Global Scientific JOURNALS

GSJ: Volume 9, Issue 7, July 2021, Online: ISSN 2320-9186
www.globalscientificjournal.com

THE DESIGN AND CONSTRUCTION OF A POTABLE WATER LEVEL DETECTOR WITH AUTOMATIC MECHANICAL MANUAL TIMER CONTROL SWITCH

Olaitan S.K and Aladenika A.K

Department of Science Laboratory Technology,

Rufus Giwa Polytechnic,

Owo Ondo State, Nigeria

ABSTRACT

A water level detector system, normally used in residential apartment and industries for detector of water level in the container so as to avoid water being overflowing and dry off from the container. The main advantage is to avoid wastage of water and dry container. The research consists of two sensors, one fixed at the top, and the other at the bottom, and it is controlled by the circuit which is the NE 555 timer Integrated Circuit (IC). The introduction of manual timer and source voltage will allow the water level detector to be more effective and durable.

Key world: IC 555 timer, manual timer.

INTRODUCTION

Water is commonly used for agriculture, industry, and domestic consumption. Therefore, efficient use and water monitoring are potential constraint for home or office water management system. Moreover, the common method of level detector for home appliance is simply to start the feed pump at a low level and allow it to run until a higher water level is reached in the water tank. People generally switch off the pump when the overhead tank starts overflowing. This results in the unnecessary wastage and sometimes non-availability of water in the case of emergency. Water level detector employs a simple mechanism to detect and maintain the water level in a container by glowing green LED when needed. The level sensing is done by two sensors which are placed at different levels on the container walls. Green colour LED will glow as soon as the water level is full.

Proper monitoring is needed to ensure water sustainability is actually being reached with disbursement linked to sensing, such programmatic approach entails based water level sensing and detecting or using IC555 timer. The level sensing is done by wire, the resistance between which depends upon the water level in the container. When the water-level is below the minimum detectable level (MDL), there is infinite impedance between the two sensors. However when water-level reaches MDL or is above it, the connection between the sensors get completed. Hence, at each instance when water reaches the MDL, the LED will glow to indicate it. Electronics circuit has undergone tremendous changes since the invention of a triode by LEE DE FOREST (1907). In those days the active component like resistors, inductors and capacitors etc.,

of the circuit were separated and distinct unite connected by soldered lead with the invention of a transistor in by W.H Brattain and I. Barden(1984), the electronic circuit became considerably reduced in size. It was due to the fact that resistors were not only cheaper, more reliable and less power consumption but was much smaller in size than an electronic tube. In the early 1960s a new field of micro-electronics was born primarily to meet the requirement of the military which was to reduce the size of it electronics equipment to approximately one tenth of it then existing volume. The drive extreme reduction in the size of electronic circuit has led to the development of micro-electronics circuit called integrated circuits (ICs) which are so small than their actual construction. Scherz P, (2000).

An integrated circuit is a complete circuit in which both the active and passive component are fabricated on a tiny single chip of silicon Tharaja B. L (2006). Active component are those which have the ability to produce gain, examples are transistors and field effect transistors (FET). An integrated circuit sometimes called a chip or microchip is a semi-conductor wafer on which thousands of millions of tiny transistors, capacitors are fabricated, An IC can be either analog or digital depending on its intended application.

Water level detector system detects the water level in the container or reservoir, this water detector is made up of NE 555 timer IC with 8 pins. The level measurement consist of determining the distance from the upper surface of a liquid in a container or tank chosen mark located above or below this surface by itself the level is not an

independent physical quantities describing the state of a substance through direct and indirect level *www.circuitstoday.com*.

Hence, this water level detector is one of the cheapest and simplest devices which prevent wastage of both electricity and water.

METHODOLOGY

All the materials are locally purchased in Owo and Akure, and mounted on a circuit board according to the circuit diagram below:

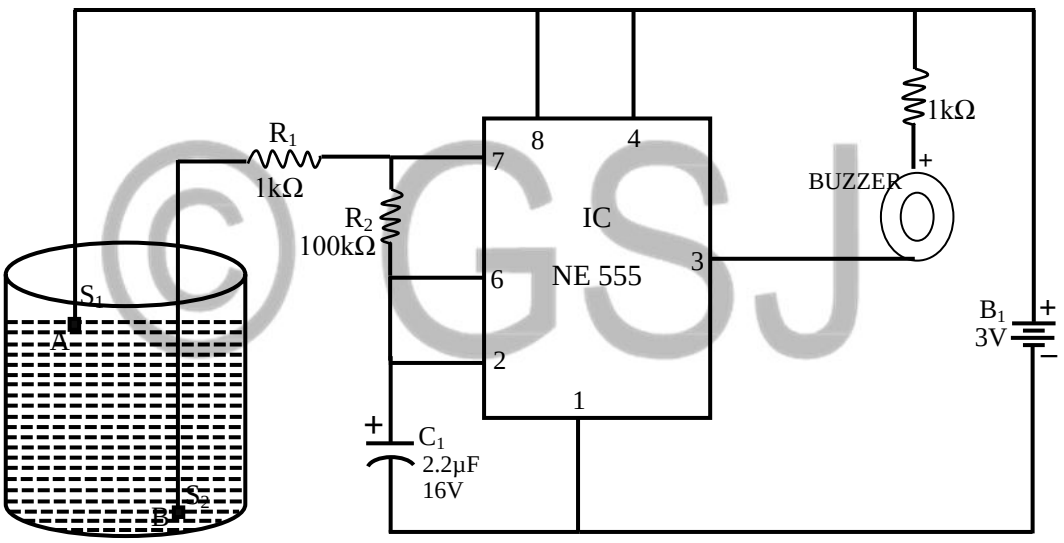

Figure 1: **Circuit diagram of water level detector system (www.circuitstoday.com)**

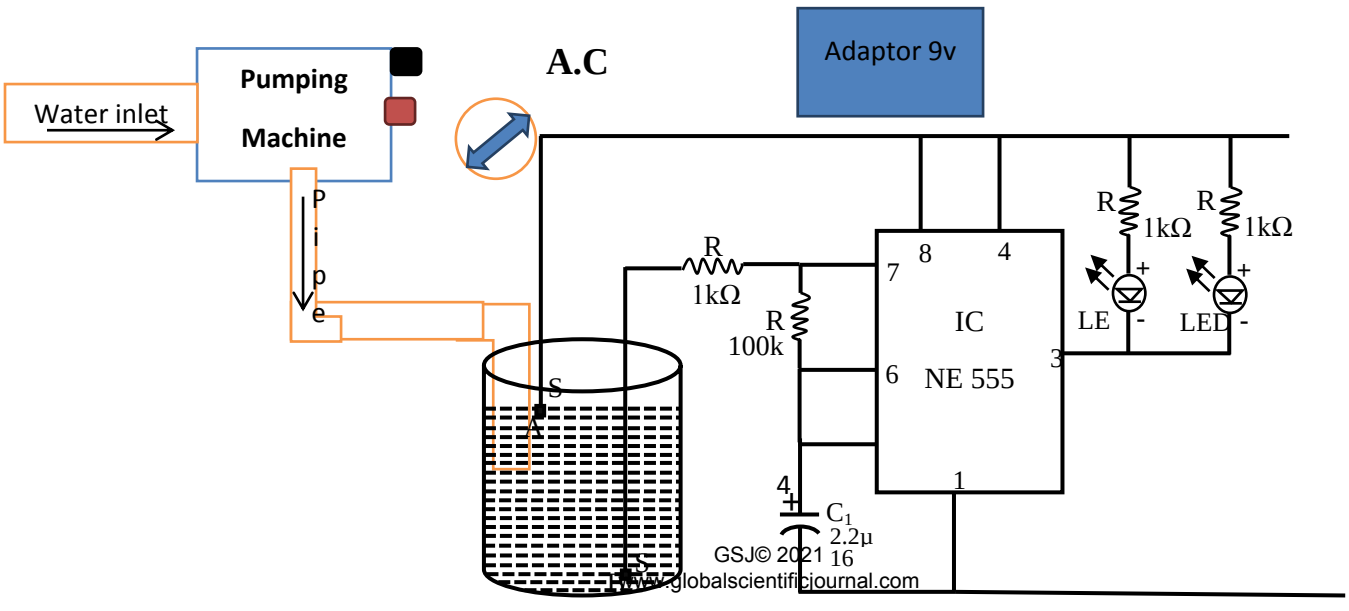

Figure 2: the modified Circuit diagram of water level detector system

CONSTRUCTION OF WATER LEVEL DETECTOR SYSTEM.

The IC stand was soldered on the Vero board, and the negative lead of the capacitor was soldered with the pin 1 of the IC stand. The positive lead of the capacitor was connected to the pin 2 of the IC stand using wire. Then pin 2 was connected to pin 6 of the IC stand using wire. 100kΩ resistor was connected to pin 6 and 7 of the IC stand, 1kΩ resistor was connected to pin 7 and also to the second lead of 100kΩ resistor. The second lead of the 1kΩ resistor was connected with wire to make sensor B. Pin 8 and 4 were soldered together with wire and was connected to pin 3 which is the output. Yellow and green LEDs were connected to 1kΩ resistor each and was connected to pin 3. Then, the second lead of the resistor was connected with wire to the positive (+) part of the 9V . The pin 8 and 4 were connected with wire to make sensor A. The pin 1 that was soldered with capacitor, was connected with wire and the wire was connected to the negative (-) part of the 9V adaptor.

All the components soldered on the Vero board were tested with a multimeter. Then, the NE 555 timer IC was fixed to its stand and the circuit was tested by making the bare end of the sensors A and B to touch each other and the green and yellow LEDs glowed when the sensors A and B touched each other.

COMPONENT TEST

Similar components like resistor were packed together. The other component include capacitor, LED, resistor, etc. Reference was made to colour coding data sheet to ascertain the expected value of resistors used

TESTING THE WATER LEVEL DETECTOR

The water level detector was tested before using it in the field by dipping the bare ends of the sounding wires into water and observing the light emitting diodes (LED). The LEDs light, when the bare ends of the wire contact the water. Alternatively, the unit was tested by touching the bare ends of the lead wire together.

CONCLUSION

The performance and efficiency was beyond expectation and from every ramification the design of water level detector was successful. Thus, by using this simple arrangement we can save wastage of water and electricity.

REFERENCE

J.Bardeen and W.H.Brattain phys.Rev. 74,230 Published 15 July 1984

Tharaja B. L., &Tharaja A. K., (2006).*A Text Book on Electrical Technology*, (23rd Edition).New Delhi, India: S, Chand and Company.

Scherz Paul, (2000). *Practical Electronics for Inventors*, page 589. McGraw-Hill/TAB Electronics.

Schubert, E. Fred, (2003).*Light Emitting Diodes*.Cambridge University Press.ISBN 0-8194-3956-8.

www.circuitstoday.com