THE EVOLUTION AND DESIGN OF ELECTRONIC DICE: A MODERN GAMING REVOLUTION

ECB1204-ANALOG INTEGRATED CIRCUIT

A PROJECT REPORT

Submitted by

VIGNESH G S

VENGADESH T

MONEESH S

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

K.RAMAKRISHNAN COLLEGE OF TECHNOLOGY
(An Autonomous Institution, Affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM, TIRUCHIRAPPALLI – 621 112,

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(AUTONOMOUS)

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BONAFIDE CERTIFICATE

Certified that this project report titled **"THE EVOLUTION AND DESIGN OF ELECTRONIC DICE: A MODERN GAMING REVOLUTION"** is the bonafide work of **VIGNESH.G.S (2303811710621123), MONEESH.S (2303811710621069), VENGADESH.T (2303811710621118)** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not from part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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Submitted for the viva-voce examination held on ……

INTERNAL EXAMINER **EXTERNALEXAMINER**

DECLARATION

We jointly declare that the project report on **"THE EVOLUTION AND DESIGN OF ELECTRONIC DICE: A MODERN GAMING REVOLUTION"** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfilment of the requirement of the award of Degree of **BACHELOR OF ENGINEERING**.

Signature

VIGNESH GS

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Place : Samayapuram

Date :

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CHAPTER 1

1.1 PROBLEM STATEMENT

The objective is to design and develop an electronic dice that serves as a digital alternative to traditional dice, providing a user-friendly, portable, and reliable solution for games, simulations, or educational purposes. The device should randomly generate numbers, typically between 1 and 6, while simulating true randomness and ensuring uniform distribution. It should include a mechanism for rolling, such as a button press or motion detection, and clearly display the result using LEDs, a digital screen, or similar outputs. The design must be compact, lightweight, and durable, capable of withstanding regular use and accidental impacts. Additionally, the device should operate on a portable power source low power consumption.

1.2 INTRODUCTION

Electronic dice are modern alternatives to traditional mechanical dice,designed to generate random outcomes in an interactive and electronic format. Using micro-controller technology and LED displays, electronic dice provide the convenience of automation, accuracy, and enhanced functionality, such as programmable features and quick resets. The objective of an electronic dice system is to simulate the randomness of traditional dice rolls while offering a compact, durable, and user-friendly solution for gaming, educational, or experimental purposes.Detailed Explanation of Electronic Dice and Its Objectives.

Electronic dice are innovative devices that replicate the functionality of traditional dice through electronic means. Unlike physical dice that rely on manual rolling and gravity.

1.2.1 RANDOMNESS

Electronic dice are designed to ensure unbiased outcomes using pseudorandom number generation (PRNG) algorithms, reducing the possibility of human manipulation or physical inconsistencies that may occur with traditional dice. Electronic dice aim to simulate the randomness of traditional dice while offering enhanced features and precision. Randomness is typically achieved through algorithms like pseudorandom number generators (PRNGs) or true random number generators (TRNGs). PRNGs use mathematical formulas or computational processes to produce sequences that approximate true randomness, while TRNGs leverage physical phenomena, such as noise from electronic components, to generate genuinely random outcomes.

1.2.2 CONVENIENCE

Electronic dice eliminate the need for manual rolling and can be reset quickly, making them ideal for fast-paced games or situations where repeated use is required. Electronic dice offer a range of conveniences that enhance usability and functionality compared to traditional dice. They eliminate the need for physical handling and rolling, making them especially useful in digital or hybrid gaming environments. With features like automatic number generation, LED displays, and audible outputs, they provide clear and instant results without ambiguity.

1.2.3 DURABILITY AND PORTABILITY

Made with robust materials and compact designs, electronic dice are resistant to wear and tear, unlike physical dice that may chip or lose balance over time.

CHAPTER 2

2.1 DESIGN PROCEDURE

The Electronic Dice uses simple integrated circuits to generate random numbers and display them on LEDs. Key components include 555 Timer IC Generates clock pulses to drive the decade counter.4017 Decade Counter IC Decodes clock pulses into one of six outputs (representing dice numbers).LED Display: A 3x3 grid that mimics traditional dice faces.Push Button: Used to trigger the dice roll.Power Supply: Provides necessary operating voltage.

2.2 DETAILED COMPONENT EXPLANATION

2.2.1 IC 555 TIMER

Its function is to Produces clock pulses when the push button is pressed.Reliable,low-cost, and easy to configure.Operates in astable mode with resistors and capacitors determining pulse frequency.

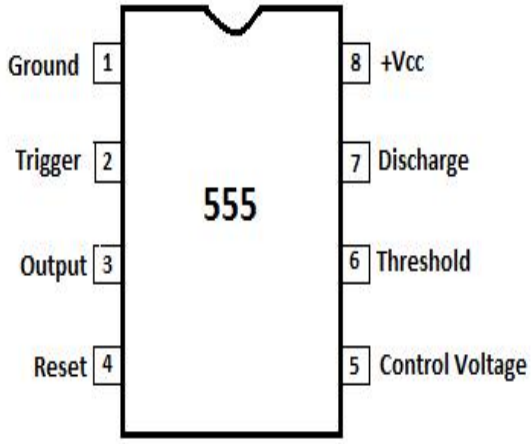

Fig:2.1 IC 555 TIMER

2.2.2 IC 4017 DECADE COUNTER

Converts clock pulses from the 555 Timer IC into one of ten outputs.withonly six outputs used for the dice faces. Ideal for sequential counting applications.

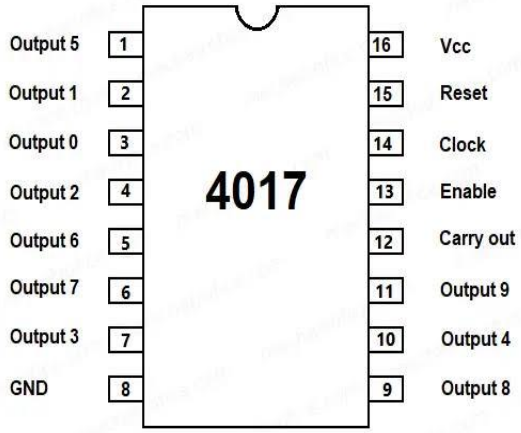

Fig:2.2 IC 4017

2.2.3 LEDs (1-6)

LEDs light up in patterns from 1 to 6, as on a traditional dice.Each output of the 4017 IC connects to specific LEDs to create the required pattern.

2.2.4 PUSH BUTTON

Starts the clock pulses when pressed.Includes a debouncing circuit for stable operation.

2.5.5 POWER SUPPLY

5V to 9V power supply from a battery or a regulated adapter.

CHAPTER 3

COST OF COMPONENTS

1. IC 555- 20 Rupees

2. IC 4017 - 50 Rupees

3. Resistors - 6 Rupees

4. Capacitors - 4 Rupees

5. LED - 30 Rupees

6. Push Button - 20 Rupees

7. Breadboard - 90 Rupees

8. Battery - 15 Rupees

3.2 BLOCK DIAGRAM

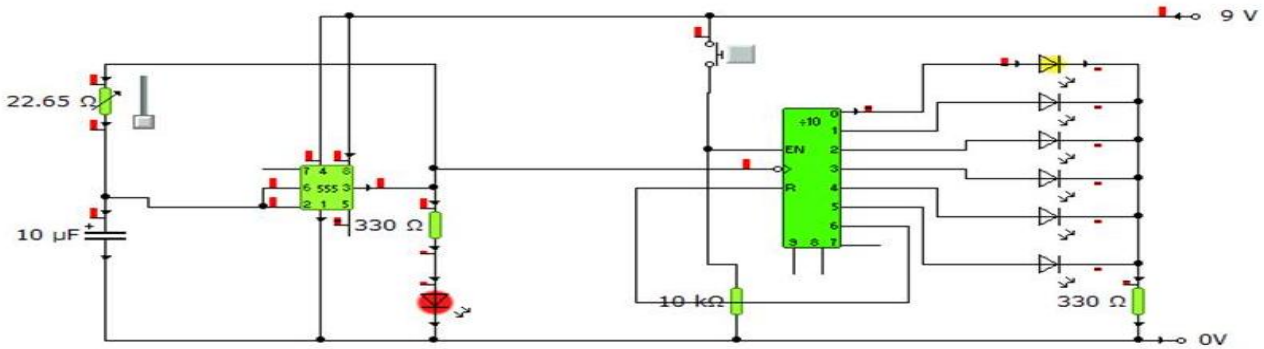

Fig:3.2.1 Circuit Diagram Of Dice

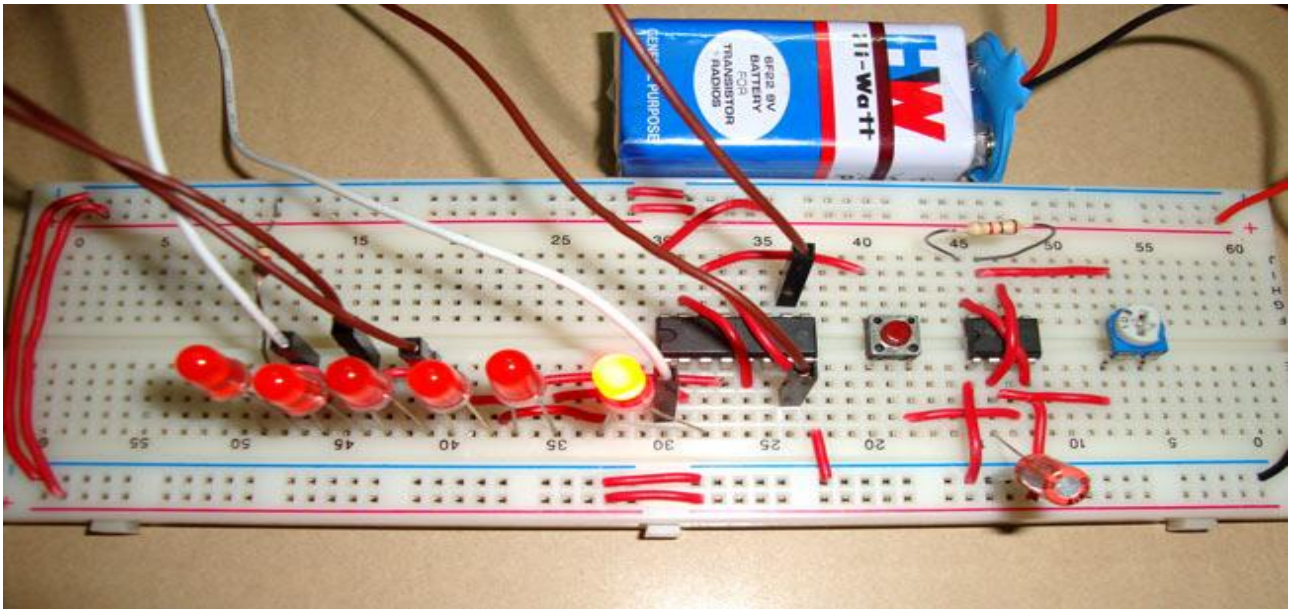

Fig:3.2.2 Project Demo

CHAPTER 4

RESULT AND DISCUSSION

The electronic dice produced random numbers from 1 to 6 , displayed on an LED grid.The push button successfully triggered the roll, and the LEDs displayed the numbers correctly.

4.1 ADVANTAGES

Simpler, low-cost circuit compared to a microcontroller

based design.Compact and easy to assemble.

4.2 LIMITATIONS

No advanced features like reprogrammability.Randomness depends on the user's timing of the button press.

4.3 FUTURE SCOPE

Add sound or visual effects using additional ICs or circuits. The future scope for electronic dice is promising, driven by advancements in technology and the increasing demand for interactive gaming tools.

With the integration of smart sensors, Bluetooth connectivity, and mobile app synchronization, electronic dice can enhance traditional gaming experiences by offering realtime tracking, customizable features, and digital game integration.

Additionally, they can find applications in education, helping to teach probability, mathematics, and decision-making in an engaging way. In the realm of virtual and augmented reality, electronic dice can bridge the gap between physical and digital gaming environments.

4.4 CONCLUSION

In conclusion, the electronic dice is a modern and innovative solution that effectively replaces traditional dice with a compact, reliable, and versatile digital device. By leveraging electronic components to generate random numbers and visually display outcomes, it enhances convenience and usability in gaming, simulations, and educational activities.

The electronic dice offers precise functionality, portability, and durability, ensuring long-term performance and user satisfaction. Additionally, its potential for customization, such as multi-sided configurations and advanced features, makes it adaptable to a wide range of applications, demonstrating its value as a practical and enjoyable tool for users of all ages.