“BRAKE FAILURE INDICATOR”

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ABSTRACT

In the process of creating something more advanced we have created a world with a lot of modernization, but with it also comes a lot of problems and one such problem is accidents, while travelling this is the main thing that everyone tries to avoid but sometimes it is inevitable Now-a-days we can see a lots of accidents almost everywhere. Thousands of lives are effected And with such rapid growth of population there are more vehicles than ever on road, which also means there are a lot of chances of brake failure.

In foreign countries they take immediate measures for the prevention of accidents but our country India takes less action against the prevention of accidents. Brake failure is one of the common cause ofaccidents.

Brake failure indicator circuit constantly monitors the condition of the brake of the vehicle and warns you about the brake conditions every time the brake is applied.

Sometimes ,in a vehicle even when the main system does not work they still have some degree of control over their vehicles. Two braking system is also available one of which acts like a back up system.

Though along with tire ware outs and brake failure are rare to occur. Its one of the prime reason of accidents with heavier vehicles like trucks and busses.
There is either leakage of brake line or master cylinders or wheel cylinders which are all causes of brake failure.

There are many precautions that should be undertaken while using a vehicle.
There are many products used to construct a brake failure indicator like LED ,buzzer etc and hence accidents can be avoided. Its application is very easy because it is automatic

Several factors gives rise to brake failure which includes hydraulic lines which will not be attached properly. The brake pads or rotors are damaged due to over heating.

When brakes are applied by the driver, the plunger is push into the master cylinder, which pushes out the brake fluid from the tubes and all the moving units of the vehicle are effected.

There are various other devices available in the market to predict brake failure like united states 3711827, etc

It is basically a self test which is used to determine if the warning light is operated properly, But our project can indicate brake failure.

OBJECTIVES:

- The main objective of our project is to avoid as many accidents as possible.
- To save as many lives as possible.
- All small number of accidents which includes trains and boats can be avoided.
- The change in the hydraulic pressure can be measured.
- To indicate the failure of the braking system.
- The vehicles moving units can be controlled.
- The leakage fluid can be measured

Scope:

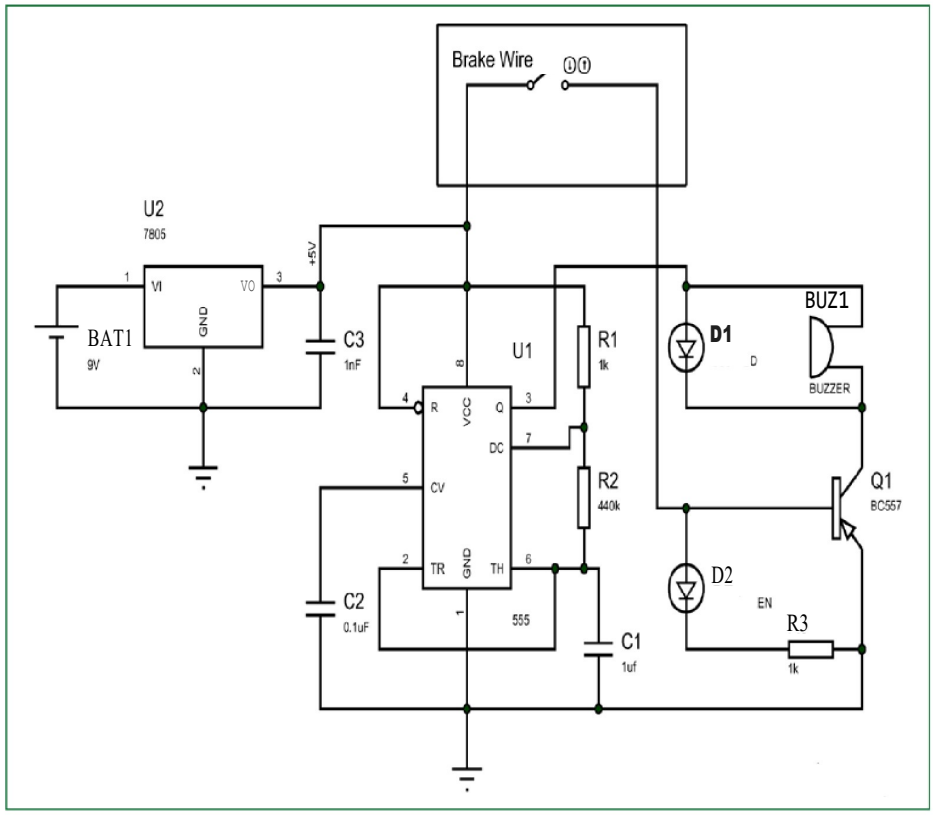
For avoiding accidents due to brake failure, this circuit is designed, There is certain time factors which is used by the brake for it to stop when the brake is applied One can understand the brake malfunction if they re able to formulate the time and space needed by the brakes The maintenance of brake is very important and a lot of people take it for granted due to which the accidents occur.

This circuits will only work Duty with vehicles with negative grounding. If the fluid pressure drops to leakage the brake switch doesn't function. Usually a vehicle does not suffer from total failure of the braking system Hence this equipment is very useful as it has easy application since it is automatic and runs immediately causing and alarm. This indicates brake failure and the driver will ought to control the vehicle as soon as possible by avoiding more accidents. Many lives at risks can be saved using this equipment and hence will have a brighter scope in future with more advanced technologies

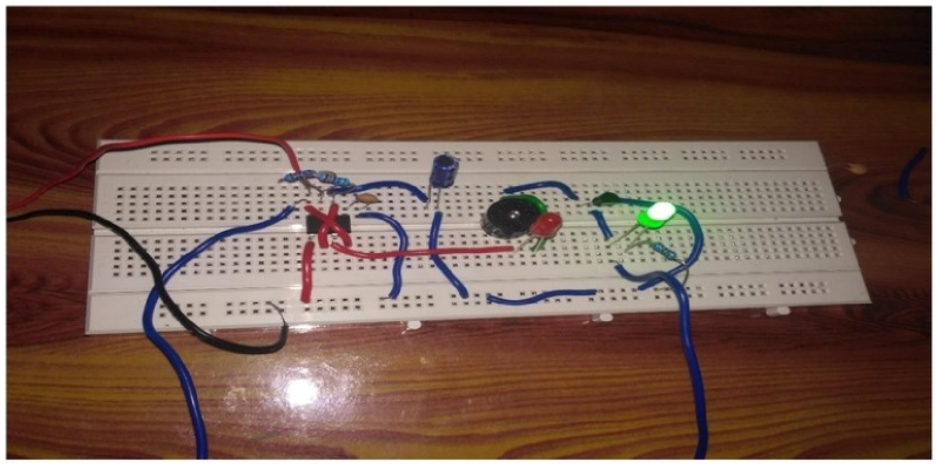
Materials required:

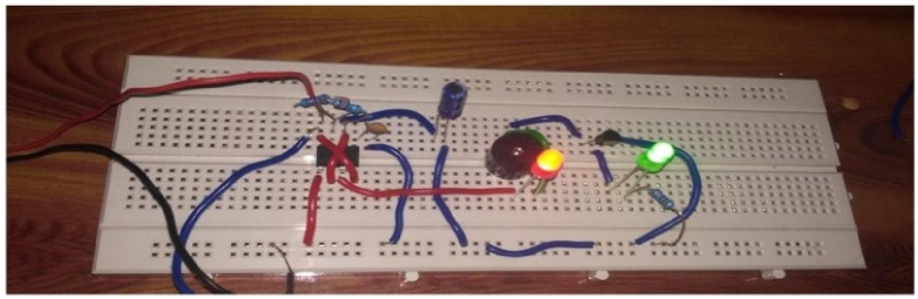
1. Breadboard
2. 555 timer IC
3. BC557 PNP Transistor
4. Red and green color LED
5. luf and 0.1uf capacitors
6. lk and 440kresistors
7. Connecting wires
8. Buzzer

CIRCUIT DIAGRAM :



Live pictures





BREAD BOARD

For prototyping of electronics construction a breadboard is used

Before it originated info its modern forms it was a wood used for slicing bread Now a days solderless breadboards are available which is a plug board, terminals are present like array board.

The term bread board is usually used to refer to these

The socket of solderless breadboard consists of perforated blocks with tin plated phosphor bronze or nickel silver alloy spring clips below the perforations.

Contact points or the tie points are nothing but these clips which are always specified on the specification lists of the breadboard.

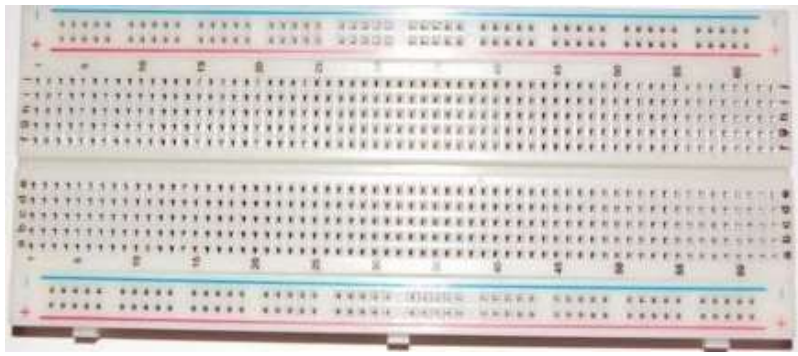
ADVANTAGES :

- Solderless connections in the breadboards have the advantage to quickly change all the components.
- This makes it easy for the user to connect and disconnect the circuits.
- Because the components can be replaced quickly they due not get damaged due to heat from continuous soldering.
- The use of hot soldering irons can be risky this makes its safer while using it for teaching purposes.

DISADVANTAGES:

- They cant handle high voltages hence they don't work with high voltage circuits.
- With higher frequencies the signal will not be able to pass through the bDard giving errors.

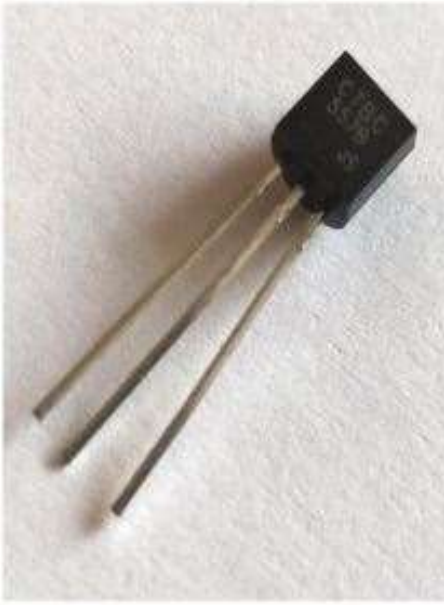
Picture of a breadboard



BC557 PNP TANSISTOR

FEATURES:

- Bi-polar pnp transistor.
- Dc current gain is 300 maximum.
- Continuous collector current is 100Ma
- Emitter base voltage is 6v
- Base currents is 5Ma maximum
- Available in to-95 package.



BC-557	
1	Collector
2	Base
3	Emitter

BC557 PIN CONFIGURATION

pin number	Pin name	description
1	collector	Current flows in through collector
2	base	Controls the biasing of transistor
3	emitter	Current drains out through emitter.

BC557 is a pnp transistor and is forward biased due to which the collector and emitter will be closed when the base pin is held at the ground,

Its will be opened when it will be reversed biased when the signal is provided to the base pins.

This is the difference between a pnp transistor and an npn transistor .

APLLICATIONS:

- It acts like a driver module and drives module like relay drivers, led drivers etc.
- It also drives amplifier modules like audio amplifiers and signal amplifiers etc.
- « Its also used in Darlington pair

LIGHT EMITTING DIODES(LED)

A two lead semiconductor light source is called LED.

The semiconductor is pn type and emits light when it is activated. When supply is given the electrons present are able to combine with electrons holes within the device, and the energy are released These released energy are called photons and this effect is known as electroluininescence.

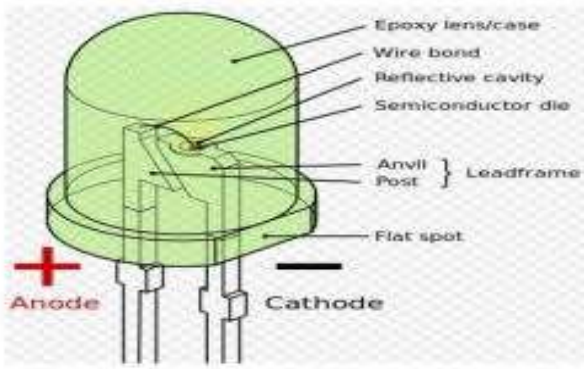
There are different colors that are emitted from the LEDs. These colors are determined by the band gap of the pn semiconductor.

They are small in size and to shape the radiation pattern integrated optical components may be used.

A conventional LED parts consist of flat bottom surfaces called avil and post. These surfaces are put inside ,they epoxy which are the anchors, this helps the conductors from being damaged by forcefully pulling it out because of mechanical stress and vibrations

APPLICATION

- LEDs are used for environmental and task lightening and because of their new sensors and displays ,they used in high switching rates useful for advanced communications technology.
- They are used in aviation lighting, automotive headlamps, advertising, traffic signals etc..



Capacitors:

Capacitors is an electronic device that stores the potential energy in the form of electric field.

It is a two terminal electronic component. The effect which is produced by the capacitor is known as capacitance Its used to add capacitance in the circuit even if there is some capacitance present between two electronic conductor . condenser and condensator where used previously to refer to capacitors

They are made up of atleast two electrical conductors in the form of metallic plates or surfaces which is separated by a dielectric medium The conductor is mostly an electrolyte but foils and thin films also can be used. The capacitors charge capacity is increased by the non conducting dielectric,

If a capacitor is attached to a battery an electric field develops which is present across the dielectric

Therefore positive charge is collected in one plate and the other plate has negative charges .the effect of capacitor is known as capacitance and is defined as the ratio of electric charge on each conductor to the potential difference between them.

The capacitance unit SI is called Farad

APPLICATION :

- They are used to block the direct current in the electronic circuits while allowing alternating current to pass.
- The power supply output in analog filters are smoothened. And they tune the radio frequencies in RCs. They also stabilize voltage and current flow in electric power transmission.

RESISTORS

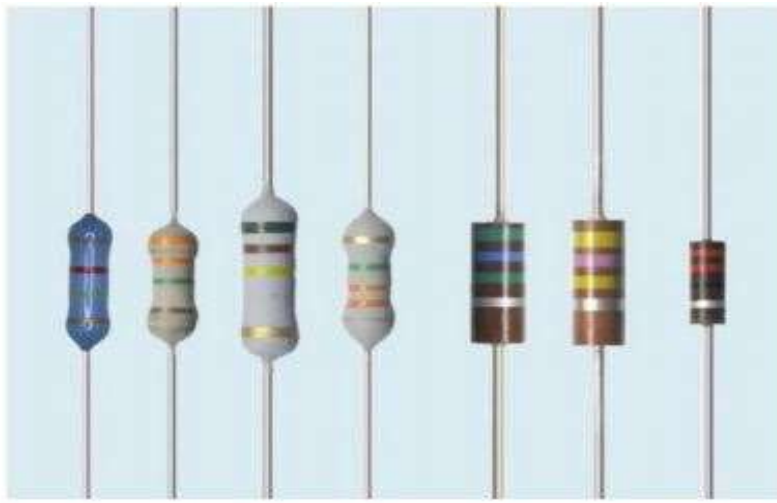
It is a passive component. It consists of two terminals which produces resistance Its used to alter the signal levels, to terminate transmission lines and to mainly reduce the flow of current also to divide voltage biased active elements

High value of heat is dissipated with high voltage resistors, which is used by the motor controls in distribution system, and in generators to test the loads.

The resistors having only fixed resistance and only change slightly with temperature are called fixed resistor.

And variable resistors can be altered and hence used as sensing in force, heat or light or chemical activity.

Different types of resistors



BUZZER

The audio signaling device is called as a buzzer or a beeper Buzzers are of three types namely mechanical, electromechanical or piezoelectric.

Buzzers are typically used in alarms, timers and confirmation of user output such as as mouse click or key stroke.

MECHNICAL BUZZER:

- usually require drivers.
- Joy buzzer is of a purely mechanical buzzer.
- Common examples are doorbells.

PIEZOELEC TRIC BUZZER:

- An oscillating electronic circuit is used to drive this element
- Other audio signals are also used to drive this element.
- To produce audible beep it depends on acoustic cavity

APPLICATION:

- Novelty uses
- Judging panels
- For teaching purposes
- Annunciator panels
- Electronic devices
- Video games
- Microwave and washing machines
- Sporting events like basketball
- Alarms

BUZZER

555 TIMER IC

This is the main component used for construction of brake failure indicator and is very commonly used by students It is an 8 pin device, this timer should be operated for l5v and above. And the maximum current it can handle is 100mA. These precautions should be taken care for the IC to not be burnt and damaged

It consists if two comparators or two op amps and onw SR flip flops which is set reset flip flop The 555 timer works in astable mode and it produces clock pulse

ASTABLE MODE.

The 555 timer behaves like an oscillator when it is in the astable mode and it generates a square wave that can be varied by changing the values of two resistors and a capacitors which is connected to chip.

The output cycles on and off continuously The threshold pin and the trigger pin are connected to C 1 Hence the trigger pin also has the same voltage.

Voltage is low at CI the trigger pin and the threshold pin in the beginning of the off and on cycles. The output is on when ever the trigger pin voltage is low .the discharge pin is off, and the currents flows through the resistors

This mode is basically used for waking the LEDs blink and to do periodic turn on and off actions. According to the calculations made it should be on for 0 3 sec and off for 0.3 seconds.

T1 = 0.693(R1-R2)C1 T=T1+T2
T2 = 0.693*R2*C1 F=1/T Duty cycle = T1/(T1+T2)

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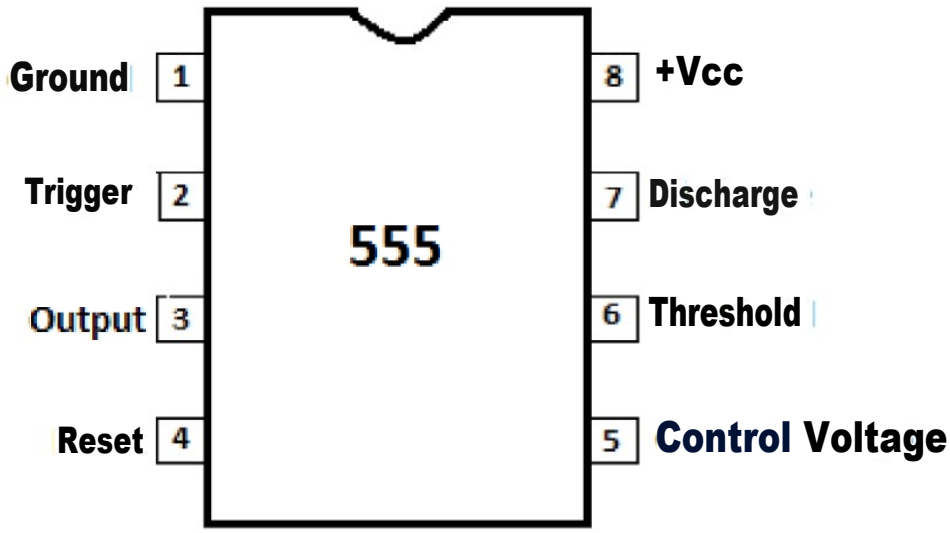
555 TIMER IC

PIN DIAGRAM :



Pin 1

Ground :this pin is connected to the ground for the timer to function

Power or VCC : the positive voltage is connected to this pin from the range +3.6v to + l5v.

Pin 4

Reset' the flipflop in the timer, which controls the output of the flipflop at pin 3 directly Its connected to master reset of the flipflop and for the flip flop to work and reset the voltage of MR should go from high to low. Its also connected to VCC for it to st0p from hard resetting

Output: it does not have any special features, it gives the output.

Pin 5

Control pin: this pin is connected to comparator one from negative input pin Its function is that the user can directly have control on comparator one

Pin 2

Trigger from comparator two negative input Tigger is drawn, wherein the output of the comparator is connected at SET pin of high voltage at output of the timer

Pin 6

Threshold: when to reset the fiip flop in the timer is decided by the threshold pin voltage. From positive input of comparator one threshold is drawn,

Pin 7

Discharee: its received from transistor open collector. When the output is low the flipflop gets resetted. This pin is also connected to the ground.

CONNECTING WIRES:

Solid wire, also called solid-core or single-strand wire, consists of one piece of metal wire Solid wire is useful for wiring breadboards Solid wire is cheaper to manufacture than standard wire and is used where there is little need for flexibility in the wire. Solid wire also provides mechanical ruggedness and, because it has relatively less surface area which is exposed to attack by corrosives, protection against the environment.

Construction:

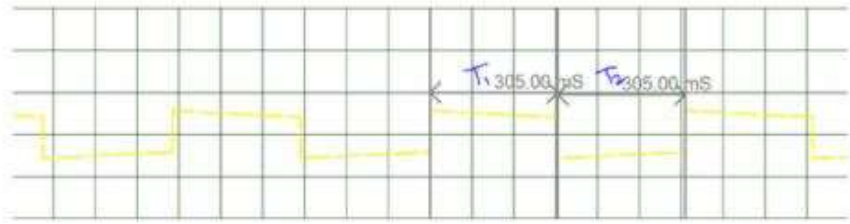
The circuit is constructed as per the circuit diagram The 555 timer and the pup transistor are the main components.

The transistor works on monitoring the brake wire and helps in deciding which LED should glow, The 555 timer operates in astable mode and helps in producing the clock pulses.

The blinking of the LEDs or to do some periodic on and off actions. The tinier works with the 0 3 seconds on time and 0 3 seconds off time The values of the resistors R l,R2 and capacitors C 1 decides the on an off time the pulse produced,

For our project we have used the values of R1=l000olim, R2=440000ohm and C l=0.000001uf.

Resistors RI in ohms	Resistor R2 in ohms	Capacitor C 1 in farad	On time TI	Off time in T2	Time period T	Frequency F	Duty cycle
1000	440000	0.000001	0.305613	0.30492	0.610533	1.63791	0,50056



The BS557 PNP transistor controls the LEDs and bell. At the point when the Brake wire is in appropriate condition the base of this transistor is furnished with 5V through a current restricting (R4) Resistor. This likewise drives the Green LED light and separates the Buzzer and Red LED from ground therefore keeping it killed,

At the point when the break wire is cut the base of the BC557 is additionally cut and along these lines the Green LED is killed and the Buzzer and Red LED are associated with ground. Since the positive end of Buzzer and LED is associate with the third stick of 555 clocks which is wired in Astable mode task, they squint/signal dependent on the length set by the above estimation.

Working

When the association is made power the circuit, ensure the Brake link (here I have utilized an ordinary green wire to speak to the brake link) is associated over the +5V and base of BC557 through a resistor as appeared in the circuit.

On the off chance that everything functions of course you should see the Green LED turned on and the Buzzer and Red Light Turned Off. Presently, cut/expel the brake link the Red LED and the Buzzer should begin blazing.

Conclusion

From the above discussion and information of the system we can easily construct a brake failure indicator with low cost and we could detect the brake conditions of the vehicle and thereby preventing road accidents