

Switching Power Supply Circuit Diagrams

This book explores key techniques and methods in electromagnetic compatibility management, analysis, design, improvement and test verification for spacecraft. The first part introduces the general EMC technology of spacecraft, the electromagnetic interference control method and management of electromagnetic compatibility. The second part discusses the EMC prediction analysis technique and its application in spacecraft, while the third presents the EMC design of spacecraft modules and typical equipment. The final two parts address spacecraft magnetic design testing technologies and spacecraft testing technologies. The book also covers the program control test process, the special power control unit (PCU), electric propulsion, PIM test and multipaction testing for spacecraft, making it a valuable resource for researchers and engineers alike.

Collection of selected, peer reviewed papers from the 2013 3rd International Conference on Frontiers of Manufacturing Science and Measuring Technology (ICFMM 2013), July 30-31, 2013, LiJiang, China. Volume is indexed by Thomson Reuters CPCI-S (WoS). The 518 papers are grouped as follows: Chapter 1: Practice of Design Engineering and Researches for Industry; Chapter 2: Applied Materials Engineering; Chapter 3: Measuring Technologies, Signal and Data Processing; Chapter 4: Control, Automation, Communication and Information Technologies; Chapter 5: Environmental Engineering, Urban Development, Transportation and Logistics; Chapter 6: Organization of Manufacture and Engineering Management.

This book offers all important industrial communication systems for buildings in one single book! It stimulates a basic understanding of network and bus systems for the automation of buildings. After an introduction to EIB/KNX, LON und BACnet technologies, the authors illustrate how these systems can be utilized for specific applications, like air conditioning or illumination. This book assumes only a basic knowledge of mathematics and thanks to its simple explanations and many examples is ideal for students and professional engineers who require practical solutions. Numerous practical examples explain basic concepts of industrial communication technology as well as the procedure for the transmission of digital data. All chapters have been thoroughly revised for the 2nd edition and the book includes the latest technical developments and standards.

The third edition of the book on Industrial Electronics and Control including Programmable Logic Controller is aimed at providing an explicit explanation of the mode of operation of different electronic power devices in circuits and systems that are in wide use today in modern industry for the control and conversion of electric power. The book strives to fulfil this need for a fundamental treatment that allows students to understand all aspects of circuit functions through its neatly-drawn illustrations and wave diagrams. Several colour diagrams are included to explain difficult circuits and waveforms. This approach will help students in assimilating the operation of power electronics circuits with more clarity. Same as in previous editions, the book commences with a discussion on rectifiers, differential amplifiers, operational amplifiers, multivibrators, timers and goes on to provide in-depth coverage of power devices and power electronics circuits such as silicon controlled rectifiers (SCRs), inverters, dual converters, choppers, cycloconverters and their applications in the control of ac/dc motors, and heating and welding processes. The book also presents an overview of the modern developments in the field of optoelectronics and fibre optics. Finally, the book ends with a discussion on Programmable Logic Controller (PLC). The book has an added advantage of multiple-choice questions, true/false statements, review questions and numerical problems at the end of each chapter, designed to reinforce the student's understanding of the concepts and mathematical derivations introduced in the text. The book is intended as a textbook for polytechnic students pursuing courses in electrical engineering, electronics and communication engineering, and electronics and instrumentation engineering. This tailor-made book with its exhaustive

explanations of circuit operations and its student-friendly approach should prove to be a boon to the students and teachers alike. AUDIENCE: Polytechnic Students - pursuing courses in Electrical Engineering, Electronics and Communication Engineering, and Electronics and Instrumentation Engineering

A wide-ranging and practical handbook that offers comprehensive treatment of high-pressure common rail technology for students and professionals In this volume, Dr. Ouyang and his colleagues answer the need for a comprehensive examination of high-pressure common rail systems for electronic fuel injection technology, a crucial element in the optimization of diesel engine efficiency and emissions. The text begins with an overview of common rail systems today, including a look back at their progress since the 1970s and an examination of recent advances in the field. It then provides a thorough grounding in the design and assembly of common rail systems with an emphasis on key aspects of their design and assembly as well as notable technological innovations. This includes discussion of advancements in dual pressure common rail systems and the increasingly influential role of Electronic Control Unit (ECU) technology in fuel injector systems. The authors conclude with a look towards the development of a new type of common rail system. Throughout the volume, concepts are illustrated using extensive research, experimental studies and simulations. Topics covered include:

Comprehensive detailing of common rail system elements, elementary enough for newcomers and thorough enough to act as a useful reference for professionals Basic and simulation models of common rail systems, including extensive instruction on performing simulations and analyzing key performance parameters Examination of the design and testing of next-generation twin common rail systems, including applications for marine diesel engines Discussion of current trends in industry research as well as areas requiring further study Common Rail Fuel Injection Technology is the ideal handbook for students and professionals working in advanced automotive engineering, particularly researchers and engineers focused on the design of internal combustion engines and advanced fuel injection technology. Wide-ranging research and ample examples of practical applications will make this a valuable resource both in education and private industry.

Industrial Process Automation Systems: Design and Implementation is a clear guide to the practicalities of modern industrial automation systems. Bridging the gap between theory and technician-level coverage, it offers a pragmatic approach to the subject based on industrial experience, taking in the latest technologies and professional practices. Its comprehensive coverage of concepts and applications provides engineers with the knowledge they need before referring to vendor documentation, while clear guidelines for implementing process control options and worked examples of deployments translate theory into practice with ease. This book is an ideal introduction to the subject for junior level professionals as well as being an essential reference for more experienced practitioners. Provides knowledge of the different systems available and their applications, enabling engineers to design automation solutions to solve real industry problems. Includes case studies and practical information on key items that need to be considered when procuring automation systems. Written by an experienced practitioner from a leading technology company

The second edition of High Voltage Test Techniques has been completely revised. The present revision takes into account the latest international developments in High Voltage and Measurement technology, making it an essential reference for engineers in the testing field. High Voltage Technology belongs to the traditional area of Electrical Engineering. However, this is not to say that the area has stood still. New insulating materials, computing methods and voltage levels repeatedly pose new problems or open up methods of solution; electromagnetic compatibility (EMC) or components and systems also demand increased attention. The authors hope that their experience will be of use to students of Electrical Engineering confronted with High Voltage problems in their studies, in research and development and also

in the testing field. Benefit from a completely revised edition Brings you up-to-date with th latest international developments in High Voltage and Measurement technology An essential reference for engineers in the testing field

A contemporary evaluation of switching power design methods with real world applications • Written by a leading author renowned in his field • Focuses on switching power supply design, manufacture and debugging • Switching power supplies have relevance for contemporary applications including mobile phone chargers, laptops and PCs • Based on the authors' successful "Switching Power Optimized Design 2nd Edition" (in Chinese) • Highly illustrated with design examples of real world applications Fusion Technology 1980, Volume 2 contains the proceedings of the 11th Symposium on Fusion Technology held at the Examination Schools, Oxford, UK on September 15-19, 1980. As a continuation of the papers presented in the symposium, the book begins with a description of the data acquisition and control in fusion technology. Subsequent papers presented focus on power supplies, plasma engineering, and fusion materials. Various reactor studies reported in the symposium are also shown. Barry Davis provides the reader with a comprehensive study of DC power supplies, using linear and switching technologies plus a range of oscillator circuits found in the electronics industry. The book is written in an easy to read style with many practical circuits and fault finding examples. Features include: objectives listed at the start of each chapter; chapter summary, list of key terms, multichoice and essay review questions at the end of each chapter; minimum use of mathematics; many practical and tested circuits constructed; extensive use of circuit diagrams; and end of chapter review questions.

All the mandatory units of the 2010 BTEC Level 3 Engineering specification, plus selected popular optional units Clear, full colour layout and numerous activities, worked examples and questions with answers, make it easy for students to learn and revise for their exams Content you can trust - written by two lecturers with over 50 years combined experience of designing and delivering engineering qualifications Free student website with interactive quizzes, downloads and additional material o support learning The third edition of this bestselling textbook ensures that all the mandatory units of 2010 BTEC Level 3 Engineering specification are fully covered in a way that encourages students to explore engineering for themselves, developing the expertise and knowledge required at this level. Key points and definitions highlight the most important concepts and hundreds of activities and worked examples help put theory in context. Questions throughout the text, with answers provided, allow students to test their knowledge as they go, while end of unit review questions are ideal for exam revision and set course work. For lecturers a Tutor Support DVD-ROM is available to help with the delivery of the programme: BTEC National Engineering Tutor Support Material, ISBN 978-0-08-096683-0. Units covered: Unit 1 - Health and Safety in the Workplace, Unit 2 - Communications for Engineering Technicians, Unit 3 - Engineering Project, Unit 4 - Mathematics for Engineering technicians, Unit 5 - Mechanical Principles and Applications, Unit 6 - Electrical and Electronic Principles, Unit 7 - Business Operations in Engineering, Unit 8 - Engineering Design. A free student website, including answers to all activities, is available at <http://www.key2study.com/btecnat> and features: Interactive quizzes with automatic marking and feedback A free comprehensive 2D CAD package for downloading A variety of

spreadsheet tools for solving common engineering problems Useful engineering data summaries Extensive Visio symbol libraries for engineering drawing/CAD Drawing templates and sample drawings in industry-standard format Additional material to support learning activities and assignments Book chapter: Arithmetic and Trigonometric Fundamentals 'Test your Knowledge' and 'End of Unit Review' questions

As we increasingly use electronic devices to direct our daily lives, so grows our dependence on reliable energy sources to power them. Because modern electronic systems demand steady, efficient, reliable DC voltage sources—often at a sub-1V level—commercial AC lines, batteries, and other common resources no longer suffice. New technologies also require intricate techniques to protect against natural and manmade disasters. Still, despite its importance, practical information on this critical subject remains hard to find. Using simple, accessible language to balance coverage of theoretical and practical aspects, *DC Power Supplies, Power Management and Surge Protection* details the essentials of power electronics circuits applicable to low-power systems, including modern portable devices. A summary of underlying principles and essential design points, it compares academic research and industry publications and reviews DC power supply fundamentals, including linear and low-dropout regulators. Content also addresses common switching regulator topologies, exploring resonant conversion approaches. Coverage includes other important topics such as: Control aspects and control theory Digital control and control ICs used in switching regulators Power management and energy efficiency Overall power conversion stage and basic protection strategies for higher reliability Battery management and comparison of battery chemistries and charge/discharge management Surge and transient protection of circuits designed with modern semiconductors based on submicron dimension transistors This specialized design resource explores applicable fundamental elements of power sources, with numerous cited references and discussion of commercial components and manufacturers. Regardless of their previous experience level, this information will greatly aid designers, researchers, and academics who, study, design, and produce the viable new power sources needed to propel our modern electronic world. CRC Press Authors Speak Nihal Kularatna introduces his book. Watch the video A practical introduction to techniques for the design of electronic products from the Electromagnetic compatibility (EMC) perspective Introduces techniques for the design of electronic products from the EMC aspects Covers normalized EMC requirements and design principles to assure product compatibility Describes the main topics for the control of electromagnetic interferences and recommends design improvements to meet international standards requirements (FCC, EU EMC directive, Radio acts, etc.) Well organized in a logical sequence which starts from basic knowledge and continues through the various aspects required for compliance with EMC requirements Includes practical examples and case studies to illustrate design features and troubleshooting Author is the founder of the EMC design risk evaluation approach and this book presents many years' experience in teaching and researching the topic Providing material for both the Foundation and Higher tiers of the revised NEAB and WJEC syllabuses, this series is an updated edition of "Modular Science for GCSE". This compendium contains modules which form the basis of this course.

Is it possible to design and make automatic devices for industrial and power engineering without microcircuits and microprocessors and without complex power supplies? Electronic

Read Book Switching Power Supply Circuit Diagrams

Devices on Discrete Components for Industrial and Power Engineering answers the question above with a resounding "Yes!" by describing ten original automatic devices based exclusively on modern discrete components. The book reveals that devices based on high-voltage transistors and thyristors as well as miniature vacuum and high power gas-filled reed switches are actually much simpler to implement and more reliable than traditional devices. By identifying elementary functional modules and the basic working principles of semi-conductor devices, the text allows for the construction of complete automatic devices. It also contains an extensive reference section that includes information on modern high-voltage bipolar, FET and IGBT transistors, thyristors and triacs, as well as reed switches.

This book presents the vocabulary of a continually evolving and fundamental technical field which is finding ever broad applications in industry. It provides special attention to the language of national and international standards and recommendations, as well as appropriate field indications.

The book is designed for students studying the course on Electronic Circuits – 1. The topics have been organized in a sequential manner to enhance the understanding of the fundamentals of the subject. A wide variety of solved examples have been provided with step-by-step solutions, which will enable the students in a better understanding of the course.

Take the "black magic" out of switching power supplies with Practical Switching Power Supply Design! This is a comprehensive "hands-on" guide to the theory behind, and design of, PWM and resonant switching supplies. You'll find information on switching supply operation and selecting an appropriate topology for your application. There's extensive coverage of buck, boost, flyback, push-pull, half bridge, and full bridge regulator circuits. Special attention is given to semiconductors used in switching supplies. RFI/EMI reduction, grounding, testing, and safety standards are also detailed. Numerous design examples and equations are given and discussed. Even if your primary expertise is in logic or microprocessor engineering, you'll be able to design a power supply that's right for your application with this essential guide and reference! Gives special attention to resonant switching power supplies, a state-of-the-art trend in switching power supply design Approaches switching power supplies in an organized way beginning with the advantages of switching supplies and thier basic operating principles Explores various configurations of pulse width modulated (PWM) switching supplies and gives readers ideas for the direction of their designs Especially useful for practicing design engineers whose primary specialty is not in analog or power engineering fields

High voltage engineering is extremely important for the reliable design, safe manufacture and operation of electric devices, equipment and electric power systems. The 21st International Symposium on High Voltage Engineering, organized by the 90 years old Budapest School of High Voltage Engineering, provides an excellent forum to present results, advances and discussions among engineers, researchers and scientists, and share ideas, knowledge and expertise on high voltage engineering. The proceedings of the conference presents the state of the art technology of the field. The content is simultaneously aiming to help practicing engineers to be able to implement based on the papers and researchers to link and further develop ideas.

Multifunction devices combine the essentials of a fax machine, printer, scanner, and copier into one peripheral for small and home offices. As the market for this equipment grows, the need for skilled repair and maintenance increases. Unfortunately the service documentation supplied by the manufacturers is completely inadequate making the repair jobs even harder and more expensive. Marvin Hobbs teaches you how multifunction peripherals work in theory and in practice with lots of hands-on examples and important troubleshooting and repair tips you don't want to miss. This book fills a gap in the literature, and will be a welcome addition to the library of any technician or do-it-yourselfer. Written by a knowledgeable practitioner with inside industry information Fully covers the troubleshooting and repair of multifunction peripherals A

must-have instructional and reference title for anyone who works with computer peripherals! Instrumentation and Control Systems, Third Edition, addresses the basic principles of modern instrumentation and control systems, including examples of the latest devices, techniques and applications. The book provides a comprehensive introduction on the subject, with Laplace presented in a simple and easily accessible form and complemented by an outline of the mathematics that would be required to progress to more advanced levels of study. Taking a highly practical approach, the author combines underpinning theory with numerous case studies and applications throughout, thus enabling the reader to directly apply the content to real-world engineering contexts. Coverage includes smart instrumentation, DAQ, crucial health and safety considerations, and practical issues such as noise reduction, maintenance and testing. PLCs and ladder programming is incorporated in the text, as well as new information introducing various software programs used for simulation. The overall approach of this book makes it an ideal text for all introductory level undergraduate courses in control engineering and instrumentation. Assumes minimal prior mathematical knowledge Includes an extensive collection of problems, case studies and applications, with a full set of answers at the back of the book Helps place theory in real-world engineering context

Optimal Design of Switching Power Supply John Wiley & Sons

Electronic Circuit Analysis is designed to serve students of a two semester undergraduate course on electronic circuit analysis. It builds on the subject from its basic principles over fifteen chapters, providing detailed coverage on the design and analysis of electronic circuits.

This book gathers selected papers from the 8th International Field Exploration and Development Conference (IFEDC 2018) and addresses a broad range of topics, including: Reservoir Surveillance and Management, Reservoir Evaluation and Dynamic Description, Reservoir Production Stimulation and EOR, Ultra-Tight Reservoirs, Unconventional Oil and Gas Resources Technology, Oil and Gas Well Production Testing, and Geomechanics. In brief, the papers introduce readers to upstream technologies used in oil & gas development, the main principles of the process, and various related design technologies. The conference not only provided a platform to exchange experiences, but also promoted the advancement of scientific research in oil & gas exploration and production. The book is chiefly intended for industry experts, professors, researchers, senior engineers, and enterprise managers.

Volume is indexed by Thomson Reuters CPCI-S (WoS). The peer-reviewed papers of this volume provide a comprehensive and up-to-date guide to the worldwide state-of-the art knowledge concerning Precision Engineering and Non-Traditional Machining. They cover precision mechanics design, precision and ultra-precision machining, precision testing and control, non-traditional machining, manufacturing information engineering, MEMS/NEMS, optical instrumentation and technology and materials science and technology. The volume will provide readers not only with a broad overview of the latest advances, but also with a valuable reference source.

This is the introduction to PLCs for which baffled students, technicians and managers have been waiting. In this straightforward, easy-to-read guide, Bill Bolton has kept the jargon to a minimum, considered all the programming

methods in the standard IEC 1131-3 - in particular ladder programming, and presented the subject in a way that is not device specific to ensure maximum applicability to courses in electronics and control systems. Now in its fourth edition, this best-selling text has been expanded with increased coverage of industrial systems and PLCs and more consideration has been given to IEC 1131-3 and all the programming methods in the standard. The new edition brings the book fully up to date with the current developments in PLCs, describing new and important applications such as PLC use in communications (e.g. Ethernet – an extremely popular system), and safety – in particular proprietary emergency stop relays (now appearing in practically every PLC based system). The coverage of commonly used PLCs has been increased, including the ever popular Allen Bradley PLCs, making this book an essential source of information both for professionals wishing to update their knowledge, as well as students who require a straight forward introduction to this area of control engineering. Having read this book, readers will be able to:

- * Identify the main design characteristics and internal architecture of PLCs
- * Describe and identify the characteristics of commonly used input and output devices
- * Explain the processing of inputs and outputs of PLCs
- * Describe communication links involved with control systems
- * Develop ladder programs for the logic functions AND, OR, NOT, NAND, NOT and XOR
- * Develop functional block, instruction list, structured text and sequential function chart programs
- * Develop programs using internal relays, timers, counters, shift registers, sequencers and data handling
- * Identify safety issues with PLC systems
- * Identify methods used for fault diagnosis, testing and debugging programs

Fully matched to the requirements of BTEC Higher Nationals, students are able to check their learning and understanding as they work through the text using the Problems section at the end of each chapter. Complete answers are provided in the back of the book.

- * Thoroughly practical introduction to PLC use and application - not device specific, ensuring relevance to a wide range of courses
- * New edition expanded with increased coverage of IEC 1131-3, industrial control scenarios and communications - an important aspect of PLC use
- * Problems included at the end of each chapter, with a complete set of answers given at the back of the book

Voltage Regulator Circuit Manual highlights the techniques in DC regulator design. This book contains seven chapters that cover different circuit types, from the simple incorporation of silicon chips to the complex IC manufacturing. After providing an overview of the changes in power supply design, this book goes on discussing the various circuit configurations applicable to linear IC voltage regulators and switching regulator designs. The following chapters contain schematic diagrams of a general assortment of regulators. In these chapters, the circuits are based on three-terminal, linear regulator ICs that offer simplicity of design, low cost, minimal circuit complexity, and relatively fast construction times. A chapter focuses on a wide assortment of regulators that fall into the general category of “switchers”, which is a very broad class of circuit that encompasses

several highly different configurations. The discussion then shifts to the switching power-supply circuits that fall into the category of flyback regulators, also known as ringing choke regulators. The last chapters deal with DC regulators that perform true value voltage conversions and their distinct characteristics. These chapters also include circuits that did not exactly fit the other circuit categories, such as battery chargers and motor controllers. Technicians and electronic engineers and designers who are interested in electronic design will find this book beneficial.

All the design and development inspiration and direction a hardware engineer needs in one blockbuster book! Clive "Max" Maxfield renowned author, columnist, and editor of PL DesignLine has selected the very best FPGA design material from the Newnes portfolio and has compiled it into this volume. The result is a book covering the gamut of FPGA design from design fundamentals to optimized layout techniques with a strong pragmatic emphasis. In addition to specific design techniques and practices, this book also discusses various approaches to solving FPGA design problems and how to successfully apply theory to actual design tasks. The material has been selected for its timelessness as well as for its relevance to contemporary FPGA design issues. Contents
Chapter 1 Alternative FPGA Architectures Chapter 2 Design Techniques, Rules, and Guidelines Chapter 3 A VHDL Primer: The Essentials Chapter 4 Modeling Memories Chapter 5 Introduction to Synchronous State Machine Design and Analysis Chapter 6 Embedded Processors Chapter 7 Digital Signal Processing Chapter 8 Basics of Embedded Audio Processing Chapter 9 Basics of Embedded Video and Image Processing Chapter 10 Programming Streaming FPGA Applications Using Block Diagrams In Simulink Chapter 11 Ladder and functional block programming Chapter 12 Timers *Hand-picked content selected by Clive "Max" Maxfield, character, luminary, columnist, and author *Proven best design practices for FPGA development, verification, and low-power *Case histories and design examples get you off and running on your current project

Framework Science is a flexible and easy-to-use course designed to encourage students' engagement with science. Student Book Features: Colourful, engaging text and illustrations Key words highlighted in 'language bank' boxes Clear diagrams Help students understand concepts Topical science is emphasised.

Covers semiconductor electronics, microlithographic process, components, microelectronic circuit technology, microprocessor technology and software technology. Includes some 29,000 terms and 40,000 translations in the field.

An important part of any communication system is its power supply system. The smooth operation of all communications depends on the quality of the power supply and on the operational reliability of the increasingly complex equipment and devices used for this purpose. This book describes current power supply technologies, it explains the circuit techniques using easy-to-understand examples and illustrations. Also covered are automatic control, grounding and protection techniques as well as the design of battery and grounding installations. The book is conceived as a practical guide for those involved in planning installing, commissioning and servicing

telecommunication systems, but it is also useful as an introduction to the subject. Technical plasmas have a wide range of industrial applications. The Encyclopedia of Plasma Technology covers all aspects of plasma technology from the fundamentals to a range of applications across a large number of industries and disciplines. Topics covered include nanotechnology, solar cell technology, biomedical and clinical applications, electronic materials, sustainability, and clean technologies. The book bridges materials science, industrial chemistry, physics, and engineering, making it a must have for researchers in industry and academia, as well as those working on application-oriented plasma technologies. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

The tools and techniques to fully leverage coplanar technology Coplanar Microwave Integrated Circuits sets forth the theoretical underpinnings of coplanar waveguides and thoroughly examines the various coplanar components such as discontinuities, lumped elements, resonators, couplers, and filters, which are essential for microwave integrated circuit design. Based on the results of his own research findings, the author effectively demonstrates the many advantages of coplanar waveguide technology for modern circuit design. Following a brief introductory chapter, the text thoroughly covers the material needed for successful design and realization of coplanar microwave circuits, including: * Fundamental transmission properties of coplanar waveguides using a full wave analysis * Detailed analysis of most discontinuities used in coplanar waveguide design * Lumped elements in coplanar technology that are needed in circuit design * Development of software for coplanar circuit design, including a CD-ROM containing a test version of the software for modeling coplanar circuit components and circuits * Application of derived results to build more complex components such as lumped element filters, waveguide filters, millimeter wave filters, end-coupled waveguide structures, waveguide couplers, and Wilkinson couplers for different frequency ranges in coplanar technology The final chapter focuses on special coplanar microwave integrated circuits that have been developed using the software presented in the text. The book concludes with a thought-provoking discussion of the advantages and disadvantages of the coplanar technique. Extensive use of figures and tables helps readers easily digest and visualize complex concepts. A bibliography is included at the end of each chapter for further study and research. Coplanar Microwave Integrated Circuits is recommended for graduate students and engineers in RF microwaves who want to reap all the advantages and possibilities of coplanar technology.

A detailed introduction to the most important skill in electronics for students & beginning hobbyists. Now updated to include the latest information on computer symbols & circuit diagrams, digital electronics, Boolean algebra, logic gates, & truth tables.

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