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# **Automation of Home Energy Management System and Energy Monitoring Using ZIGBEE and GSM**

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**Abstract**— in this paper present a home energy organization system with power demand time and schedule their power usage in the household loads by themselves for the purpose of reducing electricity expense and achieved by a power cut. we first introduce a general architecture of an energy administration system (EAS) in a home network (HN) based on the smart grid and then propose a proficient planning method for residence power usage. The goal of the scheme support the customer to use less power during peak hours or move the time of energy used to off peak times such as nighttime and month end Accordingly, all appliances in the home operate robotically in the most cost-efficient way. Therefore, using real-time pricing (RTP) model is adopted there is the prospect that most appliances would operate during the time with the lowest electricity price and power sharing on demand time. Hence optimizes the home energy and reduce the power cost /man power.

**Index terms**--- Home energy organization, Energy administration system (EAS), Home network (HN), Real time pricing (RTP), and Proficient planning method for power usage.

## **I. INTRODUCTION**

The growing demand of electrical energy has made electric power systems to encounter more regular strain conditions. The common cause of system strain conditions includes transmission line outages, which are likely to occur during significant peak hours. Such actions will cause a supply-limit situation where cascading failures and large-area blackout are probable. Demand reaction (DR) has been visualized to deal with such sudden supply limit events by selectively imposing a control on system loads, whereby regaining balance between electricity supply and demand. DR also plays a unique role in load changing that can help increase consistency and effectiveness in operation. With the application of the proposed systems, Human operator billing are prone to reading error as sometime the houses electric power meter is placed in a position where it is not easily nearby, then inside our system smart meter is used Through the smart meter E-billing is possible. It will automatically it will update the energy consumption of the customer to EB unit. If power will be less in a grid, automatically power will be managed. Our proposed system when low power generation automatically goes to power management. All the devices controlled depends upon the priority based and timing based control the devices when low power generation. This project proposed system has automated metering infrastructure, but Existing System, can't manage the power effectively. Our future work is power sharing during power demand time and reduce the manpower. In general demand response refers to actions taken to change residents' electrical energy demand in reply to variation in the price of electricity over time.

## **II. LITRATURE REVIEW**

To studied this paper for a home authority management scheduler (HAMS) to reduce the cost of energy spending using RTP and with the recent expansion of advanced metering infrastructure, real time pricing (RTP) schemes to be introduced in future retail electricity market [1]. This document suggests an original energy management advance for smart homes that combine a wireless network, based on Bluetooth small Energy (BSE), for the communication among home appliances and this paper approach to reducing peak load demand, electricity utilization charges with an increase console level of consumers [2]. This paper presents the operations of appliance are controlled in response to energy price signals to reduce the consumer's electricity bill whilst minimizing the everyday level of total energy while preserving ease level [3]. In this paper suggest to Wireless Sensor Networks (WSNs) and Power Line Communications (PLCs) are used in this work to realize a smart home control network. The goals are to reduce the impact of wireless intervention in a smart home organize network and needless energy consumption of a smart home [4]. This paper presents a load measurement plan for home energy organization system with energy demand time. The planned system to manage household loads according to their predefined precedence and guarantee the total household power spending below certain

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levels [5]. The goal of this paper the system is to encourage the consumer to use less energy during peak hours or to move the time of energy use to off peak times such as night time and weekend on demand time [6]. In this paper readily available an integrated solution to guess and re-engineer the electricity demand in a region at a given day/time. The system available in this paper expands DR to built-up loads by energetically scheduling and selfish appliances in each dwelling unit [7]. In our study, the Home Energy Management System (HEMS) is expected as one of the promising technologies to satisfy the demand. The HEMS assisted by a sensor network having an efficient power supply in order to be spreading around the people [8]. This paper presents a scheme architecture for load management in smart buildings which enables independent require side load management in the smart grid. Being of a structure composed of three main modules for permission control, load balancing, and demand response, thus allowing the integration of different energy sources, and ease maintenance and upgrading [9]. This paper describes a home energy management system based on power line communication. Elegant metering and power line message can provide full information of energy, using up patterns and intelligent controlling of appliances at home [11].

### III. PROPOSED SYSTEM

In this paper proposed to implement automatic metering infrastructure using mesh topology and manage the power based on priority level and then automatically goes to power managed. The concept of this paper reduces the time delay for a lower priority task and Slicing of interrupt timings to improve the performances. Advantages of proposed system Meter reading taken automatically using ZIGBEE and GSM. Then Power cut achieved from EB office through wireless. Normal work happens at any time and external conditions. Occupies Less Manpower and High Accurate meter reading such as Customer service as well.

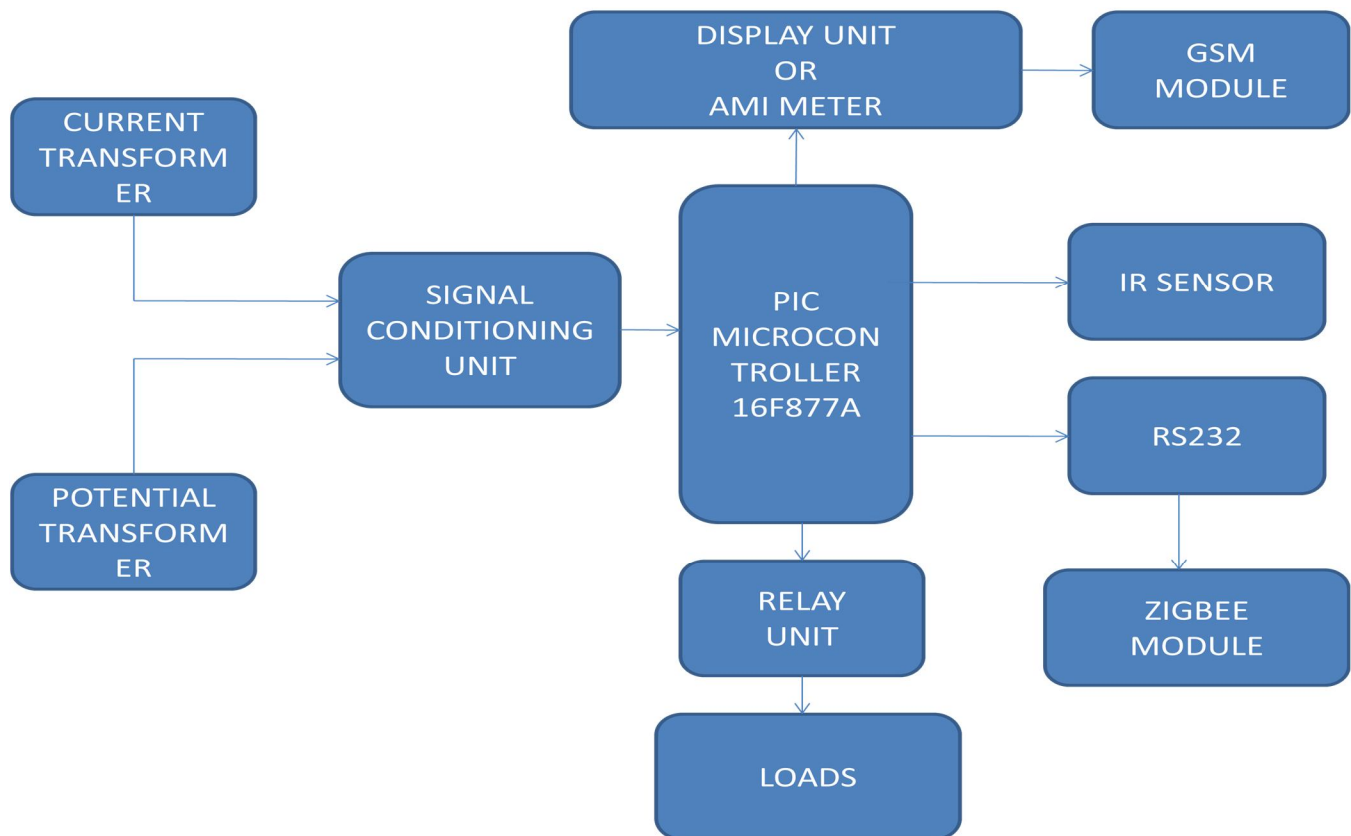


Fig.1 block diagram of proposed system

### IV. DESCRIPTION OF BLOCK DIAGRAM

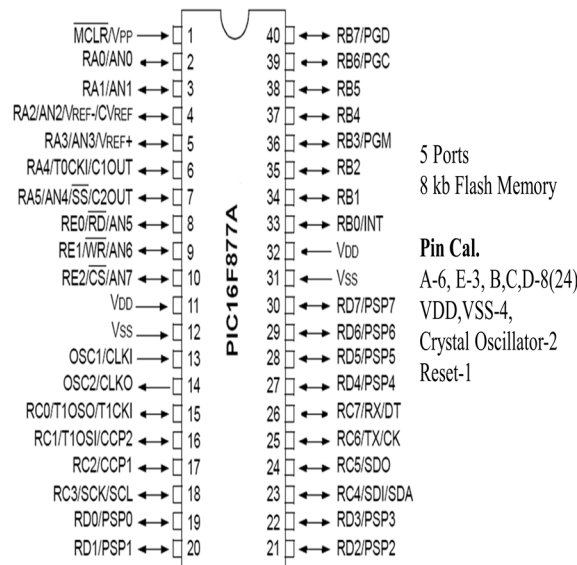
A. Microcontroller (PIC 16F877A)

1) Name Specification

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- PIC---- Peripheral Interface controller
- 16---- Controller Family Identification
  
- F---- Family
  
- 877----- Controller Series
  
- A----- Advanced

### PIN DIAGRAM of PIC



The PIC microcontrollers used for wide range application and then operating frequency range is 20MHz. It is a family of CMOS 8-bit flash controller. This type of processors has reduced instruction set and instructions are executed virtually in each cycle.

#### B. Current Transformer

A current transformer (CT) is used to measure alternating electric current. Current transformers, together with voltage (or potential) transformers (VT or PT), are known as device transformers. Current transformers are commonly used in metering and shielding relay in the electrical control industry. Current transformers are used extensively for measuring current and monitor the process of the power grid. Along with voltage leads, revenue-grade CTs drive the electrical utility's watt-hour meter on practically every building with three-phase service and single-phase services greater than 200 amperes.

#### C. Potential Transformer

Probable transformer or voltage transformer gets used in electric power scheme to step down the system voltage to a secure value which can be fed to low ratings meters and relays. Commercially accessible relays and meters used for protection and metering, are designed for low voltage.

#### D. Signal Conditioning

Signal condition can include amplification, filtering, converting, range matching, isolation and any other processes required to make sensor output proper for processing after conditioning.

#### E. Relay Unit

The relay is an electrically operated switch for use Electro Magnetic type Relay. Many relays use an electromagnet to function a switching device mechanically, but other operating principles are also used. Relays are used where it is essential to manage a circuit





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simulation results show that the proposed automation of energy management system based on the smart grid can successfully and proactively control and manage the operation of various appliances to keep the total family consumption below a specified demand limit. Simulation results specify that at a low demand limit level, the system is able to keep the total family demand below the limit, but customers may need to sacrifice their comfort level to some extent. However, it is expected that the results of work will benefit of electric distribution and exact response aggregators in providing an exact and deep accepting into the limits and achieve the power cut on demand response time.

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