MULTI FUNCTION REMOTE CONTROL

Oleh

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Penghantaran Laporan Ini Adalah Untuk Memenuhi Keperluan Untuk Penganugerahan Diploma Kejuruteraan Elektronik (Komputer) di Jabatan Kejuruteraan Elektrik Politeknik Seberang Perai

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PENGISTIHARAN

Di sini kami mengistiharkan bahawa laporan ini adalah berdasarkan hasil kerja kami sendiri dengan bantuan maklumat daripada sumber-sumber yang diberitahu di dalam pengakuan. Kami juga mengistiharkan hasil projek kami ini tidak pernah dihasilkan oleh mana-mana pelajar lain serta dari institusi pengajian yang lain.

……………………………………………

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Tarikh : 28/10/2016

ABSTRAK

Projek multi function remote control ini adalah mengenai pengawal suis dengan menggunakan frekuensi. Tujuan utama projek ini adalah untuk membantu orang yang kurang sihat dan orang kurang upaya untuk menghidupkan suis lampu atau kipas dengan menggunakan remote control ini tanpa perlu bangun. Apabila remote di tekan. Transmitter akan menghantar isyarat ke receiver dan receiver akan membuat arahan yang diterima. Remote ini sesuai di letakkan di mana saja kursusnya di bilik tidur, pejabat, makmal. Dengan adanya projek ini dapat menyenangkan kerja- kerja manusia. Remote ini dapat menjimatkan kos. Remote ini dapat menggawal dua peralatan elektrik iaitu kipas dan lampu. dengan ini, ia akan menjadi kemudahan kepada orang yang berada di rumah.

ABSTRACT

Project multi-function remote control is about using the frequency switch controller. The main objective of this project is to help people who are sick and disabled to turn on a lamp and fan using the remote control without having to get up from the sit. When the remote is pressed. The transmitter will send a signal to the receiver and the receiver will make the instructions received. Furthermore, this remote can put anywhere but courses in bedrooms, offices, laboratories. With this project can make easy for human. Moreover, this remote can save costs. Lastly, this remote can control two electric equipment that are fan and lamp. With this, it will be easier for people at home.

PENGHARGAAN

Bersyukur kami ke hadrat ilahi dengan limpah kurnia dan izinnya, dengan ini kami Muhammad Nazri bin Rohim (10DTK13F1096) dan Mohamad Syafarudin bin Harbani (10DTK13F2038) siswa politekinik seberang perai yang mengikuti kursus diploma kejuruteraan elektronik (komputer) telah berjaya menyelesaikan proposal akhir ini.

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ISI KANDUNGAN

SENARAI RAJAH

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In everyday life,people always use one remote to control one electrical equitment. Therefore, the approach taken to ease this problem is to create a remote control that can control many electrical equitment such as fan,lamp or many more. This remote control suitable for the sick people or for the people that can't get up from their sit.

1.2 PROBLEM STATEMENT

At present, this remote control to help home facilities, sick people and also for the disabled people. This remote control can make easier to the people. In fact people no need to use the switch anymore. Finally, the project can be assured that these problems can be solved.

1.3 OBJECTIVE

i. To build a remote control that can controlelectrical equitment

ii. To learn the process and component to complete this project.

iii. To gain the knowledge on trouble shouting and analyzing the circuit.

1.4 SCOPES

A project produced must have its own scope to demonstrate against the other project. The main scope of this project is to use the radio frequency as the main medium to run this project. From the transmitter it sent to the receiver and than the receiver will do the command.It also can be widely use at home, premises and other buildings. This project build for low cost product. This project is about to on the lamp and fan by using remote frequency it do not have to use a switch anymore.

1.5 IMPORTANCE

The importance in this project is to help the people to use one remote control that can control many electrical equitment. They do not have to use the switch anymore.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A Multi Remote Control is a device that can control many electrical device in one time. This Multi device can make easier to use and good condition in room. Many people always use one remote to control the electronic device therefore this Multi Remote control can change from only one electronic device to many electronic device.

2.2 MODULATION OF REMOTE CONTROL

In electronics and telecommunications, modulation is the process of varying one or more properties of a periodic waveform, called the *carrier signal*, with a modulating signal that typically contains information to be transmitted.

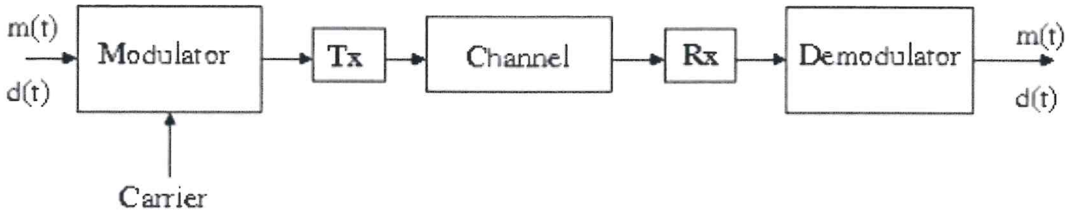
In telecommunications, modulation is the process of conveying a message signal, for example a digital bit stream or an analog audio signal, inside another signal that can be physically transmitted. Modulation of a sine waveform transforms a baseband message signal into a passband signal.A modulator is a device that performs modulation

A demodulator (sometimes *detector* or *demod*) is a device that performsdemodulation, the inverse of modulation. A modem (from modulator–demodulator) can perform both operations.

The aim of analog modulation is to transfer an analog baseband (or lowpass) signal, for example an audio signal or TV signal, over an analog bandpass channel at a different frequency, for example over a limited radio frequency band or a cable TV network channel.

The aim of digital modulation is to transfer a digital bit stream over an analog bandpass channel, for example over the public switched telephone network (where a bandpass filter limits the frequency range to 300–3400 Hz) or over a limited radio frequency band.Analog and digital modulation facilitate frequency division multiplexing (FDM), where several low pass information signals are transferred simultaneously over the same shared physical medium, using separate passband channels (several different carrier frequencies).

The aim of digital baseband modulation methods, also known as line coding, is to transfer a digital bit stream over a baseband channel, typically a non-filtered copper wire such as a serial bus or a wired local area network.The aim of pulse modulation methods is to transfer a narrowband analog signal, for example a phone call over a wideband baseband channel or, in some of the schemes, as a bit stream over another digital transmission system.



transmitter to receiver

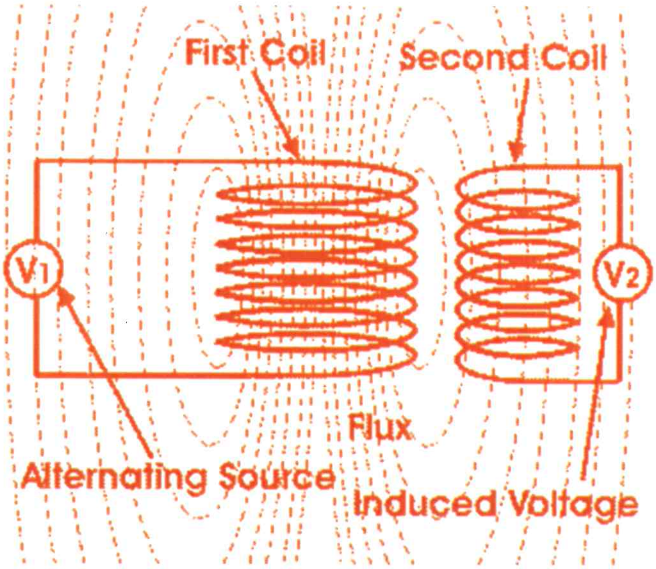
Figure 2.2.1

2.3 PREVIOUS RESEARCH

2.3.1 TRANSFORMER

Say you have one winding which is supplied by an alternating electrical source. The alternating current through the winding produces a continually changing flux or alternating flux that surrounds the winding. If any other winding is brought nearer to the previous one, obviously some portion of this flux will link with the second. As this flux is continually changing in its amplitude and direction, there must be a change in flux linkage in the second winding or coil. According to Faraday's law of electromagnetic induction, there must be an EMF induced in the second. If the circuit of the later winding is closed, there must be an current flowing through it. This is the simplest form of electrical power transformer and this is the most basic of working principle of transformer. For better understanding, we are trying to repeat the above explanation in a more brief way here. Whenever we apply alternating current to an electric coil, there will be an alternating flux surrounding that coil. Now if we bring another coil near the first one, there will be an alternating flux linkage with that second coil. As the flux is alternating, there will be obviously a rate of change in flux linkage with respect to time in the second coil. Naturally emf will be induced in it as per Faraday's law of electromagnetic induction. This is the most basic concept of the theory of transformer.

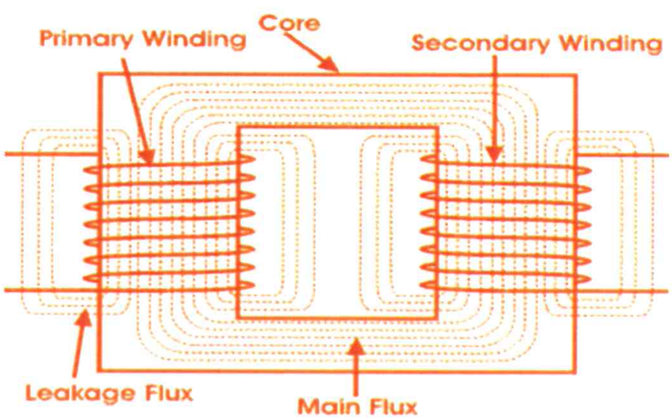
The winding which takes electrical power from the source, is generally known as primary winding of transformer. Here in our above example it is first winding.



Primary winding

Figure 2.3.1.1

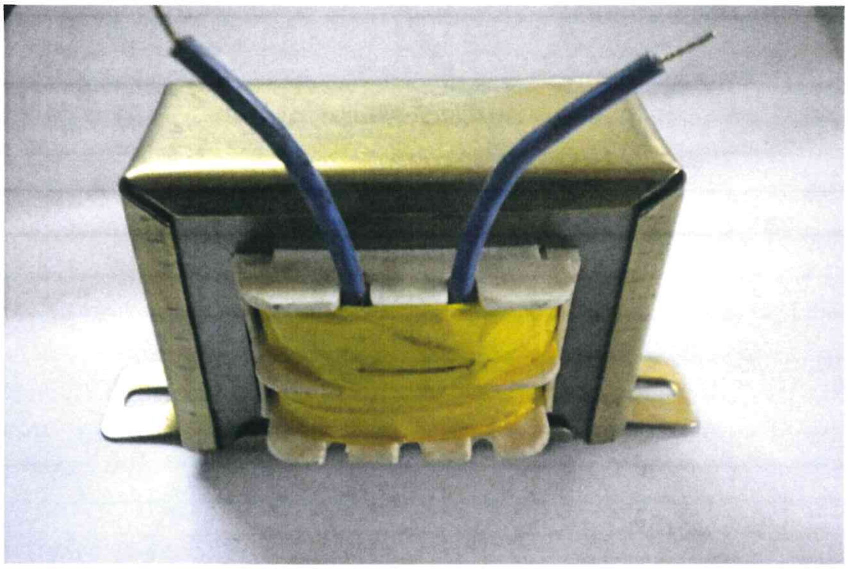
The winding which gives the desired output voltage due to mutual induction in the transformer, is commonly known as secondary winding of transformer. Here in our example it is second winding.



Second primary winding

Figure 2.3.1.2

The above mentioned form of transformer is theoretically possible but not practically, because in open air very tiny portion of the flux of the first winding will link with second; so the current that flows through the closed circuit of later, will be so small in amount that it will be difficult to measure. The rate of change of flux linkage depends upon the amount of linked flux with the second winding. So, it is desired to be linked to almost all flux of primary winding to the secondary winding. This is effectively and efficiently done by placing one low reluctance path common to both of the winding. This low reluctance path is core of transformer, through which maximum number of flux produced by the primary is passed through and linked with the secondary winding.

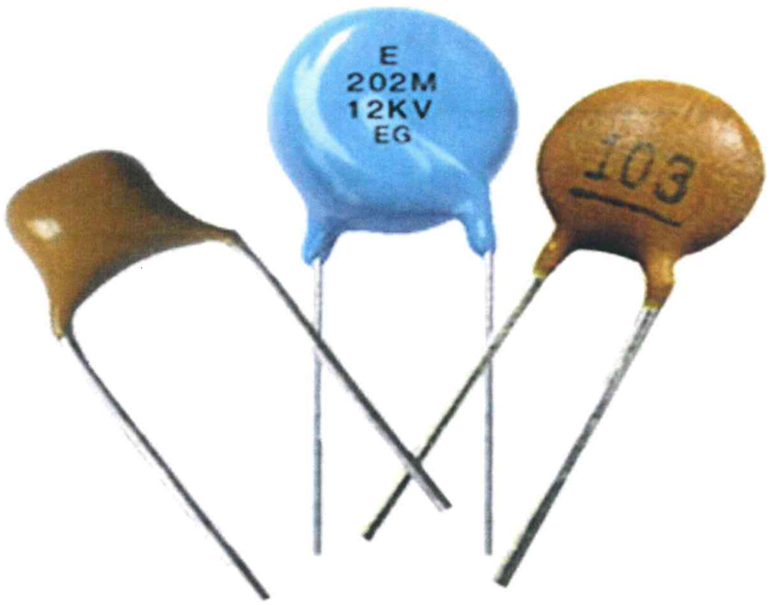


Transfomer

Figure 2.3.1.3

2.3.2 CERAMIC CAPACITOR

Ceramic capacitor are constructed with material such as titanium acid barium used as the dielectric. Internally capacitor are constructed as a coil, so they can be used in high frequency application. Typically, they are used in circuit which bypass high frequency signal in ground. These capacitor have the shape of a disk. Their capacitor is comparatively small. Ceramic capacitor have no polarity.



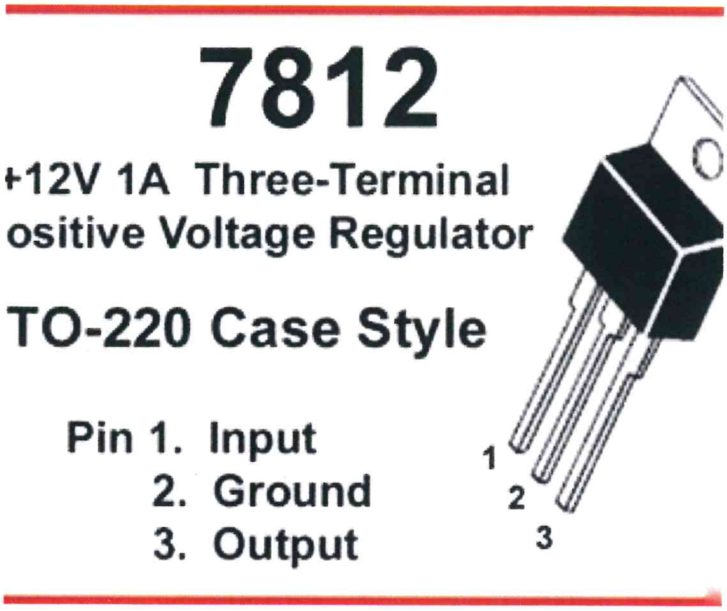
Ceramic Capacitor

Figure 2.3.2.1

2.3.3 AC REGULATOR 7812

7812 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7812 provide +12V regulated power supply Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

Pin Diagram:



Ac Regulator 12v

Figure 2.3.3.1

Pin Description:

Pin No.	Function	Name
1	Input voltage (5V-18V)	Input
2	Ground (0V)	Ground
3	Regulated output 12V (11.75V-12.25V)	Output

Table 2.3.3.2

2.3.4 CAPACITORS

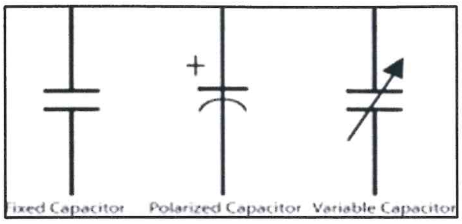
A capacitor (originally known as a condenser) is a passive two-terminal electrical component used to store electrical energy temporarily in an electric field. The forms of practical capacitors vary widely, but all contain at least two electrical conductors (plates) separated by a dielectric (i.e. an insulator that can store energy by becoming polarized). The conductors can be thin films, foils or sintered beads of metal or conductive electrolyte, etc. The nonconducting dielectric acts to increase the capacitor's charge capacity. Materials commonly used as dielectrics include glass, ceramic, plastic film, air, vacuum, paper, mica, and oxide layers. Capacitors are widely used as parts of electrical circuits in many common electrical devices. Unlike a resistor, an ideal capacitor does not dissipate energy. Instead, a capacitor stores energy in the form of an electrostatic field between its plates.

When there is a potential difference across the conductors (e.g., when a capacitor is attached across a battery), an electric field develops across the dielectric, causing positive charge +Q to collect on one plate and negative charge −Q to collect on the other plate. If a battery has been attached to a capacitor for a sufficient amount of time, no current can flow through the capacitor. However, if a time-varying voltage is applied across the leads of the capacitor, a displacement current can flow.

An ideal capacitor is characterized by a single constant value, its capacitance. Capacitance is defined as the ratio of the electric charge Q on each conductor to the potential difference V between them. The SI unit of capacitance is the farad (F), which is equal to one coulomb per volt (1 C/V). Typical capacitance values range from about 1 pF (10−12 F) to about 1 mF (10−3 F).

The larger the surface area of the "plates" (conductors) and the narrower the gap between them, the greater the capacitance is. In practice, the dielectric between the plates passes a small amount of leakage current and also has an electric field strength limit, known as the breakdown voltage. The conductors and leads introduce an undesired inductance and resistance.

Capacitors are widely used in electronic circuits for blocking direct current while allowing alternating current to pass. In analog filter networks, they smooth the output of power supplies. In resonant circuits they tune radios to particular frequencies. In electric power transmission systems, they stabilize voltage and power flow.

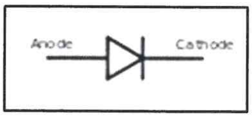


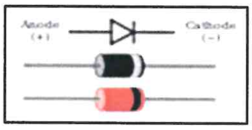
Capasitor symbol

Figure 2.3.4.1

2.3.5 DIODE

In electronics, a diode is a two-terminal electronic component that conducts primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance to the flow of current in one direction, and high (ideally infinite) resistance in the other. A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals. A vacuum tube diode has two electrodes, a plate (anode) and a heated cathode. Semiconductor diodes were the first semiconductor electronic devices. The discovery of crystals' rectifying abilities was made by German physicist Ferdinand Braun in 1874. The first semiconductor diodes, called cat's whisker diodes, developed around 1906, were made of mineral crystals such as galena. Today, most diodes are made of silicon, but other semiconductors such as selenium or germanium are sometimes used.





Diode

Figure 2.3.5.1

2.3.6 RELAY

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

Magnetic latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic latching relays are useful in applications where interrupted power should not be able to transition the contacts.

Magnetic latching relays can have either single or dual coils. On a single coil device, the relay will operate in one direction when power is applied with one polarity, and will reset when the polarity is reversed. On a dual coil device, when polarized voltage is applied to the reset coil the contacts will transition. AC controlled magnetic latch relays have single coils that employ steering diodes to differentiate between operate and reset commands.

2.3.6.1.POLE AND THROW

Since relays are switches, the terminology applied to switches is also applied to relays; a relay switches one or more poles, each of whose contacts can be thrown by energizing the coil.

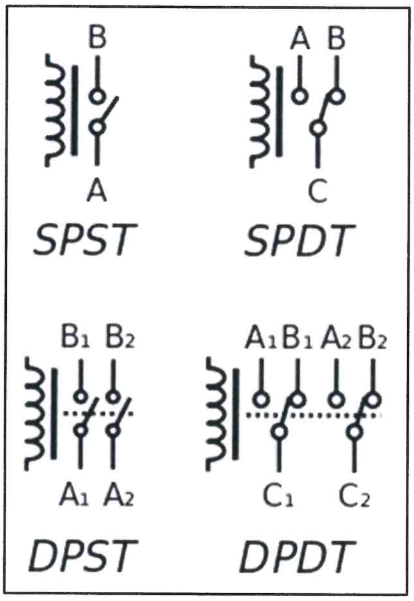
Normally open (NO) contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called a "Form A" contact or "make" contact. NO contacts may also be distinguished as "early-make" or "NOEM", which means that the contacts close before the button or switch is fully engaged.

Normally closed (NC) contacts disconnect the circuit when the relay is activated; the circuit is connected when the relay is inactive. It is also called a "Form B" contact or "break" contact. NC contacts may also be distinguished as "late-break" or "NCLB", which means that the contacts stay closed until the button or switch is fully disengaged.

Change-over (CO), or double-throw (DT), contacts control two circuits: one normally open contact and one normally closed contact with a common terminal. It is also called a "Form C" contact or "transfer" contact ("break before make"). If this type of contact has a "make before break" action, then it is called a "Form D" contact.

The following designations are commonly encountered:

- SPST – Single Pole Single Throw. These have two terminals which can be connected or disconnected. Including two for the coil, such a relay has four terminals in total. It is ambiguous whether the pole is normally open or normally closed. The terminology "SPNO" and "SPNC" is sometimes used to resolve the ambiguity.
- SPDT – Single Pole Double Throw. A common terminal connects to either of two others. Including two for the coil, such a relay has five terminals in total.
- DPST – Double Pole Single Throw. These have two pairs of terminals. Equivalent to two SPST switches or relays actuated by a single coil. Including two for the coil, such a relay has six terminals in total. The poles may be Form A or Form B (or one of each).
- DPDT – Double Pole Double Throw. These have two rows of change-over terminals. Equivalent to two SPDT switches or relays actuated by a single coil. Such a relay has eight terminals, including the coil.



Relay Symbol

Figure 2.3.6.2

2.3.7 BATTERY HOLDER

A battery holder is one or more compartments or chambers for holding a battery. For dry cells, the holder must also make electrical contact with the battery terminals. For wet cells, cables are often connected to the battery terminals, as is found in automobiles or emergency lighting equipment.

A battery holder is either a plastic case with the shape of the housing molded as a compartment or compartments that accepts a battery or batteries, or a separate plastic holder that is mounted with screws, eyelets, glue, double-sided tape, or other means. Battery holders may have a lid to retain and protect the batteries, or may be sealed to prevent damage to circuitry and components from battery leakage. Coiled spring wire or flat tabs that press against the battery terminals are the two most common methods of making the electrical connection inside a holder. External connections on battery holders are usually made by contacts with pins, surface mount feet, solder lugs, or wire leads.

Where the battery is expected to last over the life of the product, no holder is necessary, and a tab welded to the battery terminals can be directly soldered to a printed circuit board.

Battery Holder

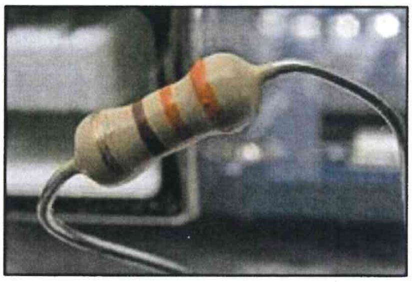
Figure 2.3.7.1

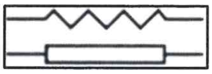
2.3.8 RESISTOR

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits. In electronic circuits, resistors are used to limit current flow, to adjust signal levels, bias active elements, and terminate transmission lines among other uses. High-power resistors, that can dissipate many watts of electrical power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated circuits.

The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance will fall within a manufacturing tolerance.

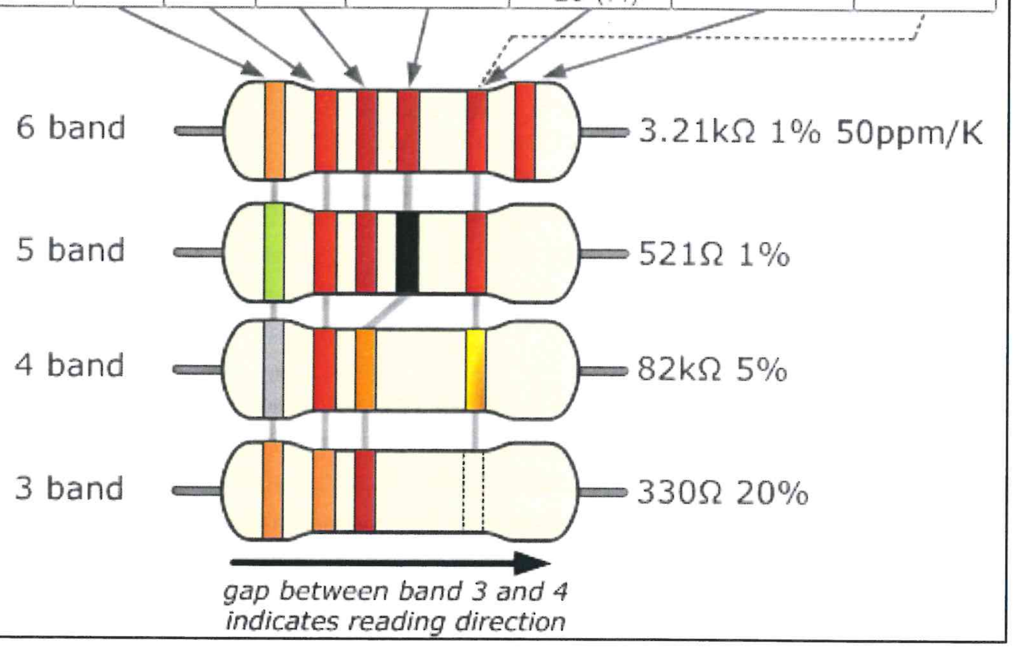




Resistor

Figure 2.3.8.1

	Color	Signficant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
Bad	black	0	0	0	x 1		250 (U)	
Beer	brown	1	1	1	x 10	1 (F)	100 (S)	1
Rots	red	2	2	2	x 100	2 (G)	50 (R)	0.1
Our	orange	3	3	3	x 1K		15 (P)	0.01
Young	yellow	4	4	4	x 10K		25 (Q)	0.001
Guts	green	5	5	5	x 100K	0.5 (D)	20 (Z)	
But	blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
Vodka	violet	7	7	7	x 10M	0.1 (B)	5 (M)	
Goes	grey	8	8	8	x 100M	0.05 (A)	1(K)	
Well	white	9	9	9	x 1G			
Get	gold			3th digit only for 5 and 6 bands	x 0.1	5 (J)		
Some	silver				x 0.01	10 (K)		
Now!	none					20 (M)		



Resistor information

Figure 2.3.8.2

2.3.9 TRANSISTOR

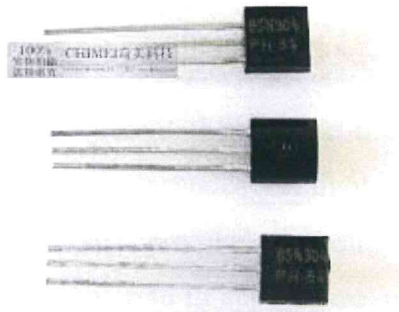
A transistor is a device that regulates current or voltage flow and acts as a switch or gate for electronic signals. Transistors consist of three layers of a semiconductor material, each capable of carrying a current.

The transistor was invented by three scientists at the Bell Laboratories in 1947, and it rapidly replaced the vacuum tube as an electronic signal regulator. A transistor regulates current orvoltage flow and acts as a switch or gate for electronic signals. A transistor consists of three layers of a semiconductor material, each capable of carrying a current. A semiconductor is a material such as germanium and silicon that conducts electricity in a "semi-enthusiastic" way. It's somewhere between a real conductor such as copper and an insulator (like the plastic wrapped around wires).

The semiconductor material is given special properties by a chemical process called *doping*. The doping results in a material that either adds extra electrons to the material (which is then called *N-type* for the extra negative charge carriers) or creates "holes" in the material's crystal structure (which is then called *P-type* because it results in more positive charge carriers). The transistor's three-layer structure contains an N-type semiconductor layer sandwiched between P-type layers (a PNP configuration) or a P-type layer between N-type layers (an NPN configuration).

A small change in the current or voltage at the inner semiconductor layer (which acts as the control electrode) produces a large, rapid change in the current passing through the entire component. The component can thus act as a switch, opening and closing an electronic gate many times per second. Today's computers use circuitry made with complementary metal oxide semiconductor (CMOS) technology. CMOS uses two complementary transistors per gate (one with N-type material; the other with P-type material). When one transistor is maintaining a logic state, it requires almost no power.

Transistors are the basic elements in integrated circuits (IC), which consist of very large numbers of transistors interconnected with circuitry and baked into a single siliconmicrochip.



Transistor

Figure 2.3.9.1

2.3.10 LED (Light Emitting Diode)

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

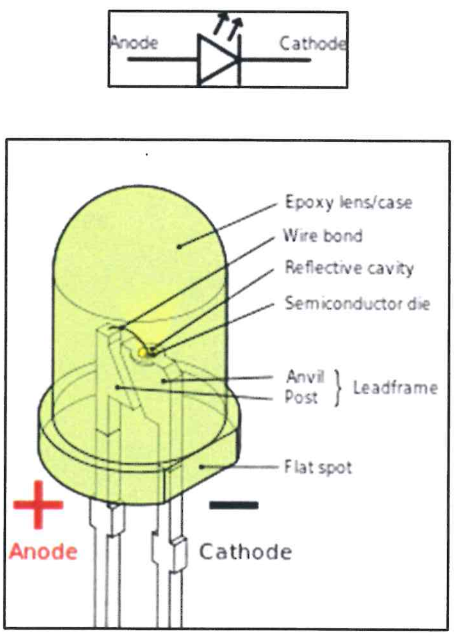
An LED is often small in area (less than 1 mm2) and integrated optical components may be used to shape its radiation pattern.

Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared light. Infrared LEDs are still frequently used as transmitting elements in remote-control circuits, such as those in remote controls for a wide variety of consumer electronics. The first visible-light LEDs were also of low intensity, and limited to red. Modern LEDs are available across the visible, ultraviolet, and infrared wavelengths, with very high brightness.

Early LEDs were often used as indicator lamps for electronic devices, replacing small incandescent bulbs. They were soon packaged into numeric readouts in the form of seven-segment displays, and were commonly seen in digital clocks.

Recent developments in LEDs permit them to be used in environmental and task lighting. LEDs have many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. Light-emitting diodes are now used in applications as diverse as aviation lighting, automotive headlamps, advertising, general lighting, traffic signals, camera flashes and lighted wallpaper. As of 2015, LEDs powerful enough for room lighting remain somewhat more expensive, and require more precise current and heat management, than compact fluorescent lamp sources of comparable output.

LEDs have allowed new text, video displays, and sensors to be developed, while their high switching rates are also used in advanced communications technology.



LED

Figure 2.3.10.1