FOURTH SEMESTER ECD PROJECT REPORT

FASTEST FINGER FIRST CIRCUIT USING 555 TIMER

Submitted by

YASH JOHRI, 210907340
ANNAPANENI AKSHAYA, 210907348
AKSHIT GUPTA, 210907350

SECTION -D (D2)
SEM-IV

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MANIPAL INSTITUTE OF TECHNOLOGY

(A Constituent Institution of Manipal Academy of Higher Education)

MANIPAL – 576104, KARNATAKA, INDIA

APRIL/MAY 2023

ABSTRACT

Quiz-style game programmes are more popular on television these days. Fastest finger first circuit, which measure a player's reaction speed, are utilised in these quiz games. We show this concept for a two-team quiz game that shuts out the opposing team and establishes whose side hit the button first. When a player hits his entrance button, an LED for the appropriate team will illuminate simultaneously.

The circuit comprises of several copies of module that can be given to an individual quiz taker or a team. Each module has a trigger and an LED that indicates if the team associated with that module was the first to touch the trigger.

The circuit's output can be connected to a monostable setup, which will cause light or buzzer to sound for a second after any quiz taker presses the trigger.

This design creates a clock signal using a 555 timer IC, which is then used to progressively illuminate the LEDs linked to the buttons. The lath circuit, which locks in the contestant's response and turns off the other buttons, is activated when the first competitor presses their button and lights up their LED, because of the circuit's precision, dependability, and speed, game shows and other competitive events frequently use it. Overall, using this circuit to asses participants response times and dexterity may be entertaining and interesting.

The design creates a clock signal using a 555 timer IC, which is then used to progressively illuminate the LEDs linked to the buttons. The latch circuit, which locks in the contestant's response and turn off the other buttons, is activated when the first competitor presses their button and lights up their LED. Because of the circuit's precision, dependability, and speed, game shows and other competitive events frequently use it.

CHAPTER 1

INTRODUCTION

Here in the circuit diagram of the School/College quiz Buzzer circuit using 555 IC, we have used three 555 timer IC in bistable configuration. The important part is each 555 IC will have their own stable state controlled by separate buttons which will be accessed by the participants. Another single button controls the other stable state of the all the timer ICs in common which is accessed by the organizer to reset the entire circuit. When any of the buttons P1, P2, P3 is pressed the corresponding TRIGGER pin gets low and the timer shifts its stable state and the output pin of the corresponding timer goes high. And the Green LED of corresponding Participant turns on and buzzer starts beeping.

The operation is that when the first stable state of any one timer is set, it disables the remaining timers. This is because the forward biased diode connected to output pin of the set timers gets forward biased making the remaining button terminals go high. Hence, even if the other buttons are pressed after this, the corresponding timer's pin sees only high signal. Hence, the buttons work only after resetting the entire circuit. The buzzer is controlled using NPN transistor BC547 whose control signal is the common TRIGGER to which buttons are connected. Also, the buttons are grounded through internal diode of transistor. This project is an electronic quiz buzzer that is affordable. This project is useful for a 3-team quiz contest, although it can be modified for a greater number of teams. It will record the first hit among all the contestants that may appear to be simultaneous by naked eye.

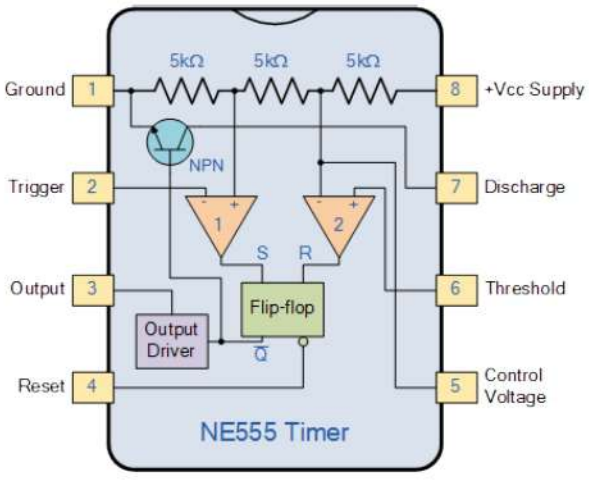

Fig 1.1: Block diagram of 555 Timer IC

CHAPTER 2

METHODOLOGY

The output of the 555 IC is turned ON if Pin-2 detects any voltage less than 1/3rds of the supply voltage. The output of the 555 IC is reset if the rest Pin detects 0V.

We employed two more rails in addition to positive and negative rails:

Status/Feedback rail is pushed down to 0V by default on the Reset rail, which is raised up to positive voltage by default using resistors. All the modules' outputs are linked to this rail through diodes. Thus, this rail will by default be at 0V. But, as soon as any module's output is turned on, the voltage at this rail goes from negative to positive via the diode.

Thus, the voltage at the status rail will be at 0V when all the modules' outputs are in the off state. Any team can click the button, which applies this 0V from the status rail to Pin 2 when they do. The output of the 555-timer corresponding to the team that initially depressed the trigger goes ON because 0V is less than 1/3rd of the supply voltage. As soon as this occurs, the feedback via the PN diode causes voltage at the status rail to shift to positive voltage. Because to the positive voltage at PIN-2 of each module, output will not turn ON even if other teams pull the trigger right away. By providing 0V to the reset pin of each 555 IC using the reset rail and a dedicated puh button, all the modules' states may be reset.

2.1 Components Used:

- 555 TIMER IC - An integrated circuit(chip) called the 555 timer is utilised in several oscillator, timer, and delay applications.

Fig:2.1

- PUSH BUTTON - A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off. Depending on model they could operate with momentary or latching action function.

Fig:2.2

➔ LEDs (Red and Green) – As an electric current passes through a semiconductor device called light-emitting diode (LED), the LED emits light. As current flows through an LED, the electrons and holes recombine and produces light.

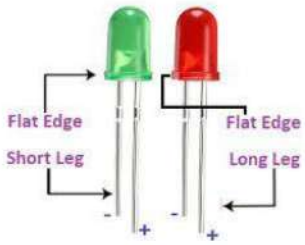

Fig:2.3

➔ 1N4007 Diode – Rectifier diodes like the 1N4007 are made particularly for circuits alternating current to direct current. It has a peak inverse voltage (PIV) RATING OF 1000V and can carry of up to 1A.

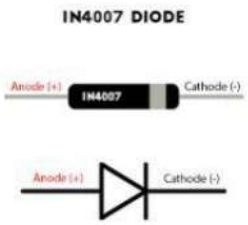

Fig:2.4

➔ BC547 – BC547 is typically utilised for pulse-width modulation, rapid switching, and current amplification (PWM). Thus, if you need to regulate the speed of a motor or actuator in some projects, all we need to do id utilise this transistor.

Fig:2.5

➔ Buzzer – A buzzer is a mechanical audio signalling device. Those are used as alarm clocks, timers and to validate human input such as mouse click or keyboard.

Fig:2.6

➔ 9-Volt Battery – Electric batteries with a nominal voltage of 9 volts are known as nine-volt batteries. According to battery chemistry, the actual voltage ranges from 7.2 to 9.6 volts.

Fig:2.7

➔ Resistors (10k and 1k) – These controls or restricts the passage of current in a circuit. Moreover, resistors may be used to supply a specified voltage to an active device like a transistor.

Fig:2.8

➔ Breadboard

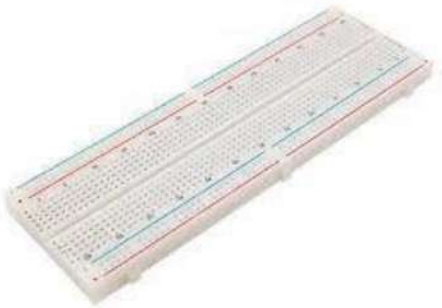

Fig:2.9

➔ Connecting Wires

Fig:2.10

2.2 CIRCUIT DIAGRAM: -

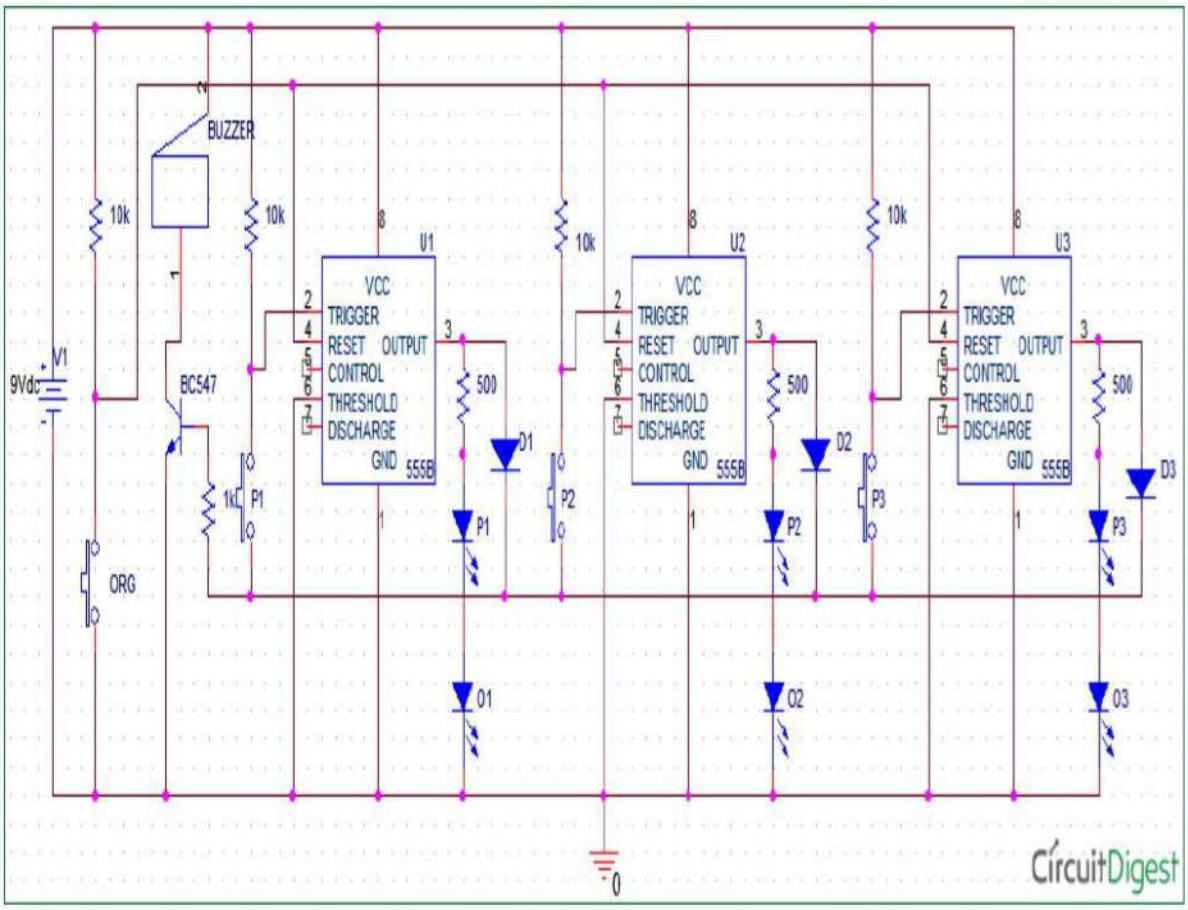

Fig:2.11

CHAPTER 3

RESULT ANALYSIS

3.1 RESULT OF THE ENTIRE PROJECT

Here we will be discussing the results of this entire mini project.

Some of the results are:

There are three teams in total, the main agenda of this project is the person who clicks the button first the led glows at their module, we can get to know even with microsecond difference. There is also a reset option to reset the LEDs after each question so that there will not be any confusion. This can be used frequently in quizzes and games. We even can add more teams and build another circuit.

CHAPTER 4

CONCLUSION AND FUTURE SCOPE OF WORK

4.1: CONCLUSION

- ➔ Every quiz contest's buzzer round will have questions that area available to all the teams taking part. Every team member who knows the answer and hits their switch first after hearing the question has an opportunity to respond.
- ➔ Whoever flips the switch first in several instances has the chance to respond. The quiz master reset the buzzer functioning circuit for the following round by depressing the reset button. All teams have installed on their workstation for visual cues. The LEDs continue to shine while the buzzer controller is rest, showing which team is qualifies to respond to the question.

4.2: FUTURE SCOPE OF WORK

- ➔ The fastest finger circuit implemented in this project is just a demonstration of the idea. But the idea can be more improved into a better model which can work in quiz competitions in schools, colleges, and television shows and even for the entertain purpose.

CHAPTER 5
REFERENCES

• https://elonics.org/fastest-finger-first-quiz-buzzer-circuit-using-555ic/

• https://circuitdigest.com/electronic-circuits/quiz-buzzer-circuit-using-555-timer

YouTube-
• https://youtu.be/8Jig8gjtMSw

• https://youtu.be/V2MLKod1G9U