An Embedded System for Power Saving Of Street Light Controller

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Abstract: *This paper is about an saving of power for street light controller using Embedded technology. In the today's era of electronism, power is always concern a major issue, though we have limited resources for power generation. It is 'Power saving and energy conservation' concept which in another context can be power generation. In other words 'power saving is power generation'. The Street lights which consume lots of power if it can be used in proper operative mode and time bound conditions then it can be prove to be great efforts to these power savings. This paper is on 'street light controller' mainly focuses to control operations of street lights in group, so that proper light conditions has to be maintained on street lights with alternate ON-Off control according to time bound conditions. Secondly light measurements and input voltage measurements also forms the part of work which in turn avoid unnecessary switching of the lights and forms the part of protection by giving proper voltage operative conditions. All these protections which contributes in increase efficiency of power utilization with increase life of street lights makes the saving of national revenue in form of saving of power, saving of natural resources with the technology advancement. The cost of generating the electricity is very high. We cannot store the electrical energy. Therefore energy conservation is very important.*

Keywords: Microcontroller, Power, street light, wireless etc.

1. Introduction

In the work of 'street light' we require lot of parameters to measure and to process, most important function of time-keeping for actuators. A part from all these functions human interfacings and data recording also form the part of work. These all functions have to be synchronized and a microcontroller perform all these functions. Microcontroller require in project can be chosen which satisfy all these peripheral and timing requirements. Microcontroller require for this work shall be memory sufficient also with EEPROM capabilities. From the number of available families of microcontroller few may satisfy this criterion and from only those few single chips have to choose[1].

Lighting has always been an effective tool to promote a City. It is not only a functional requirement, which provides safety and security to motorists and residents; it helps in creating an identity and image. A well-lit city is always a reassuring place for its residents to stay and move around[2]. It has an economic benefit by way of attracting tourists and assuring its residents to stay out longer. Restaurateurs, Shop owners, Clubs and Social areas are direct beneficiaries, which contribute positively to the overall economy. It does not need any elaboration that dark roads deter people and well-lit surroundings attract people. At the same time, city lighting if not planned well can create anarchy in visual environment (both in day and night) and lead to energy waste, which is very precious in current context. Better infrastructure leads to more comfortable driving conditions. At the same time, speed of driving increases which re-emphasizes the need to have upgraded lighting conditions to match World Class standards.
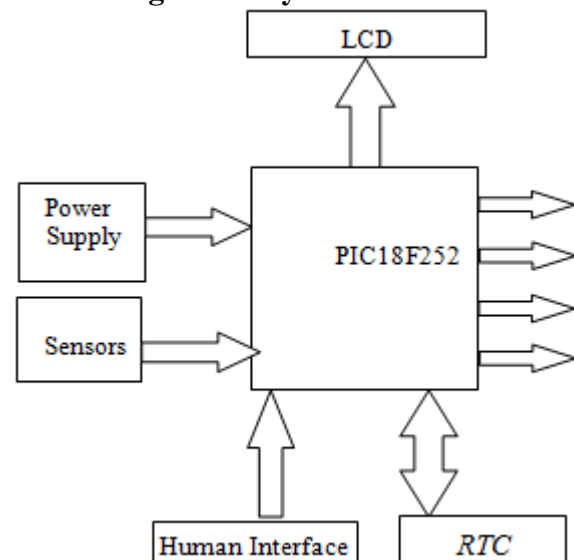
2. Block Diagram of System
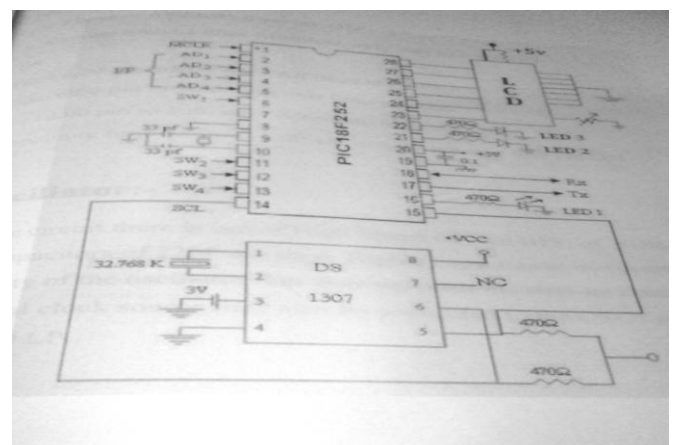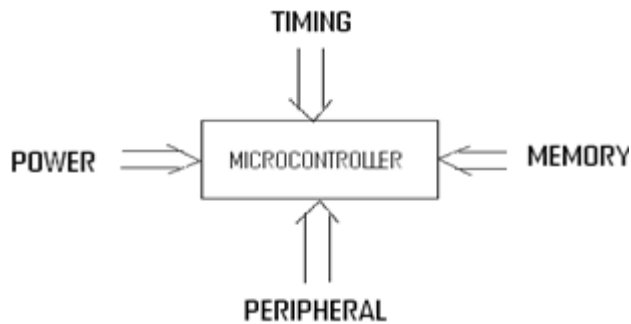

Figure 1: Block diagram

**Figure 1:** Shows the block concept of a system

A.PIC18F252 is the 28 pin IC, having 10 bit inbuilt A/D converter with five input channels. Operating frequency is DC-40MHz, 32k bytes program memory and data memory is of 1536 bytes. In this work PortA is used for the analog inputs, port B is used as output[5]

port for the LCD Display and on PortC there are 4 pins used for push-button and other 4 pins are used for the LED indication.The Relay is connected to the PortB and 5MHz crystal has been used in the oscillator

3. Sensors and Actuators

Sensors and Actuators form the part of essentials in such a way that sensors sense the required parameter for proper operation. In our research work we measure the i/p voltage by using rectifying circuits with signal conditioning and we measure the light by using transducing elements like LDR'S. These measure parameters are processed in microcontroller which generates signals for Actuators. Elements like relays and their driving circuits form the part for these actuators[6].
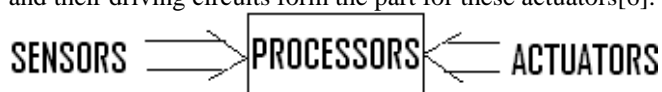
4. Display

Use of 2x16 LCD Display, which has normally, shows scrolling text. By using left justifying the higher four data bits are used for displaying the data and Enable RS pins are used for operating the LCD display. The R/W pin connected to ground because it is only used for busy check and that precision checked out by giving suitable delays. Pin1 is connected to the ground, pin 2 is connected to +5v and pin 3 is connected to the trimpot through resistor to improve the readability of the LCD and varies with the brightness of the surrounding[4]. By using the LCD Display the parameters can be monitored like, Standard inverse-3, Standard inverse-1, and Very inverse, extremely inverse, long time inverse and also monitor the normal or highest value, and reset delay, the most important parameter is like COT (contactor opening time) can be monitored.

5. Human Interfacing

Use of the push-button and the display to navigate through the menus and for set the required parameters. Keys of functioning are as MENU, ENTER, SCROLL-Up and RESET. By pressing the Enter key user will select the parameter which he wants to enter and by pressing the Menu key user can go to the list in which he has select the

parameters like SI3, VI, etc. Use of the Scroll-up key to increment the value, parameter. And also shifting the cursor right. Finally the working of the RESET pin is to clear the all parameter for which the LEDs glow[9].

6. Relay

The TRIP condition occurs as at least one channel has tripped and has been switched off due to an Over Current condition. This condition is signaled by the TRIP output signal, which is asserted true and the relevant yellow LED light.

7. RTC

User can be set the date and time, as he wants only because of inbuilt RTC.

8. Light Sensor

Light sensors used here are Light Dependent Resistor (LDR). The LDR is made by CdS material. It possesses photoconductive effect. When there is no light on LDR then its resistance is very large i. e. in Mega ohms. When LDR is exposed to light means when light falls on LDR its resistance of will decrease. It will be in few ohms.
A.

9. Power Supply

Requirements of power supply is the main task, power supply of +5V and +12V is required for the circuit. The supply of +12 V needed for the relay connections and 7805 IC which has given +5V to the circuit[10].

## 10. Result

A.MPLAB IDE

 The latest information on Microchip MPLAB IDE v7.21, the Windows(R) Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB IDE Project Manager, MPLAB Editor and MPLAB SIM simulator, as well as general editing and debugging features.
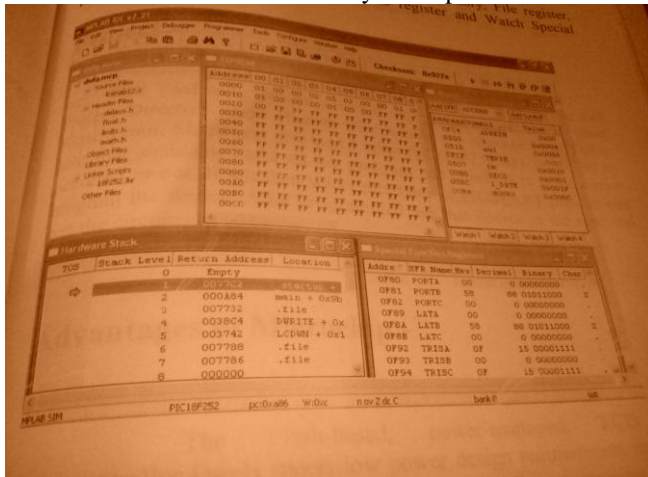
B.Compilers

 Include the MPLAB C18 and MPLAB C30 C compilers, MPLAB ASM30 assemblers.

C.Memory Usage Gauge

In this work user can see program memory and data memory has been used
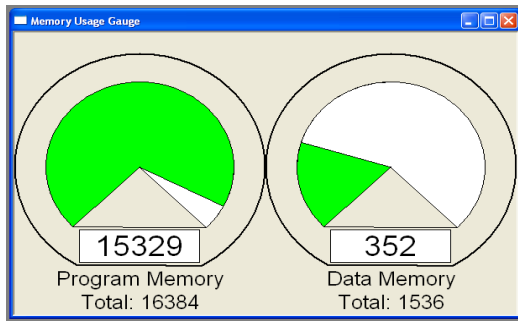
The LEDs are controlled with the help of this technology in research level and this is definitely saves power.

Advantages

1) By using different modes we can save lots of electric energy
2) For this work no man power is required once installed
3) Perfect accuracy of timing
4) Automatic Intensity Setting

11. Conclusion

If this technology is implemented in city street light controlling station then it is definitely saved the electricity. Our final product is a power saving of Street Light Controller using embedded technology can be further used in a security, saving of power, Industries, Automation System, and Medical Field etc.

References

[1] Ayala Kenneth J."The 8051 Microcontroller", Published By Penram International (India), Second Edition
[2] Dougherty Kelvin M.," Analog To Digital Conversion" A Practical Approach, Mc-Graw-Hill, Inc.
[3] Hall D.V, "Microprocessor & Interfacing Programming Hardware", Tata Mc-Grow-Hill Edition, 1991, Seventh Reprint1995.
[4] Mazidi Muhammad Ali, Mazidi Janice Gillispie,"The 8051 Microcontroller And Embedded Systems" Published By Pearson Education (Singapore) Pvt. Ltd, First Edition.
[5] S.S.Shende, P.B.Dahikar2, MJ.Hedau3, **K.Y. Rokde4, International Journal** of Innovative Research in Computerand Communication Engineering(An ISO 3297: 2007 Certified Organization)Vol. 2, Issue 1, January 2014 p-p 2626-2631
[6] M. J. Hedau, M. P. Dhore, P. B. Dahikar, "Application of Wireless Signal Simulation Via Cell-Phone "International Conference on circuit system and simulation, , pp. 92–95, Vol.7, IACSIT Press, Singapore, 2011
[7] M. J. Hedau, M. P. Dhore, P. B. Dahikar, "Application of Microcontroller in Technical communication "International Journal of ETA and ETS, IACSIT ISSN No 0974-3588Vol.5Issue 1,2012.
[8] **K.Y.Rokde**, Dr. P.B.Dahikar2, Dr. M.J.Hedau3, S.S.Shende 4 **International Journal** of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol. 2, Issue 9, September 2014 p-p 2320-9798.
[9] P. B. Dakar M. J. Hedau S. C. Moholkar "Application of Microcontroller in Receiving Unit of the Technical Communication" International Journal of ETA and ETS, IACSIT ISSN No 0974-3588 Vol.5 Issue 2, 2012.
[10] **K.Y.Rokde**, Dr. P.B.Dahikar, Dr. M.J.Hedau, S.S.Shende, "An Embedded System for Device Control System with Telephone Answering Machine", **International Journal** of Researches in Social Sciences and Information Studies IJRSSIS, Vol. 2, Issue 3, ISBN No-2347-8268, September 2014.
[11] **Dr.M.J.Hedau'**Application of Microcontroller in transmitter section of wirelass system'International Journal of computational Engineering (IJCER) Vol.4, Issue 10, ISSN(e) No-2250-3005, Oct 2014