

# Report on Water Level Indicator

## [Module 2]

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## **1.Introduction:**

The Water Level Indicator employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container.

The sensing is done by using a set of nine probes which are placed at nine different levels on the tank walls (with probe 9 to probe 1 placed in increasing order of height, common probe (i.e., a supply carrying probe) is placed at the base of the tank). The level 8 represents the “tank full” condition while level 0 represents the “tank empty” condition.

Most water level indicators are equipped to indicate and detect only a single level. The Water Level Indicator implemented here can indicate up to nine such levels and the microcontroller displays the level number on a seven-segment display.

So, the circuit not only capable of cautioning a person that the water tank has been filled up to certain level, but also indicates that the water level has fallen below the minimum detectable level. This circuit is important in appliances such as the water cooler where there is a danger of motor-burnout when there is no water in the radiator used up also it can be used in fuel level indication.

## **2.Application definitions & Requirements:**

### **2.1 Application**

we show the water level indicator using eight transistors which conducts as level rises, a buzzer is also added which will automatically start as the water level becomes full, auto buzzer starts with the help of microcontroller. With the help of this project, we not only show the level of water on seven segment display but also indicate the water full condition using a buzzer.

### **2.2 Table of Requirements**

#### **High level Requirements**

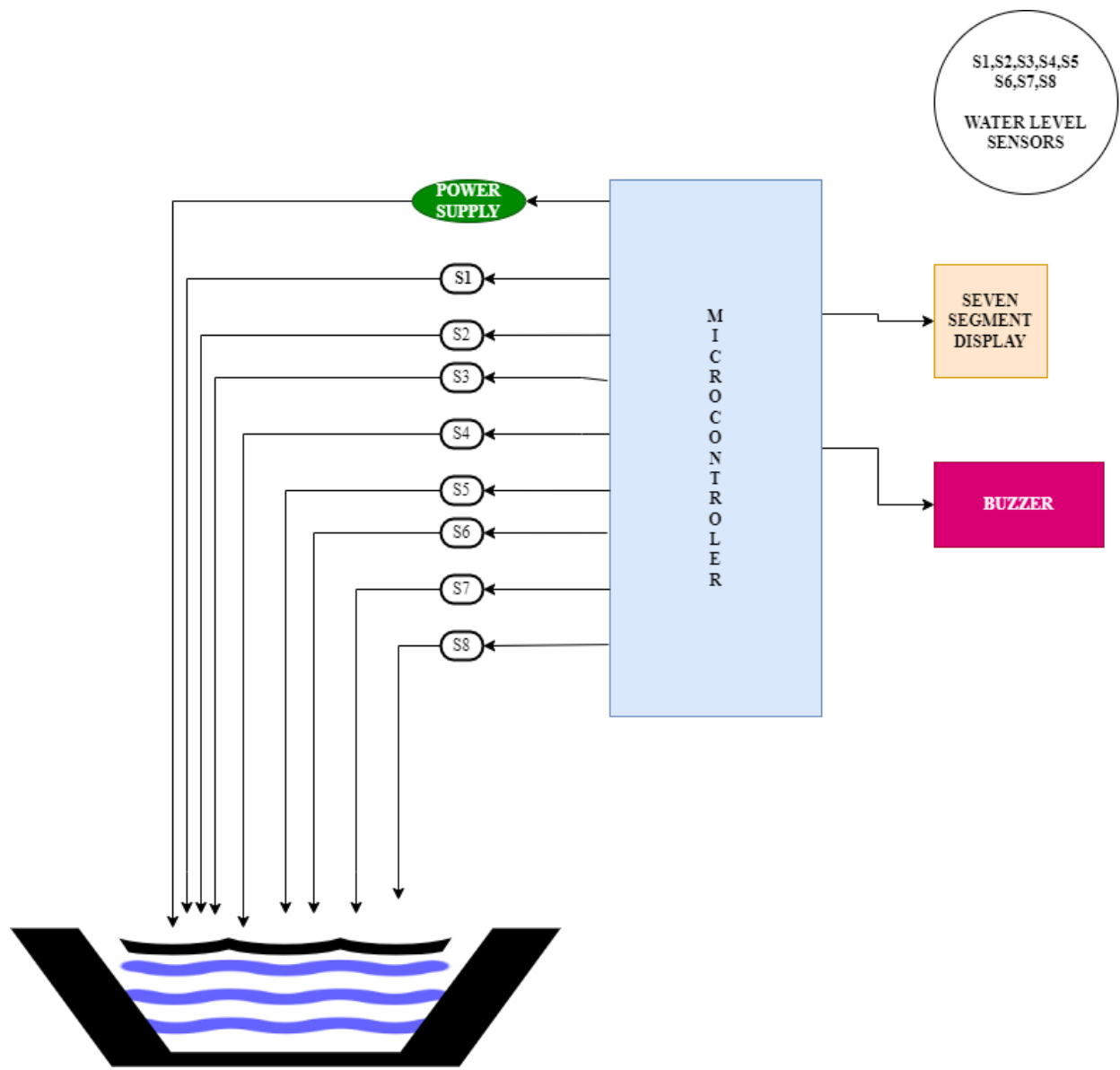
<b><u>Requirement ID</u></b>	<b><u>Design Consideration</u></b>
HLR-1	Maximum 10 probes
HLR-2	9 conductive Sensors
HLR-3	Under Voltage Protection(<5v)
HLR-4	Over current Protection(>200A)

HLR-5	Transistor use act as inverter
HLR-6	Seven Segment LCD for Display

#### Low level Requirements:

<u>Requirement ID</u>	<u>Design Consideration</u>
LLR01_HLR-1	Use only Conductive Sensors
LLR02_HLR-2	Buzzer is used for attention
LLR03_HLR-3	Microcontroller is used in low active Region
LLR04_HLR-3	Cathode LCD is used
LLR05_HLR-3	Both regions are operated

### 3.Block Diagram of the Embedded System:



#### **4.Subsystem level Design Details:**

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 3rd to 7th level.
3. There is ample amount of water available in the source tank

##### **CONDITION 1: Water not available**

When the tank is empty there is no conductive path between any of the 8 indicating probes and the common probe (which is connected to 5v+ supply) so the transistor base emitter region will not have sufficient biasing voltage hence it remains in cut off region and the output across its collector will be  $V_{cc}$  approximately 4.2v.

As in this case the microcontroller is used in the active low region (which means it considers 0-2 volts for HIGH and 3-5 volts for LOW) now the output of transistor which is 4.2v approximately will be considered as LOW by the microcontroller and hence the default value given by microcontroller to the seven-segment display is 0 which indicates as the tank is empty.

##### **CONDITION 2: Intermediate levels**

Now as the water starts filling in the tank a conductive path is established between the sensing probes and the common probe and the corresponding transistors get sufficient biasing at their base, they start conducting and now the outputs will be  $V_{be}$  (i.e., 1.2v-1.8v) approximately which is given to microcontroller.

Here the microcontroller is programmed as a priority encoder which detects the highest priority input and displays corresponding water level in the seven-segment display.

In this project while the water level reaches the 7th level i.e., last but one level along with display in seven segment a discontinuous buzzer is activated which warns user that tank is going to be full soon.

##### **CONDITION 3: Water full**

When the tank becomes full, the top-level probe gets the conductive path through water and the corresponding transistor gets into conduction whose output given to microcontroller with this input microcontroller not only displays the level in seven segment display but also activates the continuous buzzer by which user can understand that tank is full and can switch off the motor and save water.

## **5.Applications:**

- Automatic Water level Controller can be used in Hotels, Factories, Homes Apartments, Commercial Complexes, Drainage, etc., It can be fixed for single phase motor, Single Phase Submersibles, Three Phase motors. (For 3Æ and Single-Phase Submersible Starter is necessary) and open well, Bore well and Sump. We can control two motor and two sumps and two overhead tanks by single unit.
- Automatic water level controller will automatically START the pump set as soon as the water level falls below the predetermined level (usually 1/2 tank) and shall SWITCH OFF the pump set as soon as tank is full.
- Fuel level indicator in vehicles.
- Liquid level indicator in the huge containers in the companies.