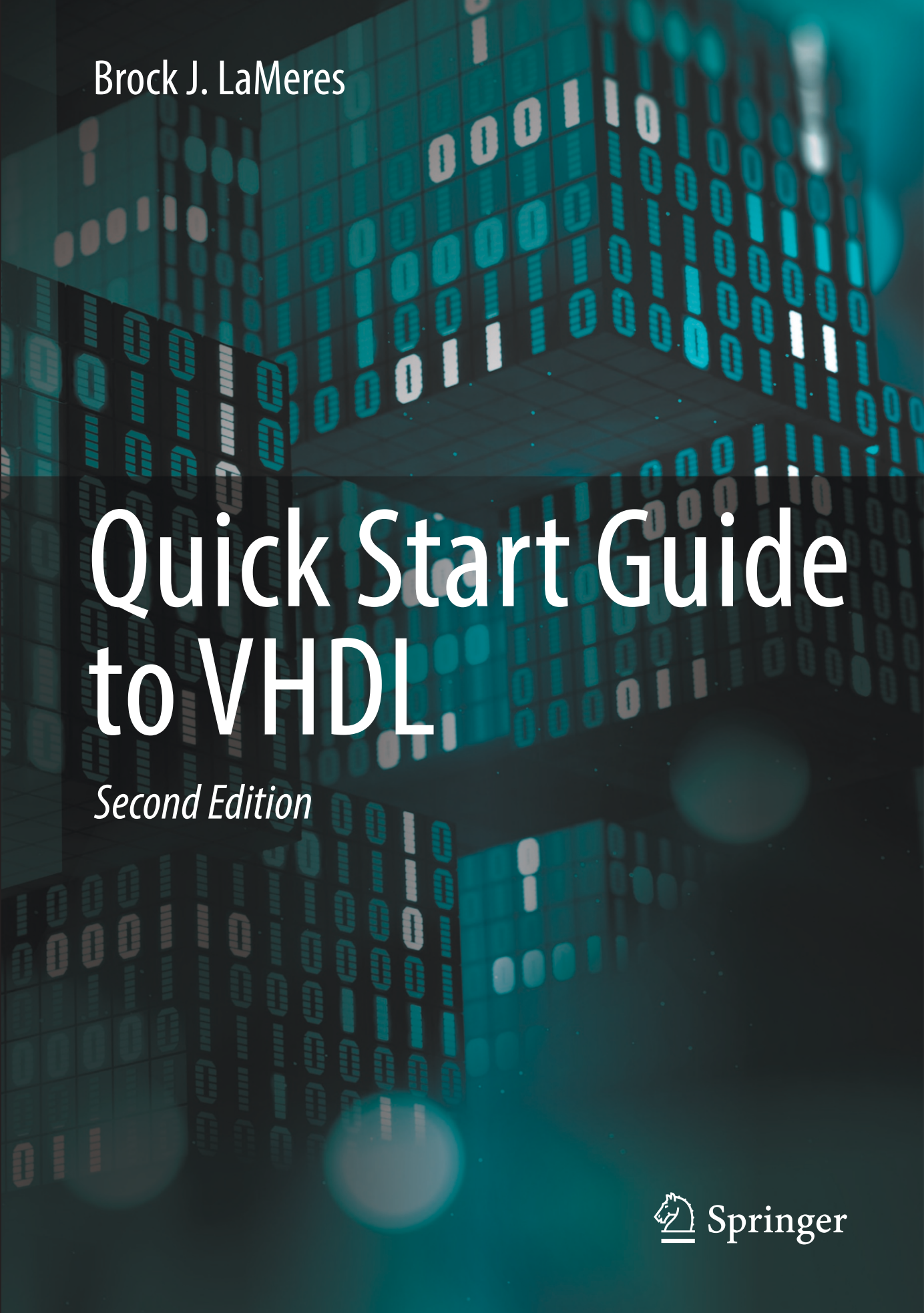
Brock J. LaMeres
Quick Start Guide to VHDL
Second Edition
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Brock J. LaMeres
Department of Electrical and Computer Engineering
Montana State University
Bozeman, MT, USA

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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 VHDL 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 VHDL 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 VHDL, the language is presented in a manner that builds foundational knowledge first before moving into more complex topics. As such, Chaps. 1, 2, 3, 4, and 5 only present functionality built into the VHDL standard package. Only after a comprehensive explanation of the most commonly used packages from the IEEE library is presented in Chap. 7 are examples presented that use data types from the widely adopted STD_LOGIC_1164 package. For a reader that is using the book as a reference guide, it may be more practical to pull examples from Chaps. 7, 8, 9, 10, and 11 as they use the types *std_logic* and *std_logic_vector*. For a VHDL novice, understanding the history and fundamentals of the VHDL base release 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 book culminates with a full computer design in Chap. 12 and a detailed look at floating-point systems in Chap. 13.

The second edition adds in a new chapter on floating-point systems. The detailed background of floating-point numbers is given before moving into VHDL modeling. A discussion of the packages in the IEEE and IEEE_Proposed libraries is presented in order to provide an understanding of what models are synthesizable and which are not.

Bozeman, MT, USA — Brock J. LaMeres

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For my amazing daughter Alexis. You are the kindest person I have ever met. You have been blessed with intelligence, beauty, and a heart that cares more for others than yourself. Watching you become the person you are today has been one of the greatest joys of my life. You will make the world a better place just by being who you are. As you begin your journey into the world, know that you have everything you need to succeed and that you never need to change. Go forward with courage, learn from your mistakes, and know that your family will always be behind you every step of the way. With love, Dad.

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