EE112 PROJECT

SMILEY ON 8*8 LED

GROUP NO. 18

TEAM

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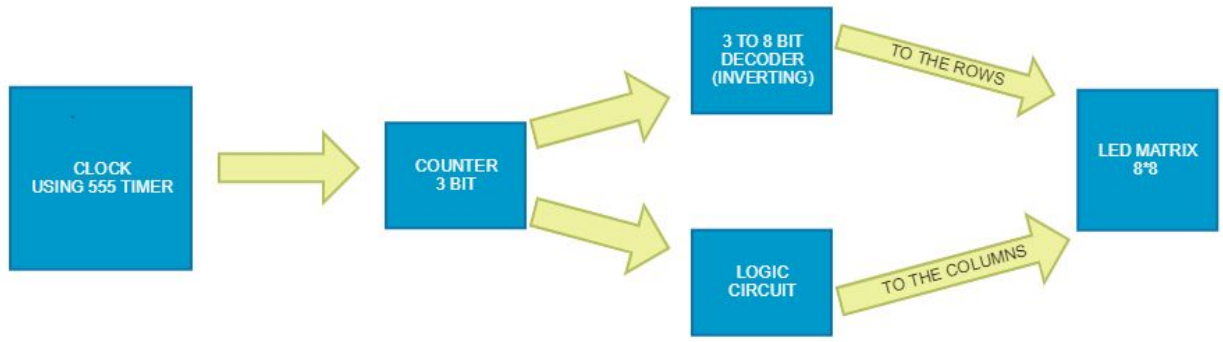
Project description

We made a smiley on a 8*8 LED matrix display using decoder and logic circuit. Using a variable resistor to change the frequency of 555 timer, we set the frequency such that the changes in the displays (alternating rows and columns) are not perceptible to human eye and hence we see a smiley without any flickering of light. But as we reduce the frequency , we are able to see the pattern as directed by the logic circuit.

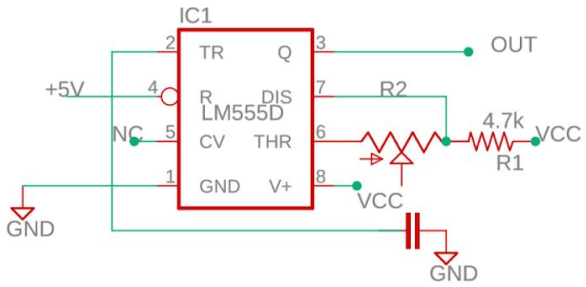
BLOCK DIAGRAM



SCHEMATICS AND DESCRIPTION OF BLOCKS

CLOCK

The clock signal is generated by IC 555 operating as an astable multivibrator. It produces a clock signal of frequency between 584 Hz to 3070 Hz.



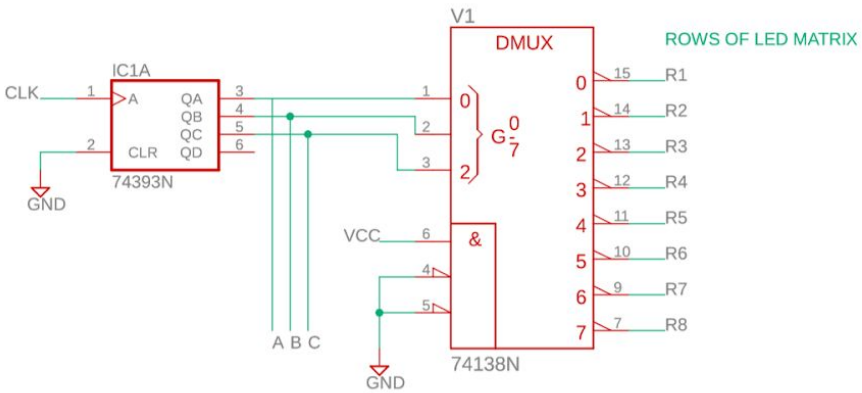
Time constant = (R_a + 2*R_b) * C * ln 2

= (4.7 + 2*R_b) *1000 * 0.1*10^(-6) * 0.693

The max value of R_b = 10 kohm and minimum zero. Capacitor used is 0.1 microFarad

Thus, Time constant varies from 0.33 msec to 1.71 msec.

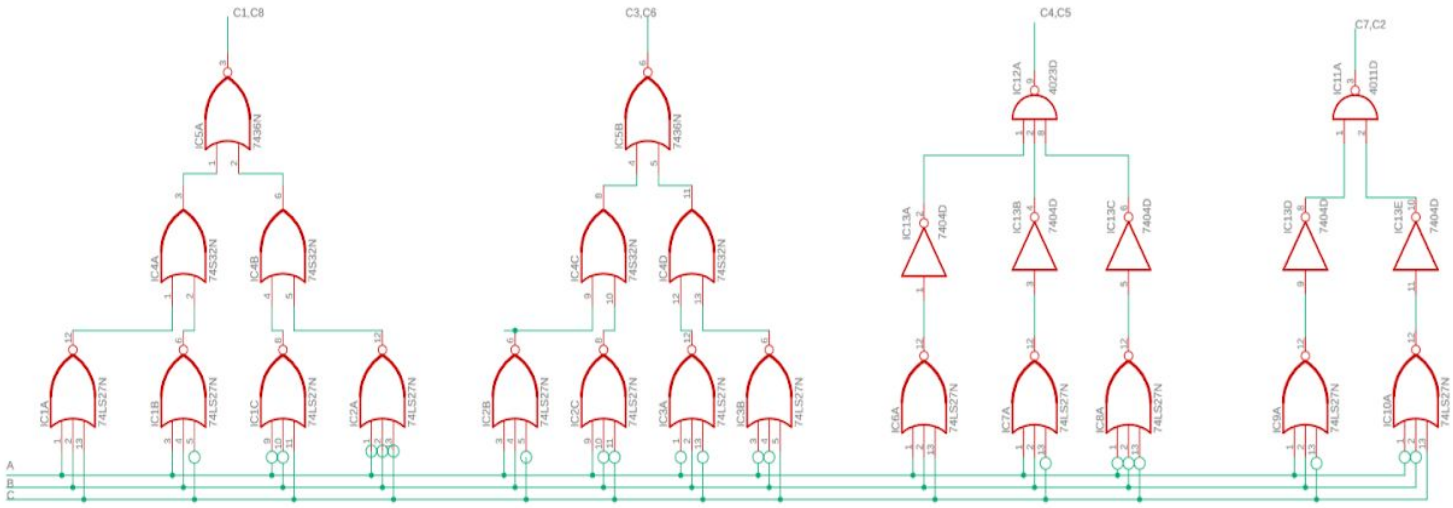
COUNTER TO DECODER TILL MATRIX



The clock output is given to counter which counts from 7 to 0 (down ripple counter). The counter is a 4 bit counter but we made use of only 3 output pins hence using it as 3 bit counter. Its output is connected to the inverting decoder as shown in the schematic. Reset pins of both IC's are connected to the ground or Vcc according to

need. As counter counts the corresponding row has zero voltage from decoder while rest of the rows are at high voltage. Since the rows of the LED matrix are at common cathode, the row with the low voltage lights up if the corresponding column is at high voltage.

- ## LOGIC CIRCUIT



The logic of this circuit is such that for a value counted by the counter, this circuit will provide high voltage to the required columns of the matrix. The columns of the LED matrix are at common anode so the corresponding cells where the row voltage is low and column voltage is high lights up. Since smiley face is symmetrical about the columns, only four logic combinations are required and the corresponding columns are interconnected accordingly. At a particular time instant only one row and the corresponding columns are lit up but the frequency is set such that we see the smiley face whole not the transitions.

LIST OF COMPONENTS

1. IC's
    - 7404 (not gates)
    - 7408 (and gates)
    - 7427 (nor gates)
    - 7432 (or gates)
    - 74138 (3 to 8 bit decoder)
    - 74393 (4 bit counter)

- LM555 (timer)

2. LED MATRIX
3. Resistor = 4.7 k ohm
4. Variable resistor = 10k ohm
5. Capacitor = 0.1 micro Farad
6. Display unit