<<数字设计进阶>>

图书基本信息

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作者：克里特

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内容概要

This book first gives an introduction to electronic circuits: various electronic components,basic FET construction and operation. Then discusses structure of combinational logic circuits and logic minimization, introduces several combinational circuits that are frequently used by digital designers, including a data selector, a binary decoder, an encoder,and a shifter, also discusses several combinational circuits that perform arithmetic operations on binary numbers, including adders, multipliers, and comparators. Finally,introduces the concept of electronic memory and the founding concepts used in the design of sequential circuits.

作者简介

Clint Cole，is on the faculty at Washington State University，where he teaches many different engineering courses. Cole has worked at Hewlett-Packard，Physio-Control，and Heartstream. Mr. Cole co-founded Heartsteam in 1991，serving as lead engineer until Hewlett-Packard purchased the company in 1997. Mr. Cole co-founded Digilent in 2000，where he serves as President and senior engineer..

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书籍目录

章节摘录

In a schematic editor, circuits can readily be constructed by assembling graphical shapesthat describe logic gates, interconnections, and I/O ports. The completed schematic definesa virtual circuit model, and such models serve two primary purposes： they can besimulated so that a circuit's behavior can be analyzed before it is built； and they can besynthesized, or automatically implemented in a real, physical circuit device. Thewidespread use of simulation and synthesis CAD tools has defined a new and powerfuldesign approach used by virtually all digital design engineers. But it is important toremember that CAD tools work with virtual circuit models, and not with real, physicalcircuits. Even the most powerful circuit simulators cannot fully model all circuit behaviors, and much about circuit function can only be learned through building and interacting witha physical circuit.The use of CAD tools greatly simplifies the job of creating a circuit definition that meetsthe needs of any given design problem. Design problems are typically expressed as a"behavioral" requirement——for example , a design requirement might be to illuminate awarning light if a measured temperature exceeds 90~C for 10 seconds, or if coolant level istoo low. This worded description describes how a circuit should behave, but it provides noinformation about circuit structure. A circuit model can be developed to meet the needs ofsuch a behavioral problem statement, and that circuit model can be simulated so that itsperformance can be compared to the problem requirements. But note that the assumptionsused to create the circuit model are verified against the assumptions in the problemstatement, and therefore the overall solution is only as good as the assumptions. In anyenvironment or discipline, assumptions are used in place of rigorous knowledge, and theyare usually lacking. When circuits are implemented in real, physical devices, theirbehavior and performance can be thoroughly checked and validated, leaving no room forfaulty assumptions——the circuit either works properly in its intended environment or itdoes not. It is fair to say that a solution to a given problem is only "proven" after a realcircuit has been built and verified. ……

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