AUTOMATIC WATER LEVEL CONTROLLER

Introduction

Arduino based automatic water level indicator and controller project is used to measure the water level by using ultrasonic sensors. Basic principle of ultrasonic distance measurement is based on ECHO. When sound waves are transmitted in the environment then they return back to the origin as ECHO after striking on any obstacle. So we have to only calculate its travelling time of both sounds, which means outgoing time and returning time to origin after striking on any obstacle. And after some calculation we can get a result that is the distance. This concept is used in the water controller project where the water motor pump is automatically turned on when water level in the tank becomes low.

Block Diagram

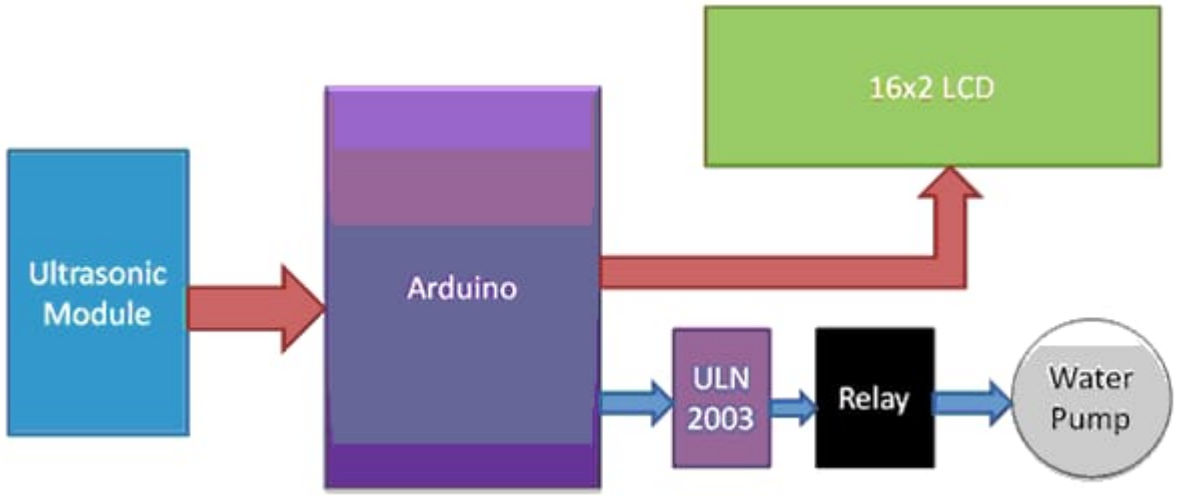

Figure: Block Diagram of Water Level Controller

Components Used

1. Arduino Uno
2. Ultrasonic sensor Module
3. 16x2 LCD
4. Relay 6 Volt
5. ULN2003

Ultrasonic Sensor Module

Ultrasonic sensor HC-SR04 is used to measure distance in range of 2cm-400cm with accuracy of 3mm. The sensor module consists of an ultrasonic transmitter, receiver and the control circuit. The ultrasonic sensor module works on the natural phenomenon of ECHO of sound. A pulse is sent for about 10us to trigger the module. After which the module automatically sends 8 cycles of 40 KHz ultrasound signal and checks its echo. The signal after striking with an obstacle returns back and is captured by the receiver.

LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications Here the water level and other important data are displayed on a 16×2 LCD display.

Relay and ULN2003

Volt relay is also connected at pin 8 of the arduino through **ULN2003** for turning on or turning off the water motor pump.

Working Principle

In this circuit the Ultrasonic sensor module is placed at the top of the bucket (water tank) for demonstration. This sensor module will read the distance between the sensor module and the water surface, and it will show the distance on the LCD screen with the message “Water Space in Tank is:”. It means we are here showing an empty place of distance or volume for water instead of water level. Because of this functionality we can use this system in any water tank. When the empty water level reaches a distance about 30 cm then Arduino turns ON the water pump by driving a relay. And now LCD will show “LOW Water Level” “Motor turned ON”, and Relay status LED will start glowing

Now if the empty space reaches a distance about 12 cm, the arduino turns OFF the relay and the LCD will show “Tank is full” “Motor Turned OFF”. Buzzer also beeps for some time and the relay status LED will turn OFF.

Advantages

- Human effort is reduced as the system controls the motor automatically based on the water level.
- This system consumes less power.

Applications

- Used in big buildings where manual monitoring is difficult.
- Used in industries to control the liquid level automatically.