EEE 212 | TERM PROJECT

PONG GAME

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GROUP 4 | SECTION 2

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ABOUT THE GAME

- One of the earliest video games - PONG - is implemented in Assembly for a 8051 family microcontroller.
- Game is being displayed on a 8x32 matrix where the half for game map and half for score displays.
- This is a two-player game where each player controls the paddle using his/her hand. The distance between the hand and the ultrasonic sensor determines the position of the paddle.
- Flow of the game can be interrupted via pushbuttons to pause, start or restart the game.
- Score and additional informative messages about the game are on a LCD.

Details of the game

- At the very beginning of the game, when the start/pause button is pressed ball starts its movement in a random direction and becomes faster and faster as game continues until it reaches a final speed.

- Buzzer beeps once at each bounce of the ball from walls or paddles.

Details of the game

- If one of players can not return the ball, other player scores one point and buzzer beeps twice with a different frequency.

- Then game waits for pressing the start button to start from the beginning.

Details of the game

- While the game is continuing, players can pause the game by pressing the start/pause button. Similarly they can resume the game by pressing the same button again.

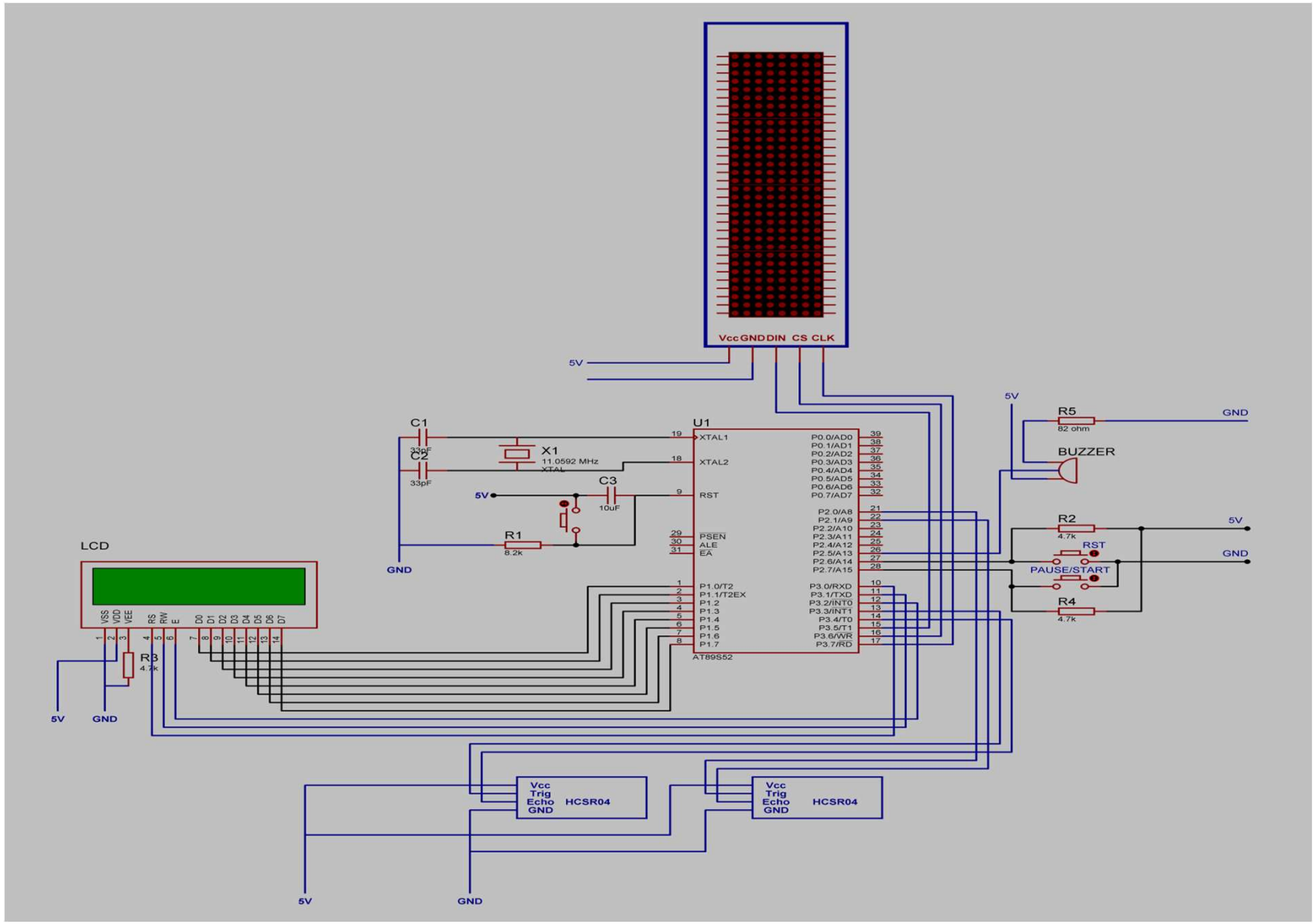
- Game continues until one of players reach 11 points.

Details of the game

- Once the game is over, buzzer beeps three times like a referee's ending whistle.

- Also a message that indicates the winner is displayed on LCD screen and game resets.

CIRCUIT SCHEMATIC

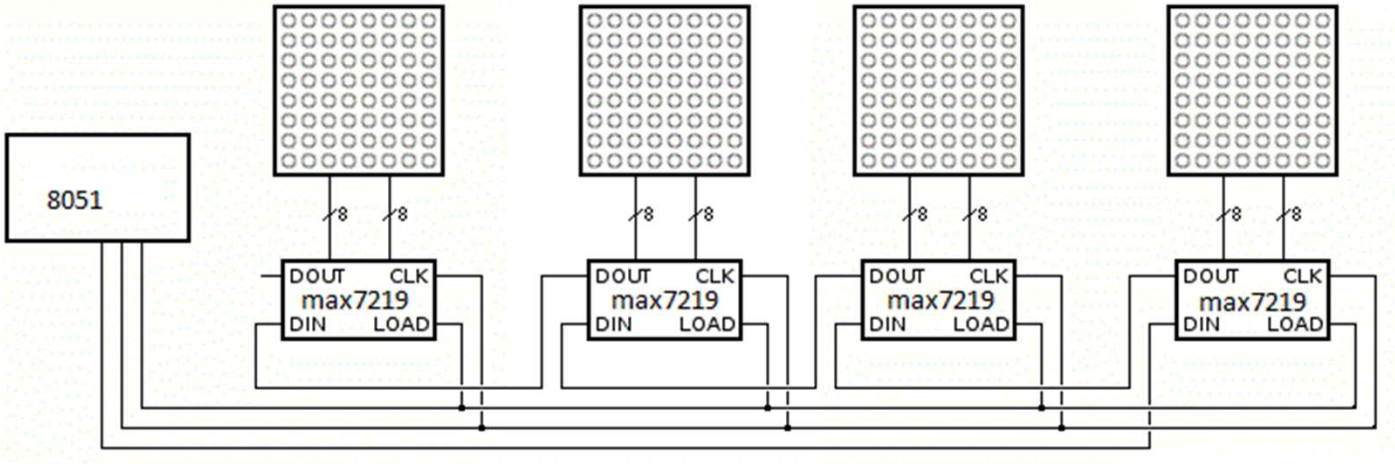


COMPONENTS OF OUR DESIGN

- 8*32 LED Matrix with MAX7219 ICs
- 2 HC-SR04 Ultrasonic Sensors
- 2*16 LCD Display
- Active Buzzer
- 2 Push Buttons

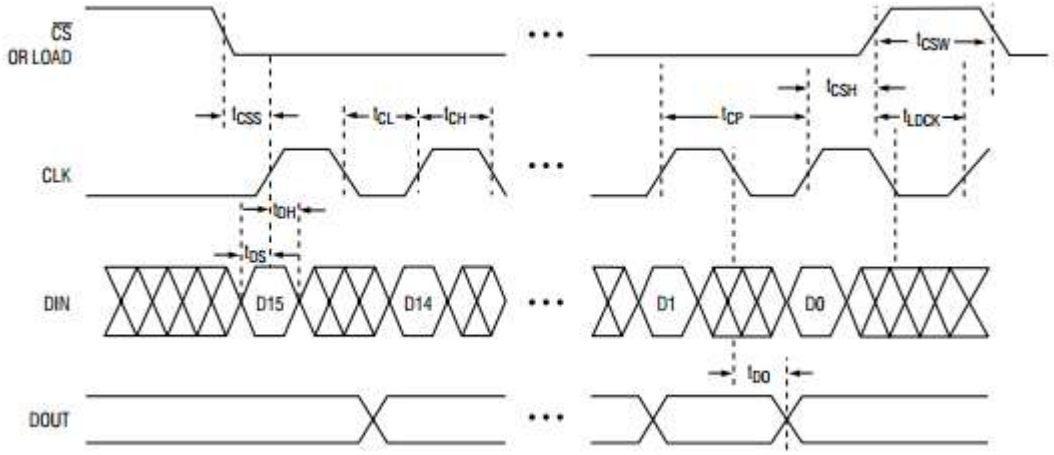
8x32 LED MATRIX

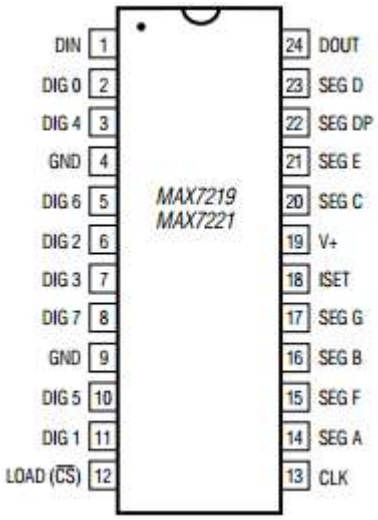
- The module consists of 4 pieces of 8x8 LED matrix connected consecutively through MAX7219 decoder chips.
- This module communicates serially with the MC through a data pin and needs a load and a clock signal to latch the data properly.



MAX7219

- MAX7219 is a serial input/output common-cathode display drivers that interface microprocessors (µPs) to 7-segment numeric LED displays of up to 8 digits. In our case, we use it to interface MC to four 8*8 LED Matrices.



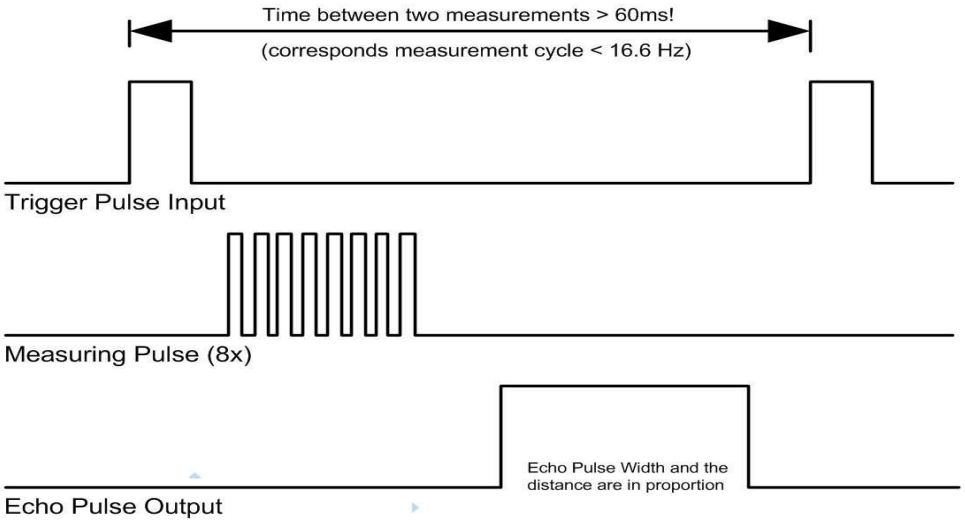


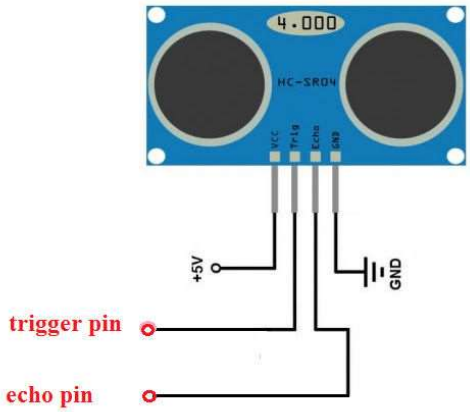
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
X	X	X	X	ADDRESS				MSB	DATA						LSB

Ultrasonic Sensor

- HC-SR04 is an ultrasonic sensor that transmits a 40kHz ultrasonic pulse after receiving a trigger signal from the MC. Trigger signal width should be 10 µs. Then ultrasonic pulse is reflected by an object. The sensor receives this echo signal and converts it to an electric signal.

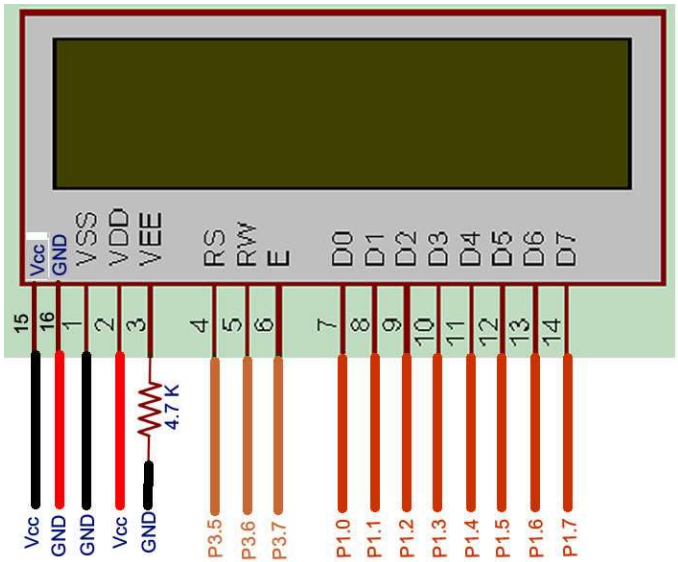
- The measured distance is proportional to the echo pulse width. If no obstacle is detected, the output pin will give a 38ms high level signal.





LCD Display Screen

- LCD displays can be used to show characters. In our case we have an 2*16 LCD, which means two rows each consisting of 16 characters. Our LCD has 8 data pins and 3 control pins.

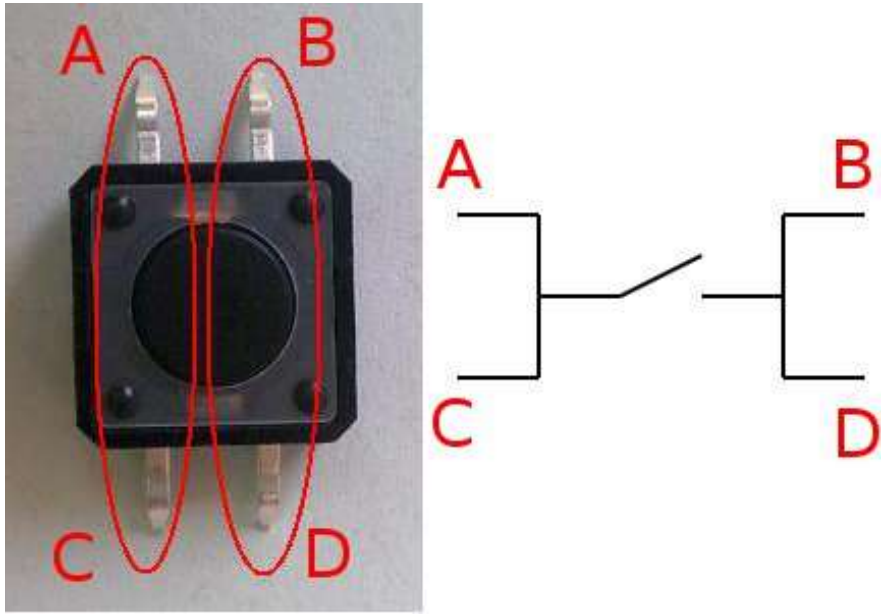


Buzzer

- A buzzer can be used to generate sounds with different frequencies. It works by piezoelectric principle.
- It has one input pin that MC sends a square wave with desired frequency to it. As long as the input signal is supplied, it continues to generate sound.

Push Buttons

- Push Buttons are very simple circuit components that can be connected easily to a pin of MC.
- They are used to give 1 or 0 as an input when pressed.



END OF OUR PRESENTATION...

THANK YOU FOR YOUR ATTENTION !