A Report on

EMERGENCY RESPONSE BEACON

Submitted as a partial fulfillment of
the requirement for the Mini Project 1A Course of
Semester III, AY 2023-2024

Submitted by

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April, 2024

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Premier Automobiles Road, Kurla, Mumbai - 400070

Certificate

This is to certify that the Mini project titled **'EMERGENCY RESPONSE BEACON'** is a work of

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submitted as partial fulfilment of the requirement for the Mini Project 1A of **"Semester III"** in **"Second Year of Engineering AY 2023-2024"**.

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Mini Project 1A Report Approval

This Mini project report entitled **Emergency Response Beacon** by **Prathamesh Kurdekar , Nisha Singh , Aakash Belgaonkar , Yashi Nimje** is approved for the completion of Mini Project 1A course **of Sem III of AY 2023-2024 in Department of Electronics & Telecommunication Engineering.**

Examiners

1. ______________

2. ______________

Date: 08 / 11 / 2023

Place : **Kurla, Mumbai**

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Abstract

In this project, an Emergency Response Beacon is developed for helping women in situations of panic/emergency and making lives of chronically ill people easier. This project consists of two individual circuits viz. Buzzer Alarm Circuit and LED Flasher Circuit. Buzzer circuit blows buzzer when panic button is pressed and flasher circuit starts flashing.

The intended output is the buzzer in the alarm circuit should make a buzzing noise along with the LED's in the flasher circuit going on and off in a sequential manner with a single click of a button.

Both circuits were successfully implemented and working on breadboard.

Chapter 1

Introduction

1.1 Motivation of Project

These are the following key points for motivation of this project:

The graph for incidences against women for last 6 years is presented in figure 1.1 [?].

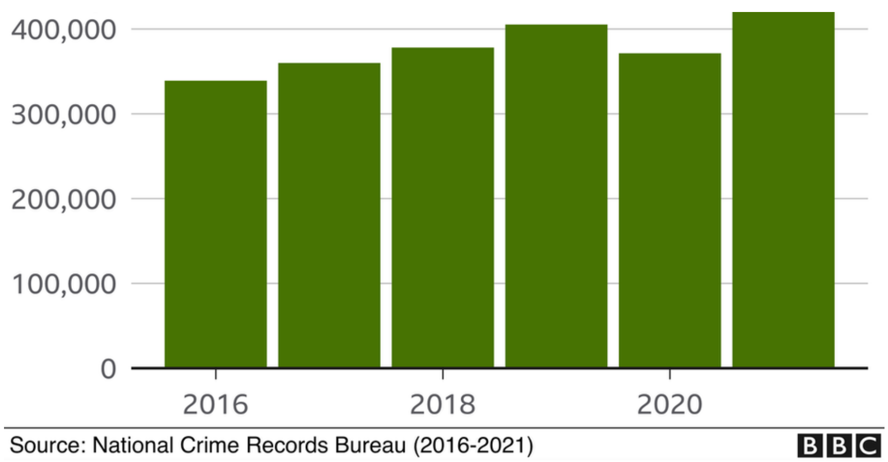


Figure 1.1: Incidences of crime against women

1. Safety for all.

2. Increasing crime rates against women.

3. Helping chronically ill people, especially heart patients. The

graph for number of critically ill patients for different age groups is presented in figure 3 [?]

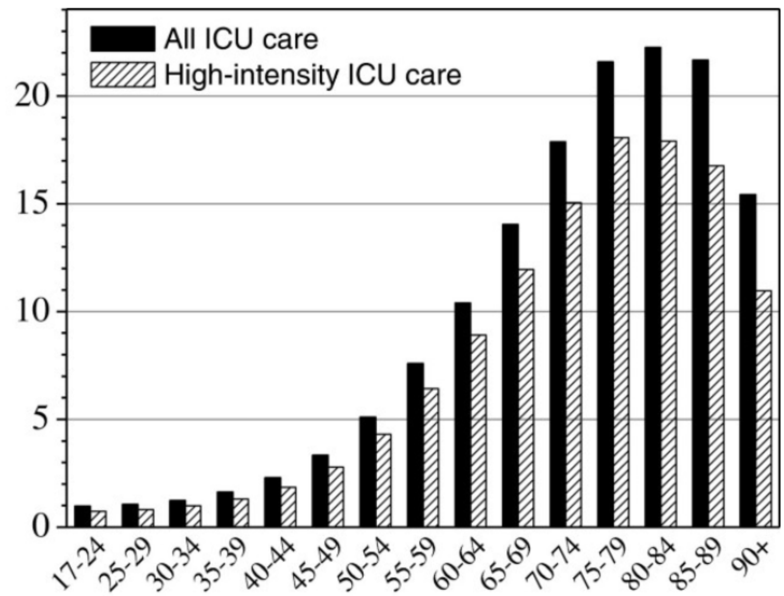


Figure 1.2: Number of critically ill people in different age-groups

1.2 Problem Statement

Design and implement a system that interfaces an LM35 temperature sensor with an 8051 microcontroller and an ADC0808 analog-to-digital converter, to accurately measure ambient temperature and convert it into digital data for processing by the 8051 microcontroller.

1.2.1 Project Objectives

The objective of the project are as follows:

- To interface 8051 microcontroller
- To create a LED flasher circuit which must go on and off in a continuous sequence.
- To combine both the circuits, by cascading them.

1.2.2 Project Outcomes

The outcomes of the project are as follows:

- The main outcome of project is safety in emergency situations. It focuses on the safety of women if they face any difficulty in unsafe situations.

1.3 Scope of the Project

It is useful in disaster management situation such as developing appropriate emergency management and response capabilities is one of the important factor in managing risk. The safety measures it takes is that it helps the people wherever they are they can easily contact the person nearby so that one can receive the signal from the person. Emergency Response Beacon is a device, which can be operated easily by user as it is easier to understand it from a child to a elder person. It is also useful in decreasing the crime rates in our society as it will become a weapon for the women. [**?**]

1.4 Future Scope

1. It will be proved very useful for all of us, mostly for chronically ill patients and women.
2. The future scope is we can work by doing some more modifications in the circuit and making it more convenient and simpler.
3. In future it can be used by making use of solar power instead of using electric supply . [**?**]

Chapter 2

Project Implementation

2.1 Circuit Diagram and Working of Project

2.1.1 Circuit Diagrams Of Buzzer - Alarm and LED - Flasher

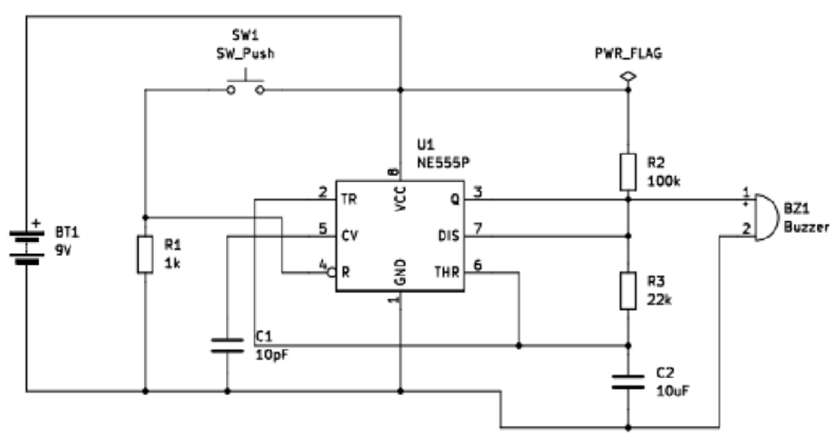


Figure 2.1: Circuit Diagram of Buzzer Alarm Circuit

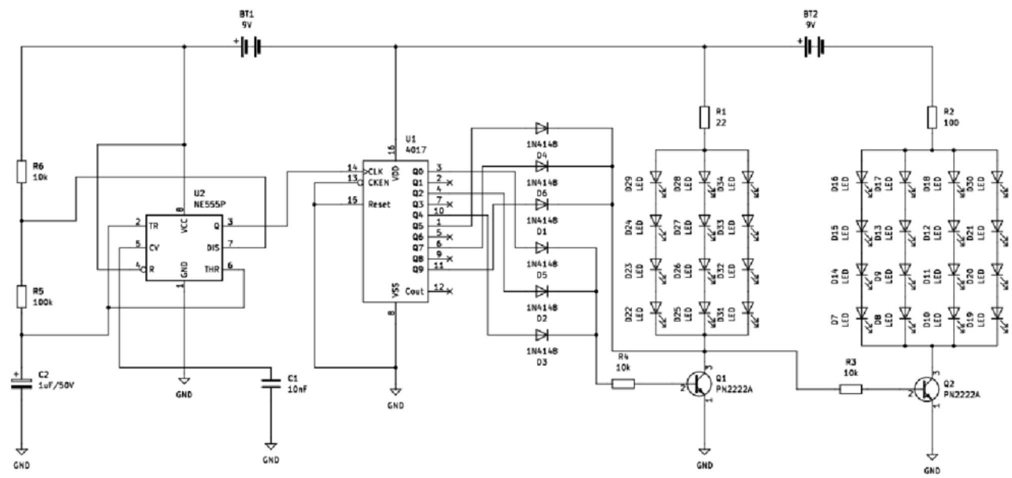


Figure 2.2: Circuit Diagram of LED Flasher Circuit

2.1.2 Working:

The 555 is used in astable mode with a frequency depending on the values of resistors R3,R2,C2. The frequency of operation of the circuit is calculated to be 1KHz.By finding the time period of the circuit by using frequency information,we get the time period of 1 second.This means the circuit has on-off repeating time period about 1s. The circuit is in bi-stable mode when the button when the button is not pressed. the IC is enable mode only when pin 4 of the 555 IC is given a high voltage. For demonstration purpose we have connected a simple buzzer to the output of IC555 [?], [?].

Chapter 3

Testing and Troubleshooting

3.1 Software Used And It's Applications

3.1.1 KiCad Software

KiCad is an open-source software suite for electronic design automation (EDA), primarily used for printed circuit board (PCB) design. Here's a brief overview of KiCad and its usefulness in PCB design:

1. **Schematic Capture:** KiCad includes a schematic editor for creating circuit diagrams. This allows users to visually design the electronic circuits before moving on to PCB layout.

2. **PCB Layout:** The software provides a comprehensive PCB layout tool that enables users to place components on the board, define traces, and ensure proper connectivity. It supports multi-layer boards and complex designs.

3. **Footprint Editor:** Users can create custom component footprints or modify existing ones to match specific requirements. This flexibility is crucial for working with components from various manufacturers.

4. **Integration with SPICE:** KiCad integrates with SPICE (Simulation Program with Integrated Circuit Emphasis) for circuit simulation, allowing users to analyze and verify the functionality of their designs before moving to the PCB layout stage.

3.1.2 Applications of KiCad: PCB Layout And Design

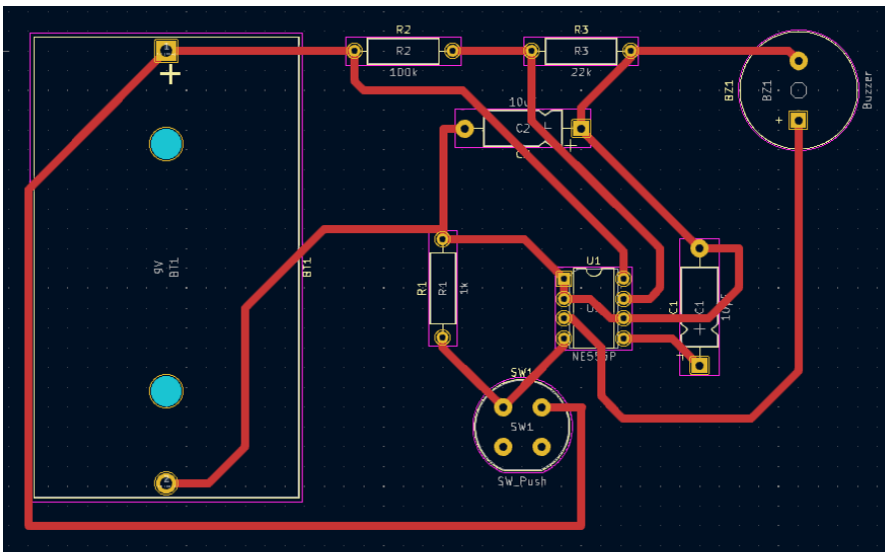


Figure 3.1: PCB Layout of Buzzer Alarm Circuit

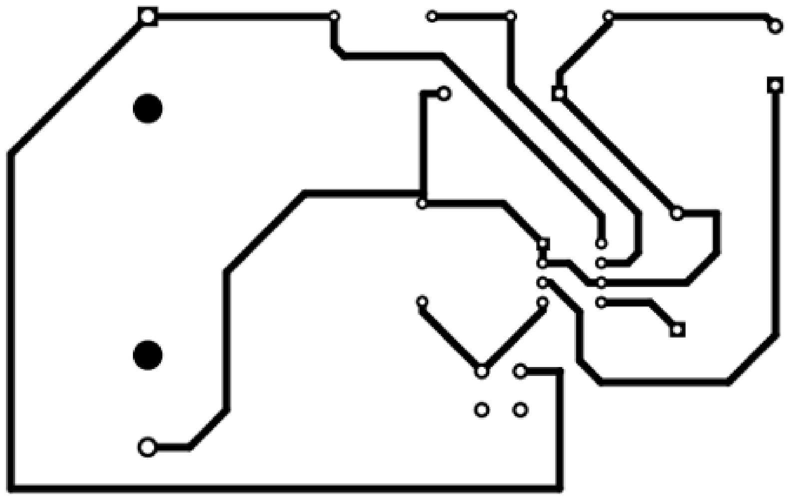


Figure 3.2: PCB Design of Buzzer Alarm Circuit

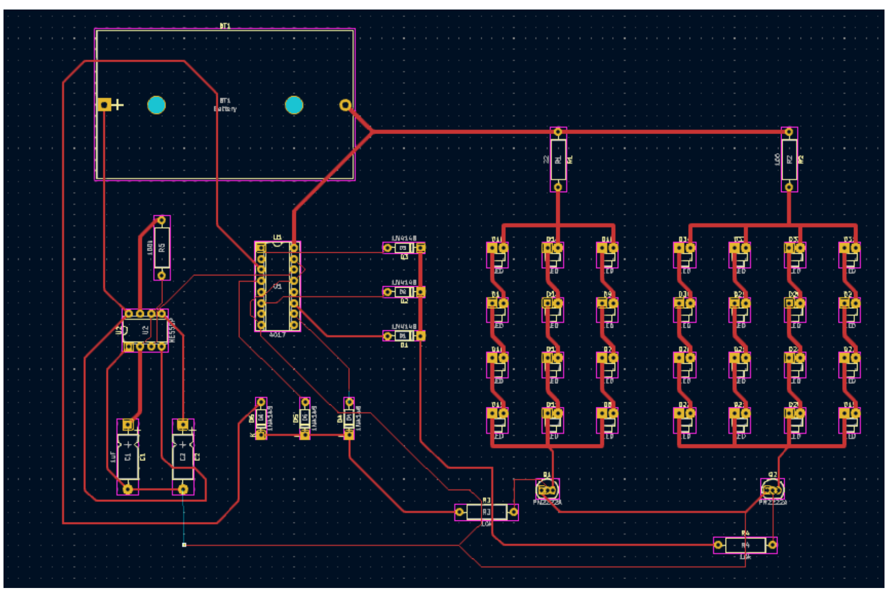


Figure 3.3: PCB Layout of LED Flasher Circuit

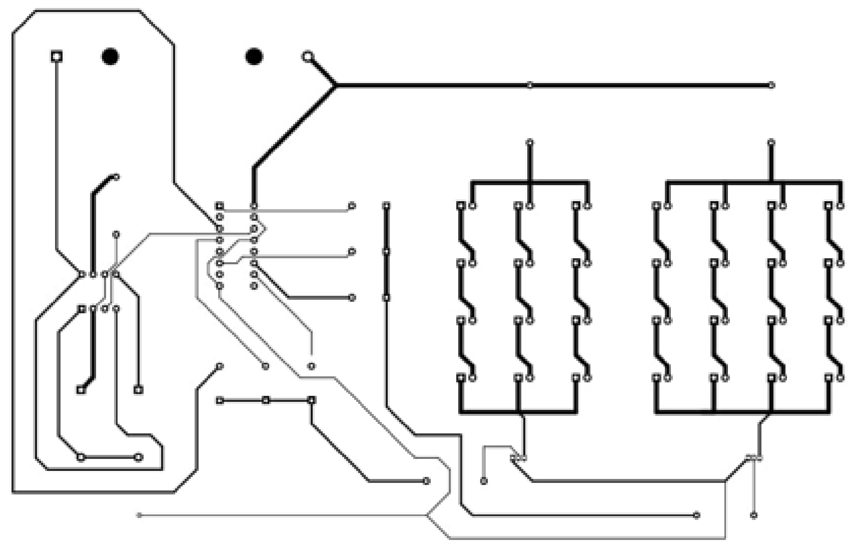


Figure 3.4: PCB Design of LED Flasher Circuit

3.1.3 MultiSim Software

Multisim is a powerful simulation software developed by National Instruments for designing and testing electronic circuits. Here are key points about Multisim:

1. **Circuit Simulation:** Multisim allows users to design and simulate electronic circuits before physical implementation. It provides a virtual environment for testing circuits without the need for physical components.

2. **Graphical Interface:** The software features a user-friendly graphical interface that enables users to easily draw and design circuits using a wide range of electronic components.

3. **Component Library:** Multisim includes an extensive li-

brary of electronic components, such as resistors, capacitors, transistors, and integrated circuits, making it a versatile tool for various circuit designs.

4. **Analysis Tools:** The software provides various analysis tools to evaluate circuit performance, including DC, AC, transient, and frequency domain analyses. This helps users understand how the circuit behaves under different conditions.

5. **Education and Research:** Multisim is widely used in educational settings for teaching electronics and circuit design. It is also utilized in research and development to prototype and test circuits before physical implementation.

6. **Customization:** Users can create custom components and models, enhancing the flexibility of the software for specific design requirements.

7. **Simulation Outputs:** Multisim provides detailed simulation results, helping users analyze and troubleshoot their circuits effectively.

3.1.4 Applications of MultiSim: Simulation of Circuits

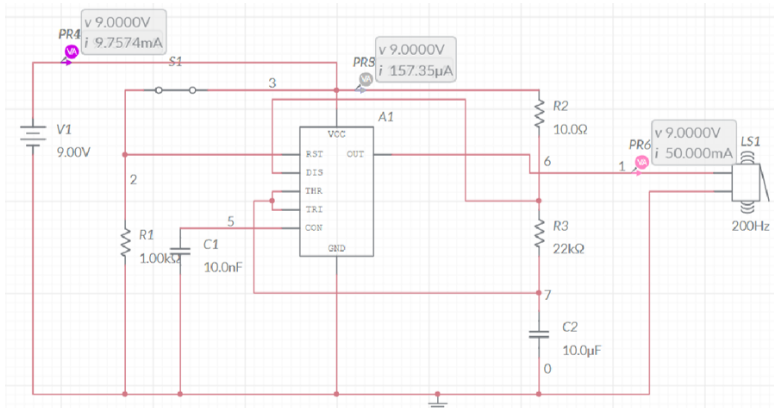


Figure 3.5: Simulation Results of Buzzer Alarm Circuit

Input Voltage: 9V, Input Current: 9.757mA

Output Voltage: 9V, Output Current: 50mA

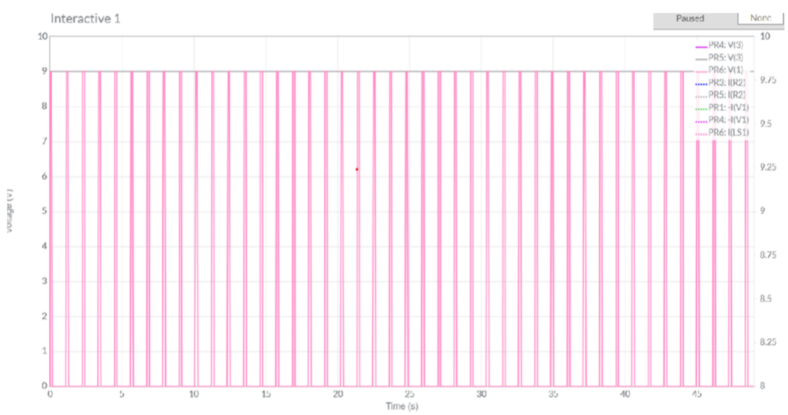


Figure 3.6: Simulation Results of Buzzer Alarm Circuit

3.2 List of Components and Budget

Table 3.1: List of Components

Component	Specification	Quantity	Price in Rs
Timer IC	IC555	06	120
Decade Counter	CD4017	03	75
Push-Button	4-Pin	01	20
LED's	5mm, Red	16	15
LED's	5mm, Blue	12	10
Resistor	10k	03	02
Resistor	100k	02	02
Resistor	22k	02	02
Potentiometer	100k	01	20
Capacitor	1uF	01	02
Capacitor	10nF	01	02
Diode	1N4148	06	06
Transmitter	PN2222	02	10
Capacitor	10uF	01	02
Battery	9V	04	80
Mini-Buzzer	200Hz	01	25
Breadboard	(6.5 x 2.5)"	02	160
Wires in m	1/2W	04	40
Total			593

Chapter 4

Results

4.1 Breadboard Implementation of Buzzer Alarm Circuit

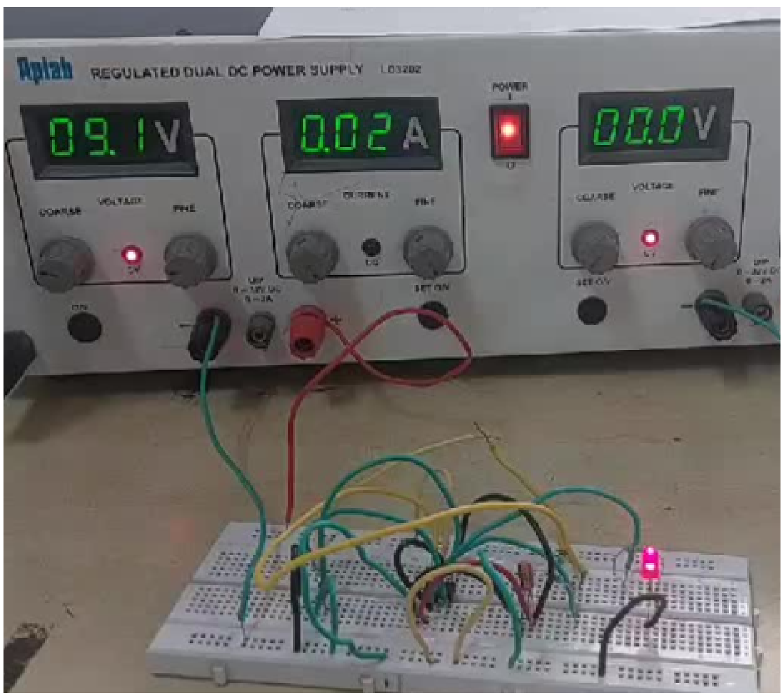


Figure 4.1: Breadboard Implementation of Buzzer Alarm Circuit

In the above figure, all the components are joined together except for a LED which substitutes for buzzer, according to circuit diagram of Buzzer Alarm Circuit [Figure 2.1] onto a breadboard, which is connected to a 32V Regulated DC Power Supply. The alternate glowing of LED signifies that IC555 along with the circuit are working properly, and we are getting the desired output. [1] [2] [3]

4.2 Breadboard Implementation of LED Flasher Circuit

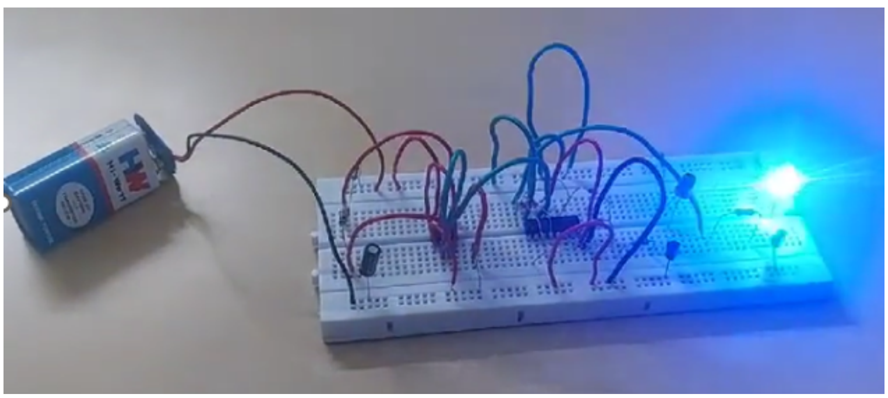


Figure 4.2: Breadboard Implementation of LED Flasher Circuit

In the Figure 2.1.1, all the components are joined together according to circuit diagram of LED Flasher Circuit [Figure 2.2] onto a breadboard, which is connected to a 32V Regulated DC Power Supply. The alternate glowing of red and blue LED signifies that both the IC's (IC555 and CD4017)are working properly, and we are getting the desired output.

[4]

Chapter 5

Conclusion

The Emergency Response Beacon, equipped with both a Buzzer Alarm Circuit and LED Flasher Circuit, offers a comprehensive solution for alerting and signaling in urgent situations. The Buzzer Alarm provides an audible alert, ensuring attention is drawn to the emergency, while the LED Flasher enhances visibility in low-light conditions. Together, these circuits create a reliable and effective emergency response system, aiding in quick and efficient communication of critical situations. [5] [6] [7]

Bibliography

[1] D. A. Rodríguez, A. Díaz-Ramírez, J. E. Miranda-Vega, L. Trujillo, and P. Mejia-Alvarez, "A systematic review of computer science solutions for addressing violence against women and children," *IEEE Access*, vol. 9, pp. 114 622–114 639, 2021.

[2] B. S. Bala, M. Swetha, M. Tamilarasi, and D. Vinodha, "Survey on women safety using iot," *International Journal of Computer Engineering in Research Trends*, vol. 5, no. 2, pp. 16–24, 2018.

[3] V. Mishra, N. Shivankar, S. Gadpayle, S. Shinde, M. A. Khan, and S. Zunke, "Women's safety system by voice recognition," in *2020 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS)*. IEEE, 2020, pp. 1–5.

[4] M. Sarma, K. K. Sarma, M. Sarma, and K. K. Sarma, "Application of proposed phoneme segmentation technique for speaker identification," *Phoneme-Based Speech Segmentation using Hybrid Soft Computing Framework*, pp. 163–182, 2014.

[5] B. L. Tait, "Behavioural biometrics authentication tested using eyewriter technology," in *2019 IEEE 12th International Conference on Global Security, Safety and Sustainability (ICGS3)*. IEEE, 2019, pp. 1–9.

[6] M. Q. Khan and S. Lee, "Gaze and eye tracking: Techniques and applications in adas," *Sensors*, vol. 19, no. 24, p. 5540, 2019.

[7] R. Kredel, C. Vater, A. Klostermann, and E.-J. Hossner, "Eye-tracking technology and the dynamics of natural gaze behavior in sports: A systematic review of 40 years of research," *Frontiers in psychology*, vol. 8, p. 287392, 2017.

Appendix A

Datasheets

xx555 Precision Timers

1 Features

- Timing From Microseconds to Hours
- Astable or Monostable Operation
- Adjustable Duty Cycle
- TTL-Compatible Output Can Sink or Source Up to 200 mA
- On Products Compliant to MIL-PRF-38535, All Parameters Are Tested Unless Otherwise Noted. On All Other Products, Production Processing Does Not Necessarily Include Testing of All Parameters.

2 Applications

- Fingerprint Biometrics
- Iris Biometrics
- RFID Reader

3 Description

These devices are precision timing circuits capable of producing accurate time delays or oscillation. In the time-delay or mono-stable mode of operation, the timed interval is controlled by a single external resistor and capacitor network. In the a-stable mode of operation, the frequency and duty cycle can be controlled independently with two external resistors and a single external capacitor.

The threshold and trigger levels normally are two-thirds and one-third, respectively, of V_{CC}. These levels can be altered by use of the control-voltage terminal. When the trigger input falls below the trigger level, the flip-flop is set, and the output goes high. If the trigger input is above the trigger level and the threshold input is above the threshold level, the flip-flop is reset and the output is low. The reset (RESET) input can override all other inputs and can be used to initiate a new timing cycle. When RESET goes low, the flip-flop is reset, and the output goes low. When the output is low, a low-impedance path is provided between discharge (DISCH) and ground.

The output circuit is capable of sinking or sourcing current up to 200 mA. Operation is specified for supplies of 5 V to 15 V. With a 5-V supply, output levels are compatible with TTL inputs.

Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
xx555	PDIP (8)	9.81 mm × 6.35 mm
	SOP (8)	6.20 mm × 5.30 mm
	TSSOP (8)	3.00 mm × 4.40 mm
	SOIC (8)	4.90 mm × 3.91 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.

4 Simplified Schematic

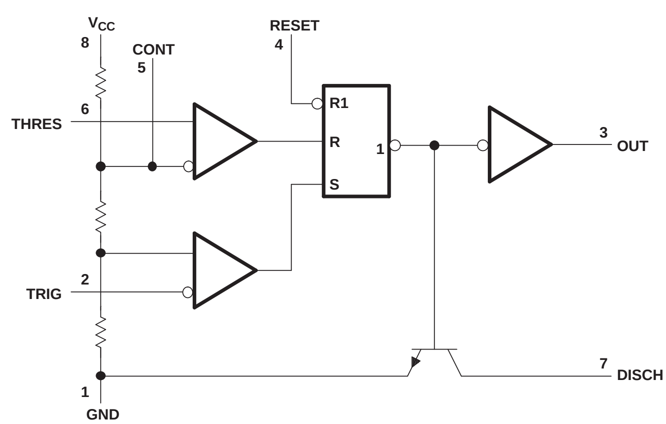


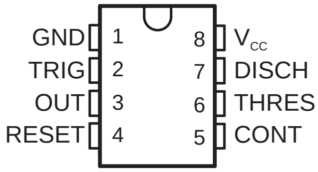
Table of Contents

5 Revision History

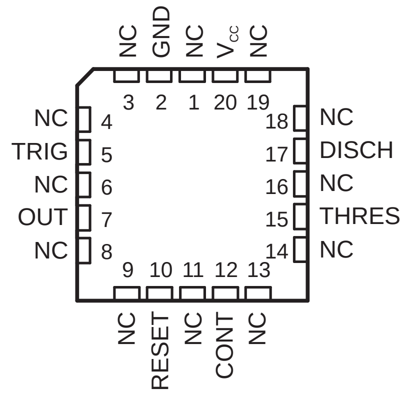
Changes from Revision H (June 2010) to Revision I	Page
• Updated document to new TI enhanced data sheet format.	1
• Deleted Ordering Information table.	1
• Added Military Disclaimer to Features list.	1
• Added Applications.	1
• Added Device Information table.	1
• Moved T_{stg} to Handling Ratings table.	4
• Added DISCH switch on-state voltage parameter.	5
• Added Device and Documentation Support section.	19
• Added ESD warning.	19
• Added Mechanical, Packaging, and Orderable Information section.	19

6 Pin Configuration and Functions

NA555...D OR P PACKAGE
NE555...D, P, PS, OR PW PACKAGE
SA555...D OR P PACKAGE
SE555...D, JG, OR P PACKAGE
(TOP VIEW)



SE555...FK PACKAGE
(TOP VIEW)



NC – No internal connection

Pin Functions

PIN			I/O	DESCRIPTION
NAME	D, P, PS, PW, JG	FK		
	NO.			
CONT	5	12	I/O	Controls comparator thresholds, Outputs 2/3 VCC, allows bypass capacitor connection
DISCH	7	17	O	Open collector output to discharge timing capacitor
GND	1	2	–	Ground
NC		1, 3, 4, 6, 8, 9, 11, 13, 14, 16, 18, 19	–	No internal connection
OUT	3	7	O	High current timer output signal
RESET	4	10	I	Active low reset input forces output and discharge low.
THRES	6	15	I	End of timing input. THRES > CONT sets output low and discharge low
TRIG	2	5	I	Start of timing input. TRIG < ½ CONT sets output high and discharge open
V_{CC}	8	20	–	Input supply voltage, 4.5 V to 16 V. (SE555 maximum is 18 V)

FAIRCHILD
SEMICONDUCTOR™

October 1987
Revised January 1999

CD4017BC • CD4022BC
Decade Counter/Divider with 10 Decoded Outputs • Divide-by-8 Counter/Divider with 8 Decoded Outputs

General Description

The CD4017BC is a 5-stage divide-by-10 Johnson counter with 10 decoded outputs and a carry out bit.

The CD4022BC is a 4-stage divide-by-8 Johnson counter with 8 decoded outputs and a carry-out bit.

These counters are cleared to their zero count by a logical "1" on their reset line. These counters are advanced on the positive edge of the clock signal when the clock enable signal is in the logical "0" state.

The configuration of the CD4017BC and CD4022BC permits medium speed operation and assures a hazard free counting sequence. The 10/8 decoded outputs are normally in the logical "0" state and go to the logical "1" state only at their respective time slot. Each decoded output remains high for 1 full clock cycle. The carry-out signal completes a full cycle for every 10/8 clock input cycles and is used as a ripple carry signal to any succeeding stages.

Features

- Wide supply voltage range: 3.0V to 15V
- High noise immunity: 0.45 V_{DD} (typ.)
- Low power Fan out of 2 driving 74L
  TTL compatibility: or 1 driving 74LS
- Medium speed operation: 5.0 MHz (typ.)
  with 10V V_{DD}
- Low power: 10 µW (typ.)
- Fully static operation

Applications

- Automotive
- Instrumentation
- Medical electronics
- Alarm systems
- Industrial electronics
- Remote metering

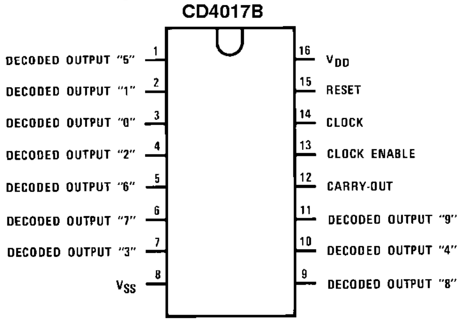
Ordering Code:

Order Number	Package Number	Package Description
CD4017BCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4017BCSJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
CD4017BCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
CD4022BCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4022BCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

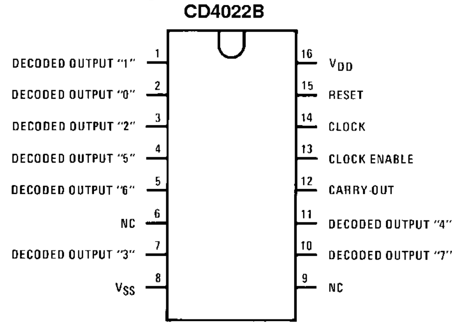
Connection Diagrams

Pin Assignments for DIP, SOIC and SOP
CD4017B



Top View

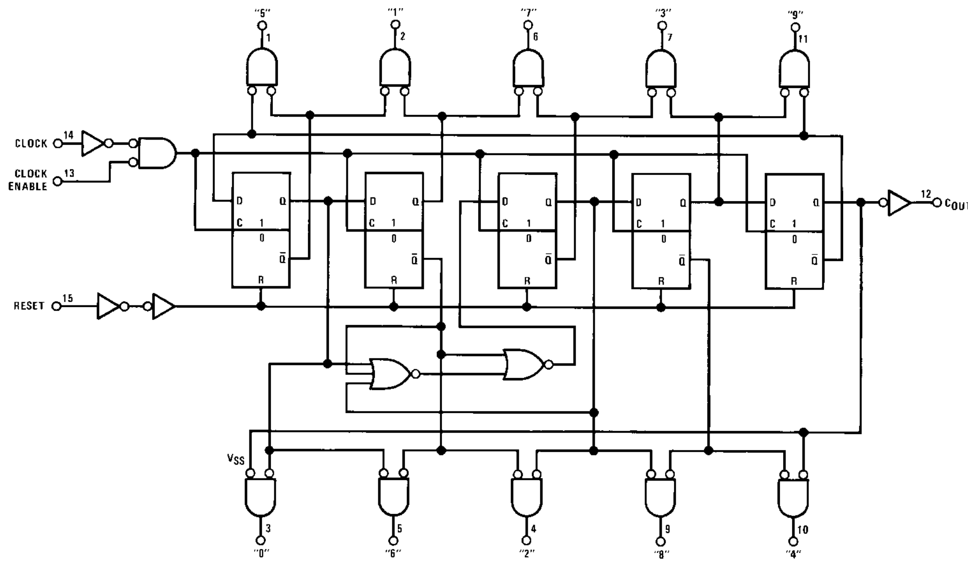
Pin Assignments for DIP and SOIC
CD4022B



Top View

Logic Diagrams

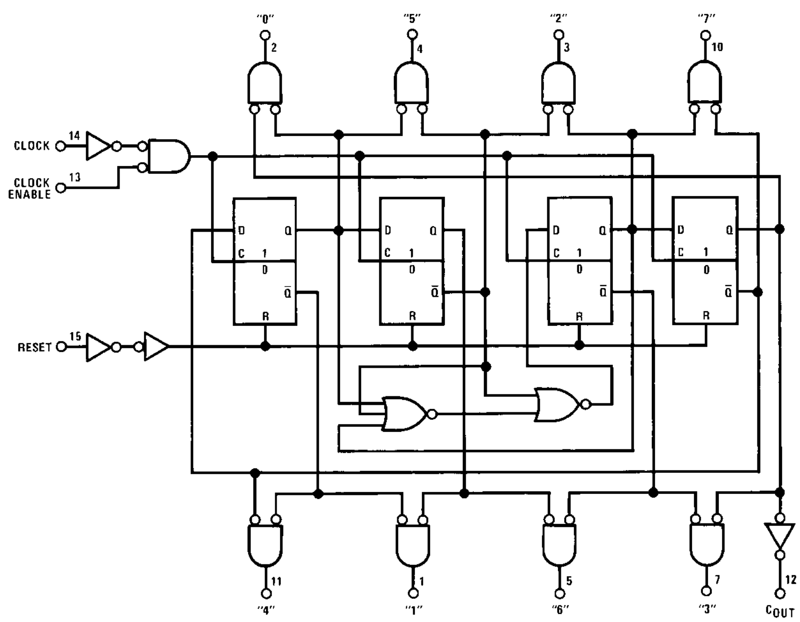
CD4017B



Terminal No. 8 = GND

Terminal No. 16 = V_{DD}

CD4022B



Terminal No. 16 = V_{DD}

Terminal No. 8 = GND

Absolute Maximum Ratings (Note 1)

(Note 2)

DC Supply Voltage (V_{DD})	–0.5 V_{DC} to +18 V_{DC}
Input Voltage (V_{IN})	–0.5 V_{DC} to V_{DD} +0.5 V_{DC}
Storage Temperature (T_S)	–65°C to +150°C
Power Dissipation (P_D)	
Dual-In-Line	700 mW
Small Outline	500 mW
Lead Temperature (T_L)	
(Soldering, 10 seconds)	260°C

Recommended Operating Conditions (Note 2)

DC Supply Voltage (V_{DD})	+3 V_{DC} to +15 V_{DC}
Input Voltage (V_{IN})	0 to V_{DD} V_{DC}
Operating Temperature Range (T_A)	–40°C to +85°C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed, they are not meant to imply that the devices should be operated at these limits. The table of "Recommended Operating Conditions" and "Electrical Characteristics" provides conditions for actual device operation.

Note 2: V_{SS} = 0V unless otherwise specified.

DC Electrical Characteristics (Note 2)

Symbol	Parameter	Conditions	–40°C		+25°			+85°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	V_{DD} = 5V		20		0.5	20		150	μA
		V_{DD} = 10V		40		1.0	40		300	μA
		V_{DD} = 15V		80		5.0	80		600	μA
V_{OL}	LOW Level Output Voltage	$\|I_O\|$ < 1.0 μA								
		V_{DD} = 5V		0.05		0	0.05		0.05	V
		V_{DD} = 10V		0.05		0	0.05		0.05	V
		V_{DD} = 15V		0.05		0	0.05		0.05	V
V_{OH}	HIGH Level Output Voltage	$\|I_O\|$ < 1.0 μA								
		V_{DD} = 5V	4.95		4.95	5		4.95		V
		V_{DD} = 10V	9.95		9.95	10		9.95		V
		V_{DD} = 15V	14.95		14.95	15		14.95		V
V_{IL}	LOW Level Input Voltage	$\|I_O\|$ < 1.0 μA								
		V_{DD} = 5V, V_O = 0.5V or 4.5V		1.5			1.5		1.5	V
		V_{DD} = 10V, V_O = 1.0V or 9.0V		3.0			3.0		3.0	V
		V_{DD} = 15V, V_O = 1.5V or 13.5V		4.0			4.0		4.0	V
V_{IH}	HIGH Level Input Voltage	$\|I_O\|$ < 1.0 μA								
		V_{DD} = 5V, V_O = 0.5V or 4.5V	3.5		3.5			3.5		V
		V_{DD} = 10V, V_O = 1.0V or 9.0V	7.0		7.0			7.0		V
		V_{DD} = 15V, V_O = 1.5V or 13.5V	11.0		11.0			11.0		V
I_{OL}	LOW Level Output Current (Note 3)	V_{DD} = 5V, V_O = 0.4V	0.52		0.44	0.88		0.36		mA
		V_{DD} = 10V, V_O = 0.5V	1.3		1.1	2.25		0.9		mA
		V_{DD} = 15V, V_O = 1.5V	3.6		3.0	8.8		2.4		mA
I_{OH}	HIGH Level Output Current (Note 3)	V_{DD} = 5V, V_O = 4.6V	–0.2		–0.16	–0.36		–0.12		mA
		V_{DD} = 10V, V_O = 9.5V	–0.5		–0.4	–0.9		–0.3		mA
		V_{DD} = 15V, V_O = 13.5V	–1.4		–1.2	–3.5		–1.0		mA
I_{IN}	Input Current	V_{DD} = 15V, V_{IN} = 0V		–0.3		-10^{-5}	–0.3		–1.0	μA
		V_{DD} = 15V, V_{IN} = 15V		0.3		10^{-5}	0.3		1.0	μA

Note 3: I_{OL} and I_{OH} are tested one output at a time.