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Study of Automatic Water Dispenser

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ABSTRACT: Water scarcity is one of the major problems which the major cities are facing across the world. We all know that 70% of the Earth surface is covered with water but only a minor percent of it is used for the daily purpose. Scientist have been searching for many techniques to make the major sources of water such as sea, ocean to be used in day to day life. Apart from creating dams and electricity it is supposed to make water reach those places which are having shortage of water.
There are many diseases which have come in to existence which are caused due to the impurity of water. As per a survey approx. 4,000 children across the world are dying everyday as a result of diarrhoeal diseases due to unsafe water which they use in day to day life.
70% of the world wide water is allocated to farming and most of these farming irrigation systems operate at only 40% efficiency. As per our ancestors the next world war if happen will be due to the water problems as there have been many conflicts for rivers, dams and many more between two countries.

Keywords: Microcontroller, TDS, water temperature, computer simulation, automatic ejection of water, waste

I. INTRODUCTION

Water pumps are very useful in the water supply, the first wooden pumps are came into existence in 1700s the other pumps which came into the existence in mid 1800s and these pumps are known as metal piston type pumps which are driven by steam. The first submersible pumps are came into existence in 1920s
Automatic Water Dispenser is containing a series of many functions like controlling the water level, showing the value of TDS, showing the value of temperature, and automatic ejection of water.
In today's life there must be some elements which is needed to be controlled, therefore the Automatic water dispenser is providing the good quality of water for the human beings. In day to day life intelligent systems are used in a wide range and these are embedded in design.
There are some physical elements which are needed to be controlled in day to day life in order for them to perform their expected task. We are showing our research as the Automatic water dispenser it is a series of function to maintain each parameter of water such as water level, showing the value of temperature, showing the value of TDS, automatic water ejection. A control system therefore can be defined as a device or set of device that manages, commands directs or regulate the behaviour of other devices.

This paper is focused in presenting the embedded into an Automatic Water Dispenser. The thing by which we get motivated is the wastage of water and the impurity of water. We also know that it will help the environment and water cycle by which we can save water for our future.

II. RELATED WORKS

Many inventions were made to control the water dispurities in order to make the whole system automatic. The research result were flexible, proposed a web and cellular based monitoring service protocol to determine and sense water level globally. At first there was a need to store the water. Big tanks were made to collect the water when the pump fetched the water from the ground level to the tank. A water level sensor was used so that it can automatically cut off the supply from the pump to tank in order to avoid the wastage of water. A TDS is used which shows the amount of mobile charged ions, including minerals, salts or metals in a given volume of water. In 2010 Khaled Reza el al. introduced the notion of water level monitoring. Then in 2013 Gunturi introduced a controller based automatic plant irrigation system. Then again in 2013 Rojiha analysed the existing oil pumping system and then he discovered that they have a high power consuming process and needs more manual power. These all are

effective system but totally dependent upon the working of sensors so modification was necessary and further a manual cut off switch was also introduced so that these systems can also work manually.

III. PRINCIPLE OF WORKING

Here in this work the block diagram of the operations of the system of Automatic Water Dispenser is presented. It consists of the following major units: Sensors, Microcontrollers, Display Unit, TDS, and Water temperature. The diagram below shows the flow of operations in the system as well as their inter-operability. Taking the advantage we use the water level sensor, when the water touches the sensor positioned on a particular level in the tank than the voltage is transferred to the copper which in turn transferred to the circuit for the further processing. Since we are using the microcontroller in the circuit then the HIGH and LOW is fed into the microcontroller which in turn uses this for controlling of the water level. The output of the water level is displayed on the LCD (Liquid Crystal Display) screen. The microcontroller is programmed which is used to control the functionalities of the whole system.

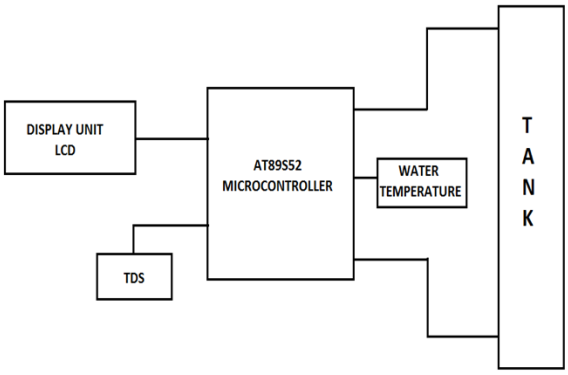


Fig.1. Block Diagram of Automatic water dispenser.

The functioning of whole system is done by the microcontroller, means LCD is functioned by the microcontroller which shows the output on the screen, then the water level sensor is also connected by the microcontroller and output is shown by the LCD that on what position the water is in the tank and when the water reaches on the top level of the tank then microcontroller automatically cut off. Through the microcontroller we also see the value of TDS and the temperature of water. The specific software tool deployed for the virtual design and the implementation of the device is the Proteus simulation software. This software has two parts; the ISIS and the ARES parts. We use ISIS part of the software of Proteus for the circuit design, and ARES part of the Proteus software for the PCB design.

A. Description for hardware module for Automatic water dispenser

5V DC supply given from the battery for the microcontroller and LCD. Three sensors (temperature, TDS) are sensing the whole system continuously. This gives an output into digital form on LCD which will be given from the microcontroller. The microcontroller verifies the values of controlling the water level, TDS, and temperature of water.

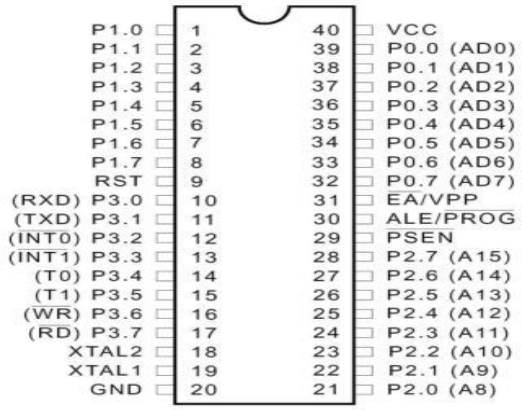
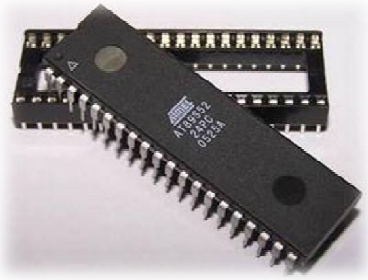


Fig 2. Pin Diagram of AT89S52.

IV. CIRCUIT COMPONENTS

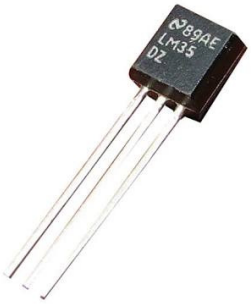
1. MICROCONTROLLER AT89S52: The AT89S52 is a low power, high performance CMOS 8-bit microcontroller with 8k bytes of in-system programmable flash memory. The device is made using Atmels high-density non-volatile memory technology. The AT89S52 provides the features like Watchdog timer, dual data pointer, power of flag, fast programing time, flexible ISP programming, green packaging option.



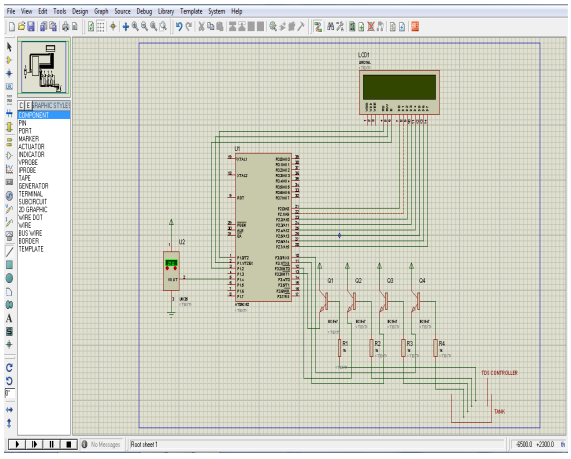
2. LCD Module: LCD (liquid Crystal Display) is an electronic display module and find a wide range of applications. A 16*2 display is used in devices and

circuits. The 16*2 module is preferred over a seven segments. The 16*2 LCD means it can display 16 characters per line and there are 2 such lines. The LCD has two registers namely command and data.

3. Temperature Sensor: The LM35 series are precision integrated circuit temperature sensor whose output voltage is linearly proportional to the Celsius. The LM35 thus has an advantage over linear temperature sensors calibrated in kelvin. The LM35 does not require any external calibration or trimming to provide typical accuracies at room temperature.



Description for software module for Automatic Water Dispenser



The software module used for making the Automatic Water Dispenser is the proteus the ISIS part of the software is used for making the circuit of the system. In this Atmel microcontroller is used by which the 16*2 LCD (Liquid Crystal Display) is interfaced, the water level controlling unit is interfaced with the microcontroller, the temperature sensor LM 35 is interfaced with the microcontroller which is used to control the temperature.

After construction of the circuit tests are carried out to eensure that the device is functioning or not according to the the specifications. After the successful testing of the the prototype design of the automatic water dispenser with feedback was design according to the software. All the circuit components were combined together with the microcontroller to obtain the model of the design. Picture of the design shows the circuit connections of all the sub sections macking up the automatic water dispenser, with all of them interfaced with the AT89S52 microcontroller.

V. MEASUREMENT AND EQUATIONS

This is the measurement equations for calculating the TDs in water by these equations we can calculate the TDS. There are three equations given below one is for the TSS(Total suspended solids), second one is for the TS(Total solids), and third one is for the TDS(Total dissolved solids) As we know that the TDS for drinking water is about 500ppm. so equations are given below.

- **Total dissolved solids concentration**
  Mg Dissolved Solids/L= (A-B)*1000/ mL sample
- **Total suspended solids concentration**
  Mg Suspended Solids/L=(A-B)*1000/ mL sample
- **Total solids concentration**
  Mg Total solids/L=(A-B)*1000/mL sample

1. **Measurement of Total dissolved solids 50ml aliquot**
2. **Measurement of Total suspended solids 50 & 10ml aliquots**
3. **Measurement of Total solids 50ml aliquot**

So by this we can determine the concentration of solids in water so the three aliquots values are given for determining the concentration of solids.

VI. RESULTS AND DISCUSSION

In this work, the microcontroller for the Automatic Water Dispenser with feedback, have passed the necessary test with the other components interfaced to it. With this system is implemented is possible to monitor the water level in the water tank, switching on the water when the tanks get empty and switches off the water when the tanks get full, the water TDS, water temperature, and automatic ejection of water from the tap this all process is done without any need of human interference. As already we have seen in the previous section that the microcontroller is the base of this

project or we can say that it is the heart of the project as all the control and signal is passed through the microcontroller. The LCD is interfaced with the microcontroller to give the output of the water level the TDS and the temperature of water, and the automatic ejection of the water helps human being, that without touching the water tap they are getting sufficient, pure and temperature controlled water. The upper limit of TDS in drinking water is 500ppm.

VII. SUMMARY AND CONCLUSION

Automatic water Dispenser system employs the use of different technologies in the whole design its development and implementation. The system is used by the microcontroller to automatic the process of water which is used by human beings and it has the ability to detect the level of water, the TDS of water, the temperature of water, and the use of the LCD in this system provides the output which is very useful for human beings.

This research has successfully provided the improvement on existing water condition by which human beings get the good quality of water, and with this there will be no wastage of water.

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