sensor that detects the flow of water in a wet-pipe sprinkler system. Dry-Pipe Flow Sensor: A sensor that detects the flow of water in a dry-pipe sprinkler system. Open-Pipe (Deluge) Flow Sensor: A sensor that detects the flow of water in an open-pipe sprinkler system.

Figure 2.2 One Form Sensors

2.8 Summary

This chapter presented some information about alarm system. We have seen some types of Alarm Systems. One of which is related to the alarm in my project: Single Sensor Alarm. As well as there is information about event types, and how we can use the alarm systems in general. We have seen using alarm systems as well as sprinkler system water flow sensors. Have also been describes in this chapter.

CHAPTER THREE

WATER ACTIVITY ALARM

3.1 Overview

This chapter will present detailed technical information about the water- activity alarm. Also we will include the components of this project. As well as we will show the output graphs of various parts of the circuit.

3.2 Why we need this device?

We can use this device to detect the water in any place, for example in our homes we all have water pipes in kitchens all this may need to detect when we are have been the loss of water, in this case we can use this device to put in all places may occur water lack .

Also we can use this device in swimming pools as we seen before in first case, we can put many sensors for any place around the pool, it will be signal by LED or by hearing to alarms audios in the speaker's device.

Just one device like my device it will use for measuring water level in any water tanks in our homes or any other place, for example we can use it in the homes water tanks as we see (electrical circuit of pump).let's go to explaining our circuit by (circuit maker programs) .

3.3 Components of project (Water Activity alarm)

- R1 100K (Brown, Black, Yellow, Gold)
- R2 100K (Brown, Black, Yellow, Gold)

- R3 33K (Orange, Orange, Orange, Gold)
- R4 33K (Orange, Orange, Orange, Gold)
- R5 2.7M (Red, Violet, Green, Silver)
- R6 1K (Brown, Black, Red, Gold)
- R7 10K (Brown, Grey, Orange, Gold)
- R8 18K (Brown, Grey, Orange, Gold)

There is a four capacitors, it is a difference in qualities; it will contact with a circuit as we will see in the figure (3.1).

- C1 100 ηF Polyester (Brown, Black, Yellow, Black, Red)
- C2 33 μF 10 V Tantalum
- C3 10 ηF Polyester (Brown, Black, Yellow, Black, Red)
- C4 10 μF 25V Electrolytic

We have two Integrated circuits and two Transistors, it be definition a semiconductors.

- IC 1 TL 081 CP
- IC 2 LM 380N
- Tr 1 BC 109 C
- Tr 3 BC 179

There is one switch can we use it in our project also we will use another one in devolvement this circuit. We will be including that in chapter fore.

- S1 (SPST) Miniature toggle type

But about loudspeakers just one type we used in our project.

- LS1 The value between (40 – 80 ohms)

We use it here one power supple in project:

- B1 PP6 Size 9 volt and connector to suit

The Miscellaneous (sensor) it can makes from two non insulated wires placed on a plastic or other insulated base, with the smallest possible gap between the two wires. Alternatively a small piece of strip board or a sensor made from printed circuit board could be used.

We have here three LED photocells it was use in project. The red one is dictates here to show signal alarm, when sensor works, as well as the yellow LED show also, but it will be on, to make reset to the circuit, but the green one it work when ever power give the circuit, we will see that as well.

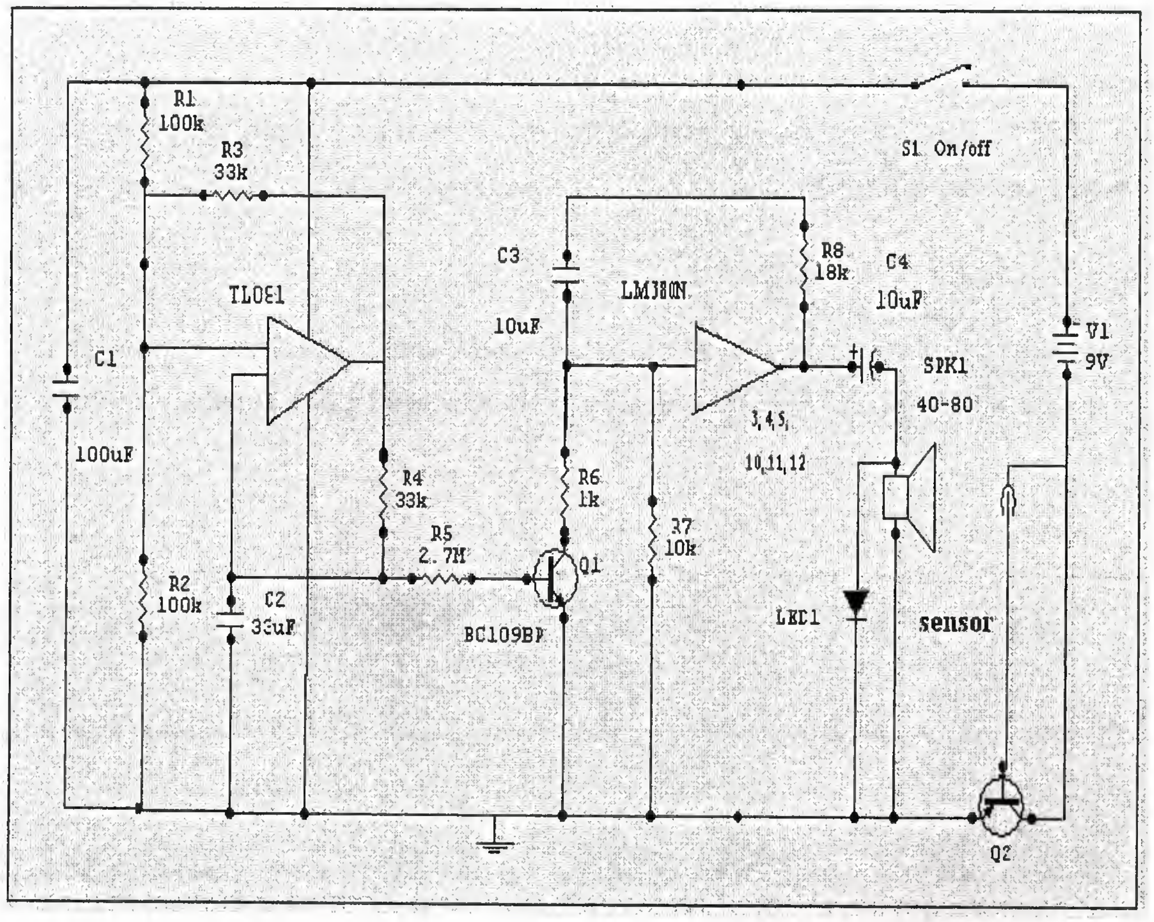


Figure 3.1 Circuit of Water –Activity Alarm

3.4 Explaining diagram Circuits

The water activity alarm is a project worked as detect the water by a simple sensor. The audio alarm signal it is a tone by a speaker, which is slowly varied up and down in frequency.

The applications for this unit it is use to detector a rain or any losses of water from any place. In the project we will development by added some component to get a new unit may we need it in our home or as well in the future as possible.

This project is contend electrical component, we will explain all them one by one from resistor to loudspeaker and capacitor as we will see later, we use type of switch (SPST) we will applied explain it, and as we will see I will find some component to development my circuit project .

The component it is a simple sensor, it can consist of tow non-insulating wire placed on plastic or other insulating base, with the smallest possible gap between the two wires.

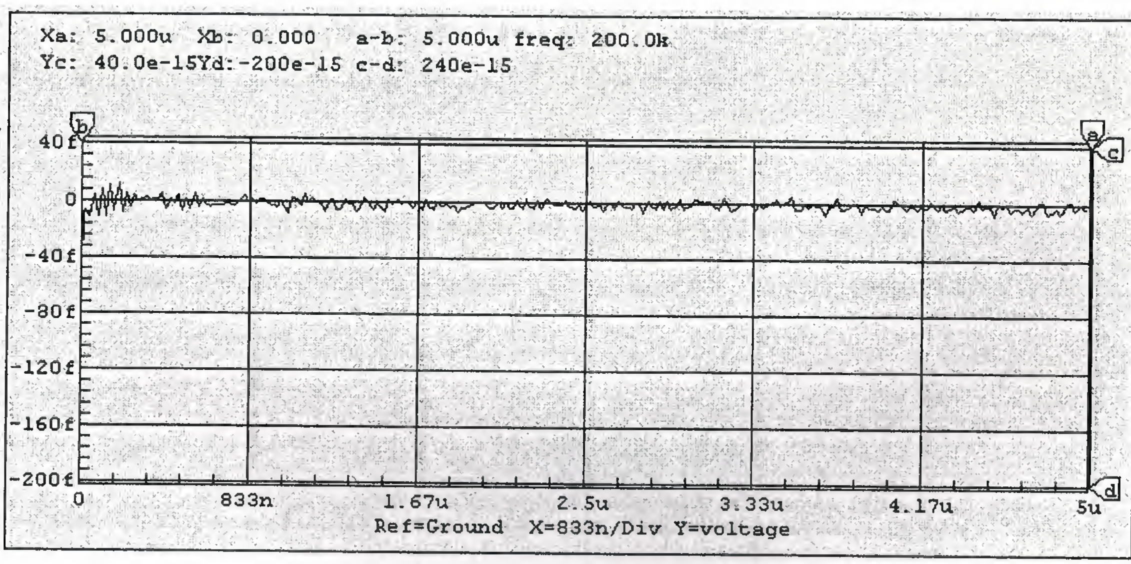


Figure 3.2 The output of IC LM380N

We will start explaining the circuit from the supply (in pout) to the output of IC LM380N (input of speaker). When we click to switch 1 the currant it will be give feed the circuit power supply as we seen in figure (3.1).

In fact, from understanding this circuit .I seen the integrated circuits with all components which we used in our circuit, it is working as amplifiers of current; also it's making a tones for give audio alarms.

As we said, after the power supply which feed the integrated circuit it will given in the output it wave as we seen in figure (3.2), it is like sine wave; may reading that by loudspeaker on form audio . But we know the power supply is (DC) direct currents, that's mean the frequency is zero. So by work these components together, it's will give in the output, a difference wave, as we seen in figure (3.2).

The figure (3.3) as we seen it is slope of power. The slopes it is a prove the power it is decries slow from up to down as we seen. The low of power is P = I.V, or P = I^2.V, or P = V^2/R.Which V: Volt, P: powers, and I: Currents.

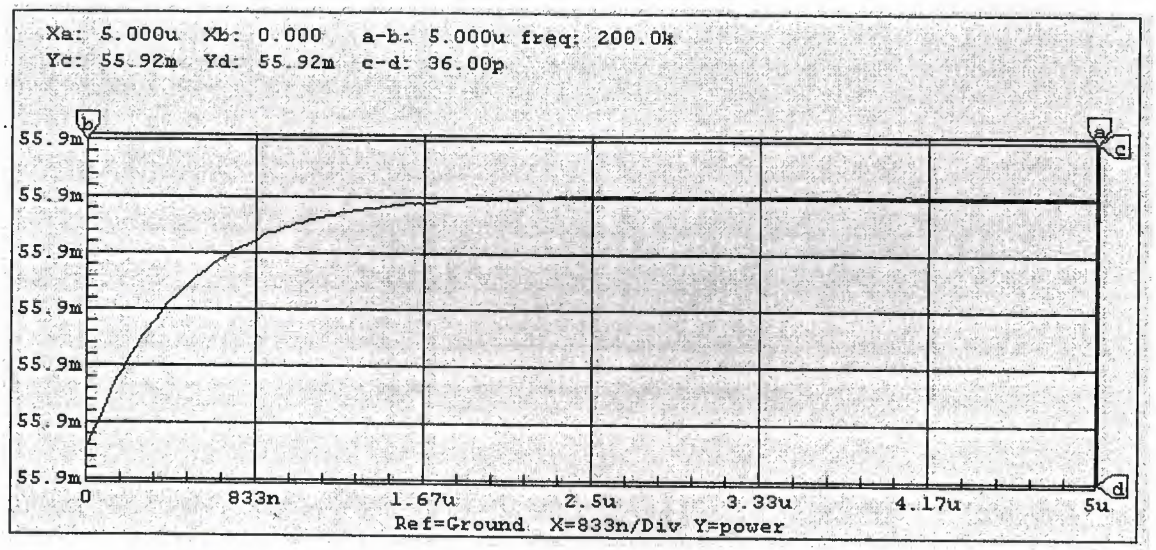


Figure 3.3 Shown a curve of power

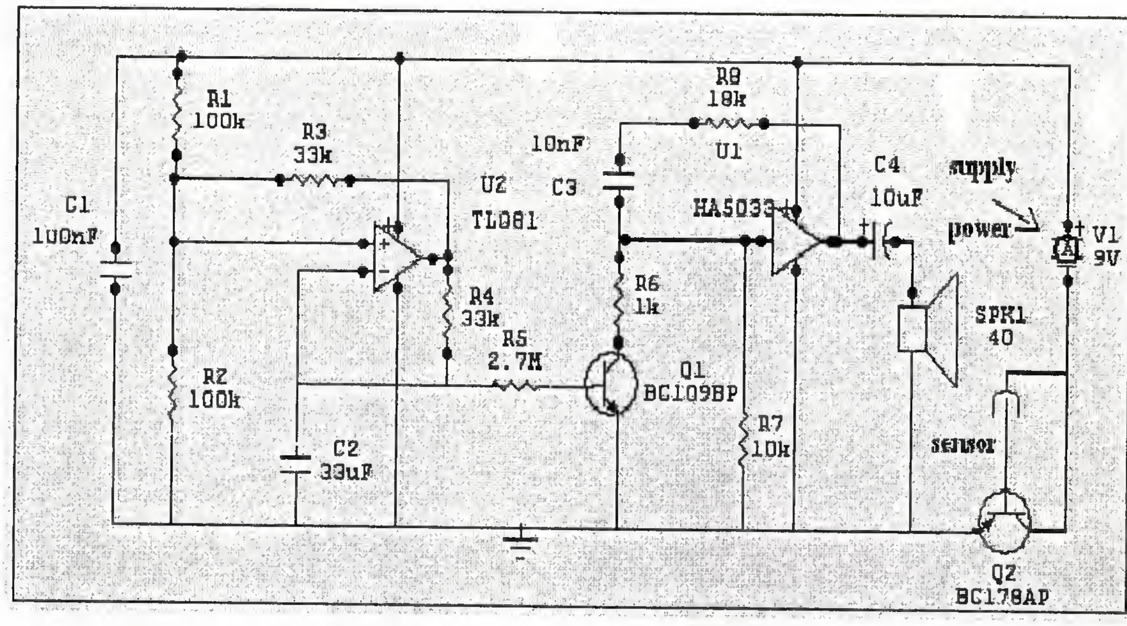


Figure 3.4 The point (A) show power of circuit

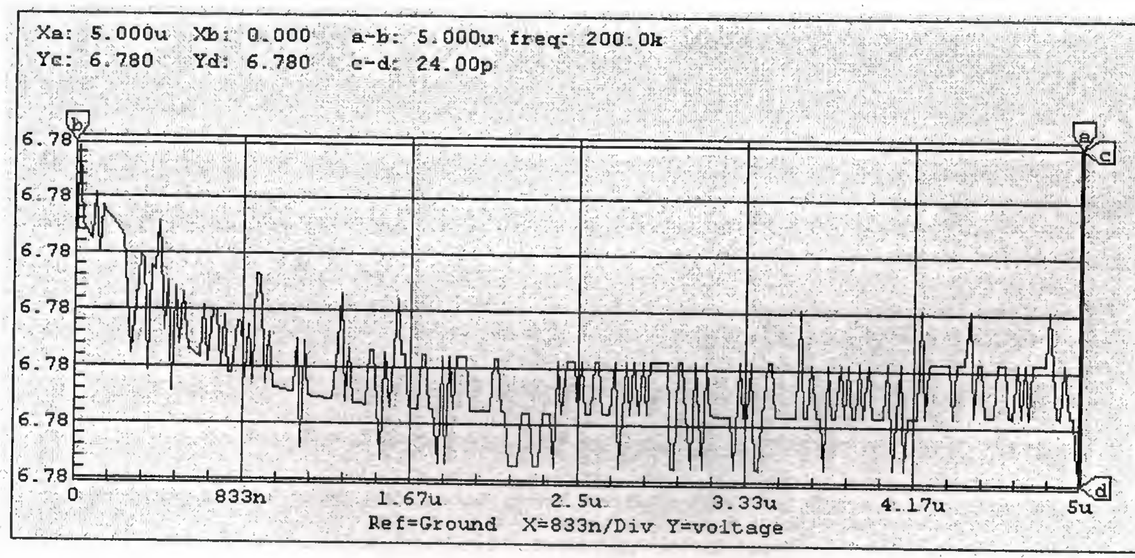


Figure 3.5 Draw wave form of output for IC 1, as we see below in point (A) in figure (3.4).

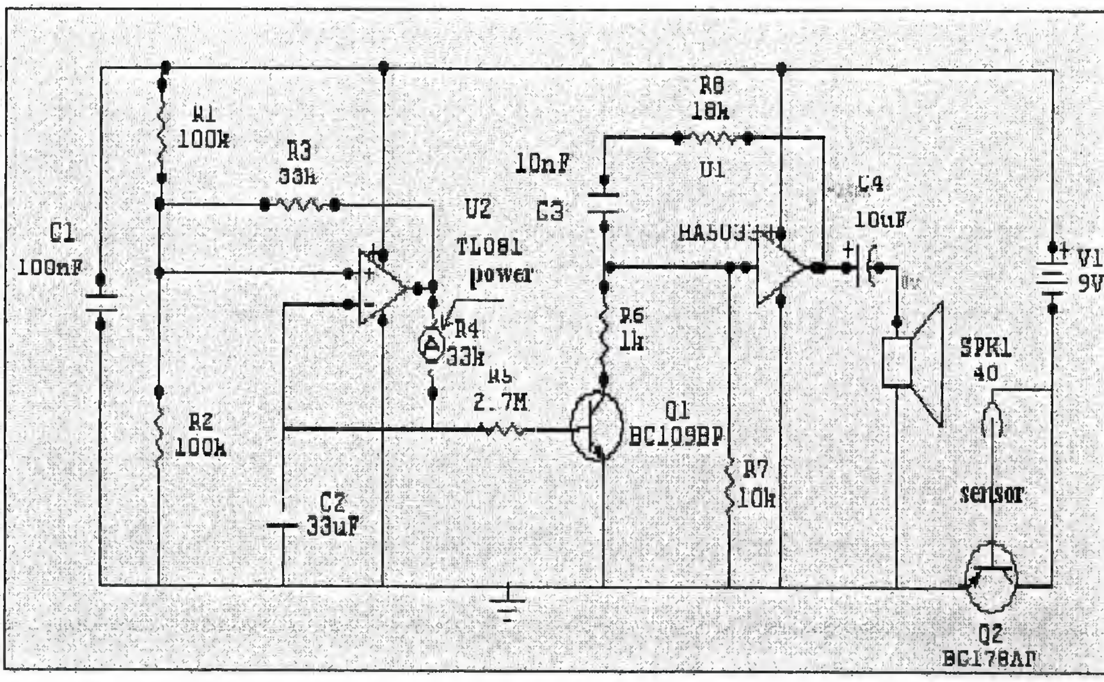


Figure 3.6 The point (A) as we see up, it the curve of power

Actually; we were see a different between previous figures. As we see up the wave form of output of IC TL081 and IC HA5033. Also their different of currents between them .for example the power of output TL081 is (1.134 mw). But the power of another IC is (0.13mw).

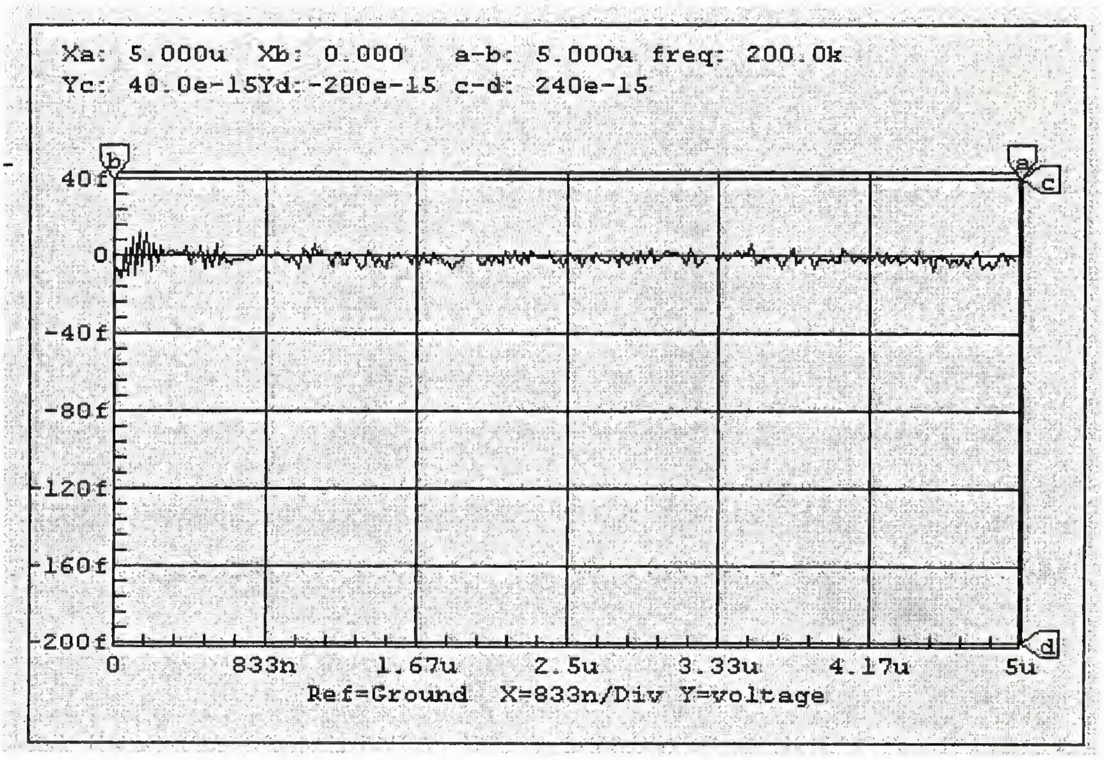


Figure 3.7 The relation between frequency and voltage in input of a speaker

There is a new idea here. As we see up there is a frequency in input of speaker, we know the frequency of source is equal zero, so in this circuit it is generate (AC) alternative current. That means this circuit it makes such as transformer device (opposite), which it makes the transform power from AC to DC. Note figure (3.7).

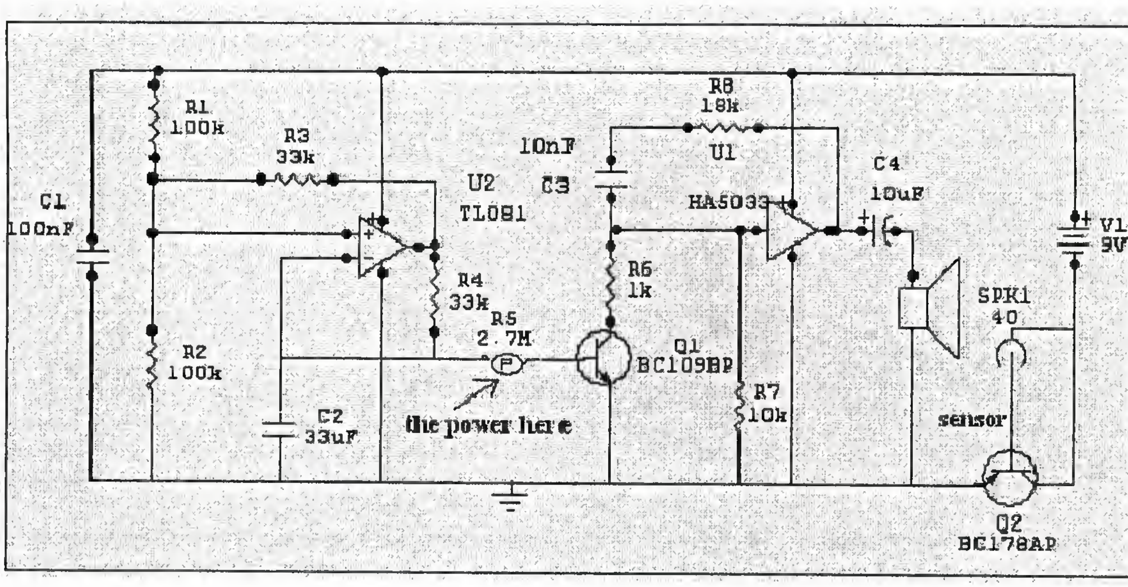


Figure 3.8 The point (P) as we see up, it is presents slope of power

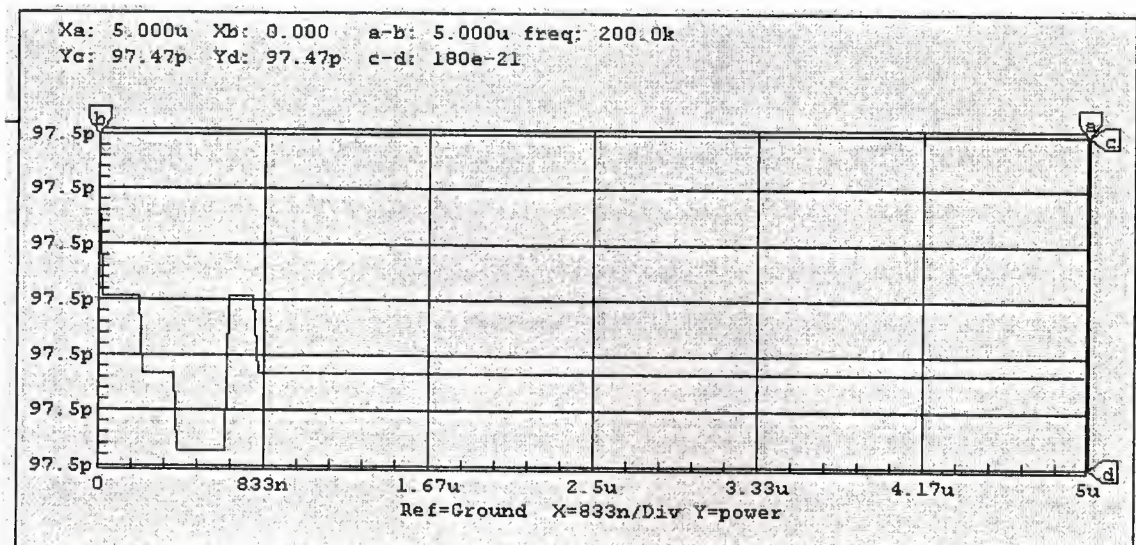


Figure 3.9 Relation between powers in point p and time (see figure 3.8).

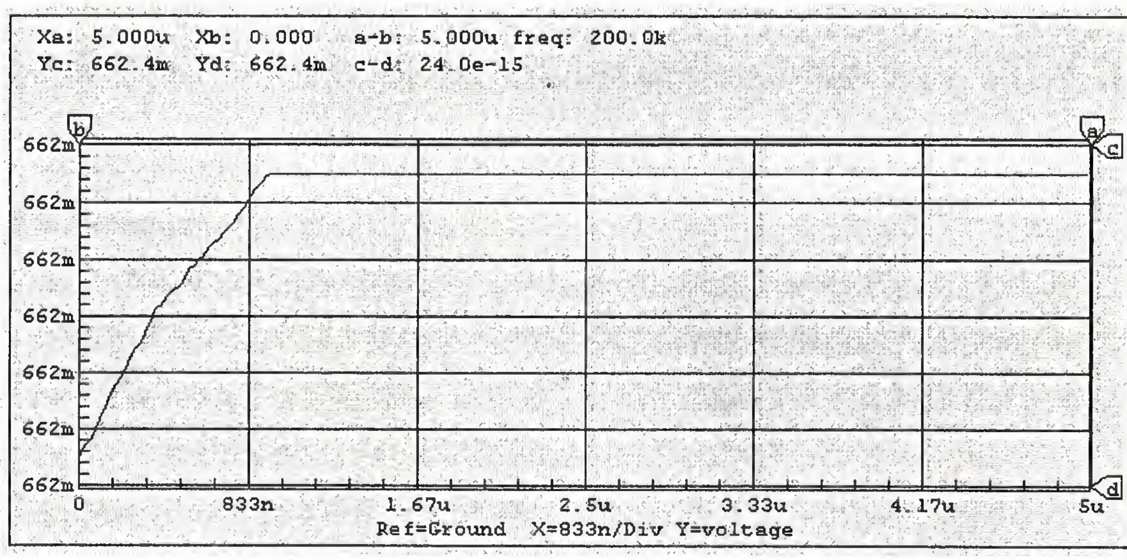


Figure 3.10 Relation between powers of point (V) and time. See figure 3.11

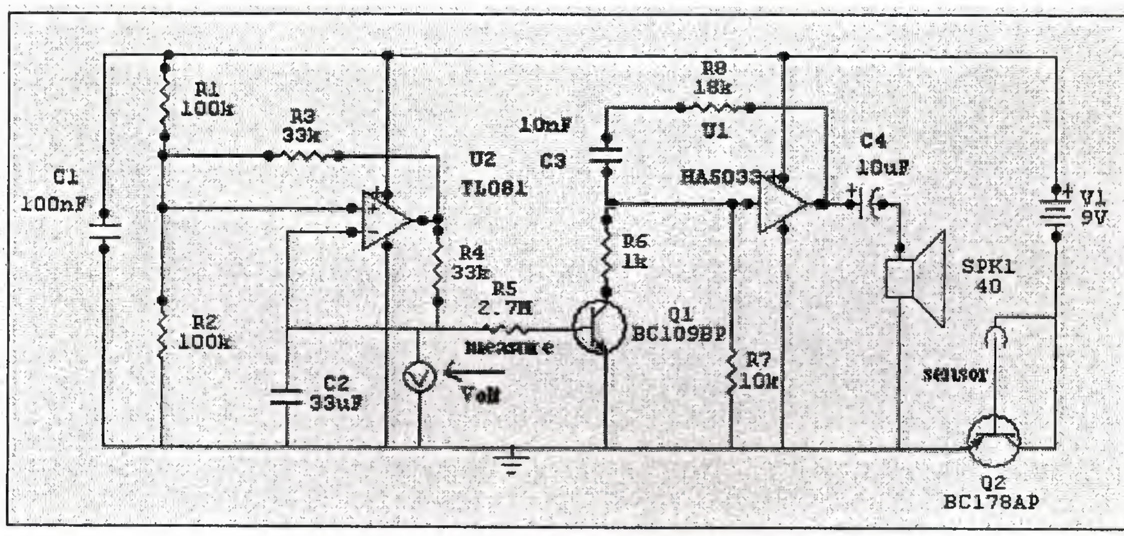


Figure 3.11 Measure volts in point (V).

We are note in figure (3.10) and figure (3.11); the slope of volt is start from point above zero and increasing as we seen in figure (3.10). The volt value of point (v) is equal (662.4mV). There is a notion; some body may ask why the volt of point (p) start from zero at lest and increasing as in figure (3.10), which we toke before about it? The answer is: we know have measure between points of capacitor 33μF which we have seen in figure (3.11).

3.5 Summary

This chapter presented detailed technical information about the water- activity alarm. We have included the components of this project. As well as the circuit diagrams Circuits and output graphs of various parts of the circuit.

CHAPTER FOUR

MODIFICATIONS & RESILTS

4.1 Overview

This chapter will present modification of water- activity alarm. Also we will include the new components which we use in development this project. As well as we will show the output graphs of various parts of the circuit. The results of testing the completed project will also be described in this chapter.

4.2 Components of modification project (Water Activity alarm)

The modification on this original project in clued:

- Relay 1: 12 V DC-CL, 125 V AC, 20A, BLACK ONE
- Relay 2: 12 V DC –SL-C, 240VAC, 7A, BLUE ONE
- R1: from (33 -50 k).
- TR: K.2G C3198 Y.
- S: rest switch (push button switch.)

We have one resistor; a potentiometer it is a manually-adjustable, variable resistor. It is commonly used for volume and tone controls in stereo equipment. But here we use it to make to balance or equilibrium point for circuit, we will explaining that later.

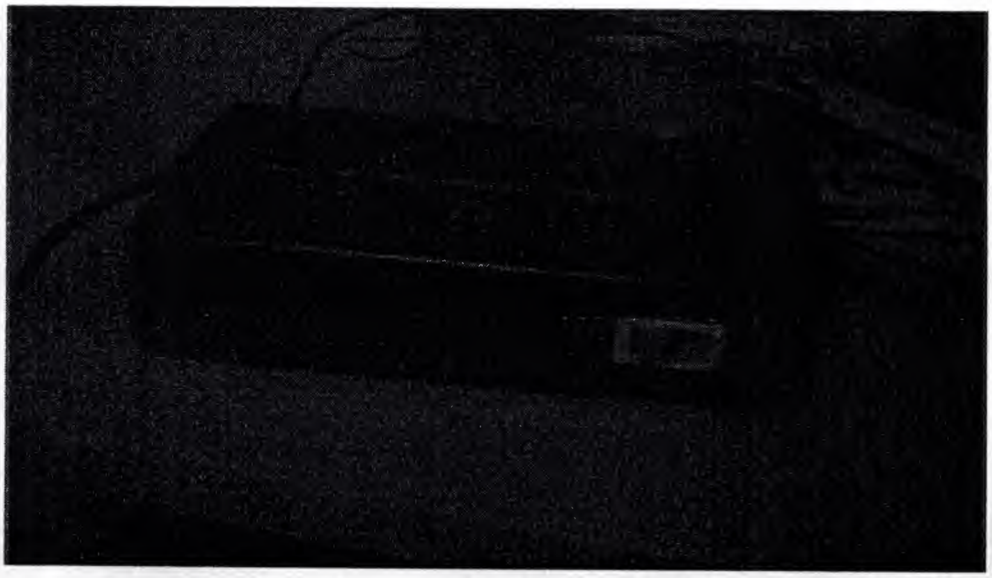


Figure 4.1 The out form of Water Activity Alarm

As we seen in figure (4.1, 4.2), we tacked photo of last out form of water activity alarm device. When I choose this cover, I sow it that is suitable form for my project.

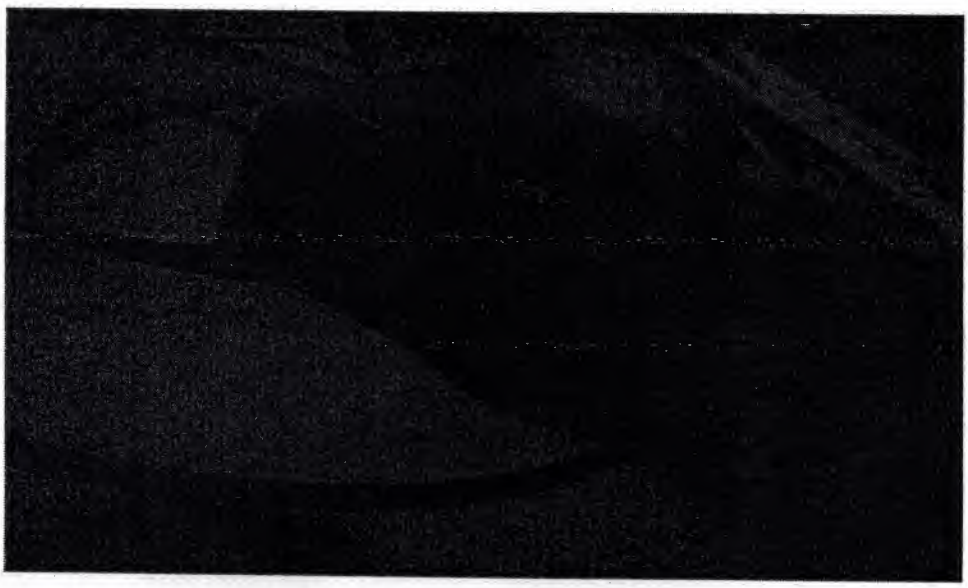


Figure 4.2 The out form of Water Activity Alarm from another side

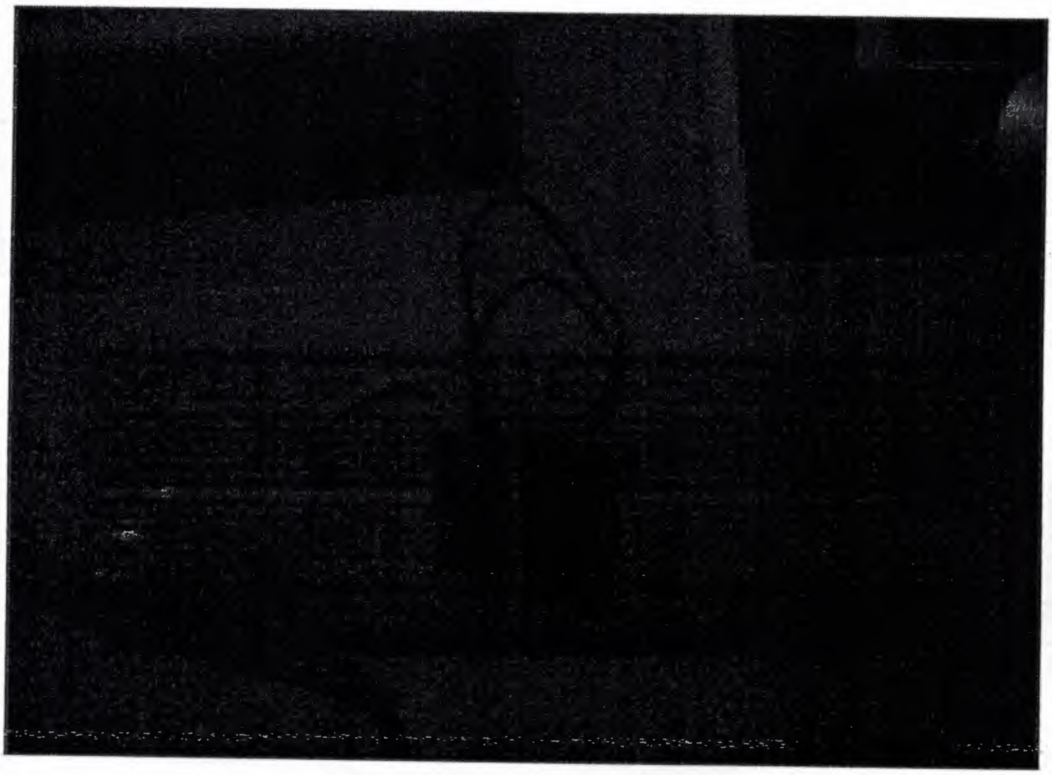


Figure 4.3 The Relays on testing board

4.3 Explaining the circuit

We know the original circuit (water activity alarm) it is working, when the device is detect any waters losses. Now we developed this circuit by adding some components such as relays.

In simply, the new circuit is working with original circuit, which given in output of second relay is 220 V AC/50 HZ, as we see later. In fact, the modification which we added on this circuit may be able to make a new circuit, by a way or another device might be successful in the future hopefully.

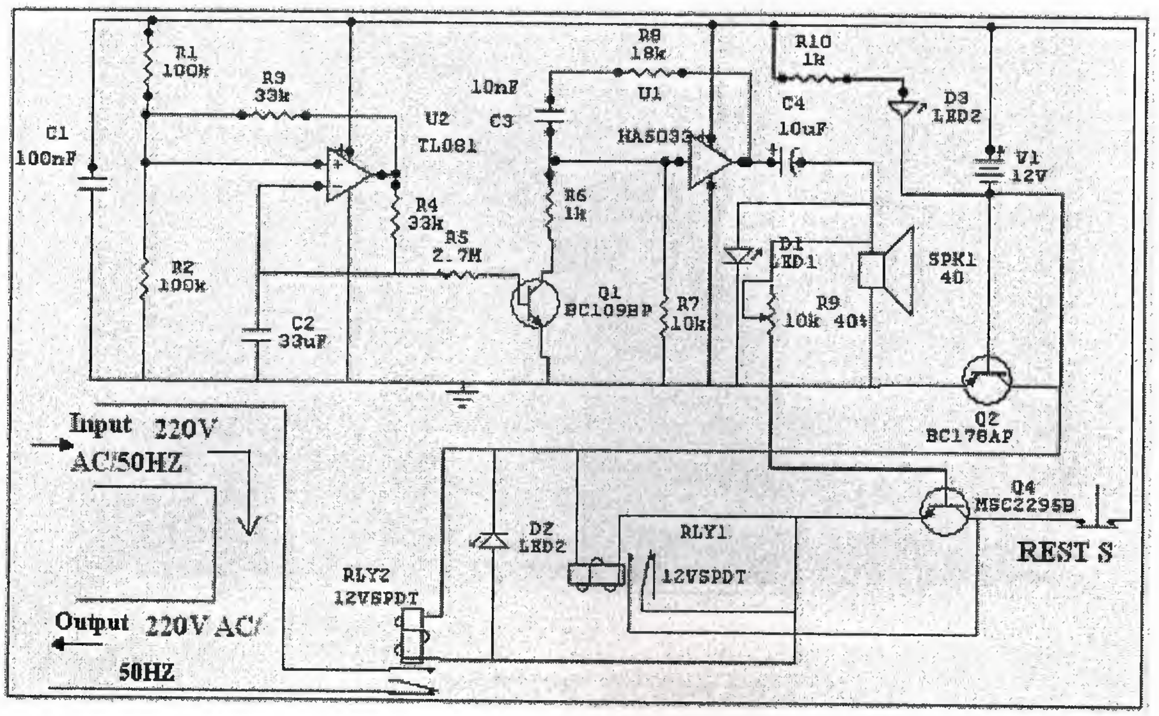


Figure 4.4 The Modification on Water Activity Alarm

Look to figure (4.4), as we see the figure (4.4) is illustrate explaining diagram of circuit, the signal which is coming from side of speaker (+) which is connected with TR MSC22295B, in base of it so the transistor will be working like switch. So the coil of relay 1 will be work than the contact of relay one is change from station one to another, in this case the another relay will be working, as we see above in figure (4.4).

Simply, the contacted of second relay is give in side 220 V AC/50, may can use the power supply to take from it 7 Ampere. This is value special on my device.

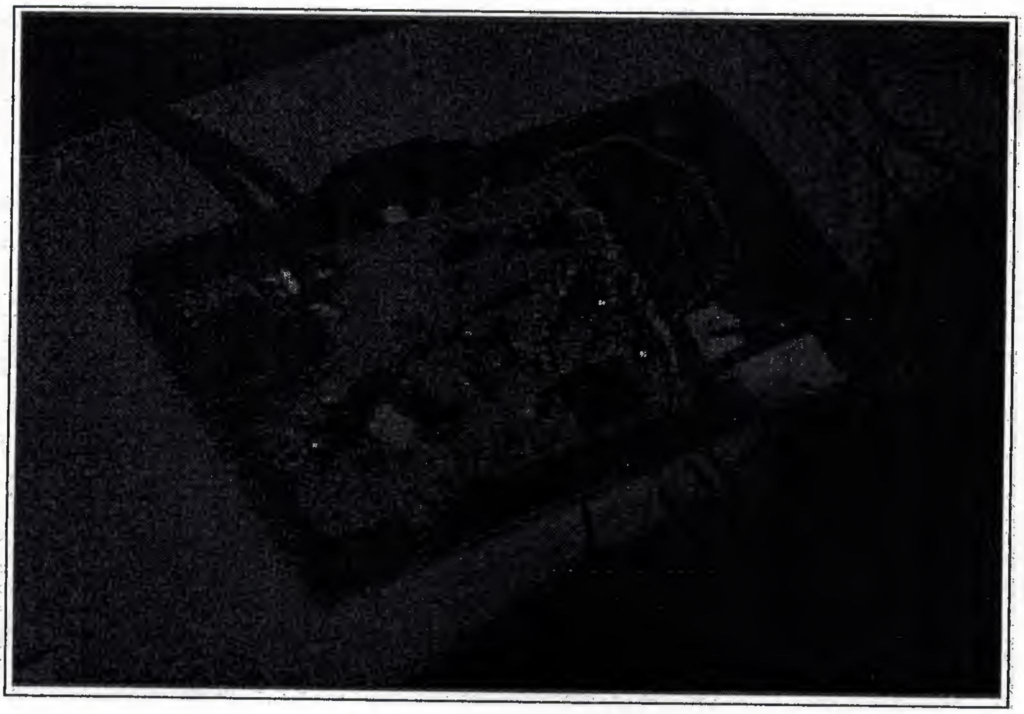


Figure 4.5 internal forms   for water activity alarm

Figure 4.6 Photo illustrate testing circuit, situation normal

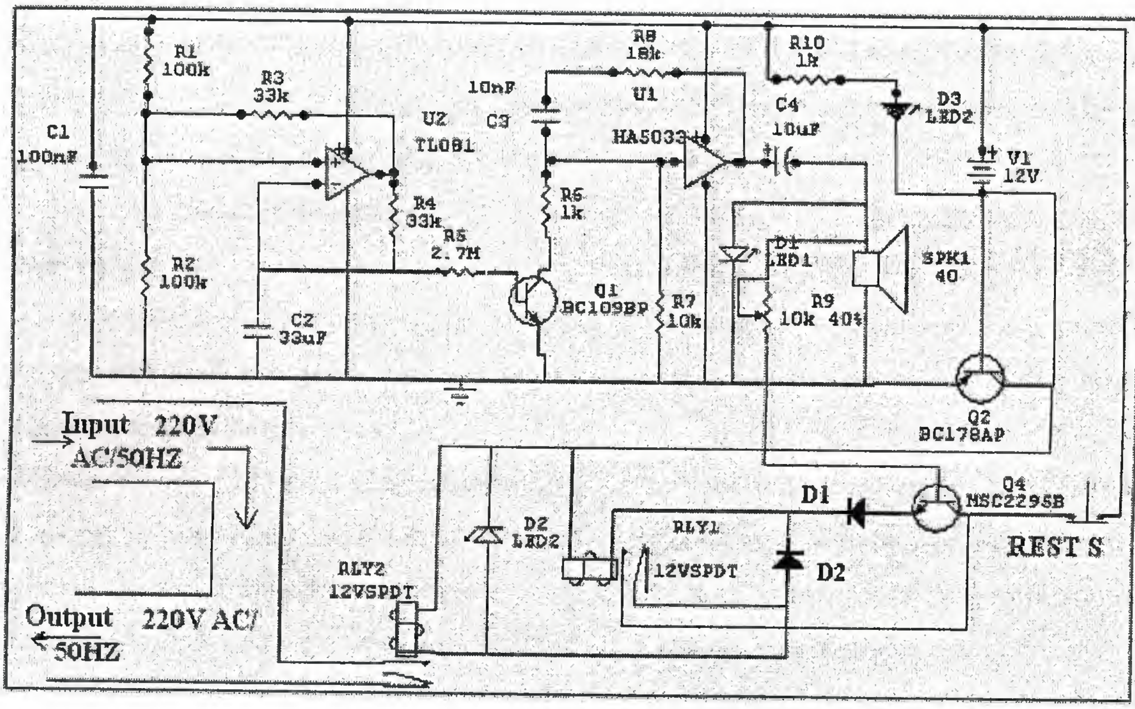


Figure 4.7 Last form of circuit with two diodes

The last form of diagram circuit is illustrate some modification, which it developed on the circuit, as we see above there is a rest switch, when we put there to make rest to the circuit when we want, for example we doing that after showing the alarm, where the yellow photocell (LED D2) it will be on, even we make change for the rest switch. But the red photocell D1 it chance situation for off even the alarm is stopping. But about green LED photocell D3 it is keep on even closes the switch 1.

4.4 Results

We will describe the results of our project as we see in photo below. We chose this form to illustrate how the project will work, as we see below there is glass water or cup and there is a sensor putting from there, the level of water in the cup is not full, that mean the sensor it is outside cup level, in this case the alarm it not work (normal situation), we see just the green LED is working in that case, see figures (4.8, 4.9).

Note, The circuit it is successful which tested practically, by doing this testing practical with our self.

But when we increase the water in the cup where connected the sensor in this time the sensor will send two signals to circuit, the first signal to transistor (BC178AB) where allowing to pass current from speaker, in this case the speaker will send tones as well as we will see the red LED will be on, another signal it give order to transistor (K.2G C3198 Y) allowing to pass current to feed coil of relay 1 , so the relay 1 will be working and it will change contact from open to another case, where will allow current to pass from another relay, the yellow LED it is work and it will be on even make rest to the circuit .

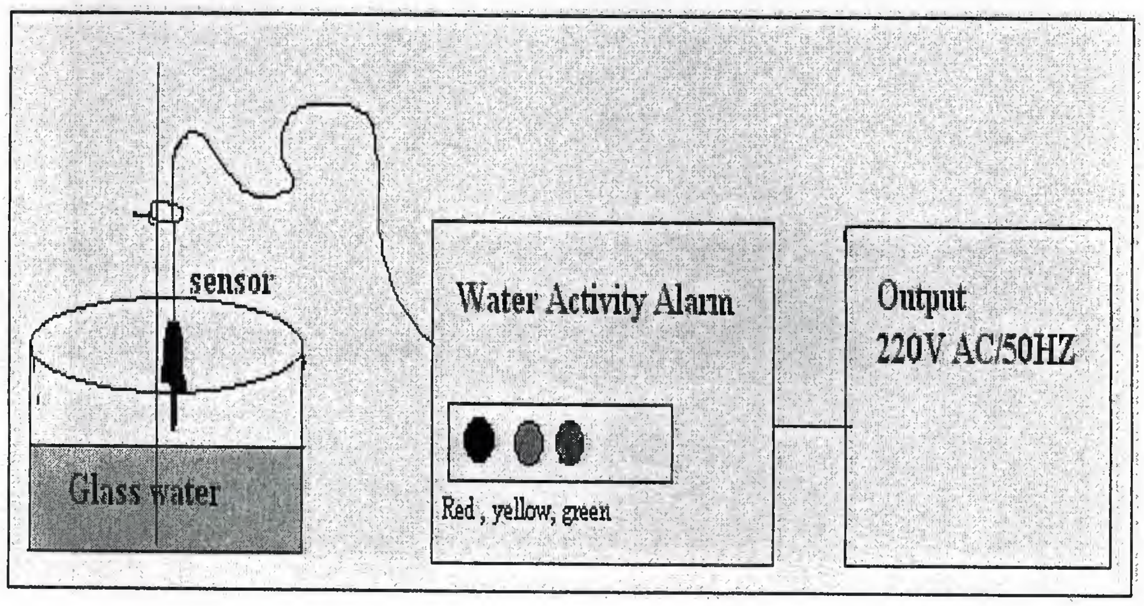


Figure 4.8 Box diagram illustrate work device

Note, this circuit give us in its output power supply, may can use that as resource, the power which we can give from it around 7 A /220 V AC .50HZ.

In figure 4.7 we see in the circuit diagram two diodes (D1, D2), we putting that for stoppage and discourage feedback from relays to transistor and also from signal transistor (K.2G C3198 Y) to second relay, even don't make overload on transistor (K.2G C3198 Y), also, don't effects on sensitivity of transistor, see figures (4.8, 4.9), where; if we have load increase (as many parts as relays); the sensitivity will decreasing, so the sensors will not be answering when it have adverbs normal.

Note; about sensors we may use more than one sensor to connect it on parallel, here we made the sensors using coax cables; where we see the gap between excretions is appropriate.

Figure 4.9 Photo illustrate testing the water activity alarm

4.5 Summary

This chapter presented some modifications on the water- activity alarm. Also we included the new components which we used in development this project. As well as we illustrated and showed the output graphs of various parts of the circuit. Results were also presented, showing how the project was tested.

CONCLUSION

In this project we arrived to many points, where; we had been tried developing the original project. Where; we added another circuit on the original circuit water activity alarm. Also we testing a circuit which we structure practically, where; it was successful practically.

We presented in the first chapter information about electronic components by showing photo about it, which we used in structure project, as well as we have been described safety guidelines in that chapter. Also had been presented information about systems alarm in general; where we focused on waters systems alarm types, by describe all types which it is used in alarm systems, we seen that in second chapter.

Also we had been in chapter three explaining circuit of water activity alarm from through helping circuit maker programs, where we presented some photos about circuit water activity alarm which take it from that program.

The result which we presented it in last chapter (chapter four), it including some electronic components as relays, diodes, and transistor, as we seen in last chapter, by structure it; we had a new circuit , can we used that as a resources giving in its output power supply its value 220V.AC/50 HZ. The characteristics of this circuit it described in last chapter. We are willing in the future to more progress in evolvement.

The aims of this project were successful, where, we had done test for device, we tried and arrived to sub division of the aims. From through the searching and development we got knowing and information about alarm systems, also we can able by this design to helping in practical life, as we seen in chapter four and three , we arrived also to some modification; that was one of smart addition on the original project.

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