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Control on Energy use by Microcontroller and Wireless Technology

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ABSTRACT

Looking at the increasing demand of energy it is impossible to balance the demand supply equation of energy. This balance may be achieved by taking out some options to reduce the use of energy. This project deals with the reduction in consumption of energy. for that it is using microcontroller PIC16F72 and all the components will communicate with each other by wireless technology as Zig bee technology. We can place different sensors in different places. Microcontroller will get activated by this sensor with the signals instead of using wires. In this model wireless technology is used called as Zig bee technology. This project may be used where the use of energy is more and the number of person around that place is also more. in such places no one takes the responsibility of switch on and switch off of the electronic equipment. so the automatic controlling of illumination and cooling system such as fans is required. So that energy will not get waste.

Keywords— Energy, Liquid crystal display, Loads, Microcontroller, Sensors, Wireless communication, Zero crossing detector, Zig bee technology.

I. INTRODUCTION

Energy saving is the big issue currently. In this project a model has been developed it detects a person entering the place. a WELCOME message will be display by the LCD. and then the room lightening will be checked and it catches the condition when the light is sufficient the lamp will be in OFF mode and when light is insufficient the lamp will be in ON mode adjusting the proper lightning. With the help temperature sensor the room temperature is observed and the speed of the fan changes according to the temperature of the temperature sensor. In Degree Centigrade the LCD will display the temperature and the arrival of a person. The complete system shut down itself when a person leaves the room providing the smart automation and power saving system with the proper Comfort to the visitors getting the information from both the situation of the lightning and the room temperature the microcontroller PIC16F72 a brain behind the system has been programmed in such a way that will adjust the proper illumination of the light and will control the fan speed as per the temperature variation of the room using a dimmer circuit the main difference between the other projects made on this type of energy saving is that in this project a wireless technology is used known as zig bee technology. Hence the communication between the components will be wireless and hence reduces the hardware and increases the ease of use. The reduction of energy consumption is a challenging job without curtailing the facilities. It is an endeavour to optimise the consumption utilising the modern electronic system developed using microcontroller[1].

II. RELATED WORK

The economic development of a modern society is strongly dependent on energy. Production & supply of goods and energy consumption has strong effect on the environment at local and global level[1]. It demands a good balance between the use of energy for development of social welfare and the preservation of environment, as overuse may lead to negative environmental impacts. So management of energy is essential at this point of time, since the conventional resource will surely be exhausted within a few years[1]. It‟s an endaevour to manage the use of electrical energy through the design of advanced system with a view to reduce the consumption of energy and subsequently to reduce the bill of electricity. At the same time the saving of conventional fuel will lead to extension of use of energy for longer period and hence the conservation of energy[1]. Energy efficient campus buildings not only save money, but are also comfortable and have an abundance of natural light. These features contribute to a more effective learning environment[2]. In previous studies some graphical representations shows the

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difference between energy consumption in various conditions.

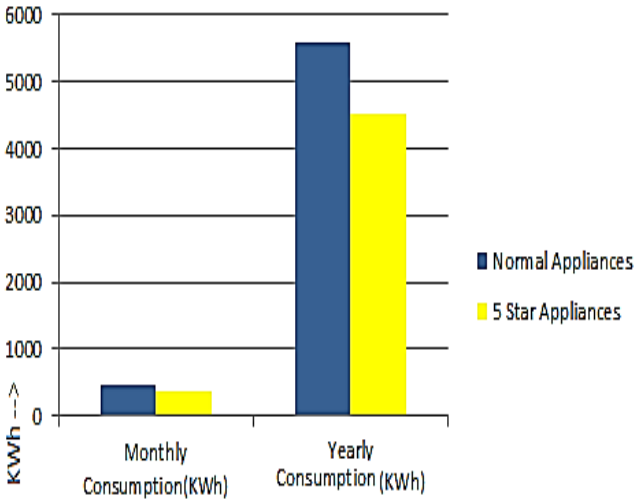

Figure 1: Bar chart comparing energy consumption between existing conventional and 5 Star rating appliances[1]

The above graph shows usual consumption and below graph shows the consumption difference due to use of microcontroller

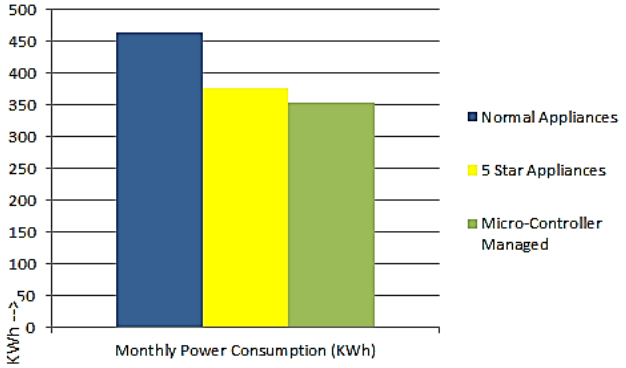

Figure 2 : Bar chart comparing energy consumption between conventional, 5 Star rating and micro-controller managed 5 Star rating appliances[1].

III. PROPOSED METHODOLOGY

In this project the complete signals will be communicate through wireless communication as we are using zig bee technology and the microcontroller is the heart of this system again the software part contains the programming of microcontroller PIC16F72. Simple C language is selected for the programming

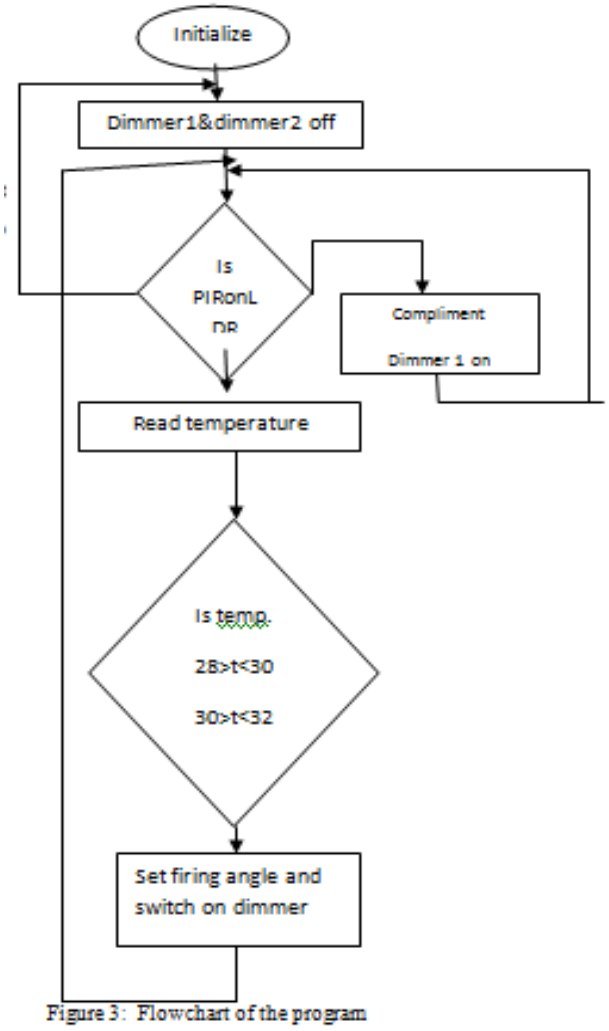

Figure 3: Flowchart of the program

IV. ZIG BEE TECHNOLOGY

Zig bee is the only standards based wireless technology designed to address the unique needs of low cost , low power wireless sensor and controls network in just about any market. Since zig bee can be used almost anywhere , is easy to implement and needs little power to operate, the opportunity for growing into new market, as well as innovation in existing markets , is limitless. With hundreds of members around the globe , zig bee uses the 2.4 GHz radio frequency to deliver a variety of reliable and easy to use standards anywhere in the world. Consumer, business, government and industrial users rely on a variety of smart and easy to use zig bee standards to gain greater control of everyday activities.

V. SCHEMATIC EXPLAINATION

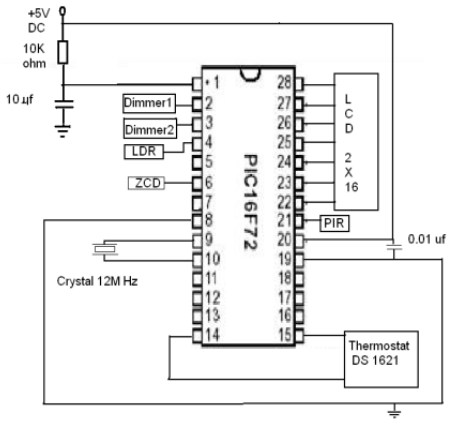

Figure 4 : Schematic diagram

PORT A

Port A can acts as a both input as well as output port. It is having 6 pins (A0-A5). In these A0 is connected to Dimmer1, A1 is connected to Dimmer2 and A4 is connected to ZCD output.

PORT B

Port B can acts as a both input as well as output port. It is having 8 pins (B0-B7). In these B1 connected to register selection pin(R/S), B2 is connected to read/write(R/W) and B3 pin is connected to enable pin.

PORT C

Port C can acts as a both input as well as output port. It is having 8 pins (C0-C7). In these RC3 and RC4 connected to the thermostat pins. 12M Hz Crystal Oscillator is connected in between 9^{th} and 10^{th} pins of micro controller. Reset pin is connected to the pin number1 i.e., MCLR/VPP. 8^{th} and 19^{th} pins are connected to ground (Vss).

VI. CONCLUSION

Energy Saving System is not limited for any particular application, it can be used in places anywhere in a process industries with little modifications in software coding according to the requirements. This thought not only ensures that our work will be usable in the future but also provides the flexibility to adapt and extend, as per needs. In this project work we have studied and implemented a complete working model using a PIC microcontroller. The programming as well as interfering of PIC microcontroller has been mastered during the implementation. This study of energy saving is included in this system in many applications. In this project zig bee is used but this can be again modified by using other techniques also.

VII. ACKNOWLEDMENT

The work cannot be perfect without the helping hand of an experience person. The knowledge and experience helps a lot to overcome the problems while performing the task. I thank **Mr. U.B. Vaidya (prof. Electrical dept. at R.C.E.R.T Chandrapur)** and **Mr. P.S. Padewar (prof. Electronics dept. R.C.E.R.T, Chandrapur)** for their guidance and support .

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