

PROJECT REPORT

QUIZ BUZZER CIRCUIT USING 555 TIMER IC

1. INTRODUCTION

In quiz competitions, it is essential to identify the participant who presses the buzzer first. Manual judgment often leads to errors and unfair decisions. To solve this problem, an electronic quiz buzzer system can be designed that automatically locks out other participants once one buzzer is pressed.

This project presents a **Quiz Buzzer Circuit using 555 Timer ICs**, where multiple contestants can press their respective buttons, but only the **first response is registered**. The circuit ensures fairness by disabling other inputs after the first trigger. The entire design is implemented using **analog electronic components** and simulated in **Proteus Design Suite**.

2. OBJECTIVES

The objectives of this project are:

- To design a quiz buzzer system using 555 timer ICs
 - To detect the first button press among multiple participants
 - To lock out other participants after the first response
 - To provide visual indication using LEDs
 - To implement the system without any microcontroller or software
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3. SYSTEM OVERVIEW

The system consists of multiple **555 Timer ICs**, each corresponding to a participant. Each timer is triggered by a push button. Once a participant presses their button, the corresponding timer output goes HIGH and lights an LED. At the same time, the circuit disables the other timers, preventing multiple responses.

This design ensures **first-come-first-serve logic** using pure hardware.

4. BLOCK DIAGRAM DESCRIPTION

The quiz buzzer system consists of the following blocks:

- **Push Buttons** – Input devices for contestants
 - **555 Timer ICs** – Used as monostable/trigger circuits
 - **Diodes** – Prevent backflow and isolate stages
 - **Resistors & Capacitors** – Timing and biasing elements
 - **LED Indicators** – Display which contestant pressed first
 - **Power Supply** – DC power source for the circuit
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5. HARDWARE COMPONENTS USED

5.1 555 Timer IC

- Used as a trigger and latch circuit
- Responds immediately to button press
- Maintains output state until reset

5.2 Push Buttons

- Used by participants to register answers
- Normally open type

5.3 Diodes

- Prevent false triggering
- Isolate individual timer outputs

5.4 Resistors

- Used for pull-up, pull-down, and current limiting
- Ensure stable operation of ICs and LEDs

5.5 LEDs

- Visual indication of the first participant response

5.6 Power Supply

- Provides DC voltage required for circuit operation
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6. WORKING PRINCIPLE

1. Each participant is assigned a **push button** connected to a 555 timer.
2. Initially, all timers are in the inactive state and all LEDs are OFF.
3. When a participant presses their button:
 - o The corresponding 555 timer is triggered.
 - o Its output goes HIGH.
 - o The connected LED turns ON.
4. The output of the triggered timer disables the trigger inputs of the other timers using diode logic.
5. As a result, even if other buttons are pressed later, their outputs remain inactive.
6. The system remains in the locked state until it is reset.

This ensures that **only the first button press is registered**.

7. CIRCUIT OPERATION STATES

Condition	Output
No button pressed	All LEDs OFF
First button pressed	Corresponding LED ON
Other buttons pressed later	No effect
Reset applied	System returns to initial state

8. SIMULATION RESULTS

The circuit was simulated using Proteus Design Suite. The following observations were made:

- Only one LED turns ON per round

- The first button press is always registered
 - Other inputs are successfully locked out
 - Circuit operates reliably without glitches
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9. APPLICATIONS

- Quiz competitions
 - Classroom response systems
 - Game shows
 - Event buzzer systems
 - Educational electronics demonstrations
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10. ADVANTAGES

- No microcontroller required
 - Simple and reliable hardware logic
 - Fast response time
 - Cost-effective design
 - Easy to understand and implement
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11. LIMITATIONS

- Limited number of participants
 - Manual reset required
 - No digital score storage
 - Fixed hardware logic
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12. FUTURE ENHANCEMENTS

- Add reset timer circuit

- Increase number of participants
 - Add buzzer or sound indication
 - Integrate microcontroller for score display
 - Wireless quiz buzzer extension
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13. CONCLUSION

The Quiz Buzzer Circuit using 555 Timer IC successfully demonstrates a reliable method for detecting the first participant response in quiz competitions. The project highlights the power of analog electronics in implementing logical decision-making without software or microcontrollers.

14. REFERENCES

1. 555 Timer IC Datasheet
 2. Basic Electronics – Thomas L. Floyd
 3. Proteus Design Suite Documentation
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