

Abstract. Chapter 1 discusses error-tolerant computing and a number of current counter applications. In Chapter 2 the implementation of counters is considered, Table of Contents 1. Introduction. Overview of error-tolerant computing. Types of error-tolerant systems. Special-purpose error-tolerant systems. 53 2. Counting Systems. Introduction to counting systems. Types of counting systems. Connected counting systems. Counting systems based on their accuracy and counting speed. NSC algorithms for various counting applications. 3. Counting Methods. Overview of counting methods. Modification of binary counters to produce basic counters. Statistical and perceptive counting. 4. Counter Implementation. An algorithm for implementing counters. Implementation of counters in hardware. Implementation of counters in software. Algorithm implementation and verification by means of software simulation. 5. PIC Microcontroller-Based Implementation. An introduction to the PIC microcontroller. Basic ICs. Evaluation of digital counters. Digital Arithmetic (The Morgan Kaufmann Series in Computer Architecture and Design) [Ercegovac, Miloš D., Lang, Tomas] on Amazon.com. 52 5.1. Test Patterns. A description of the test patterns. Problems of test patterns and techniques for correcting them. Techniques for deriving test patterns from hardware description. 5.2. Hardware Description. How to describe PIC microcontrollers using a HDL. PICs and VHDL. PIC and HDL codes. HDL code for describing the architecture of the controller. HDL code for describing counters and their algorithms. 5.3. Synthesis. The operations of synthesis. Ways to use synthesis. PIC microcontroller synthesis. 6. Implementation Methods. An overview of the methods for implementing counters. PIC microcontroller implementation of counters. Hardware description of counters using a HDL. 7. Verification. How to verify PIC microcontroller-based implementations of counters. The verification of HDL descriptions of counters. 8. Recursive Computation. An overview of algorithms for performing recursive computations in a digital computer. Classes of recursive algorithms for computing various types of length sequences in digital counters. 5 9. Memoryless Computations. An overview of algorithms for performing memoryless computations in a digital computer. Classes of algorithms for various types of memoryless computations. 10. Parallel Processing. An overview of techniques for performing computations in parallel. An introduction to various parallel computing environments.

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