

# Energy Efficient Street Light Controller

S. S. Kadlag  
Assistant Professor  
AVCOE, Sangamner

A. K. Pathak  
Assistant Professor  
AVCOE, Sangamner

## ABSTRACT

In today's world we all are well acquainted with our nation's energy scenario. The energy demand by far outstrips the energy supply. In order to balance the ratio between energy demand and supply, load shedding is performed. We witness daily power cuts in domestic as well as industrial sectors, hence energy saving is the need of our hour. Not only the available power is less than the demand but also it is being wasted on a large scale. The wastage is in the form of unnecessary usage of lighting, low power factor and similar other factors. Keeping this thing in mind we have developed a "Street light controller with status feedback". The main objective of our project is power saving which is 1. by reducing voltage in various steps 2. By reducing voltage through semiconductor switches like thyristors, SCR by controlling the firing angle 3. By switching the street light in various combination at various time (RYB). Also power factor correction is performed so that losses can be

minimized. Our project is an advanced microcontroller based system which precisely controls various loads in various settings like offices, malls, public parks etc.

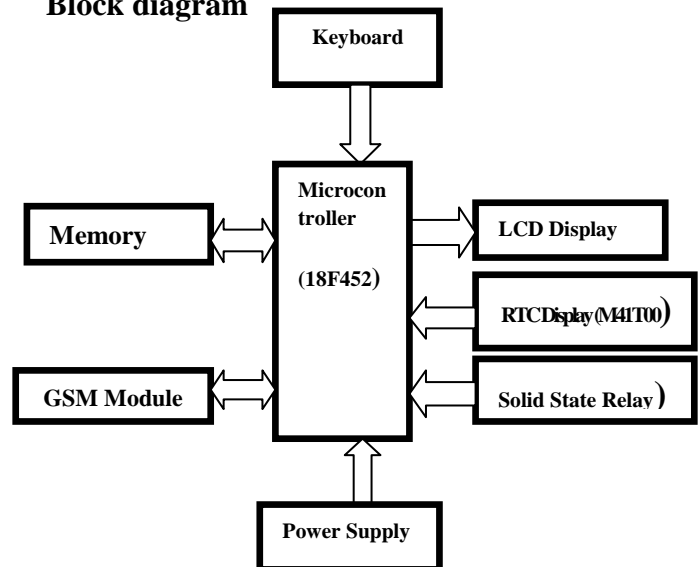
## 1. INTRODUCTION

In this project, we save the energy and power factor control by various parameter like voltage (R,Y,B), current (R,Y,B), power factor (R,Y,B), are give 230v means input is equal to output for full light 19-0.30 o'clock then again 20% decreases voltage 0.30-4 o'clock and then decreases the 100% up to 7 o'clock.

We control the voltage through GSM from one place to another place here, no need of man power and time, advantages of GSM system is we control the voltage immediate no wastage of time using the RTC and LCD display. We measure the ON time and OFF time and also calculate how much energy saves per day. We use the EEPROM memory for the starting the data means time, date, day, year & how much energy saves per year.

## 2. BLOCK-DIAGRAM DESCRIPTION

### Block diagram



## Microcontroller

The MC68HC908GP32 is a member of the low-cost, high-performance M68HC08 Family of 8-bit the relay as ON/OFF control. Microcontroller units (MCUs). All MCUs in the family use the enhanced M68HC08 central processor unit (CPU08) and are available with a variety of modules, memory sizes and types, and package types.

Features: For convenience, features have been organized to reflect:

- Standard features of the MC68HC908GP32
- Features of the CPU08
- Standard Features of the MC68HC908GP32
- High-performance M68HC08 architecture optimized for C-compilers

- Fully upward-compatible object code with M6805, M146805, and M68HC05 Families
- 8-MHz internal bus frequency
- FLASH program memory security(1)
- On-chip programming firmware for use with host personal computer which does not require highvoltage for entry
- In-system programming
- System protection features:–Optional computer operating properly (COP) reset
  - Low-voltage detection with optional reset and selectable trip points for 3.0-V and 5.0-Voperation
  - Illegal opcode detection with reset
  - Illegal address detection with reset
- Low-power design; fully static with stop and wait modes
- Standard low-power modes of operation:
  - Wait mode
  - Stop mode
- Master reset pin and power-on reset (POR)
- 32 Kbytes of on-chip FLASH memory with in-circuit programming capabilities of FLASH program memory
- 512 bytes of on-chip random-access memory (RAM)
- Serial peripheral interface module (SPI)
- Serial communications interface module (SCI)

### Gsm Module

The Global switching System for Mobile Communication (GSM) is the most popular standard for mobile phones in the world. It is a second generation (2G) mobile phone system with digital signaling and speech channels.

GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM network operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. GSM-900 uses 890-915 MHz to send the information from the mobile station to the base station (up link) & 935-960 MHz for the other direction (down link), providing 124 RF channel (channel no.1-24) spaced at 200 KHz. Duplex

spacing of 45 MHz is used. The transmission power in the handset is limited to a maximum of 2 watt in GSM 850/900 & 1 Watt in GSM 1800/1900.

Characteristics: Built-in RTC in the module.

Use AC DC Power Adaptor with following ratings

Input AC Voltage : 230V

Output DC Voltage : 12V

Output DC Current : 2A

Polarity : Centre +ve& Outside +ve

### Real Time Clock

The M41T00 is a low power serial real time clock with a built-in 32.768 kHz oscillator (external crystal controlled). Eight bytes of the RAM are used for the clock/calendar function and are configured in binary coded decimal (BCD) format. Addresses and data are transferred serially via a two-line bidirectional bus. The built-in address register is incremented automatically after each WRITE or READ data byte. The M41T00 clock has a built-in power sense circuit which detects power failures and automatically switches to the battery supply during power failures.

■ 350 nA standby at 3.0 V.

■ 1.3 V to 4.4 V operation

■ Timekeeping down to 1.0 V

■ Tiny 3 mm x 3 mm lead-free QFN16 package

■ 400 kHz I2C Interface

■ BCD registers for year, month, day, date, hours, minutes and seconds

■ 2 century bits (Y2.1 K compliant)

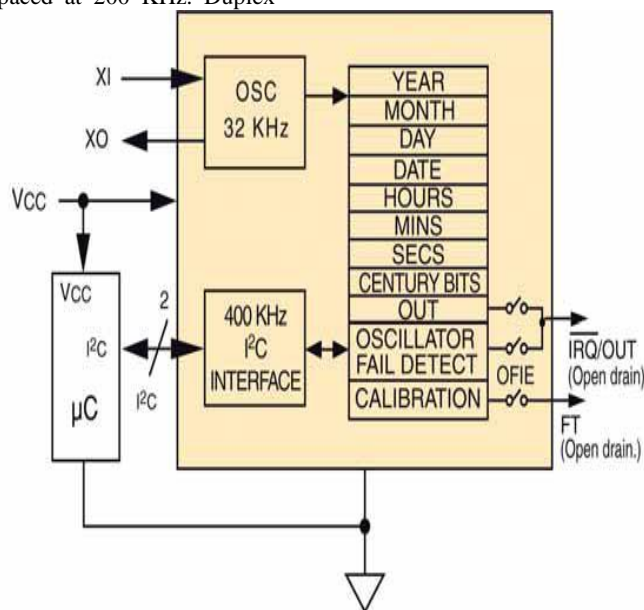
■ Automatic leap year adjustment

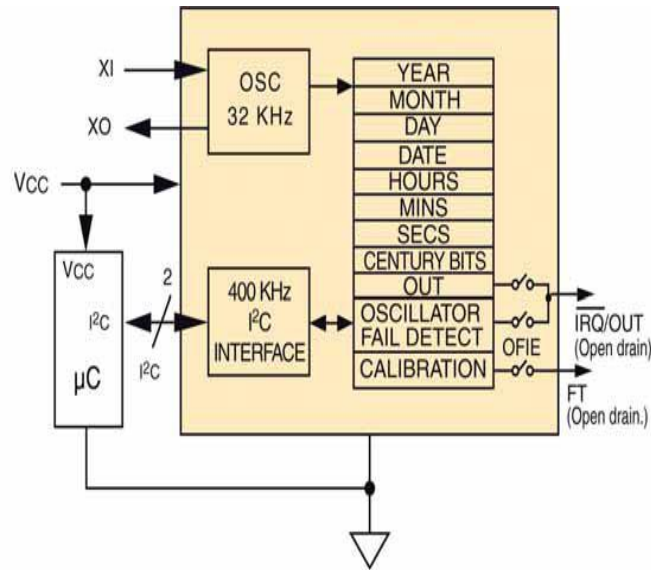
■

–40° to +85° C operating range

■ Oscillator fail detect

■ Calibration register. The energy needed to sustain the RAM and clock operations can be supplied from a small lithium coin cell.





## Features

- For new designs use M41T00S
- Counters for seconds, minutes, hours, day, month, years, and century
- 32 kHz crystal oscillator integrating load capacitance (12.5 pF) providing exceptional oscillator stability and high crystal series resistance operation
- Serial interface supports I2C bus (100 kHz protocol)
- Ultra low battery supply current of 0.8 Ma (typ at 3 V)
- 2.0 to 5.5 V clock operating voltage
- Automatic switchover and deselect circuitry (for 3 V application select M41T00S datasheet)
- Software clock calibration to compensate crystal deviation due to temperature
- Automatic leap year compensation
- Operating temperature of -40 to 85 °C

## Memory

The memory is divided into two categories program memory and data memory. The program memory stores the firmware permanently whereas the data memory content are erased when power is switched off. The AT24C512 provides 524,288 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 65,536 words of 8 bits each. The device's cascadable feature allows up to 4 devices to share a common 2-wire bus. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. Memory required for our project is 512Kb

For stamp recording

1 stamp requires 8 bytes. The byte distribution is as follows:

3 bytes for time- hrs-min-secs

3 bytes for date-dd/mm/yy

2 bytes for fuel record

## Hardware part

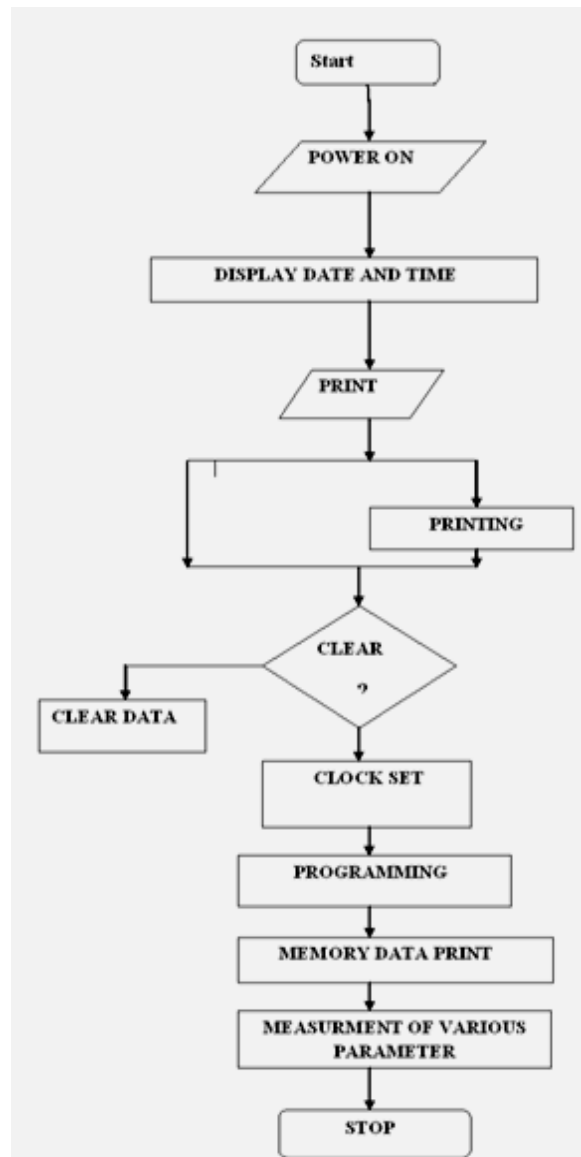
### Components used

- MC68HC908GP32
- EEPROM memory
- Three keys keyboard
- GSM module
- Solid State Relay
- Real time clock IC M41T00
- 16x2 LCD display.
- Serial communication RS232
- Power supply

### Software Part

1. Power ON
2. To display the time and date
3. To print the data
4. If yes, then go to printing
5. If no, ask clear the data
6. To set the clock
7. To go to the programming
8. Memory data print
9. Measure the parameters (R,Y,B),current(R,Y,B),KW(R,Y,B),KVA(R,Y,B),KVAR(R,Y,B)
10. Stop

## FLOW CHART



### Advantages

- Program ON/OFF time for every month as per sunset & sunrise timing of respective location
- Different modes of operation 1.Start 2.Dim1 3.Dim2 4.Dim3 5.Stop
- Following information available on LCD display
- 1.real time & month 2.I/p voltage & current for each 3Ø 3.O/p voltage & current status indication for each 3Ø
- The system energy saving capability is no load dependent If load is reduced from 10%-20%

### Limitations

- Climatic changes
- System causes the problem due to the down server

### Application

In Metro Cities,

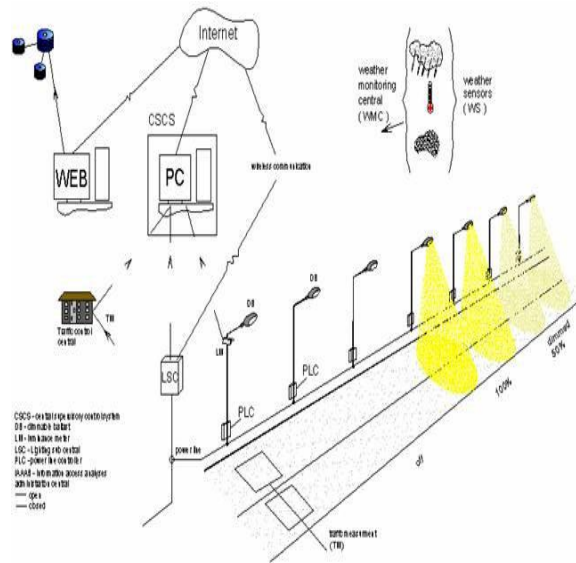
- In Rural Area(By Modifying The Program),
- In Industrial Area As Per Their Time Schedule

### 3. CONCLUSIONS

In today's life the more wastage of energy. So to save the energy and control the energy, hence we developed our project Street Light Controller with Status feedback

#### 4. FUTURE SCOPE

By using SOLAR panel, we saves the electricity in large scale



#### 5. REFERENCES

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