# DIGITAL CLOCK USING 4026 IC (MINUTE CLOCK)

*A project report submitted in partial fulfillment of the requirements for the 4$^{TH}$ semester of the degree of*

**BACHELOR OF TECHNOLOGY**

in

## ELECTRONICS ENGINEERING

Submitted by


**ADITI GUPTA (21001017001)**

**AMAN KAPIL (21001017005)**

**CHIRAG TYAGI (21001017018)**

**DIKSHA CHOPRA (21001017023)**

**DOLLY RANI (21001017024)**

**IRSHITA SAPRU (21001017030)**


Under the Supervision of

**Ms. Poulami Jana**



**Department of Electronics Engineering**
**Faculty of Engineering and Technology**
**J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana-121006**

# DECLARATION

I hereby certify that the work which is being presented in this project report entitled **"DIGITAL CLOCK USING 4026 IC (MINUTE CLOCK)"** in partial fulfillment of requirements for the 4th semester of degree of BACHELOR OF TECHNOLOGY in ELECTRONICS ENGINEERING, submitted to the Department of Electronics Engineering, Faculty of Engineering and Technology, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana-121006 is an authentic record of our work carried out under the supervision of **Ms. Poulami Jana Mam**. We have not submitted the matter presented in this project report to any other University/Institute for the award of B.Tech. or any degree or diploma.


**ADITI GUPTA (21001017001)**

**AMAN KAPIL (21001017005)**

**CHIRAG TYAGI (21001017018)**

**DIKSHA CHOPRA (21001017023)**

**DOLLY RANI (21001017024)**

**IRSHITA SAPRU (21001017030)**

# CERTIFICATE

This is to certify that the project entitled **"DIGITAL CLOCK USING 4026 IC (MINUTE CLOCK)"** submitted to Department of Electronics Engineering, Faculty of Engineering and Technology, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana-121006 by **Mr. Aman Kapil, Ms. Aditi Gupta, Mr. Chirag Tyagi, Ms. Irshita Sapru, Ms. Dolly Rani and Ms. Diksha Chopra** in partial fulfillment ofthe requirement for the **4th** semester of degree of BACHELOR OF TECHNOLOGY in ELECTRONICS ENGINEERING, is a Bonafide work carried out by us under my supervision and guidance. This project work comprises of original work and has not been submitted anywhere else for any other degree to the best of my knowledge.

Project Supervisor

**Ms. Poulami Jana**
Faculty
Department of Electronics Engineering
JC Bose UST, YMCA
Faridabad

# ACKNOWLEDGMENT

We would like to express my yawning sense of profound gratitude to my honorable, esteemed guide, **Ms. Poulami Jana Mam** for their able guidance and support in completingour project.
The success and the outcome of this project required a lot of guidance and assistance from many people, and we are privileged to have got this all along the completion of the project. All that we have done is only due to the supervision and assistance and we would not forget to thank him.

# TABLE OF CONTENTS: -

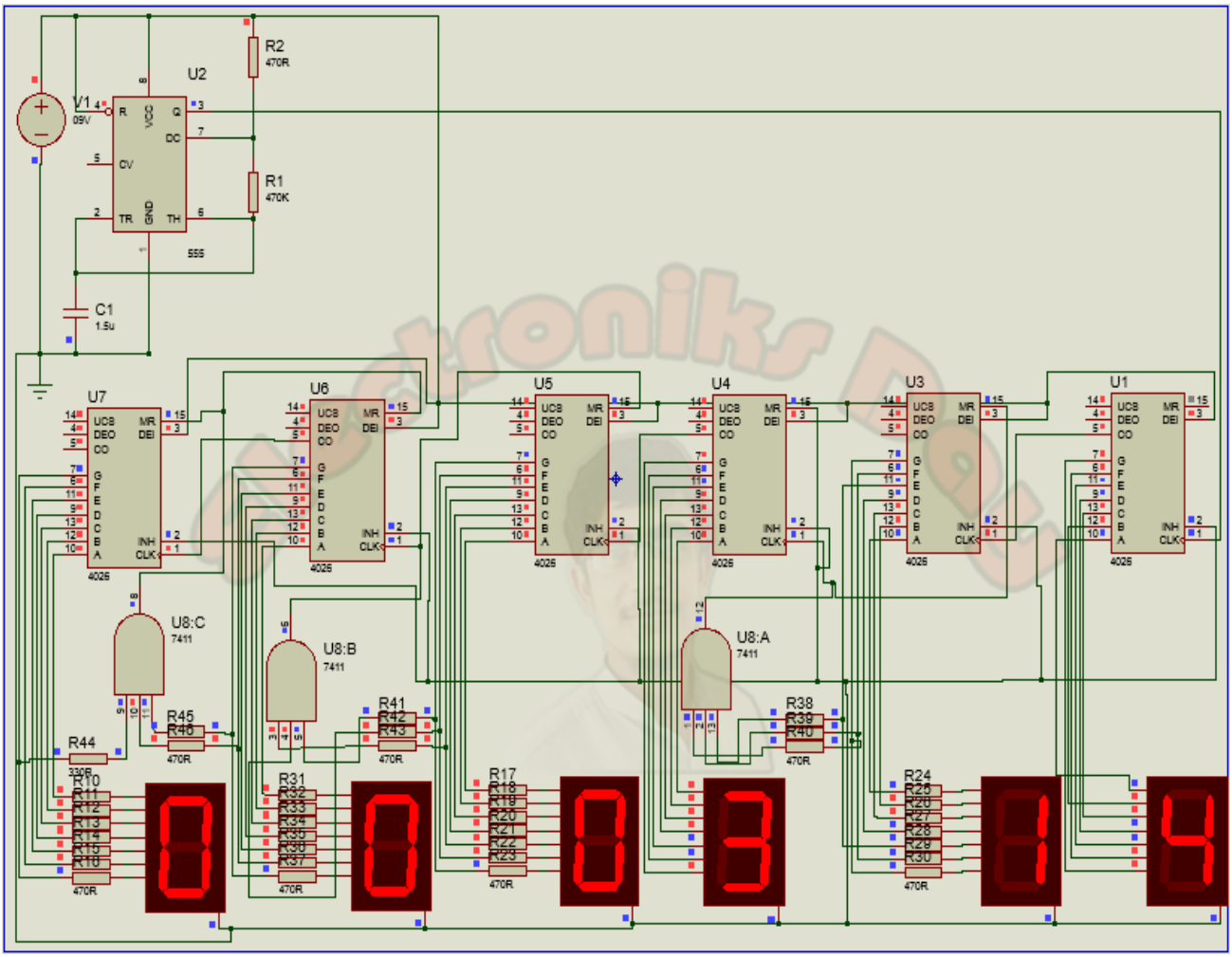
## INTRODUCTION: -

The working of the circuit  starts with the 555 timer where it was wired as a monostable Multivibrator. The 555 timer generate clock pulse after a second and output of 555 is connected to pin 1 of IC 4026 which is a seven segment display decade counter which is used to drive a 7 segment display with input clock pulse.

## COMPONENTS REQUIRED: -

- *555 Timer*
- *IC 4026*
- *IC 7411 (Three input AND Gate)*
- *7-Segment  common cathode display*
- *2.2uF Capacitor.*
- *470 ohm and 470 kilo ohm resistors.*
- *9V Battery*

# CIRCUIT DIAGRAM: -



## WORKING: -

The working of the circuit starts with the 555 timer where it was wired as a monostable Multivibrator. The 555 timer generate clock pulse after a second and output of 555 is connected to pin 1 of IC 4026 which is a seven segment display decade counter which is used to drive a 7 segment display with input clock pulse. Here the clock pulse was obtained from the monostable multivibrator and fed into the pin 1 of first ic 4026. Pin 2 was usually grounded since giving high signal to this pin will inhibit the input clock signal to pin 1 and pin 3(Enable Clock) is always taken High.

Initially when the circuit is switched ON the 7 segments will indicate "00:00:00" count and as soon as the negative trigger was given to 555 high pulse will be obtained from pin 3. The high pulse was fed to first IC and therefore it increments its count with each clock, displaying 1 to 9 in its seven segment. As soon as 10 counts was incremented by IC a high to low signal was obtained from its pin 5 which indicates the completion of ten increments.

The pin 5 was connected to the clock pin of the next 4026 IC. Therefore whenever 10 counts was completed by the 7 segment, the high to low signal at the pin 5 will feed a single clock pulse input to the second IC and therefore the corresponding 7 segment will be incremented one value. For a digital clock we must reset second IC when it reach to number 6 because we want seconds count upto "59" therefore we used IC 7411 (Three input AND Gate). In the same manner fourth IC will count from 0 to 6 and then value in the fifth IC will be incremented by one. This is all about for seconds and minute of clock. Now for hours we must reset fifth and sixth IC when number reached to “23” so we put one more three input AND gate.

# *About components:*

## *555 Timer:*

**The 555 is basically a monostable Multivibrator. The important characteristics of a Monostable  Multivibrator is as long as the pin 2 receives a positive trigger the output at pin 3 will be of low state. And when negative trigger was fed into the pin 2, the output at the pin 3 will go high for a specific period of time. This time was decided by the Resistor and Capacitor connected with it. You can see my post "How to properly use 555 timer" for help, link is given at the end of page.**

## IC 4026:

**The 4026 IC is a 16-pin CMOS seven-segment counter from the 4000 series. It counts clock pulses and returns the output in a form which can be displayed on a seven-segment display. This avoids using a binary-coded decimal to seven-segment decoder, but it can only be used to display the (decimal) digits 0-9.**

## IC 7411:

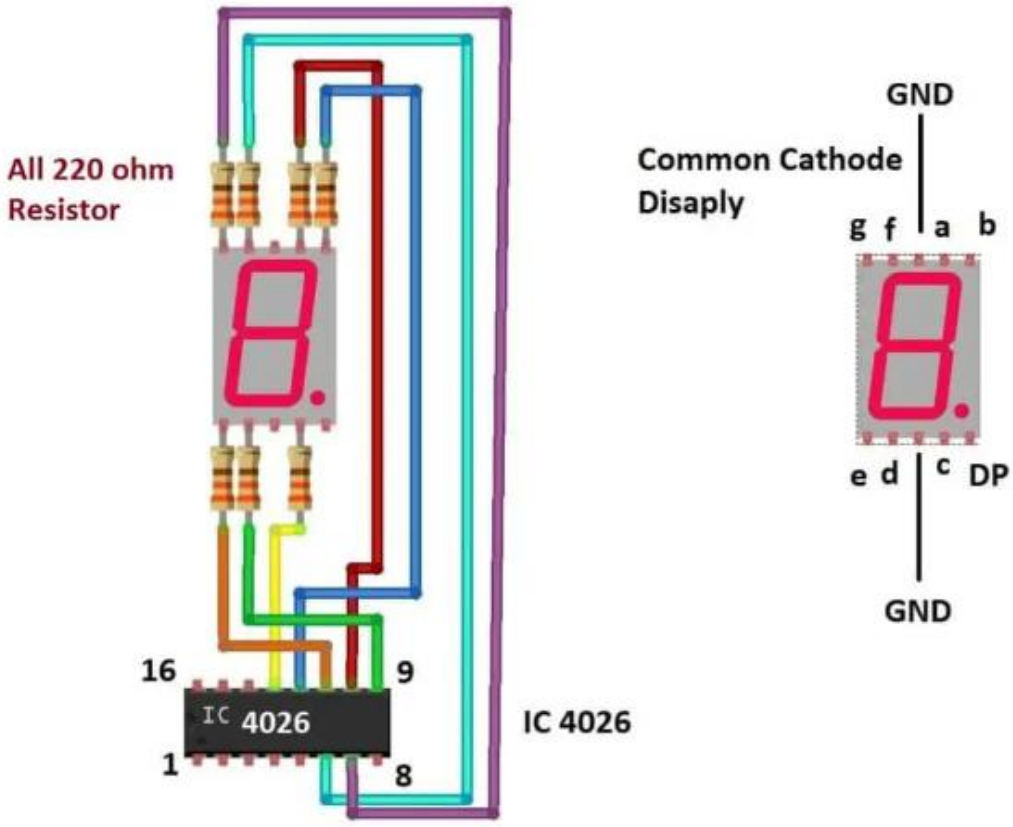
**The IC 7411 is basically AND Gate having three inputs and one output. This IC contains three AND Gates.**

## ***Circuit Description:***

The above circuit consists of 4 seven segment display driver IC 4026 which can display 0 to 9 on common cathode 7 segment display, one IC controls one 7 segment display. There are three IC 4017 which are decade counters, it tracks the time and reset the IC 4026's count to "00" when the minute digit reaches 60.

There is a logic two input AND gate IC 7408 in this circuit which is used for resetting the hour digits to "00" when hour reaches "12". The AND gate's output goes HIGH when its two inputs are HIGH. The input for AND gate is provided by two IC 4017s (IC6 and IC7), when the clock reads 12 the pin numbers 2 and 4 of IC6 and IC7 respectively becomes HIGH and rest the IC1 and IC2 (4026s) to count "00".

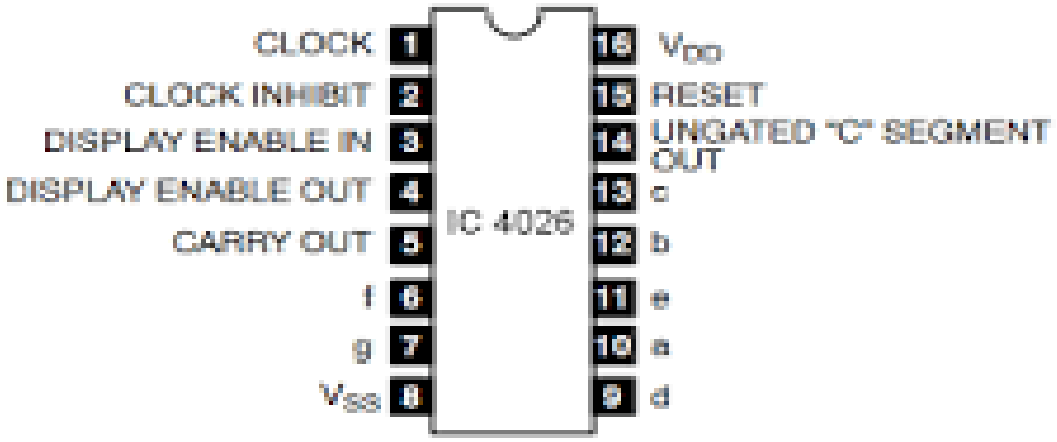
## ❖ *IC 4026 to 7 segment display connection:*




IC 4026 to 7 segment Display Connection

## ❖ ***IC 4026 PIN DIAGRAM:-***

- Pin #1 is clock input, when we apply clock signal, the IC increments the count.
- Pin #2 is Clock Enable, when it is connected to Vcc the clocks inputs are ignored, it has to be grounded during normal operation so that counts can be incremented.
- Pin #3 is Display Enable, when it is connected to Vcc the 7 segment display lights up, grounding this pin will turn off the display but the count will be incremented internally, this can be used for power saving.
- Pin #4 is not used here.
- Pin #5 is carry out, when the count reaches 10 this pins outputs HIGH signal, this output is used for cascading another IC 4026 for 10's place digit.
- Pin numbers 6, 7, 9, 10, 11, 12, 13 are output for 7 segment display.
- Pin # 8 is ground and pin # 16 is +5V supply.
- Pin #15 is reset, when this pin is connected HIGH the count resets to zero. This pins has to be grounded while incrementing the count.



# REFERENCES

1. Analog Electronic Circuits by Soumitra K. Mandal

2. Power electronics: converters, devices, and Applications by M.H. Rashid

3. Power electronics by P.S Bimbhra

4. Power electronics by M.D. Singh and K.B. Khanchandani

5. Power electronics by V.R. Moorthi

# BIBLIOGRAPHY


- Ahmed, Syed Imran *Pipelined ADC Design and Enhancement Techniques*, Springer, 2010 ISBN 90-481-8651-X.
- *Bassett, R. J.; Taylor, P. D. (2003), "17. Power Semiconductor Devices", Electrical Engineer's Reference Book, Newnes, pp. 17/1–17/37, ISBN 0-7506-4637-3*
- Campardo, Giovanni; Micheloni, Rino; Novosel, David *VLSI-design of Non-volatile Memories*, Springer, 2005 ISBN 3-540-20198-X.
- *Kind, Dieter; Feser, Kurt (2001), translator Y. Narayana Rao (ed.), High-voltage Test Techniques, Newnes, ISBN 0-7506-5183-0*
- Kories, Ralf; Schmidt-Walter, Heinz *Taschenbuch der Elektrotechnik: Grundlagen und Elektronik*, Deutsch Harri GmbH, 2004 ISBN 3-8171-1734-5.