Digital clock

In

Logic design

By

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1. Introduction *(Heading 1)*

Digital clocks are type of clocks which shows the time in digital numbers. Digital clocks are commonly used in most technologies. Nowedays, All of people care about the time in everything. Digital clocks are made of microcontrollers which enables us to control the clock and give us some features such as starting any minutes or ours we want. Our project is following the same techniques, it counts the seconds automatically until it reach 59 seconds then the minutes will start to count intil reaching 59 minutes and then the hours counters will count until it reaches 12 hours then all the digital clock will be reseted to zero. **A common example of a counter application in timekeeping systems is shown in this figure implified logic circuit of a digtal clock that displays seconds, minutes and hours. First a 555 astable timer converts AC voltage to a 1 HZ pulse waveform followed by a divide by 10 counter, followed by a divide by 6 counter, which form both of the seconds counters , followed by a divide by 10 counter, followed by a divide by 6 counter which forms both of the minutes counters, and later on the pulse waveform is followed by a divide by 10 counter and a divide by 2 counter**

making the the hours counters. Both of the seconds and minutes counter count from 0 to 59 then recycles to 0, Sending a

1. Content

Digital clocks are made of components like:4 Dclocks, 6 seven segments, , 6 IC counters (74190)3 switches, 4 logic AND Gates (7408) And some LEDs and 47 microfrad Capacitors.

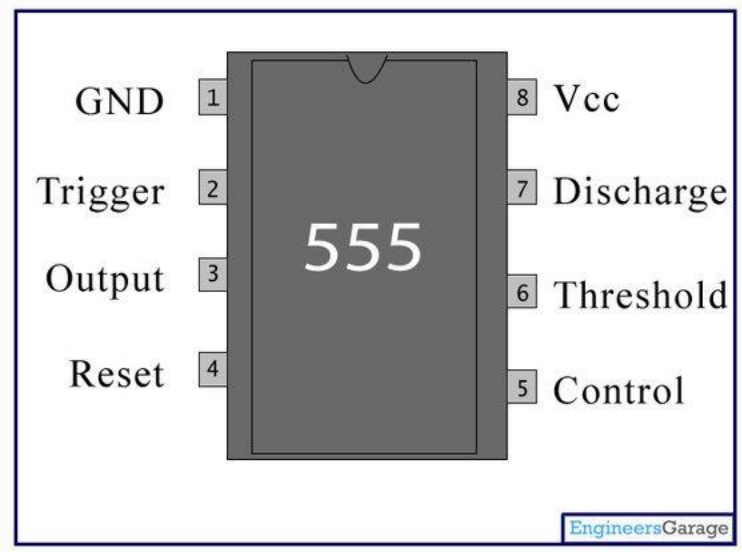
IC Counter(74190): this Ic is presettable BCD decade and Binary UP AND DOWN synchronous counters. This counter can be incremented and decremented on the low to high transition of the clock up depending on the high level on the clock up or down input. This counter gives an output from 1 to 9 in binary and then this output will be transformed to the decimal form to be represented in the 7 segment.

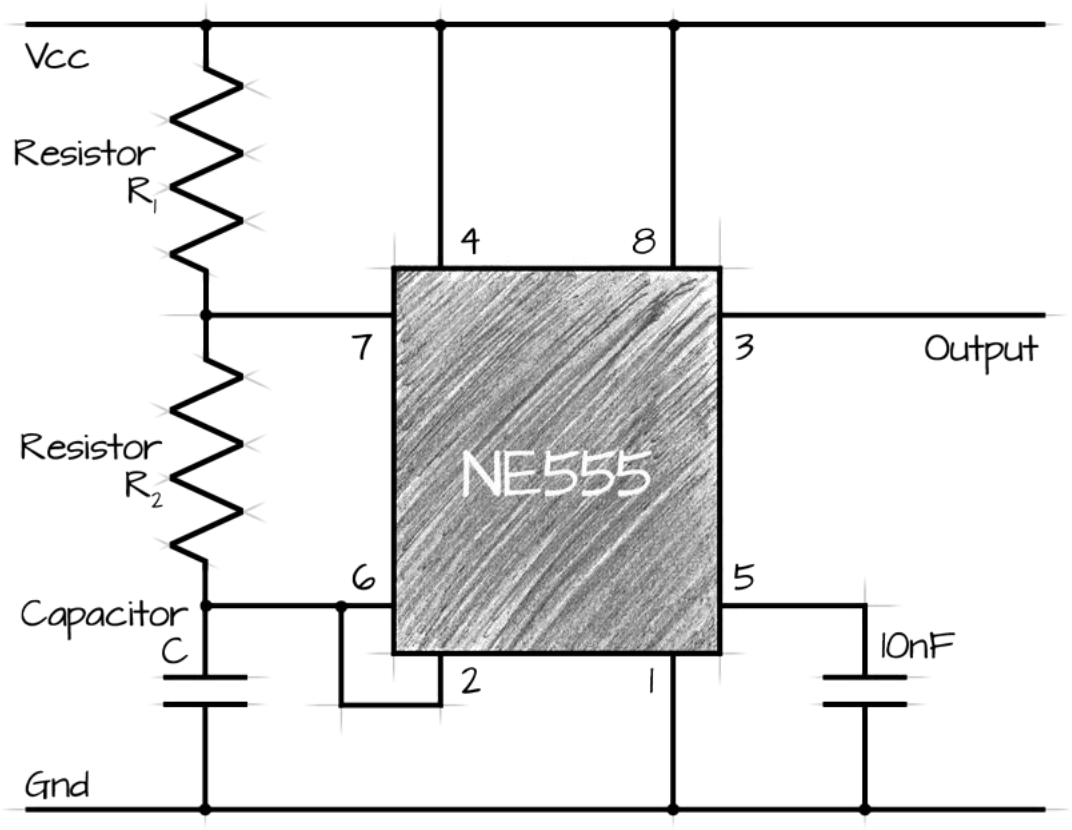
componant

- 555 Timer
- VCC 9 V
- Resistors
- Capacitors
- 47s90 Decade Counter
- 7 Segment Common anode
- 3-Input AND Logic Gate

Timer 555

555 Timer Astable timer is a device that has no stables the resulting output typically square wave that is used as a clock singal in many types of sequential logic curicuts .When a 555 timer is operating in Astable mode we obtain a pulse on the output pin whose ON time (Time high) and OFF time (Time low) can be controlled. This controlling can be done by selecting the appropriate values for the Resistor R1,R2 and capacitor C1. circuit can be used to produce a square wave in which the high time (T1) and low time (T2) can be calculated. This method used to generate clock pulses for Digital IC's or blink an LED . The output wave obtained from (OUT)-(pin3

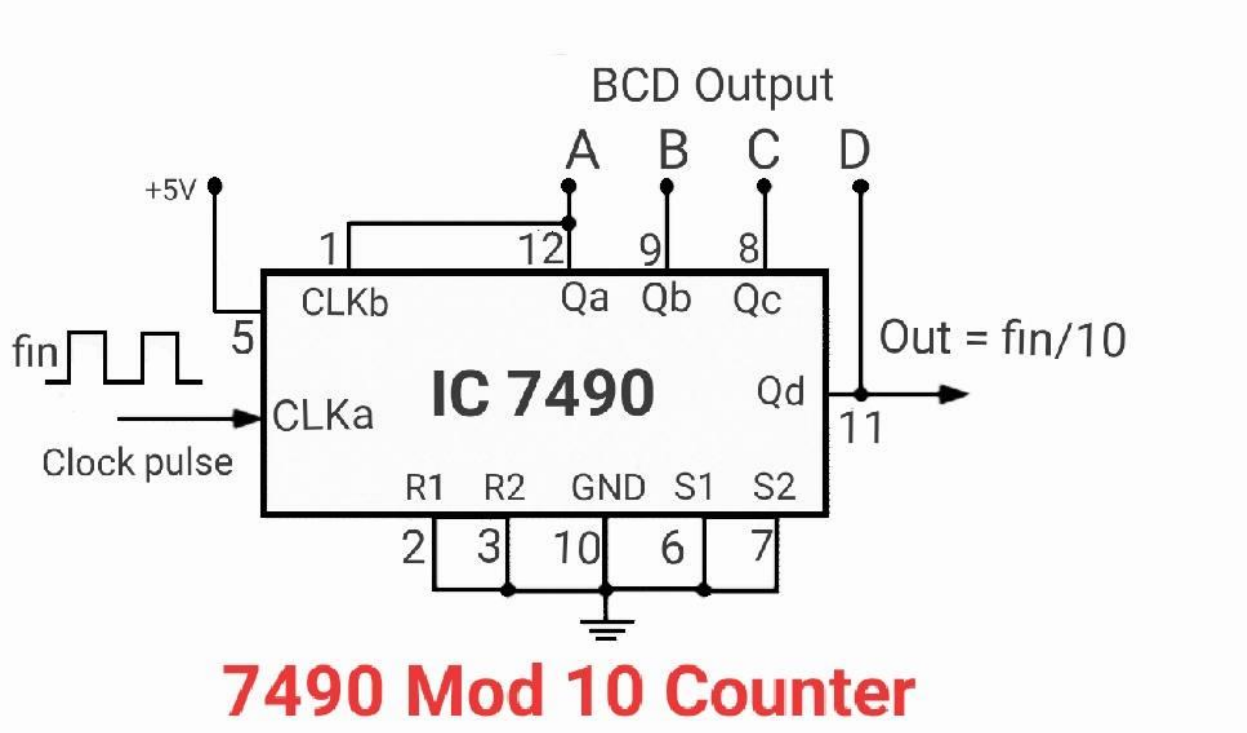




The equation of 555 timer is

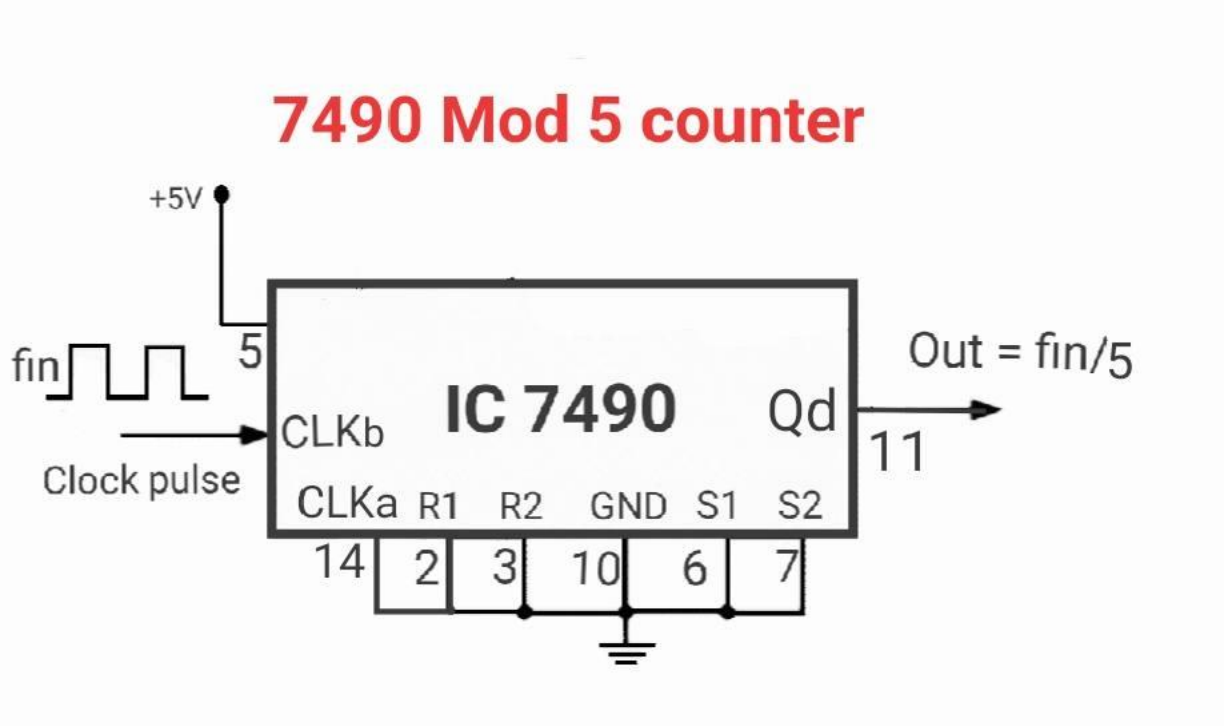
Parameter	Formulae	Unit
Time High (T1)	0.693 × (R1+R2) × C1	Second
Time Low (T2)	0.693 × R2 × C1	seconds
Time Period (T)	0.693 × (R1+2×R2) × C1	Seconds
Frequency (F)	1.44 / (R1+2×R2) × C1	Hertz (Hz)
Duty Cycle	(T1/T)×100	Percentage (%)

f = 1/ T



= 1.44/ (R1 + 2R2) * C1

F=1.44/(10*10^3+10*10^3)*47*10^-6=1.5319 f


7490 Mod 5 counter
+5V
5
fin
Clock pulse
CLKb
IC 7490
Qd
11
Out = fin/5
CLKa R1 R2 GND S1 S2
14 2 3 10 6 7

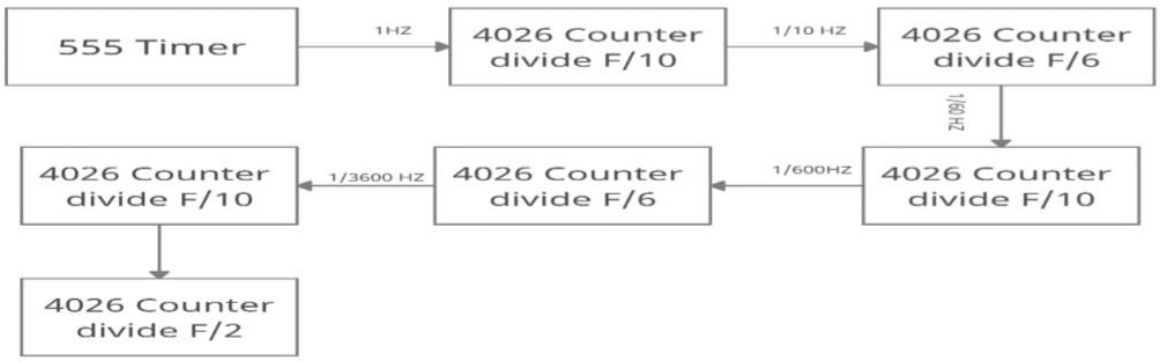
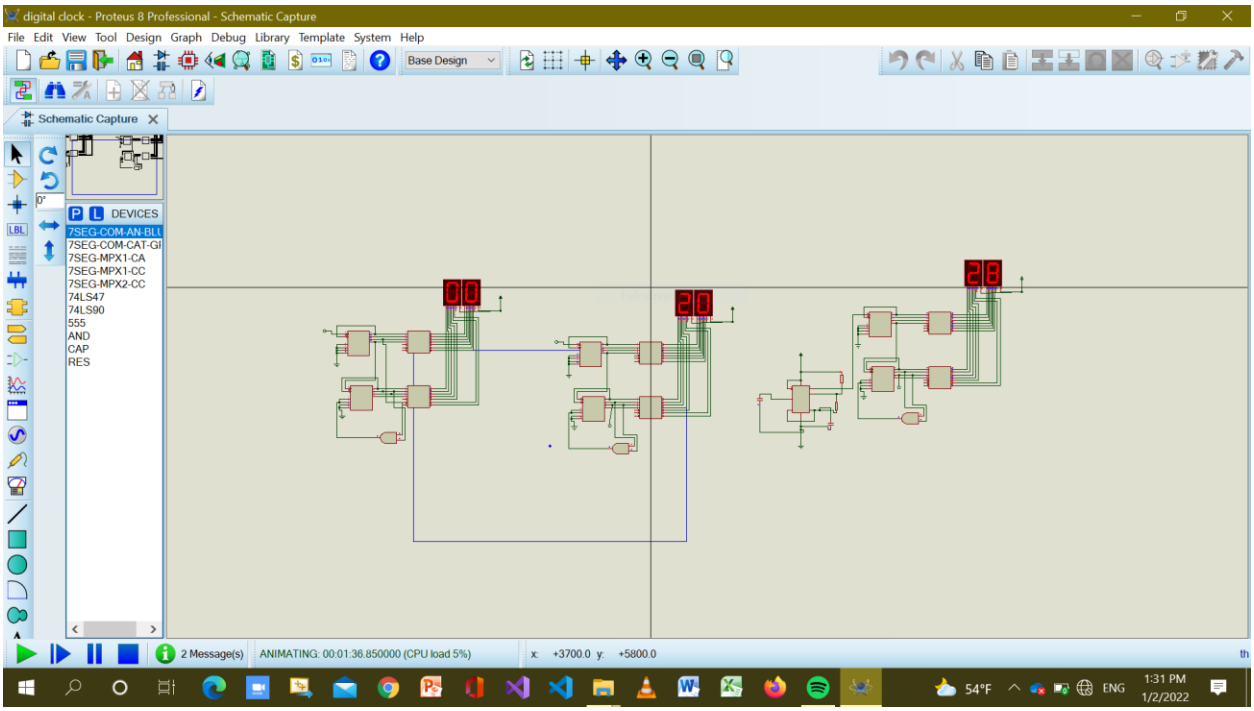

555 Timer
1HZ
4026 Counter divide F/10
1/10 HZ
4026 Counter divide F/6
1/60 HZ
4026 Counter divide F/10
1/600HZ
4026 Counter divide F/6
1/3600 HZ
4026 Counter divide F/10
4026 Counter divide F/2

Figure 1.2



1. Conclusion

To conclude, Digital clocks is one of the most important devices in our daily lives. As we use it everyday to manage our life. We made one of them simulated in proteus system in a simple way. Our clock work with some ICs (74192 Synchronous Up/Down decade Counter). And wwith some counters called DClocks and some seven segments and LEDs we made our clock to count until 12:59:59 then it resets to become 00:00:00 and start counting again. So, this project show us how to make a simple digital clock in simulation system.

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