



Smart AC Power Management

Priya Bhagat¹, Shavet Sharma²

¹M.Tech Scholar, ²Assistant Professor

Department of Electrical Engineering, Sri Sai College of Engineering & Technology
Badhani, Pathankot, Punjab, India

ABSTRACT

In our state we are facing tremendous problems in terms of electricity shortage. We are rich as producers but not getting the desired because of miss use of electricity. The solution is only the smart concept which can be achieved using the latest and modern technologies. In this paper I am describing some modern technologies like IOT and Microcontrollers and how to use such technologies for AC Power Management.

KEYWORD: *Sensor, IOT, SCR.*

I. INTRODUCTION

Smart buildings are the buildings which are fully automated, with the electronic gadgets of the house connected to a personal area network, with Wi-Fi facility being available for the building for 24/7 and hence the electric and electronic appliances in the house can be accessed via internet across the world. Electrical power is the crucial power and needs to be conserved so that the future generations also can access this energy. Hence electrical power management becomes a very important aspect for conservation of energy. When we have smart buildings, then the power management with the application of Internet of Things using Wireless Sensor Networks becomes an achievable job. It is often desired to control the power fed to a load using electronic methods. Such methods permit a fine control of power with better efficiency than electrical methods. Semiconductor devices that are often used to control the flow of current in a circuit are diodes, diode ac (Diac) Thyristors or Silicon Controlled Rectifier (SCR) and Triode ac (Triac). Diodes only conduct when it is forward biased and have no external control of the start of conduction. Thyristors

allow control of the start of conduction in the positive half-cycle of an AC voltage but rely on periodic reversal of current to turn them off. Triac on the other hand has the ability to conduct current in both half cycles by using positive or negative gate pulse which provides control on the start of conduction; therefore it can be used to provide a control of power in ac circuits of lighting equipment, hot-air oven, electric incubator and electric heater and in universal single phase ac motor. In these systems, power is controlled by means of phase angle variation of the conduction period through the setting of different firing times corresponding to different firing angles. As per the concept of Firing Angle Control Thyristors, we can control the AC power and the display unit can be used to display any percentage of power utilized or full power. The consumers can even enter any percentage to lower down the power to the load.

II. AC POWER MANAGEMENT

Most of the home based appliances are based on AC power. For smooth operations of loads it is mandatory to control the AC power supplied to them and this can be achieved by managing the operation of the power electronic switches like SCR.

The two methods to control switching operation of SCR are Phase Control Method and Integral Cycle Switching.

III. TECHNOLOGY FOR SMART AC POWER MANAGEMENT

As we know the smartness can be only achieved by deploying latest technologies and in AC Power Management Microcontroller concept is on top priority based on different types of sensors used to

detect and respond to electrical or optical signals. We have different types of sensors available and are classified based on the quantities such as electric current or magnetic or radio sensors, Humidity sensor, Fluid velocity or Flow sensors, Pressure sensors, Thermal or Heat or Temperature sensors, Proximity sensors, Optical sensors, Position sensors, Chemical sensor, Environment sensor, Magnetic switch sensor etc. The popular Microcontroller is 8051 series but in this paper I am going to explore the architecture of PIC Microcontroller. The IOT is also one of the latest and most popular technologies today used to control the hardware remotely using the famous network the Internet Technology.

IV. PIC ARCHITECTURE

Peripheral Interface Controller (PIC) provided by Micro-chip Technology to categorize its solitary chip microcontrollers. These appliances have been extremely successful in 8 bit micro-controllers. The foremost cause behind it is that Micro-chip Technology has been constantly upgrading the appliance architecture and included much required peripherals to the micro-controller to go well with clientele necessities. PIC microcontrollers are very popular amid hobbyists and industrialists; this is only cause of wide availability, low cost, large user base & serial programming capability. The architecture of the 8 bit PIC microcontrollers can be categorized as below:

1. Base Line Architecture:

In the base-line architecture PIC microcontrollers of PIC10F family is included, other than that a fraction of PIC12 & PIC16 families are also included. These gadgets make use of 12 bit program word architecture with six to twenty-eight pin package alternatives. Briefly defined attribute set of baseline architecture allows the most lucrative product solutions. This architecture is perfect for battery enabled gadgets. The PIC10F200 series is another reasonably priced 8 bit flash micro-controller with a 6 pin package.

2. Mid-Range Architecture:

In this midline member of PIC12 & PIC16 families are added that attribute 14 bit program word architecture. The midrange PIC16 gadgets proffer a broad variety of package alternatives (from 8 to 64 package), with low to high levels of peripheral incorporation. This PIC16 appliance attributes a variety of analog, digital & serial peripherals, like-SPI, USART, I2C, USB, LCD & A/D converters. The

mid-range PIC16 micro-controllers have suspended controlling ability with an eight level hardware load.

3. High Performance Architecture:

The high performance architecture included the PIC18 family of appliances. These micro-controllers make use of 16 bit program word architecture along with 18 to 100 pin package alternatives. The PIC18 appliances are high performance micro-controllers with incorporated Analog to Digital converters. All PIC18 micro-controllers integrate a highly developed RISC architecture that supports flash appliances. The PIC18 has improved foundation attributes, 32 level deep load and several inner and exterior interrupts.

V. CONCLUSION:

In this paper I have briefly described technical aspects for AC Power Management. The paper describes the need of AC Power Management and how to deploy technologies like IOT and Microcontrollers to make possibility of smart AC Power Management. The paper also describes the PIC Microcontroller and its architecture.

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