



# High-Speed Digital System Design: A Handbook of Interconnect Theory and Design Practices

By Stephen H. Hall, Garrett W. Hall, James A. McCall

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## High-Speed Digital System Design: A Handbook of Interconnect Theory and Design Practices By Stephen H. Hall, Garrett W. Hall, James A. McCall

A cutting-edge guide to the theory and practice of high-speed digital system design

An understanding of high-speed interconnect phenomena is essential for digital designers who must deal with the challenges posed by the ever-increasing operating speeds of today's microprocessors. This book provides a much-needed, practical guide to the state of the art of modern digital system design, combining easily accessible explanations with immensely useful problem-solving strategies. Written by three leading Intel engineers, High-Speed Digital System Design clarifies difficult and often neglected topics involving the effects of high frequencies on digital buses and presents a variety of proven techniques and application examples. Extensive appendices, formulas, modeling techniques as well as hundreds of figures are also provided.

Coverage includes:

- \* A thorough introduction to the digital aspects of basic transmission line theory
- \* Crosstalk and nonideal transmission line effects on signal quality and timings
- \* The impact of packages, vias, and connectors on signal integrity
- \* The effects of nonideal return current paths, high frequency power delivery, and simultaneous switching noise
- \* Explanations of how driving circuit characteristics affect the quality of the digital signal
- \* Digital timing analysis at the system level that incorporates high-speed signaling effects into timing budgets
- \* Methodologies for designing high-speed buses and handling the very large number of variables that affect interconnect performance
- \* Radiated emission problems and how to minimize system noise
- \* The practical aspects of making measurements in high-speed digital systems



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## **Editorial Review**

### **Review**

"...an excellent guidebook for interconnect design...this very valuable work is highly recommended for design engineers and recent graduates struggling to transition from theory to real-world design." (Choice, Vol. 38, No. 8, April 2001)

"This is an excellent book for anyone who has basic circuit theory knowledge.... It is a recommended book for all academic engineering libraries and would, also, be useful for the practicing engineer." (E-Streams, Vol. 4, No. 8, August 2001)

### **From the Back Cover**

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### **About the Author**

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GARRETT W. HALL is a Silicon Systems Engineer at Intel Corporation.

JAMES A. McCALL is a Senior Design Engineer at Intel Corporation.

## Users Review

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