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RF Technologies for Low Power Wireless Communications
Official Gazette of the United States Patent and Trademark Office
Wireless Communications at 60 GHz: A Single-Chip Solution on CMOS Technology
Ultra-Low Power Wireless Technologies for Sensor Networks
Modeling and Optimization of Optical Communication Networks
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Low-Power Wireless Communication Circuits and Systems

Microgrid Protection and Control
6G Wireless
Wired and Wireless Seamless Access Systems for Public Infrastructure
Wireless Sensor Networks

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Computer Science and Education Springer Science & Business Media
"The book provides thorough discussion on emerging topics related to 6G wireless communication systems such as programmable wireless environment (PWE); distributed and pervasive AI for wireless communications as well as terahertz (THz) communications. 6G Wireless: The Communication Paradigm Beyond 2030 provides comprehensive coverage of the vision, requirement, use-cases, enabling technologies, and challenges for the future 6G wireless communication systems. This will include key use cases such as Immersive and eXtended reality (IXR), advanced VR/AR, intelligent humanoid robotics/devices, fully autonomous transportation, intelligent and ubiquitous healthcare, neural communication through brain interface, remote surgery, holographic/3D video communications, high precision autonomous manufacturing and haptic/tactile communications. For those use cases, the book thoroughly analyses the challenges and requirements followed by providing indepth coverage of potential enabling technologies like terahertz communications, pervasive and distributed AI battery- less/ultra-low-power devices, programmable wireless environment, metasurface for reconfigurability, cell-free or cell-less architecture, quantum communications, 3D beamforming, energy harvesting, and wireless power transfer, optical and visible light communications, blockchain, and so on. The book also presents the significant challenges facing the research community to meet the 6G requirements as well as potential research directions to address these challenges. Written in tutorial style the primary audience of the book is postgraduate students and researchers in the broad domain of wireless communications as well as research-active academics. The book can also be useful as a reference book for BSc/MSc project/thesis works"--
Low-power Wireless Optical Transmission Springer Science & Business Media
Mobile and wireless communications applications have a clear impact on improving the humanity wellbeing. From cell phones to wireless internet to home and office devices, most of the applications are converted from wired into wireless communication. Smart and advanced wireless communication environments represent the future technology and evolutionary development step in homes, hospitals, industrial, vehicular and transportation systems. A very appealing research area in these environments has been the wireless ad hoc, sensor and mesh networks. These networks rely on ultra low powered processing nodes that sense surrounding environment temperature, pressure, humidity, motion or chemical hazards, etc. Moreover, the radio frequency (RF) transceiver nodes of such networks require the design of transmitter and receiver equipped with high performance building blocks including antennas, power and low noise amplifiers, mixers and voltage controlled oscillators. Nowadays, the researchers are facing several challenges to design such building blocks while complying with ultra low power consumption, small area and high performance constraints. CMOS technology represents an excellent candidate to facilitate the integration of the whole transceiver on a single chip. However, several challenges have to be tackled while designing and using nanoscale CMOS technologies and require innovative idea from researchers and circuits designers. While major researchers and applications have been focusing on RF wireless communication, optical wireless communication based system has started to draw some attention from researchers for a terrestrial system as well as for aerial and satellite terminals. This renewed interested in optical wireless communications is driven by several advantages such as no licensing requirements policy, no RF radiation hazards, and no need to dig up roads besides its large bandwidth and low power consumption. This second part of the book, Mobile and Wireless Communications: Key Technologies and Future Applications, covers the recent development in ad hoc and sensor networks, the implementation of state of the art of wireless transceivers building blocks and recent development on optical wireless communication systems. We hope that this book will be useful for students, researchers and practitioners in their research studies.
IoT and Low-Power Wireless Springer Science & Business Media
Integrated circuit design for biomedical applications requires an interdisciplinary background, ranging from electrical engineering to material engineering to computer science. This book is written to help build the foundation for researchers, engineers, and students to further develop their interest and knowledge in this field. This book provides an overview of various biosensors by introducing fundamental building blocks for integrated biomedical systems. State-of-the-art projects for various applications and experience in developing these systems are explained in detail. Future design trends in this field is also discussed in this book.
Future Mechatronics and Automation Springer
Over the past decade, there has been a prolific increase in the research, development and commercialisation of Wireless Sensor Networks (WSNs) and their associated technologies. WSNs have found application in a vast range of different domains, scenarios and disciplines. These have included healthcare, defence and security, environmental monitoring and building/structural health monitoring. However, as a result of the broad array of pertinent applications, WSN researchers have also realised the application specificity of the domain; it is incredibly difficult, if not impossible, to find an application-independent solution to most WSN problems. Hence, research into WSNs dictates the adoption of an application-centric design process. This book is not intended to be a comprehensive review of all WSN applications and deployments to date. Instead, it is a collection of state-of-the-art research papers discussing current applications and deployment experiences, but also the communication and data processing technologies that are fundamental in further developing solutions to applications. Whilst a common foundation is retained through all chapters,

this book contains a broad array of often differing interpretations, configurations and limitations of WSNs, and this highlights the diversity of this ever-changing research area. The chapters have been categorised into three distinct sections: applications and case studies, communication and networking, and information and data processing. The readership of this book is intended to be postgraduate/postdoctoral researchers and professional engineers, though some of the chapters may be of relevance to interested masters level students.

Low-Power Wireless Infrared Communications BoD – Books on Demand

The book offers unique insight into the modern world of wireless communication that included 5G generation, implementation in Internet of Things (IoT), and emerging biomedical applications. To meet different design requirements, gaining perspective on systems is important. Written by international experts in industry and academia, the intended audience is practicing engineers with some electronics background. It presents the latest research and practices in wireless communication, as industry prepares for the next evolution towards a trillion interconnected devices. The text further explains how modern RF wireless systems may handle such a large number of wireless devices. Covers modern wireless technologies (5G, IoT), and emerging biomedical applications Discusses novel RF systems, CMOS low power circuit implementation, antennae arrays, circuits for medical imaging, and many other emerging technologies in wireless co-space. Written by a mixture of top industrial experts and key academic professors.

Perception-Action Cycle CRC Press

This three-volume set constitues selected papers presented during the 17th International Conference on Computer Science and Education, ICCSE 2022, held in Ningbo, China, in August 2022. The 168 full papers and 43 short papers presented were thoroughly reviewed and selected from the 510 submissions. They focus on a wide range of computer science topics, especially AI, data science, and engineering, and technology-based education, by addressing frontier technical and business issues essential to the applications of data science in both higher education and advancing e-Society.

Millimeter Wave Communication Systems Springer Nature

The rapid progress of mobile, wireless communication and embedded micro-sensing MEMS technologies has brought about the rise of pervasive computing. Wireless local-area networks (WLANs) and wireless personal-area networks (WPANs) are now common tools for many people, and it is predicted that wearable sensor networks will greatly improve everyday life as we know it. By integrating these technologies into a pervasive system, we can access information and use computing resources anytime, anywhere, and with any device. Wireless Ad Hoc Networking: Personal-Area, Local-Area, and the Sensory-Area Networks covers these key technologies used in wireless ad hoc networks. The book is divided into three parts, each providing self-contained chapters written by international experts. Topics include networking architectures and protocols, cross-layer architectures, localization and location tracking, time synchronization, QoS and real-time, security and dependability, applications, modeling and performance evaluation, implementation and experience, and much more. The book is novel in its single source presentation of ad hoc networking and related key technologies and applications over the platforms of personal area, sensory area, and local area networks. It is a valuable resource for those who work in or are interested in learning about the pervasive computing environment.

6G Key Technologies Low-power Wireless Optical TransmissionLow-Power Wireless Infrared Communications

The aim of this book is to present the modern design and analysis principles of millimeter-wave communication system for wireless devices and to give postgraduates and system professionals the design insights and challenges when integrating millimeter wave personal communication system. Millimeter wave communication system are going to play key roles in modern gigabit wireless communication area as millimeter-wave industrial standards from IEEE, European Computer Manufacturing Association (ECMA) and Wireless High Definition (Wireless HD) Group, are on their way to the market. The book will review up-to-date research results and utilize numerous design and analysis for the whole system covering from Millimeter wave frontend to digital signal processing in order to address major topics in a high speed wireless system. This book emphasizes the importance and the requirements of high-gain antennas, low power transceiver, adaptive equalizer/modulation, channeling coding and adaptive multi-user detection for gigabit wireless communications. In addition, the book will include the updated research literature and patents in the topics of transceivers, antennas, MIMO, channel capacity, coding, equalizer, Modem and multi-user detection. Finally the application of these antennas will be discussed in light of different forthcoming wireless standards at V-band and E-band.

Sensors and Low Power Signal Processing BoD – Books on Demand

Visible light communication (VLC) is an evolving communication technology for short-range applications. Exploiting recent advances in the development of high-power visible-light emitting LEDs, VLC offers an energy-efficient, clean alternative to RF technology, enabling the development of optical wireless communication systems that make use of existing lighting infrastructure. Drawing on the expertise of leading researchers from across the world, this concise book sets out the theoretical principles of VLC, and outlines key applications of this cutting-edge technology. Providing insight into modulation techniques, positioning and communication, synchronisation, and industry standards, as well as techniques for improving network performance, this is an invaluable resource for graduate students and researchers in the fields of visible light communication, optical wireless communication, and industrial practitioners in the field of telecommunications.

Mobile and Wireless Communications Network Layer and Circuit Level Design CRC Press

This volume addresses the problem of designing efficient signalling and provides a link between the areas of communication theory and modem design for amplitude constrained linear optical intensity channel. It provides practical guidelines for the design of signalling sets for wireless optical intensity channels.

Wireless Ad Hoc Networking Springer Science & Business Media

The perception-action cycle is the circular flow of information that takes place between the organism and its environment in the course of a sensory-guided sequence of behaviour towards a goal. Each action causes changes in the environment that are analyzed bottom-up through the perceptual hierarchy and lead to the processing of further action, top-down through the executive hierarchy, toward motor effectors. These actions cause new changes that are analyzed and lead to new action, and so the cycle continues. The Perception-action cycle: Models, architectures and hardware book

provides focused and easily accessible reviews of various aspects of the perception-action cycle. It is an unparalleled resource of information that will be an invaluable companion to anyone in constructing and developing models, algorithms and hardware implementations of autonomous machines empowered with cognitive capabilities. The book is divided into three main parts. In the first part, leading computational neuroscientists present brain-inspired models of perception, attention, cognitive control, decision making, conflict resolution and monitoring, knowledge representation and reasoning, learning and memory, planning and action, and consciousness grounded on experimental data. In the second part, architectures, algorithms, and systems with cognitive capabilities and minimal guidance from the brain, are discussed. These architectures, algorithms, and systems are inspired from the areas of cognitive science, computer vision, robotics, information theory, machine learning, computer agents and artificial intelligence. In the third part, the analysis, design and implementation of hardware systems with robust cognitive abilities from the areas of mechatronics, sensing technology, sensor fusion, smart sensor networks, control rules, controllability, stability, model/knowledge representation, and reasoning are discussed.

Low-Power Processors and Systems on Chips John Wiley & Sons

Microgrid Protection and Control is the result of numerous research works and publications by R&D engineers and scientists of the Microgrid and Energy Internet Research Centre. Through the authors long-routed experience in the microgrid and energy internet industry, this book looks at the sophisticated protection and control issues connected to the special nature of microgrid. The book explains the different ways of classifying types of microgrids and common misconceptions, looking at industrial and research trends along with the different technical issues and challenges faced with deploying microgrid in various settings. Forecasting short-term demand and renewable generation for optimal operation is covered with techniques for accurate enhancement supported with practical application examples. With chapters on dynamic, transient and tertiary control and experimental and simulation tests this reference is useful for all those working in the research, engineering and application of microgrids and power distribution systems. Contains practical examples to support the research and experimental results on microgrid protection and control Includes detailed theories and referential algorithms Provides innovative solutions to technical issues in protection and control of microgrids

Visible Light Communication John Wiley & Sons

The increasing demand for extremely high-data-rate communications has urged researchers to develop new communication systems. Currently, wireless transmission with more than one Giga-bits-per-second (Gbps) data rates is becoming essential due to increased connectivity between different portable and smart devices. To realize Gbps data rates, millimeter-wave (MMW) bands around 60 GHz is attractive due to the availability of large bandwidth of 9 GHz. Recent research work in the Gbps data rates around 60 GHz band has focused on short-range indoor applications, such as uncompressed video transfer, high-speed file transfer between electronic devices, and communication to and from kiosk. Many of these applications are limited to 10 m or less, because of the huge free space path loss and oxygen absorption for 60 GHz band MMW signal. This book introduces new knowledge and novel circuit techniques to design low-power MMW circuits and systems. It also focuses on unlocking the potential applications of the 60 GHz band for high-speed outdoor applications. The innovative design application significantly improves and enables high-data-rate low-cost communication links between two access points seamlessly. The 60 GHz transceiver system-on-chip provides an alternative solution to upgrade existing networks without introducing any building renovation or external network laying works.

Iot and Low-Power Wireless Springer Science & Business Media

MODELING and OPTIMIZATION of OPTICAL COMMUNICATION NETWORKS Optical networks are an integral part of many of the technologies that we use every day. It is a constantly changing and evolving area, with new materials, processes, and applications coming online almost daily. This book provides a basis for discussing open principles, methods and research problems in the modeling of optical communication networks. It also provides a systematic overview of the state-of-the-art research efforts and potential research directions dealing with optical communication metworks. It also simultaneously focuses on extending the limits of currently used systems encompassing optical and wireless domains and explores novel research on wireless and optical techniques and systems, describing practical implementation activities, results and issues. A handbook on applications for both academia and industry, this exciting new volume includes detailed discussions on real-world case studies on trends and emerging technologies associated with modeling of optical communication networks. This book also describes several numerical models and algorithms for simulation and optimization of optical communication networks. Modeling and optimization presents several opportunities for automating operations and introducing intelligent decision making in network planning and in dynamic control and management of network resources, including issues like connection establishment, self-configuration, and self-optimization, through prediction and estimation by utilizing present network state and historical data. It focuses on extending the limits of currently used systems encompassing optical and wireless domains, and explores the latest developments in applications like photonics, high speed communication systems and networks, visible light communication, nano-photonics, wireless, and MIMO systems.

Contemporary Issues in Wireless Communications CRC Press

Low-power Wireless Optical TransmissionLow-Power Wireless Infrared CommunicationsSpringer Science & Business Media

Biomedical Circuits and Systems Lulu.com

Over the last three decades, interest in Infrared (IR) technology as a medium to convey information has grown considerably. This is reflected by the increasing number of devices such as laptops, PDAs, and mobile phones that incorporate optical wireless transceivers and also by the increasing number of optical wireless links available for indoor and

Mobile and Wireless Communications Springer Science & Business Media

A survey of microwave technology tailored for professionals inwireless communications RF Technologies for Low Power WirelessCommunications updates recent developments in wirelesscommunications from a hardware design standpoint and offersspecialized coverage of microwave technology with a focus on thelow power wireless units required in modern wireless systems. Itexplores results of recent research that focused on a holistic,integrated approach to the topics of materials, devices, circuits,modulation, and architectures rather than the more traditionalapproach of research into isolated topical areas. Twelve chapters deal with various

fundamental research aspectsof low power wireless electronics written by world-class experts ineach field. The first chapter offers an overview of wirelessarchitecture and performance, followed by detailed coverage of: Advanced GaAs-based HBT designs InP-based devices and circuits Si/SiGe HBT technology Noise in GaN devices Power amplifier architectures and nonlinearities Planar-oriented components MEMS and micromachined components Resonators, filters, and low-noise oscillators Antennas Transceiver front-end architectures With a clear focus and expert contributors, RFTechnologies for Low Power Wireless Communications will beof interest to a wide range of electrical engineering disciplinesworking in wireless technologies.

Advanced Network Programming – Principles and Techniques Cambridge University Press

An accessible and integrated roadmap to the technologies enabling 6G development In 6G Key Technologies: A Comprehensive Guide, two internationally well-recognized experts deliver a thoroughly original and comprehensive exploration of the technologies enabling and contributing to the development of 6G. The book presents the vision of 6G by reviewing the evolution of communications technologies toward 6G and examining the factors driving that development, as well as their drivers, requirements, use cases, key performance indicators, and more. Readers will discover: Thorough introductions to the standardization and technology evolution toward 6G, as well as the vision behind the development of 6G in terms of architectures, algorithms, protocols, and applications. In-depth explorations of full-spectrum wireless technologies in 6G, including enhanced millimeter wave technologies, terahertz-based communications and networking, visible-light and optical wireless communications. Fulsome discussions of smart radio networks and new air interface technologies for 6G including intelligent reflecting surface, cellular massive MIMO, cell-free massive MIMO, adaptive and non-orthogonal multiple access technologies. Perfect for professional engineers, researchers, manufacturers, network operators, and software developers, 6G Key Technologies: A Comprehensive Guide will also earn a place in the libraries of graduate students studying in wireless communications, artificial intelligence, signal processing, microwave technology, information theory, antenna and propagation, system-on-chip implementation, and computer networks.

Integrated Optics John Wiley & Sons

Advanced concepts for wireless communications offer a vision of technology that is embedded in our surroundings and practically invisible, but present whenever required. Although the use of deep submicron CMOS processes allows for an unprecedented degree of scaling in digital circuitry, it complicates the implementation and integration of traditional RF circuits. The requirement for long operating life under limited energy supply also poses severe design constraints, particularly in critical applications in commerce, healthcare, and security. These challenges call for innovative design solutions at the circuit and system levels. Low Power Emerging Wireless Technologies addresses the crucial scientific and technological challenges for the realization of fully integrated, highly efficient, and cost-effective solutions for emerging wireless applications. Get Insights from the Experts on Wireless Circuit Design The book features contributions by top international experts in wireless circuit design representing both industry and academia. They explore the state of the art in wireless communication for 3G and 4G cellular networks, millimeter-wave applications, wireless sensor networks, and wireless medical technologies. The emphasis is on low-power wireless applications, RF building blocks for wireless applications, and short-distance and beam steering. Topics covered include new opportunities in body area networks, medical implants, satellite communications, automobile radar detection, and wearable electronics. Exploit the Potential behind Emerging Green Wireless Technologies A must for anyone serious about future wireless technologies, this multidisciplinary book discusses the challenges of emerging power-efficient applications. Written for practicing engineers in the wireless communication field who have some experience in integrated circuits, it is also a valuable resource for graduate students.

Low Power Synchronization for Wireless Communication CRC Press

The power consumption of microprocessors is one of the most important challenges of high-performance chips and portable devices. In chapters drawn from Piguet's recently published Low-Power Electronics Design, this volume addresses the design of low-power microprocessors in deep submicron technologies. It provides a focused reference for specialists involved in systems-on-chips, from low-power microprocessors to DSP cores, reconfigurable processors, memories, ad-hoc networks, and embedded software. Low-Power Processors and Systems on Chips is organized into three broad sections for convenient access. The first section examines the design of digital signal processors for embedded applications and techniques for reducing dynamic and static power at the electrical and system levels. The second part describes several aspects of low-power systems on chips, including hardware and embedded software aspects, efficient data storage, networks-on-chips, and applications such as routing strategies in wireless RF sensing and actuating devices. The final section discusses embedded software issues, including details on compilers, retargetable compilers, and coverification tools. Providing detailed examinations contributed by leading experts, Low-Power Processors and Systems on Chips supplies authoritative information on how to maintain high performance while lowering power consumption in modern processors and SoCs. It is a must-read for anyone designing modern computers or embedded systems.