<u>CPE223/224 MINI PROJECT</u>

DIGITAL ALARM CLOCK

Digital

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INTRODUCTION

We have chosen a digital clock as a mini project because we are interested how we use the knowledge from digital class to adapt to make thing in real life and how the circuit work. Also we want to learn more about basic digital clock circuit so we have built a 24 hours digital clock that can be setting the time and able to alarm.

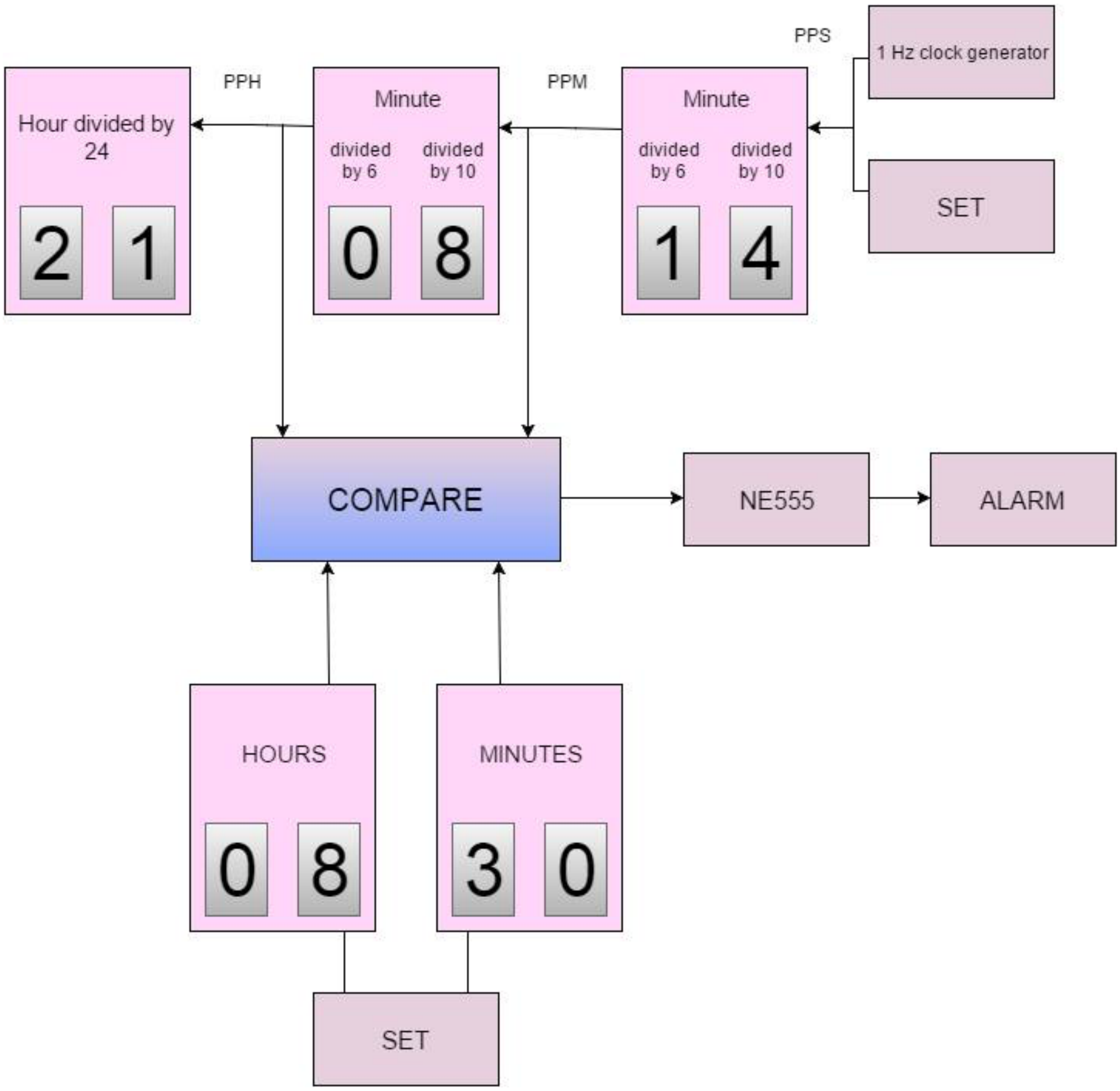
OBJECTIVE

We choose this topic because we use digital alarm clock in daily life but we don't know how its circuit works. We want to build our digital alarm clock by our all skills from digital and circuit. Firstly we thought this circuit was very easy to do but exactly it is kind of little complicated so we studied hard for doing this project completely.

EQUIPMENT

1. Logic toggle
2. 7-Segments BCD
3. 7493
4. 7408 (AND)
5. XOR
6. XNOR
7. 7432 (OR)
8. Resistor
9. LED
10. SPEAKER
11. NE555 TIMER IC
12. 5V DC VCC
13. DCLOCK (1Hz PULSE GENERATOR)

BLOCK DIAGRAM



Simulation

We have 2 clocks. There are a digital clock circuit and a alarm clock circuit that user can set time for alarming. Build a normal digital clock circuit, It is 3 principle parts, there are seconds block, minutes block and hours block. Firstly we use 1 Hz clock generator to generate 1 PPS (pulse per second) signal to the seconds block and then The seconds block contains mod by 10 followed by mod 6 after that its generate a 1 PPM (pulse per minute) signal to the minutes block. We did it again in minutes block but it will generate a 1 PPH signal to hour block. The hours block we use 24-hour clock so we mod 24 it will count from 00 to 23. And the another part is alarm-setting part that the user can set a time and we use XNOR gates for compare bit by bit between normal clock and alarm time after that we use AND gate to combine every bit and also combine from hour comparer and minute comparer together. When 2 parts are equal we use a timer IC (NE555) to delay a buzzer sound.

Problem

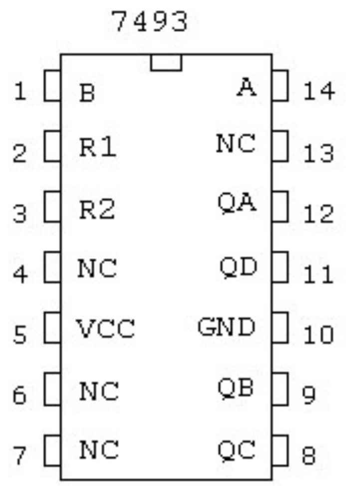
Firstly, we didn't know about how to build an alarm clock. We know only how to build a normal clock but we want to build 24 hours digital circuit clock so we try to solve about how to build 24 hours problem. We was searching in the internet and ask some questions to TA.Secondly, we didn't know how to set time to alarm. We tried to edit a circuit.The last of problem, the proteus is broken easily when we use its hard so sometimes our circuit is not wrong but the proteus cannot work. I had fixed this problem by sending my circuit to run in another program.

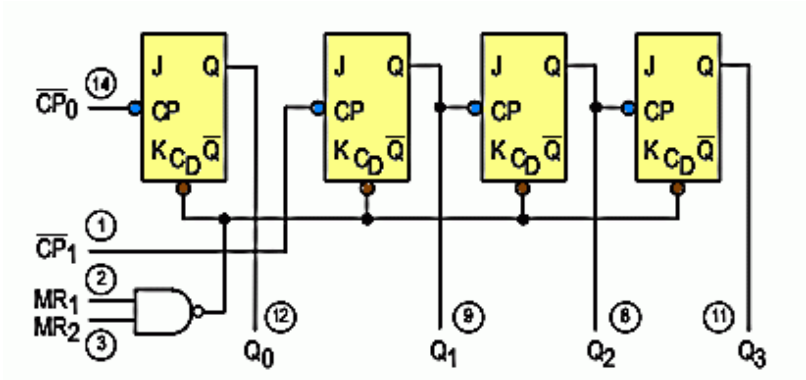
Conclusion

In conclusion, we build a normally digital clock which can alarm. When alarm clock and normal clock have exactly the same time, the alarm clock will alert by LED and buzzer. After clock alarm with setting time, a normal clock also work normally

THEORY

7493



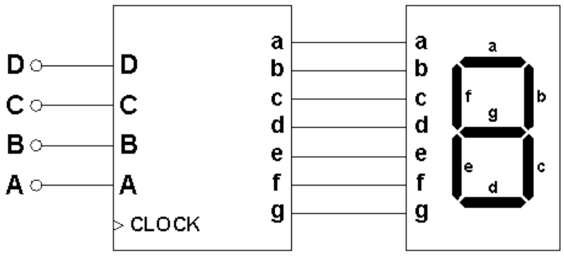


Description

Each of these monolithic counters contains four master-slave flip-flops and additional gating to provide a divide-by-two counter and a three-stage binary counter for which the count cycle length is divide-by-five for the 90A and divide-by-eight for the 93A.

7 Segment BCD

Binary Inputs				Decoder Outputs							7-Segment Display Outputs
D	C	B	A	a	b	c	d	e	f	g	
0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	1	0	1	1	0	0	0	0	1
0	0	1	0	1	1	0	1	1	0	1	2
0	0	1	1	1	1	1	1	0	0	1	3
0	1	0	0	0	1	1	0	0	1	1	4
0	1	0	1	1	0	1	1	0	1	1	5
0	1	1	0	1	0	1	1	1	1	1	6
0	1	1	1	1	1	1	0	0	0	0	7
1	0	0	0	1	1	1	1	1	1	1	8
1	0	0	1	1	1	1	1	0	1	1	9



BCD to 7 Segment Decoder

7-Segment LED Display

Numbers can be represented in different numerical systems with different bases. In daily life, we represent a number using the digits 0 to 9. This is the decimal system and the base is 10. In digital electronics, only two states, Low and High, are used to represent the digits 0 and 1. This is the binary system and the base is 2. Each digit in a binary number is called a bit, which comes from the English words "binary digit”.

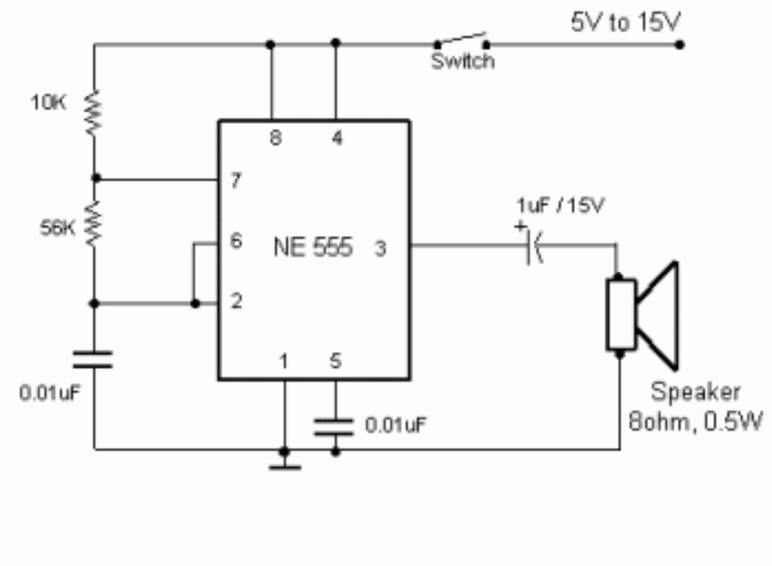
Four Inputs A to D are used to control the number displayed on the LED Display. The Inputs are arranged in the sequence "DCBA" to represent a 4-bit Binary Number. Their weights are as follows:

The conversion between a 4-bit Binary Number and a Decimal Number is:

Decimal Number = D x 23 + C x 22 + B x 21 + A x 20

7-Segment LED Display is a form of displaying decimal Arabic number in electronics. It predates the widely used Dot-Matrix Displays nowadays. A 7-Segment LED Display is composed of seven segments, Figure 1. Each segment is a LED. They are combined to produce standardized representations of the decimal Arabic numbers.

ELECTRIC BUZZER : NE 555 as timer



The **555 timer IC** is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide up to four timing circuits in one package.

REFERENCE

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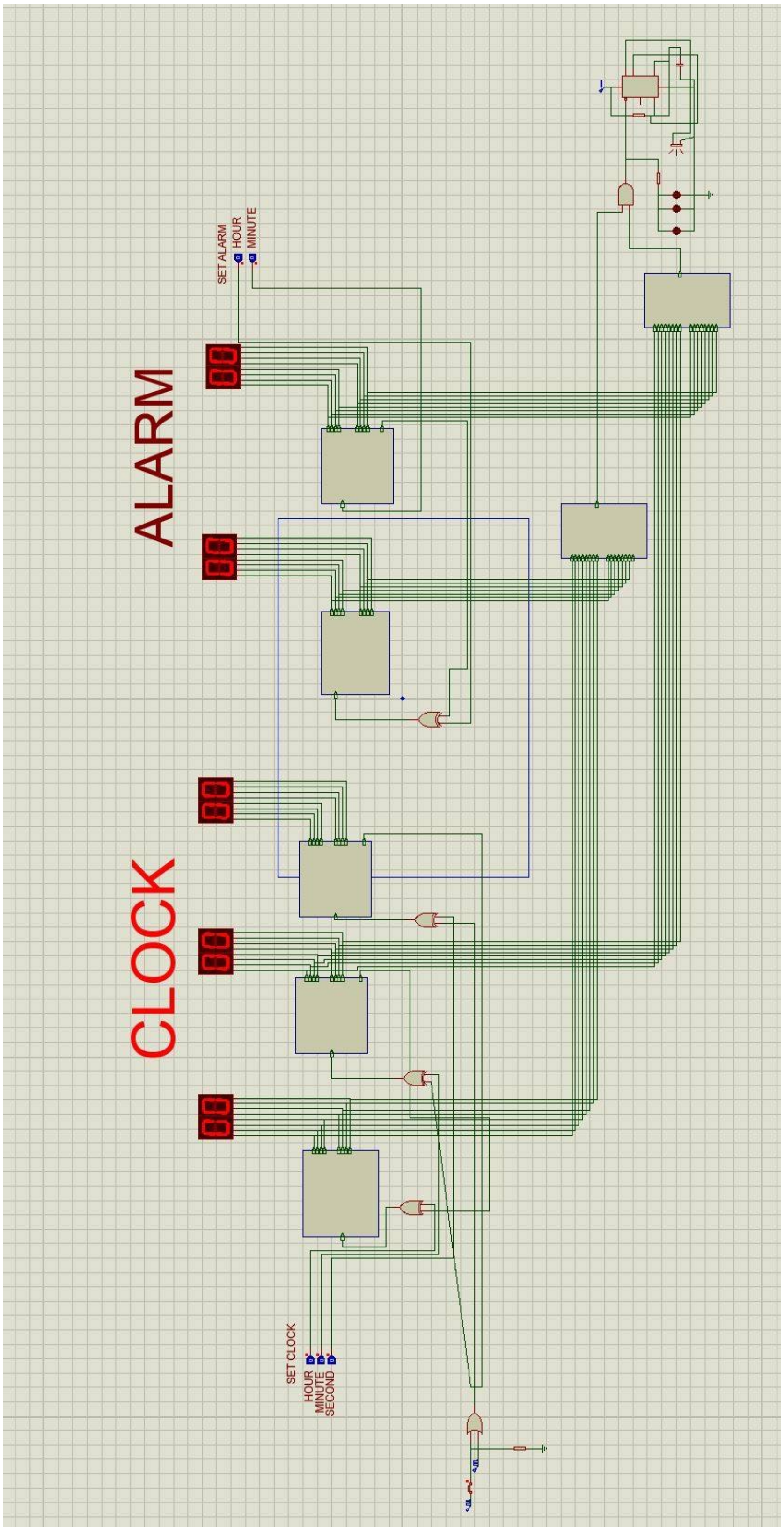
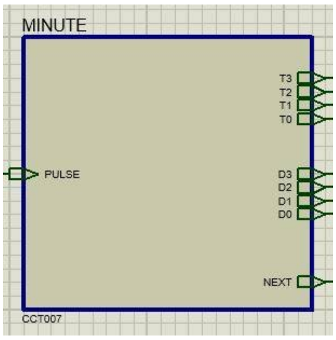
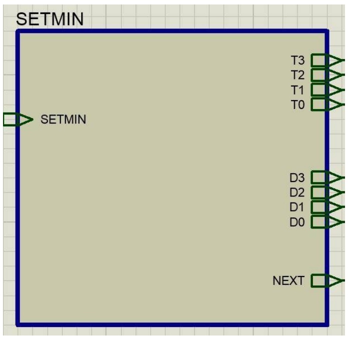
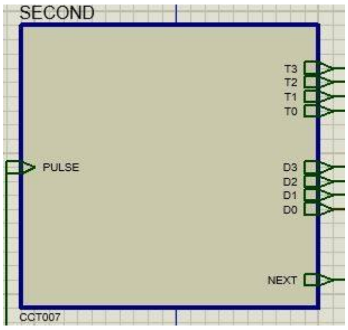
APPENDIX

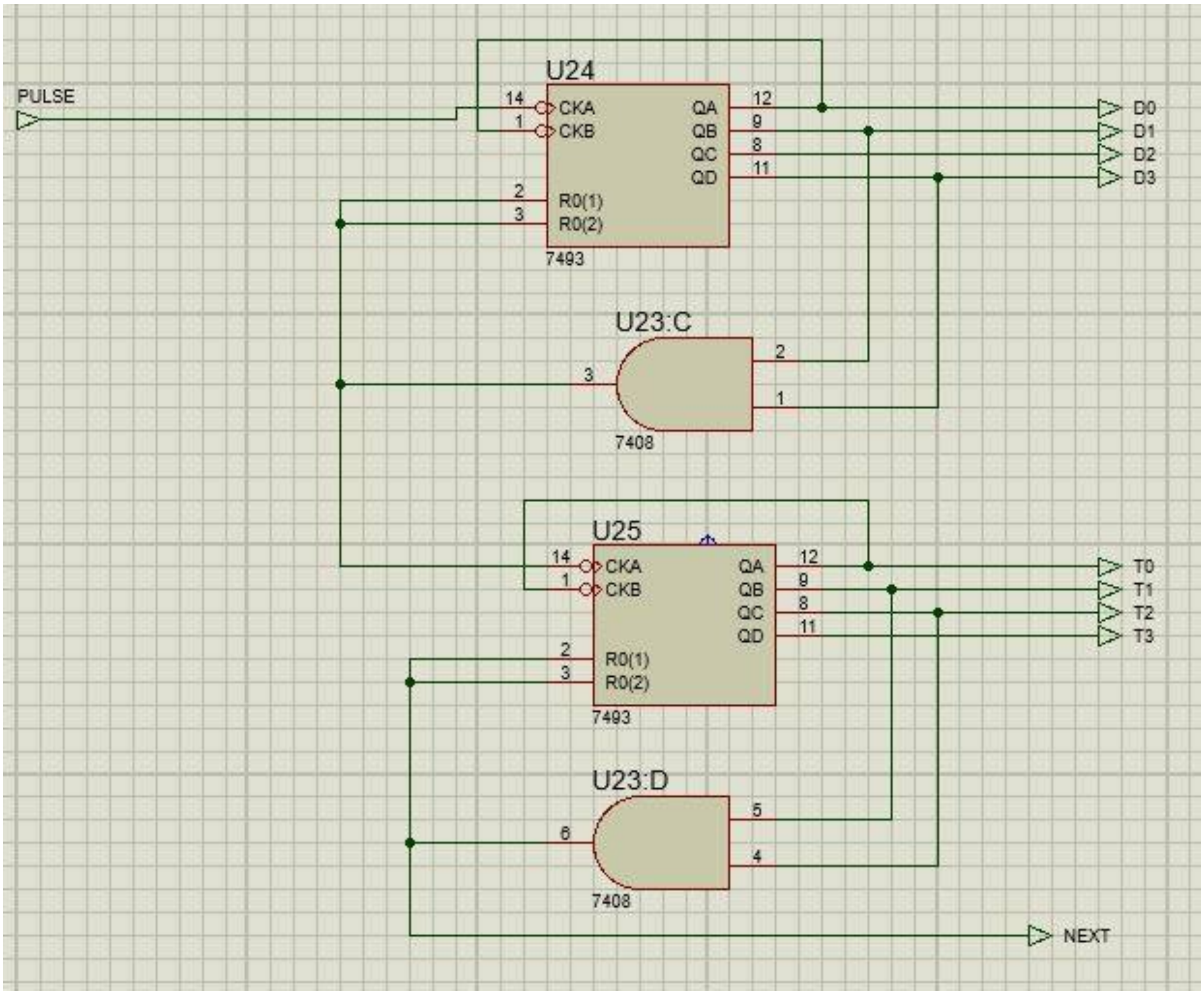


DIGITAL ALAR CLOCK CIRCUIT

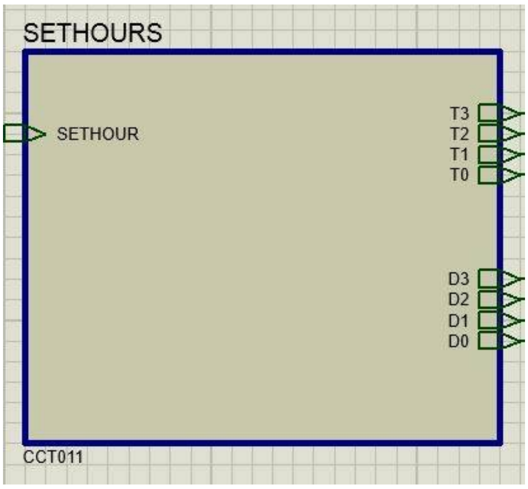


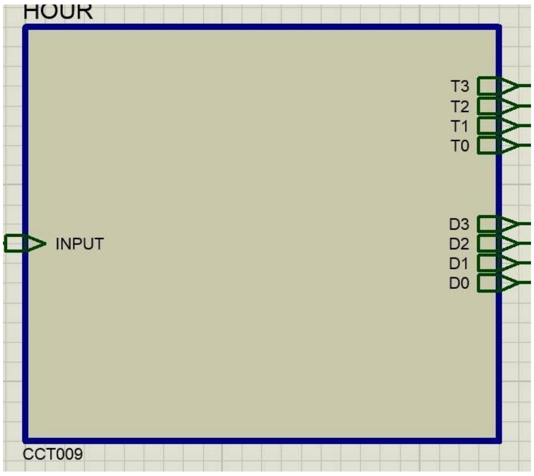


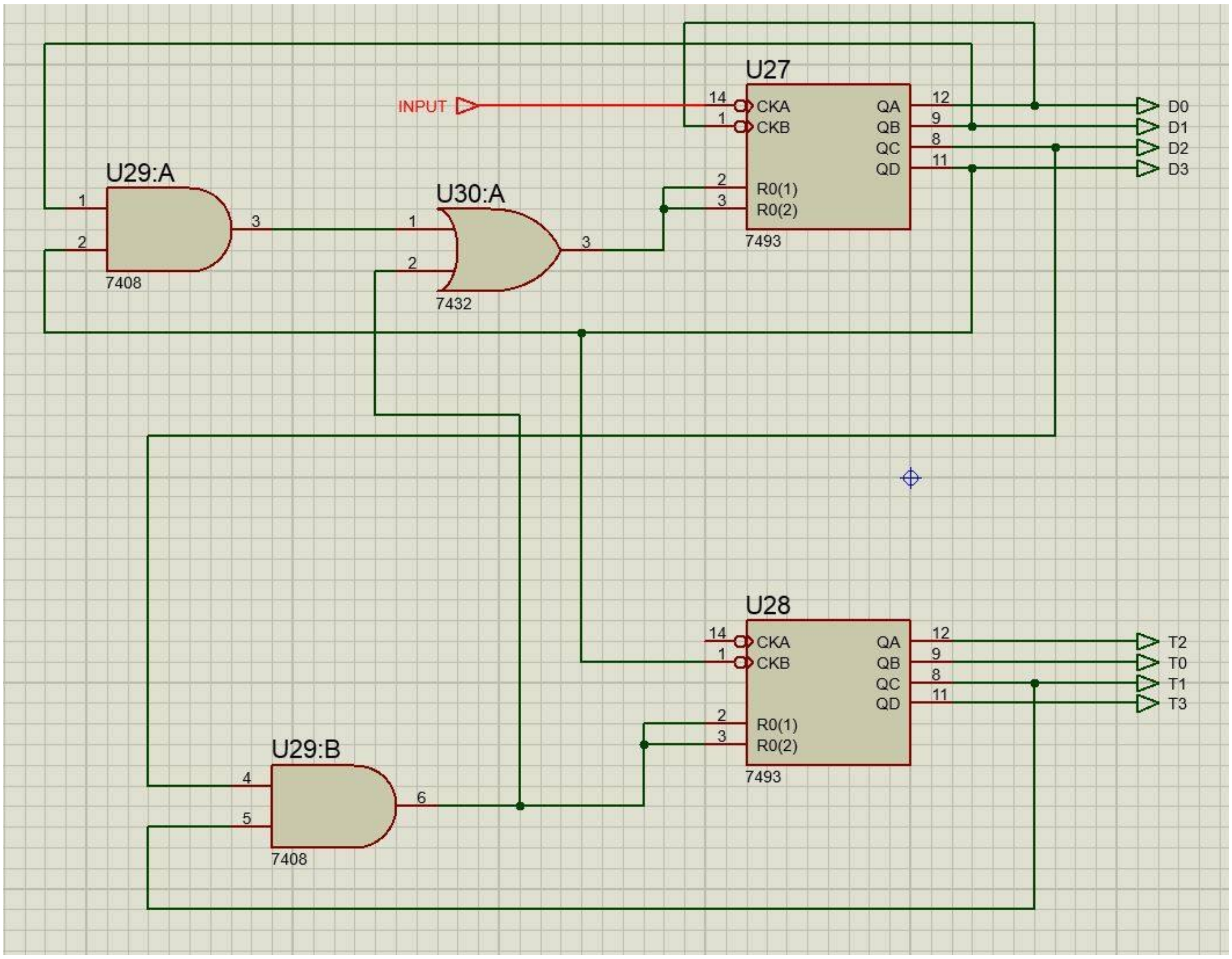




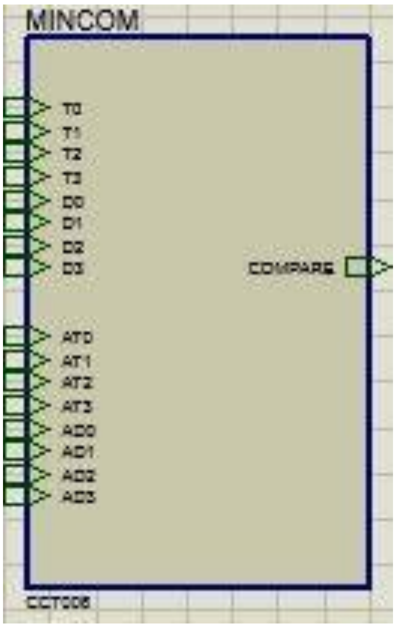
MINUTE SECOND AND SETMINUTE BOXES AND CIRCUIT INSIDE THE BOX

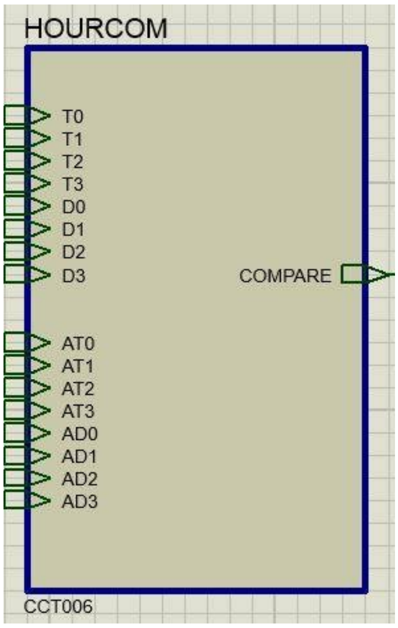


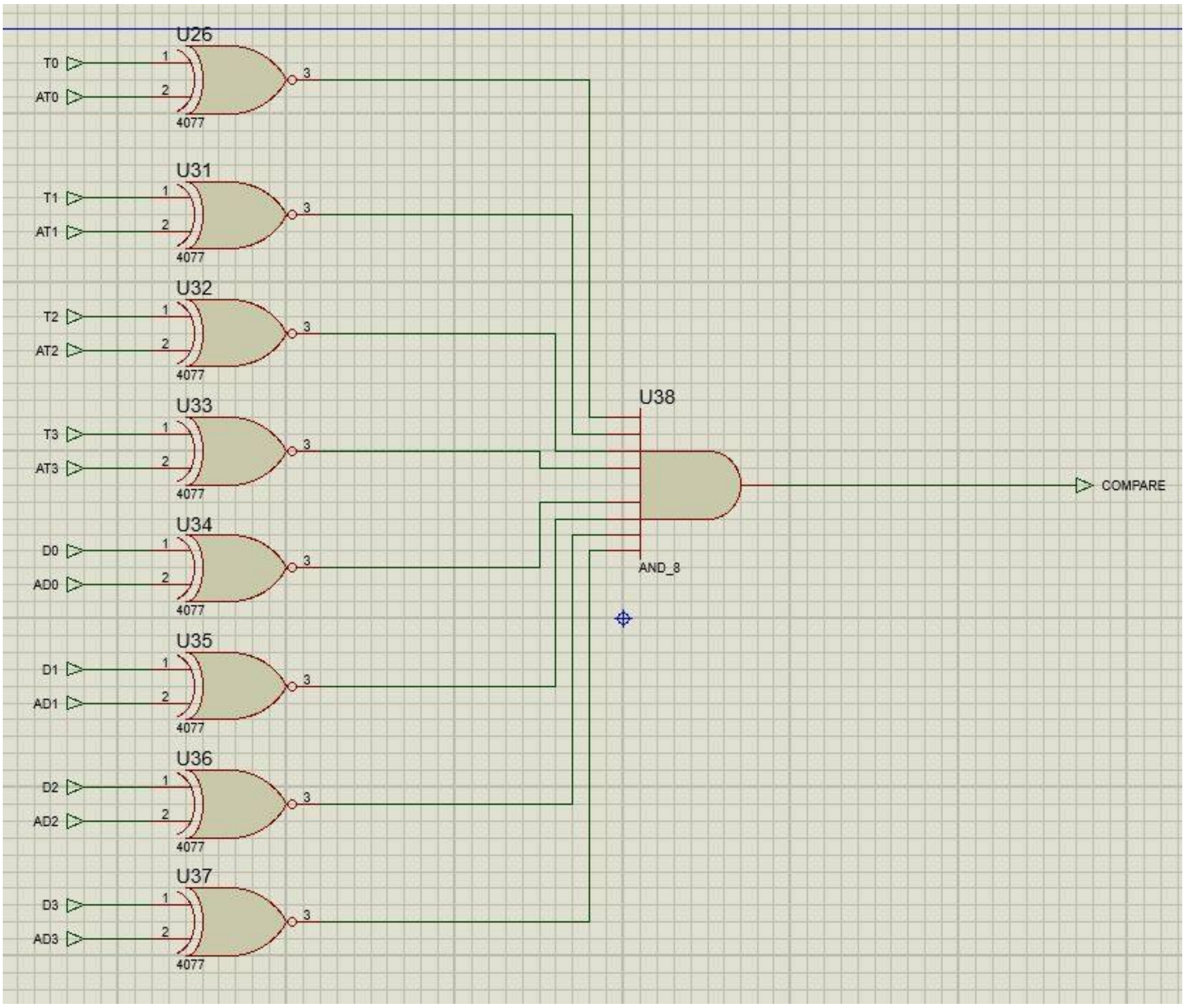




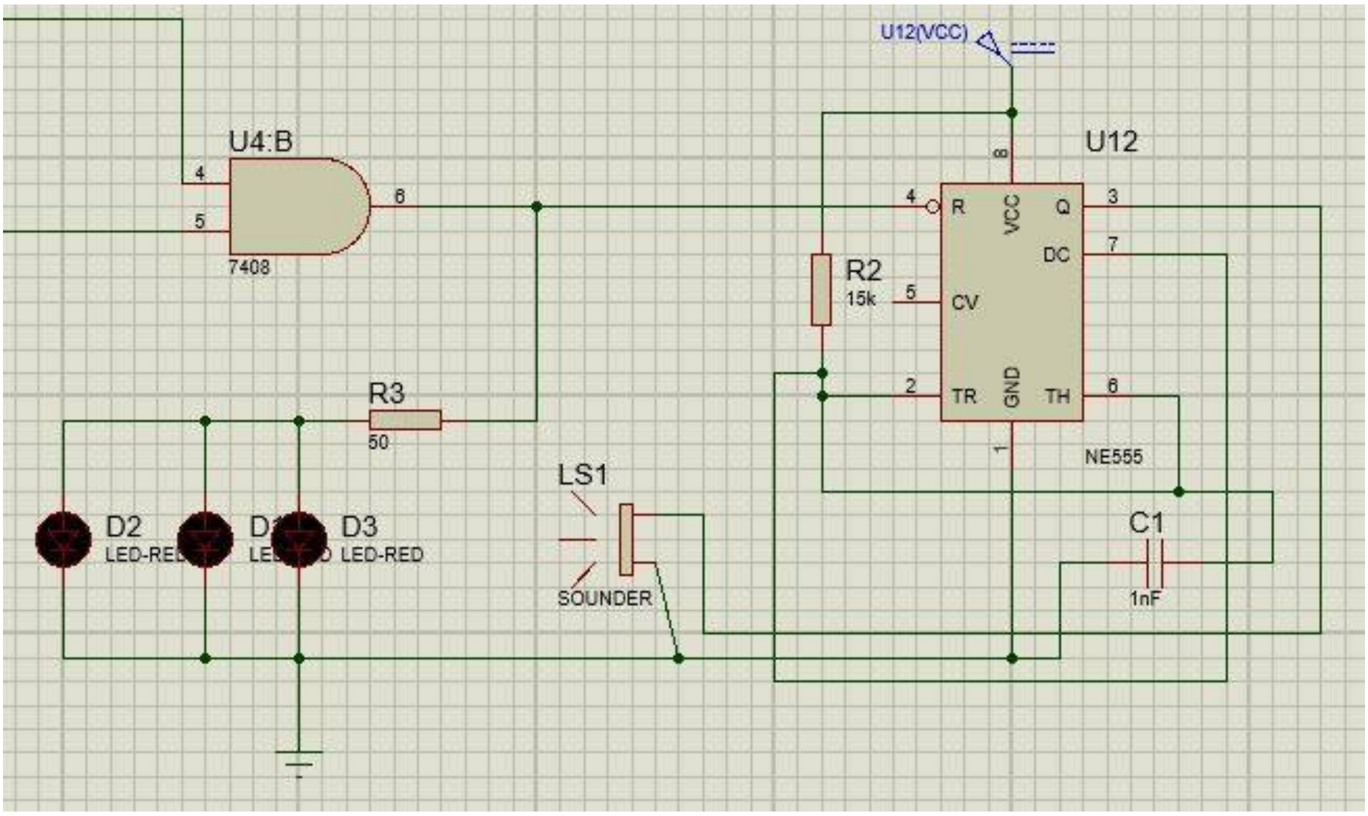
HOUR AND SETHOUR BOXES AND CIRCUIT INSIDE THE BOX







MINUTE COMPARE AND HOUR COMPARE BOXES AND INSIDE THE BOX



ALARM PART CIRCUIT