

## CONTROLLING OF STREET LIGHTS USING SMARTPHONE

T.SAI KISHORE<sup>1</sup>, M.RUBINA FATIMA<sup>2</sup>, K.POOJA HARIKA<sup>3</sup>, I.RETWIK SATYA  
TEJA<sup>4</sup>, PATHAN SALAHUDDIN<sup>5</sup>, MOHAMMED ROSHAN<sup>6</sup>

<sup>123456</sup>UG Students, Dept. of ECE, PRAGATI ENGINEERING COLLEGE

### ABSTRACT

In this present world day by day power usage is increasing but power sources are not increasing to generate enough power for our needs. So it is compulsory for everyone to eliminate power waste methods. One of power wasting applications is present street light control system, in this many times the operator forgets to switch off the lights even after morning also and we do not have option to switch on only few lights at mid nights as density of people is less at that time. And in present system we need lot of man power. We can eliminate this power wastage and reduce manpower with latest technologies that are coming out today. Especially in mobile field so many applications are being developed to give us more information and entertainment. This project is designed with combination of two latest and most demanding technologies that are Smart phone and Embedded Systems. In this project we will use an application to control street lights from mobile app. This app can be opened from anywhere using mobile. In this app we have some options or buttons to control the street lights, whenever

we operate this application then it sends command to controlling system through Bluetooth. At controlling system side we have Bluetooth module, micro controller and load controlling circuits. Whenever this Bluetooth module receives command from its application then it transfers this command to micro controller. Micro controller will control the respective loads depends up on the command it received.

### INTRODUCTION

- This Project is aimed to Control the Street Lights using Smart Phone.
- In this present world day by day power usage is increasing but power sources are not increasing to generate enough power for our needs. So it is compulsory to eliminate power waste methods. We can eliminate this power wastage and reduce man power with latest technologies that are coming out today.
- This project is designed with combination of two latest and most demanding technologies that are Smart phone and Embedded Systems.

- In this project we will use an application to control street lights from mobile app. In this app we have some options, whenever we operate this application it sends command to controlling system through Bluetooth.

At controlling system side we have Bluetooth module, micro controller and load controlling circuits.

### **8051 MICROCONTROLLER**

Microcontroller is a general-purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip they are CPU core, Memory (both ROM and RAM), Some parallel digital I/o. Microcontrollers are small in size, inexpensive, consumes less power.

8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage and 128 bytes of RAM storage, 2 16-bit timers. It consists of are four parallel 8-bit ports, which are programmable as well as addressable as per the requirement. An on-chip crystal oscillator is integrated in the microcontroller having crystal frequency of 12 MHz.

Flags are 1-bit registers provided to store the results of certain program instructions. Other instructions can test the condition of the flags and make decisions based on the flag states. In order that the flags may be conveniently addressed, they are grouped inside the program status word (PSW) and the power control (PCON) registers.

The 8052 have four math flags that respond automatically to the outcomes of math operations and three general-purpose user flags that can be set to 1 or cleared to 0 by the programmer as desired. The math flags include Carry (CY), Auxiliary Carry (AC), Overflow (OV), and Parity (P). User flag is named F0; this general-purpose flag that may be used by the programmer to record some event in the program.

Register bank selection may be done by the use of RS0 and RS1 Note that all of the flags can be set and cleared by the programmer at will. The math flags, however, are also affected by math operations.

### **HARDWARE COMPONENTS**

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.

A capacitor is a passive electronic component that stores energy in the form of an electrostatic field. In its simplest form, a capacitor consists of two conducting plates separated by an insulating material called the dielectric. The capacitance is directly proportional to the surface areas of the plates, and is inversely proportional to the separation between the plates. Capacitance also depends on the dielectric constant of the substance separating the plates.

A transformer uses the principles of electromagnetism to change one A.C. voltage level to another. Faraday's work in the 19th century showed that a changing current in a conductor (e.g., a transformer primary winding) sets up a changing magnetic field around the conductor. If another conductor (secondary winding) is placed within this changing magnetic field a voltage will be induced into that winding.

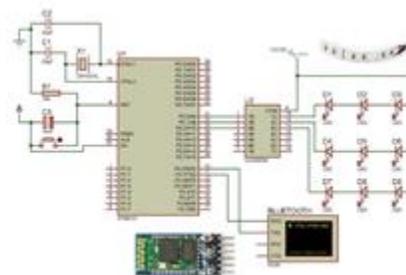
A transformer is a static electrical device that transfers electrical energy between two or more circuits. A varying current in one coil of the transformer produces a varying magnetic flux, which, in turn, induces a varying electromotive force across a second coil wound around the same core. Electrical energy can be transferred between the two coils, without a metallic connection between the two circuits. Transformer is a static

device used to convert the voltage from one level to another level without change its frequency.

A diode bridge is an arrangement of four diodes in a bridge circuit configuration that provides the same polarity of output for either polarity of input. It is used in most common application, for conversion of an alternating current input into a direct current output, it is known as bridge rectifier. A bridge rectifier provides full-wave rectification from a two-wire AC input, resulting in lower cost and weight as compared to a rectifier with a 3-wire input from a transformer with a center-tapped secondary winding.

A HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. It has six pins : 1. Key/EN 2. VCC 3.GND 4. TXD 5. RXD 6. State.

## DESIGN IMPLEMENTATION



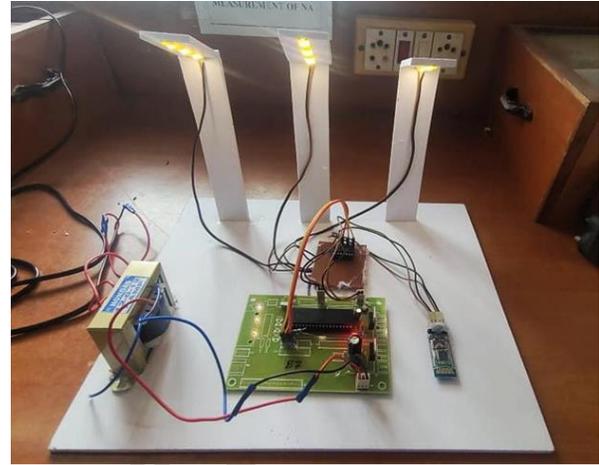
The power supply that comes to our house is generally 230v AC, but our requirement of operation of our circuit is 5v, so by using transformer we convert 230v AC to 12v AC, and after converting to 12v the output of the transformer (12v AC) is given to the onboard bridge rectifier. The bridge rectifier is used to convert AC input to the DC output here we are converting 12v AC to 12v DC, But the microcontroller operates at 5v DC so by using the voltage regulator we are converting 12v DC to the 5v AC

The smart phone is installed with bluetooth app which is to be connected with bluetooth module, so that it receives the signal from the app. The output of Bluetooth module is given to the microcontroller. Whenever the button is pressed the instructions in the microcontroller gets processed and gives output to the Relay Driver. The output of Relay Driver is connected to the street lights(LED strips). And these Led strips shows us the output of the circuit.

Initially the LED strips will be in off state, According to the button pressed in the app the particular led strip will be activated, they are:

- DEVICE 1 ON - LED Strip 1: ON
- DEVICE 2 ON - LED Strip 2: ON
- DEVICE 3 ON - LED Strip 3: ON
- DEVICE 1 OFF - LED Strip 1: OFF

- DEVICE 2 OFF - LED Strip 2: OFF
- DEVICE 3 OFF - LED Strip 3: OFF
- All ON/OFF



### CONCLUSION

- Controlling of street lights using smart phone provided wireless control for on/off of lights. By this the manual operation is completely eliminated.
- The street lights can be switched on/off using mobile phone without actually going near the switchboards.
- This can create a whole new dimension as it takes the control of as near as to one's palm for always.

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