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AUTOMATIC IRRIGATION SYSTEM

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Abstract-

The goal of the project is to create an autonomous irrigation system that turns the pump motor on and off in response to soil moisture levels. Using the right irrigation technique is crucial in the realm of agriculture. The benefit of this approach is that it requires less human involvement while yet ensuring proper irrigation. By using an op-amp as a comparator and serving as an interface between the sensor setup and the microcontroller, it uses a microcontroller that is configured to receive input signals of changing soil moisture conditions. The controller generates an output that drives a relay to operate the pump as soon as it receives this signal. Additionally connected to the microcontroller is an LCD display for status monitoring.

Key Words*: soil moisture sensor, 8051Microcontroller, relay, LED Display, ac motor*

Introduction

People in today's fast-paced environment demand that everything be automated. Every aspect of modern human life must be remote controlled. Human existence should be easier in the age of advanced gadgets. In order to make it more convenient, we created the "AUTOMATIC IRRIGATION SYSTEM". Millions of individuals benefit from an irrigation facility control concept. This model creates a smart switching device using sensing arrangement technology and a microprocessor. The need for quick advancements in food production technologies is driven by the ever-rising demand for food. a nation like India, even in places where agriculture dominates the economy and the climate is isotropic, we are unable to fully utilize agricultural resources. The primary causes are a lack of rain and shortage.

1. PROPOSEDSYSTEM

The main reason is the lack of rains & scarcity of land reservoir water. Irrigation has always been an ancient practice which has evolved through so many stages over the years. Our ancestral farmers in a bid to irrigate their farm sought for various methodologies. Manual irrigation using buckets and watering cans, flood irrigation, drip irrigation, sprinkler irrigation were and are still being used today. The existing system has several limitations; leaching off of soil nutrients, erosion due to flooding, loss of water from plant surfaces through evaporation, water wastage which can result to water scarcity in drought areas and production of unhealthy crops.

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BLOCK DIAGRAM:

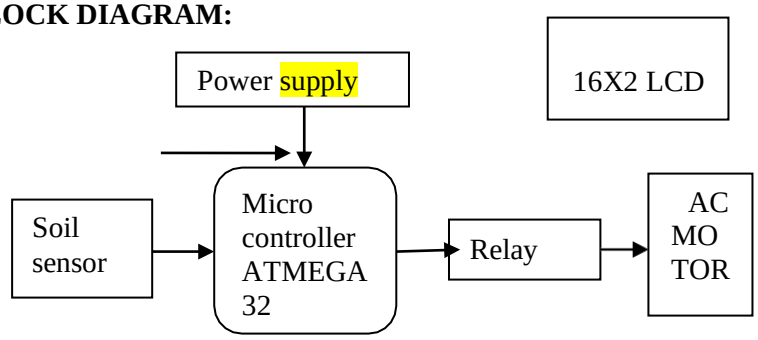

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Fig -1: Block Diagram of Automatic irrigationsystem

Experimental Work

- Write the programs to theController by using keil software
- Now burn the program in themicrocontroller with the helpof the flash magic.
- Give the connectionaccording to the circuitdiagram.
- Use power supply circuitstoprovide 5Vol. DC to themicrocontroller,
- Now you can see the samemessageon LEDBoard.

1.1 HARDWAREMODULE

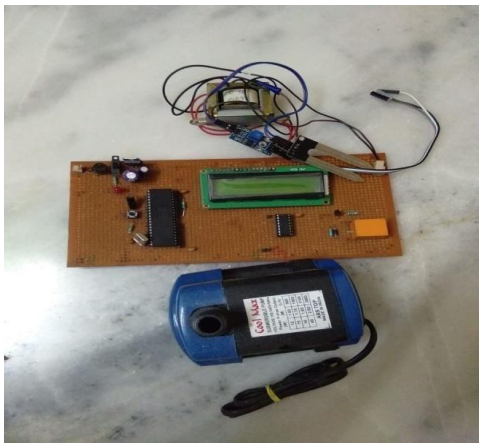
1. Microcontroller atmega 32
2. Power Supply3.soil sensor

Micro controller atmega32

ATmega32 is an 8-bit high performancemicrocontrollerof Atmel's Mega AVRfamily.It isbased on nhancedRISC (ReducedInstructionSetComputing)rchitecture with 131 powerful instructions.Most of the instructions execute in onemachine cycle. MIcrocontroller can work ona maximum frequency of 16MHz.

The main features are: -

- 32K bytes of In-System Programmable Flash Program memory withRead-While-Write capabilities
- 1024 bytes EEPROM
- 2K byte SRAM
- 32 general purpose I/O lines
- 32 general purpose working registers
- a JTAG interface for Boundary scan
- On-chip Debugging support andprogramming



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1.1.1 Power Supply:

For our project we require + 5 Volt and
+12 Volts supply. +5 Volt is given toMicro-controller board, and LED display.
+12 Volts are used for the GSM MODEM.

1.1.2 soil sensor

Soil moisture sensors measure the volumetric water content in soil .Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons as a proxy for the moisture content.

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- Frequency Domain Reflectometry: The dielectric constant of a certain volume element around the sensor is obtained by measuring the operating frequency of an oscillating circuit.
- Time domain transmission: The dielectric constant of a certain volume element around the sensor is obtained by measuring the speed of propagation along a buried transmission line.[2]

1.1.3 RELAY

A small cradle relay often used in ectronics. The "cradle" term refers to theshape of the relay's armature.

A simple electromagnetic relay consists of a coil of wire wrapped around a soft iron core (a solenoid), an iron yoke which provides a low reluctance path for magnetic flux, a movable iron armature and one or more sets of contacts (there are two contacts in the relay pictured). The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts. The armature is held in place by a spring so that when the relay is de-energized there is an air gap in the magnetic circuit. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function. The relay in the picture also has a wire connecting the armature to the yoke. This ensures continuity of the circuit between the moving contacts on the armature, and the circuit track on the printed circuit board (PCB) via the yoke which is solderedto the PCB.

Then an electric current is passed through the coil it generates a magnetic field that activates the armature and the consequent movement of the movable contact(s) either makes or breaks (depending upon construction) a connection with a fixed contact. If the set of contacts was closed when the relay was de-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open. When the current to the coil is switched off, the armature is returned by a force, approximately half as strong as the magnetic force, to its relaxed position. Usually, this force is provided by a

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spring, but gravity is also used commonly in industrial motor starters. Most relays are manufactured to operate quickly. In a low- voltage application this reduces noise; in a high voltage or current application it reduces arcing. When the coil is energized with direct current a diode is often placed across the coil to dissipate the energy from the collapsing magnetic field at deactivation, which would otherwise generate a voltage spike dangerous to semiconductor circuit components. Such diodes were not widely used before the application of transistor relay drivers, but soon became ubiquitous as early germanium transistors were easily destroyed by this surge. Some automotive relays include a diode inside the relay case.If the relay is driving a large, or especially a reactive load, there may be a similarproblem of surge currents around the relay output contacts. In this case a circuit

3 CONCLUSIONS

An Automatic irrigation system have been proposed but most of them have been found to be very expensive and in available the future each of the farmer whether poor or uneducated might wake up in need of such a system therefore the proposed applications must be targeting an automatic irrigation system with minimal cost.

Here we can control the moisture content of the soil in the cultivating field automatically.

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