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AUTOMATION USING POWER LINE COMMUNICATION

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ABSTRACT

Power Line communication is communication technologies that enable sending data over existing power cables. Now a days power line is getting wide acceptance for sending control signals and communication signals. It has the advantage of less initial expenses to establish a communication network. In this work it is demonstrated power line can be used for transmitting data using simple power line communication interface. The results are promising that power line can also be used for high speed data transfer. Note to practitioners- Wireless communication has become very popular for data transmission. Wireless devices are operated by using storage cell or utility power. Many Home automation products in market are device dependent. With wireless devices huge investment is required to automate the complete home which is just function specific. These days security is a serious issue. One can integrate all the functionalities to have affordable commercial product if data transmission at high rate can be done on power line. The outcome of this work can become a part of such product which can be plugged in to all devices which are connected to power line. Such method provides affordable and integrated solution. If high speed data transmission is possible over power line a microcontroller is the only device that can be programmed according to applications to make a product.

I. INTRODUCTION

In Power Line communication is communication technology that enables sending data over existing power cables. Power line communication is communication technology that enables sending data over existing power cable. The proposed system fulfills all requirements of today people. PLC get wide acceptance to send control signal & communication signal. The main advantage of system is it has less initial expenses to establish communication network. Hence the demonstrated power line can be used for transmitting digital data using simple power line communication interface. Hence the result are favorable to power line. Can also be used for high speed data transfer The wireless device are also interface by using remote which have Trans receiver the use will easily send command to master controller. The communication between master and slave device is power line communication. For Power line communication PLC

modem 1187 is used which transmit & receive serial knowledge at 9600 rate. Wireless devices are operated by using storage cell or utility power. Many automation products in market are device dependent. These days security is a serious issue. Ones can the system can implement all the functionalities to have affordable commercial product if data transmission at high rate can be done on power line. To transmit electric power from a small number of sources (the generators) to a large number of sinks (consumers) in the frequency range of 50-

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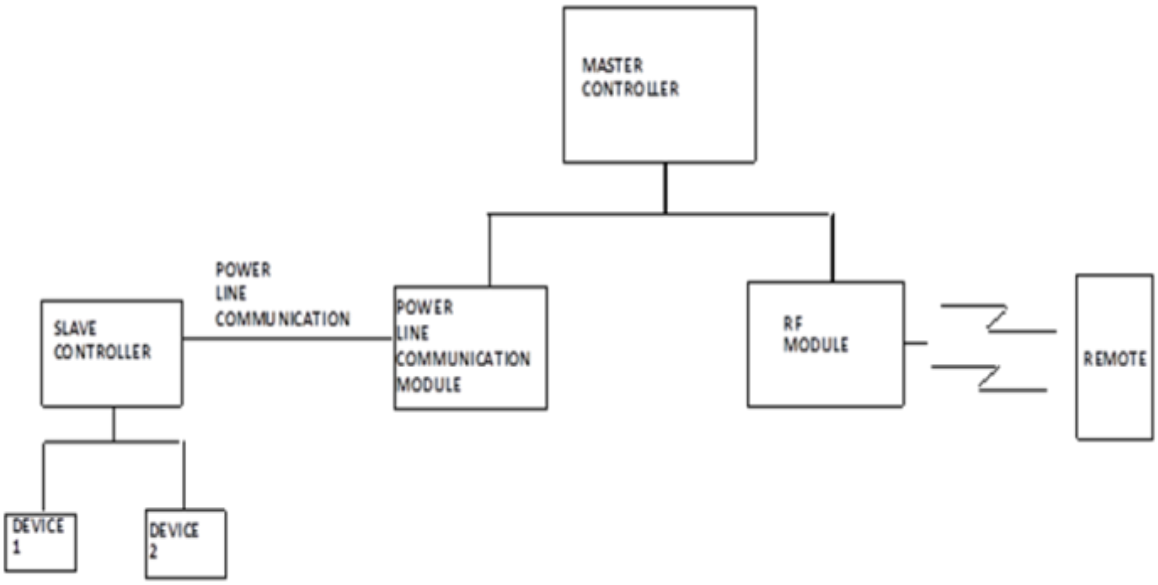
60 Hz power lines were design. Electrical power lines are usually classified into the high (>100kV), medium (1-100kV) and low (<1kV)voltage network. Power line communication which is also known as Power line carrier, power line digital subscriber line (PDSL), mains communication, power-line telecommunications, or power line networking (PLN) uses the existing electrical network for communication.

II. OBJECTIVE

1) The aim of home automation is to control home devices from a central control point.
2) In this project, we present the design and implementation of a low cost but yet flexible and secure RF remote based home automation system.
3) The communication between the devices is wireless. The protocol between the units in the design is enhanced to be suitable for most of the appliances.
4) The system is designed to be low cost and flexible with the increasing variety of devices to be controller

III. SYSTEM METHODOLOGY



In this project the system is mainly divided in two part one is master controller & other is slave controller. The source information is generated through RF remote key. RF remote send key status to RF receiver which is present in master controller. At that time PLC module in master controller act as transmitter & send this command to receiver PLC module which is present in slave controller through existing AC power line. That key status will take decision to On /Off particular relay in slave controller.

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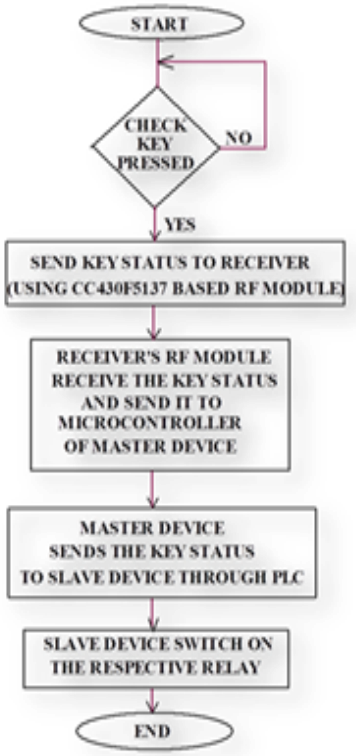
IV. FLOWCHART



The Fig shows the flow of complete system. To overcome all drawbacks on literature survey the proposed automation system is design. Here we use CC430f51 RF Trans receiver for sending wireless command to master controller. Master controller require pulse transformer for detection of zero crossing. Zero crossing will be detected on basis of interrupted by using transistor circuit. Data will transmit through Renesas RL78 series controller on TTL level. Data will transmit only after detection of zero crossing. The transmission time for power line communication will require 500msec. Data was successfully transmitted through power line to the slave device. Slave device route the appliances by using relay circuit. Master controller send control command to selected slave device particular address. Slave device control the addressed appliances. For that power line communication no extra line will require. In master controller there is transformer which convert 230V to 15V.The output of transformer is given as input to zero crossing detection circuit. Zero crossing will be detected on the basis of interrupt by using transistor circuit.While pressing any key on RF Remote (which is used to control the slave device by sending command through power line communication), it send the key status to Master device through wireless communication using TI's CC430F5137 RF module. Data will transmit through Renesas's RL78 series controller on TTL level. Data will transmit only after detection of zero crossing. The transmission time for power line communication will requires 500msec. Communication is on process. Transmission LED is blinking, which indicate data is transmitted successfully. While pressing any key on RF Remote (which is used to control the slave device by sending command through power line communication), it send the key status to Master device through wireless communication using TI's CC430F5137 RF module. The RF module on master device is always in receiver mode so it accepts that particular data which is received from

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RF Remote and send to microcontroller (Renesas's R5F100AA). Through TTL level serial communication. Microcontroller sends the incoming key status to slave device through power line communication. For that we are using PLC module which is communicate with microcontroller through TTL level serial communication. Slave device receives the data from master and send to microcontroller through TTL level serial communication and switch ON or OFF the particular relay.

V. EXPERIMENTAL SETUP

The proposed system consist of mainly three parts. First part is master controller , second part is slave controller & third part is remote device. Master controller consist of power line communication module, RF receiver section & zero crossing circuit. Slave controller is consist of power line communication module, relay circuit & display section. Remote is consist of RF transmitter and three number of operating key & On-Off key. Fig shows the experimental setup of system.

Fig : Experimental Setup

VI. INSTRUCTION FOR OPERATING THE SYSTEM

1. Start the system.
2. Wait for communication.
3. On the remote by using On/Off button.
4. To ON device 1 press key 1 from remote ,display shows RLY 1 ON .
5. To ON device 2 press key 2 from remote ,display shows RLY 2 ON .
6. To ON device 3 press key 3 from remote ,display shows RLY 3 ON .
7. To Off device 1 press key 1 from remote ,display shows RLY 1 OFF .
8. To ON device 2 press key 2 from remote ,display shows RLY 2 OFF .
9. To ON device 3 press key 3 from remote ,display shows RLY 3 ON .
10. Off the remote by using On/Off button

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VII. RESULTS

The proposed system is divided in three parts Master, slave & remote. The slave device is having one LCD display which shows actual result of proposed system . The Instruction is given by remote to On/ Off the device. Following table gives results.

	LED status of RF remote	Message on Display of Slave device
Case I , key 1 press	Led 1 ,On	RLY 1 ON
Case II , key 2 press	Led 2 On	RLY 2 ON
Case III , key 3 press	Led 3 On	RLY 3 ON

Following images displays the case 1 that is press key 1 on remote ,

Fig LED status of Remote key 1 press

Fig Relay 1 ON message

VIII. CONCLUSION

The proposed system provide full access control or automation of home / industry, without disturbing AC line infrastructure. The instruction send to system is wireless as using RF remote and the communication between master & slave is Power line communication. The system is inexpensive, easy to use.

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