ISSN: 2278 – 909X
International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)
Volume 7, Issue 12, December 2018

Microcontroller Based Automated Water Level Sensing and Controlling

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Abstract:-
In this paper we present the concept of water level monitoring and management in terms of electrical conductivity of water. More specifically, we investigate microcontrollers based water level sensing and control in a wireless and wired environment. Water level management approach will help reduce the flow of water along with household electricity consumption. Apart from this, it can indicate the amount of water in the tank, which can support global water types, including satellite data transmission systems, for cellular dealers, remote water monitoring systems. In addition, cellular phones with relatively high calculation power and high quality graphical user interfaces have recently been made available. It is necessary to reuse such valuable resources in the mobile application from the perspective of users. Finally, we have proposed a web and cellular based monitoring service protocol that determines and understands the water level globally.

Key Word: Conductivity, indicator, microchip, nozzle, and water level sensor

1. INTRODUCTION
2.

Stability of water resources available for a variety of reasons The word is now a major issue. This problem is silently Bad water is related to allocation, inefficient use, and lack of Enough and Integrated Water Management There is water Generally used for agriculture, industry and domestic Consumption. Therefore, efficient use and water monitoring Home or office are potential obstacles to water management system. Many surveillance systems in the past few decades Integrated with water level detection has been accepted. Measuring the level of water is an essential function for the government Residence perspective This way, it would be possible Track the actual implementation of such initiatives Integration of various control activities Therefore, water The control system makes the implementation possible Importance in home applications Current automated The level detection method has been described and can be used to turn the device on / off. In addition, the standard method of level Control for home appliance is only to start feed pump A low level and allows it to run to high water level Reached the water tank. This is not supported properly Adequate control system In addition, liquid level control.

Systems are widely used for liquid level monitoring, Reservoirs, silo, and dams, usually, such systems The scene provides constant levels with multi level Signal Audio visual alarm at desired level and Depending on the needs of the user, the pump can automatically control This should be included in the management system. Is proper monitoring The stability of water is really necessary to ensure Reached with sensation and distribution related to automation. Such a programmatic approach is based on microcontroller Automatic water level sensing and control.

This paper is organized in the following ways Topic Two The system is focused with basic concepts of design. In Topic Three We describe the concrete idea of 8051 microcontroller. In Topic four the design and implementation part has been described. Topic 5 tells us about our proposed surveillance and Controlling the Network Topic Six Deals With Conclusions And future works.

II. BASIC CONCEPTS

Water Level Monitoring and Control Techniques The system is centered with some basic parts which are slowly Collected together in our proposed method. Basic Details of some parts are described below.

A water level indicators

For water level signal unit we can use some LED light Which will work for water level signals. By touching Different level of water should be LED, through water level sensor Should be indicated as on / off (i.e.: yes sensor sensory water).

B. Water Level Sensor

We want to make special water level sensors Present some convenient materials like Iron Rod, Nozzles, resistance, rubber etc. A connecting rod made of iron And steel which should be connected to the ground and we need it At least four nozzles should be connected to + 5v through one 1kΩ resistance We need to bind them together and put one Rubber at their joint point which will act as an insulator Every nozzle when the sensor touches water, nozzles and Connecting rod gets electricity connection using water Conductivity [3].

C. Water pump control system

We can control the water pump by connecting it with water Output pin of microcontroller through a motor driver circuit.

When Microcontroller sends a positive signal (+ 5V) or land Motor Driver Circuit, Then Signal for Water Pump (0v) Turn on or off respectively. We also want to use one It is believed that the manual switch on the motor driver circuit To use it manually to control it. It makes this system even more user friendliness.

D. Microcontroller

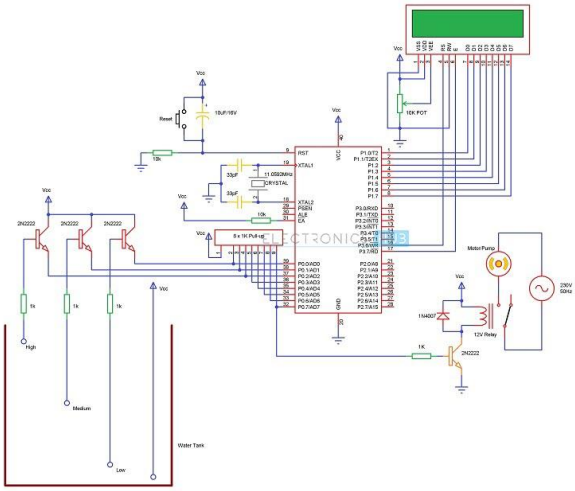
Microcontroller is a computer on a chip that is programmed For almost any control, indexing, monitoring and performance Display the ceremony. Due to its relatively low cost, it Becomes a natural choice for the designer. Microcontroller One has been designed for everyone. The big advantage of this is no other Its applications require external components because everything The required peripherals are already built in it. Thus, we can Less, save time, space and cost required to build Cost equipment [1]

E. other

To control some high power devices such as lights, heaters, Solenoids and motor with a microcorroller need us interfaces Device between microcontroller pin and high power equipment. Occasionally the contactor is called mechanical relay Milliampere is available to switch many currents Thousands amperes. In this system we should use a relay Circuit with water pump to optimize with high voltage AC Present. The output of the relay circuit should be connected Negative side of motor of cable. Positive side of Cable 220V should be connected to current. So can we Use electromagnetic relay as an electrical amplifier.

III. Water Level Controller using 8051 Microcontroller

Using the 8051 microcontroller project, water level controller will help to control the water motor automatically by feeling the level of water in the tank. This article tells you how to recognize and control the level of water in the overhead tank or any other container. This system monitors the water level of the tank and automatically switch on the motor when the tank is empty. When the overhead tank or container is complete, the motor stops. Here, the water level of the tank is indicated on the LCD (liquid crystal display). By using this system, we can avoid overflow of water. This system primarily works on a principle that "water conducts electricity". The four strings dipped in the tank will point to different water levels. Based on the output of these sta microcontroller displays the level of water on the LC also controls the motor. Initially when the tank is emp LCD will show the message less and the motor automatically. When the level of water reaches half then it now displays the LCD half and still the mot When the tank is full, the LCD is full and the automatically displays. Then, the motor moves wh water level in the tank decreases.



The water level controller's heart AT89C51 microcontroller using the 8051 microcontroller project. Water level check is connected via transistor of P 0.0, P 0.1 and P 0.2 (they are connected through the existing limited resistors connected to the base of the transistor). P 0.0 for lower level, half level for higher level and P 0.1 for P 02.2. The collector terminals of the transistor are connected to the VCC and the amitator terminal is connected to the port terminals (P 0.0, P 0.1 and P 02.2). Port of microcontroller is connected to the data pin of 1 LCD and the control devices of the LCD display are connected to RS, RW and N respectively, P 3.6, GND and P. 3.7. For demonstration purposes, we have used a simple DC motor pump. It is connected to the relay and the input in the relay is fed through the transistor to p.7.7

IV. Design and Implementation

For experiment this design we have been using an 8 bit microcontroller, an inverter, a reserve tank (res. tank), water tank and water pump. Water pump has been controlled using water level sensor. Four homemade water level sensors are used to detect the water level. Inverted sensor data used to pass as the input of microcontroller [6]. We used MPLAB programming software to write into PIC 16F84A memory [1].

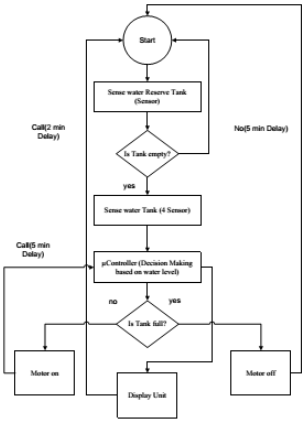


Figure 1: Flow chart of system design

A system architecture

A water level sensor is done in the first phase of the design Designed to understand the level of water accurately. Microcontroller Used to automatically control the overall system which decreases Design and control complexity Microcontroller takes Input from the sensor unit which feels the level of water Through inverter After input variable processing, as a result The output decides the action of the water pump (on / off) with respect to the output For the current water conditions of the tank. Whole design flow The chart is shown in Figure 1. To control some high power devices such as lights, heaters, Solenoids and motor with a microcontroller need us interfaces Device between microcontroller pin and high power equipment. Occasionally the contactor is called mechanical relay Milliampere is available to switch many currents Thousands amperes. In this system we should use a relay Circuit with water pump to optimize with high voltage AC Present. The output of the relay circuit should be connected Negative side of motor of cable. Positive side of Cable 220V should be connected to current. So can we Use electromagnetic relay as an electrical amplifier.

B. Sensor Unit

Water level sensor unit has two parts, one sensor is used Reserve tank and other four sensors inside the water
Tank In addition, sensor rod, nozzle, Rubber etc. The rod is made of iron and steel, which is Nozzles attached to the ground are connected to + 5V. iron Rod and nozzle are binding through a rubber. Is rubber Used to make electrical connection of iron rod and nozzle Apart. 22kΩ resistance has been caused due to water conductivity Used. The original operation occurs when the sensor has a nozzle Water, nozzle and connected to the rod is attached Water Conductivity Then Nozzle Ground Signal (0v) Which is connected to the input of the inverter. Production of Inverter is connected in the form of microcontroller input which is Turns on / off LEDs, the user shown in Figure 2 acts as a display unit.

C control unit

The original operating control of the control unit is water Pump by microcontroller which is specially definedprogram. Water pump is connected with an output pin Microcontroller through a relay circuit which is connected with one Transistor This transistor is connected to the collector The relay is on the circuit and the emitting ground. In relay Circuit, a diode is used to send signals in one direction And to resist the change of a stimulus current flow Respectively Production of relay circuit is connected Motor pump cable as a negative On the other side of the motor Cable AC is connected with 220V as a positive voltage.
The control unit performs the following actions:
1) Off operation: When microcontrolers send 0 volts The basis of the transistor it closes and its Emitters and collectors become open. No land again The signal (0v) is collected in the relay circuit. Like this Negative side is becoming positive in the cable of the motor pump Signal (+ 5V). Therefore, the motor pump will be closed To get positive signal (+ 5v) and 220v AC on one side Second end
2) On operation: When the transistor is turned on Microcontroller sends positive signal (+ 5V) and its Emitters and collectors decrease. Relay circuit and Motor pump ground signal (0V) and it will be available for Due to getting land, motor pump will be operational Negative side and 220v AC on the other side. In addition, the current positive signal has been changed to (+ 5V) can bear persuasive for land or vice versa Some resistance For this reason we should use the diode. One On / off switch is used to control motor driver circuits Manually Picture of the control unit shown in Figure 2 8051 Microcontroller D operation description and full circuit diagram We must use some essential to implement the system.
8051 parts like microcontrollers, crystal oscillator, 2 capacitors capacitance 22 pf and 27 pf, inverter, LED, water tank, water level sensor, water pump, transistor, Motivator and some capacitors Graphical Figure of The entire circuit diagram is shown in Figure 2. RA4 pin Microcontroller is used to detect the existence of water If there is no water available in reserve tank, then it sends a signal which controls the whole circuit and closes it for a fixed amount. The amount of time And when the timer gets on it, it gets the senses Reserved tank again RA0, RA1, RA2 and RA3 pin are used Get inverted production from the source of water. Pin 15 and 16 Microcontroller is connected to the crystal oscillator. The crystal is attached to the ground on the other side of the oscillator Through two capacitors of 22 PF and 27 PF, respectively Operates as external clock generator to execute.
If four pin RA 0, RA1, RA2 and RA3 get a ground signal (0V) means that water tank does not have water. So all The LEDs should be closed. We can set this issue further Intelligent way, if pin RA understands 3 Ground signals then we can Make sure there is no water in the tank. And if we got the pin If someone feels RA Positive sign (+ 5v) we can tell it The water tank is full of water. So, when the water tank is empty The water pump should be turned on and all the LED light becomes Close. If the pin RA3 gets a positive signal (+ 5V) and the other three Ground signals (0V), which means that the water tank has 1/4 of water. For this reason the water pump is on and the first LED Must be now; The other three LEDs are still closed. If Four pins RA 0, RA1, RA2 and RA3 receive positive signals (+ 5V) means that the water tank is now full of water. For this Due to the water pump now and all the LEDs should be closed Note that we have used these LEDs for the scene User's Home Monitoring When the water is being reduced from the tank using the house, The display LED should start off one by one from top to bottom. If all the LEDs are closed Meaning tank is empty again and water pump Should start again after the last LED stops. This operation should be done automatically Perform as a cycle. This is the same experimental result Presented here (see Table I).

TABLE I
EXPERIMENTAL RESULT OF WATER LEVEL SENSING UNIT, MOTOR AND VISIBLE LEVEL DESCRIPTION FOR USER BY LED LIGHT

Inverted Input From Water Sensor		Output						
Res. Tank	Water Tank	LED 1	LED 2	LED 3	LED 4	Motor	Tank	Reserve Tank
0	0000	OFF	OFF	OFF	OFF	OFF	Empty	Empty
1	0000	ON	OFF	OFF	OFF	ON	Empty	Water Exist
1	1000	ON	ON	OFF	OFF	NO OP.	1/4	Water Exist
1	1100	ON	ON	ON	OFF	NO OP.	2/4	Water Exist
1	1110	ON	ON	ON	ON	NO OP.	3/4	Water Exist
1	1111	ON	ON	ON	ON	ON	Full	Water Exist

E. Programming Description

The program we used to control the entire process is written in PIC16F84A microcontroller's assembly language. All the codes have been tested and simulated using MPLAB software which is provided by MICROCHIP [1]. The external timer we have used in our system is a Crystal Oscillator (XTAL) 4MHZ. When the system powered up, microcontroller took the input from the water sensor through the inverter. Inverted inputs from RA0, RA1, RA2 and RA3 of microcontroller are loaded by register and its combination is being checked. The combination checking was done in the following way.

1) When microcontroller gets the first pin signal then it loads the signal to its register. After that it checks the next pin signal and then loads it to its register. Other pin signals operation also done respectively in the same way. Finally it loads all (four) required pin's signal to the register. By using these four signal combinations it decides an output and sends that signal to the output pin.

2) The whole operation makes a cycle or repeats itself with respect to the input signals.

V. C Programming:

```
void main()
{
P2=0XFF;
P1=0x00;
//P0=0x00;
 Lcd_Init();
while(1)
{
while(P2.F2==1)
{
Lcd_Cmd(_LCD_CLEAR);
Lcd_Out(1,1,txt1);
motor=1;                        //motor off
switch(~P2)
{
case 0: Lcd_Out(2,6,txt5); break;
case 1:Lcd_Out(2,6,txt4); break;
case 3: Lcd_Out(2,6,txt3); break ;
default: ;
}
Delay_ms(500);
                    //motor on
}   motor=0;
}
}
```

VI. CONCLUSION

Water is most important basic needs for all the living beings. But unfortunately, a large amount of water is wasted due to uncontrolled use. Some other automatic water level monitoring systems are also offered till now but there is some lack of practice in most of the method. We tried to overcome these problems and implemented an efficient automatic water level monitoring and control system. Our intention of this research work was to establish a flexible, economical and easy configurable system that could solve the problem of losing our water. We are using a low cost 8051 microcontroller in this system which is the main point of the ost. We have successfully used the system in the laboratory and therefore have proposed to control the web-based water level and control the network, which offers the flexibility to control this system with different types of equipment from any location through the internet. Will do This can be quite beneficial for the efficient management of water by this research work.

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