

THE IMPROVEMENT ON THE SYSTEM ROBUSTNESS THROUGH POWER MANAGEMENT SYSTEM

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Abstract- A power system converts, transmits, and controls energy to perform useful work. Power systems are usually large non-linear systems, which are often being subjected to low frequency electromechanical oscillations. Latest innovative ideas to make the life easier using the technology depends upon the application of the power electronics in turn about power quality. The System robustness of the power management system can be improved by improving power quality. Power quality can be improved by improving the voltage system which in turn can be improved by eliminating negative spikes, voltage sags etc

1. INTRODUCTION

All electric power systems require power supplies to operate. This part of the system design is often being overlooked. The electric power industry shapes and contributes to the welfare, progress, and technological advances of the humanity. The growth of electric energy consumption in the world has been phenomenal. The supply voltage(s) must be kept as quiet as possible for the optimum performance of high performance circuits. Electric power supply system in a country comprises of generating units that produces the electricity; high voltage transmission lines that transport electricity over long distances; distribution lines that deliver the electricity to consumers; substations that connect the pieces to each other; and energy control centers to coordinate the operation of the components. The voltage supply in the power system should be kept continuous; there should not be any negative spikes, voltage sags, high temperature etc. Voltage sags, due to the faults, can be critical to the operation of a power plant, and hence, are of major concern. Depending on nature of the fault (e.g. symmetrical or unsymmetrical), the magnitudes of the voltage sags can be equal in each phase or unequal respectively.

2. LITERATURE REVIEW

Power management is an important issue and thus there has been a significant amount of prior work in this area. The most straightforward way to manage power in a multi core chip is to simply apply well-known single core techniques to every core. However, Isci observed that such "local" (per-core) management was potentially inefficient because it could not take advantage of peak power averaging effects that occur across multiple cores. They introduce the global schemes in which a single, centralized, "global" controller determines the power budget and settings (frequency of the voltage supply) for each core. Sharkey provide a more detailed evaluation of these global schemes in terms of their efficiency. Sartori and Kumar present a proactive scheme for managing peak power in multicore chips. They observe that the

distributed algorithms can be used to select the power level allocation for cores and that they would be more scalable than algorithms based on having a centralized global controller. Lungu and Sorin quantified the effort required to formally verify parts of microprocessors. Martin and Marty discussed the verification effort required for different cache coherence protocols. Our work differs from this prior work by focusing on the power management schemes.

3. OBJECTIVE AND SCOPE OF STUDY

We have also reviewed that today's systems require power supply design to be integrated with the system design in order to maintain high efficiency. The prevalence of multicore architectures coupled with demands for low power systems motivate the development and evaluation of efficient power management solutions targeted specifically at multicores. Power is managed for many reasons, including to: improve power-efficiency, avoid power spikes, increase battery life, reduce the cost of providing power to the chip, and manage temperature. Main objectives of this research are as follows:

- To reduce the Supply voltage what can reduce the desirable effects in the power dissipation of the digital circuits and also lowering the supply of linear circuits limits the dynamic range of the signal.
- To eliminate the negative supplies to the electric power system.
- To improve the power efficiencies of the power system
- To reduce the cost of the power providing to chip and manage the temperature as well.

Scope of Study

A Power Management System is a modular unit, which combines Static Voltage Regulator, Isolation Transformer, Best Phase Selector, Auto Mains Failure, AC Distribution Panel, Lightning and Surge protection and Alarm systems to provide the Power Management Solution for Telecom BTS

Publication History

Manuscript Received : 10 October 2014
Manuscript Accepted : 20 October 2014
Revision Received : 28 October 2014
Manuscript Published : 31 October 2014

sites. PMS has utility for the other applications as well where a controlled power is required for electrical appliances at industrial sites, manufacturing facilities.

4. RESEARCH APPROACHES

Electrical energy is an essential ingredient for the industrial and all round development of any country. It is generated centrally in bulk and transmitted economically over the long distances. Electrical energy is conserved at every step in the process of the Generation, Transmission, Distribution and utilization of electrical energy. The power supply in the power system could be varied due to negative spikes, sags etc. in the voltage supplying to the power system. Hence, our approach would be experimentally based method for this research.

5. RESEARCH METHODOLOGY

Experimental method: - supply Architecture:

1. Boards that derive the input power supplies from a backplane with its power always on and the boards plugged into or extracted from the backplane without turning the power off – these are called hot swappable boards, shown in Figure 1.

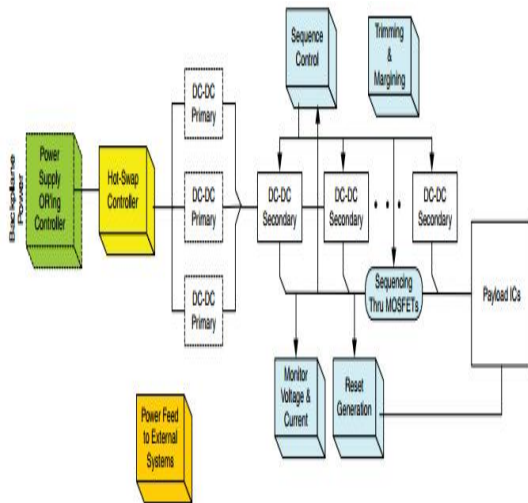


FIGURE 1 POWER MANAGEMENT IN A HOT-SWAPPABLE CIRCUIT BOARD

2. Boards that derive the power from an external power supply that is turned on after the board is connected and is turned off before the board is disconnected – these are called non hot-swappable boards.

Figure 1 illustrates the power supply architecture of a circuit board with the common power management blocks shown in 3-D. A hot swappable board derives its power from one or more supplies from backplane. There can be more than one set of the supplies sourced from the backplane, so these boards are operational even when one of the supplies fails. The backplane supplies in Figure 4 are also called the primary supplies. Primary supplies are used to derive one or more main payload supply rails, which are also called as secondary supply rails.

The power quality is also a problem such as poor power quality or even power loss problem for the power system. The power quality if improved then PMS works in the positive in the system. Poor power quality in the form of the harmonic distortion or low power factor increases stress on a

facility’s electrical system. Over time this increased the electrical stress will shorten the life expectancy of electrical equipment. In addition to the system degradation, poor power quality can cause nuisance tripping and unplanned shutdowns within electrical system.

In an increasingly automated electrical world, it is most important for a facility to evaluate power quality. Harmonic distortion, low power factor, and the presence of other transients can cause the severe damage to the power system equipment. PSE provides the system analysis and evaluation of power quality issues and makes recommendations for system design solutions. The largest device, the ispPAC-POWR1220AT8, can be used to implement complex power management functions, the smallest device, the ProcessorPM-POWR605, can be used to implement power management functions for a wide variety of microprocessors and DSPs.

6. CONCLUSION

Field results from different applications are given to give the reader a better insight in the benefits that may be gained by having good Power Quality. It has been observed that after a particular amount of increases in the load on feeders, the voltage levels at the load terminal decreases. During the period of voltage sag, the speed of air conditioning motors decreases and consequently causes an increase of motor current. The current of motors can rise to 2.3 pu and as higher than this value at the beginning of the post-sag period. The power systems’ robustness can be improved via reduction of voltage supplies, elimination of negative supplies, and improvement of power efficiencies with proper management of temperature.

REFERENCES

- [1] B. Marinescu, J. M. Coulondre, "A coordinated phase shifting control and remuneration method for a zonal congestion management scheme," Power Systems Conference and Exposition, 2004. IEEE PES, pp. 72-77, 10-13 Oct. 2004
- [2] P. Kundur, "Power System Stability and Control", McGraw-Hill, 1994.
- [3] S. Lehnhoff, U. Häger, O. Krause, H. F. Wedde, C. Rehtanz: "Towards Autonomous Distributed Coordination of Fast Power Flow Controllers in Transmission Networks." In: Proc. 4th Int. IEEE Conf. on Liberal. and Modern. of Pow. Syst., Irkutsk, Russia, 2009.
- [4] Verboomen, J., "Optimisation of Transmission Systems by use of Phase Shifting Transformers". PhD thesis, Technische Universiteit Delft, 2008.
- [5] Blajszczak, G. Antos, P, "Power Quality Park - Idea and feasibility study," Proc. Of Electric Power Quality and Supply Reliability Conference (PQ), 16-18 June, pp 17 – 22, 2010.
- [6] G. Lee, M. Albu, and G. Heydt, "A Power Quality Index Based on Equipment Sensitivity, Cost, and Network Vulnerability," IEEE Transactions on Power Delivery, Vol 19, no 3, pp. 1504–1510, July 2004.
- [7] S. Djokic, G. Vanalme, J. V. Milanovic, and K. Stockman, "Sensitivity of Personal Computers to Voltage Sags and Short Interruptions," IEEE Transactions on Power Delivery, vol. 20, no. 1, pp. 375–383, January 2005.
- [8] R. J. Yester, "New Approach to High Availability Computer Power System Design," EC&M, pp. 18–24, January 2006.
- [9] F. B. Ajaei, S. Afsharnia, A. Kahrobaeian, and S. Farhangi, "A Fast and Effective Control Scheme for the Dynamic Voltage Restorer," IEEE Transactions On Power Delivery, Vol. 26, no. 4, pp. 2398-2404, Oct. 2011.