

# Level monitoring with pumping control for water tank system

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**Abstract:** The purpose of this project is to develop a system of level monitoring for water tank system. The system consists of two tanks, upper and lower tank. The water level will be monitored in both tanks.

If the water in the upper tank reaches the minimum level the pumping system will transfer water from the lower into the upper tank. This feeding will continue until reaching predefined water level in the upper tank. Also the system is supported with suitable sensors to monitor different intermediate levels in the upper tank.

Finally if the lower tank has no enough water to feed the upper tank then an alarm system will give alert to the user and the pumping system will stop.

**Keyword:** water tank, Level monitoring, control water pumping

## INTRODUCTION

Like any engineering project seeks to solve problems, and contribute to the establishment of infrastructure and community structure. I would start off my draft through this in order to build this beloved country.

As well known that is water is life line. Engineers try to make life of other people easier by providing services through new technology. Microcontroller is a compact microcomputer designed to govern the operation of embedded systems in motor vehicles, robots, office machines, medical devices, mobile radios, vending machines, home appliances, and various other devices. A typical microcontroller includes a processor, memory, and peripherals.

Almost every electronic device at homes, companies and anywhere around us nowadays has microcontrollers.

## METHODOLOGY

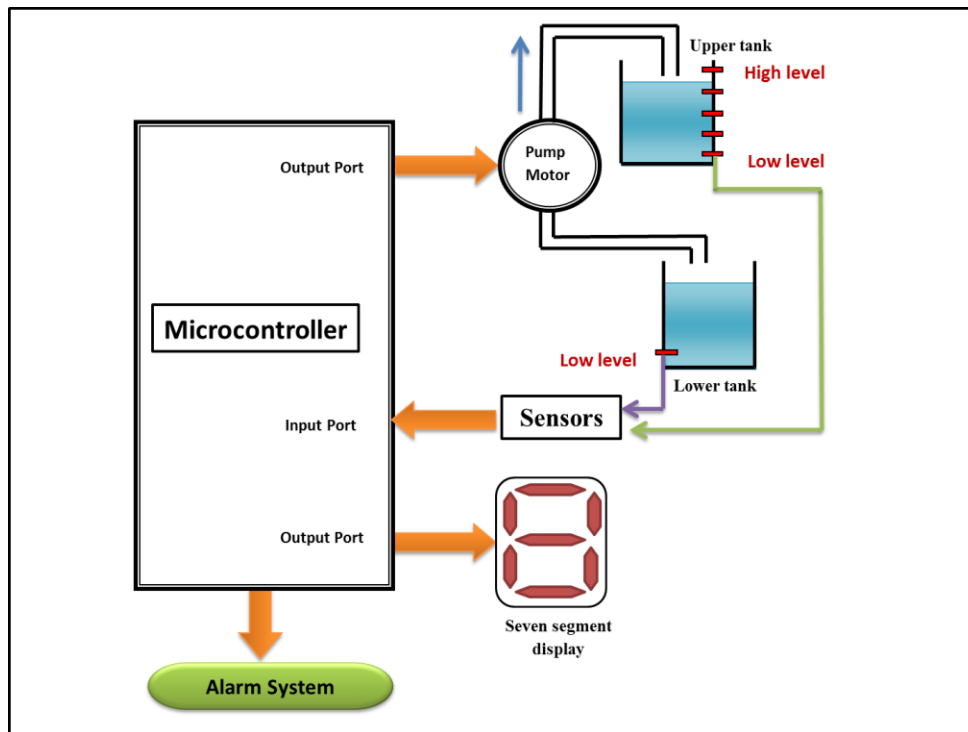


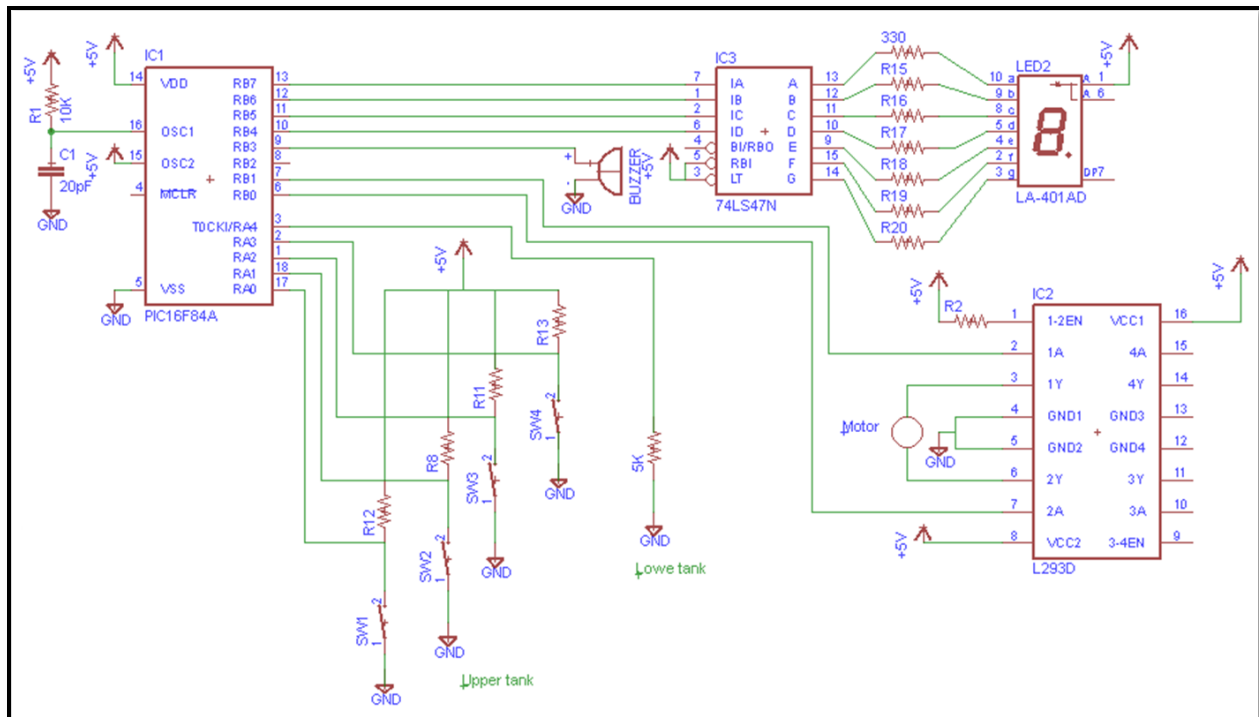
Figure 1. Block diagram of the system

The control system heart is the Microcontroller. It is a computer on a chip that is programmed to perform almost any control, sequencing, monitoring and display the function. Because of its relatively low cost, it becomes the natural choice to the designer.

The seven segment display is used in order to indicate the water level. Whereas the sensor is used to detect each level and send it to the microcontroller to display the level in the seven segment display.

The alarm system should works only when the sensor detects low level of the lower tank.

## HARDWARE



**Figure 1. Schematic diagram of the system**

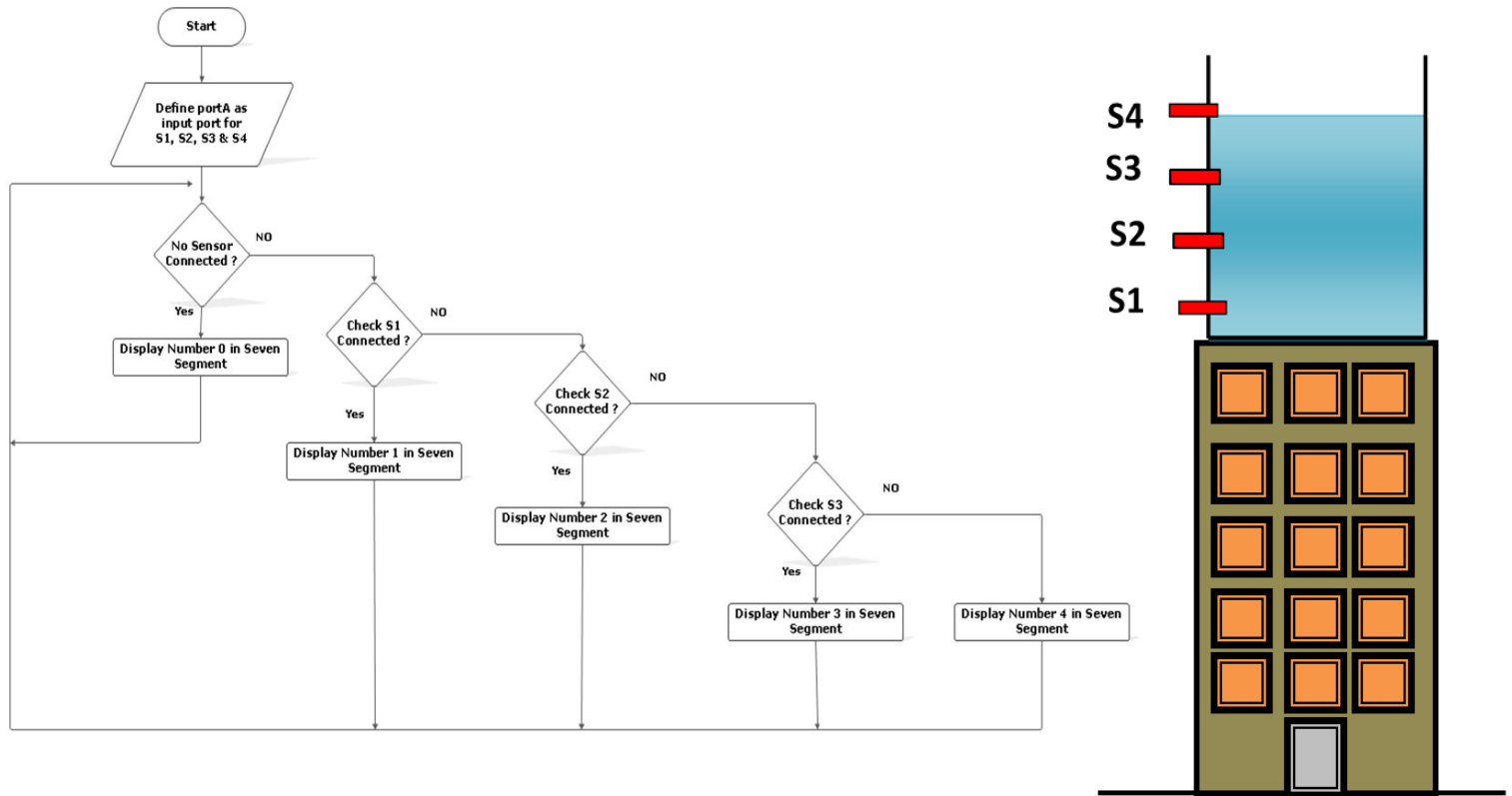
The system consists of three sub systems which are Water sensing system, Pump circuit system, and numerical display system as showing in Figure 1.

The water sensing system takes port A of Pic16F84A while pump and numerical display systems take port B. The H-Bridge takes a part in this design to drive the motor.

The numerical display system uses BCD 7447 with common anode display to minimize the number of ports used.

## SOFTWARE

The flowchart is the first part in programming design.



**Figure 2. Numerical display system flowchart**

This system contains four input sensors in the upper tank and four output ports to the seven segment display. It checks four sensors and displays the suitable number in seven segment display.

The water pumping system is designed to pump the water from lower tank to the upper tank and check the availability of water in both tanks by check sensors S1 and S2. Also it tries to prevent the overflow by checking sensor S4. Figure 3 shows the water pumping system flowchart and the diagram that clarify the mechanism of work.

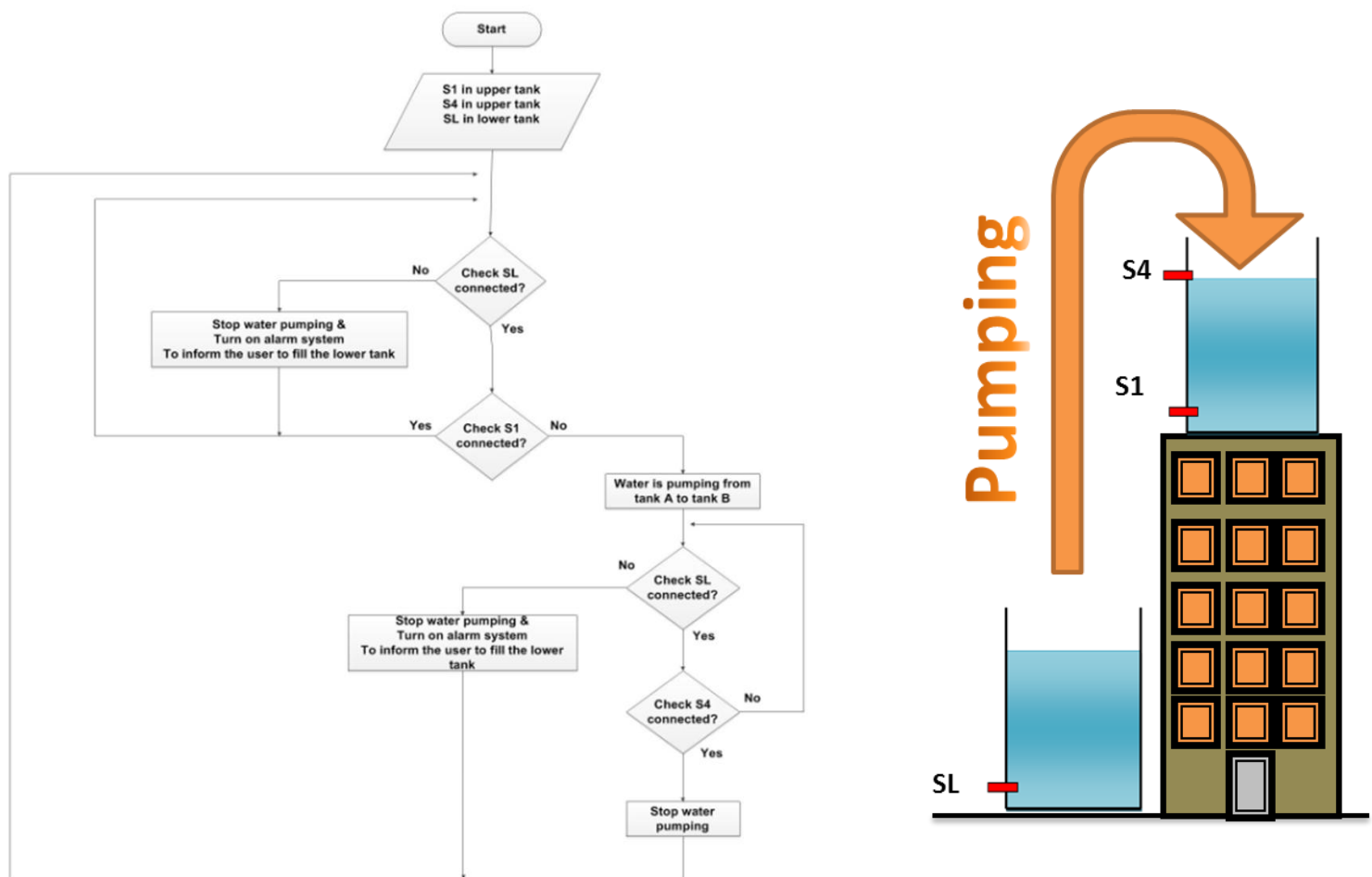


Figure 3. Pumping system flowchart

## RESULT AND DISCUSSION

Water is one of the most important basic needs for all living beings. But unfortunately a huge amount of water is being wasted by uncontrolled use.

Some other automated water level monitoring system is also offered so far but most of the methods have some shortness in practice. This system tries to overcome these problems and implemented an efficient automated water level monitoring and controlling system.

The goal of this system is to establish a flexible, economical and easy configurable system which can solve our water losing problem.

The extensive capabilities of this system are what make it so interesting and able to future development.

The end product will have a simplistic design making it easy for users to interact with.

This will be essential because most of homeowners prefer the easiest product and doesn't like to go in deep with technical things.

## REFERANCES

- 1- Tim Wilmshurst, (2007). *Designing Embedded System With Pic Microcontrollers*. Third Edition, Elsevier Ltd, Great Britain.
- 2- S Salivahanan, N Suresh Kumar, A Vallavaraj.(2008). *Electronic Device And Circuits*. Second Edition, Tata McGraw-Hill Publishing company limited, India.
- 3- Dogan Ibrahim, (2006). *PIC BASIC Projects*. Elsevier's Science & Technology Rights. Great Britain.
- 4- Stephen L. Herman, (2007). *Electric MotorControl*. 9th Edition. Delmar, Cengage Learning. United States.
- 5- <http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en010230>
- 6- [http://www.globalspec.com/learnmore/flow\\_transfer\\_control/pumps/centrifugal\\_pumps](http://www.globalspec.com/learnmore/flow_transfer_control/pumps/centrifugal_pumps)
- 7- <http://www.circuitgallery.com/2012/05/numeric-water-level-indicator-liquid.html>
- 8- [http://www.iaeng.org/publication/WCECS2010/WCECS2010\\_pp220-224.pdf](http://www.iaeng.org/publication/WCECS2010/WCECS2010_pp220-224.pdf)