Multicell Battery Stack Monitor Linear Technology | 75164253e3393b68cd1f4c61b25dbfa9

A Systems Approach to Lithium-Ion Battery Management

Electronic Design Energy storage devices are a crucial area of research and development across many engineering disciplines and industries. While batteries provide the significant advantage of high energy density, their limited life cycles, disposal challenges and charge and discharge management constraints undercut their effectiveness in certain applications. Compared to electrochemical cells, supercapacitors are charge-storage devices with much longer life cycles, yet they have traditionally been hobbled by limited DC voltage capabilities and energy density. However, recent advances are improving these issues. This book provides the opportunity to expand your knowledge of innovative supercapacitor applications, comparing them to other commonly used energy storage devices. It will strengthen your understanding of energy storage from a practical, applications-based point-of-view, without requiring detailed examination of underlying electrochemical equations. No matter what your field, you will find inspiration and guidance in the cutting-edge advances in energy storage devices in this book. Provides explanations of the latest energy storage devices in a practical applications-based context Includes examples of circuit designs that optimize the use of supercapacitors, and pathways to improve existing designs by effectively managing energy storage
devices crucial to both low and high power applications. Covers batteries, BMS (battery management systems) and cutting-edge advances in supercapacitors, providing a unique compare and contrast examination demonstrating applications where each technology can offer unique benefits

Battery Safety

New Scientist Provides engineers and technicians with detailed data and information on the characteristics, properties, performance, and uses of all types of electric batteries.

Handbook of Batteries

Fundamentals of Wireless Communication Analog Circuits Cookbook is a collection of tried and tested recipes form the masterchef of analog and RF design. Based on articles from Electronics World, this book provides a diet of high quality design techniques and applications, and proven circuit designs, all concerned with the analog, RF and interface fields of electronics. Ian Hickman uses illustrations and examples rather than tough mathematical theory to present a wealth of ideas and tips based on his own workbench experience. This second edition includes 10 of Hickman's latest articles, alongside 20 of his most popular classics. The new material includes articles on power supplies, filters using negative resistance, phase noise and video surveillance systems. Essential reading for all circuit design professionals and advanced hobbyists

Contains 10 of Ian Hickman's latest articles, alongside 20 of his most popular classics

Battery Power Management for Portable Devices Electric Vehicle Battery Systems provides operational theory and design guidance for engineers and technicians working to design and develop efficient electric vehicle (EV) power sources. As Zero Emission Vehicles become a requirement in more areas of the world, the technology required to design and maintain their complex battery systems is needed not only by the vehicle designers, but by those who will provide recharging and maintenance services, as well as utility infrastructure providers. Includes fuel cell and hybrid vehicle applications. Written with cost and efficiency foremost in mind, Electric Vehicle Battery Systems offers essential details on failure mode analysis of VRLA, NiMH battery systems, the fast-charging of electric vehicle battery systems based on Pb-acid, NiMH, Li-ion technologies, and much more. Key coverage includes issues that can affect electric vehicle performance, such as total battery capacity, battery charging and discharging, and battery temperature constraints. The author also explores electric vehicle performance, battery testing (15 core performance tests provided), lithium-ion batteries, fuel cells and hybrid vehicles. In order to make a practical electric vehicle, a thorough understanding of the operation of a set of batteries in a pack is necessary. Expertly written and researched, Electric Vehicle Battery Systems will prove invaluable to automotive engineers, electronics and integrated circuit design engineers, and anyone whose interests involve electric vehicles and battery systems. * Addresses cost and efficiency as key elements in the design process * Provides comprehensive coverage of the theory, operation, and configuration of complex battery systems, including Pb-acid, NiMH, and Li-ion technologies * Provides comprehensive coverage of the theory, operation, and configuration of complex battery systems, including Pb-acid, NiMH, and Li-ion technologies

Battery Reference Book Digital Design and Computer Architecture: ARM Edition covers the fundamentals of digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Combining an engaging and humorous writing style with an updated and hands-on approach to digital design, this book takes the reader from the fundamentals of digital logic to the actual design of an ARM processor. By
the end of this book, readers will be able to build their own microprocessor and will have a top-to-bottom understanding of how it works. Beginning with digital logic gates and progressing to the design of combinational and sequential circuits, this book uses these fundamental building blocks as the basis for designing an ARM processor. SystemVerilog and VHDL are integrated throughout the text in examples illustrating the methods and techniques for CAD-based circuit design. The companion website includes a chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios, and motors. This book will be a valuable resource for students taking a course that combines digital logic and computer architecture or students taking a two-quarter sequence in digital logic and computer organization/architecture. Covers the fundamentals of digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Features side-by-side examples of the two most prominent Hardware Description Languages (HDLs)—SystemVerilog and VHDL—which illustrate and compare the ways each can be used in the design of digital systems. Includes examples throughout the text that enhance the reader’s understanding and retention of key concepts and techniques. The Companion website includes a chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios, and motors. The Companion website also includes appendices covering practical digital design issues and C programming as well as links to CAD tools, lecture slides, laboratory projects, and solutions to exercises.

Energy Research Abstracts Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. Thoroughly revised, comprehensive coverage of battery technology, characteristics, and applications This fully updated guide offers complete coverage of batteries and battery usage—from classic designs to emerging technologies. Compiled by a pioneer in secondary lithium batteries, the book contains all the information needed to solve engineering problems and make proper battery selections. You will get in-depth descriptions of the principles, properties, and performance specifications of every major battery type. Linden’s Handbook of Batteries, Fifth Edition, contains cutting-edge data and equations, design specifications, and troubleshooting techniques from international experts. New chapters discuss renewable energy systems, battery failure analysis, lithium-ion battery technology, materials, and component design. Recent advances in smartphones and hybrid car batteries are clearly explained, including maximizing re-chargeability, reducing cost, improving safety, and lessening environmental impact. Coverage includes: •Electricity, electrochemistry, and batteries•Raw materials•Battery components•Principles of electrochemical cell operations•Battery product overview•Electrochemical cell designs (platform technologies)•Primary batteries•Secondary batteries•Miscellaneous and specialty batteries•Battery applications•Battery industry infrastructure

Next-Generation ADCs, High-Performance Power Management, and Technology Considerations for Advanced Integrated Circuits

Lithium-Ion Batteries Addresses the methodology and theoretical foundation of battery manufacturing, service and management systems (BM2S2), and discusses the issues and challenges in these areas This book brings together experts in the field to highlight the cutting edge research advances in BM2S2 and to promote an innovative integrated research framework responding to the challenges. There are three major parts included in this book: manufacturing, service, and management. The first part focuses on battery manufacturing systems, including modeling, analysis, design and control, as well as economic and risk analyses. The second part focuses on information technology’s impact on service systems, such as data-driven reliability modeling, failure prognosis, and service decision making methodologies for battery services. The third part addresses battery management systems (BMS) for control and optimization of battery cells, operations, and hybrid storage systems to ensure overall performance and safety, as well as EV management. The contributors consist of experts from universities, industry research centers, and government agency. In addition, this book: Provides comprehensive overviews of lithium-ion battery and...
battery electrical vehicle manufacturing, as well as economic returns and government support. Introduces integrated models for quality propagation and productivity improvement, as well as indicators for bottleneck identification and mitigation in battery manufacturing. Covers models and diagnosis algorithms for battery SOC and SOH estimation, data-driven prognosis algorithms for predicting the remaining useful life (RUL) of battery SOC and SOH. Presents mathematical models and novel structure of battery equalizers in battery management systems (BMS). Reviews the state of the art of battery, supercapacitor, and battery-supercapacitor hybrid energy storage systems (HESSs) for advanced electric vehicle applications. Advances in Battery Manufacturing, Services, and Management Systems is written for researchers and engineers working on battery manufacturing, service, operations, logistics, and management. It can also serve as a reference for senior undergraduate and graduate students interested in BM2S2.

Thomas Register This textbook takes a unified view of the fundamentals of wireless communication and explains cutting-edge concepts in a simple and intuitive way. An abundant supply of exercises make it ideal for graduate courses in electrical and computer engineering and it will also be of great interest to practising engineers.

Rechargeable Lithium Batteries

Electrochemical Power Sources: Fundamentals, Systems, and Applications This contributed volume contains the results of the research program “Agreement for Hybrid and Electric Vehicles”, developed in the framework of the Energy Technology Network of the International Energy Agency. The topical focus lies on technology options for the system optimization of hybrid and electric vehicle components and drive train configurations which enhance the energy efficiency of the vehicle. The approach to the topic is genuinely interdisciplinary, covering insights from fields. The target audience primarily comprises researchers and industry experts in the field of automotive engineering, but the book may also be beneficial for graduate students.

Industrial Applications of Batteries The advent of lithium ion batteries has brought a significant shift in the area of large format battery systems. Previously limited to heavy and bulky lead-acid storage batteries, large format batteries were used only where absolutely necessary as a means of energy storage. The improved energy density, cycle life, power capability, and durability of lithium ion cells has given us electric and hybrid vehicles with meaningful driving range and performance, grid-tied energy storage systems for integration of renewable energy and load leveling, backup power systems and other applications. This book discusses battery management system (BMS) technology for large format lithium-ion battery packs from a systems perspective. This resource covers the future of BMS, giving us new ways to generate, use, and store energy, and free us from the perils of non-renewable energy sources. This book provides a full update on BMS technology, covering software, hardware, integration, testing, and safety.

Analog Circuit Design

Linden's Handbook of Batteries, Fifth Edition


X-Ray Equipment Maintenance and Repairs Workbook for Radiographers and Radiological Technologists The X-ray equipment maintenance
and repairs workbook is intended to help and guide staff working with, and responsible for, radiographic equipment and installations in remote institutions where the necessary technical support is not available, to perform routine maintenance and minor repairs of equipment to avoid break downs. The book can be used for self study and as a checklist for routine maintenance procedures.

Electronic Design's Gold Book This book is based on the 18 tutorials presented during the 28th workshop on Advances in Analog Circuit Design. Expert designers present readers with information about a variety of topics at the frontier of analog circuit design, including next-generation analog-to-digital converters, high-performance power management systems and technology considerations for advanced IC design. For anyone involved in analog circuit research and development, this book will be a valuable summary of the state-of-the-art in these areas. Provides a summary of the state-of-the-art in analog circuit design, written by experts from industry and academia; Presents material in a tutorial-based format; Includes coverage of next-generation analog-to-digital converters, high-performance power management systems, and technology considerations for advanced IC design.

Digital Design and Computer Architecture Electricity is the most important secondary energy source, the present production rate, mainly from thermal electric power stations, being of the order of 1.3 TW. However, the total capacity of primary and rechargeable batteries currently in use is the same as the output of the world's power stations. But present battery systems will not meet future needs for the economical storage of large amounts of electrical energy for vehicles, public transport, road levelling, solar energy utilisation, civil video and audio, terrestrial and space communications, etc. Current accumulators based on aqueous acid or alkali systems do not have sufficient output and, moreover, the materials employed (Pb, Cd, Ni) are environmental pollutants that require safe recycling. Further, stocks of these strategic metals are being rapidly depleted. This book discusses actual field results with novel systems, such as rechargeable lithium batteries, zinc/air cells, metal-free accumulators, graphite/carbon devices and others, including fuel cells. The book stresses that a universal electrochemical system is not feasible: the choice of any system must depend on the concrete field of application and must be taken in consideration of a large number of technical, economic and environmental circumstances.

Analog Circuits Cookbook Includes all works deriving from DOE, other related government-sponsored information and foreign nonnuclear information.

Advances in Battery Manufacturing, Service, and Management Systems Batteries that can store electricity from solar and wind generation farms are a key component of a sustainable energy strategy. Featuring 15 peer-reviewed entries from the Encyclopedia of Sustainability Science and Technology, this book presents a wide range of battery types and components, from nanocarbons for supercapacitors to lead acid battery systems and technology. Worldwide experts provides a snapshot-in-time of the state-of-the-art in battery-related R&D, with a particular focus on rechargeable batteries. Such batteries can store electrical energy generated by renewable energy sources such as solar, wind, and hydrowater installations with high efficiency and release it on demand. They are efficient, non-polluting, self-contained devices, and their components can be recovered and used to recreate battery systems. Coverage also highlights the significant efforts currently underway to adapt battery technology to power cars, trucks and buses in order to eliminate pollution from petroleum combustion. Written for an audience of undergraduate and graduate students, researchers, and industry experts, Batteries for Sustainability is an invaluable one-stop reference to this essential area of energy technology.
The light-duty vehicle fleet is expected to undergo substantial technological changes over the next several decades. New powertrain designs, alternative fuels, advanced materials and significant changes to the vehicle body are being driven by increasingly stringent fuel economy and greenhouse gas emission standards. By the end of the next decade, cars and light-duty trucks will be more fuel efficient, weigh less, emit less air pollutants, have more safety features, and will be more expensive to purchase relative to current vehicles. Though the gasoline-powered spark ignition engine will continue to be the dominant powertrain configuration even through 2030, such vehicles will be equipped with advanced technologies, materials, electronics and controls, and aerodynamics. And by 2030, the deployment of alternative methods to propel and fuel vehicles and alternative modes of transportation, including autonomous vehicles, will be well underway. What are these new technologies - how will they work, and will some technologies be more effective than others? Written to inform the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) and Environmental Protection Agency (EPA) Corporate Average Fuel Economy (CAFE) and greenhouse gas (GHG) emission standards, this new report from the National Research Council is a technical evaluation of costs, benefits, and implementation issues of fuel reduction technologies for next-generation light-duty vehicles.

Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles estimates the cost, potential efficiency improvements, and barriers to commercial deployment of technologies that might be employed from 2020 to 2030. This report describes these promising technologies and makes recommendations for their inclusion on the list of technologies applicable for the 2017-2025 CAFE standards.

Advanced Hybrid and Electric Vehicles The introduction of Li-ion batteries in 1991 created a tremendous change in the handheld devices landscape. Since then, the energy stored and put to use in palm-sized electronic devices has quadrupled. Devices are continuously getting more power hungry, outpacing battery development. Written by leading engineers in the field, This cutting-edge resource helps you overcome this challenge, offering you an insightful overview and in-depth guide to the many varied areas of battery power management for portable devices. You find the latest details on optimizing charging circuits, developing battery gauges that provide the longest possible run-time while ensuring data protection, and utilizing safety circuits that provide multiple independent levels of protection for highly energetic batteries. This unique book features detailed design examples of whole systems, providing you with the real-world perspective needed to put this knowledge into practice. You get the state-of-the-art know-how you need to perfect your device designs, helping you make them strong competitors in the fast-growing portable device marketplace.

Battery Management Systems for Large Lithium Ion Battery Packs Rechargeable Lithium Batteries: From Fundamentals to Application provides an overview of rechargeable lithium batteries, from fundamental materials, though characterization and modeling, to applications. The market share of lithium ion batteries is fast increasing due to their high energy density and low maintenance requirements. Lithium air batteries have the potential for even higher energy densities, a requirement for the development of electric vehicles, and other types of rechargeable lithium battery are also in development. After an introductory chapter providing an overview of the main scientific and technological challenges posed by rechargeable Li batteries, Part One of this book reviews materials and characterization of rechargeable lithium batteries. Part Two covers performance and applications, discussing essential aspects such as battery management, battery safety and emerging rechargeable lithium battery technologies as well as medical and aerospace applications. Expert overview of the main scientific and technological challenges posed by rechargeable lithium batteries Address the important topics of analysis, characterization, and modeling in rechargeable lithium batteries Key analysis of essential aspects such as battery management, battery safety, and emerging rechargeable lithium battery technologies

Batteries for Sustainability Crompton's Battery Reference Book has become the standard reference source for a wide range of professionals
and students involved in designing, manufacturing, and specifying products and systems that use batteries. This book is unique in providing extensive data on specific battery types, manufacturers and suppliers, as well as covering the theory - an aspect of the book which makes an updated edition important for every professional's library. The coverage of different types of battery is fully comprehensive, ranging from minute button cells to large installations weighing several hundred tonnes. Must-have information and data on all classes of battery in an accessible form Essential reference for design engineers in automotive and aerospace applications, telecommunications equipment, household appliances, etc. Informs you of developments over the past five years

Electrochemical Energy Storage for Renewable Sources and Grid Balancing Advances in Battery Technologies for Electric Vehicles provides an in-depth look into the research being conducted on the development of more efficient batteries capable of long distance travel. The text contains an introductory section on the market for battery and hybrid electric vehicles, then thoroughly presents the latest on lithium-ion battery technology. Readers will find sections on battery pack design and management, a discussion of the infrastructure required for the creation of a battery powered transport network, and coverage of the issues involved with end-of-life management for these types of batteries. Provides an in-depth look into new research on the development of more efficient, long distance travel batteries Contains an introductory section on the market for battery and hybrid electric vehicles Discusses battery pack design and management and the issues involved with end-of-life management for these types of batteries

Electric Vehicle Battery Systems Lithium-Ion Batteries features an in-depth description of different lithium-ion applications, including important features such as safety and reliability. This title acquaints readers with the numerous and often consumer-oriented applications of this widespread battery type. Lithium-Ion Batteries also explores the concepts of nanostructured materials, as well as the importance of battery management systems. This handbook is an invaluable resource for electrochemical engineers and battery and fuel cell experts everywhere, from research institutions and universities to a worldwide array of professional industries. Contains all applications of consumer and industrial lithium-ion batteries, including reviews, in a single volume Features contributions from the world's leading industry and research experts Presents executive summaries of specific case studies Covers information on basic research and application approaches

Fast Electrochemical Impedance Spectroscopy

Microelectronic Circuit Design for Energy Harvesting Systems Battery Management Systems - Design by Modelling describes the design of Battery Management Systems (BMS) with the aid of simulation methods. The basic tasks of BMS are to ensure optimum use of the energy stored in the battery (pack) that powers a portable device and to prevent damage inflicted on the battery (pack). This becomes increasingly important due to the larger power consumption associated with added features to portable devices on the one hand and the demand for longer run times on the other hand. In addition to explaining the general principles of BMS tasks such as charging algorithms and State-of-Charge (SoC) indication methods, the book also covers real-life examples of BMS functionality of practical portable devices such as shavers and cellular phones. Simulations offer the advantage over measurements that less time is needed to gain knowledge of a battery's behaviour in interaction with other parts in a portable device under a wide variety of conditions. This knowledge can be used to improve the design of a BMS, even before a prototype of the portable device has been built. The battery is the central part of a BMS and good simulation models that can be used to improve the BMS design were previously unavailable. Therefore, a large part of the book is devoted to the construction of simulation models for rechargeable batteries. With the aid of several illustrations it is shown that design improvements can indeed be realized with the presented battery models. Examples include an improved charging algorithm that was elaborated in simulations and verified in
practice and a new SoC indication system that was developed showing promising results. The contents of Battery Management Systems - Design by Modelling is based on years of research performed at the Philips Research Laboratories. The combination of basic and detailed descriptions of battery behaviour both in chemical and electrical terms makes this book truly multidisciplinary. It can therefore be read both by people with an (electro)chemical and an electrical engineering background.

Thomas Register of American Manufacturers and Thomas Register Catalog File Analog circuit and system design today is more essential than ever before. With the growth of digital systems, wireless communications, complex industrial and automotive systems, designers are challenged to develop sophisticated analog solutions. This comprehensive source book of circuit design solutions will aid systems designers with elegant and practical design techniques that focus on common circuit design challenges. The book’s in-depth application examples provide insight into circuit design and application solutions that you can apply in today’s demanding designs. Covers the fundamentals of linear/analog circuit and system design to guide engineers with their design challenges. Based on the Application Notes of Linear Technology, the foremost designer of high performance analog products, readers will gain practical insights into design techniques and practice. Broad range of topics, including power management tutorials, switching regulator design, linear regulator design, data conversion, signal conditioning, and high frequency/RF design. Contributors include the leading lights in analog design, Robert Dobkin, Jim Williams and Carl Nelson, among others.

Battery Management Systems This book offers a review of electrochemical impedance spectroscopy (EIS) and its application in online condition monitoring of electrochemical devices, focusing on the practicalities of performing fast and accurate EIS. The first part of the book addresses the theoretical aspects of the fast EIS technique, including stochastic excitation signals, time-frequency signal processing, and statistical analysis of impedance measurements. The second part presents an application of the fast EIS technique for condition monitoring and evaluates the performance of the proposed fast EIS methodology in three different types of electrochemical devices: a Li-ion battery, a Li-S cell, and a polymer electrolyte membrane (PEM) fuel cell. Uniquely, in addition to theoretical aspects the book provides practical guidelines for implementation, commissioning, and exploitation of EIS for condition monitoring of electrochemical devices, making it a valuable resource for practicing engineers as well as researchers.

Power Engineering

Advances in Battery Technologies for Electric Vehicles This book describes the design of microelectronic circuits for energy harvesting, broadband energy conversion, new methods and technologies for energy conversion. The author also discusses the design of power management circuits and the implementation of voltage regulators. Coverage includes advanced methods in low and high power electronics, as well as principles of micro-scale design based on piezoelectric, electromagnetic and thermoelectric technologies with control and conditioning circuit design.

Chemical Engineering Progress

Energy Storage Devices for Electronic Systems Electricity from renewable sources of energy is plagued by fluctuations (due to variations in wind strength or the intensity of insolation) resulting in a lack of stability if the energy supplied from such sources is used in ‘real time’. An important solution to this problem is to store the energy electrochemically (in a secondary battery or in hydrogen and its derivatives) and to
make use of it in a controlled fashion at some time after it has been initially gathered and stored. Electrochemical battery storage systems are the major technologies for decentralized storage systems and hydrogen is the only solution for long-term storage systems to provide energy during extended periods of low wind speeds or solar insolation. Future electricity grid design has to include storage systems as a major component for grid stability and for security of supply. The technology of systems designed to achieve this regulation of the supply of renewable energy, and a survey of the markets that they will serve, is the subject of this book. It includes economic aspects to guide the development of technology in the right direction. Provides state-of-the-art information on all of the storage systems together with an assessment of competing technologies Features detailed technical, economic and environmental impact information of different storage systems Contains information about the challenges that must be faced for batteries and hydrogen-storage to be used in conjunction with a fluctuating (renewable energy) power supply

Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles Safety of Lithium Batteries describes how best to assure safety during all phases of the life of Lithium ion batteries (production, transport, use, and disposal). About 5 billion Li-ion cells are produced each year, predominantly for use in consumer electronics. This book describes how the high-energy density and outstanding performance of Li-ion batteries will result in a large increase in the production of Li-ion cells for electric drive train vehicle (xEV) and battery energy storage (BES or EES) purposes. The high-energy density of Li battery systems comes with special hazards related to the materials employed in these systems. The manufacturers of cells and batteries have strongly reduced the hazard probability by a number of measures. However, absolute safety of the Li system is not given as multiple incidents in consumer electronics have shown. Presents the relationship between chemical and structure material properties and cell safety Relates cell and battery design to safety as well as system operation parameters to safety Outlines the influences of abuses on safety and the relationship to battery testing Explores the limitations for transport and storage of cells and batteries Includes recycling, disposal and second use of lithium ion batteries

Portable Design Industrial Applications of Batteries looks at both the applications and the batteries and covers the relevant scientific and technological features. Presenting large batteries for stationary applications, e.g. energy storage, and also batteries for hybrid vehicles or different tools. The important aerospace field is covered both in connection with satellites and space missions. Examples of applications include, telecommunications, uninterruptible power supplies, systems for safety/alarms, car accessories, toll collection, asset tracking systems, medical equipment, and oil drilling. The first chapter on applications deals with electric and hybrid vehicles. Four chapters are devoted to stationary applications, i.e. energy storage (from the electric grid or solar/wind energy), load levelling, telecommunications, uninterruptible power supplies, back-up for safety/alarms. Battery management by intelligent systems and prediction of battery life are dealt with in a dedicated chapter. The topic of used battery collection and recycling, with the description of specific treatments for the different systems, is also extensively treated in view of its environmental relevance. Finally, the world market of these batteries is presented, with detailed figures for the various applications. * Updated and full overview of the power sources for industries * Written by leading scientists in their fields * Well balanced in terms of scientific and technical information

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