# UP COUNTER CIRCUIT WITH SEVEN SEGMENT DISPLAY

ECT 203 LOGIC CIRCUIT DESIGN

Mini Project Report

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Submitted to Binu Ma'am


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# ABSTRACT

This project introduces the design and implementation of an up counter circuit integrated with a seven-segment display. The primary objective is to create a versatile counting system capable of visually representing numerical values from 0 to 9 using the seven-segment display. The circuit is constructed using standard digital logic components. The counter circuit incrementally counts in a cyclic manner, triggering the seven-segment display to sequentially showcase the corresponding digits. A reset feature is incorporated to allow users to initiate counting from a predefined starting point. Light emitting diodes are added to the circuit which blinks whenever the counter or the reset button is enabled.

This report provides a comprehensive overview of the project, detailing its objectives, components, circuit diagram, working principle, IC overview, potential applications, and a conclusive summary

# INTRODUCTION

Digital counters are crucial in various electronic applications for counting events, pulses, or sequences. The Up Counter Circuit discussed in this report is built around the CD4026 IC, which is specifically designed for driving seven-segment displays. This project explores the practical application of this IC in creating a versatile and efficient counter circuit.

# OBJECTIVES

- Develop an up counter circuit that efficiently counts upwards with minimal latency, ensuring accuracy and reliability in diverse counting scenarios.

- Integration of CD4026 IC to Explore the capabilities of the IC to streamline the counting process and simplify the driving of a Seven Segment Display.

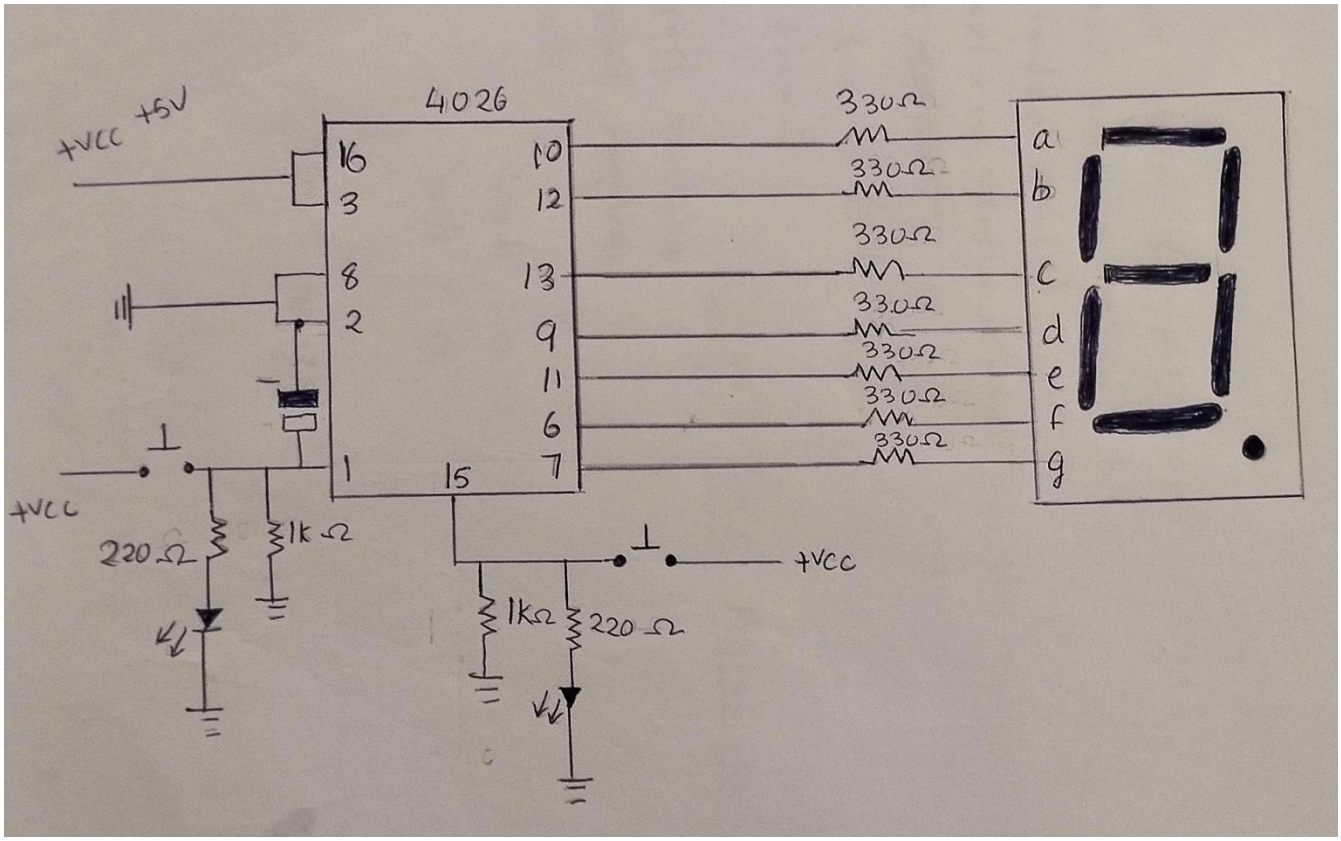
- Implement a user-friendly manual reset functionality, allowing users to reset the counter to zero effortlessly. This feature enhances the practicality of the circuit in real-world applications where resetting is a common requirement.

- Investigate potential applications of the designed circuit in diverse settings, ranging from educational institutions to industrial environments, showcasing the adaptability of the Up Counter Circuit with CD4026.

# REQUIRED COMPONENTS

- Breadboard
- IC CD4026
- 330 ohm resistors
- 220 ohm resistors
- 1k ohm resistors
- Push switches
- 1u electrolytic capacitor
- LED bulbs
- Common cathode seven segment display
- 9 volt battery

# CIRCUIT DIAGRAM



# WORKING

The circuit begins with a clock pulse source that serves as the input trigger. The clock pin is connected to the push button. The heart of the circuit is the CD4026 IC, which functions as a 4-bit binary counter. With each incoming clock pulse, the IC increments its internal count by one.

Simultaneously, the CD4026 IC decodes the binary count into the corresponding decimal value. This decoded decimal value is then sent to the Seven Segment Display.

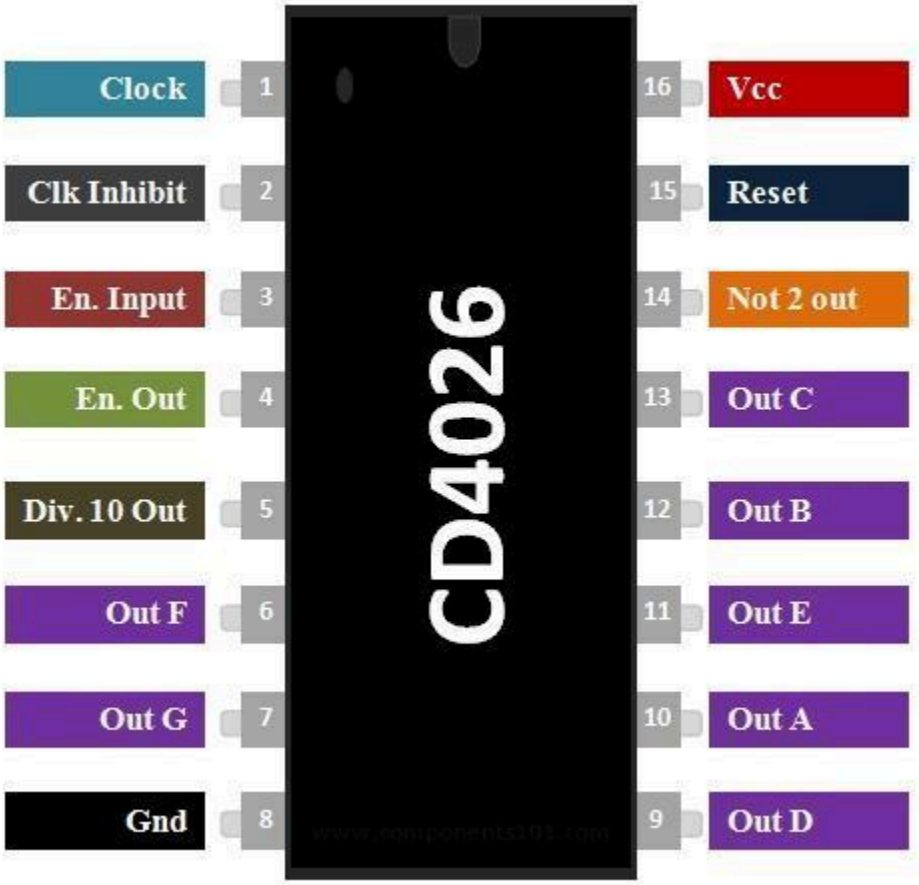
The Seven Segment Display visually represents the decimal count. The segments of the display are selectively illuminated to display the specific numeral corresponding to the decoded count.

To enhance user interaction, a manual reset button is incorporated into the circuit. When pressed, it resets both the internal count of the CD4026 IC and the displayed value on the Seven Segment Display, effectively resetting the counter to zero.

The process repeats with each clock pulse, allowing the counter to increment continuously. The Seven Segment Display provides a visual representation of the count in real-time.

This working principle ensures a dynamic and responsive counting mechanism, with the CD4026 IC simplifying the counter's control and the Seven Segment Display providing a clear and intuitive output. The inclusion of manual reset functionality adds practicality, making the circuit adaptable to various applications where controlled counting and display are essential.

# IC CD4026 OVERVIEW




The CD4026 is a versatile CMOS IC designed for use in counter and display driver applications. It incorporates a 4-bit binary counter and a 7-segment display driver. Each time a clock pulse is received, the counter increments, and the corresponding decimal value is displayed on the seven-segment display.

# APPLICATIONS

- Industrial Automation: Applied in industrial settings for counting production units, monitoring machinery cycles, and tracking events accurately.
- Electronic Timers: Employed in electronic timers for controlling processes, measuring time intervals, and visually representing elapsed time.
- Scoreboards and Games: Integrated into scoreboards for games or sports events, providing real-time scoring through the Seven Segment Display.
- Event Counters: Used for counting people entering a venue, items on a conveyor belt, or others, visually communicated through the display.

# CONCLUSION

This project successfully demonstrates the design and implementation of an Up Counter Circuit using the CD4026 IC and a Seven Segment Display. The versatility and ease of use of the CD4026 make it a valuable component in various digital applications. This project contributes to the understanding of digital electronics and provides a foundation for further exploration of counter circuits in electronic systems.

# REFERENCES


- http://www.friendlywire.com/

- https://www.wikipedia.org/

**HARDWARE IMPLEMENTATION OF THE PROJECT (Completed project picture) :**