

INTIMATION NOTICE BOARD AND ENERGY CONSERVATION SYSTEM

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ABSTRACT :

Despite the installation of light energy waste control systems in modern buildings, many people end up paying for high energy bills. The cost of installation of these systems is usually high, and most of them are inefficient making it a major concern to the normal user. Due to technological advancement, sensors and microcontrollers are employed in a wide range of applications. This includes domestic and industrial fields where they aid in control of automated processes. In order to control energy wastage, researchers have devised different technologies all geared towards minimization of energy waste. In this research a prototype of light control system has been designed, fabricated and tested for stability. It consists of pir sensor, KC7786 passive infrared motion sensor, PIC18F4520 microcontroller interfacing board, system software and lighting loads operated by relay using relay driver ULN2803. Passive Infrared motion sensor (PIR) has been used for motion detection while the entire system is controlled by the PIC18F4520 microcontroller. In addition, the designed system is programmable, automated, portable and cost effective. And also another objective of this project is to design a SMS driven automatic display board using FYS-8013bx alphanumeric display. In manually operated system waste a lot of things like paper printer link, manpower and also brings the lost of time. While in this project we save the time and another resources.

KEY WORDS: PIC18F4520, Passive Infrared motion sensor, Relay, LDR, TEMP sensor, Alpha numeric Display.

I. Introduction

The objective of this project to develop an infrared sensor system to detect human presence in a room. To design a SMS driven automatic display board. The energy crisis is one of the major problems that the world needs to resolve for sustainable economic development. Electrical energy lighting makes up the largest part of power consumption in the world particularly through the use of lamps. These lamps are mainly controlled using ordinary switches that are manually operated. Sometimes the intensity from outside is sufficient to illuminate the room therefore there is no need to turn any light ON. Due to busy schedule and competitive world, human beings cannot spare time to perform their daily activities manually. One of the most common things that one forgets to do is switching off the lights whenever they are not required. This leads to wastage of electrical power and an increase in the payment for such services hence the need of some power management to save energy. And also another objective of this project is to design a SMS driven automatic display Board. In manually operated system waste a lot of things like paper printer ink, manpower and also brings the loss of time. While in these project we save the time and another resources. In

programmable electronic display the notice must save in memory, while in this project we can change the notice without changing the program. And in another section the appliances operated manually by switch, while in our project these appliances are operate automatically. And for instance the automated controls are more flexible and offer reliable solutions Compared to the manual controls.

II. Hardware Implementation

The block diagram of the hardware implementation of the entire system is as shown in the Figure1.pic Microcontroller is a small sized controller capable of performing various functionalities such as in home automation systems, Industrial applications, etc. The various functionalities of the components are given below:

The various components of pic-microcontroller are

- 10 bit inbuilt adc 8 channels
- 40 pin i/o
- Lower power consumption- between 2.0v to 5.5v.
- 1serial half duplex port.

- Inbuilt i2c bus
- Inbuilt spi bus
- High sink/source current-25 MA
- Wifi module ESP8266

- single voltage operation,12VDC
- Open collector output, active low
- 3 pin terminal standard 0.21"
- Built in regulator and amplifier
- high immunity RFI and line noise

1. TEMPERATURE SENSOR:

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in $^{\circ}$ Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 0.1^{\circ}$ C at room temperature and $\pm 0.05^{\circ}$ C over a full 0° C to 150° C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μ A from its supply, it has very low self-heating, less than 0.1° C in still air. The LM35 is rated to operate over a 0° C to 150° C temperature range, while the LM35C is rated for a 0° C to 110° C range (0.1° C with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-202 package.

FEATURES:

- Calibrated directly in $^{\circ}$ Celsius (Centigrade)
- Linear a 10.0 mV/ $^{\circ}$ C scale factor
- 0.1° C accuracy guaranteeable (at 25° C)
- Suitable for remote applications
- Operates from 4 to 30 volts
- Less than 60 μ A current drain
- Low self-heating, 0.08° C in still air
- Nonlinearity only $\pm 0.1^{\circ}$ C typical

2 PIR SENSOR:

KC7786 is a small size PIR sensor module with built-in amplifier and logic circuit. The heart of the module is high reliable PIR controller KC778B. The PIR sensor can be manufacturer specified. The Fresnel lens is included for the detection of the human body movement at a distance of 5 meters. It is suitable for automatic illumination system, intruder alarm system.

FEATURE:

- Small size, 27mm square

3. LDR SENSOR:

Photo resistors or light dependant (LDR) which change resistance according to light intensity. Normally the resistance of Photo resistor (LDR) decreases with increasing intensity of light falling on it. Photo multiplier tube containing a photocathode which emits electrons when illuminated, the electrons are then amplified by a chain of dynodes.

FEATURE :

- wide spectral response
- low cost
- wide ambient temperature range

4. ALPHANUMERIC DISPLAY:

FEATURE:

- 20.4mm (0.8") Single digit numeric display series.
- Standard brightness.
- Low current operation.
- Excellent character appearance.
- Easy mounting on P.C. boards or sockets.

5. WIFI MODULE:

The ESP82XX WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP82XX is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. This module comes with AT commands firmware which allows you to get functionality like arduino wi-fi shield, however you can load different firmware's to make your own application on the modules' memory and processor. It's a very economic module and has a huge and growing community support. This module has onboard 80Mhz low power 32 bit processor which can be used for custom firmware's. This also means that you can host small webpages without any external controller. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces; it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts. ESP8266 is transforming the world with its low cost and high features which makes it an ideal module for Internet Of Things (IOT). It can be used in any application where you need to connect a device to your local network or internet. ESP8266 WiFi Serial module

FEATURES:

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network.

- Roll the serial text on alphanumeric Display →"A"

V. APPLICATION

- Reduce the requirement of electricity power.
- Home Automation.
- Industrial Automation.
- Automobile..

III. BLOCK DIAGRAM

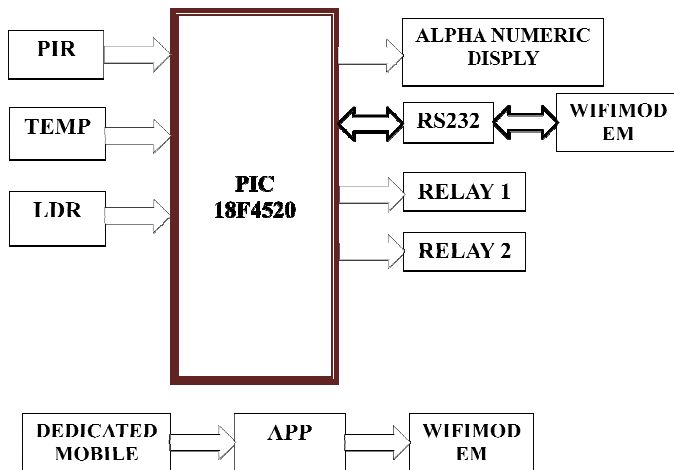


Fig.1. Block diagram of Intimation notice board and energy conservation system

IV. ALGORITHM

- Start
- Initialize LCD, Baud rate 9600
- Loop (A)
- Is Person detected (PIR sensor)? N→ Relay1, Relay2 and Relay3 OFF→"B"
- Y→ Relay1 ON
- "B"
- Select Channel1
- Read ADC
- Store and display the Temperature on LCD
- Select Channel2
- Read ADC
- Store and display the Light intensity on LCD
- Is Temperature > 40 degrees? N→Relay 2 Off→"C"
- Y→ Relay 2 ON
- "C"
- Is Light intensity > set point? N→Relay 3 Off→"D"
- Y→ Relay 3 ON
- "D"
- Is serial interrupt detected? (Serial frame from APP)N→"A"
- Y→ Store the serial frame in µC RAM

VI. ADVANTAGES

- The system is completely automatic and requires no human supervision to carry out the necessary actions.
- The main advantage of this system is it is economical and reliable.
- Does not required external power source the circuit power supply provides power to the every component.
- It is easy to operate

VII. FUTURE SCOPE

- Extending the system to include a room with multiple exits/entrances by employing several sensors. This arrangement would require installation of multiple pairs of transmitter-receiver sensors and a logical combination of the outputs. In addition motion detectors with a higher resolution can be integrated in the system to improve on the system robustness. This can be achieved by using detectors with a wider field of view and longer detection distance. This would be suitable for multiple door access and higher detection rates of occupants to evolve a more reliable system.
- In daytime natural light may be sufficient if the room has a suitable architectural design and less artificial light would be needed. In such a situation, photo detectors can be interfaced to the system to provide the user with override option and also allow one to select the preferred light intensity for a particular task.
- The designed system can also be configured in such a way that the duration of time for which the lights remain on/off within a 24 hour period is recorded. This can be achieved by using data loggers or employing PIC18F4520 timer registers and modifying the programmer code.

VIII. CONCLUSION

A simple, cheap, portable and microcontroller-based automatic room light controller required for energy waste control has been designed and implemented. An entry/exit sensing unit that uses two sets of infrared transmitter and receiver for determining the number of people accessing the controlled room has also been created. The Microchip MPLAB Integrated Development Environment has been used to write, develop and debug codes for the PIC microcontroller with Proteus ISIS being used for simulating the designed circuits. The system integrates infrared transmitter and receiver, passive infrared detector, PIC18F4520 microcontroller, relay control circuit and an LCD output module.

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