DLD LAB PROJECT REPORT

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Title: Digital Clock

Project Outline:

Working Logic of Clock

A digital clock is a type of clock which displays time digitally in numerals instead of analog clock where time is indicated by the positions of rotating hands. It is to be designed like MM:SS format which represents minutes and seconds respectively is referred as S1 and S0 and same goes for MM.S0 counts from 0 to 9 and S1 becomes 1 and S0 counts again. Seconds count from 0 to 59.So our S1 counter counts from 0 to 5 and S0 from 0 to 9.Thus 0 to 59 is obtained in seconds and when it becomes 60 then it is one minute.M1 and M0 essentially count the same way as in seconds. So a 1 second pulse given to S0 makes it count from 0 to 9 and whenever S0 reaches 10 pulse has to be generated to make S0 again and make it S1 one. This process repeats and so on. The counting of MM is similar to of SS but MM receives clock triggering pulse from SS.

Components Required

1.Timer IC

2.Counter IC

3. Seven segment display

4.AND gates 3 input

5.Resistors 10K ohm,2.2 k ohm

6.Capacitors 100microfarad

7.9V battery

8.Jumper wires

9.Breadboard

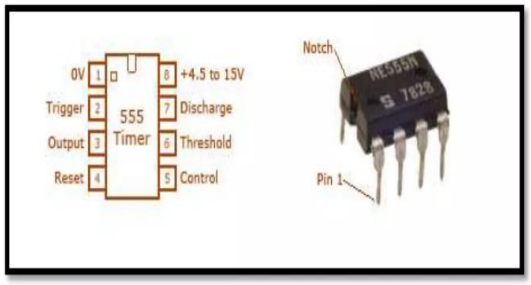
10.Cutter

Description of components

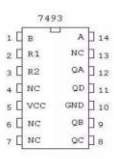
1.Timer IC:It is used as vibrator.It requires clock pulses and multivibrator can be produced by adding the resistors and capacitor to basic timer IC.The timing during which output is either high or low is determined by externally connected two resistors and capacitor.

We set up it in such a way that it works at a suitable frequency.

Pin Configuration:

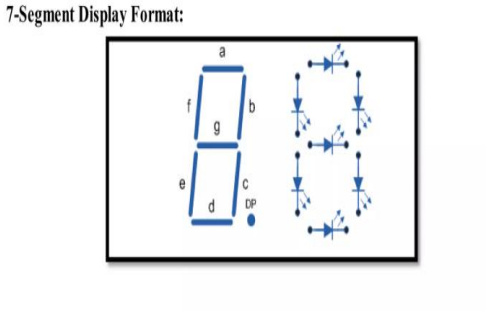


2.4 bit binary counter specifies that this counter contains four master slave flip flops and 3 stage binary counter. It can count from zero to ten and its outputs are decoded. This saves a lot of board space and time required to build our circuits when our application demands using a counter followed by a decoder IC.



Pin	Symbol	Description
1	CP_1	clock input, 2nd, 3rd and 4th section (high-to-low edge-triggered)
2	MR_1	asynchronous master reset
3	MR_2	asynchronous master reset
4	NC	no connection
5	Vcc	supply voltage
6	NC	no connection
7	NC	no connection
8	Q_2	counter output
9	Q_1	counter output
10	GND	ground
11	Q_3	counter output
12	Q_0	counter output
13	NC	no connection
14	CP_0	clock input, 1st section (high-to-low edge-triggered)

3.Seven segment display consists of seven individual LEDs called segments and in order to produce the required numbers or HEX characters from 0 to 9 and A to F respectively one on the display of correct combination of LED segments need to be illuminated and BCD to seven segment display decoders 74LSS47 IC should be used.A standard 7 segment display has 8 input connections one for each LED segment and one that acts as a common terminal or connection for all internal display segments.



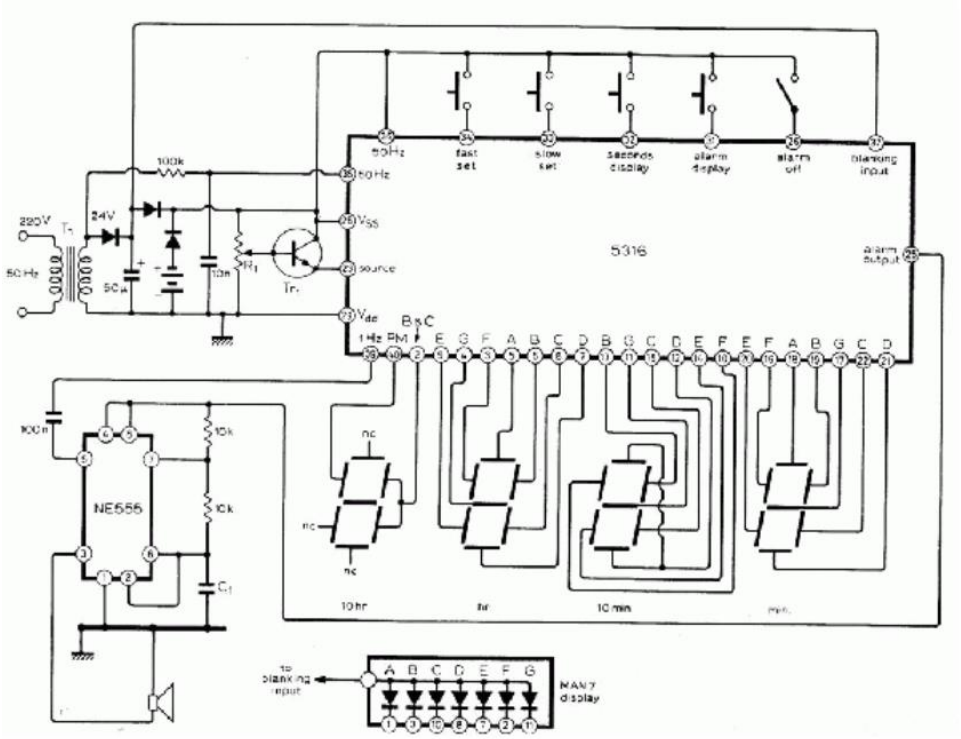
4.AND gates: In digital clock making, AND gates with three inputs serve the purpose of controlling various functionalities and operations within the clock circuitry. AND gates can be used in conjunction with other components to generate clock pulses at specific intervals. By combining signals from different sources such as crystal oscillators or frequency dividers, the AND gate can help produce a precise clock signal for the clock's operation. Digital clocks often require logical operations

to coordinate different functions such as displaying hours, minutes, and seconds. AND gates with three inputs can be employed to perform these logic operations.

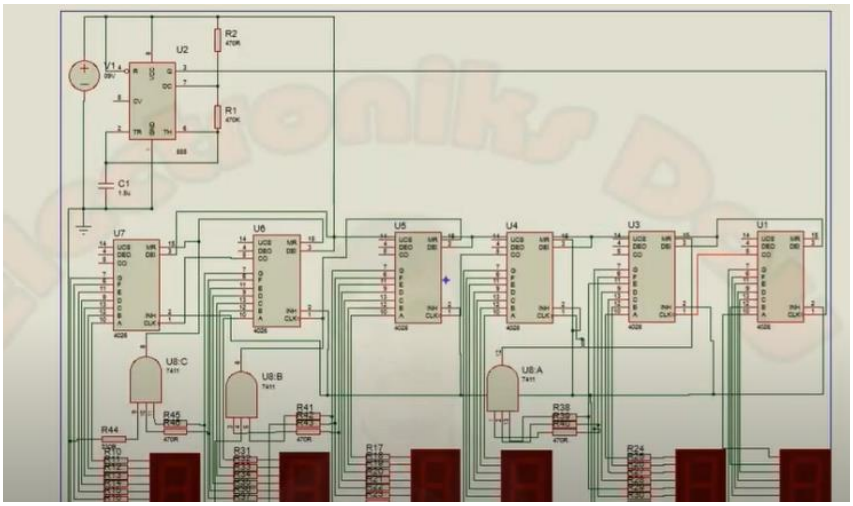
5.Capacitors and resistors: In digital clocks, capacitors can be used for various purposes, such as storing energy to maintain the clock's operation during brief power interruptions or fluctuations while resistors may be used to limit the current flowing through LEDs or other display components.

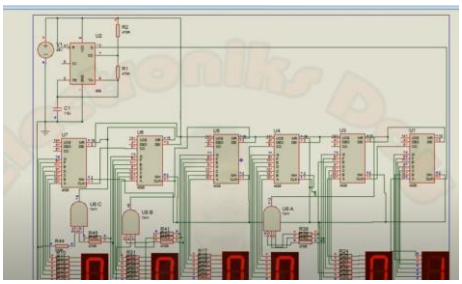
6.9V battery: In digital clocks, 9V batteries can serve as backup power sources or primary power sources, depending on the clock's design and intended use. Some digital clocks incorporate a 9V battery as a backup power source to maintain timekeeping functionality during power outages or when the main power source is disconnected. The battery typically powers essential components of the clock circuitry, such as the real-time clock (RTC) module or memory, ensuring that the clock continues to keep time accurately even when external power is unavailable.

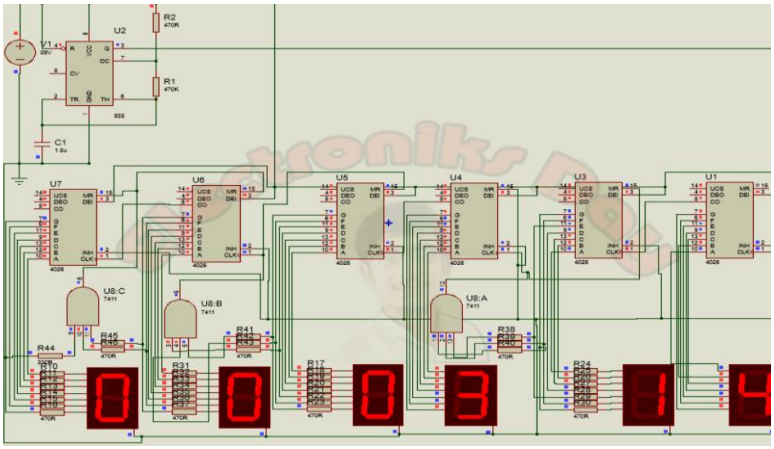
Circuit diagram:



Proteus diagrams:






U2
R2
470R
R1
470K
C1
1.0u
U7
U6
U5
U4
U3
U1
U8:C
U8:B
U8:A
R44
R45
R41
R38
R24
R31
R17
R10
470R

Hardware Implementation: