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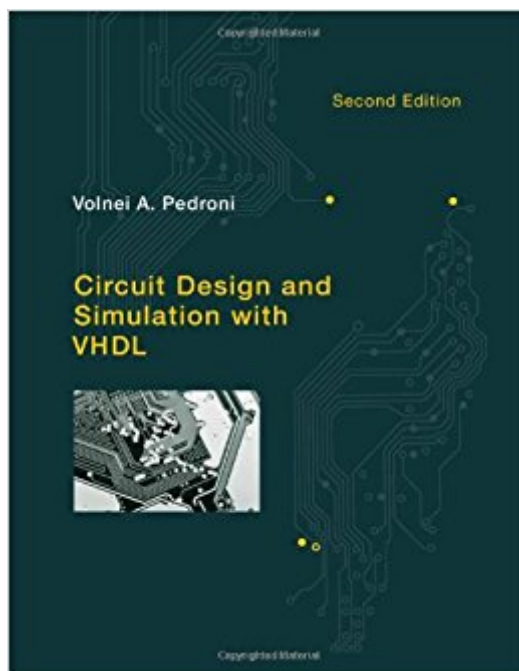# Circuit Design And Simulation With VHDL (MIT Press)

Second Edition

Volnei A. Pedroni

Circuit Design and Simulation with VHDL

Synopsis

This text offers a comprehensive treatment of VHDL and its applications to the design and simulation of real, industry-standard circuits. It focuses on the use of VHDL rather than solely on the language, showing why and how certain types of circuits are inferred from the language constructs and how any of the four simulation categories can be implemented. It makes a rigorous distinction between VHDL for synthesis and VHDL for simulation. The VHDL codes in all design examples are complete, and circuit diagrams, physical synthesis in FPGAs, simulation results, and explanatory comments are included with the designs. The text reviews fundamental concepts of digital electronics and design and includes a series of appendixes that offer tutorials on important design tools including ISE, Quartus II, and ModelSim, as well as descriptions of programmable logic devices in which the designs are implemented, the DE2 development board, standard VHDL packages, and other features. All four VHDL editions (1987, 1993, 2002, and 2008) are covered.This expanded second edition is the first textbook on VHDL to include a detailed analysis of circuit simulation with VHDL testbenches in all four categories (nonautomated, fully automated, functional, and timing simulations), accompanied by complete practical examples. Chapters 1--9 have been updated, with new design examples and new details on such topics as data types and code statements. Chapter 10 is entirely new and deals exclusively with simulation. Chapters 11--17 are also entirely new, presenting extended and advanced designs with theoretical and practical coverage of serial data communications circuits, video circuits, and other topics. There are many more illustrations, and the exercises have been updated and their number more than doubled.

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Customer Reviews

Volnei Pedroni explains what designers really need to know to build hardware with VHDL. This book sets the standard for how hardware description languages should be taught. (David Money Harris, Professor of Engineering, Harvey Mudd College)

Volnei A. Pedroni received his PhD in Electrical Engineering from the California Institute of Technology. He is Professor of Electronics Engineering at Brazil's Federal University of Technology.

I own all the Pong Chu VHDL/Verilog books and I find this book the easiest and friendliest to understand! To the reviewer whom spoke in a negative fashion about this book, they know not what they are talking about because they have the older version of the book which is not obsolete by any means! This book has a few usable pieces of firmware that I like which I cannot find in the Pong Chu books. It shows you how to interface an I2C controller and LCD controller. This is all in the state machine logic section. Just spoke with professor Volnei today and asked for the book source. He opened up the examples section and removed the password no questions asked! What a nice guy! So there you go...Now you have access to the source code in pdf format! I have also overheard that he is working on the Third Edition of the book! So exciting and cannot wait to see some new material soon...Best book on FPGA hands-down and more legible and easier to understand than other convoluted babble I've had the non-pleasure of reading. I am so impressed with this book that I am migrating all the examples from ALTERA to Lattice on the Machx03 breakout board...What a great way to learn one of the most secretive tools in engineering! Five Stars...Get it and Learn it! :)

I'm new to VHDL design, so while I was not completely new to VHDL, I wanted to learn more about testbenches and simulation. This book covers those well, and I like that goes in depth into VHDL keywords. I especially like the coverage of the data types and converting between different data types, something I had scratched my head on before. The information on testbenches and simulation were good, and it's good that the appendices cover details on Modelsim, Xilinx ISE, and Altera Quartus. About the only thing I was a little disappointed in was I was hoping it talk more about

editing timing constraints. I could see how somebody completely new to VHDL might be a little overwhelmed initially though, if this was the only resource they had.

My biggest problem with this book is that only the first 10 chapters (and CPU) have any source-code on the enclosed CDROM. There's more than enough space on the CDROM to place the entire book in it! Also, more explanation about how to build test benches for VHDL code would have been very helpful.The chapters on Xilinx and Altera Quartus design tools were helpful, but hopelessly out of date. Some of that is the fault of Xilinx and Altera for changing their GUIs from release to release, such that there's no continuity for the book's authors to hang their text on!

This is a concise, and well-organized book, especially suited for readers who already have some background in Verilog. I appreciated the extensive example code. I would definitely recommend this book over the one by Ashenden.

If you really want to understand and be able to work with vhdl for circuit desing, then this is the best choice to start your journey. It goes slowly but it is well paid.

This book goes from really simple concepts to fairly complicated ones. I was learning FPGA development for fun, and this book shed a lot of light onto what was happening under the hood and helped me understand how to make better designs.

I've adopted this book for a class I teach in digital systems design. I agree with another reviewer that the book has problems for instructional use. It does overwhelm the student in the first chapters! I reduced the problem by writing a VHDL introduction I give the students, and telling them to only skim sections of the first few chapters of the book.I'd also warn against assigning problems from the text. I've found that the frequently require knowledge gained only after reading latter chapters or require VHDL features that are missing from the software that we use.I know this sounds like a negative review, and you might ask why I gave it 4 stars. Where it wins is in that it is very thorough and isn't a "throwaway" textbook. It's the closest book to reality that I've seen. It's also very well priced.

This is the best book I have used for self study of VHDL for use at my job to implement FPGAs. I like the easy to read text that uses many practical code examples to emphasize the use of VHDL. At

the end of each chapter there are several questions that help your understanding of the topics.

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