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Fluid Level Controller and Detector

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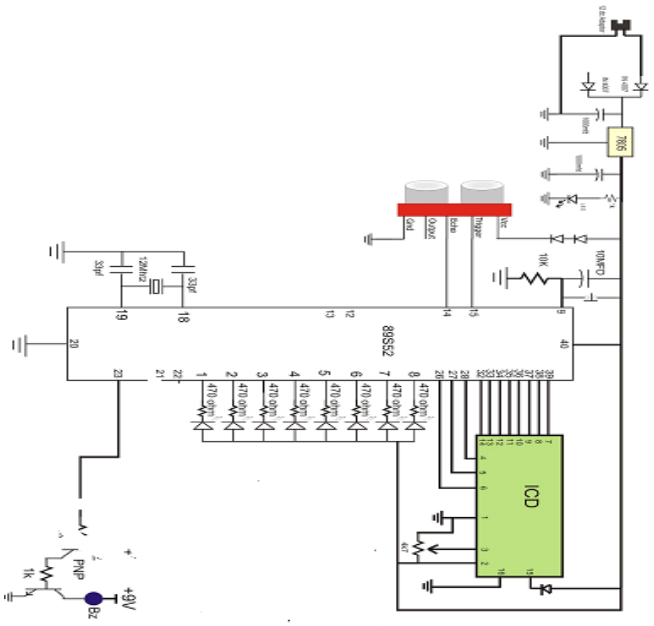
ABSTRACT:
The project Ultrasonic FLUID LEVEL is a very interesting and useful project for many industrial applications. In this project we have used the ultrasonic waves to measure the distance in between two points. If the measure distance is below set point then circuit automatic stop the water level. We use different LED with buzzer in this project. When ultrasonic sensor detect the liquid level it then circuit measure the water and display the same on LCD. At the same time microcontroller compare the water and switch on the corresponding LED as per the distance in this project we use one motor to drive the water level. When we switch the power then water level starts automatically and water is measured by the ultrasonic sensor. When sensor sense the interruption then level is display on the LCD automatically. When water level is nearby to collapse with the object then water level stop automatically.

1. INTRODUCTION:

Water level controller is the equipment used to control the water level in a field. The level of the water is controlled by using a microcontroller. Main components are PIC microcontroller, sensor, motor etc. The sensor senses the presense of water and give indication to the microcontroller. The microcontroller produces the control signals to drive the motor. If there is no water then microcontroller gives control signal to start the motor and if there is sufficient water in the field then the microcontroller give control signal to stop the motor. And also the microcontroller enables the display and displayed as "THE MOTOR IS ON" when the motor starts and disable the display when the motor is off. Hence the level of water in a field can be automatically controlled. The main components used in this is ultrasonic sensor, motor, microcontroller. Level sensors the level of substances that flow, including liquids . The substance to be measured can be inside a container or can be in the natural form for example river or lake. The level of measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point level sensors only indicate whether the substance is above or below the sensing point. This project used continuous level sensor that is ultrasonic sensor.

CIRCUIT DIAGRAM:



2. LITERATURE RESEARCH:

This aims in finding the difference between old and new techniques:

2.1 Technology of Water level

The technique of water level monitoring and controlling system concentrated with some basic parts which are softly aggregated together in our proposed method. Basic descriptions of some parts are described below. Water Level Indicator For water level indication unit we can use some LED light which will work for water level indication. By touching different water levels through water level sensor, LED should be indicated as on/off (i.e. on: yes sensor senses water. Water Level Sensor To make special water level sensor we would like to introduce some convenient materials such as Iron rod, nozzles, resistance, rubber etc. A connecting rod made by iron and steel which should be connected with ground and we need at least four nozzles which should be connected with +5v via a 1kΩ resistance. We need to bind them together and put a rubber at their joint point which will act as an insulator for every nozzle. When the sensor touches water, nozzles and connecting rod get electric connection using water conductivity.

Microcontroller Based Automated Water Level Sensing and Controlling: Design and Implementation Issue

2.2 Ultrasonic Sensoning

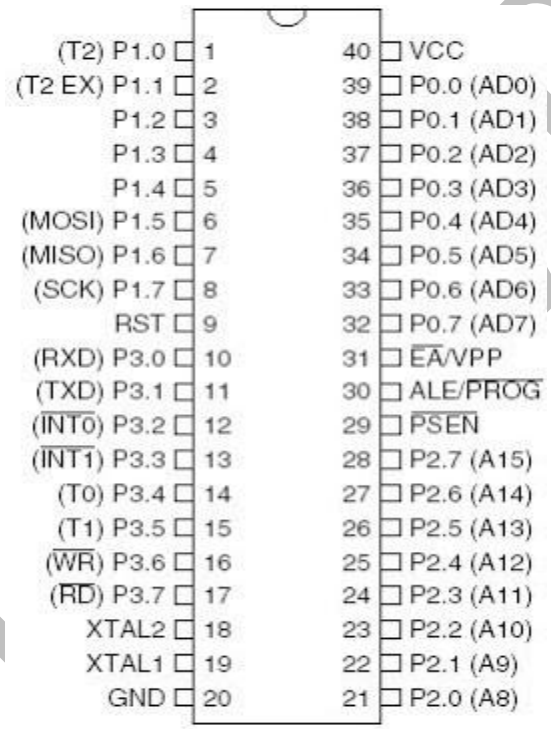
The basic principal is based on the speed of ultrasonic waves in open air. We have used a microcontroller 89S52 MICROCONTROLLER to transmit and receive ultrasonic waves through 40 KHz ultrasonic receiver and transmitters MODULE. By measuring the time required to travel the unknown distance by ultrasonic waves in air we can find out the distance between two points. The distance measured is displayed on a LCD display. The transmission & reception of ultrasonic waves is very complex in nature so it needs very sophisticated techniques to process these waves. There are numerous applications of ultrasonic waves in instrumentation and control. These applications include measurement of distance, speed, flow etc. Ultrasonic also find many application in medical instrumentation.

3. Background Information

This section presents background information on the main subsystems of the project. Specifically, this section discusses microcontroller and ac motor theory in order to provide a better understanding.

3.1 Microcontroller: A microcontroller is a single chip that contains the processor, volatile memory for input and output, non-volatile memory for the program, a clock and an I/O control unit also called a computer on a chip, more than billions of microcontroller units are embedded each year in a myriad of products from simple toys to appliances to automobiles. In this system we use 89S52 microcontroller.

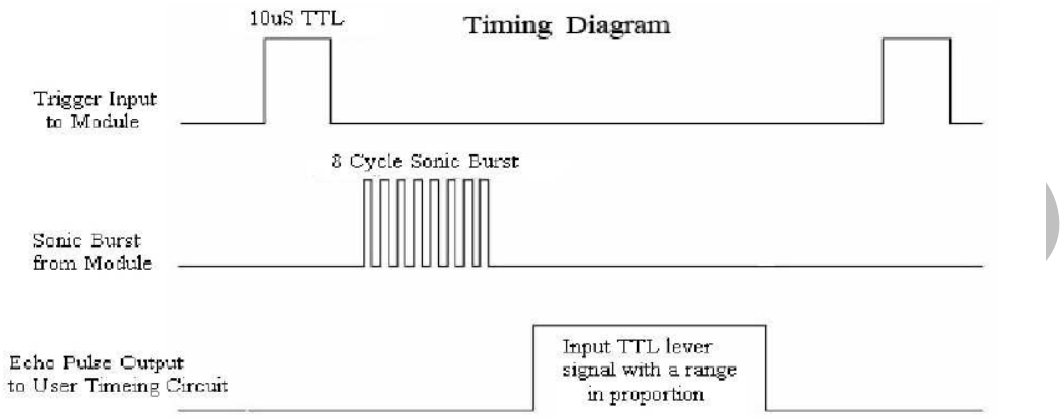
Fig1: PIN diagram of 89S52 microcontroller



3.2 Ultrasonic module.

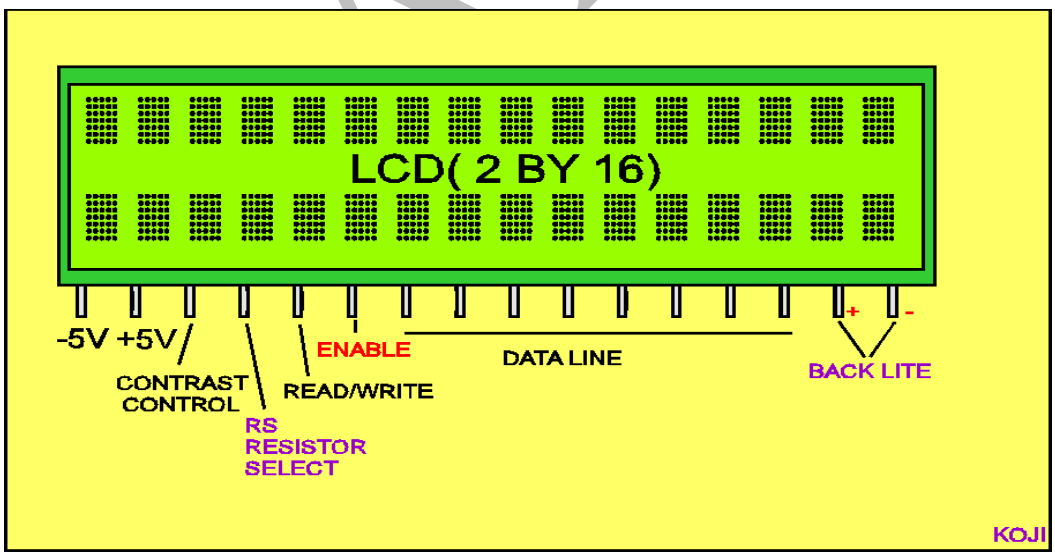
Fig2: Ultrasonic Sensor

The Timing diagram is shown below. You only need to supply a short 10uS pulse to the trigger input to start the ranging, and then the module will send out an 8 cycle burst of ultrasound at 40 kHz and raise its echo. The Echo is a distance object that is pulse width and the range in proportion .You can calculate the range through the time interval between sending trigger signal and receiving echo signal. Formula: uS / 58 = centimeters or uS / 148 =inch; or: the range = high level time * velocity (340M/S) / 2; we suggest to use over 60ms measurement cycle, in order to prevent trigger signal to the echo signal.



3.3 LCD SCREEN:

There is total 8 data line on the LCD for data receiving , but here we use only 4 data lines for data receiving from the microcontroller. Pin no 33,34,35,36 is connected to the pin no 11,12,13,14 of the LCD data lines. Pin no 4,5,6 is the RS/RW/ENABLE pin no of the LCD , These pins are connected to the pin no 39,38,37 of the microcontroller



3.4 Reset Circuitry:

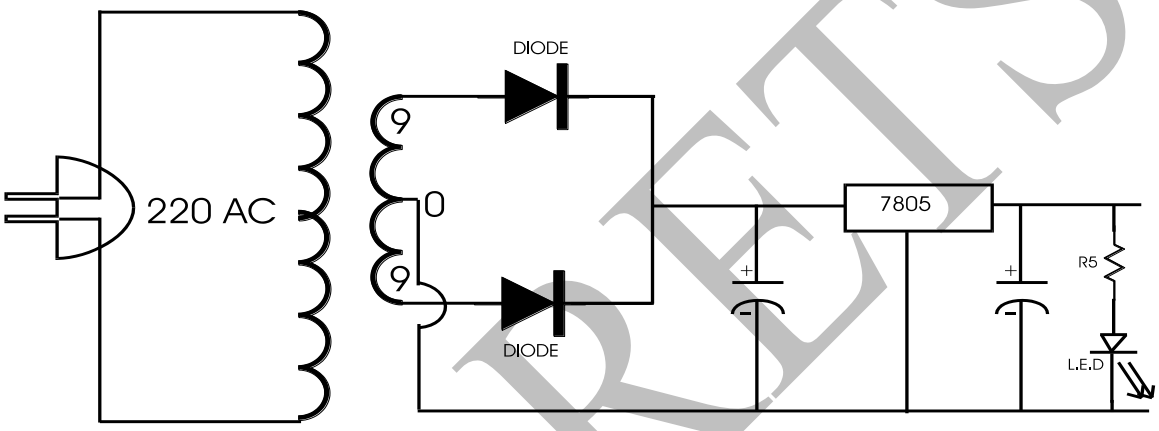
As soon as you give the power supply the 8051 doesn't start. You need to restart for the microcontroller to start. Restarting the microcontroller is nothing but giving a Logic 1 to the reset pin at least for the 2 clock pulses. So it is good to go for a small circuit which can provide the 2 clock pulses as soon as the microcontroller is powered. This is not a big circuit we are just using a capacitor to charge the microcontroller and again discharging via resistor.

3.5 Crystals

Crystals provide the synchronization of the internal function and to the peripherals. Whenever we are using crystals we need to put the capacitor behind it to make it free from noises. It is good if we use 33 pf capacitor.
We can also use resonators instead of costly crystal which are low cost and external capacitor can be avoided.
But the frequency of the resonators varies a lot. And it is strictly not advised when used for communications projects.

3.6 POWER SUPPLY

In the power supply section we use one step down transformer to step down the voltage from 220 volt ac to 9 volt dc. Output of the transformer is further connected to the two diode circuit. Here two diode work as a full wave rectifier circuit. Output of the full wave rectifier is now filtered by the capacitor. Capacitor converts the pulsating dc into smooth dc with the help of charging and discharging effect. Output of the capacitor is now regulated by the ic 7805 regulator. IC 7805 provides a 5 volt regulation to the circuit and provides a regulated 5 volt power supply. Output of the regulator is now again filter by the capacitor. In the output of the capacitor we use one resistor and one LED in series to provide a visual indication to the circuit.



4. CONCLUSION

By measuring the time required to travel the unknown distance by ultrasonic waves in air we can find out the distance between two points. The distance measured is displayed on a LCD display. The transmission & reception of ultrasonic waves is very complex in nature so it needs very sophisticated techniques to process these waves. This helps us to indentify that how much liquid is there in the tank. We can enter the value also that how much liquid do we want in the tank.

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