



Signal Integrity Issues and Printed Circuit Board Design

By Douglas Brooks

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This book covers the increasingly complex area of Signal Integrity issues in PCB design thoroughly, but without a need for great technical depth of understanding. Section 1 is an overview of electrical engineering principles that can serve as an introductory course for someone without any engineering education, or a review for someone who has. Section 1 can be skipped for people who already have a solid understanding in EE. Section 2 covers the major causes of signal integrity problems on printed circuit boards (a) EMI, (c) crosstalk, (c) signal reflections and transmission lines, and (d) power system decoupling (bypass capacitors). Each topic is covered in depth with real world illustrations and numerous examples. Two complete chapters are devoted to examples of how high-end computer simulation software packages view signal integrity problems and their solutions.

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Editorial Review

From the Back Cover

The definitive high-speed design resource for every PCB designer

In this book, renowned engineer, author, and seminar leader Douglas Brooks teaches PCB designers how to successfully design boards for any high-speed application. Brooks begins with an easy-to-understand electronics primer for every PCB designer, then offers practical, real-world solutions for every important signal-integrity problem. Based on his legendary seminars, this book offers even more design rules, specific recommendations, examples, illustrations, and diagrams.

Coverage includes—

- Essential electronics concepts: propagation, current, resistance, reactance, impedance, phase shifts, and more
- EMI principles and controls: loop area, uncontrolled differential currents, and common mode currents
- Controlling signal reflections: transmission lines, proper terminations, and trace layer design
- Power system stability (bypass capacitor decoupling): Traditional approaches, and techniques based on power-system impedance
- Eliminating forward crosstalk, and eliminating or controlling backwards crosstalk
- Power-system conditioning: power-system plane design and correct board stackups
- Lossy lines and eye diagrams: skin effects, dielectric absorption, and more

Two full chapters of simulation illustrations—ideal for those without access to high-speed simulation tools

About the Author

About the Author DOUGLAS BROOKS is President of UltraCAD Design, Inc., Bellevue, WA, a leading printed circuit board design service bureau specializing in large, complex, fast turn designs for the video and data-processing industries. He represents signal-integrity seminars at events nationwide, including PCB DesignConferences East and West and IPC Expo. His columns “Brookspeak” and “Rise Time” appeared regularly in *Printed Circuit Design Magazine*. He is author of *Electrical Engineering for the Non-Degreed Engineer*.

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