Brock J. LaMeres

Quick Start Guide to Verilog

Second Edition

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Brock J. LaMeres
Department of Electrical and Computer Engineering
Montana State University
Bozeman, MT, USA

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Preface

The classical digital design approach (i.e., manual synthesis and minimization of logic) quickly becomes impractical as systems become more complex. This is the motivation for the modern digital design flow, which uses hardware description languages (HDL) and computer-aided synthesis/minimization to create the final circuitry. The purpose of this book is to provide a quick start guide to the Verilog language, which is one of the two most common languages used to describe logic in the modern digital design flow. This book is intended for anyone that has already learned the classical digital design approach and is ready to begin learning HDL-based design. This book is also suitable for practicing engineers that already know Verilog and need quick reference for syntax and examples of common circuits. This book assumes that the reader already understands digital logic (i.e., binary numbers, combinational and sequential logic design, finite state machines, memory, and binary arithmetic basics).

Since this book is designed to accommodate a designer that is new to Verilog, the language is presented in a manner that builds foundational knowledge first before moving into more complex topics. As such, Chaps. 1–6 provide a comprehensive explanation of the basic functionality in Verilog to model combinational and sequential logic. Chapters 7–12 focus on examples of common digital systems such as finite state machines, memory, arithmetic, and computers. For a reader that is using the book as a reference guide, it may be more practical to pull examples from Chaps. 7–12 as they use the full functionality of the language as it is assumed the reader has gained an understanding of it in Chaps. 1–6. For a Verilog novice, understanding the history and fundamentals of the language will help form a comprehensive understanding of the language; thus, it is recommended that the early chapters are covered in the sequence they are written.

The second edition of this book adds a chapter on floating-point systems. This new chapter provides a comprehensive background on the IEEE 754 standard for encoding floating-point numbers and then shows Verilog modeling approaches to implement floating-point arithmetic.

Bozeman, MT, USA — Brock J. LaMeres

Acknowledgments

For my incredible daughter Kylie. You are smart, beautiful, and creative. But even more important is that you have a sense of humor that brings joy to the world. You bring laughter to every situation and leave every room full of smiles. Never let the world make you think you should be anything other than who you are. Your strength will carry you through any hard times you encounter, and your humor will allow you to enjoy the ride. The world needs people like you more than ever. Your family will always be with you as you build the life of your dreams. With love, Dad.

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