International Journal of Research in Advent Technology, Vol.5, No.3, March 2017
E-ISSN: 2321-9637
Available online at www.ijrat.org

Wireless Automation for Multi Water Tank

Kaavyaa N[1], Kalai Selvi S[2], Kalaivani G[3], Kousalya Devi V[4], Dr.Muthukrishnan S[5]
Student[1, 2, 3, 4], Head of the department[5]
Department of Electronics and Communication Engineering[1, 2, 3, 4, 5]
Sri Eshwar College of Engineering, Coimbatore[1, 2, 3, 4, 5]
Email: kavyanagarajan9596@gmail.com[1],skalaiselvi95@gmail.com[2],
mailstokalaivani@gmail.com[3],kousi.kousalya2895@gmail.com[4]

Abstract- The drinking water crisis in India is reaching alarming proportions. It might very soon attain the nature of global crisis. Hence, it is of utmost importance to preserve water. In many houses, colleges and industries, there occurs wastage of water due to overflow in Overhead Tanks. Wireless Automation for Multi Water Tank can provide a solution to this problem. This method can be used for both overhead and underground tank. It is designed to monitor the level of water in a tank. In our system we used controller to automate the process of water pumping in a tank and has the ability to detect the level of water in a tank using float sensor, switch on or off the pump accordingly and display the status on the LCD screen. The system also monitors the level of water in the sump tank. If the level inside the sump tank is low, the pump will not be switched ON and this protects the motor from dry running. A beep sound will be generated when the level in the sump tank is low or if there is any fault with the sensors. Wireless Automation for Multi Water Tank also monitors multiple overhead tanks in an Institution or apartments and be controlled by a single receiver and control unit.

Index Terms - Float Sensor, Water Level Detection, Automation, Wireless.

1. INTRODUCTION

Water is a universal solvent which plays an important role in our everyday life. Water is one of the most common substances found in nature. It is used in our everyday activities. Sources of water include rain water, river water, lake water, sea water etc. Rain water is the most accessible source of water in most localities, but in the last century pipe – borne water was invented. This water is free from germs but contains some mineral salts; it is generally accepted in most countries and is used as a source of drinking water.

The total amount of water available on Earth has been estimated at 1.4 billion cubic kilometers, enough to cover the planet with a layer of about 3 km. About 95% of the Earth's water is in the oceans, which is unfit for human consumption. About 4% is locked in the polar ice caps, and the rest 1% constitutes all fresh water found in rivers, streams and lakes which are suitable for our consumption. A study estimated that a person in India consumes an average of 135 litres per day. This consumption would rise by 40% by the year 2025. This signifies the need to preserve our fresh water resources.

1.1. Existing System

The world is experiencing water shortage, which implies that water source should be managed so as to minimize wastage. . For instance, in Modernized Societies we can see the over tank in many buildings. People generally switch on their water pump when their tanks are short of water. But they switch off the water pump when the tank starts over flowing. This results in unnecessary wastage and sometimes unavailability of water in cases of emergency [5].

One has to keep on observing his tank water level to switch off the motor once it is switched on. And sometimes this also can happen that the motor coil burns because of absence of water in the sump. So these are the everyday problem that motivated us in coming up with an affordable, wireless automatic water level control system that doesn't need any attention once it is installed [7].

1.2. Objective

The following objectives are likely to be focused and achieved at the end of the project.

(1) To control multiple water tank from sensor output.
(2) Automatic motor ON and OFF according to received data.
(3) To prevent overflow of water in tank.
(4) To avoid damage of motor due to dry running.

2. IMPLEMENTATION

The status of the tank whether it is high or low is send to controller of the receiver from transmitter controller in free space. In case of long distance due to much interference in air medium signal may not reach the receiver. To avoid this critical situation repeaters are used which can receive and transmit same information with

increase in transmitting distance. Receiver controls motor and displays the status of motor and water level in tank via LCD display.

2.1. Transmitter Unit

Transmitter unit which consists of wireless module, float sensors and repeaters, is placed in the tank. The status of the sensor i.e. the water level will be intimated to the control unit by sending the signal through wireless module. Fig. 1.1 shows the block diagram of transmitter unit.

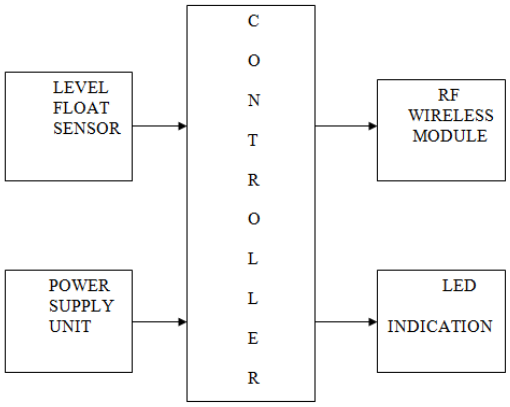

Fig.1.1 Block diagram of Transmitter Unit

2.2. Receiver and Control Unit

In receiving unit we have multi select switch, controller and motor. According to the status of the sensor and the selection of the switch, the controller will run the motor. Fig.1.2 shows the block diagram of receiver unit.

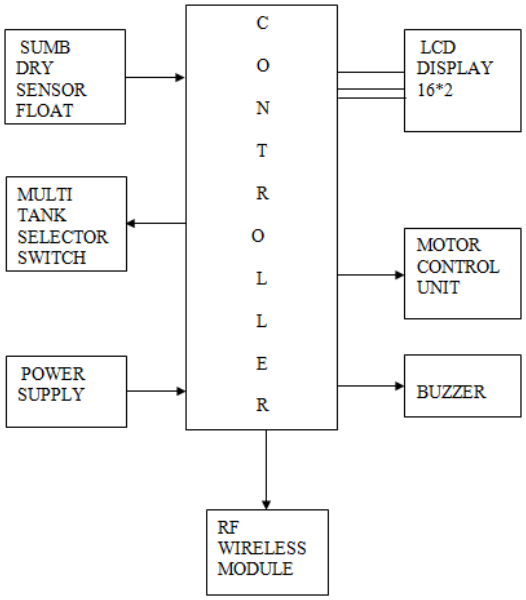

Fig.1.2 Block diagram of Receiver Unit

2.3. Repeater Unit

Receiver cannot read the signal from transmitter in case of long distance, it results in signal loss. To avoid that signal loss repeater is used. Fig.1.3 shows the block diagram of repeater unit.

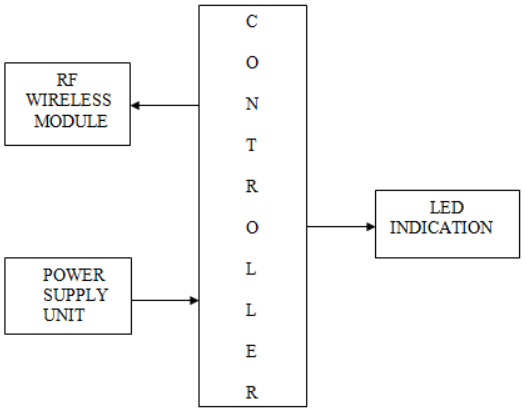

Fig.1.3 Block diagram of Repeater Unit

3. WORKING

Wireless Automation for Multi Water Tank consists of three units. That are transmitting unit, receiving unit and repeater unit. Fig.1.4 shows the functional diagram.

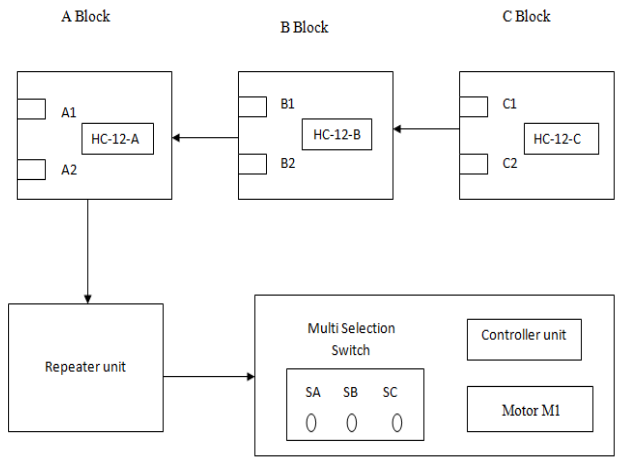

Fig.1.4 Functional Diagram

There are three blocks in the institution referred to as A block B block and C block. In each block there is an overhead tank and in each tank two float sensors are placed. These sensors are used to measure the water level in the tank. From the output of the sensor the water level will be given to the control unit. HC-12 is a transceiver it can transmit as well as receive the signal. HC-12-C unit will send the status of the C1 and C2 sensors to HC-12-B.From HC-12-B the status of both C and B block sensor values are given to A block. Similarly HC-12-A will receive the signal

from HC-12-B and then the status of all the three overhead tanks will be send to the receiver.

Receiver cannot read the signal from transmitter in case of long distance due to signal loss. To avoid that signal loss repeaters are used. The receiving unit consists of a multiple selection switch. When the A block sensor is low, switch A will be selected, and then the controller will check whether sump sensor is low or high. If it is high then the motor will be on and it remains in on state until the A block sensor becomes high. Once A block sensor will become high then the controller will send the signal to the motor.

The same process will be repeated when switch B or switch C is selected.

4. CONCLUSION

Wireless automation for multi water tank control system provides solution to the problems like overflow of water in all water tanks. It can be implemented with ease in any place like home, institutions, office, apartments and in industrial areas. The main advantage of this system is that it can control multiple water tanks simultaneously. In this system we interfaced LCD with controller to display the status of the system as it operates. Finally, it reduces stress associated with manual water pump controller, which require that somebody go to physically switch them on and off. Wireless automation for multi water tank plays a vital role in overcoming water scarcity by avoiding wastage of water. It is a simple effective way to conserve the water. Its simplicity in design and low cost components make it an ideal piece of technology for the common man. In future, status of the tank can be updated in webpage, so that it is possible to control the water level from any part of the world.

REFERENCES

[1] Asaad Ahmed Mohammedahmed Eltaieb, Zhang Jian Min, "Automatic Water Level Control System", International Journal of Science and Research (IJSR). Vol. 4, Issue 12, December 2015.
[2] Ejiofor Virginia Ebere, Oladipo Onaolapo Francisca, "Microcontroller based Automatic Water level Control System", International Journal of Innovative Research. Vol. 1, Issue 6, august 2013.
[3] Dr.Seema Verma, "Wireless Sensor Network application for water quality monitoring in India", National Conference on Computing and Communication Systems (NCCCS), pp.1-5, 2012.
[4] Xizi Li., and Changyi Jiao., "Water Conservancy Monitoring System Based On Wireless Sensor Network", 2nd International Conference on Mechanical Automation and Control Engineering., pp.1858-1860, 2011.
[5] Erua J. Band, Anyasi, F. I., "Design of an Automatic Water Level Controller Using Mercury Float Switch", IOSR Journal of Electronics and Communication Engineering (IOSR-JECE),.Volume 9, Issue 2, Mar - Apr. 2014.
[6] Dipanjan Rakshit, Bijit Baral, Saikat Datta, Pratyusha Biswas Deb, Priyanjali Mukherjee, Shaon Paul, "Water Level Indicator",International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016 .
[7] Muktha Shankari K , Jyothi K , Manu E O , Naveen I P, Harsha Herle, "Wireless Automatic Water Level Control using Radio Frequency Communication",International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 4, April 2013.
[6] Monisha. S, Nivetha K, Rashmi R, Manoj Kumar A, Dhanasekar J , "Automatic Water Management System", IJSRSET Vol. 2, Issue 2, 2016.
[7] S. M. Khaled Reza, Shah Ahsanuzzaman Md. Tariq, S.M. Mohsin Reza, "Microcontroller Based Automated Water Level Sensing and Controlling: Design and Implementation Issue", Proceedings of the World Congress on Engineering and Computer Science , Vol I WCECS 2010, October 20-22, 2010.
[8] Poh-Kiong Teo, Chee-Chiang Derrick Tiew, "Automated Water Level Management System", International Journal of Computer and Electronics Research , Volume 4, Issue 1, February 2015.