NEW HORIZON
COLLEGE OF ENGINEERING
New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

ANTI BAG SNATCHING ALARM

A MINI PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

Certified that the mini project work entitled "**Anti Bag Snatching Alarm**" carried out by **G Sai Sandeep (1NH18EC033), P ChandraMohan (1NH18EC024), Govindraj CS (1NH18EC040), ANVS Manideep (1NH18EC012),** bonafide students of Electronics and Communication Department, New Horizon College of Engineering, Bangalore.

The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide	HOD ECE
(Dr. K.C.R. Nisha)	(Dr. Sanjeev Sharma)
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External Viva

Name of Examiner	Signature with Date
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ABSTRACT

The main objective of this project is to design an electronic circuit that will serve to prevent the theft of bag or suitcase. Anti bag theft alarm circuit used in the bag or suitcase to prevent it from theft. It is a simple alarm circuit stored in a bag or suitcase that looks like a powerful alarm, simulating a police horn. This will draw attention to the other people and the thief can be catch hold of easily. Then, when the thief tries to snatch the bag or suitcase the plug gets detected from the circuit and the alarm goes off. The heart of all this project is operational amplifier which is configured as a comparator. 555timer -IC is used as a monostable multivibrator and for the audio section sound generator with built in oscillator is used. Once the sound is amplified, it is powered to the speaker for the output. The anti-theft bag alarm kit uses a circuit and simulates a police horn if someone tries to pull it off. Therefore, while travelling this kit allows the person to carry money or valuables without any fear. The alarm can only be disabled by the authorized person. The main components it consists are 555 timer -IC, an operational amplifier, an in-built oscillator, resistors, transistor (BD139), diode, ceramic and electrolytic capacitors, variable resistor. This project is useful especially in case of women while carrying bag or suitcase when travelling.

CHAPTER 01

INTRODUCTION

The project is widely used while traveling long distances carrying a bag or suitcase in hand. It can be designed on a PCB and breadboard as well. It consists of many components like 555timer-IC, operational amplifier which acts as a comparator, in built oscillator, transistor, resistors, speaker or buzzer, diode, variable resistor, 9V battery, battery holder. The operational amplifier IC is the heart of the whole circuit which acts a comparator. In recent days, the theft rate is very high in the world. They are even worse in the developing countries. Therefore, protecting portfolios with the intelligent, reliable, efficient and economical system is very important. The existence of technologies for handbags and safety bags have a number of limitations, including high false alarm rate, easy deactivation and high cost. In this project, an anti-theft handbag the security system will be designed using a UM3561 oscillator that will cause a alarm to activate. The main purpose of this project is to prevent snatching of bags and suitcases and to catch hold of the person. This project makes the life of a person easier who is travelling at very long distances without any fear. It is reliable, efficient, and handy. Once the circuit is kept inside the bag connect a jack to it. Then tie it to your bag or suitcase. If anyone snatches, we can get to know that someone is snatching the valuables present in the bag or suitcase. This circuit is most commonly used while travelling long distances and carrying any valuables in it. It produces a very large sound when the intruders try to snatch the bag or suitcase.

CHAPTER 02

LITERATURE SURVEY

- **Electronicsforu.com (**Anti-theft alarm Published in February 2004)

  Now-a-days, there are many thefts going on around us especially in case of women. This anti-bag snatching alarm provides a simple solution for this. When someone tries to snatch the bag the jack which is connected to the circuit detaches from it and it produces an alarm signaling that there is someone who is snatching the bag. This alerts the person who is carrying the bag or suitcase. So, to prevent this theft we use this circuit called anti-bag snatching alarm.

- **Slideshare.net (**Anti bag snatching alarm by Soumya Tiwari and published on Dec 4 2017)

  Today, people are still terrified of thieves. Day by day, it is growing in society. Above all, women are not safe with the bag outside. For this reason, to eliminate American investor Richard w. Dixon invented the handbag theft alarm in 1971. This was the first use of the theft alarm. It was based on the theory that sudden pull or shaking force exerted by the handle of the bag will cause the alarm to be triggered. In order, to prevent this we can use this circuit anti-bag snatching alarm.

- **Electronicsproject.org**

  Here is a very simple project, as well as very useful anti-bag alarm to snatch the project, used in the bag or suitcase in order to prevent theft. The sound produced by the alarm anti-bag snatching is like the police horn to attract people's attention when someone tries to snatch their handbag or suitcase. This circuit provides safety in order to prevent loss of the valuables in the bag or suitcase. This provides safety especially in case of women who travel frequently with their bag or suitcase.

- **Academia.edu** (Anti snatching alarm Published in February 2004 by Anurag dandge)

  In recent days, the rate of theft is very high in the world and the situation are even worse in developing countries. As a result, the protection of intelligent, reliable, efficient and economical system is very important. The technologies for bag and bag safety have a number of limitations, theft alarm rate, easy deactivation and high cost. In this project, an anti-bag snatching security system will be designed using the vibration sensor system that will alarm to trigger and alert the people who are carrying a bag or suitcase. This security is very much needed in this developing country to protect our own citizens from thefts.

- **Electronicshub.org**

  This is a simple alarm circuit to thwart the snatching of your valuables during the trip. The circuit placed in your bag or suitcase sounds a loud alarm, simulating a police horn, if someone tries to snatch your bag or suitcase. This will attract the attention of other passengers and the thief can be caught immediately. In standby mode, the circuit is blocked by a socket (a mono socket with short cables connected to the unit's single-jack socket). When the thief tries to snatch the bag, the socket separates from the unit socket and triggers the alarm.

- **Tronicchoice.wixsite.com**

  The alarm bag kit uses a circuit that is blocked by a standby and take device. The kit can be stored in a bag or suitcase and simulates a police horn if someone tries to pull it off. Therefore, during the trip, this kit entitles the person to carry money or valuables without fear. The alarm can only be deactivated by the authorized person.

CHAPTER 3

PROPOSED METHODOLOGY

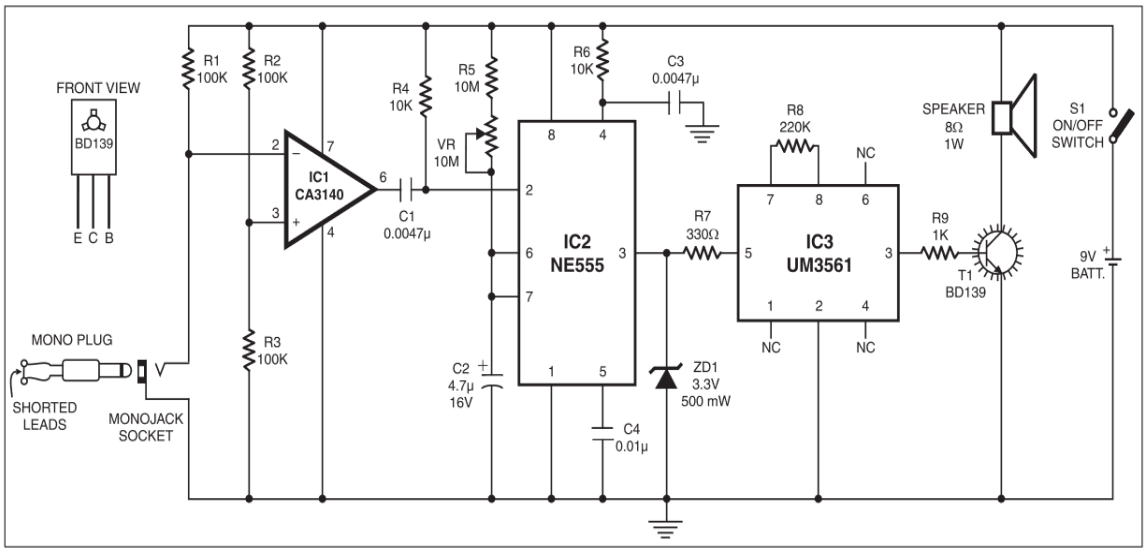


Fig 3.1 Circuit diagram

- Initially, we analyzed the circuit diagram in order to proceed forward.
- Then, we bought the components and placed all the components on the bread board.
- We placed the 1st IC and surrounding components on the bread board then we have checked the output waveforms on the CRO by applying certain voltage.
- Then, we placed the 2nd IC i.e. 555Timer and checked the output waveforms on the CRO at pin 3 of the IC.
- Then, we connected the 3rd IC i.e. the oscillator IC and connected the transistor to check whether the signal received from the IC is being amplified or not.
- Later, we have connected all the other components like resistors, capacitors, diode, etc.
- Then, we placed the transistor to the speaker to produce an alarm.
- Later, we have connected a switch in order to switch off the alarm sound.
- Then, we placed the circuit in the bag or suitcase to check, when the monoplug is detached whether it is producing an alarm or not.

CHAPTER 04

PROJECT DESCRIPTION

The project is mainly based on the CA3140 IC which acts a comparator in the circuit. There are mainly 3 pins which are connected. The remaining pins are connected to Vcc and Ground. It has 2 pins which are named as inverting ang non-inverting terminals. The output is connected to pin 6. Based on the input given at the inverting and non-inverting terminals it produces the output. The output is fed to the next IC i.e. 555-Timer IC which is in monostable state. The same output comes at the pin no 3 of the 555-Timer IC. This output is given to the next IC i.e. UM3561 which acts as a oscillator in the circuit. The output of this IC is given to the transistor. The transistor amplifies the output signal and is given to the speaker to produce an alarm when connected to the supply. So, when the intruders try to snatch the bag the monoplug gets detached from the circuit and it produces an alarm. The components used are 3 IC's- CA3140, NE555timer, UM3561, speaker, transistor (BD139), Zener diode, resistors, monoplug, monojack socket, ceramic and electrolytic capacitors, variable resistor.

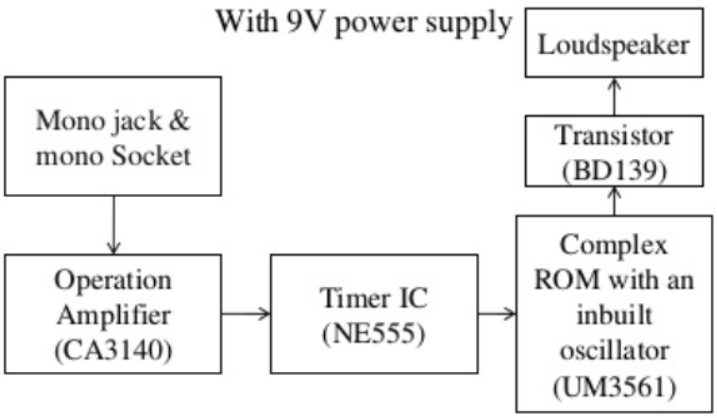


Fig 4.1 Block Diagram

COMPONENTS USED: -

Table 1.1. Components used in the project

COMPONENT	VALUE (OR) SPECIFICATION	REMARKS
IC CA3140	High input impedance	Operational amplifier
IC NE555-TIMER	Supply voltage - +16V	Timer
IC UM3561	Typically, +3 operating voltage	In-built oscillator
TRANSISTOR	BD139	Amplifies the circuit
CAPACITOR	4.7uF	Electrolytic
CAPACITOR	0.0047uF, 0.01uF	Ceramic
RESISTORS	330ohms,220ohms,100Kohms 10Mohms,10Kohms, 1Kohm	Reduces the current flow
SPEAKER	8ohms, 1W	Generates an alarm
ZENER DIODE	3.3V	Used as a voltage regulator

HARDWARE DESCRIPTION

IC CA3140

PINOUT DIAGRAM

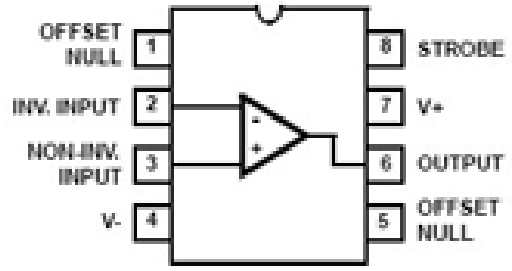


Fig 4.2. Pin diagram of IC CA3140

Pin1: Offset Null
Pin2: Inverting input
Pin3: Non inverting input
Pin4: Ground- Negative supply
Pin5: Offset Null
Pin6: Output
Pin7: Positive supply
Pin8: Strobe

BLOCK DIAGRAM:

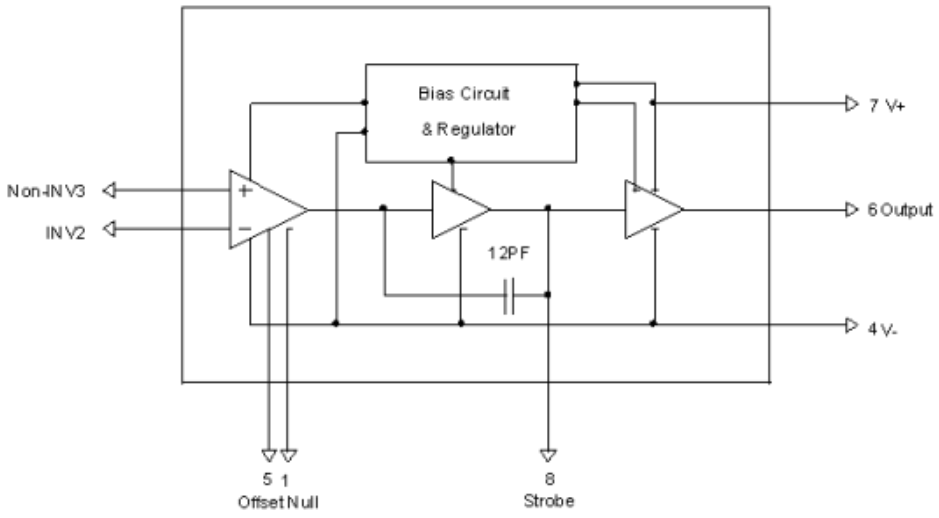


Fig 4.3. Block diagram of IC CA3140

Operating conditions are:

- Maximum supply voltage - 36V
- Input terminal current - 1mA

WORKING:

CA3140 is the 4.5MHz BiMOS Operational Amplifier with MOSFET inputs and Bipolar output. This Op Amp combines the advantage of PMOS transistors and high voltage bipolar transistors. It acts as a operational amplifier. It has inverting and non-inverting terminals. Here, pin no. two is the inverting terminal and pin no. three is the non- inverting terminal. If the input at the inverting terminal is high and low at the non-inverting terminal then the output is high at pin no. six and vice-versa. The IC is incredibly quick and it has high speed performance. It uses bi polar transistors at the output. These operational amplifiers are internally phase compensated to achieve stable operation in unity gain.

Fig 4.4 IC CA3140

NE555- TIMER IC

PINOUT DIAGRAM

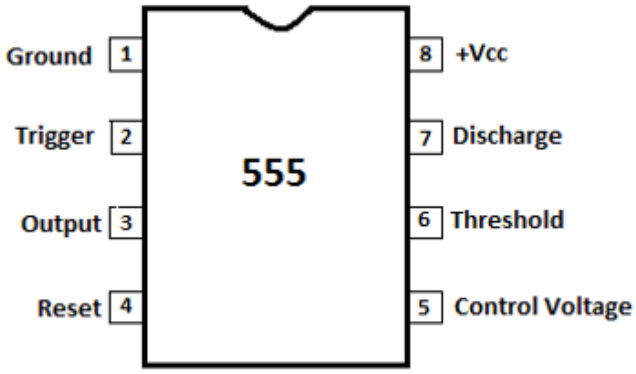


Fig 4.5. Pin diagram of NE555 – Timer

Pin 1: Ground

Pin 2: Triggering

Pin 3: Output

Pin 4: Reset

Pin 5: Control

Pin 6: Threshold

Pin 7: Discharge

Pin 8: positive supply voltage

Operating conditions are :

- Supply voltage ranges from +5V to +18V
- Load current of 200mA

BLOCK DIAGRAM

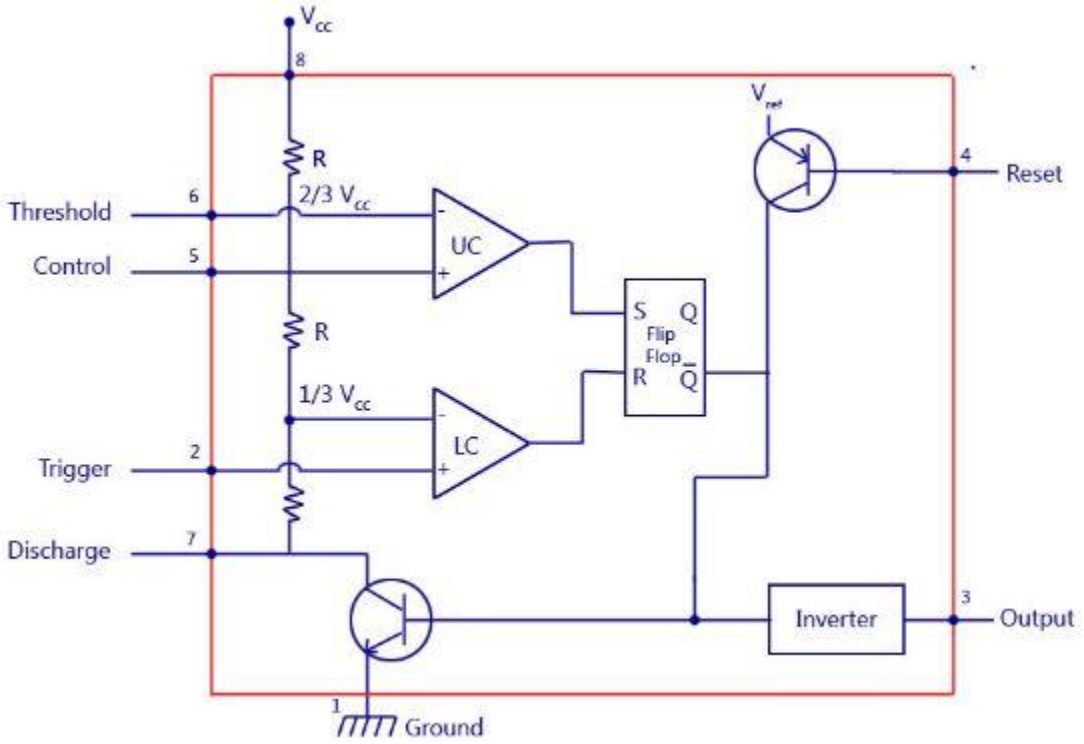


Fig 4.6. Block diagram of NE555 - Timer

WORKING: -

555 timer has 3 modes they are:

1. A- stable
2. Mono- stable
3. Bi- stable

A-stable mode:

This means that there will be no stable level in the output. Thus, the exit will swing between high and low. This unstable output character is used as a clock output or square wave for many applications.

Mono-stable mode:

This configuration consists of a stable state and an unstable state. The stable state can be chosen high or low by the user. If the stable output is fixed at high (1), the timer output is high (1). In applying an interruption, the timer output becomes low (0). Since the low state is unstable, it will automatically be high (1) after the interruption passes. The same goes for a stable monostable mode.

Bi- stable mode:

In Bistable mode, both the output states are stable. At each interrupt, the output changes from low (0) to high (1) and vice versa, and stays there. For example, if we have a high (1) output, it will go low (0) once it receives an interrupt and stays low (0) till the next interrupt changes the status.

Features of 555timer:

- External components must be selected correctly so that time intervals can be run in several minutes with frequencies greater than several hundred kilohertz.
- The output of a 555 timer can lead to transistor-transistor (TTL) logic due to its high-power output.
- The timer service cycle is adjustable.

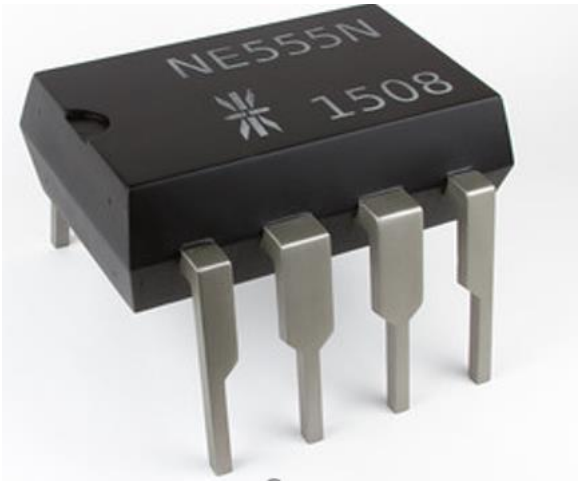


Fig 4.7 NE555-Timer

IC UM3561

PINOUT DIAGRAM

4.8. Pin diagram of IC UM3561

Pin 1: Sound effect Selection

Pin 2: negative power supply

Pin 3: Mono-tone output

Pin 4: Not connected

Pin 5: positive power supply

Pin 6: sound effect selection pin1

Pin 7: external oscillator 1

Pin 8: external oscillator 2

BLOCK DIAGRAM

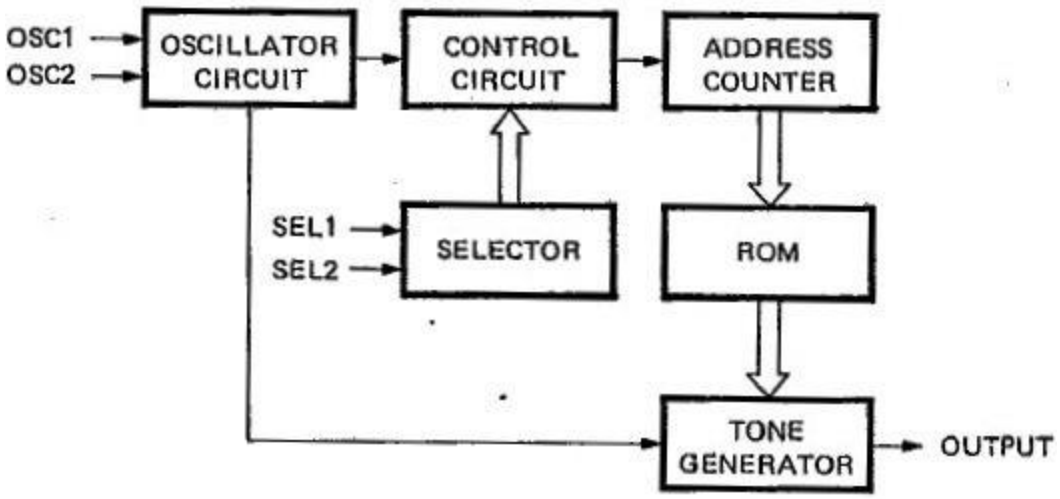


Fig 4.9. Block diagram of IC UM3561

FEATURES:

- When we reset, we can get the power
- It has an operating voltage of 3V
- It is very low cost
- It acts like a NPN transistor

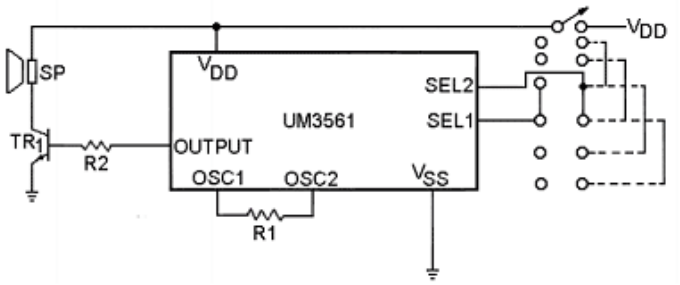
WORKING:

It mainly produces four types of sounds they are:

1. Police horn
2. Ambulance horn
3. Fire engine sound
4. Machine gun sound

Four sound application:

1. Police siren 2. Fire engine siren 3. Ambulance siren 4. Machine gun sound



SEL1	SEL2	Sound effect
No connection	No connection	Police siren
V_{DD}	No connection	Fire engine siren
V_{SS}	No connection	Ambulance siren
"-" don't care	V_{DD}	Machine gun sound

R1 = 240KΩ
R2 = 10KΩ
TR1 = 2SC9013
SP = 8Ω 0.2W speaker

Fig 4.10 Types of sounds generated

- when SEL1 and SEL2 are not connected we get a police horn.
- When SEL1 is connected to VDD and SEL2 is not connected we get a fire engine horn.
- When SEL1 is connected to VSS and SEL2 is not connected we get a ambulance horn.
- When SEL1 is connected to don't care and SEL2 is connected to VDD we get a machine gun sound.

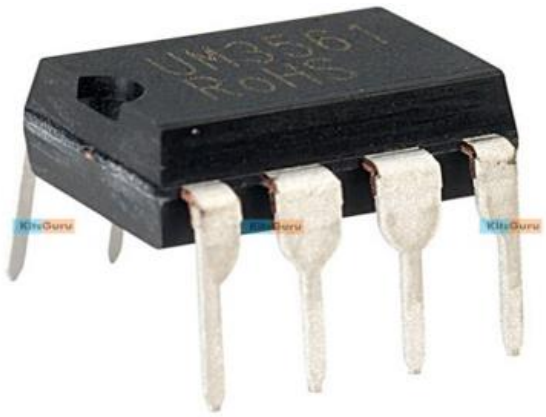


Fig 4.11 IC UM3561

TRANSISTOR (BD139)

PINOUT DIAGRAM

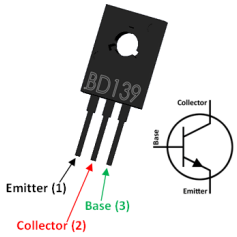


Fig 4.12. Pin diagram of transistor (BD139)

Pin 1: current drains out via emitter

Pin 2: current flows via collector

Pin 3: it is used to control the biasing of the transistor

FEATURES:

- It is made up of plastic
- The continuous current of the collector is 1.5A
- The decomposition voltage is 5V

WORKING:

- BD139 is an NPN transistor so the collector and transmitter will be left open (inverted shady) when the base pin stays on the ground and will close (before shaded) when a signal is provided to the base pin.
- BD139 has a gain value of 40 to 160, this value determines the amplification capacity of the transistor.
- The maximum current that the collector can hold is 1.5A, so we cannot connect the charges that consume more than 1.5A using the BD139 transistor.

ZENER DIODE

Fig 4.13. Zener Diode

Pin 1: cathode(K) (-ve)

Pin 2: anode (A) (+ve)

A Zener diode is a silicon semiconductor device that allows current to flow in forward or reverse direction. The diode consists of a highly doped special p-n junction, designed to operate in the opposite direction when a certain specified voltage is reached.

FEATURES

- It is highly reliable
- Very sharp reverse characteristic
- Low current level
- It consists of two terminals.
- It has cathode and anode

PRINCIPLE

If the reverse bias voltage is lower than the cutoff voltage or if the Zener diode is forward biased, it acts as an ordinary diode. That is to say that in direct polarization, it allows the current and in reverse polarization, it blocks the current.

WORKING

The Zener diode operates in the same way as the normal diode in the forward bias mode and has an ignition voltage of between 0.3 and 0.7V. However, when connected in reverse mode, this is Common in most of the cases. When the reverse voltage increases to the predetermined breaking voltage, a current begins to flow in the diode. The current increases to a maximum, which is determined by the series resistance, after which it stabilizes and remains constant over a wide range of applied voltage.

RESISTORS

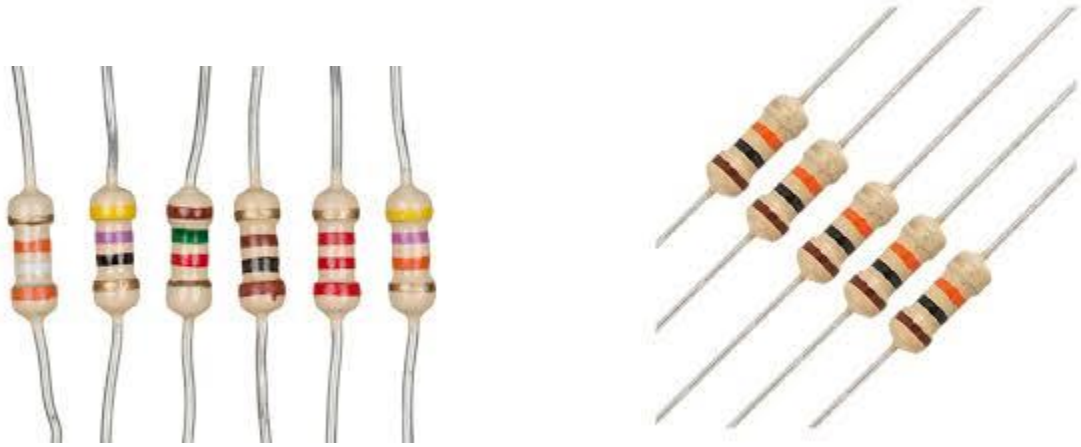


Fig 4.14. Resistors

- A resistor is considered to be a two terminal passive element that introduces a certain level of resistance into the electrical circuit.
- The main roles of resistor in an electrical circuit are to reduce the flow of current, divide the voltage level, adjust the signals.
- So, the main use of the resistors is to reduce the flow of current into an electrical device or circuit.
- We can get resistors of different resistance values which can be used in our projects.

VARAIBLE RESISTOR

Fig 4.15. Variable resistor

A variable resistor is the one which is used to control the circuit resistance. It is also called as the potentiometer. It has three terminals which are to be connected. There are 3 terminals called as cermet path, carbon path, wire wound path. Carbon path and cermet path are used for high strength applications, whereas the wire wound path is used for low resistance variable resistor. It can be used as a potentiometer. Potentiometer is used as a most common type of variable resistor. It has high working efficiency.

SPEAKER

Fig 4.16. Speaker

DESCRIPTION

A loudspeaker is a device which converts electrical audio to sound which can be heard. These are the transducers used to convert electromagnetic waves into sound waves. The speaker receives the input from the computer or the audio receiver. The input supplying to the speaker is analog or digital. The speaker has many entities like impedance, power handling, size, frequency response. It has two terminals namely red and black. Red is connected to the collector pin of the transistor (BD139) and the black is connected to the supply. The speaker used here in the circuit is of 8ohms-1W.

WORKING

The circuit is designed around the IC CA3140 operational amplifier, which is configured as a comparator. The non-inverting input(pin3) of IC1 is maintained at half the supply voltage around 4.5V by the variable resistor(potentiometer) comprising resistors R2 and R3 of 100 kilo-ohms each. The inverting input (pin2) of IC1 is kept low by the short plug in the socket. As a result, the voltage at the non-inverting input is greater than that at the inverting input and the output of IC1 is high. The output of pin 6 of IC1 is transmitted to the activation pin 2 of the IC NE555(IC2) through the coupling capacitor C1. IC2 is configured as monostable. Its trigger pin 2 is kept high by the resistor R4. Normally, the output of IC2 remains low and the alarm is disabled.

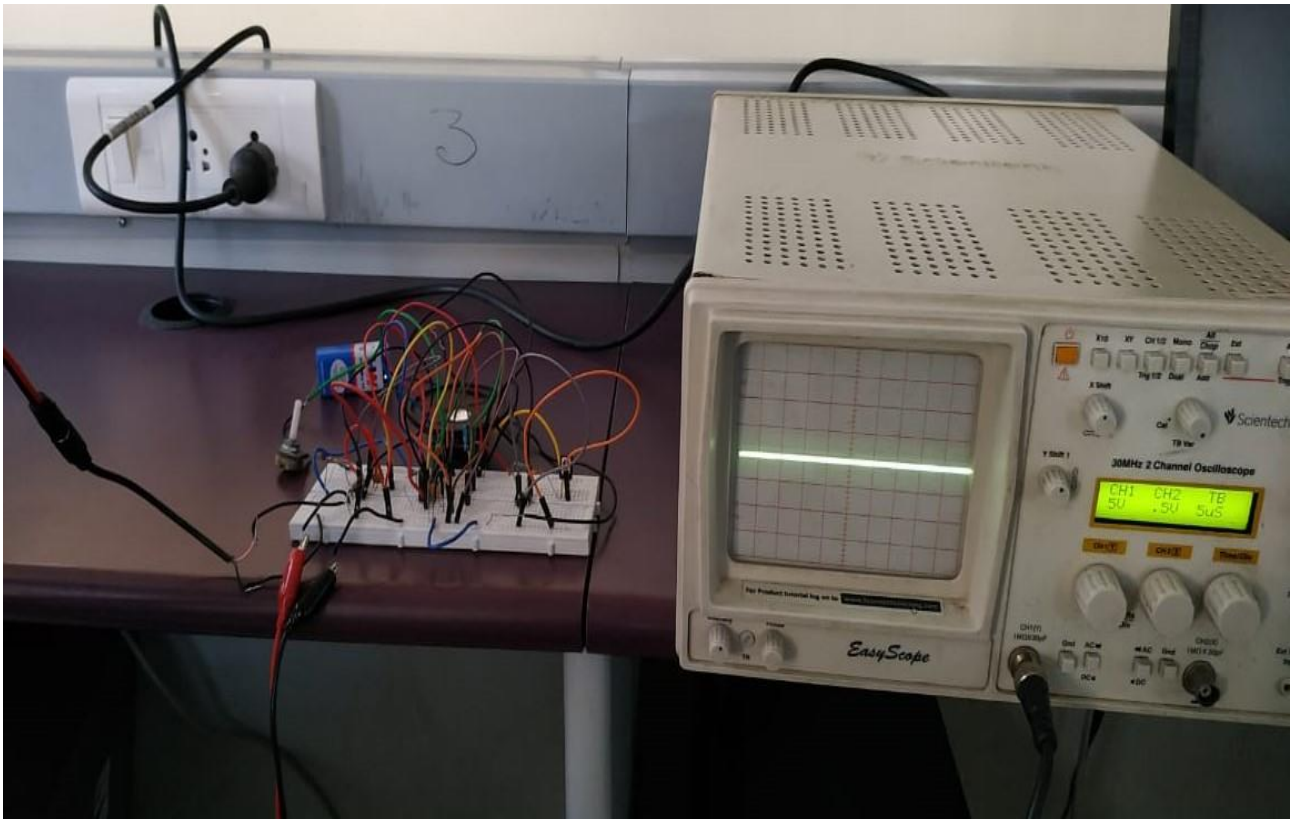
Resistor R6 and capacitor C3 connected to reset pin 4 of IC2 prevent any false triggering. The resistor R5, the preset VR and the capacitor C2 are timing components. With these values, the output at pin 3 of IC2 is about one minute, which can be increased by increasing the value of capacitor C2 or preset VR. When attempting to snatch, the plug connected to the circuit is disconnected. At this time, the voltage at the inverting input of IC1 exceeds the voltage at the non-inverting input and, subsequently, its output drops. This sends a low pulse to trigger pin 2 of IC2 so that its pin 3 output is high. As a result, the alarm circuit built around the IC UM3561 obtains the supply voltage at pin 5. The IC UM3561 is a complex ROM with an integrated oscillator. Resistor R8 is the oscillator component.

Its output is fed to the base of the one-stage transistor amplifier BD139(T1) via the resistor R9. The alarm tone generated by IC3 is amplified by the transistor T1.A loudspeaker is connected to the collector of the transistor(T1) to trigger the alarm. The alarm can be disabled if the plug is reinserted back into the monojack socket. The resistor r7 limits the current to IC3 and Zener diode ZD1 limits the supply voltage to IC3 to a required level of 3.3V. Resistor R9 limits the current to the base of the transistor. The circuit can easily be constructed on general purpose Printed circuit board or it can also be done on a breadboard. We provide a 9V power supply to the circuit. The speaker must be small so that it will be easy to hold the circuit in hand. By connecting a thin plastic cable to the plug and attaching it by hand or attaching it to another location so that when you pull the bag, the plug will easily separate from the jack and produces a alarm and the burglar can be caught easily.

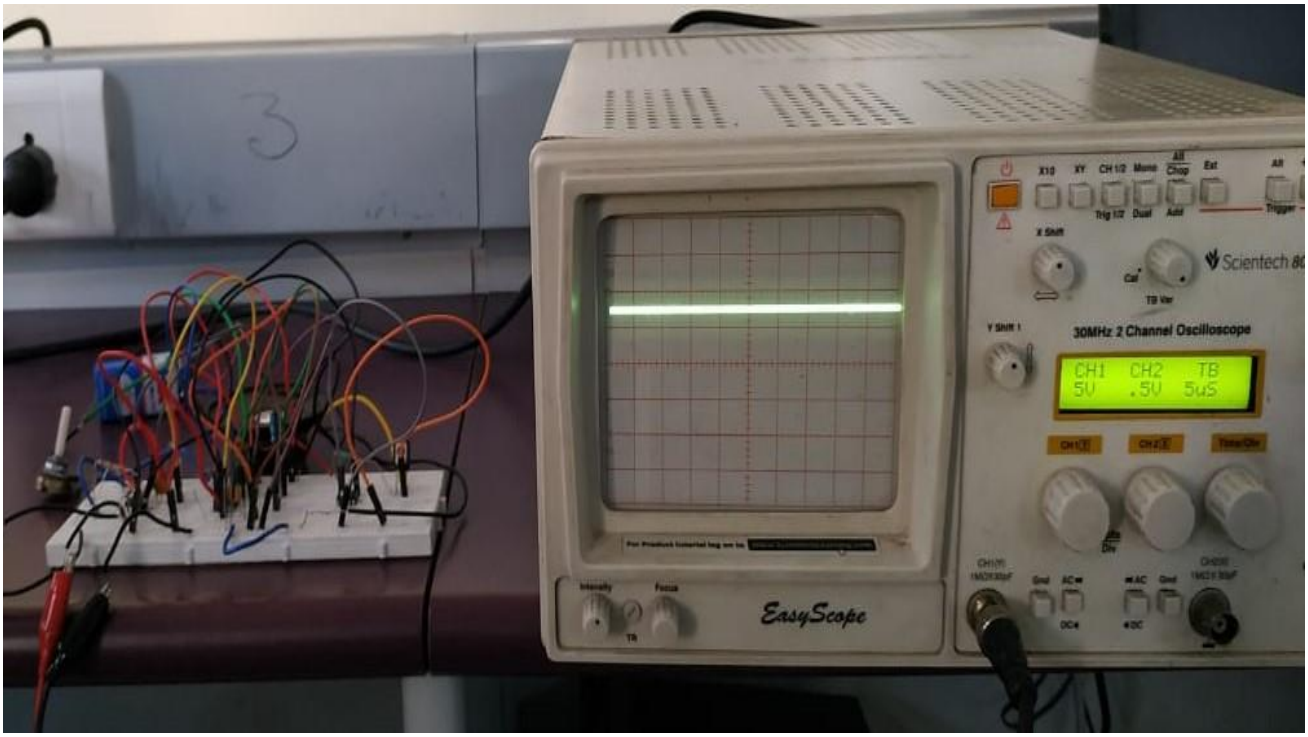
CHAPTER 05

RESULT AND DISCUSSION

After building the overall circuit, we have observed and obtained the required waveforms at every stage. Hence the following waveforms are attached below:



When 9V supply is applied in the above image we can see that for the IC CA3140 when the monoplug is connected the line is at origin. Now, we remove the monoplug which was attached before and observe the output which is shown below.



When 9V is supplied to the circuit, and when the monoplug is removed the line rises a bit say by 10V. So, from this we can conclude that the IC CA3140 is in working condition. So, now the voltage goes to the next IC i.e. 555Timer and then it passes to the next IC i.e. UM 3561 and then it goes to the transistor where the signal gets amplified and produces an alarm. Now the circuit is ready for use.

CHAPTER 06

CONCLUSION AND FUTURE SCOPE

This device is developed as an alternative way of protecting our belongings from intruders. It can be kept in a bag or suitcase while travelling which saves our life from theft by intruders. When the bag is snatched the monoplug gets detached and the alarm gets activated immediately. Here, is an alert against the theft of very simple and very useful project, used in the bag or suitcase to prevent theft. The heart of this entire burglar alarm circuit is the CA3140 IC operational amplifier, configured as a comparator. The two inverting and non-inverting inputs are respectively assigned to pins 3 and 2 of the operational amplifier and the output is obtained from pin 6. IC2 is used as a monostable multivibrator. The timing component used in this project is resistor R5, VR and capacitor C2 with the value indicated in the circuit diagram. For the audio section, IC3 is used as an alarm generator with integrated oscillator. Finally, the output is obtained from pin 3 of IC3 and is amplified by the transistor T1 to obtain the desired level and finally the alarm is generated by the speaker. Hence, we can conclude from this that this circuit will be very useful to prevent theft from burglars while travelling long distances. It can be kept in handbags especially in case women to save their lives from snatching and to prevent theft from burglars. To this device we can also add a GPS enabled system so, that when a bag or suitcase gets lost, we can easily track it from this GPS system using an interface installed in our mobiles. So, mainly it can be used as a security while travelling.

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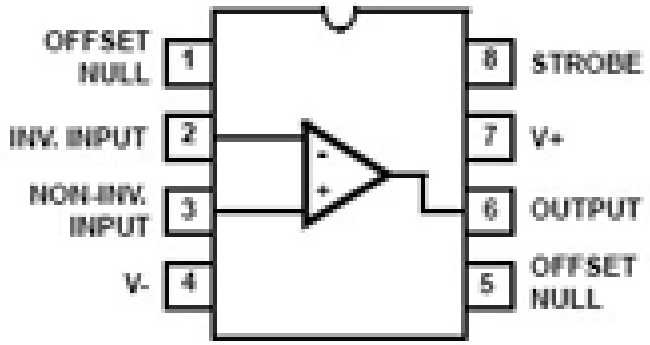
APPENDIX

IC CA3140: -



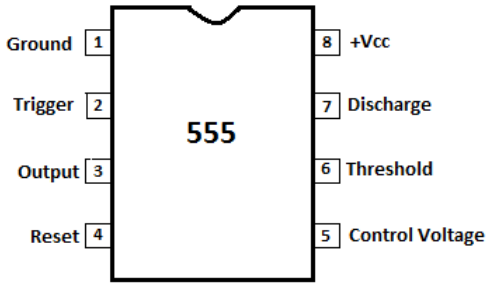
DATASHEET: -

Parameter	Symbol	Typical values
Input resistance	Ri	1.5
Input capacitance	Ci	4
Output resistance	Ro	60
Gain-bandwidth	fT	4.5
Slew rate	SR	9
Input offset voltage	Vio	5
Input offset current	Iio	0.5
Input current	I1	10

Features

- MOSFET Input Stage
  - Very High Input Impedance (Z_{IN}) -1.5TΩ (Typ)
  - Very Low Input Current (I_I) -10pA (Typ) at ±15V
  - Wide Common Mode Input Voltage Range (V_{ICR}) - Can be Swung 0.5V Below Negative Supply Voltage Rail
  - Output Swing Complements Input Common Mode Range
- Directly Replaces Industry Type 741 in Most Applications
- Pb-Free Plus Anneal Available (RoHS Compliant)

IC NE555: -



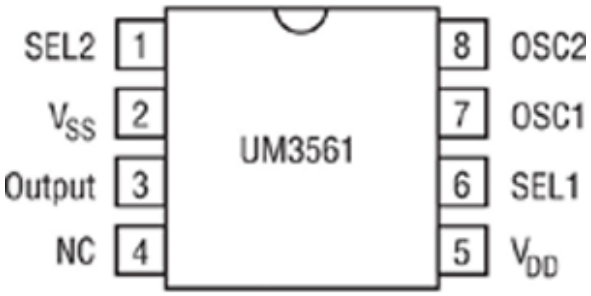
DATASHEET: -

Parameter	Symbol	Typical values
Supply voltage	Vcc	16
Power dissipation	Pd	600
Temperature range	Tamb	0 to 70
Storage temperature change	Tstg	-65 to +150
Lead soldering temperature	Tsold	230

FEATURES

- Turn-off time less than 2 μs
- Max. operating frequency greater than 500 kHz
- Timing from microseconds to hours
- Operates in both astable and monostable modes
- High output current
- Adjustable duty cycle
- TTL compatible
- Temperature stability of 0.005% per °C

IC UM3561: -



DATASHEET: -

Parameter	Symbol	Typical values
Operating voltage	Vdd	3.6V
Operating current	Idd	150uA
"H" input voltage	VIH	Vdd
"L" input voltage	VIL	Vss+0.2
Output current	Io	3Ma

Features

- Four sounds can be selected
- Typical 3V operating voltage
- RC oscillator with an external resistor