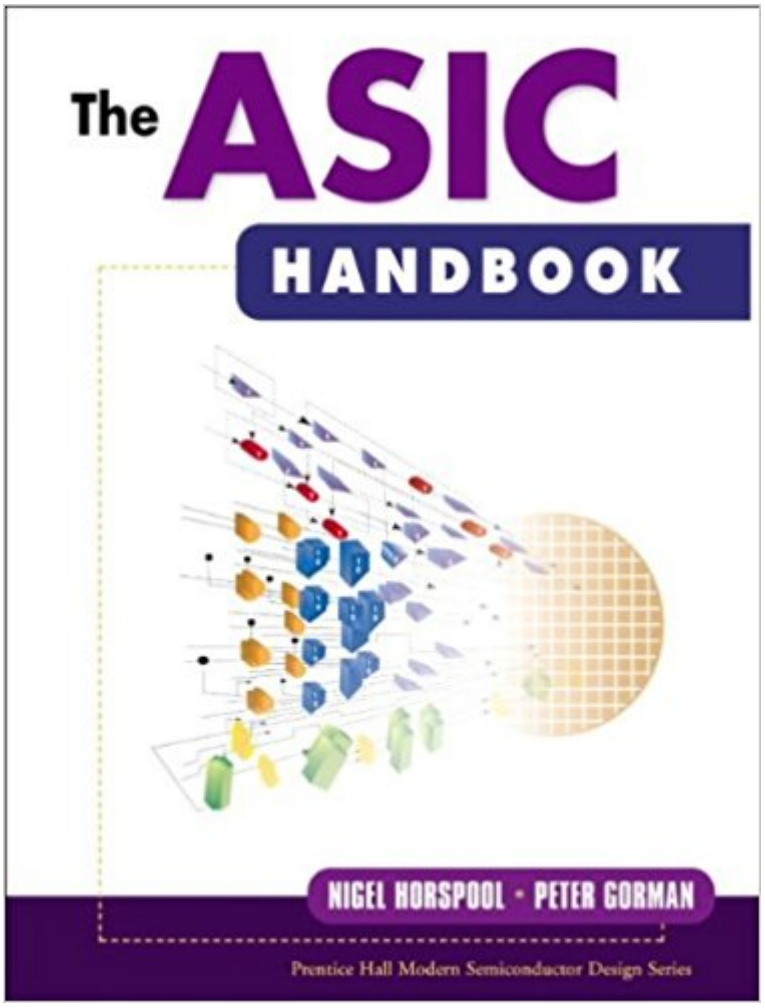
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The ASIC Handbook



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Synopsis

Get from idea to "right-first-time" silicon--fast!Now, there’s a complete guide to effective, rapid ASIC development for every electronics industry development manager or project team member. The ASIC Handbook presents techniques and methods any organization can use to slash time to market and dramatically improve quality. The authors begin with a detailed overview of the key phases of an ASIC-based development project, then cover every step of the ASIC development process, presenting specific solutions that have been proven in a wide range of applications and environments. Coverage includes: * Proven design-for-reuse and SoC solutions * Maximizing the quality of your initial designs and architectures * Effective VHDL/Verilog coding techniques * Advanced approaches to synthesis and design-for-test (DFT) * System simulation, design verification, and more The ASIC Handbook also covers the project management and leadership components of ASIC development -- delivering practical insights into team building, planning, risk reduction, and vendor management. Whether you’re a manager, project leader, or design engineer, you’ll find it indispensable.

Book Information

Paperback: 256 pages

Publisher: Prentice Hall; 1 edition (May 26, 2001)

Language: English

ISBN-10: 0130915580

ISBN-13: 978-0130915580

Product Dimensions: 6.9 x 0.6 x 9 inches

Shipping Weight: 13.6 ounces (View shipping rates and policies)

Average Customer Review: 3.1 out of 5 stars 4 customer reviews

Best Sellers Rank: #2,319,360 in Books (See Top 100 in Books) #85 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Circuits > VLSI & ULSI #383 inÃ Â Books > Computers & Technology > Programming > Software Design, Testing & Engineering > Logic #679 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Circuits > Design

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PrefaceThis book is a practical, step-by-step guide to the process of designing digital Application-Specific Integrated Circuits, or ASICs, as they are universally referred to in the industry. These components lie at the heart of nearly all successful electronic products. In the early 1990s,

only a relatively small number of companies had in-house ASIC design teams. Outside of these, third-party ASIC design companies serviced the rest of what was still a relatively small market. ASIC know-how was considered an esoteric subject. By the late 1990s, less than 10 years later, this situation had transformed far beyond what anyone could have projected. Access to ASIC expertise had become and remains a survival requirement for all the major companies in the electronics industry and for many small and medium-sized enterprises, too. Such has been the explosive growth in demand for experienced ASIC teams that there is now a significant shortfall in supply. Those companies that do succeed in attracting ASIC expertise and developing it to its maximum potential hold the key to making market-winning products that can yield enormous returns on investment. Herein lies the value of this publication.The book's aim is to highlight all the complex issues, tasks and skills that must be mastered by an ASIC design team in order to achieve successful project results. It targets ASIC and non-ASIC readers in its scope. The techniques and methodologies prescribed in the book, if properly employed, can significantly reduce the time it takes to convert initial ideas and concepts into right-first-time silicon. Reducing this ever-critical time to market does not simply save on development costs. For new products or new market segments, it provides the opportunity for getting the product there ahead of the competition and, thus, creates the potential for significantly increased market share.The book covers all aspects of ASIC-based development projects. It includes a detailed overview of the main phases of an ASIC project. Dedicated chapters provide comprehensive coverage of the key technical issues, and a further section of the book deals with relevant management techniques. The technical methods include design for reuse, high-quality design approaches, VHDL/Verilog coding tips and synthesis guidelines. Management skills such as team building are presented, as are ASIC leader tasks such as planning, risk reduction and managing relationships with ASIC vendors. The book has been written by two ASIC consultants who have worked on many successful ASIC projects in a variety of companies. They are interested in both the technical and management aspects of ASIC design. They are motivated by a desire to find and formulate continuous improvements in approaches to design and development processes. The book was written partly for their own benefit, to capture their own experiences with a view to helping them reproduce successful techniques and methodologies on future projects. Their hope now is that others can also benefit from their work. The book is intended to act as a companion guide to an ASIC team. It can be read in its entirety or subject by subject, as the need arises. It should be reread at the outset of each project and referred to frequently as the project progresses.Who Should Read This BookThe book is aimed at anyone who wants to understand the elements of an ASIC project. It is also aimed at anyone interested in

improving quality, reducing risks and improving time to market. Although some prior knowledge is an advantage in reading some of the more technical chapters, many sections of the book can be read and understood by beginners; therefore, the book is a good starting point for people beginning ASIC careers or contemplating this as an option. Broadly speaking, three groups of people will be interested in the book: non-ASIC engineers, ASIC project managers and ASIC design engineers.Non-ASIC PeopleThere are many people who have a vested interest in ASIC projects achieving their goals. The ASIC often forms part of a larger overall project that combines software, printed circuit board, mechanical and system design disciplines. In a multi-disciplined team, it is essential that at least a number of key people have a degree of cross-discipline knowledge. Such knowledge enables them to understand the opportunites and limitations that exist when the various disciplines come together, and it allows them to make educated decisions and trade-offs. Additionally, most progressive engineers have a natural desire to learn about other disciplines on their own initiative, whether it is an absolute requirement or not. This book provides the non-ASIC engineer with the opportunity to understand the world of ASICs. Senior managers, many of whom predate the ASIC revolution or come from completely different backgrounds, such as marketing or finance, also stand to benefit from this book. In addition to the management essentials that are covered, sections from several of the technical chapters will be within their grasp and will add to their knowledge of what they are dealing with.ASIC Project ManagersASIC projects are very complex and require project managers with a wide range of knowledge and skills. Project managers are frequently promoted from design engineering positions, where they may have been focused on relatively narrow or specialist areas. They are, therefore, often thrown in at the deep end when it comes to knowledge of the wider design process and knowledge of management techniques. This book is aimed at those project managers who want to understand and improve the entire ASIC design process. The book clearly explains the project flow and quality approaches to design. It is also useful for project managers who want to improve their project management skills covering issues such as team motivation, managing third-party ASIC vendors and monitoring and managing risks through all the phases of a project. Design Engineers Good design engineers are always keen to improve their knowledge and the quality of their work. They may initially participate in only a limited part of the ASIC design process, and it may take several years before they get hands-on exposure to the full spectrum of activities involved. This book defines the full ASIC process, describing good design practices, guidelines for reuse, top-down methodologies and coding and synthesis approaches. The design techniques described will enable engineers to design to a higher quality in shorter time scales.The Structure of the BookThe book is structured into a number of parts

that are formed from one or more chapters. The first chapter, "Phases of an ASIC Project," in section 1, "Project Overview," gives a detailed description of each of the phases of an ASIC project. It provides an overview of technical issues and planning tasks that are required at each stage of the design.The second section, "Design Techniques," deals with technical issues, including design reuse, quality design approaches, simulation techniques, VHDL/Verilog coding tips, and synthesis guidelines. These chapters provide practical advice on these topics. They address higher-level problems, such as design approach and quality test environments, rather than presenting an academic course on low-level device physics. They are useful for both seasoned and less experienced design engineers.The next section, "Project Management," deals with project management aspects such as planning, risk reduction and dealing with ASIC vendors. The techniques described here can be reapplied to successive projects and refined to match best the characteristics of each new project that is undertaken. Although there are numerous books available on project management, they tend to be quite broad in their scope. The project management section in this book treats the subject in an ASIC-specific context.The fourth section, "People and Team Management," aims to provide the project manager with an introduction to the subject of people and team management. Again, this is framed in an ASIC delevopment context. Some basic knowledge of motivation techniques, communication issues and team management theory will help projects to run more smoothly. A well-structured and highly motivated team will bring a project to a successful conclusion sooner and produce quality results that can be reused in future designs.The book closes with "EDA Tools." There is an abundance of EDA tools on the market. This chapter picks out a few of the more commonly used types and explains their purpose.

Get from idea to "right-first-time" silicon—fast! Now, there’s a complete guide to effective, rapid ASIC development for every electronics industry development manager or project team member. The ASIC Handbook presents techniques and methods any organization can use to slash time to market and dramatically improve quality. The authors begin with a detailed overview of the key phases of an ASIC-based development project, then cover every step of the ASIC development process, presenting specific solutions that have been proven in a wide range of applications and environments. Coverage includes: Proven design-for-reuse and SoC solutions Maximizing the quality of your initial designs and architectures Effective VHDL/Verilog coding techniques Advanced approaches to synthesis and design-for-test (DFT) System simulation, design verification, and more The ASIC Handbook also covers the project management and leadership components of ASIC development — delivering practical insights into team building, planning, risk reduction, and

vendor management. Whether you're a manager, project leader, or design engineer, you'll find it indispensable.

I'd recommend this book to those who are learning how to lead an ASIC project.

If you're looking to learn about the full lifecycle and tecnical ins and outs of ASIC design and development, look elsewhere. This book is intended for project managers who need to plan an ASIC project (and for that, it's ok), not for engineers who need to learn technical details.

The book contains notes from a project manager, but is not an engineering handbook by any stretch of imagination. The book does not provide the depth or breadth required to cover the subject.It has a few good checklists that can be useful to new project managers.

I have been in engineer for 20 years but haven't done a real ASIC. This is too lightweight for me. I think it would have been too lightweight if you are already doing FPGAs.

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