MINI PROJECT REPORT ON

“Wireless DC Motor speed control”

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ABSTRACT

The project presents a simple design and implementation of a wireless DC motor speed control. It enables the user to operate the DC motor in five different speed levels, the dc motor is operated by a 555 integrated circuit. The IC 555 in this circuit is being operated in both mono stable and A stable mode. In A stable mode the circuit can be used as pulse width modulator with a few small adjustments to the circuit. The remote transfers a tone using an infrared light emitting diode. Then the IR receiver receives the signal and the next functioning is divided into blocks. IR receiver, monostable multi vibrator decade counter, a stable multi vibrator DC motor. the detail of the project is described below.

CHAPTER 01

INTRODUCTION

The Project is built around IC 555 Timer, Decade counter, IR remote and IR receiver. Generally, we regulate to control the speed of the DC motor. Nowadays, there are lots of good quality motor speed controls on the market. However, their costs are relatively high.

A Speed control with both low cost and good performance, especially for small mobility applications. On the other hand, the wireless connectivity has a nature of low cost and environmental limitations. In our project we use to control the speed of DC motor in Five different levels using IR remote when the input is given from IR remote. IR receiver TSOP1738 receives the signals and it triggers the monostable multi vibrator. 555 Timer IC produces a clock pulses to the decade counter 4017 and decade has 10 output pins it shifts the output to the next output pin is used for the selection of the output and is used for charging the timing resistor value for a stable multi vibrator 555 timer IC and it generates pulse width modulation from the selective resistor it produces different PWM's at 555 IC timer and DC motor rotates. Resistors are responsible for generating five different PWM'S at the output pin. NPN transistor is used for driving the DC Motor, With the help of simple tv remote we can control the speed of the DC Motor which is very helpful.

CHAPTER 02

LITERATURE SURVEY

The integrated circuit was designed in 1971 by Hans R.Camenized under contract with Signetics,

Then acquired by Philips semiconductors, now NXP.

In 1962, camenzind joined the PR Mallory physical science Lab in Burlington, Massachusetts. He designed a pulse width amplifier (PMW) for audio application [8], but failed on the market because no power transistor was included. He was interested in tuners such as a spinner and a locked phase loop (PLL). Signetics hired him to develop a PLL interacted circuit in 1968.he desired an oscillator for PLL so that the frequency does not depend on the voltage or temperature of power supply. Subsequently laid off half of its employees due to a recession; the development in the PLL froze like this.

Camenzind proposed the development of a universal oscillator- based circuit for PLL and asked him to develop it on its own, borrowing the signets team instead of cutting his salary by half. Other engineer argued that the product could be constructed from existing parts; however, the marketing manager approved the idea. Among the 5xx numbers assigned to the analog integrated circuits, the reference number “555” was chosen.

Camenzind also taught circuit design at Northeastern University in the morning, attending university at night, with the goal of obtaining a master’s degree in business administration. The first design for 555 was revised in the summer of 1971. Evaluated without error, the design was designed. A few days later, camenzind came up with the idea of using direct resistance instead of a constant current source and then discovered that it worked. The modification reduced the required number of 9 pins to 8, so that the integrated circuit could contain an 8-pin package instead of a 14-pin package. The 9-pin copy had already been published by another company founded by an engineer attending the first revision and having retired from signetics; this company withdrew its version soon after the launch of 555. The 555timer was manufactured by 12 companies in 1972 and became the best-selling product.

To construct short duration timers and alarm we don't need expensive microcontroller, we can create the snooze or short duration of the alarm by using the timer IC ne555. Here this circuit is constructed to give alarm buzzer sound for three different timing intervals that is 5,10,15 minutes, so we can change the timing of this circuit easily as we want.

CHAPTER 03

PROPOSED METHODOLOGY

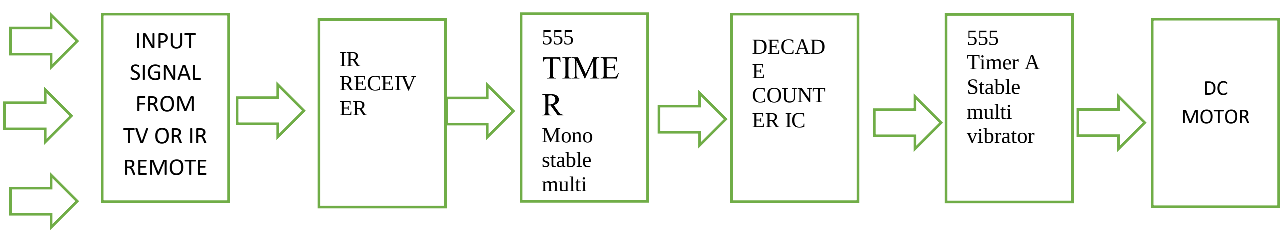


Fig (3.1) BLOCK DIAGRAM

The aim of the project is to control the speed of the dc motor wireless with the help of TV OR IR remote. When any button is pressed on the remote it sends 38khz signal which will be received by the IR receiver U1. Its output is active low that means its output remains high when there no IR signal once it gets the signal output becomes low. Then it sends low pulse to the trigger pin-2 of 555 mono stable multi vibrator. The multi vibrator is used for generating single pulse every time when we press any button on the TV remote. The 555 timer U2 sends the clock pulse to the decade counter U3. IC 4017decade counter is used for changing the value of timing resistor for 555timer. A stable multi vibrator U4 mode is used for generating PWM signals. Decade counter sets the resistance across U4 A stable multi vibrator. By switching the output to the next output pin and by changing the value of this timing resistor duty cycle of PWM signal changes. The Resistance (R5, R6, R7, R8, R11) Responsible for generating five different PWM's at the output pin. hence the speed of the DC motor changes when we press any button on the TV remote b.4.7 Zener diode is used to protect Tsop 1738.NPN Transistor is used for driving 12v DC generator. Here the timer works as both Monostable multi vibrator and A stable multi vibrator

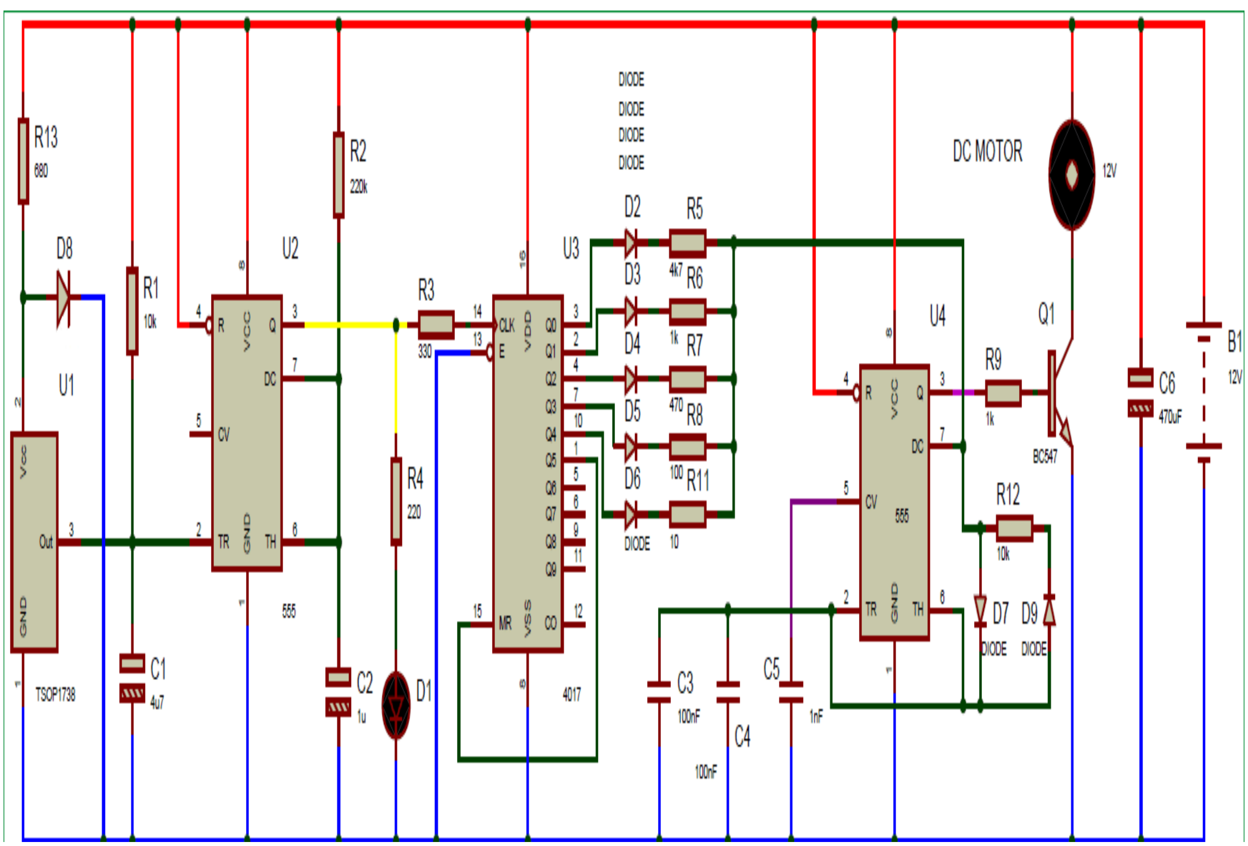


Fig (3.2) **Circuit Diagram**

CHAPTER 04

PROJECT DESCRIPTION

- Working of DC motor speed control using the TV remote and 555timer IC mainly consists of five parts IR receiver, monostable multi vibrator, decade counter, A stable multi vibrator DC motor
- When the IR receiver receives the signal from tv remote then it triggers the 555 monostable multi vibrators TSOP output is active low that means its output remains high when there are no IR signals once it gets the signal output gets low. The multi vibrator is used for generating a single pulse whenever we press the button on the TV remote
- The 555 timer sends the clock pulse to the decade counter IC 4017 to shifts the output to next pin.4017-decade counter is used for changing the value of timing resistor for 555 timers a stable multi vibrator mode 555 is used for generating PWM signal
- Decade counter sets the resistance across the U4 a stable multi vibrator. By switching the output to next output pin and by changing the value of this timing resistor duty cycle of PWM signal changes and hence the speed of the DC motor changes when we press the TV remote button

- The resistors (R5, R6, R7, R8, R11) are responsible generating five PWM'S signals.

  Hence the speed of the DC motor changes when we press any button on the tv remote
- 4.7 Zener diode is used for protecting TSOP receiver
- NPN transistor is used for driving the 12v dc motor

S.NO	REQURIED COMPONNNENTS	REMARKS	Quantity
1	IR Receiver	TSOP 1738	1
2	555 Timer IC		2
3	Transistor	BC 547	1
4	Transformer	12-0-12	1
5	diodes	1n4007	9
6	diode	Zener	1
7	Capacitor	100uf,1uf,4.7uf, 0.01uf	1
8	Capacitor	0.1uf	4
9	Resistor	10k	2no
10	Resistor	1k,330ohm	3
11	Resistor	220k,30k,22k,15k, 3.3k,220,650ohm	1
12	Led	Green, yellow	1
13	Decade counter	CD 4017	1

Fig (4.1) Components table

1.**IR RECEIVER**:

TSOP is the standard IR Remote control receiver series, supporting all major transmission codes.

IT receives IR signal at 38khz frequency. The demodulated output signal can be directly decoded by AUDRINO or RASPBERRY PI.

TSOP 1738 FEATURES

- Photo detector and pre amplifier
- Its output is active low
- It consumes less power
- It can receive 38khz signal

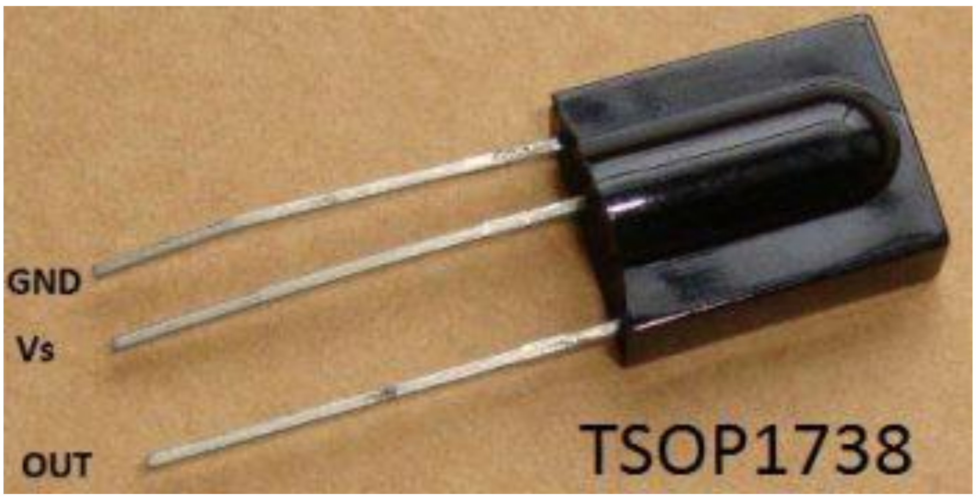


Fig (4.2) IR Receiver

2. 555 TIMER IC

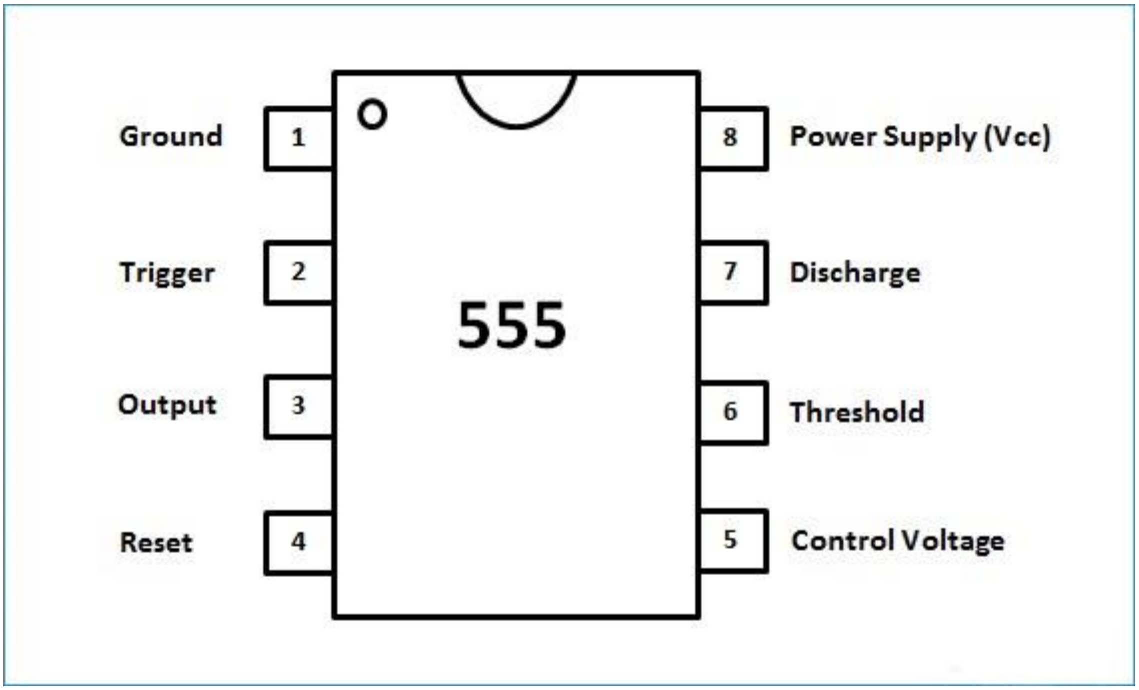


Fig (4.2)

555 Timer IC pin diagram

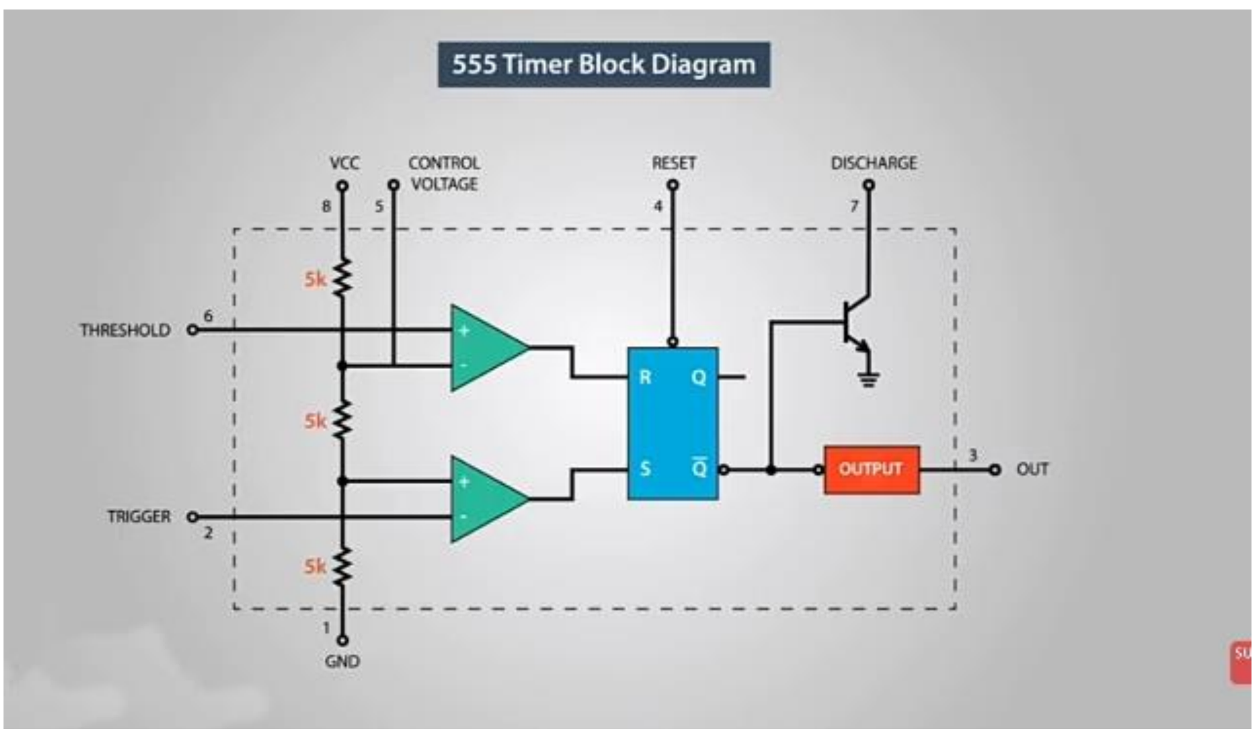


Fig (4.3) Circuit diagram of IC 555

The 555 timer IC is a monolithic timing circuit that produces accurate timing delays and oscillations in a form of square wave signals. This small IC has a lot of applications such as oscillators, tachometers, waveform generations, control system etc.

MONOSTABLE MULTI VIBRATOR

Monostable multi vibrator mode of 555 timer is called as single shot mode. The name says that only one stable is stable and other is called Unstable state. In Mono stable mode the trigger creates a timing delay by switching the output to high for whole duration of delay.

The delay is trigged by an external input to pin 2 of IC. When the input pin goes low the timing delay starts. Initially 555 timers are in stable state then the output at pin 3 is low.

Here the noninverting end of U2 lower comparator is connected 1/3VCC and the inverting end is connected to trigger pin 2. It is connected to the ground then two things happen

First the U2 lower comparator output becomes high and sets the flipflop then the output at the Pin 3 is high. Second the transistor Q1 gets off and Timing capacitor gets disconnected from the ground and starts charging through the resistor R1.This state is called the Quasi stable state and remains for some time now the capacitor starts charging and reaches to the voltage slight greater than the 2/3VCC.Voltage at the threshold pin 6 becomes greater than the voltage at the inverting end of comparator U1 then the U1 comparator becomes high and flip flop gets reset and the output at pin 3 becomes low. Then the transistor Q1 gets on and capacitor starts discharging to the ground through the discharging pin 7. The IC timer falls back to the stable state after the time determined by RC network. TIME(T=1.1*R1*C1) delay duration is dependent on the external resistors and capacitors used.

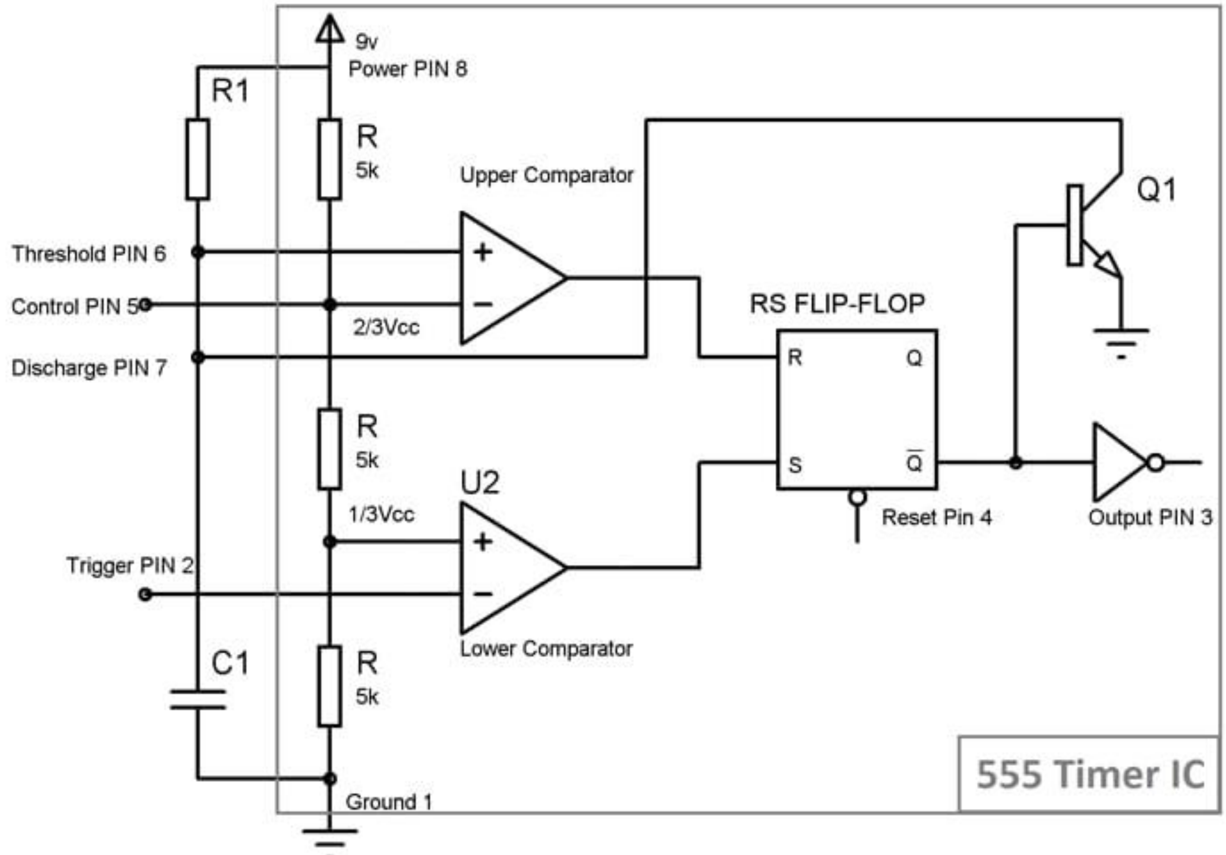


Fig (4.4)

MONOSTABLE MULTI VIBRATOR CIRCUIT DIAGRAM

ASTABLE MULTI VIBRATOR

The stable multi vibrator mode of 555 timer IC is also called Free running or self-triggering mode. Initially power is turned on trigger pin voltage is less than VCC/3 then U2 comparator is high and sets the flipflop and output pin-93 is high.

Transistor Q1 gets off and capacitor c1 starts charging when it gets charged to a voltage above VCC/3 then U2 comparator gets low, upper comparator output is also low and flip flop output remains the same high.

Now when the capacitor gets to voltage above than 2/3 VCC then the voltage act threshold pin gets higher than the inverting mode output of U1 comparator is high and resets the flipflop output of 555 chip becomes low.

Output of 555 timer gets low Q2 the transistor Q1 becomes UN and C1capacitor starts discharging and sets to the ground to the discharging pin 7 and resistor R2.

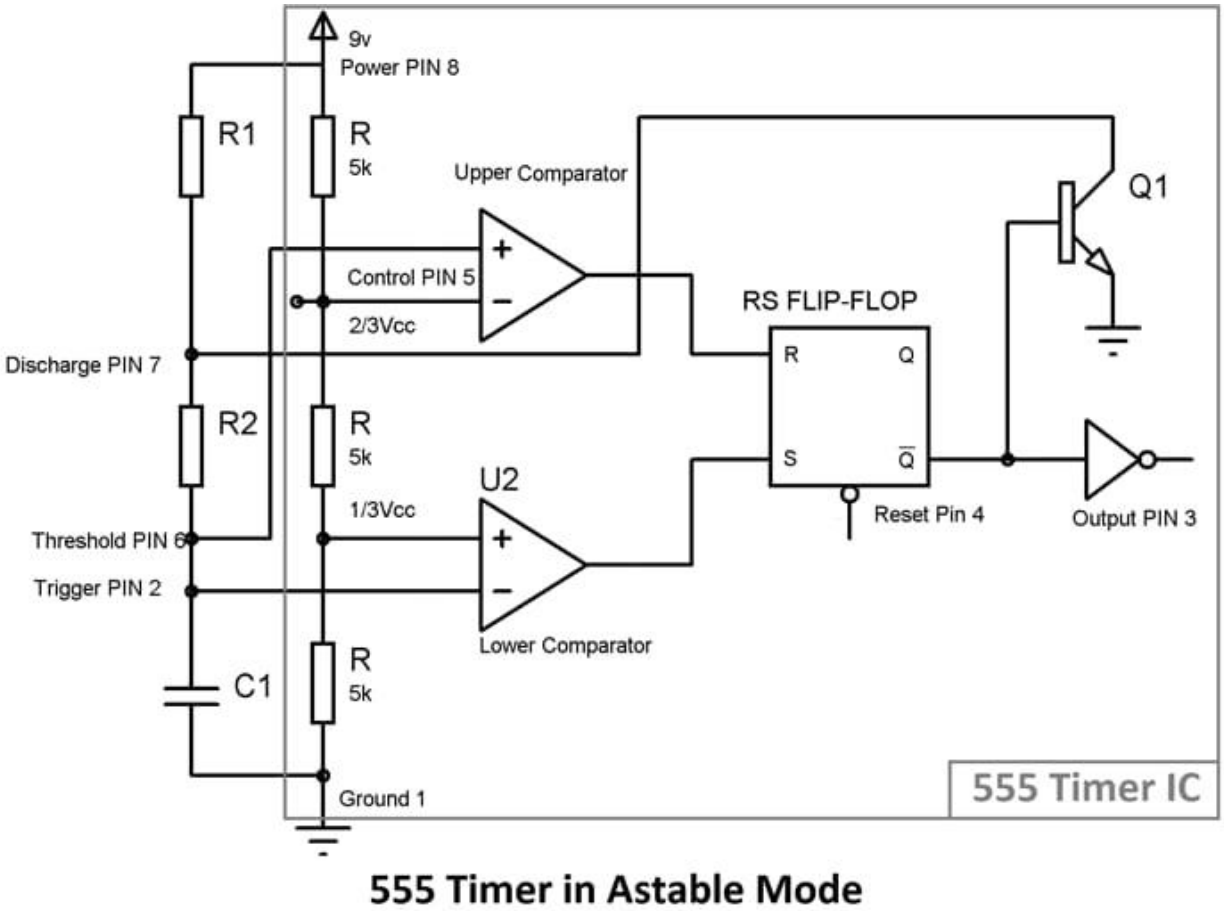
As capacitor voltage gets down below the 2/ 3VCC, upper comparator output becomes low SR flip flop remains in the previous states as both the comparators are low

While discharging when capacitor voltage gets down below VCC/ 3 this makes the lower comparator O/P high and again sets the flipflop again and 555 outputs become high. transistor Q1 becomes OFF and again capacitor C1 starts charging.

This charging and discharging of capacitors continuous and a rectangular output wave is generated. while output of 555 timers is high the capacitor charging when it is low the capacitor is discharging.

Now output high and output low duration is determined by the resistors R1 and R2 and C1

Time high =0.693*(R1+R2) *C1,Time low =0.693*R2*C1



Fig(4.5) 555 timer in A stable Mode

PIN	NAME	PURPOSE
1	**GND**	Ground reference voltage, low level(0V)
2	**TRIG**	The OUT pin goes high and a timing interval starts when this input falls below ½ of CTRL voltage (which is typically1/3 VCC, CTRL being 2/3 VCC by default if CTRL is left open). In other word, OUT is high as long as the trigger low. Output of the timer totally depends upon the amplitude of the external trigger voltage applied to this pin.
3	**OUT**	The output is driven to approximately 1.7 V below +VCC, or to GND
4	**RESET**	A timing interval may be driving this input to GND, but the timing does not begin again until RESET rises above approximately 0.7 volts. Overrides TRIG which overrides threshold.
5	**CTRL**	Provides "control" access to the internal voltage divider (default,2/3

		VCC)
6	**THR**	The timing out high intervals ends when the voltage at thresholds is greater than that at CTRL (2/3 VCC IF CTRL is open)
7	**DIS**	Open collector output which may discharge a capacitor between intervals. In phase with output
8	**VCC**	Positive supply voltage, which is usually between 3 and 15v depending on the variation

FIG(4.2) Pin description table

Definition of Pin Functions:

Pin 1 (ground): The ground pin is the most negative power potential of the device, which is normally connected to the common (ground) circuit when operating from positive supply voltages.

Pin 2 (trigger): This pin is the input of the lower comparator and is used to adjust the latch, which makes the output high. This is the beginning of the time sequence in the monostable operation. The shot is obtained by taking the pin-up and down with a voltage of 1/3 V + (or, in general, half of the voltage appearing on pin 5). The action of the activation input is level sensitive, allowing the use of slow change rate waveforms, as well as pulses, as activation sources. The trigger pulse must be shorter than the time interval determined by external R & C. If this pin remains row longer, the output will remain high until the trigger input increases again. A caution to observe with the trigger input signal is that it should not be less than 1/3 V + for a longer period than the synchronization cycle. If allowed, the timer will be reactivated at the end of the first output pulse. Therefore, when the timer is used in monostable mode with input pulses longer than the desired output pulse width, the input trigger must be effectively shortened by differentiation. The minimum pulse width allowed for activation depends to some extent on the pulse level, but in general if greater than 1uS (micro-second), the activation will be reliable. A second precaution concerning the trigger input refers to the storage duration in the lower comparator. This part of the circuit may have normal stopping delays of several microseconds after activation; that is, the lock may still have an activation input during this period after the activation pulse. In practice, this means that the minimum monostable output pulse width must be of the order of 10 uS to avoid possible double activation due to this effect. The voltage range that can safely be applied to the trip pin is between V + and ground. A DC, called the tripping current, must also flow from this terminal to the external circuit. This current is usually 500nA (nano-amp) and will set the upper limit of allowable resistance of pin 2 to earth. For an A stable configuration operating at V + = 5 volts, this resistance is 3 megaohms; It can be higher for a higher level of V +.

Pin 3 (output): output 555 is from a high current totem stage consisting of transistors Q20 to Q24. Transistors Q21 and Q22 provide a drive for source-type loads, and their Darlington connection provides a high output voltage of about 1.7 volts less than the V +power level used. Transistor Q24 offers the possibility of absorbing the current for low state loads called V + (as typical TTL inputs). The transistor Q24 has a low saturation voltage, which allows it to interact directly with a good noise margin when it performs the current reduction logic. However, the exact output saturation levels vary considerably with the supply voltage, for both high and low states. At a V + of 5 volts, for example, the low state VCE (sat) is typically 0.25 volts at 5 mA. However, when running at 15 volts, it can absorb 200 mA if a 2-volt output voltage level is allowed (the power dissipation must be taken into account in this case, of course). The high state-level is typically 3.3 volts at V + = 5 volts; 13.3 volts at V + = 15 volts. The rise and fall times of the output waveform are quite fast, the typical switching times are 100nS. The state of the output pin will always reflect the opposite of the logic state of the latch, which can be seen by examining FIG. 3. Since the lock itself is not directly accessible, this relation can be better explained in terms of the activation lock conditions. To activate the output in the high state, the activation input is momentarily taken from a higher level to a lower level. [see "Pin 2 - Trigger"]. This causes locking and high output. The performance of the lower comparator is the only way to set the output high. The output can return to a low state by raising the threshold from a lower level to a higher level [see "Pin 6 - Threshold"], which resets the latch. The output can also be reduced by bringing the reset to a low state near the ground [see "Pin 4 - Reset"]. The output voltage available on this pin is approximately equal to the VCC applied to pin 8 minus 1.7Vs.

Pin 4 (reset): This pin is also used to reset the latch and return the output to a low state. The threshold level of the reset voltage is 0.7 volts and a 0.1 mA dissipation current of this pin is required to restart the device. These levels are relatively independent of the V + level of operation; Thus, the reset input is compatible with TTL for any supply voltage. The reset input is a primary function. that is, it will force the output to a low state regardless of the state of the other inputs. Therefore, it can be used to prematurely terminate an output pulse, to block oscillations from "on" to "off", etc. The delay time between the restart and the output is generally of the order of 0.5 μS and the minimum width of the reset pulse is 0.5 μS. However, none of these numbers are guaranteed and may vary from manufacturer to manufacturer. In summary, the reset pin is used to reset the latch that controls the state of output pin 3. The pin is activated when a voltage level between 0 and 0.4 volts is applied to the pin. The reset pin will force the output to a low level, regardless of the state in which the other inputs of the flip-flop are located. When not in use, it is recommended to connect the reset input to V + to avoid the possibility of a false restart.

Pin 5 (control voltage): This pin allows direct access to the 2/3 V + voltage division point, the reference level of the upper comparator. It also allows indirect access to the lower comparator because there is a 2: 1 splitter (R8 - R9) from this point to the lower comparator reference input, Q13. The use of this terminal is a user option, but it allows extreme flexibility by allowing the modification of the period, the restart of the comparator, etc. When timer 555 is used in a voltage-controlled mode, its voltage operation varies from about 1 volt less than V + to 2 volts of mass (although this is not guaranteed). Voltages may safely be applied outside these limits but must be limited within the V + and ground limits for reasons of reliability. By applying a voltage to this pin, it is possible to vary the duration of the device independently of the RC network. The control voltage can vary from 45 to 90% of the VCC in monostable mode, which allows the output pulse width to be controlled independently of RC. When used in a stable mode, the control voltage can vary from 1.7 V to full VDC. Variable voltage in a stable mode will produce a modulated frequency (FM) output. If the control voltage pin is not used, it is recommended to ground it with a capacitor of about 0.01uF (10nF) for noise immunity because it is an input comparison. This fact is not evident in many 555 circuits since I have seen many circuits with "no-pin-5" connected to anything, but this is the proper procedure. The small ceramic lid can eliminate false activations.

Pin 6 (threshold): Pin 6 is an input of the upper comparator (the other is pin 5) and is used to reset the latch, resulting in low output. The reset through this terminal is made by taking the bottom terminal to a voltage of 2/3 V + (the normal voltage on pin 5). The action of the threshold pin is level sensitive, which allows a slow rate of change waveforms. The voltage range that can safely be applied to the threshold pin is between V + and ground. A direct current, called the current threshold, must also reach this terminal from the external circuit. This current is generally 0.1 μA and will define the upper limit of total resistance allowed from pin 6 to V +. For any synchronization setting that operates at V + = 5 volts, this resistance is 16 MΩ. For operation at 15 volts, the maximum resistance value is 20 MΩ.

Pin 7 (discharge): this pin is connected to the open collector of an NPN transistor (Q14), whose emitter is grounded so that when the transistor is activated, pin 7 is short-circuited to the mass. Generally, the sync capacitor is connected between pin 7 and ground and is discharged when the transistor is turned on. The state of attack of this transistor has a synchronization identical to that of the output stage. It is "on" (low resistance to earth) when the output is low and "off" (high resistance to earth) when the output is high. In the monostable and astable time modes, this transistor switch is used to ground the appropriate nodes of the synchronization network. The saturation voltage is generally less than 100 mV (millivolts) for currents of 5 mA or less, and the leakage in the off state is approximately 20 nA (however, these parameters are not specified by all manufacturers). The maximum collector current is internally limited by design, thus eliminating capacitor size restrictions due to the maximum discharge of the pulse current. In some applications, this open-collector output can be used as an auxiliary output terminal, with a current-dissipating capacity similar to that of the output (pin 3).

Pin 8 (V +): Pin V + (also called VCC) is the positive power supply terminal of the timer CI

555. The operating voltage supply range of the 555 is between +4.5 volts (minimum) and +16 volts (maximum). It is specified for operation between +5 volts and +15 volts. The device will operate essentially in the same way in this voltage range without changing the period. The most significant operating difference is the capacity of the output inverter, which increases

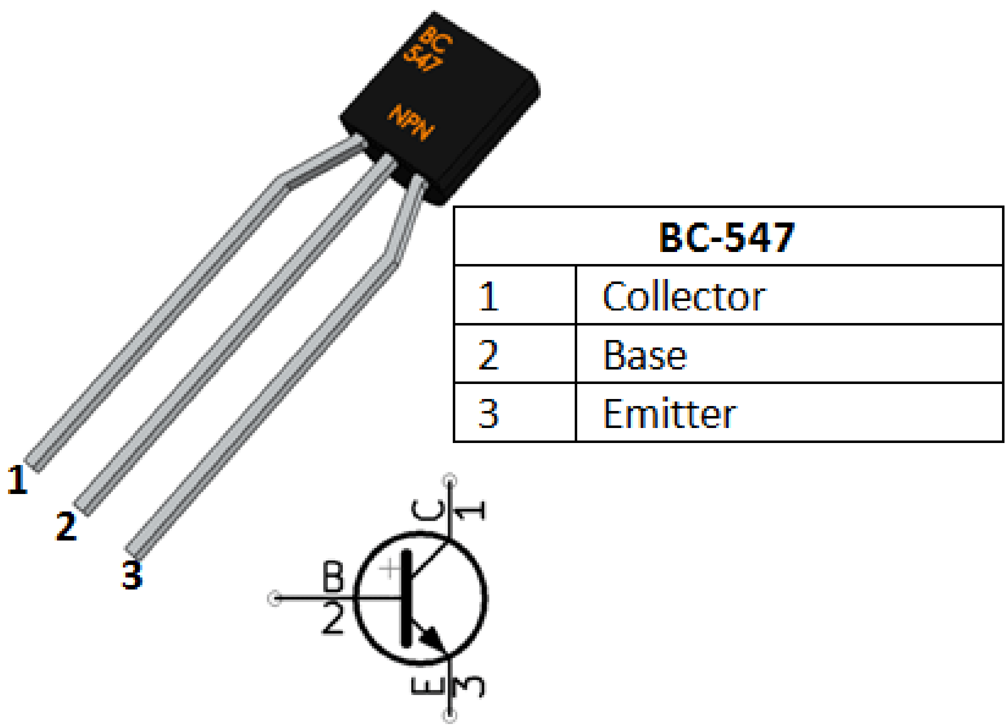
for both the current and voltage ranges as the supply voltage increases. The sensitivity of the time interval to the variation of the supply voltage is low, typically 0.1% per volt. There are special and military devices operating at voltages up to 18 **V.**

3.Transistor:

There are typically three electrical leads in a transistor, called the emitter, the collector, and the base. An electrical signal applied to the base (or gate) influences the semiconductor material's ability to conduct electrical current, which flows between the emitter and collector in most applications. A voltage source such as a battery drives the current, while the rate of current flow through the transistor at any given moment.

- Driver modules like relay driver, LED driver
- Amplifier modules like audio amplifiers, signal Amplifier

Fig(4.6) BC 547 TRANSISTOR



BC-547	
1	Collector
2	Base
3	Emitter

Earlier, the critical and important component of an electronic device was a vacuum tube; it is an electron tube used to control electric current. The vacuum tubes worked but they are bulky, require higher operating voltages, high power consumption, yield lower efficiency and cathode electron-emitting materials are used up in operation. So, that ended up as heat which shortened the life of the tube itself. To overcome these problems, John Bardeen, Walter Brattain and William Shockley were invented a transistor at Bell Labs in the year of 1947. This new device was a much more elegant solution to overcome many of the fundamental limitations of vacuum tubes.

Transistor is a semi conducer device that can both conduct and insulate. A transistor can act as a switch and an amplifier. It converts audio waves into electronic waves and resistor, controlling electronic current. Transistors have very long life, smaller in size, can operate on lower voltage supplies for greater safety and required no filament current. The first transistor was fabricated with germanium. A transistor performs the same function as a vacuum tube triode, but using semiconductor junctions instead of heated electrodes in a vacuum chamber. It is the fundamental building block of modern electronic devices and found everywhere in modern electronic systems.

Transistor Basics:

A transistor is a three-terminal device. Namely,

- Base: This is responsible for activating the transistor.
- Collector: This is the positive lead.
- Emitter: This is the negative lead

NPN transistor

N-P-N transistor consisting a layer of P-doped semiconductor between two layers of N-doped material. By amplifying current the base, we get the high collector and emitter current.

That is when NPN transistor is ON when its base is pulled low relative to the emitter. When the transistor is in ON state, current flow is in between the collector and emitter of the transistor. Based on minority carriers in P-type region the electrons moving from emitter to collector. It allows the greater current and faster operation; because of this reason most bipolar transistors used today are NPN.

4.TRANSFORMER:

12-0-12 Transformer is a

It is a center tapped transformer

Its input voltage :220v AC at 50hz

Output :24v or 122v (RMS)

Output current :2A or 3A or 5A

The center tapper transformer is named as 12-0-12 because of the output potential of three terminals. Here the center terminal is taken as reference point with 0 voltage and T1 is of 12v and T2 is of -12 v.

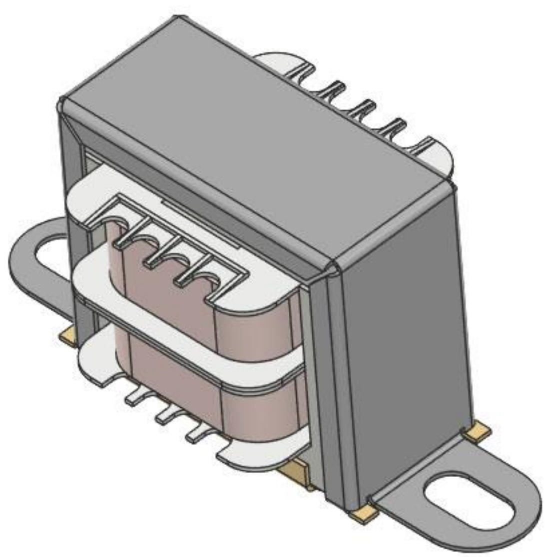


Fig (4.7) Transformer

5.DIODE

Diode is a two terminal electrical component that can conduct current in one direction as long as the diode operated in the specific voltage levels. Ideal diode has zero resistance in one direction and infinite resistance in reverse direction.

Features

Plastic package has under writer’s classification 94v-0

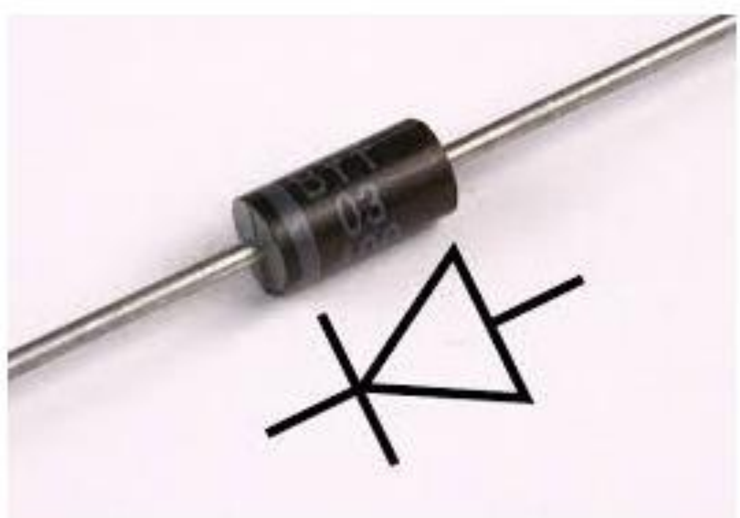
Void free modeled technique is used in construction

This diode has low reverse leakage

Surge capability of this diode is high

It is capable of high soldering guaranteed 260 Celsius/10sec

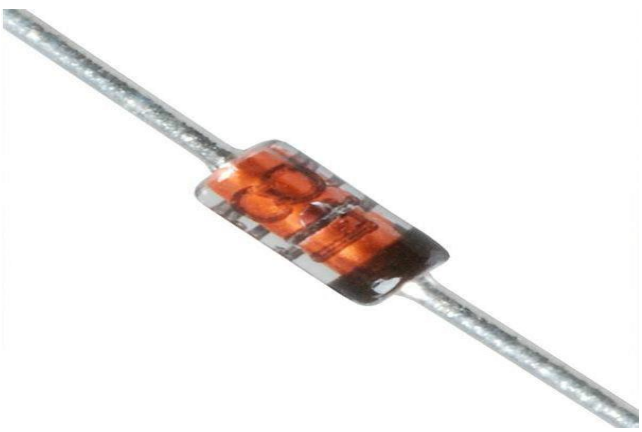
Dimensions are 0.37(905mm) lead, length,5lbs(2.3kg) tension.



Fig(4.8) diode

6.Zener DIODE:

Diode is a two terminal electrical component that can conduct current in one direction as long as the diode operated in the specific voltage levels. Ideal diode has zero resistance in one direction and infinite resistance in reverse direction. Zener diode working is nothing but connecting the diode in reverse direction. In Zener diode the current flows in conventional manner from its anode to cathode. Zener diodes are manufactured with a great variety of Zener voltages and some are even variable. It is an active component and works on the principle of Zener effect



Fig(4.9) Zener diode

7.Capacitor

Capacitors are the devices that are used to store the electrical energy in electrical field. Capacitors are passive two terminal electrical components.

Capacitors are used to block through them here we used electrolytic capacitors. How much energy that a capacitor stores depends on the capacitance of the capacitor

Fig(4.10) Capacitors

8.Resistors:

Resistors are two terminal passive electrical components resistors are generally used to slow down the flow in electrical circuits and also used for adjust signal levels and divide a resistor value by color coding on them

Fig (4.11) Resistors 220k,330ohm

Fig (4.12) Resistor

POWER SUPPLY:

A Power supply is a device that supplies electric power to an electric load. The term is most commonly referred to electric power converts that coverts one form of electric energy to another, though it may also refer to that covert another form of energy (mechanical chemical, solar) to electrical energy. the regulated power supply is that controls the output voltage or current to specific value; the controlled value is held nearly

Fig(4.13) Battery

BREADBOARD:

A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate.

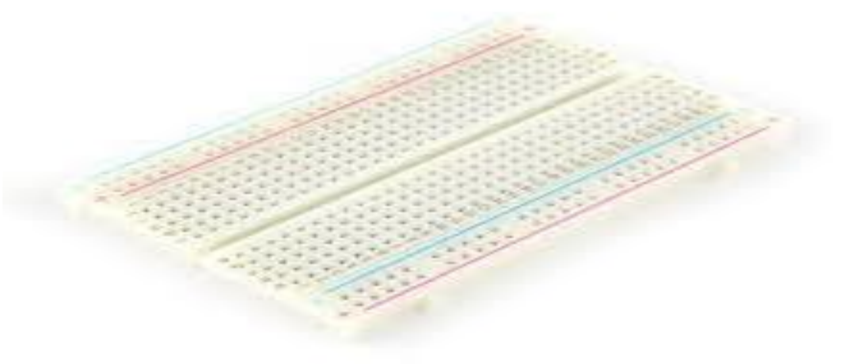


Fig (4.14) Bread board

12V DC MOTOR

A DC motor is any motor with in a class of electrical machines where by direct current electrical machines where by direct current electrical power is converted into mechanical power.

The basic working principal of a DC motor is “whenever a current carrying conductor is placed in a magnetic field it experiences a mechanical force” the direction of this force is given by Flemings left hand rule and its magnitude is given by F=BIL

A 12 V DC motor is small and in expensive, yet powerful enough to be used for many applications.

Fig (4.15) DC Motor

DECADE COUNTER

Decade counter can produce output at 10 pins (Q0-Q9) sequentially, that means it produces output one by one at 10 output pins. here the output is transferred to pins through a low to high clock pulse at pin 14. At first output changes to next clock pulse changes Q0 low and Q1 high and Q2 high and so on. after Q9 it will again starts from the Q0 the basic decade counter is an electronic circuit with a 4- bit binary an input signal (called a clock)

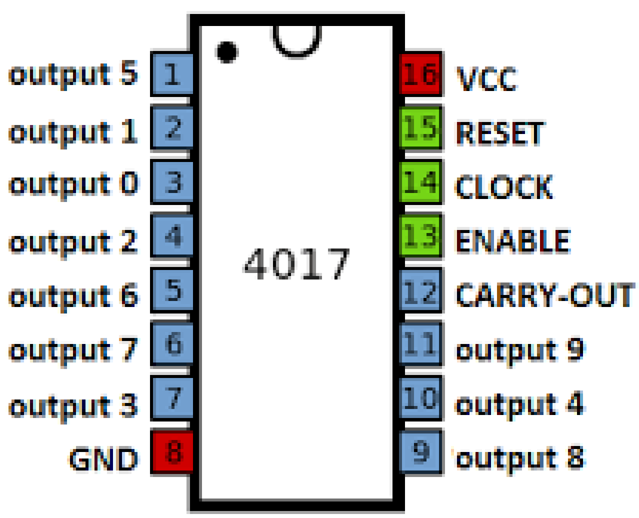


Fig (4.16) pin diagram

- Pin 1: It is the output pin 5. It goes high when the counter reads 5 count.
- Pin 2: It is the output pin 1. It goes high when the counter reads 0 count.
- Pin 3: It is the output pin 0. It goes high when the counter reads 0 count.
- Pin 4: It is the output pin 2. It goes high when the counter reads 2 count.
- Pin 5: It is the output pin 6. It goes high when the counter reads 6 count.
- Pin 6: It is the output pin 7. It goes high when the counter reads 7 count.
- Pin 7: It is the output pin 3. It goes high when the counter reads 3 count.
- Pin 8: It is the ground pin which should be connected to a low voltage (0V).
- Pin 9: It is the output pin 8. It goes high when the counter reads 8 count.
- Pin 10: It is the output pin 4. It goes high when the counter reads 4 count.
- Pin 11: It is the output pin 9. It goes high when the counter reads 9 count.
- Pin 12: This is divided by 10 output which is used to cascade the IC with another counter enable counting greater than the range supported by a single IC 4017.By cascading with another 4017 IC, we can increase and increase the range of counting by cascading it with more and more IC 4017s. Each addition cascade IC will increase the counting range by 10. However, it is not advisable to cascade more than 3 IC'S as it may reduce the reliability of the count due to the occurrence of glitches. If you need a counting range of more than twenty or thirty, I advise you to go with the conventional procedure of using a binary counter followed by a corresponding decoder.
- Pin 13: This pin is the disable pin. In the normal mode of operation, this is connected to ground or logic LOW voltage. If this pin is connected to logic HIGH voltage, then the circuit will stop receiving pulses and so it will not advance the count irrespective of several pulses received from the clock.
- Pin 14: This pin is the clock input. This is the pin from where we need to give the input clock pulses to the IC to advance the count. The count advances on the rising edge of the clock.
- Pin 15: This is the reset pin which should be kept low for normal operation. If you need to reset the IC then you can connect this pin to HIGH voltage.
- Pin 16: This is the Power supply pin. This should be given a HIGH voltage of 3v to 15v for the IC to function.

CHAPTER 05

RESULT AND DISCUSSION

By varying the TV Remote signal. The speed of the DC Motor by means of IR Remote and 555 Timer can be controlled in Five different levels. The speed of the DC Motor can be observed by Rotation of the fan. We found out that this is very cheap and efficient speed control method where all components give reliable operation.

CHAPTER 06

FUTURE SCOPE

- Using MATLAB simulation, we can extend this model to other types of motors
- The work done can be further extended in the future to design a closed-loop system and we can obtain précised values and errors can be reduced
- With the help of Bluetooth or WIFI, we can control further
- We can also improve the system by replacing the elements with advanced elements

ADVANNTAGES

- Speed regulation of the DC Motor in this system is very good.
- It can control the speed of dc motor.
- It is easy and simple to understand the design.
- It can control a high current circuit with low current signal.

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APPENDIX