Hardware Assignment Report

EE22BTECH11209 - GUMMAPU SATHWIK PREETHAM

1 Components

1. Breadboard
2. Resistor 10MΩ
3. Resistor 1KΩ
4. Capacitor 47nF
5. Capacitor 470nF
6. USB micro B breakout board
7. Jumper wires
8. Seven Segment Display - Common Anode
9. 7447 Seven Segment Display Decoder
10. 7474 D FlipFlop x2
11. 7486 XOR gate
12. 555 precision timer

2 Description

2.1 Setup

- The inner buses on both sides are at Vcc.
- The lowest bus is GND.
- The uppermost bus is carrying the Clock signal from the 555 timer.
- This circuit uses 5V from microusb.
- This acts as the Vcc of the circuit.

2.2 Circuit Overview

1. The Flipflops take clock from the clock bus and based on their initial state, output a sequence of numbers.
2. The sequence is fixed and if the circuit is operated without concern for the initial state, the output number shown is generated randomly from 1 to 15 (both inclusive).
3. The decoder is able to show numbers from 0 to 15, and the ABCD formed by the flipflops do not become 0000 at any point of time.
4. The output repeats after all 16 numbers are shown.
5. Sequence generated by this sequence is 3,7,15,14,13,10,5,11,6,12,9,2,4,8,1,3,7.....

2.2.1 Timer

1. The time period can be changed using different values of Resistor and Capacitor.
2. The capacitor used are 47nF and 470nF.
3. This allows us to get a square pulse of 5V every 0.9 seconds approximately. Which is slow enough to allow us to take readings from the resistor.

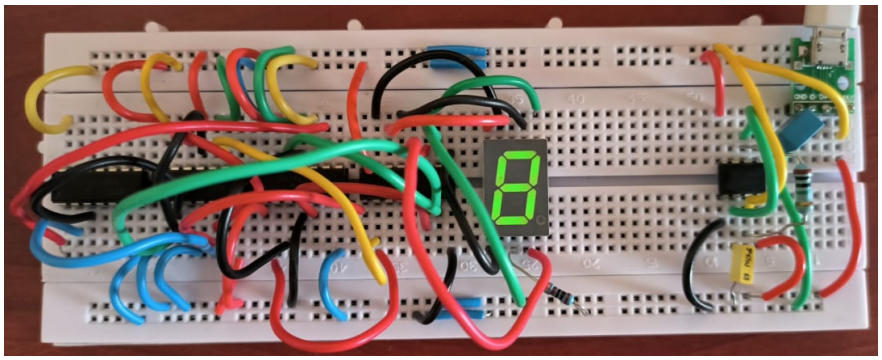

Figure 1: Image 1

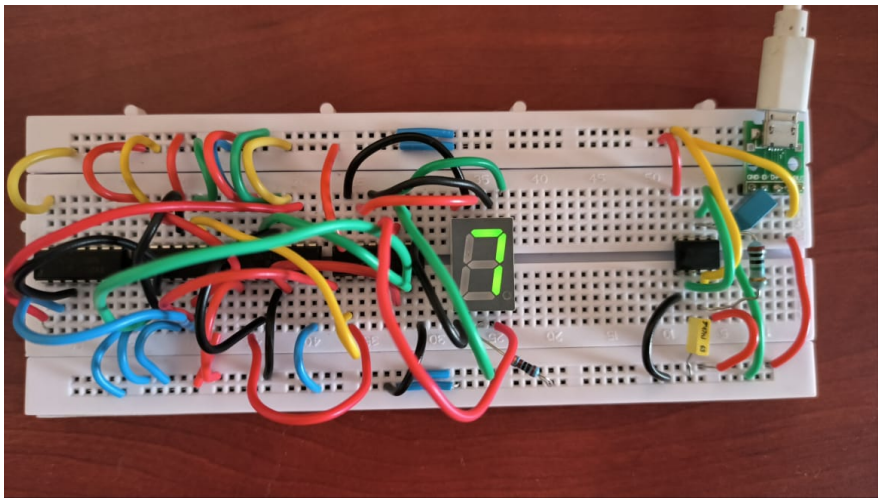

Figure 2: Image 2

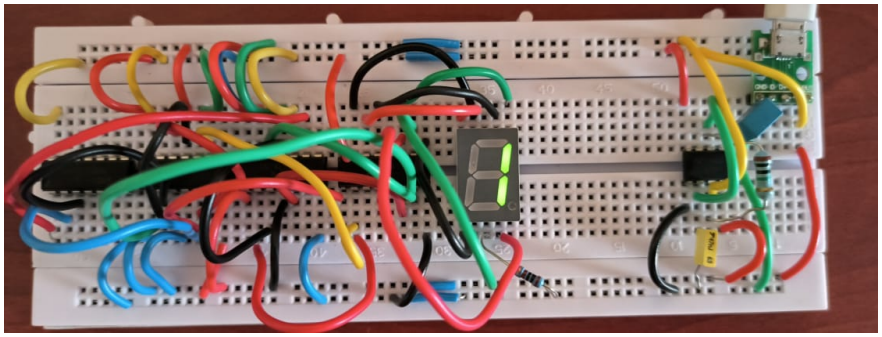

Figure 3: Image 3

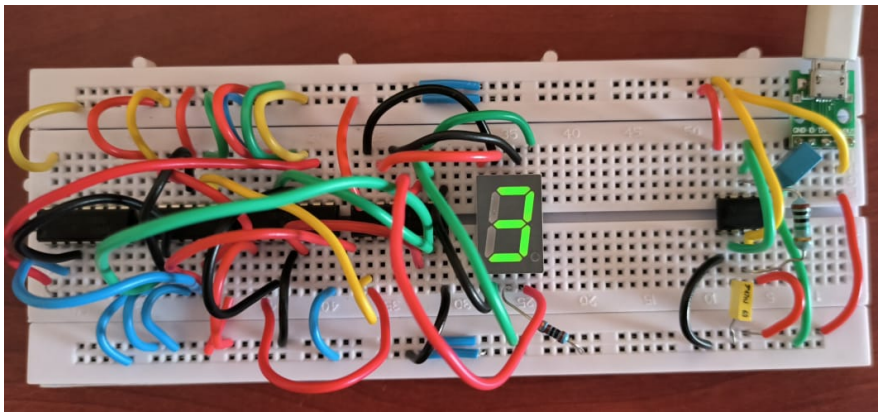

Figure 4: Image 4

3 Block Diagram

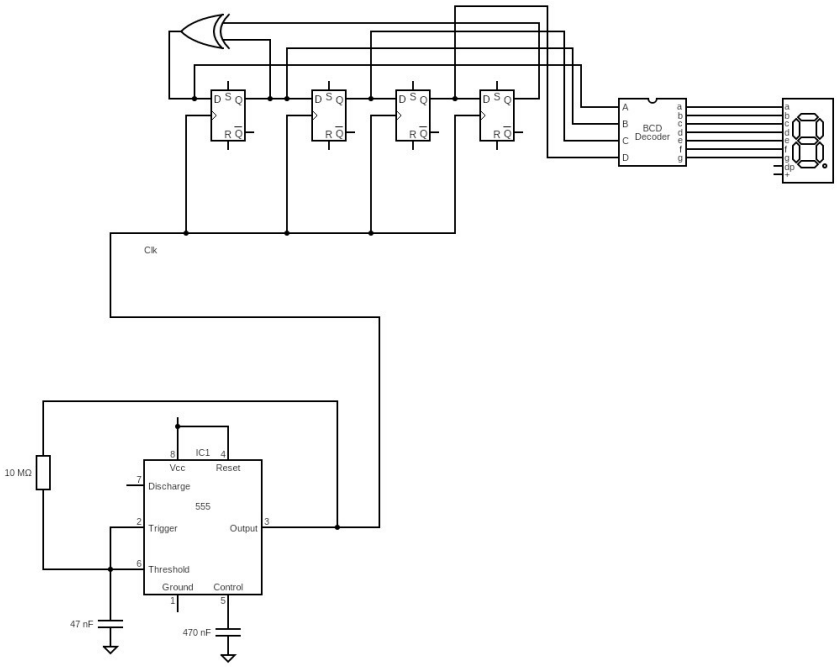

Figure 5: Block Diagram