

Microprocessor and Interfacing



Names:

NALIN MUJOO 2017AAPS0986G

RITURAJ ROY 2017A7PS0957G

AKSHIT SHARMA 2017A7PS0104G

LAKSHYA GOYAL 2017A3PS0900G

ANIMESH SAHOO 2017A8PS0976G

DESIGN PROBLEM

System to be designed:

Spirit Level Reaction-Time Tester

System Description: Used for testing the sobriety of a person.

The basic project operates like this: When a 'start' button is pressed the unit waits a random time interval (between four and eight seconds) then begins incrementing LEDs on a bar graph display so that they appear to 'rise' upwards. When the user sees the LEDs moving, he/she presses a 'stop' button as soon as possible - the earlier the button is pressed, the fewer LEDs that are lit. The entire bar graph (9 LEDs) will sweep to the top in 0.4 seconds (with 50ms between LED steps).

User Interface

Spirit Level meter features two pushbuttons (Start and Stop) and nine LEDs on a bar graph. When the START button is pressed, a random time delay is generated after which the bottom LED lights. After a 50ms time interval the bottom and the next-highest LED both light. After another delay, the three bottom LEDs light. The process continues until either the STOP button is pressed (in which case the LEDs stop rising or when all LEDs are lit). The program must also check the STOP button just before lighting the bottom LED to ensure the user isn't simply cheating and holding the STOP pushbutton continually. If the user tries to cheat, blink all LEDs several times and simply go back to the start (waiting once again for the START button). Generating a random number: In order to generate a random number, run one timer continually from an internal clock (do not stop it). When the START button is pressed, simply latch the value of the timer - this is essentially random. From that number, one can generate a random delay. The sobriety of a person on a scale of 1- 5 (1 –maximum intoxication) has to be displayed on a seven segment display.

DESIGN SPECIFICATIONS

1. Ask the user to press a button. We have 9 LEDs which we glow sequentially to check the sobriety of a person.
2. If the user presses the start button then after a random delay of 4 to 8 seconds we glow the first led. This random time is generated using latching the counter value the moment the user presses start button and taking the remainder.
3. Then after 50 ms we glow the second led, and every next led is lit up after this constant delay of 50 ms.
4. We wait for the user to press the stop button and the moment the user presses the stop button we raise an interrupt.
5. We have a seven segment display to display the sobriety index (0 -5) on seven segment display.

ASSUMPTIONS

1. We take the random intervals between 4 to 8 seconds.
2. The number of LED'S turned on decide the score
 - when less than 3 led's are lit then score = 5
 - when 3 or 4 led's are lit then score = 4
 - when 5 or 6 led's are lit then score = 3
 - when 7 or 8 led's are lit then score=2
 - when 9 led's are lit then score=1

HARDWARE REQUIREMENTS

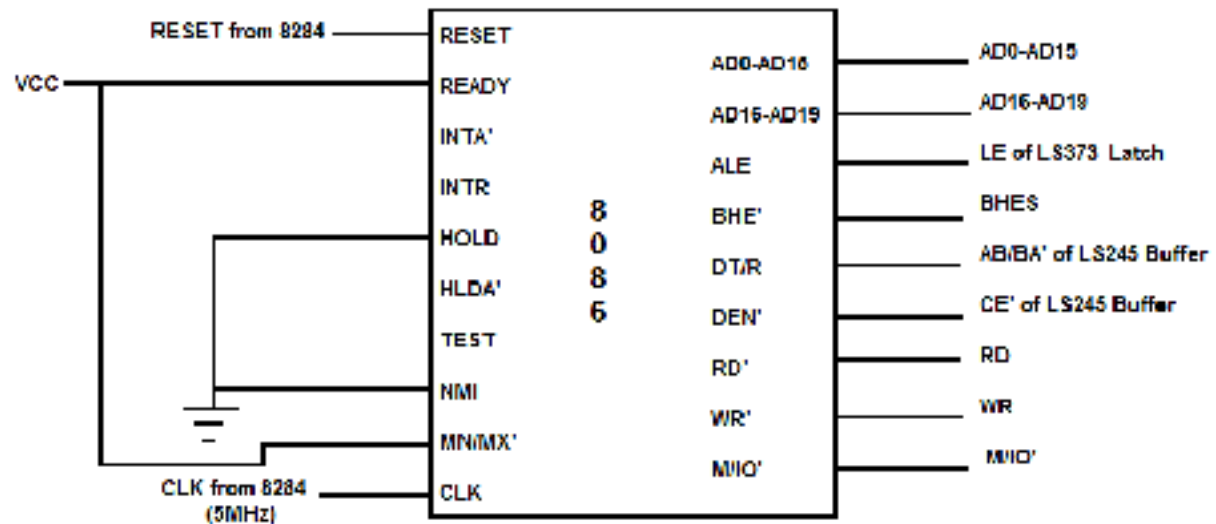
1. Microprocessor 8086
2. Octal 8 bit buffer - 74LS245 (x2)
3. Octal 8 bit latch - 74LS373(x3)
4. Decoder 74LS138(x2)

5. Programmable interval timer -8253 (x2)
6. OR ICs-7432(x2) (8 or gates used in memory interfacing)
7. ROM chips (4k each) - 2732 (x4)
8. RAM chips (2k each)- 6116 (x2)
9. 8259 (x1)

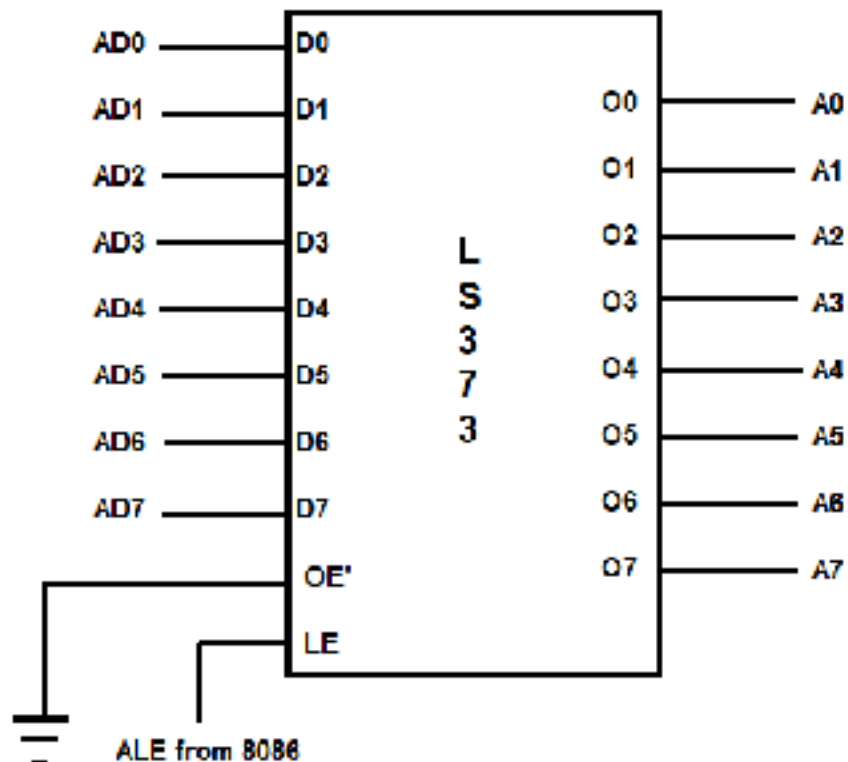
INTERFACING 8253A,8253B,8255

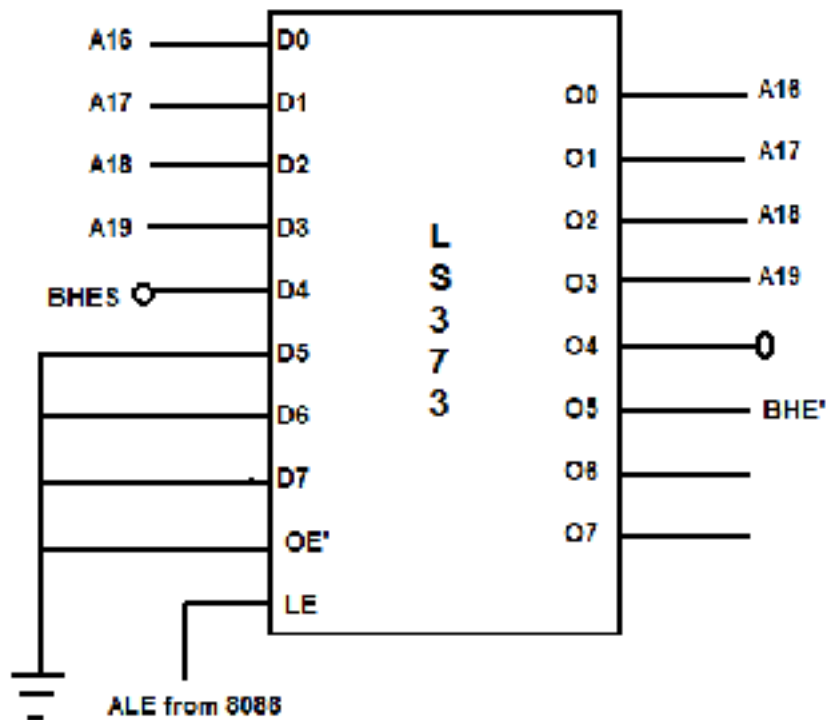
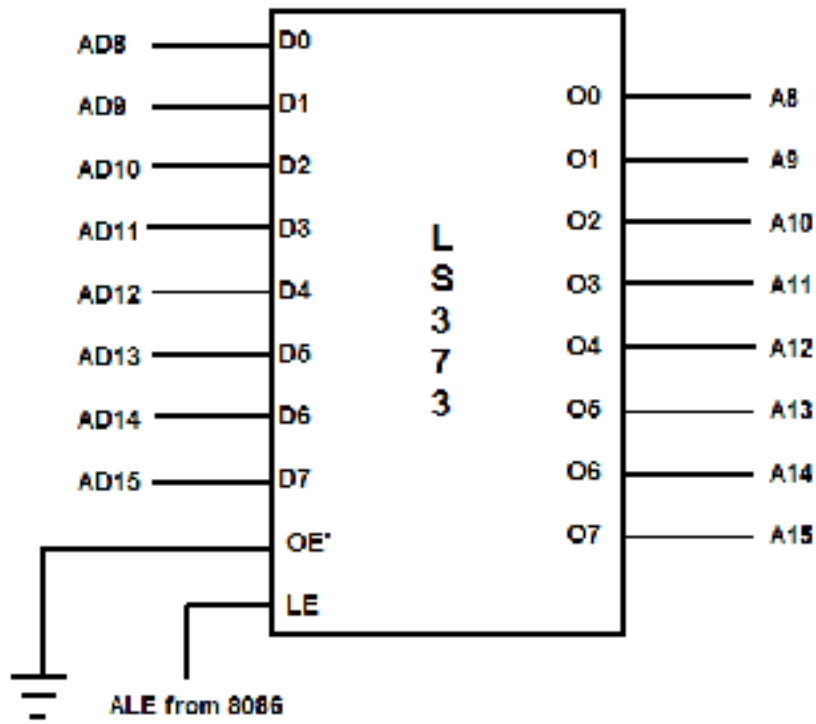
1. Fixed Addressing.
2. Incremental addressing
3. Addressing
 - 80h-86h (8255)
 - 88h-8eh (8254a)
 - 90h-96h (8254b)
 - 98h-9Ah (8259)

Interface to 8086

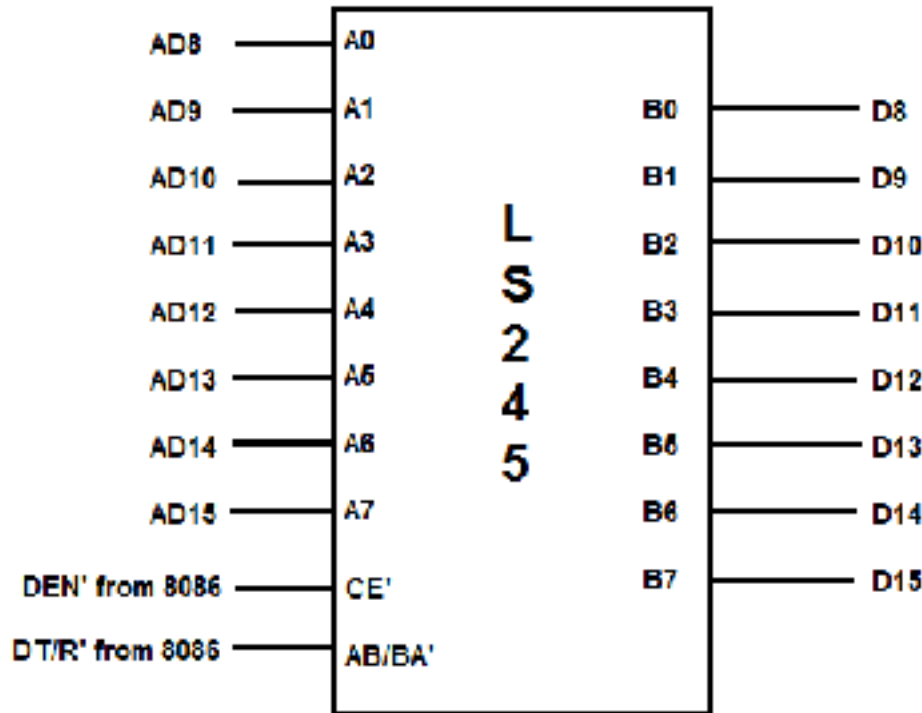
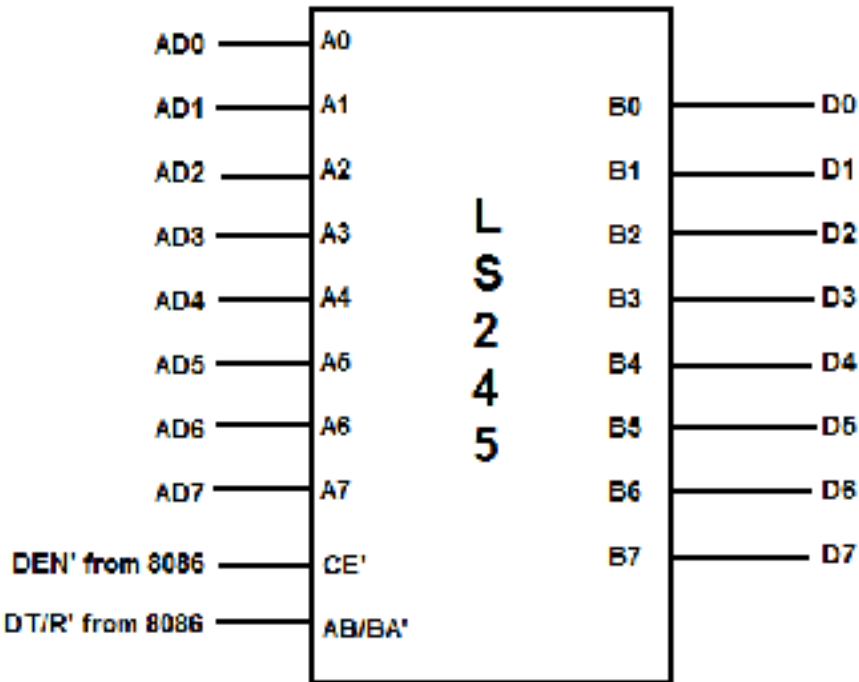


LATCHES





Buffers



MEMORY INTERFACING

1.ROM1-4KB : 00000h-00FFFh

2.RAM-4KB: 01000h-01FFFh

3.ROM2- 4KB: FF000H-FFFFFh

DECODING LOGIC

