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Nota di contenuto	Front Cover; High Speed Digital Design; Copyright Page; Contents; About the Authors/Contributors; 1 Transmission line fundamentals; Basic Electromagnetics; Electromagnetics Field Theory; Maxwell's equations; Ampere's law; Faraday's law; Gauss's law; Gauss's law for magnetism; Propagation of Plane Waves; Uniform plane wave; Uniform plane wave in conductive media; Power flow and the Poynting vector; Transmission Line Theory; Wave Equations on Lossless Transmission Lines; Lossless transmission line; Wave propagation on a lossless transmission line; Incident waves and reflected waves Impedance, Reflection Coefficient, and Power Flow on a Lossless Transmission LineInput impedance and reflection coefficient; Power flow on a lossless transmission line; Traveling and Standing Waves on a Transmission Line; Traveling waves; Standing waves; Transmission Line Structures; Stripline; Microstrip; Coplanar Waveguides; Novel Transmission Lines; References; 2 PCB design for signal integrity; Differential Signaling; Impedance; Time Domain Analysis; Eye Diagram; Jitter; Jitter components and budget; Jitter amplification example; Frequency Domain Analysis; Spectral Content; Insertion Loss Integrated Insertion Loss NoiseReturn Loss; S11 nulls; Crosstalk; Crosstalk sum; Integrated Crosstalk; Signal-to-Noise Ratio; Stack-Up Design; Impedance Target (Routing Impedance); Optimal routing

impedance; PCB Losses; Dielectric Loss; Lower loss dielectrics; Hybrid stackups; Conductor Loss; Surface roughness; Crosstalk Mitigation through StackUp; Stripline dielectric; Solder mask; Dual Stripline; PCB stackup; Angled routing; Parallelism; Densely Broadside Coupled Dual Stripline; Via Stub Mitigation; Impedance optimization; U-turn via; Back-drilling; Blind and buried via
PCB Layout OptimizationLength Matching; Fiber Weave Effect; Crosstalk Reduction; Interleaving; Guard trace; Signal-to-ground ratio; Ground placement; Orthogonal placement; Component (vertical to horizontal) cancellation; Non-Ideal Return Path; Power Integrity; Repeaters; Introduction to re-timers; Introduction to re-drivers; Modeling and simulation; PCIe considerations; References; 3 Channel modeling and simulation; Transmission Lines; Causality; Checking for Model Causality; Causal Frequency-Dependent Model; Copper Surface Roughness; Modified Hammerstad model; Huray model; Conductivity Environmental ImpactHumidity; Conductivity; Temperature; Model and simulation; Model Geometries; Stripline structures; Microstrip structures; Corner Models; Iterative corner model; Monte Carlo corner model; Ideal Assumptions: Homogeneous Impedance; Ideal Assumptions: Crosstalk Aggressors; Transmitters; IBIS Models; Spice Voltage Source Model; Linearity test; 3D Modeling; Ports/Terminals; Wave ports; Lumped ports; Model Analysis Settings; Discrete or interpolating solutions; Frequency range and step size; Port order; Normalize result to 50ohms; Plated-Through-Hole Via; Model Techniques
Pre-Layout Approximation

Sommario/riassunto

High Speed Digital Design discusses the major factors to consider in designing a high speed digital system and how design concepts affect the functionality of the system as a whole. It will help you understand why signals act so differently on a high speed digital system, identify the various problems that may occur in the design, and research solutions to minimize their impact and address their root causes. The authors offer a strong foundation that will help you get high speed digital system designs right the first time. Taking a systems design approach, High Speed Digital Design offers a