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Mini Project Report on
WATER LEVEL INDICATOR

Submitted by

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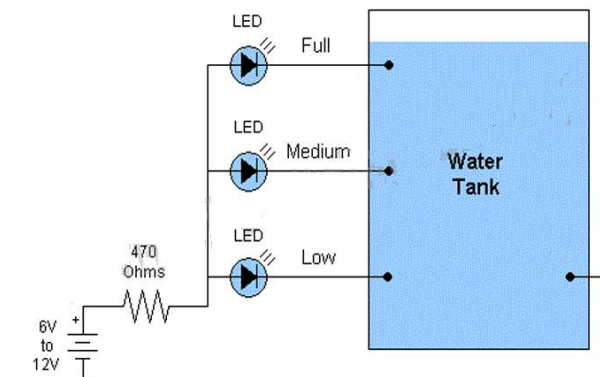
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INTRODUCTION :

What is Water Level Indicator?

A water level indicator is a system that relays information back to a control panel to indicate whether a body of water has a high or low water level. Some water level indicators use a combination of probe sensors or float switches to sense water levels. “The Water Level Indicator employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container.”

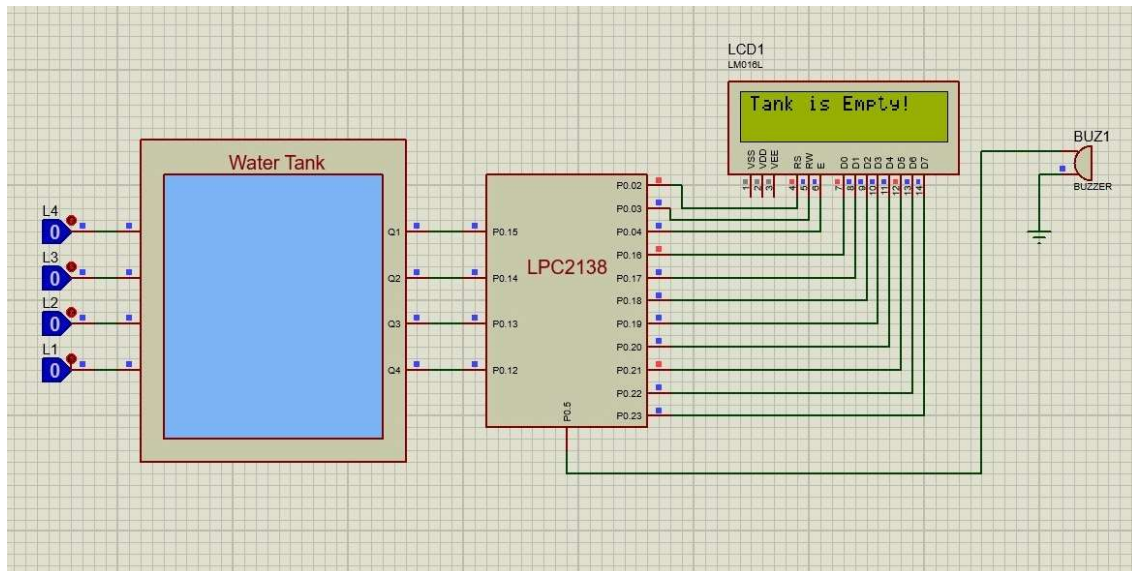
Simple Water Level Indicator



Components required:-

- LPC2138
- LCD 16X2 display
- Buzzer
- Water tank
- L239D driver

Water level indicator circuit using a microcontroller



How Water Level Indicator Project Circuit Works?

The operation of this project is very simple and can be understood easily. In our project “water level indicator” there are 3 main conditions:

1. There is no water available in the source tank.
2. Intermediate level i.e. either of 1st to 3rd level.
3. There is ample amount of water available in the source tank.

CONDITION 1: Water not available

When the tank is empty, we apply the values (L4, L3, L2, L1) = (0,0,0,0). These values act as input for LPC2138 microcontroller from P0.12 to P0.15. After computation of these values “**Tank is Empty**” will be displayed in the LCD display.

CONDITION 2: Water at intermediate level

Different values for different levels are :

- **Tank at 25% :** (L4, L3, L2, L1) = (0 , 0, 0, 1)
- **Tank at 50% :** (L4, L3, L2, L1) = (0, 0, 1, X)
- **Tank at 75% :** (L4, L3, L2, L1) = (0, 1, X, X)

If the input is a four bit sequence, The left most high bit's position represent the current level of the tank and the value will be inputted to LPC2138 and appropriate message will be displayed in the LCD display.

CONDITION 3: Water is full

- **Tank is full** :-(L4, L3, L2, L1) = (1, X, X, X)

If L4 is high, irrespective of lower order bit the LCD will display “**Tank is Full**” and the buzzer is set to active or buzz.

C program to compute water level :

```
#include<LPC21xx.h>

void LCD_init(void);
void LCD_cmd(unsigned char);
void LCD_Data_Shift(unsigned char);
void LCD_Write(unsigned char);
void LCD_Write_Text(unsigned char[]);
void Enable_Pulse(void);
void delay(unsigned int);

/* Different commands used to interface with LCD are : */

#define LCD_CLEAR    0x01
#define CURSOR_OFF   0x0C
#define FIRST_ROW    0x80
#define SECOND_ROW   0xC0
```

```

int main()
{

    unsigned int var , temp;
    IO0DIR = 0x00ff003C;

    LCD_init();
    delay(10);

    while(1)
    {
        /*get input value and store it in 'var' , after logical
        left shifting by 12 the input value will be stored in 0th
        to 3rd bit position of 'var' */

        var = (0x0000f000 & IO0PIN);
        var >>=12;
        if(var != temp)    // temp holds previous 'var' value
        {
            IO0CLR = 0x20;
            LCD_cmd(LCD_CLEAR);
            temp = var;
            if(var >= 8)    //var = 8 to 15
            {
                unsigned char msg[] = "Tank is Full";
                LCD_Write_Text(msg);
                IO0SET = 0x20;
            }
            else if(var >= 4) //var = 4 to 7
            {
                unsigned char msg[] = "Tank at 75%";
                LCD_Write_Text(msg);
            }
            else if(var >= 2) //var = 2 or 3
            {

```

```

        unsigned char msg[] = "Tank at 50%";
        LCD_Write_Text(msg);
    }
    else if(var == 1) //var = 1
    {
        unsigned char msg[] = "Tank at 25%";
        LCD_Write_Text(msg);
    }
    else //var = 0
    {
        unsigned char msg[] = "Tank is Empty!";
        LCD_Write_Text(msg);
    }
}

}

void LCD_init(void)
{
    /* Initializes LCD with various commands so that it can
    interface with microcontroller */

    LCD_cmd(0x38); //Send 8-bit initialization command to lcd
    delay(10);
    LCD_cmd(CURSOR_OFF); //Cursor OFF 0x0C
    delay(10);
    LCD_cmd(LCD_CLEAR); // LCD_Clear 0x01
    delay(2);
    LCD_cmd(FIRST_ROW); //select LCD first row 0x80
}

void LCD_cmd(unsigned char x)
{
    /*Executes commands in LCD */

```



```

        IO0CLR = 0x0000001C;
        IO0SET = 0x00000010;    //RS= 0 COMMAND MODE
        LCD_Data_Shift(x);

    }

void LCD_Data_Shift(unsigned char x)
{
    /*Sets the output data line values */

    unsigned int value = x;
    value <<=16;
    IO0CLR = 0x00ff0000;
    IO0SET = value;
    Enable_Pulse();
}

void LCD_Write(unsigned char value)
{
    /*Configure LCD for receiving Display Data*/

    IO0CLR = 0x0000000C;
    IO0SET = 0x00000014;    //RS=1 DATA MODE
    LCD_Data_Shift(value);
}

void LCD_Write_Text(unsigned char msg[])
{
    /*Prints the given string 'msg' */

    while(*msg)
    {
        LCD_Write(*msg);
        msg++;
    }
}

```

```

void Enable_Pulse(void)
{
    /* Generates a high to low pulse so that the command gets
    executed */

    IO0SET = 0x00000010;
    delay(1);
    IO0CLR = 0x00000010;
    delay(1);
}

```

```

void delay(unsigned int x)
{
    /* Delay of 'x' milliseconds */

    unsigned long i, j;
    for( j=0; j<x; j++)
        for( i=0; i<7000; i++);
}

```

- ❖ The above c program is created and runned in Keil to create Hex file of it.
- ❖ This hex file added to LCP2138.
- ❖ Thus LCP2138 will act according to how the program is defined.

Applications of a Water Level Indicator :

- The water level indicator is used in Hotels, Home apartments, commercial complex, and in factories.
- The pumps used in the water level indicator are single phase motor, submersible motor, and in three phase motor.
- Automatically the pump will switch ON/OFF when the water level in the tank is empty and full.
- We can also measure the fuel level in motor vehicles.
- By using the two motors, two sumps, two overhead tanks we cannot control by a single circuit.

Benefits of Water Level Indicators :

- Easy to install.
- Very little maintenance.
- Automatic water level indicators ensure no overflows or running of dry pump.
- Saves money by using less water and electricity.
- Can help avoid seepage of walls and roofs due to tanks overflowing.
- Consumes very little energy, perfect for continuous operation.
- Shows incitation of water levels in any type of tank.

Advantages of Water Level Indicator :

- Power saver
- Money saver
- Automatic
- Water maximization
- Reliable electronic design

Disadvantages of Water Level Indicator :

- Water level controls need to be replaced every 3 years.
- Electronics are usually built separately
- More difficult installation
- Most floats switches are outdated
- No LED indicator lights

Resource Links :

- **Keil :**
https://1drv.ms/f/s!AkUGj1ZKyo_PkCb8B8_8zYz7jQmm
- **Protus circuit :**
https://1drv.ms/f/s!AkUGj1ZKyo_PkCfcOFJONw-4jqWr