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| Nota di contenuto       | DIGITAL CIRCUIT BOARDS; CONTENTS; Preface; 1 BASICS; 1.1 Introduction; 1.2 Why the Field Approach is Important; 1.3 The Role of Circuit Analysis; 1.4 Getting Started; 1.5 Voltage and the Electric Field; 1.6 Current; 1.7 Capacitance; 1.8 Mutual and Self-Capacitance; 1.9 E Fields Inside Conductors; 1.10 The D Field; 1.11 Energy Storage in a Capacitor; 1.12 The Energy Stored in an Electric Field; 1.13 The Magnetic Field; 1.14 Rise Time/Fall Time; 1.15 Moving Energy into Components; 1.16 Faraday's Law; 1.17 Self- and Mutual Inductance; 1.18 Poynting's Vector; 1.19 Fields at DC; Glossary<br>2 TRANSMISSION LINES 2.1 Introduction; 2.2 Some Common Assumptions; 2.3 Transmission Line Types; 2.4 Characteristic Impedance; 2.5 Wave Velocity; 2.6 Step Waves on a Properly Terminated Line; 2.7 The Open Circuited Transmission Line; 2.8 The Short Circuited Transmission Line; 2.9 Waves that Transition between Lines with |

Different Characteristic Impedances; 2.10 Nonlinear Terminations; 2.11 Discharging a Charged Open Transmission Line; 2.12 Ground/Power Planes; 2.13 The Ground and Power Planes as a Tapered Transmission Line; 2.14 Pulling Energy from a Tapered Transmission Line (TTL) 2.15 The Energy Flow Through Cascaded (Series) Transmission Lines 2.16 An Analysis of Cascaded Transmission Lines; 2.17 Series (Source) Terminating a Transmission Line; 2.18 Parallel (Shunt) Terminations; 2.19 Stubs; 2.20 Decoupling Capacitor as a Stub; 2.21 Transmission Line Networks; 2.22 The Network Program; 2.23 Measuring Characteristic Impedance; Glossary; 3 RADIATION AND INTERFERENCE COUPLING; 3.1 Introduction; 3.2 The Nature of Fields in Logic Structures; 3.3 Classical Radiation; 3.4 Radiation from Step Function Waves; 3.5 Common Mode and Normal Mode 3.6 The Radiation Pattern along a Transmission Line 3.7 Notes on Radiation; 3.8 The Cross Coupling Process (Cross Talk); 3.9 Magnetic Component of Cross Coupling; 3.10 Capacitive Component of Cross Coupling; 3.11 Cross Coupling Continued; 3.12 Cross Coupling between Parallel Transmission Lines of Equal Length; 3.13 Radiation from Board Edges; 3.14 Ground Bounce; 3.15 Susceptibility; Glossary; 4 ENERGY MANAGEMENT; 4.1 Introduction; 4.2 The Power Time Constant; 4.3 Capacitors; 4.4 The Four-Terminal Capacitor or DTL; 4.5 Types of DTLs; 4.6 Circuit Board Resonances; 4.7 Decoupling Capacitors 4.8 The Board Decoupling Problem 4.9 The IC Decoupling Problem; 4.10 Comments on Energy Management; 4.11 Skin Effect; 4.12 Dielectric Losses; 4.13 Split Ground/Power Planes; 4.14 The Analog/digital Interface Problem; 4.15 Power Dissipation; 4.16 Traces through Conducting Planes; 4.17 Trace Geometries that Reduce Termination Resistor Counts; 4.18 The Control of Connecting Spaces; 4.19 Another way to look at Energy Flow in Transmission Lines; Glossary; 5 SIGNAL INTEGRITY ENGINEERING; 5.1 Introduction; 5.2 The Envelope of Permitted Logic Levels; 5.3 Net Lists; 5.4 Noise Budgets 5.5 Logic Level Variation

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#### Sommario/riassunto

A unique, practical approach to the design of high-speed digital circuit boards. The demand for ever-faster digital circuit designs is beginning to render the circuit theory used by engineers ineffective. Digital Circuit Boards presents an alternative to the circuit theory approach, emphasizing energy flow rather than just signal interconnection to explain logic circuit behavior. The book shows how treating design in terms of transmission lines will ensure that the logic will function, addressing both storage and movement of electrical energy on these lines.

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