Drip Irrigation Automation By Using Microcontroller

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Abstract- *In the field of agriculture, use of proper method of irrigation is important and it is well known that irrigation by drip is very economical and efficient. In the conventional drip irrigation system, the farmer has to keep watch on irrigation timetable, which is different for different crops. The project makes the irrigation automated. With the use of low cost sensors and the simple circuitry makes these projects a low cost product, which can be bought even by a poor farmer. This project is best suited for places where water is scares and has to be used in limited quantity. Also, third world countries can afford this simple and low cost solution for irrigation and obtain good yield on Crops. The AT89c51 microcontroller that will be used in this project. 16x2 LCD is connected to microcontroller, which displays the humidity level, temperature range and motor ON and OFF indication. Soil moisture sensor is also used for the moisture present in the land. Three relay are controlled by the microcontroller for ON OFF the motor and cooling fan. we also use the temperature and humidity sensor, LDR and cooling fan. if we use these system in the green house for temperature and humidity control*

Keywords- AT89c51,SL-HS-220, 16x2 LCD, ADC

I. INTRODUCTION

The continuous increasing demand of the food requires the rapid improvement in food production technology. In a country like India, where the economy is mainly based on agriculture and the climatic conditions are isotropic, still we are not able to make full use of agricultural resources. The main reason is the lack of rains & scarcity of land reservoir water. The continuous extraction of water from earth is reducing the water level due to which lot of land is coming slowly in the zones of un-irrigated land. Another very important reason of this is due to unplanned use of water due to which a significant amount of water goes waste. In the modern drip irrigation systems, the most significant advantage is that water is supplied near the root zone of the plants drip by drip due to which a large quantity of water is saved. At the present era, the farmers have been using irrigation technique in India through the manual control in which the farmers irrigate the land at the regular intervals. This process sometimes consumes more water or sometimes the water reaches late due to which the crops get dried.

The main aim of this project is to provide automatic irrigation to the plants which helps in saving money and water. The entire system is controlled using microcontroller which is programmed as giving the interrupt signal to the dripper. The humidity sensor are connected to internal ports of micro controller via ADC, Whenever there is a change in temperature and humidity of the surroundings these sensors senses the change in temperature and humidity and gives an interrupt signal to the micro-controller and thus the motor is ON.

II. DESCRIPTION OF COMPONENTS

Following are the major components used from which microcontroller based automation irrigation system has been fabricated

1. Microcontroller
2. Analog to digital convertor (ADC)
3. Liquid crystal display(LCD)
4. Soil moisture sensor
5. Temperature sensor
6. Water pump
7. Relay
8. Light sensor (LDR)
9. Cooling fan
10. LED bulb

A. Microcontroller

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash Programmable and Erasable Read Only Memory (PEROM) and 128 byte of RAM. It can be erased and program to a maximum or 1000 times.

B. Analog to Digital Convertor

The ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter,8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique.

C. Liquid Crystal Display

The LCD will display alphabets, numbers, characters and symbol. The LCD used here is eight bit parallel type and the display size is 16x2.liqued crystal display is used for displaying the moisture value, temperature range, motor ON and OFF.

D. Soil Moisture Sensor

The two copper leads act as the sensor probes. They are immersed into the specimen soil whose moisture content is under test. The conductivity of soil depends upon the amount of moisture present in it. It increases with increase in the water content of the soil that forms a conductive path between two sensor probes leading to a close path to allow current flowing through and will trigger an alarm and stop the pumps from continuously watering the plants.

E. Humidity sensor

Humidity sensor is used for sensing the vapors in the air. The change in RH (Relative Humidity) of the surroundings would trigger the Controller to activate the heater.

F. Temperature senor

It is an integrated circuit sensor that can be used to measure the temperature in the greenhouse. If the temperature may rises, it would triggers the cooling devices.

III. METHODOLOGY

A. Block Diagram

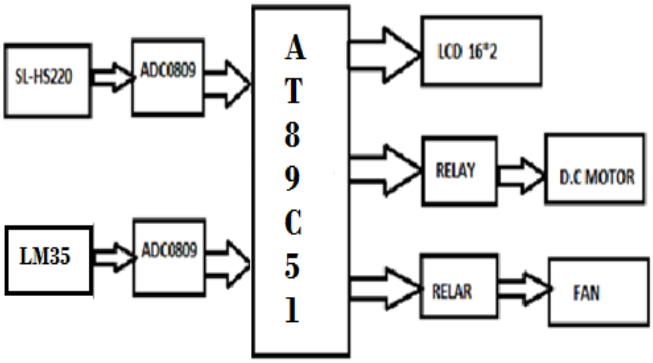

Figure3:system block diagram

B. Working of the system

The hole system required +5v and +12volt power supply. The AT89C51 is the heart of the system all programming part are save in the controller according to the program the controller perform the operation. The output of temperature sensor LM 35 and output of the humidity sensor are analog in the nature so the ADC 0809 are required to convert this analog output to the digital form so the ADC 0809 are used. The output of the soil moisture sensor is directly voltage so it will directly feed into the controller. We all ready set the value of the temperature and humidity in the controller when the value of the sensor are greater than the set vale then the cooling fan start also the heater for the hot air also start to maintain moisture. When the sunlight is poor then the light will be automatic ON and OFF.

C. Advantages Of System

1. It will reduces the man power all operation perform a single device.
2. Accuracy of the circuit is high.
3. More reliable.
4. Cheep in cost.

D. APPLICATION OF SYSTEM

1. In green house monitoring and controlling system.
2. It can be used for industrial application to maintain various parameters.
3. It can be used in temperature control, humidity control, soil moisture, maintain, and sun light detection.

IV. CONCLUSION

The Microcontroller based drip irrigation system proves to be a real time feedback control system which monitors and controls all the activities of drip irrigation system efficiently. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save man power, water to improve production and ultimately profit.

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