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Agricultural Monitoring System Using Embedded System

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ABSTRACT: The objective of this project is to agricultural monitoring system using embedded system. This project is designed with, moisture sensor, ADC, Relay with driver circuit, LCD display, Keypad, Solar panel, Charging circuit, Battery and Pump. The solar panel is solar photovoltaic modules use solar cells to convert light from the sun into electricity. Now-a-days, instead of using the power from the supply line for various operations, most of them are going for solar energy source, as it is cheapest. They trap the solar energy and they are using it for several applications. One such type of application is solar based irrigation control system. This is the cheapest method and moreover we are attaining our desired target. The moisture sensor is used to find out the environmental conditions

I. INTRODUCTION

This project relates to the cascade control of any system using Microcontroller. The control parameter is changed according to our application. Here we have controlled the irrigation pump using Microcontroller with help of solar energy system

As we studied from the solar panel gives a D.C. output of 12V this D.C. output is not always constant there is some variation in this D.C. output this can be given to the battery storage via diode. It also to avoid the reverse flow of current to the panel.

The entire system is controlled using 89S52 micro controller which is programmed as giving the interrupt signal to the relay. Humidity sensor are connected to internal ports of micro controller via Op-amp, Whenever there is a change in humidity of the surroundings these sensors senses the change in humidity. The humidity sensor measures the level of moisture in the soil and sends the signal to the microcontroller if watering is required. The motor/water pump supplies water to the plants until the desired moisture level is reached. The moisture level is also displayed on the LCD displays. In case of theft of the motor and drain run of the motor are informed to farmer by the GSM interfaced to the microcontroller.

II. EXISTING SYSTEM & PROPOSED SYSTEM

2.1. EXISTING SYSTEM

The farmers working in the farm lands are only dependent on the rains and bore wells for irrigation of the land. Even if the farm land has a water-pump, manual involvement by farmers is required to turn the pump on/off when needed.

2.2 PROPOSED SYSTEM

The project is intended to cultivate an automatic irrigation system which controls the pump motor ON/OFF on sensing the moisture content of the soil. In the field of agriculture, use of appropriate technique of irrigation is essential. The advantage of using this technique is to reduce human intervention and still certify proper irrigation. A software application was developed by predetermining the threshold values of soil moisture, temperature and water level that was programmed into an arm controller. This paper presents the controlling and monitoring the level of water and detecting the soil moisture content.

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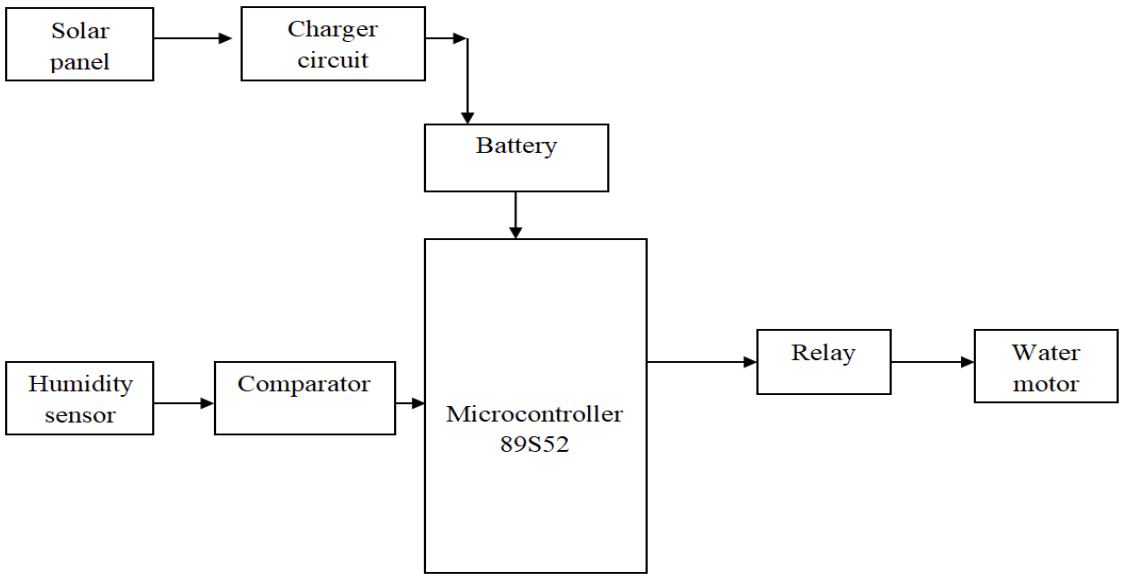
III. BLOCK DIAGRAM

3.1. BLOCK DIAGRAM



BLOCK DISCRIPTION

BLOCK DISCRIPTION

Solar panel

Solar electricity is the technology of converting sunlight directly in to electricity

Battery

A battery can be charged during day time by harvesting the solar energy through a solar cell.

Humidity sensor

The humidity sensor just senses the humidity or the moisture of the soil.

Microcontroller

The entire automation is done using micro controller.

Relay

Motor ON/OFF is controlled by a relay switch connected to Microcontroller 89s52.

Water spry

The water spry is used to pump the water and electrically supply water to plants.

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SOLAR PANEL

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Solar Panels are a form of active solar power, a term that describes how solar panels make use of the sun's energy: solar panels harvest sunlight and actively convert it to electricity. Solar Cells, or photovoltaic cells, are arranged in a grid-like pattern on the surface of the solar panel. These solar voltaic cells collect sunlight during the daylight hours and covert it into electricity.

BATTERY

9. BATTERY

Battery (electricity), an array of electrochemical cells for electricity storage, either individually linked or individually linked and housed in a single unit. An electrical battery is a combination of one or more electrochemical cells, used to convert stored chemical energy into electrical energy. Batteries may be used once and discarded, or recharged for years as in standby power applications. Miniature cells are used to power devices such as hearing aids and wristwatches; larger batteries provide standby power for telephone exchanges or computer data centers.

Figure : Lead-Acid Battery

Lead-acid batteries are the most common in PV systems because their initial cost is lower and because they are readily available nearly everywhere in the world. There are many different sizes and designs of lead-acid batteries, but the most important designation is that they are deep cycle batteries. Lead-acid batteries are available in both wet-cell (requires maintenance) and sealed no-maintenance versions.

Lead acid batteries are reliable and cost effective with an exceptionally long life. The Lead acid batteries have high reliability because of their ability to withstand overcharge, over discharge vibration and shock. The use of special sealing techniques ensures that our batteries are leak proof and non-spoilable. The batteries have exceptional charge

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acceptance, large electrolyte volume and low self-discharge, Which make them ideal as zero- maintenance batteries lead acid batteries.
Are manufactured/ tested using CAD (Computer Aided Design). These batteries are used in Inverter & UPS Systems and have the proven ability to perform under extreme conditions. The batteries have electrolyte volume, use PE Separators and are sealed in sturdy containers, which give them excellent protection against leakage and corrosion.

FEATURES

- Manufactured/tested using CAD
- Electrolyte volume
- PE Separators
- Protection against leakage

MICROCONTROLLER

MICROCONTROLLER

Microcontrollers are destined to play an increasingly important role in revolutionizing various industries and influencing our day to day life more strongly than one can imagine. Since its emergence in the early 1980's the microcontroller has been recognized as a general purpose building block for intelligent digital systems. It is finding using diverse area, starting from simple children's toys to highly complex spacecraft. Because of its versatility and many advantages, the application domain has spread in all conceivable directions, making it ubiquitous. As a consequence, it has generate a great deal of interest and enthusiasm among students, teachers and practicing engineers, creating an acute education need for imparting the knowledge of microcontroller based system design and development. It identifies the vital features responsible for their tremendous impact, the acute educational need created by them and provides a glimpse of the major application area.

FEATURES

• Fully Static Operation: 0 Hz to 24 MHz
• Three-Level Program Memory Lock
• 128 x 8-Bit Internal RAM
• 32 Programmable I/O Lines

IV. SOFTWARE TOOLS

SOFTWARE TOOLS

KEIL SOFTWARE

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

PROLOAD

Proload is a software which accepts only hex files. Once the machine code is converted into hex code, that hex code has to be dumped into the microcontroller placed in the programmer kit and this is done by the Proload. Programmer kit contains a microcontroller on it other than the one which is to be programmed. This microcontroller has a program in it written in such a way that it accepts the hex file from the keil compiler and dumps this hex file into the microcontroller which is to be programmed. As this programmer kit requires power supply to be operated, this power supply is given from the power supply circuit designed above. It should be noted that this programmer kit contains a power supply section in the board itself but in order to switch on that power supply, a source is required. Thus this is accomplished from the power supply board with an output of 12volts or from an adapter connected to 230 V AC.

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V. PCB&SOLDRING DETAILS

SOLDERING

This is the operation of joining the components with PCB after this operation the circuit will be ready to use to avoid any damage or fault during this operation following care must be taken.

1. A longer duration contact between soldering iron bit & components lead can exceed the temperature rating of device & cause partial or total damage of the device. Hence before soldering we must carefully read the maximum soldering temperature & soldering time for device.
2. The wattage of soldering iron should be selected as minimum as permissible for that soldering place.
3. To protect the devices by leakage current of iron its bit should be earthed properly.
4. We should select the soldering wire with proper ratio of Pb & Tn to provide the suitable melting temperature.
5. Proper amount of good quality flux must be applied on the soldering point to avoid dry soldering.

Construction:

Step in PCB designing

1. The circuit to be fabricated out is board through carbon paper on PCB sheet.
2. The carbon print is covered using permanent marker.
3. Make a solution of ferric chloride (fecl3) in tray.
4. Dip the PCB neatly in step 2 in the solution and mounting in continuously.
5. Continue step 4 until the copper (except under permanent marker).
6. Wash PCB with water, PCB is ready.
7. Drill the hulls so that the component can be mounted.
8. Mount the components.
9. Soldering in done make the final circuit ready.

Tips in follow while soldering

1. While soldering ics always keep temperature b/w 150-250c.
2. During the soldering of component keep the temperature B/w 250-350c.
3. Always take care that form does not get shorted while soldering.
4. Soldering should be thinner to be diameter.
5. For soldering use a soldering station is 10-25watt.

VI. ADVANTAGES & APPLICATION

ADVANTAGES

- Saving money and water.
- Improves growth
- Water is only delivered where it's needed.
- Saves time
- Helps control fungal diseases, which grow quickly under moist conditions. Also, wet foliage can spread disease.

APPLICATIONS

- Agriculture to irrigate properly.
- Green plants.
- Garden.
- House plants.

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VII. CONCLUSION

This project is very useful in water irrigation system application. A record of soil moisture, temperature, rain fall is ,maintain in a data base for backup.

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