

DATA TRANSMISSION IN THREE PHASE POWER LINE BY USING PLC

¹S.Esakki Devi , ²R.Priya, ³S. Shiyamini Rajathi ⁴ A. Mabel

¹vdeviselvakumar@gmail.com, ² priyarathinaraj16@gmail.com ,

³shiyamini29@gmail.com

1,2,3-UG Final Year, Department Of ECE, DR.G.U. Pope College Of
Engineering

4-Assistant Professor Department Of ECE, DR.G. U. Pope College Of
Engineering

Abstract

Data transfer through power line Is a technology that sends data through Electric line along with electric current. Here, we multiplex data into 240v power lines which provide electricity to our various devices. This work focuses on the benefits of the existing relationship among consecutive subchannels (spectral information) in a multi-carrier modulation based power line communication system for reducing the computational complexity and signaling overhead associated with resource allocation techniques. In this regard, we introduce the spectral compressive resource allocation technique, which reduces the computational complexity and the signaling overhead by grouping subcarriers into chunks, whose length/bandwidth is defined with basis on the so called normalized signal to noise ratio coherence bandwidth. Moreover, we address the combination of the proposal with

another technique that exploits the existing temporal relationship within periodically time-varying power line channels. Based on a data set composed of in-home power line channel estimates and additive noise measurements, we quantify the trade-off between computational complexity reduction and data rate degradation under distinct scenarios and conditions, and indicate circumstances in which the proposed technique is more useful. Finally, we show that the exploitation of both temporal and spectral information altogether **results in computational complexity reduction and less data rate degradation in comparison to other techniques.**

Index Terms—Bit loading algorithm, resource allocation technique, coherence bandwidth, power line communication, orthogonal frequency-division multiplexing.

I. Introduction

Power line communication (PLC) technology has been growing rapidly in the last decades, due to the continuous development of multicarrier schemes, since they improve data transmission through frequency selective PLC channels [3]–[5]. In order to maximize the data rate under a transmission power constraint, multicarrier schemes use bit loading algorithms [7] if the channel state information (CSI) is available at the transmitter side. The use of a bit loading algorithm allows to maximize the data rate by solving the resource allocation problem, which defines the number of bits and the power allocated to each subcarrier. Within this context, there are several works in the literature addressing resource allocation in PLC systems [2], [5], [7]–[20]. It is worth to highlight [5], which proposes a optimal resource allocation technique considering the linear periodically time variant (LPTV) channel behavior and additive white Gaussian noise (AWGN). In this work, the mains cycle (60 or 50 Hz) is divided into small time slots, called microslots, within which the channel can be considered linear time-invariant (LTI). Basically, this technique allocates different power among microslots and among subcarriers. Due to the fact that the resource allocation must be periodically performed, two inherent drawbacks of this technique are the signaling overhead, is more flexible and offer the best results.

the computational complexity and signaling overhead (control information exchanges among the entities belonging to the PLC network) [9]. In this regard, this work introduces a chunk-based resource allocation technique, the so-called spectral compressive resource allocation (SCRA), which exploits the relationship between adjacent subchannels for decreasing the signaling overhead and the computational complexity associated with the resource allocation problem in PLC systems. Christo Ananth et al. [6] presented a brief outline on Electronic Devices and Circuits which forms the basis of the Clampers and Diodes. Essentially, this technique performs a dimensionality reduction on the vector of information that feeds the bit loading algorithm. In order to quantify the relationship among adjacent subchannels, we discuss the parameter called normalized signal to noise ratio (nSNR) coherence bandwidth, which reflects the flatness of the nSNR. Furthermore, we combine the TCRA and SCRA techniques to show that the spectral-temporal compressive resource allocation (STCRA) technique, which exploits altogether both temporal and spectrum information for reducing the computational complexity and

IJARMATE
Your IIR-MATE Research Paper Here

II. Block diagram

The circuit contains PC on one side and microcontroller on other side. we send the data using power line modem. This PLM is assigned supply of 230V. Power line communication contains mainly two parts that are transmitter and receiver. The transmitter is responsible for sending signal from one PC to power line and the receiver receives the signal from power line and gives it to another PC.

Algorithm

Step 1: Start

Step 2: R, Y, B relay Selection Step

3: Send the Request Step 4: PLC

Step 5: Selection scan

Step 6: Find which relay is activated Step 7:

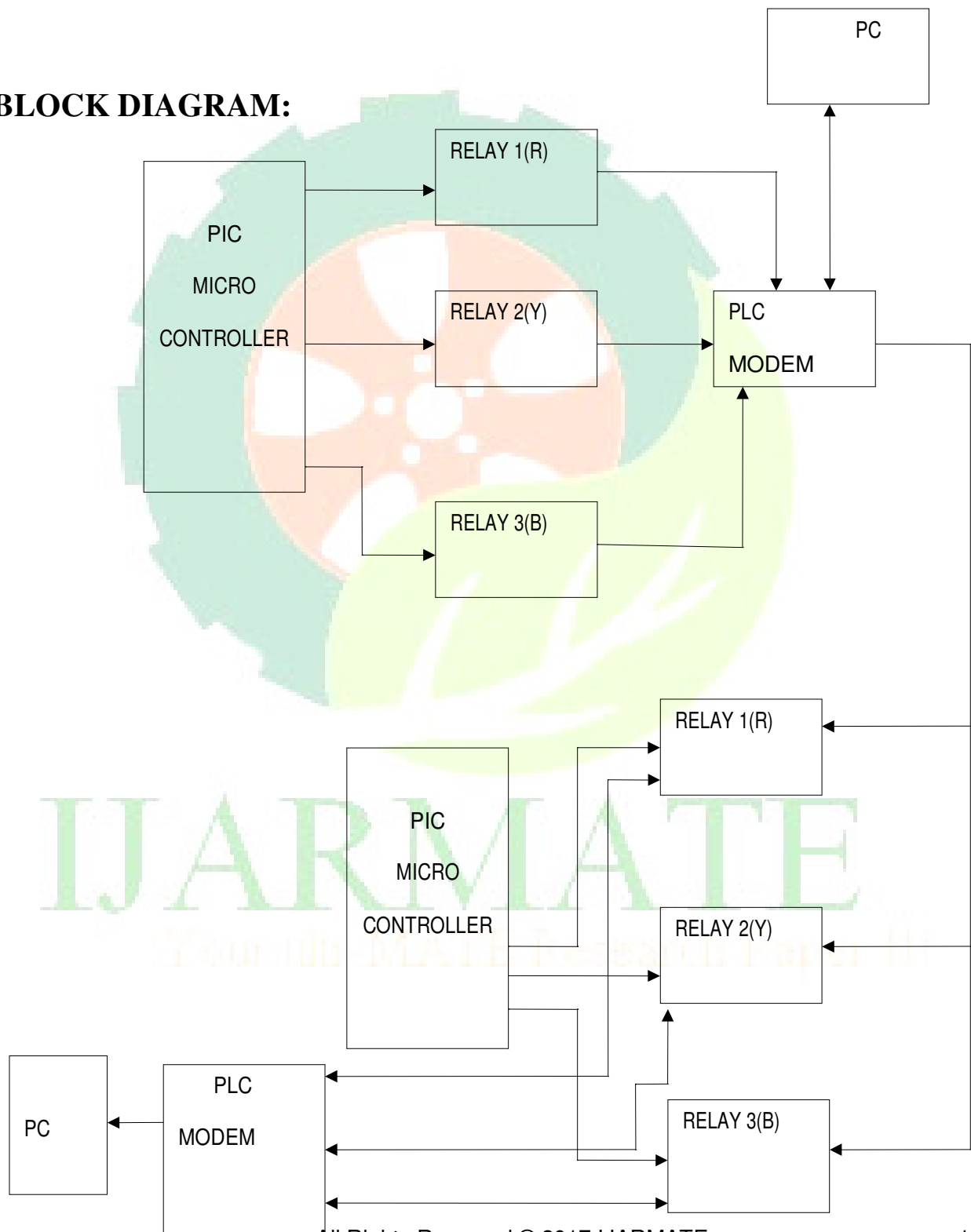
Relay fixed

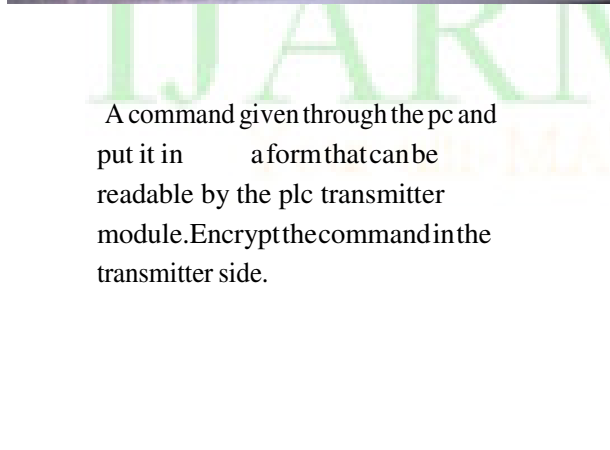
Step 8: Data transmission starts Step 9:

End

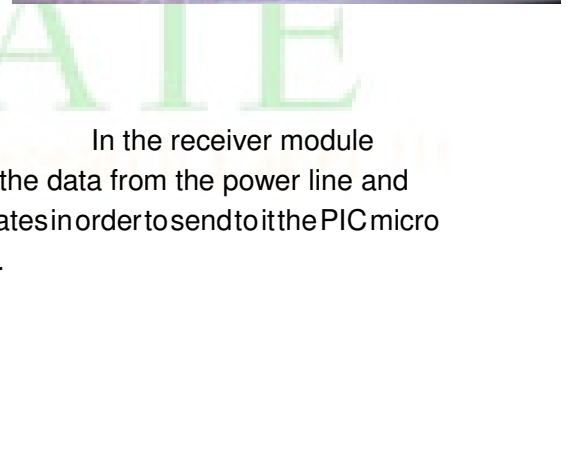
IJARMATE
Your all-MATE Research Paper Here

BLOCK DIAGRAM:





All Rights Reserved



erved © 2017 IJARMATE

V. Hardware description

a. PICmicrocontroller

Here we are using the PIC 16F877. It can be contained in 40-pin and 44-pin packages. This device is from the PIC 16F87XA family and shares a common architecture.

1. The 40/44-pin devices have five I/O ports
2. The 40/44-pin devices have fifteen interrupts
3. The 40/44-pin devices have eight A/D input channels
4. The parallel slave port is implemented only on the 40/44-pin devices
5. High performance RISC CPU
6. Only 35 single word instructions to learn
7. All the single-cycle instructions except for program branches, which are two cycle
8. Operating speed: DC-20 MHz clock input
DC-200 ns instruction cycle
9. Up to 8K x 14 words of Flash memory,
10. Up to 368 x 8 bytes of Data Memory (RAM),
Up to 256 x 8 bytes of EEPROM Data memory

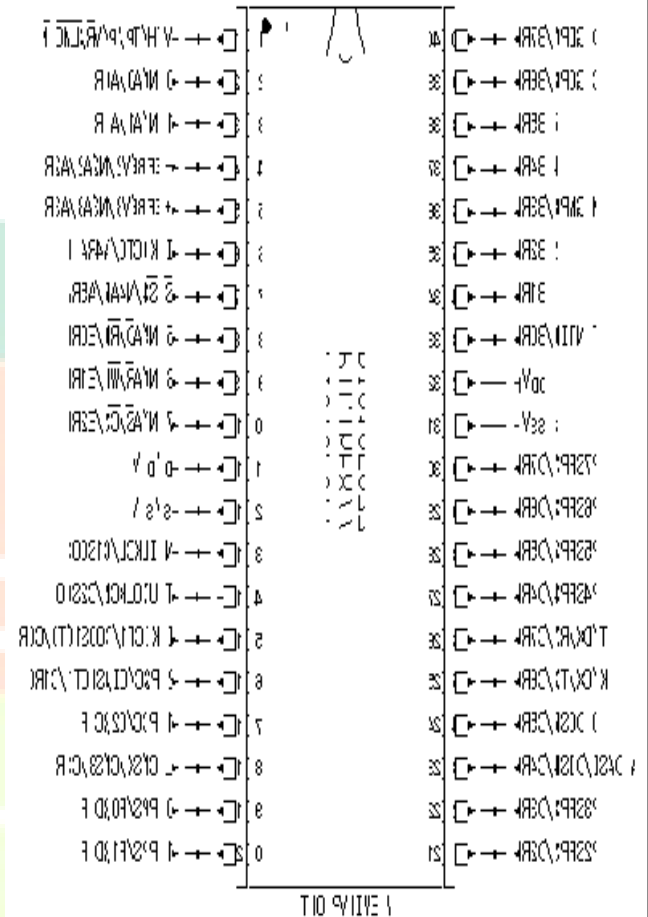
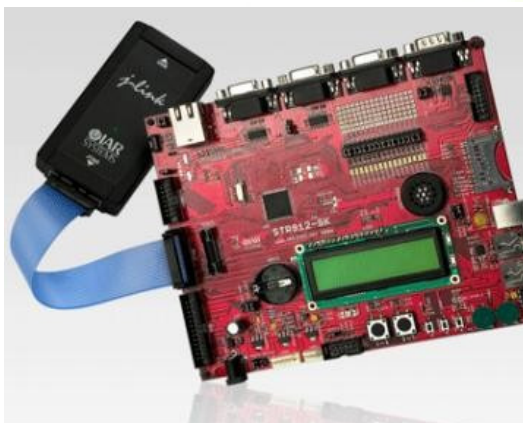


Fig: Pin diagram of PIC micro controller

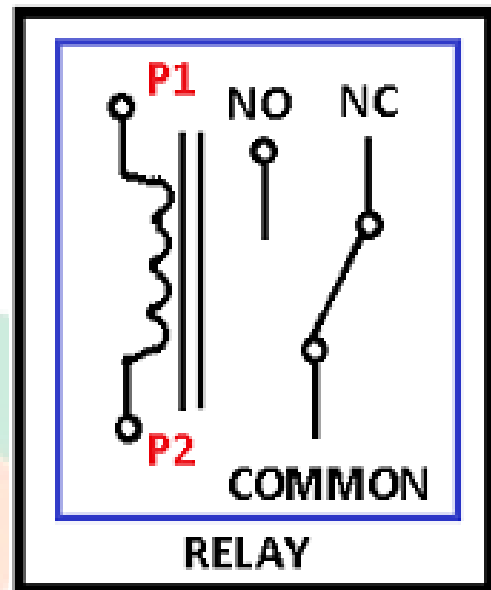


b. Relay Unit

Relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to

control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called protective relays.



C. PLC modem

PLC is nothing but Power Line Career Modem which is the main mediator in the mains line communication system, which modulate the signal with AC line and transmitter it to the receiver.

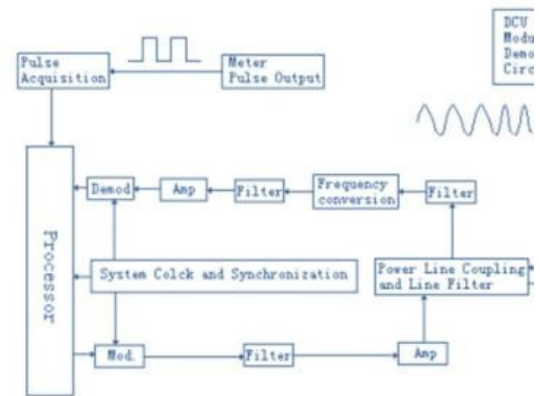
IJARMATE
Your ultimate Research Paper !!!

VI Software description

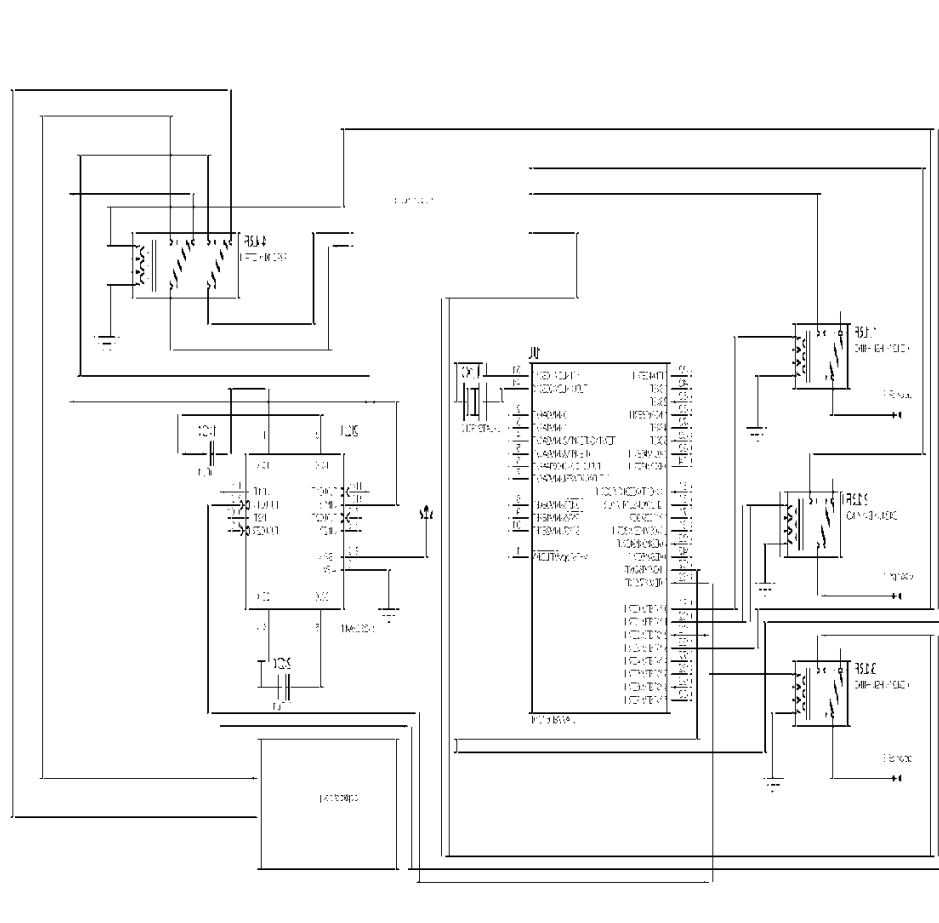
Hypo terminal software is used. It can be used to set up a dial up connection to another computer through the internal modem using Telnet or to access a bulletin board service in another computer. It can also be used to set up a connection for data transfer between two computers.

Developed by Hilgraeve from a more comprehensive communications program called Hyper ACCESS, Hyper Terminal has features similar to the Linux program, minicom.

VII Circuit diagram



IJARMATE
Your ultimate Research Paper !!



VIII Spectral compressive resource allocation technique

The SCRA is a chunk based power and bit allocation technique for reducing the computational complexity of resource allocation. It can perform drastic dimensionality reduction of the

allocation problem. combined with any existing bit loading algorithm.

Nsnr vector before running the bit loading algorithm. Unlike other technique in the literature, the SCRA, technique is not a new algorithm for solving the resource allocation problem. Basically it introduces a procedure to group sub carriers into a chunk in order to reduce the dimensionality of the resource

IX Future scope

1. Reduced the amount of noise
2. Increase the range of distance communication.

X Conclusion

In this work, we introduced a novel chunk-based resource allocation technique that is suitable for reducing the computational complexity and the signaling overhead associated with the use of the bit loading algorithm in OFDM-based PLC systems. Also, we discussed two ways of choosing the chunk length/bandwidth, namely constant and adaptive modes. When the SCRA technique is adaptive, we could see that it can offer less data rate loss ratio for a similar computational complexity reduction in comparison to the constant mode. But, we suggest the use of the constant mode since it is simpler and also easier to implement.

Furthermore, we compared the use of $B_{C,H}$ and $B_{C,\gamma}$ for determining the chunk length/bandwidth and showed that the

SCRA technique based on the nSNR coherence bandwidth is trustful, since it is less influenced by the α value. In addition, we investigated the data rate

loss ratio and the SER performance of the SCRA technique for different ways of choosing the representative nSNR of a chunk (i.e. the minimal, mean, median and maximum values of the nSNR belonging to the chunk). The numerical analyses showed that the best way of choosing the representative nSNR of a chunk is to use the minimal nSNR belonging to the chunk, since it is the only way to satisfy the SER constraint.

Finally, we showed that the STCRA technique is more flexible and can offer less data rate loss ratio for a given computational complexity reduction ratio than the others techniques in the literature.

References

- [1] M. V. Ribeiro, G. R. Colen, F. P. V. de Campos, Z. Quan, and H. V. Poor, "Clustered-orthogonal frequency division multiplexing for power line communication: When is it beneficial?" *IET Communications*, vol. 8, no. 13, pp. 2336–2347, Sept. 2014.
- [2] N. Papandreou and T. Antonakopoulos, "Resource allocation management for indoor power-line communications systems," *IEEE Trans. on Power Delivery*, vol. 22, no. 2, pp. 893–903, Apr. 2007.
- [3] A. M. Tonello, F. Versolatto, and A. Pittolo, "In-home power line communication channel: Statistical characterization," *IEEE Trans. on Communications*, vol. 62, no. 6, pp. 2096–2106, Jun. 2014.
- [4] M. Tlich, A. Zeddami, F. Moulin, and F. Gauthier, "Indoor power-line communications channel characterization up to 100 MHz - part II: Time-frequency analysis," *IEEE Trans. on Power Delivery*, vol. 23, no. 3, pp. 1402–1409, Jul. 2008.
- [5] M. A. Tunc, E. Perrins, and L. Lampe, "Optimal LPTV-aware bit loading in broadband PLC,"