Power Line Communication for Real Time Devices Control

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ABSTRACT: Data transfer through power line is a technology that sends data through Electric line along with electric current. In this we study data transmission applicability over power lines for home automation. This study concluded after the problem defined by previous research. Two major problems such as cable attenuation and excessive noise level are eliminated by our project. We designed this technology in two phases, in first phase, run the performance analysis of this technology. And secondly, build system that represents the real life applications with security issues. In data transfer through power line we transmit the eight bit command through 230volt and 50Hz supply. This project provides large coverage, since the powerlines are already installed everywhere.

KEYWORDS : *PLC , EPLCS ,G-LCD, CPE, PDSL.....*

I. INTRODUCTION

Power line communications (PLC) uses the energy cables as the communication channel and the digital data are transferred via energy cables. PLC system is realized between transceivers modems located on the power lines front-end. Industrial control and home automation have rapidly been gaining popularity for the past decade. PLC, a new technology that sends data through existing electric cables alongside electrical current, is set to turn the largest existing network in the world, the electricity distribution grid, into a data transmission network. PLC will make it possible to both industrial control and home automation over power lines with economical and reliable solutions. Long-distance monitoring of alarms and air-conditioning systems, comfortable control of intelligent household appliances, and off-site reading of electricity meters will all become feasible-simply via the power grid. BPL injectors, repeaters, extractors and customer premises equipment (CPE) are the basic devices installed to enable power line network to provide high-speed Internet access. Power Line Carrier communication systems consist of a high frequency signal injection over the electrical power lines. This kind of technology has been used since the 1950 decade in order to provide signaling and ripple control in High Voltage lines, at transmission level. In the last years the interest for this technology has suffered a revival because the impressing increase of the mobile telecommunications has brought a big development in transmission technologies for this kind of communications.

II. OBJECTIVE

Data transfer through Power line technique is economical as well as user friendly method. In this project we investigate, identify and overcome the challenges of using the power line for communication purpose. We designed this project to transmit eight bit data which we called as command from one place to another by the use of power line. We can implement this project in pre-installed single wiring supply. For transmission of command through power line we need power modem at transmitter and receiver side. In this command is send from one pc using a software terminal to a transmitter kit and then this data is transfer on power line and then this data is received on receiver side and decoded in original form.

IV. WORKING PRINCIPAL

PLC Broadband technology is capable of transmitting data via the electrical supply network, and therefore can extend an existing local area network or share an existing Internet connection through electric plugs with the installation of specific units. The principle of PLC consists in superimposing a high frequency signal (1.6 to 30 MHz) at low energy levels over the 50 Hz electrical signal. This second signal is transmitted via the power infrastructure and can be received and decoded remotely. Thus the PLC signal is received by any PLC receiver located on the same electrical network. An integrated coupler at the PLC receiver entry points eliminates low frequency components before the signal is treated.
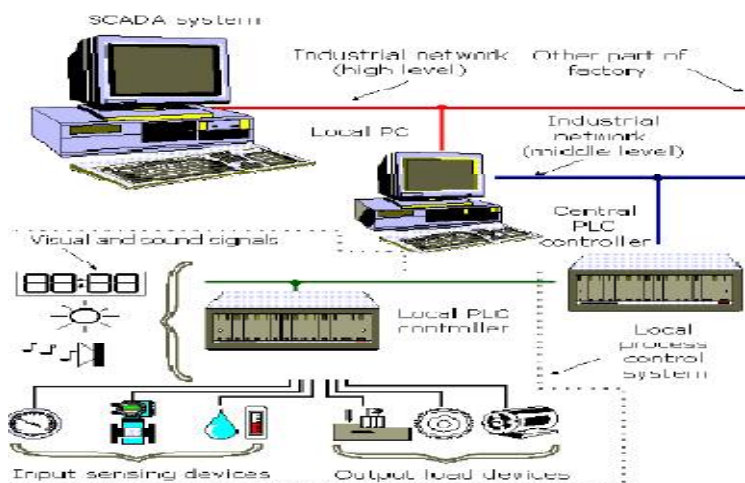

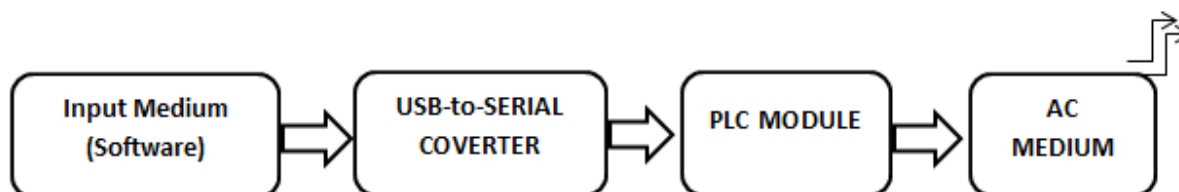
fig:1 Power line Communication
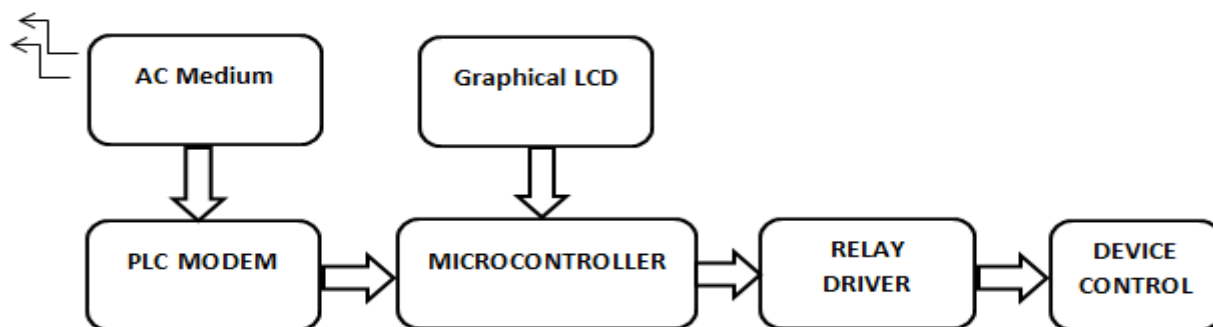
V. BLOCK DIAGRAM

Fig:2 Transmitter Module

Fig 3: Receiver Module

The Block Diagram of the PLC Transmitter and Receiver Module is as shown in above figure.

Transmitter Block of PLC:

In the transmitter case the input medium will be the software (Programming logic and control) interfaced with the Computer system which process the information and send data signal to the PLC Modem serially through USB-To-Serial Converter. Here PLC Modem will be act as a transmitting medium of communication via AC powerlines.

Receiver Block of PLC:

At the receiver end data signal is received from powerlines and PLC modem will receive the signal. This Received signal is send to the microcontroller for its further processing. Here the digital signal coming from the microcontroller will be directly given to the relay driver for driving the relay and switch on the device as per the logic.
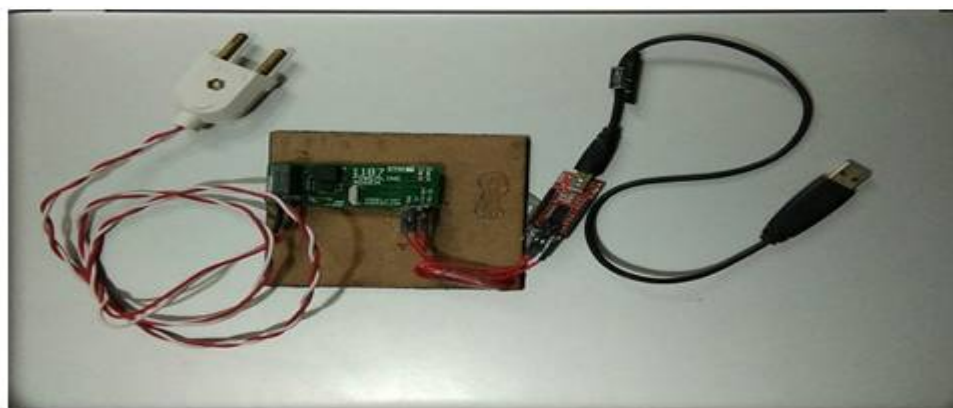
VI. EXPERIMENTAL RESULTS
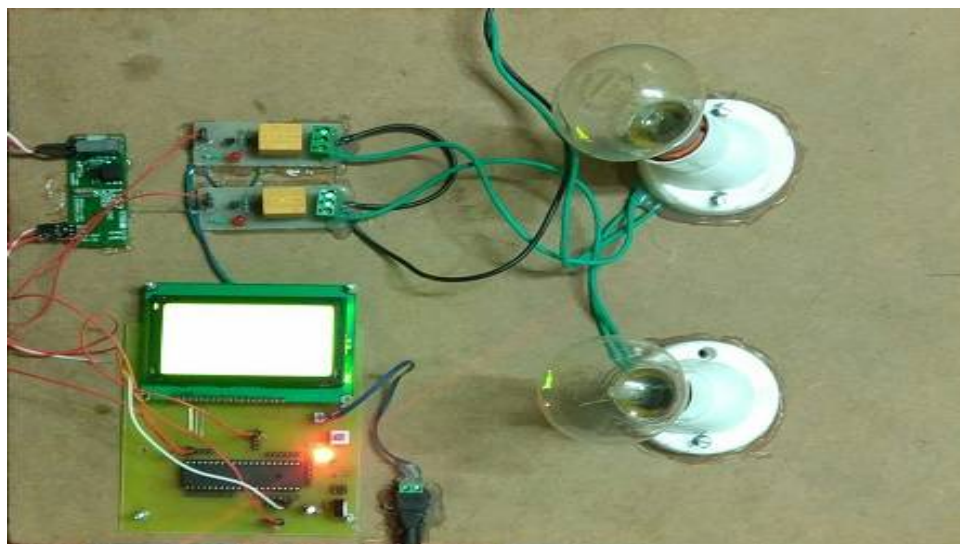

Fig 4: Transmitter Module

Fig 5: Receiver Module

EXPLANATION:

one PLC module is used at transmitter as shown in fig 4 and USB to serial converter used to interface computer to PLC module at transmitter, here data is transmitted using AC line successfully. at reciver ATMEGA 32 bit microcontroller is used along with PLC module and other components like voltage regulator IC ,Relays ,etc which is shown in fig 5 .two bulbs are shown in fig to indicate working of project .the status of the devices are shown on graphical LCD (GLCD) . software interface is used to control the devices connect as an indicator via AC mains successfully.

VII. CONCLUSION

The PLC system we designed is a primary stage of a home networking system in which we tried to send a data from one computer to another which are installed in the same building. The system has some drawbacks they are as follow:
- The power line modem used in this technology is transmitting only 8bit data. This is the biggest disadvantage of this project.
- We used this technology in case of single wiring only.

Power line communication technology is definitely an exciting alternative to connect internet via phone and modem. Though this technology is not commercially available yet, it should be available over other broadband technologies due to relatively low cost of its local loop. Moreover, its high speed will provide internet access, local phone, and long distance service to customers

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