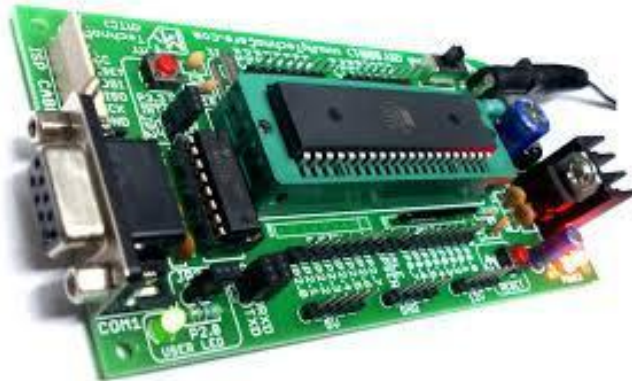Symbiosis Institute of Technology

Sem: V

Microcontrollers and Applications

Mini Project -Synopsis

Topic: Smart Streetlamp using microcontroller interfaced with light dependent resistor

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AIM: Smart street lamp using microcontrollers peripherals and ldr

Material required: LDR, power supply, photo sensor , PIC 12F1571, general purpose pcb, single stranded wire , resistor

PIC microcontroller:

PIC microcontrollers are electronic circuits that can be programmed to carry out a vast range of tasks. They can be programmed to be timers or to control a production line and much more. PIC is a Peripheral Interface Microcontroller which was developed in the year 1993 by the General Instruments Microcontrollers. It is controlled by software and programmed in such a way that it performs different tasks and controls a generation line. They are found in most electronic devices such as alarm systems, computer control systems, phones, in fact almost any electronic device.

There are many PICs available in the market ranging from PIC16F84 to PIC16C84. These types of PICs are affordable flash PICs. Microchip has recently introduced flash chips with different types, such as 16F628, 16F877 and 18F452. PIC 18 has lower price as compared to n price of the old 16F84, but it is eight times more than the code size, with more RAM and much more I/O pins, a UART, A/D converter and a lot more features.

LDR:

An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.The most common type of LDR has a resistance that falls with an increase in the light intensity falling upon the device (as shown in the image above).

There is a large variation between these figures, so the ldr can successfully detect minor variations in light and provide an analog value.

They can be described by a variety of names from light dependent resistor, LDR, photoresistor, or even photo cell, photocell or photoconductor.Although other devices such as photodiodes or photo-transistor can also be used, LDRs or photoresistors are a particularly convenient electronics component to use. They provide large change in resistance for changes in light level.In view of their low

cost, ease of manufacture, and ease of use LDRs have been used in a variety of different applications. At one time LDRs were used in photographic light meters, and even now they are still used in a variety of applications where it is necessary to detect light levels.

There are many applications for Light Dependent Resistors. These include:

Lighting switch:

The most obvious application for an LDR is to automatically turn on a light at a certain light level. An example of this could be a street light or a garden light.

Introduction to project:

Most cities are aware of the benefits of LED streetlighting compared to their existing technologies. Although LED technology has been available for decades, it has only recently become cost competitive with other lighting technologies.

LED fixtures are often 100 percent recyclable and don't use toxic substances.

LEDs are operated by tiny computers. That means they can be individually controlled and networked together to share information back and forth with a central command center run by city staff.

Individual lighting controls can be a major cost-saving technique. For example, LED streetlights that have dimming controls can reduce their light output during low-occupancy hours and power back up to full brightness when occupancy sensors sense people in the vicinity. A single streetlight could also alert all the nearby lights that a person is coming. Dimming controls can save up to 10-20 percent in additional reduced energy costs each year.

This is why we have decided to build a control system for LED using light sensitive resistor that will be switched with a microcontroller.

The design of the system:

1)   The system will consist of a power supply that will provide power to the microcontroller circuit that is interfaced with the LDR . It is basically a switching mechanism that will turn the led 'ON' when the LDR senses 'LOW' and turn the led 'OFF' when the LDR senses 'HIGH'.

2)   The program is to be written in C and the environment used is MPLABX ide. We are using PICkit 3.5 as programmer/debugger for the project

3)   There is one input from ldr sensor and one output to the led lamp. The voltage needed by the microcontroller cant exceed 5V. Hence, a power supply is constructed using a dual power supply circuit.

4)   The power supply will be constructed using center tapped rectifier and input provided through a 9V battey.