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Android Based Monitoring and Controlling Of Home Appliances through Power Grid

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Abstract - *In recent years, for its easy installation and low cost, the power line increasingly become a famous transmission medium in creating residential network. Power Line Communication (PLC) is user friendly and cost efficient. The PLC technology uses the existing electrical network structure and the omnipresent outlets throughout the house. Thus this system is very unsophisticated and cheap. The objective of this project is to build a power monitoring system for home automation system using a 9600 bit rate PLC modem and using PIC16f877A microcontroller to take the power readings of single phase AC appliances such as electronic gagates. A simple power monitoring system for smart home which uses low bit rate PLC has been implemented in this paper.*

Key Words: **PLC(power line communication), Android, PIC16f887,Bluetooth,Current Sensor.**

1.INTRODUCTION

Now a days increasing amount of electronics equipment in residential homes consumes power is becoming a anxiety .a system require in home which can more convenient and to monitor power uses of each devices so that user make judgment about to use power more effectively homes require sophistication control in its different gadgets such as electronics appliances.in traditional homes wire network for electronics devices, power line mains, inessential add extra wiring for power monitoring system. since android app with Bluetooth module and plc used to control and monitor home gadgets, todays smartphone available at low cost in market smart phones are the new family of phones which applicable to run application know as apps i.e. computer program run on phone. Android is an operating system for smartphones by Google Inc. and provide for the development of mobile applications Android is an open source. Smartphone can communicate with other devices using ad hoc network with connectivity option like Bluetooth and wifi. Bluetooth is wireless short range communication technology work over 2.4GHz frequency range and cover area up to 100m with 1Mbps speed.PLC (Power Line Communication) provides advantages to user reducing complexity by using existing power line cables since cost of home automation reduced to minimum. they are trying to achieve higher bit-rates and more reliable communication over the power lines. PLC uses lines used as a transmission channel for exchange data. PLC kit placed transmitter and receiver side for sending or receive commands and data using power line transmission channels. At load side PLC module monitors the power used by devices and monitored data send back to the owner of the home which decides the threshold value by using android app and control the particular devices. A power line communication (PLC) system superimposes a signal on the mains. It is the usage of power lines as a transmission channel for the exchange of data [2]. Each PLC unit can send or receive commands and data using this communication channel. The power usage of a load is monitored by a PLC unit, and the resulting data is sent back to the home owner over the power lines. The user can then reduce the power going into the load with a dimmer circuit on the PLC unit. PLC is a technology which uses power lines as physical media for data transmission. PLC system signals were sent and received on household and industrial 50Hz current bearing power lines. PLC offers a no new wires solution because the infrastructure has already been established. PLC modems are used for transmit-ting data at a rapid speed through a power line in a house, an office, a building, and a factory, etc. Here, the already existing current power wires serve as a transmission medium by which information is relayed from a transmitter or control station to one or more receivers. It is because power line is a relatively cheaper and more robust communication channel used throughout the world except wireless channel. It is used more commonly used than any other.

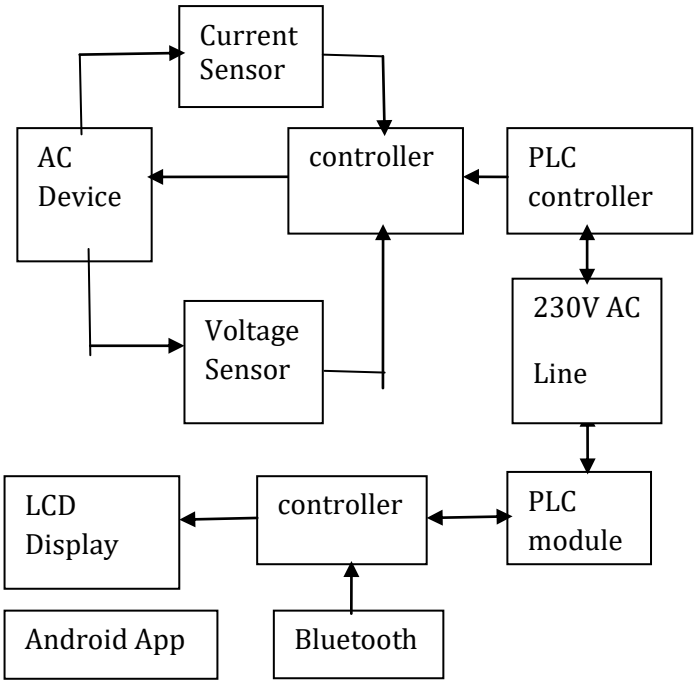
2. LITERATURE SURVEY

Nowadays human being approach towards new technology innovations this leads to automations. One of the applications is home automation. Different technologies are used for home automations one of them Power line communication.

Devices are used in home automations we need to know which devices requires large power for saving electricity that is if any device are is in not use and required at that time it must be turn off.[1]in home automations consist of multiple AC power sockets, power reading meter and PLC module and microcontroller for controlling action related to application such as on/off and related information send to

with respective user build interface. they also made a core based home server which can easily interact with web page user this allow user control and monitor devices that's means by internet .By not bothering extra wirings user can control the home devices said by Chia-Hung Lien, Hsien-Chung Chen, Ying-Wen Bai and Ming-Bo Lin. [2]explained with GSM AMR System which is more efficient ,reliable, less costly with installation charges as compared to AMR system with GPRS.AMR GSM system provides automatic billing, current power status and automatically meter connection disconnect if overload occur and there is problem of light bill payment which is explained by Priyanka R Daware and S.S. Patil. [3] In tradition system many mistakes are arrived for user and a person who taking a reading on a meter and there are also possibility of trickery Rakesh Dwivedi, Ashwani and Sandhya Dubey.

3. BLOCK DIAGRAM



4. WORKING

The android app which give the command start and stop the home appliances through the Bluetooth to the microcontroller. And this is transmission microcontroller which give this command data to the PLC module. The PLC modules both transmission and reception stages is controlled by the microcontroller. This ensure that the accuracy of the transmission, thus making the performance totally independent of application. The interface with the power network is made by LC network. The device includes the power output stage. To reduce power consumption, the PLC IC is disable by power down input. For the lower power operation in reception mode dynamically controlled by the microcontroller. All logic input and outputs are compatible with TTL/CMOS levels. The digital part of the PLC IC is fully scan testable. Two digital inputs SCANTEST and TEST1 pins must be left open circuit in functional mode. To provide strict stability with respect to environmental condition the carrier frequency is generated by the ROM memory controlled by microcontroller. The data modulation is applied through PLC IC pin DATA_IN. The DAC and the power stage are set in order to provide a maximum signal level. The output of the power stage must always be connected to decoupling capacitor. Direct connection to the mains is done through an LC network. In transmission mode the receiving part is not disable and transmission of signal is performed. The input signal received by the modem is applied to input amplifier with AGC. This is basically for noise performance improvement and ensure a maximum sensitivity of the AGC. An 8 bit conversion is performed, follow through the digital band pass filtering. After the digital demodulation, the baseband data is made available through pulse shaping. The signal pin of PLC IC pin RX_IN is high impedance input protected and decoupled. The high sensitivity of this input required a 50 HZ rejection filter. It also act as an anti-aliasing filter for internal digital circuit. The demodulated signal is get by microcontroller and give the pulse to the relay to stop the function of the home appliances. At the receiver and the voltage sensor and current sensor is present which sense the voltage and the current capacity of the appliances. This data is again give to the microcontroller. At that time the operation of transmission and reception is alter. Where the receiver act as a transmission and the transmission is act as receiver. The same procedure is follow transmission to receiver. The receiver the Bluetooth is send data with help of microcontroller to the android app for the live reading of the home appliances.

5. FLOWCHART

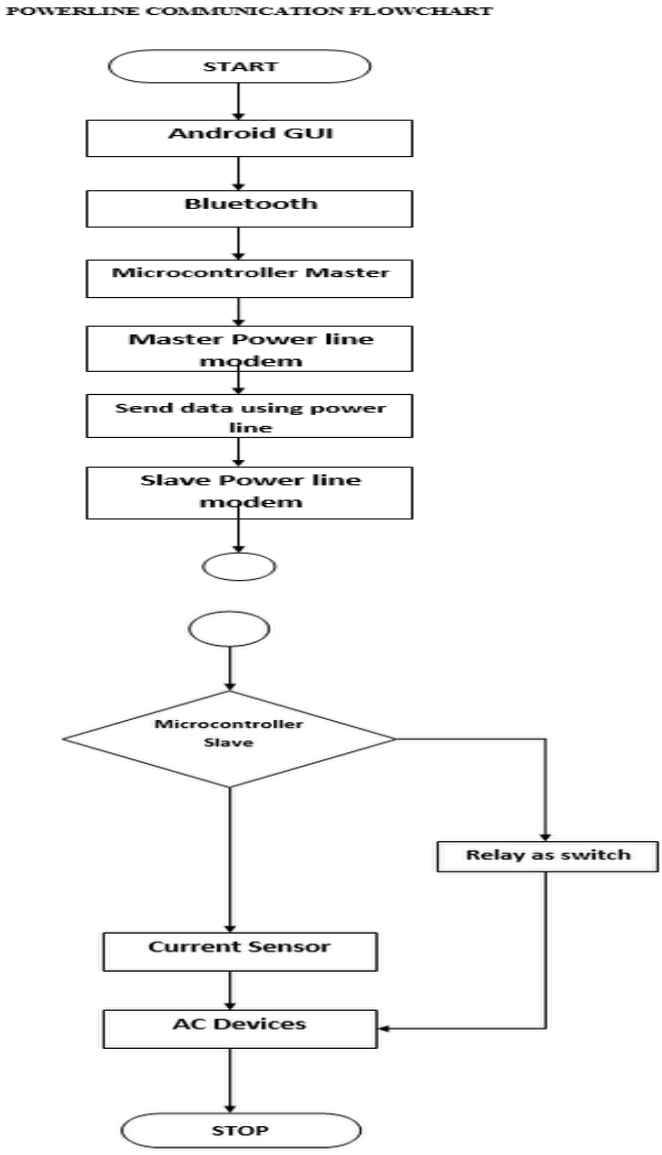


Fig.2: Flow chart

6. RESULTS

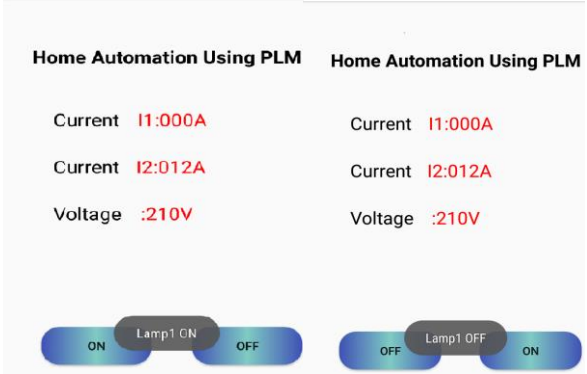


Fig.3: Result on App

7. CONCLUSION

Thus we design a system using Android App and PLC module to demonstrate that home automation with low cost and reliable system. The main aim of this system to control turn on off electronics devices using smartphones to give benefit physically challenged peoples who won't require extra help fo on off home appliances.

8. REFERENCES

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