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APPLICATION OF RECONFIGURABLE HARDWARE TECHNOLOGY IN THE DEVELOPMENT AND IMPLEMENTATION OF BUILDING AUTOMATION SYSTEMS

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Abstract

Due to the continuously increasing trend in the costs of the traditional fossil fuels, the development of residential or commercial buildings with reduced energy needs becomes a significant and more pressing scientific challenge. At the same time, consumers are increasingly demanding more comfortable buildings, where the energy needs are addressed using locally available renewable energy resources. Consumers also require a higher level of security, supervision, and control of the building, depending on the needs of the users. The abovementioned expectations present building automation systems design engineers with a challenging situation, which is difficult to approach using classical methods or strategies. As a result, this paper outlines novel facilities and solutions offered by the current level microelectronics in building mechatronics systems development and implementation. In the first step of this endeavor, the benefits of the reconfigurable technology are highlighted and explained. Next, available hardware resources are presented, especially examining the novel FPGA processors-based architectures suited for building automation applications. The feasibility and versatility of such a reconfigurable hardware configuration and parallel computing digital system were tested in a concrete building supervising and control application. The experimental results met the designers' expectations, indicating that the proposed hardware represents a viable solution for a wide range of high performance building automation systems design and development.

Key words: intelligent building, FPGA processor net zero-energy, parallel computing, reconfigurable technology

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