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KEY=REDUCTION - COCHRAN HULL

Controlling Radiated Emissions by Design

Springer *The 3rd edition of Controlling Radiated Emissions by Design has been updated to reflect the latest changes in the field. New to this edition is material on aspects of technical advance, specifically long term energy efficiency, energy saving, RF pollution control, etc. This book retains the step-by-step approach for incorporating EMC into every new design, from the ground up. It describes the selection of quieter IC technologies, their implementation into a noise-free printed circuit layout, and the gathering of all these into low radiation packaging, including I/O filtering, connectors and cables considerations. All guidelines are supported by thorough and comprehensive calculated examples. Design engineers, EMC specialists and technicians will benefit from learning about the development of more efficient and economical control of emissions.*

Metallic Pigments in Polymers

iSmithers Rapra Publishing *This book is the ideal basic guide for anyone who is about to start working with metallic pigments but also contains a wealth of information for those who already use these pigments. It is hoped that this book will help existing users to achieve the best possible effects with metallic pigments and encourage those who have not yet used them to explore their potential to add value to their products.*

Controlling Radiated Emissions by Design

Springer Science & Business Media *In all possible industrial, military and household/personal applications, the number of digital devices operating with data rates of hundreds of Megabits, using processor chips with Gigahertz clocks, has increased astronomically. At the same time, a myriad of popular RF receivers like portable telephones, laptop PCs with integrated wireless modems, wireless Internet, and other electronic devices, are becoming ubiquitous, such that the number of sensitive, licit receivers operating within a square kilometer of an urban area can be counted in tens of thousands. In the crowded space that they share, the conjunction of both events is increasing the number of potential interference situations, especially in the upper VHF and UHF regions where spurious radiations are most difficult to contain. There is, in addition, a growing, although controversial, concern about the possible health hazard caused by long exposure to near fields of low power radio transmitters. All these aspects result in a continuous effort for lowering RF radiations. This new edition of Controlling Radiated Emissions by Design retains the step-by-step approach for incorporating EMC into every new design, from the ground up. Quite different from other classical EMC books, it approaches the problem from a development engineer's viewpoint, starting with the selection of quieter IC technologies, their implementation into a noise-free printed circuit layout, and the gathering of all these into a low radiation packaging, including I/O filtering, connectors and cables considerations. Equally far from a cookbook of recipes, all guidelines are supported by thorough, but relatively easy and comprehensive calculated examples, allowing a quantitative design, instead of purely qualitative. New to this edition is material on surface mount techniques, IC's ground-bounce, random-versus-periodic frequency spectra and recent progress in low cost ferrite and filter components. Also included is detailed information*

on radiation from high-speed chips (e.g. Pentium >200 MHz) and the efforts by some manufacturers to reduce it. The book has numerous tables, all of which have been updated to reflect the latest changes in the field, including a brief overview of the U.S. and worldwide emission tests. Controlling Radiated Emissions by Design is an invaluable tool for helping design engineers, EMC specialists and technicians develop more efficient and economical control of emissions.

Platform Interference in Wireless Systems

Models, Measurement, and Mitigation

Newnes *Intra-system EMC problems are becoming increasingly common in mobile devices, ranging from notebook PCs to cell phones, with RF/wireless capbilities. These issues range from minor annoyances to serious glitches which impede the functioning of the device. This book gives a thourough review of electromagnetic theory (including Maxwell's equations), discusses possible sources and causes of intra-system interference, shows to use models and analysis to discover potential sources of intra-system EMC in a design, how to use appropriate tests and measurements to detect intra-system EMC problems, and finally extensively discusses measures to mitigate or totally eliminate intra-system EMC problems. With more and more mobile devices incorporating wirless capability (often with multiple wireless systems, such as Bluetooth and WiFi), this book should be part of the reference shelf of every RF/wireless engineer and mobile device designer. *Addresses a growing problem in RF/wireless devices----interference created inside the devices, which impair their operation *Covers devices, ranging from laptop PCs to mobile phones to Bluetooth headsets *Explains the sources of such intra-system interference, how to detect and measure such interference, design techniques for mitigating the interference, and proven techniques for eliminating the interference*

Testing for EMC Compliance

Approaches and Techniques

John Wiley & Sons *The Keep It Simple (KISS) philosophy is the primary focus of this book. It is written in very simple language with minimal math, as a compilation of helpful EMI troubleshooting hints. Its light-hearted tone is at odds with the extreme seriousness of most engineering reference works that become boring after a few pages. This text tells engineers what to do and how to do it. Only a basic knowledge of math, electronics, and a basic understanding of EMI/EMC are necessary to understand the concepts and circuits described. Once EMC troubleshooting is demystified, readers learn there are quick and simple techniques to solve complicated problems a key aspect of this book. Simple and inexpensive methods to resolve EMI issues are discussed to help generate unique ideas and methods for developing additional diagnostic tools and measurement procedures. An appendix on how to build probes is included. It can be a fun activity, even humorous at times with bizarre techniques (i.e., the sticky finger probe).*

Advanced Materials and Design for Electromagnetic Interference Shielding

CRC Press *With electromagnetic compliance (EMC) now a major factor in the design of all electronic products, it is crucial to understand how electromagnetic interference (EMI) shielding products are used in various industries. Focusing on the practicalities of this area, Advanced Materials and Design for Electromagnetic Interference Shielding comprehensively introduces the design guidelines, materials selection, characterization methodology, manufacturing technology, and future potential of EMI shielding. After an overview of EMI shielding theory and product design guidelines, the book extensively reviews the characterization methodology of EMI materials. Subsequent chapters focus on particular EMI shielding materials and component designs, including enclosures, metal-formed gaskets, conductive elastomer and flexible graphite components, conductive foam and ventilation structures, board-level shielding materials, composite materials and hybrid structures, absorber materials, grounding and cable-level shielding materials, and aerospace and nuclear shielding materials. The last chapter presents a perspective on future trends in EMI shielding materials and design. Offering detailed coverage on many important topics, this indispensable book illustrates the efficiency and reliability of a range of materials and design solutions for EMI shielding.*

EMI/RFI Shielding Plastics

Society of Plastics Engineers Chicago Section & Electrical & Electronic Division Presents a Regional Technical Conference, June 21, 22, 23, 1982, Sheraton O'Hare Hotel, Rosemont, Illinois

Electro Static Discharge

Understand, Simulate, and Fix ESD Problems

John Wiley & Sons *A thorough and concise treatment of ESD Recognizing its methodic, step-by-step attack of theelectrostatic discharge (ESD) problem, the initial release of thisbook was quoted by specialists as "the most thorough and concisetreatment of the broad ESD continuum that is available." Now in itsThird Edition, this book delivers the same trusted coverageof the topic while also incorporating recent technological advancesthat have taken place in the engineering community. The book beginswith the basics of ESD for humans and objects, and goes on tocover: Effects of ESD coupled to electronics Principal ESD specifications ESD diagnostics and testing Design for ESD immunity To help with troubleshooting, many ESD case histories are givenalong with their successful fixes. Electrostatic Dischargeis essential reading for all designers who want to avoid componentfailures, no trouble found incidents, and random errors.*

Data Conversion Handbook

Newnes *This comprehensive handbook is a one-stop engineering reference. Covering data converter fundamentals, techniques, applications, and beginning with the basic theoretical elements necessary for a complete understanding of data converters, this reference covers all the latest advances in the field. This text describes in depth the theory behind and the practical design of data conversion circuits as well as describing the different architectures used in A/D and D/A converters. Details are provided on the design of high-speed ADCs, high accuracy DACs and ADCs, and sample-and-hold amplifiers. Also, this reference covers voltage sources and current reference, noise-shaping coding, and sigma-delta converters, and much more. The book's 900-plus pages are packed with design information and application circuits, including guidelines on selecting the most suitable converters for particular applications. You'll find the very latest information on: · Data converter fundamentals, such as key specifications, noise, sampling, and testing · Architectures and processes, including SAR, flash, pipelined, folding, and more · Practical hardware design techniques for mixed-signal systems, such as driving ADCs, buffering DAC outputs, sampling clocks, layout, interfacing, support circuits, and tools. · Data converter applications dealing with precision measurement, data acquisition, audio, display, DDS, software radio and many more. The accompanying CD-ROM provides software tools for testing and analyzing data converters as well as a searchable pdf version of the text. * Brings together a huge amount of information impossible to locate elsewhere. * Many recent advances in converter technology simply aren't covered in any other book. * A must-have design reference for any electronics design engineer or technician.*

EMC for Systems and Installations

Newnes *This is a guide for the system designers and installers faced with the day-to-day issues of achieving EMC, and will be found valuable across a wide range of roles and sectors, including process control, manufacturing, medical, IT and building management. The EMC issues covered will also make this book essential reading for product manufacturers and suppliers - and highly relevant for managers as well as technical staff. The authors' approach is thoroughly practical - all areas of installation EMC are covered, with particular emphasis on cabling and earthing. Students on MSc and CPD programmes will also find in this book some valuable real-world antidotes to the academic treatises. The book is presented in two parts: the first is non-technical, and looks at the need for EMC in the*

context of systems and installations, with a chapter on the management aspects of EMC. The second part covers the technical aspects of EMC, looking at the various established methods which can be applied to ensure compatibility, and setting these in the context of the new responsibilities facing system builders. EMC for Systems and Installations is designed to complement Tim Williams' highly successful EMC for Product Designers. Practical guide to EMC design issues for those involved in systems design and installation Complementary title to Williams' bestselling EMC for Product Designers Unique guidance for installers on EMC topics

Engineering Materials and Design

Science Abstracts

Electrical & electronics abstracts. Series B

Basic Linear Design

Evaluation Engineering

Printed Circuit Board Design Techniques for EMC Compliance

A Handbook for Designers

Wiley-IEEE Press "*Electromagnetic compatibility (EMC) is an engineering discipline often identified as "black magic." This belief exists because the fundamental mechanisms on how radio frequency (RF) energy is developed within a printed circuit board (PCB) is not well understood by practicing engineers. Rigorous mathematical analysis is not required to design a PCB. Using basic EMC theory and converting complex concepts into simple analogies helps engineers understand the mitigation process that deters EMC events from occurring. This user-friendly reference covers a broad spectrum of information never before published, and is as fluid and comprehensive as the first edition. The simplified approach to PCB design and layout is based on real-life experience, training, and knowledge. Printed Circuit Board Techniques for EMC Compliance, Second Edition will help prevent the emission or reception of unwanted RF energy generated by components and interconnects, thus achieving acceptable levels of EMC for electrical equipment. It prepares one for complying with stringent domestic and international regulatory requirements. Also, it teaches how to solve complex problems with a minimal amount of theory and math. Essential topics discussed include: * Introduction to EMC * Interconnects and I/O * PCB basics * Electrostatic discharge protection * Bypassing and decoupling * Backplanes-Ribbon Cables-Daughter Cards * Clock Circuits-Trace Routing-Terminations * Miscellaneous design techniques This rules-driven book-formatted for quick access and cross-reference-is ideal for electrical and EMC engineers, consultants, technicians, and PCB designers regardless of experience or educational background." Sponsored by: IEEE Electromagnetic Compatibility Society*

Op Amps for Everyone

Design Reference

Newnes *The operational amplifier ("op amp") is the most versatile and widely used type of analog IC, used in audio and voltage amplifiers, signal conditioners, signal converters, oscillators, and analog computing systems. Almost every electronic device uses at least one op amp. This book is Texas Instruments' complete professional-level tutorial and reference to operational amplifier theory and applications. Among the topics covered are basic op amp physics (including reviews of current and voltage division, Thevenin's theorem, and transistor models), idealized op amp operation and*

*configuration, feedback theory and methods, single and dual supply operation, understanding op amp parameters, minimizing noise in op amp circuits, and practical applications such as instrumentation amplifiers, signal conditioning, oscillators, active filters, load and level conversions, and analog computing. There is also extensive coverage of circuit construction techniques, including circuit board design, grounding, input and output isolation, using decoupling capacitors, and frequency characteristics of passive components. The material in this book is applicable to all op amp ICs from all manufacturers, not just TI. Unlike textbook treatments of op amp theory that tend to focus on idealized op amp models and configuration, this title uses idealized models only when necessary to explain op amp theory. The bulk of this book is on real-world op amps and their applications; considerations such as thermal effects, circuit noise, circuit buffering, selection of appropriate op amps for a given application, and unexpected effects in passive components are all discussed in detail. *Published in conjunction with Texas Instruments *A single volume, professional-level guide to op amp theory and applications *Covers circuit board layout techniques for manufacturing op amp circuits.*

Electronic Design

Edn Designers Guide to Electromagnetic Compatibility

Newnes *In 1996, enforcement of the mandatory European Union EMI/EMC (electromagnetic interference and compatibility) began. Before that time, many designers were just beginning to worry about "EMI problems". Now, 8 years later, the same old EMI problems are still with us, and some new ones have emerged as well. Anyone selling components or equipment of any sort in Europe and therefore the world for most globally based companies requires compliance with the EMC directive. There is no alternative. The information in this book enables faster, cheaper compliance.*

Conductive Polymers and Plastics

In Industrial Applications

William Andrew *This book is a collection of papers by individuals in industry and academia on research and application development of conductive polymers and plastics. Conductive plastics are positioned to play an increasingly important role in affairs of mankind, specifically in the area of electrical and electronic conductivity. While general knowledge about conductive polymers and plastics has been available for many years, a true understanding of their application has only taken place in the last 3 to 4 years. This is attributed to advances in materials and processing techniques. Engineers have only begun to explore the design freedom and economic benefits of specifying conductive polymers and plastics in industrial and business applications. This book is a key reference and guide to the use of conductive polymers and plastics. It is a summary of existing technologies, but also a look at future possibilities.*

Handbook of Aerospace Electromagnetic Compatibility

John Wiley & Sons *A comprehensive resource that explores electromagnetic compatibility (EMC) for aerospace systems Handbook of Aerospace Electromagnetic Compatibility is a groundbreaking book on EMC for aerospace systems that addresses both aircraft and space vehicles. With contributions from an international panel of aerospace EMC experts, this important text deals with the testing of spacecraft components and subsystems, analysis of crosstalk and field coupling, aircraft communication systems, and much more. The text also includes information on lightning effects and testing, as well as guidance on design principles and techniques for lightning protection. The book offers an introduction to E3 models and techniques in aerospace systems and explores EMP effects on and technology for aerospace systems. Filled with the most up-to-date information, illustrative examples, descriptive figures, and helpful scenarios, Handbook of Aerospace Electromagnetic Compatibility is designed to be a practical information source. This vital guide to electromagnetic compatibility: • Provides information on a range of topics including grounding, coupling, test procedures, standards, and requirements • Offers discussions on standards for aerospace applications • Addresses aerospace EMC through the use of testing and theoretical approaches Written for EMC engineers and practitioners, Handbook of Aerospace Electromagnetic Compatibility is a critical text for understanding EMC for aerospace systems.*

NUREG/CR.

Power Supply Cookbook

Elsevier *Power Supply Cookbook, Second Edition provides an easy-to-follow, step-by-step design framework for a wide variety of power supplies. With this book, anyone with a basic knowledge of electronics can create a very complicated power supply design in less than one day. With the common industry design approaches presented in each section, this unique book allows the reader to design linear, switching, and quasi-resonant switching power supplies in an organized fashion. Formerly complicated design topics such as magnetics, feedback loop compensation design, and EMI/RFI control are all described in simple language and design steps. This book also details easy-to-modify design examples that provide the reader with a design template useful for creating a variety of power supplies. This newly revised edition is a practical, "start-to-finish" design reference. It is organized to allow both seasoned and inexperienced engineers to quickly find and apply the information they need. Features of the new edition include updated information on the design of the output stages, selecting the controller IC, and other functions associated with power supplies, such as: switching power supply control, synchronization of the power supply to an external source, input low voltage inhibitors, loss of power signals, output voltage shut-down, major current loops, and paralleling filter capacitors. It also offers coverage of waveshaping techniques, major loss reduction techniques, snubbers, and quasi-resonant converters. Guides engineers through a step-by-step design framework for a wide variety of power supplies, many of which can be designed in less than one day Provides easy-to-understand information about often complicated topics, making power supply design a much more accessible and enjoyable process*

Electronic Systems Maintenance Handbook

CRC Press *The days of troubleshooting a piece of gear armed only with a scope, voltmeter, and a general idea of how the hardware works are gone forever. As technology continues to drive equipment design forward, maintenance difficulties will continue to increase, and those responsible for maintaining this equipment will continue to struggle to keep up. The Electronic Systems Maintenance Handbook, Second Edition establishes a foundation for servicing, operating, and optimizing audio, video, computer, and RF systems. Beginning with an overview of reliability principles and properties, a team of top experts describes the steps essential to ensuring high reliability and minimum downtime. They examine heat management issues, grounding systems, and all aspects of system test and measurement. They even explore disaster planning and provide guidelines for keeping a facility running under extreme circumstances. Today more than ever, the reliability of a system can have a direct and immediate impact on the profitability of an operation. Advocating a carefully planned, systematic maintenance program, the richly illustrated Electronic Systems Maintenance Handbook helps engineers and technicians meet the challenges inherent in modern electronic equipment and ensure top quality performance from each piece of hardware.*

Electronic Packaging and Production

Chemical Engineering Progress

Assembly Engineering

EMI Troubleshooting Techniques

McGraw Hill Professional *Presents a methodical approach to locating the cause of and correcting EMI/RFI breakdowns. This book gives you hands-on, optimal solutions whether your task is design, lab testing, or on-site troubleshooting, no matter what type of electronic equipment you're handling.*

Mixed-signal and DSP Design Techniques

Newnes *Sampled Data Systems - ADCs for DSP Applications - DACs for DSP Applications - Fast Fourier Transforms - Digital Filters - DSP Hardware - Interfacing to DSPs - DSP Applications - Hardware Design Techniques.*

The Electronic Packaging Handbook

CRC Press *The packaging of electronic devices and systems represents a significant challenge for product designers and managers. Performance, efficiency, cost considerations, dealing with the newer IC packaging technologies, and EMI/RFI issues all come into play. Thermal considerations at both the device and the systems level are also necessary. The Electronic Packaging Handbook, a new volume in the Electrical Engineering Handbook Series, provides essential factual information on the design, manufacturing, and testing of electronic devices and systems. Co-published with the IEEE, this is an ideal resource for engineers and technicians involved in any aspect of design, production, testing or packaging of electronic products, regardless of whether they are commercial or industrial in nature. Topics addressed include design automation, new IC packaging technologies, materials, testing, and safety. Electronics packaging continues to include expanding and evolving topics and technologies, as the demand for smaller, faster, and lighter products continues without signs of abatement. These demands mean that individuals in each of the specialty areas involved in electronics packaging-such as electronic, mechanical, and thermal designers, and manufacturing and test engineers-are all interdependent on each others knowledge. The Electronic Packaging Handbook elucidates these specialty areas and helps individuals broaden their knowledge base in this ever-growing field.*

IEEE Recommended Practice for Powering and Grounding Electronic Equipment

Inst of Elect & Electronic

Electri-onics

EMI Filter Design

CRC Press *Offering simple methods of measuring AC and DC power lines, this highly popular, revised and expanded reference describes the selection of cores, capacitors, mechanical shapes, and styles for the timeliest design, construction, and testing of filters. It presents analyses of matrices of various filter types based on close approximations, observation, and trial and error. Supplying simple parameters and techniques for creating manufacturable, repeatable products, the second edition provides insights into the cause and elimination of common mode noise in lines and equipment, explores new data on spike, pulse, trapezoid, and quasisquare waves, and reviews the latest high-current filters.*

Principles of Electromagnetic Compatibility

Artech House Microwave Library

Grounding, Bonding, and Shielding for Electronic Equipments and Facilities

MiL-HDBK-419A

MIL-HDBK-419A 29 DECEMBER 1987 Volume 2 of 2 Applications Unfortunately, few Military Handbooks address the need for defense against electromagnetic pulse (EMP) and cybersecurity. While EMP has been thought of as a remote possibility (who in his right mind is going to launch a nuclear weapon of any kind against the U.S.?) Advances in non-nuclear EMP, miniaturization of electronics and autonomous drones suddenly brings EMP into the role of the possible. No longer would an adversary need to risk retaliation when a drone from an unknown source attacks a vital facility. The information in

this book is part of the solution to the question "How do we defend against EMP?" List of Applicable EMP and Cybersecurity Publications: MIL-STD-188-125-1 High-altitude electromagnetic pulse (HEMP) Protection For Ground-Based C4I Facilities Performing Critical, Time-Urgent Missions MIL-STD-188-124A Grounding, Bonding and Shielding for Common Long Haul/Tactical Communication Systems MIL-HDBK -1195 Radio Frequency Shielded Enclosures TOP 01-2-620 High-Altitude Electromagnetic Pulse (HEMP) Testing MIL-HDBK-1012/1 Electronic Facilities Engineering MIL-HDBK-1013/1A Design Guidelines for Physical Security of Facilities

LED Lighting

Technology and Perception

John Wiley & Sons *Promoting the design, application and evaluation of visually and electrically effective LED light sources and luminaires for general indoor lighting as well as outdoor and vehicle lighting, this book combines the knowledge of LED lighting technology with human perceptual aspects for lighting scientists and engineers. After an introduction to the human visual system and current radiometry, photometry and color science, the basics of LED chip and phosphor technology are described followed by specific issues of LED radiometry and the optical, thermal and electric modeling of LEDs. This is supplemented by the relevant practical issues of pulsed LEDs, remote phosphor LEDs and the aging of LED light sources. Relevant human visual aspects closely related to LED technology are described in detail for the photopic and the mesopic range of vision, including color rendering, binning, whiteness, Circadian issues, as well as flicker perception, brightness, visual performance, conspicuity and disability glare. The topic of LED luminaires is discussed in a separate chapter, including retrofit LED lamps, LED-based road and street luminaires and LED luminaires for museum and school lighting. Specific sections are devoted to the modularity of LED luminaires, their aging and the planning and evaluation methods of new LED installations. The whole is rounded off by a summary and a look towards future developments.*

EEM

Electronic Engineers Master Catalog

Electromagnetic Compatibility of Integrated Circuits

Techniques for low emission and susceptibility

Springer Science & Business Media *Electromagnetic Compatibility of Integrated Circuits: Techniques for Low Emission and Susceptibility focuses on the electromagnetic compatibility of integrated circuits. The basic concepts, theory, and an extensive historical review of integrated circuit emission and susceptibility are provided. Standardized measurement methods are detailed through various case studies. EMC models for the core, I/Os, supply network, and packaging are described with applications to conducted switching noise, signal integrity, near-field and radiated noise. Case studies from different companies and research laboratories are presented with in-depth descriptions of the ICs, test set-ups, and comparisons between measurements and simulations. Specific guidelines for achieving low emission and susceptibility derived from the experience of EMC experts are presented.*

Scientific and Technical Aerospace Reports

Controlling Conducted Emissions by Design

Springer *This book presents a useful way to "design in" electromagnetic compatibility (EM C). EMC design considerations are often an addendum to the design. These Band-Aid fixes are not the best approach most of the time but are all that is possible at a late stage in the design and development process. This book is not the classic "EMI fix cookbook"; it is intended for all electronics design engineers. The analytical tools presented enable the designer to address EMC considerations early in the design process. Power conversion engineers will find the enclosed information especially important because of the inherent conducted emissions problems in power conversion equipment. Switching power supplies are commonly the most significant noise generators in electronic systems. In most design work, if the conducted emission problem is addressed, good layout and packaging will ensure that the conducted and radiated electromagnetic interference (EM!) requirements are met. The EMI process involves three components: source, path, and victim. These elements are easily modeled on the computer. The methods of modeling and analysis on the computer are the essence of this book. The EMI source is analyzed using the FFr and the results are applied to a computer model of the path and victim (test setup). The resulting currents are measured and compared to a standard.*

Index to IEEE Publications