EFFICIENT POWER CONSUMPTION MANAGEMENT USING PLCC

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Abstract: **Recently our government has provided more awareness about the power consumption. But consumer (peoples) doesn't follow the government rules. In our project, each and every home's energy meter interconnected with EB station via PLC modem. So the government fixed the total amount of power for individual home. If anyone consumer used more than this preset value, they will get alert signal from the EB station and the maximum power consumed devices automatically controlled. By this way, we can prevent maximum unwanted usage power. And also the consumer can able to request some wattage of the power for the ceremonial events. Another advantageous is that, Here we used PLC modem for the communication purpose. In case, If we used GSM or GPRS another means, we have to pay for that communication.**

Keywords: Power line communication, Energy meter, Power.

I.INTRODUCTION

Power Line Communication is a fairly recent technology which is used to transfer data and establish means of communication at broadband speeds over transmission line. The technology is widely known as Power Line Telecommunication (PLT) or even Power plus Communications (PPC). The technology uses advanced modulation technology which super imposes the data signal of high frequency over the low frequency power signal. This fast system enables transmission in the form of voice and other data as well it has wide implications. Since most forms of communication today require separate hard wiring it is convenient to use PLCC which can employ the pre-existing power cables within the house. Since the power in these cables is AC (alternating Current), it can be employed for various bidirectional modes of communication as well. Such a communication system can be used for the monitoring and also the controlling of various fundamental functions like energy management, security, and safety control applications at homes, factories, offices, aircraft etc. Power line carrier communication it plays a vital role in the field of power consumption. This paper targets the mandatory solutions for the power consumption among users. We have chosen power line carrier communication (PLCC) modem because it is very cheap compared with the GSM modems and the user don't have to pay for this communication either it when comes to GSM they have to pay a lot for this. Then usage of this apparatus is very simple.

II.RELATED WORK

Going to overcome the problem of power consumption by introducing our new technology called "POWER LINE CARRIES COMMUNICATION". We are going to set the limitation of power for each and every home so that the large amount of power consumption get reduced by using power line carrier communication. The user can also request for extra unit of power for any ceremonial events and any necessary condition.

III.POWER LINE CARRIER COMMUNICATION (PLCC) IN HOME AUTOMATION

Home automation is actually a collection of device, system, and subsystem which have ability to interact with one another or function independently. Power Line carrier Communication (PLCC) is called power-line carrier or a mains communication. PLCC uses electric power lines to carry information over the power line.

It is a technique used in home automation for remote control as it can use the household electrical power wiring as a transmission medium. PLCC has been a very important interdisciplinary topic for power, communication, industrial, and automation engineers and researchers since the 1980s. PLCC promises to be an enabling home network technology due to its ability to deliver data over existing power lines in homes.

Recently, with the explosive growth of the Internet and telecom technology home automation experience an accelerating growth based on different kinds of residential network. At present there are several kinds of transmission medium in home network, such as coaxial-cable, radio, microwave, millimeter, power line and fiber optics. Compared with the other kinds of transmission medium, power line has distinct advantage in setting up a network without additional line installation and existing digital device, including home appliance and information device, at a very low cost. Many applications are operating at high speed and a fixed connection is often prefer. If the power utilities could supply communication over the power line to the customers it could make a tremendous breakthrough in communication. Every household can be connected at any time and services being provide on real time. The power line being used as a communication medium could also be a cost effective way compared to other system because it uses an existing infrastructure, wire exist to every household connected to the power line network. On the other hand, device power in home automation still can be supplied by power line itself. So PLCC rapidly becomes a popular solution to set up residential network.

Concerning the former, one should consider that the targets are conventional house, adapt when users have an accident leading to disability or when they get older. Signal strength or signal attenuation in home electrical line is important for design of home automation communication circuit. PLCC communication signals via main power lines are transmitted from a part of the home and received at the other side. Measurements are carried out general divisions of a home such as kitchen, bedrooms, living room, hall, and restroom, etc. Connectors are used to deliver power lines in the divisions of every home. Connectors are placed at wall between two neighbor divisions at home. So power is delivered through connectors to every division.These connectors are induced an additional attenuation. Power-line

distances are measured for signal attenuations between 6–30 m.

IV.INFORMATION

The module provides bi-directional half-duplex communication over the mains of any voltage up to 250V AC and for frequency 50hz upto 60hz. Half Duplex communication means it can either transmit or receive data at a time. Normally module is in receiving mode all the time listening to incoming communication on the power line. Once application gives serial data to transmit on its RX-IN pin, it switches over to transmit and transmits the data through power line. Once transmit process is complete it switches back to receive mode. The transmission of data is indicate by Red LED. The reception of data by modem is indicate by Green LED which is on TX out pin. Data communication of modules are transparent to user's data terminals protocol independent as a result and multiple units can be connected to the mains without affecting the operation of others. There is no hassle of building interface circuit. Interface to user's data device is a simple data-in and data-out serial link. Transmission is based on byte by byte basics. Once you give one byte to module for transmission, you will have to wait at least 500ms before a new byte is given to module again since the module waits for zero crossing of AC mains to transfer a bit. For AC 50Hz system the zero crossing of AC signals happens every 10ms and modem needs 50 zero crossings to transmit one byte with error checking data. So that it takes 500ms for one byte. For example if we want to transmit character "TEST", then we will have to transmit 'T', then wait 500ms, then transmit 'E' and wait 500ms, then transmit 'S' and wait 500ms, then transmit 'T' and wait 500ms. This can be quite slow speed for big data transfer, but purpose of this module is transfer of small data bytes like sensor readings and remote control for which this speed is ok to implement.

V.SPECIAL FEATURES

- Transmit and Receive
- serial data at 9600 bps
- Data Tx/Rx LEDs
- Powered from 5V
- Low Cost & Simple to use
- Built in Error Checking
- Direct interface with microcontroller

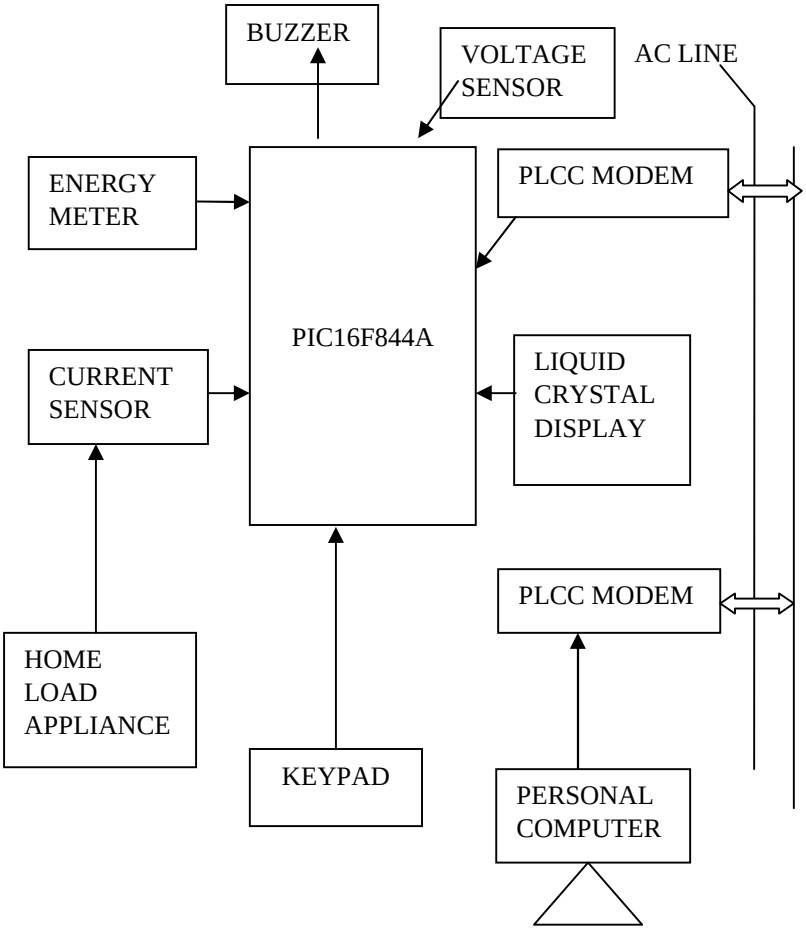
VI.MICRO-CONTROLLER SELECTION

The most and main part of hardware design process is CPU core selection. Generally the selection is based on the size, speed, cost, familiarity, development time, availability, time-to-reach market and application etc. In our application we have to consider the following things for the CPU selection.

- Performance and Speed should be high.
- Size should be as less as possible, so pin count also should be low.
- Power Consumption should be very low.
- Cost should be less.

So based on the above factor the microcontrollers are recommended for this application.

BLOCK DIAGRAM



Functional block diagram

VII.SYSTEM ANALYSIS

The consumer is been made mandatory in power consumption control, then the consumer will request for some extra unit. . A preset value will be given to each and every consumer, if anyone consumer used more than this preset value, they will get alert signal from the EB station and the maximum power consumed devices automatically controlled. By this way, we can prevent maximum unwanted usage power. And also the consumer can able to request some wattage of the power for the ceremonial events. And this will satisfy the consumers necessary and urgent needs also, and this is the major advantage of our project. This system will reveals the nowadays energy consumption issues.

VIII.EVALUATIONS

Nowadays in every home there is no limitation in usage of power. Due to that there is huge amount of power get consumed in every home. So production of power is not enough for industries, home etc. Data transmission can be done using wireless communication; due to that data loss will happen. Here there is only metering is been done by using GSM modems. There is no limitation in the power consumption. Man power will be largely needed. Cost will be high when using the GSM modems. But in our project, it is found to make the power consumption control mandatory.

IX.CONCLUSION

The hardware and software design of an embedded monitoring system for real time applications is presented in this paper. Finally our project overcomes the essential necessity of nowadays energy consumption issue. It has been made mandatory that the consumers should maintain the power consumption carefully. Our project will show the easy way to maintain power consumption. It is very necessary to the government to bring awareness to the consumers about this issue.

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