

SELECTIVE GUIDE TO LITERATURE ON INTEGRATED CIRCUITS

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INTRODUCTION

Over the last 25 years significant changes have been generated in industry by the use of sophisticated electronic systems. In great part, these new products have become possible because of the development of integrated circuits. Integrated circuits are the building blocks for nearly all electronic systems, and their use is present in almost every aspect of human endeavor today. The world-wide economic impact of the development of integrated circuits and the products utilizing them is unquestionable.

The purpose of this guide is to identify library resources which will help students, researchers, practicing engineers and information professionals seeking information about integrated circuits. The guide lists published printed and electronic reference works, including an extended list of conference proceedings and major periodicals. Product information and trade catalogs are also included, as well as a list of major integrated circuit manufacturers in the United States.

BIBLIOGRAPHIES AND LITERATURE GUIDES

In this section two types of sources are listed: significant bibliographies covering the field of integrated circuits but not necessarily exclusive to this topic and literature guides dealing with science and engineering that contain a good number of titles related to integrated circuits.

Anthony, L.J., ed. *Information Sources in Engineering*. 2nd ed. London, England: Butterworths, 1985. Covers both European and American sources.

This guide provides lists of sources for almost every major field of engineering. In addition, it gives valuable hints on how to search the engineering literature with some historical perspectives.

Ardis, Susan B., ed. by Jean M. Poland. *A Guide to the Literature of Electrical and Electronics Engineering*. Littleton, CO: Libraries Unlimited, 1987.

This comprehensive guide covers, by types of sources, all major aspects of electrical engineering.

Chen, Ching-chih. *Scientific and Technical Information Sources*. 2nd ed. Cambridge, MA: MIT Press, 1987.

This is a major compilation of scientific and technical sources. It is divided into 23 chapters by types of sources, with each chapter further subdivided into several subject areas such as: chemistry, electrical and electronics engineering, computer technology, etc.

Hurt, C.D. *Information Sources in Science and Technology*. 2nd ed. Englewood, CO: Libraries Unlimited, 1994.

A multidisciplinary guide covering: history of science; multidisciplinary sources of information; astronomy; general biology; botany and agriculture; chemistry; geosciences; mathematics; physics; zoology; general engineering; civil and construction engineering; energy and environment; mechanical and electrical engineering; production and processing engineering; transportation engineering; and biomedical sciences.

Purdue University, Center for Information and Numerical Data Analysis and Synthesis. *Materials Properties Bibliographic Data System, Purdue University, Center for Information and Numerical Data Analysis and Synthesis (CINDAS)*. West Lafayette, IN.

A compilation of information on the thermophysical, mechanical, and electronic properties of materials for a large number of materials of scientific and technical interest. Available online from CINDAS.

U.S. National Institute of Standards and Technology. *Semiconductor Measurement Technology: A Bibliography of NIST Publications*. Washington, DC: U.S. Dept. of Commerce, National Institute of Standards and Technology, 1962- .

It contains reports on work performed at the National Institute of Standards and Technology, formerly the National Bureau of Standards, and on measurement techniques used by the semiconductor industry. It includes reports on well established measurement methods, data, models, and associated technology.

PRINTED AND ELECTRONIC INDEXES AND ABSTRACTS

Indexes and abstracts are the tools for locating not only journal articles, but also technical reports, conference proceedings, etc., by subject and/or author. At least one such index or abstract has been developed for each major scientific or technical field. Indexes list the subjects covered in a selected group of publications and supply the information necessary to retrieve the articles. Abstracts also include summaries for each article covered. Although there is no index or abstracting service dedicated exclusively to integrated circuits, the works listed in this section have a much broader scope and are the major sources for this type of information in the field. Most of these titles will be found in university libraries, in specialized collections, or in large public libraries. Items preceded with an asterisk (*) are available in a computerized format (i.e., CD-ROM or online).

Aerospace Database see *Scientific and Technical Aerospace Reports (STAR)*.

* *C2C Currents: Japan-Electronics*. Washington, DC: Scan C2C, monthly, 1990-. Provides a summary of the contents of leading Japanese scientific and business journals.

Online Vendors: Data-Star, European Space Agency, ORBIT, 1993-.

CARL Uncover. Denver, CO: CARL Systems, Inc. A current awareness multidisciplinary online database with more than 14,000 journals indexed.

This file contains most of the core journals in integrated circuits and related areas. Easy to use. Articles selected can be ordered directly for a fee. Available only online.

Compendex Plus see *Engineering Index Monthly*.

* *Computer and Control Abstracts*. London: Institution of Electrical Engineers, 1966-.

Represents: Science Abstracts. Section C. Covers the world-wide literature of computer science and technology. The areas of applications of ICs to the computer industry are well covered. Of special interest are the sections on: Control and Measurements of Specific Variables; Circuits and Devices; and Logical Design and Digital Techniques.

CD-ROM: INSPEC ONDISC, updated quarterly, 1983-.

Online Vendors: BRS, DIALOG, STN, 1969-. Both the CD-ROM and online versions include all the Science Abstracts Sections A, B, C, and D, with more than 2.5 million citations.

* *Dissertation Abstracts International*. Ann Arbor, MI: University Microfilms International, monthly, 1861-.

Covers mainly United States and Canada. Section B: Physical Sciences and Engineering has abstracts of dissertations in electrical engineering, computer technology, communications, solid state, and other areas related to integrated circuits.

CD-ROM: Dissertation Abstracts Ondisc, updated bi-annually, 1861-.

Online Vendors: BRS, OCLC EPIC, STN, DIALOG, 1861-. The online and CD-ROM versions cover both doctoral and master theses.

Dissertation Abstracts Ondisc see *Dissertation Abstracts International*.

Ei Concise Engineering and Technology Index see *Engineering Index Monthly*.

Ei EE Disc see *Engineering Index Monthly*.

Ei Page One see *Engineering Index Monthly*.

* *Electrical and Electronic Abstracts*. London: Institution of Electrical Engineers, monthly, 1898-.

Represents: Science Abstracts. Section B. Provides a comprehensive and world-wide coverage of the literature of electrical engineering. Covers all forms of literature except patents. Arranged by subject topics, it contains specific parts for integrated circuits, semiconductor devices, and other related areas.

CD-ROM: INSPEC ONDISC, updated quarterly, 1983-.

Online Vendors: BRS, DIALOG, ORBIT, STN, 1969-. Both the CD-ROM and online versions include all the Science Abstracts Sections A, B, C, and D, with more than 2.5 million citations.

* *Electrical Patents Index (EPI)*. London: Derwent Publications Ltd., weekly, 1963-.

Provides world-wide coverage of patents in electrical engineering as well as integrated circuits. It includes up-to-date information about patent property.

Online Vendors: DIALOG, ORBIT, STN, 1963-. The online version *World Patent Index (WPI)* corresponds to 3 Derwent publications: *Chemical Patents Index*, *General and Mechanical Patents Index*, and *Electrical Patents Index*.

* *Electronics and Communications Abstracts Journal*. Bethesda, MD: Cambridge Scientific Abstracts, bimonthly, 1967-.

This journal covers electronic circuits, electronic physics, electronic systems, electronic devices, communications, and optical engineering with a strong emphasis on U.S. publications.

Online Vendor: STN, ESA-IRS, 1982-. Available on ESA-IRS through two files: ELCOM and CSA Engineering.

* *Engineering Index Monthly*. Hoboken, NJ: Engineering Information, monthly, 1884-.

Indexes more than 4,500 journals, reports, books and conference proceedings covering most fields of engineering including computers, and electrical and electronic engineering. *Engineering Index Annual*, a cumulative edition which contains over 160,000 abstracts yearly.

CD-ROMs: *Compendex Plus*, updated quarterly, 1989-. Corresponds to the paper edition.

Ei Page One, updated bi-monthly, 1991-. It is a current two-year listing of the table of contents from 4,000 journals and conference proceedings. *Ei Concise Engineering and Technology Index*, updated bi-monthly, 1993-. Covers articles published in 425 leading journals and conference proceedings with abstracts. *Ei EE Disc*, updated quarterly, 1989-. It is a specialized portion of *Compendex Plus* covering the last ten years of electrical and electronic engineering.

Online Vendors: Data-Star, DIALOG, OCLC, ORBIT, STN, 1970-. The online file has over 2.8 million citations with abstracts.

* *Government Reports Announcements and Indexes*. Washington, DC: U.S. National Technical Information Services, biweekly, 1975-.

The main source for U.S. government-sponsored research, development, and engineering reports. About 70,000 new reports are added annually. In the field of electronics this index is particularly important for its coverage of materials sciences; solid state physics; electrotechnology; circuits; optoelectronic devices and systems; semiconductor devices; and the applications of integrated circuits.

CD-ROM: *NTIS Bibliographic Database*, updated quarterly, 1983-.

Online Vendors: BRS, DIALOG, ORBIT, STN, 1964-. The online file contains over 1.5 million citations.

IEE/IEEE Publications Ondisc. Ann Arbor, MI: University Microfilms International, quarterly, 1992-.

This is a CD-ROM version including the full text of about 10,000 journals, conference proceedings, and standards published by IEE and IEEE from 1988 onward. It includes an index-disc containing bibliographic records corresponding to the full-text publications.

Index to IEEE Publications. New York: Institute of Electrical and Electronics Engineers, annual, 1971-.

The index to all IEEE publications: journals, transactions, magazines, books, and proceedings. Includes summaries.

INSPEC see *Computer and Control Abstracts*, and *Electrical and Electronics Abstracts*.

International Aerospace Abstracts (IAA) see *Scientific and Technical Aerospace Reports (STAR)*.

Key Abstracts-Electronic Circuits. London: Institution of Electrical Engineers, monthly, 1975-.

This current awareness service covers: power electronics, amplifiers, signal generators, modulators, pulse circuits, digital electronics, and filters.

Key Abstracts-Microelectronics & Printed Circuits. London: Institution of Electrical Engineers, monthly, 1988-.

A current awareness service with extensive coverage of microelectronics and printed circuits.

Key Abstracts-Semiconductor Devices. London: Institution of Electrical Engineers, monthly, 1975-.

A current awareness service covering semiconductor devices and device technology and semiconductor integrated circuits.

Materials Science and Engineering Abstracts. Bethesda, MD: Cambridge Scientific Abstracts, monthly, 1993-.

Jointly published with Engineering Information. It provides information on mechanical and physical properties of materials and their applications. It includes, among others, ceramics, composites, metals, electrical and magnetics materials, and electronic materials.

NTIS Bibliographic Database see *Government Reports Announcements and Indexes*.

* *Science Citation Index*. Philadelphia: Institute for Scientific Information, bimonthly with annual accumulations, 1961-.

Provides international coverage of about 4,500 journals in all areas of science, medicine, and engineering. It covers the core journals for integrated circuits. The Citation Index is a good tool to determine how an author or article has been cited.

CD-ROM: *Science Citation Index Compact Disc Edition*, updated quarterly, 1992-.

Online Vendors: Data-Star, DIALOG, 1974-.
Science Citation Index Compact Disc Edition see *Science Citation Index*.

*** *Scientific and Technical Aerospace Reports (STAR).***
Washington, DC: U.S. National Aeronautics and Space Administration, semimonthly, 1963- .

The major indexing service for technical reports in aerospace. It indexes NASA publications related to NASA contractors and agencies. It is complemented by IAA (*International Aerospace Abstracts*), which covers the periodical part of the literature. In the field of electronics this database is particularly important because of its coverage of aircraft communication and navigation; space and spacecraft communications; communications and radar; electronics and electrical engineering; solid state physics; and the applications of integrated circuits in this field.

Online Vendors: DIALOG, NASA/RECON, 1962- . The DIALOG online version, Aerospace Database, covers both STAR and IAA. It contains more than 1.8 million citations.

*** *Solid State and Superconductivity Abstracts.***
Bethesda, MD: Cambridge Scientific Abstracts, bimonthly, 1957- .

Covers all aspects of theory, production, and application of solid state materials and devices and superconductivity. Integrated circuits and semiconductor devices are included.

Online Vendor: BRS/Colleague, STN, 1981- . The database contains more than 120,000 citations.

World Meetings: United States and Canada. Newton Centre, MA: Technical Meeting Information Service, quarterly, 1963- .

Provides a brief description about future medical, scientific, and technical meetings. Meetings might be announced 2 years in advance. There is also a similar publication for outside U.S. and Canada.

World Patent Index (WPI) see Electrical Patents Index (EPI)

ENCYCLOPEDIAS

Encyclopedic works dealing with integrated circuits are included in this section. Other works listed here have substantial coverage of topics related to ICs. Encyclopedias are usually written by authorities in the field; topics are presented in a clear style to make it comprehensible to those who are unfamiliar with a specific technology.

Bever, Michael B., ed. *Encyclopedia of Materials Science and Engineering*. 8 vols, and suppl. Cambridge, MA: MIT Press, 1986- .

A collection of topical articles written by distinguished scientists and engineers. Includes extensive bibliographies, tables, and graphics.

Buchsbaum, Walter H. *Encyclopedia of Integrated Circuits: A Practical Handbook of Essential Reference Data*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1987.

Essential data pertaining to analog, consumer, digital, and interface ICs are included. Each functional description of a part includes a representative part number from different manufacturers. Each entry also has a brief description, a diagram, and an explanation of key parameters.

Graf, Rudolf F. *The Encyclopedia of Electronic Circuits*. Rev. ed. Blue Ridge Summit, PA: Tab Books, 1988- . 5 vols.

Basic coverage of electronic circuits; the chapters dealing with ICs, semiconductor devices, VLSI, and other related topics provide students with practical applications.

Gibilisco, Stan. *International Encyclopedia of Integrated Circuits*. 2nd ed. Blue Ridge Summit, PA: TAB Books, 1992.

Contains information on integrated circuits according to their applications: clocks, counters, and timers; communications; data-conversion and processing; logic circuits; micro-computer peripherals; power supplies; and test equipment. The book is intended as an overview of the types of devices available.

Hoffmann, Reinmut K.; translated by Geoffrey A. Ediss and Nigel Keen; English translation edited by Harlan H. Howe Jr. *Handbook of Microwave Integrated Circuits. (Integrierte Mikrowellenschaltungen. English)*. Norwood, MA: Artech House, 1987.

This book provides complete coverage of the basic principles of microwave integrated circuits.

Holdsworth, Brian, and Graham R. Martin, eds. *Digital Systems Reference Book*. Boston: Butterworth-Heinemann, 1993.

Includes chapters on "Fundamentals"; "Devices for Digital Systems"; "System Design and Techniques"; "System Development"; and "Applications." Each chapter is divided into sections which are written by experts in the field.

Lenk, John D. *McGraw-Hill Circuit Encyclopedia and Troubleshooting Guide*. New York: McGraw-Hill, 1993, Vol. 1- .

Circuits are grouped by functions, with each group having a practical guide for testing and troubleshooting. The encyclopedia, when concluded, will include the most commonly used circuits in all phases of electronics.

DICTIONARIES

In a field of rapid development such as integrated circuits, dictionaries are very good sources of information. The titles listed in this section reflect the many changes in terminology in this area. Some are very specialized lists of terms, while others are more general in their scope but include definitions related to integrated circuits and their applications.

Booth, Christopher J., and Gediminas P. Kurpis, eds. *The New IEEE Standard Dictionary of Electrical and Electronic Terms*. 5th ed. New York: Institute of Electrical and Electronics Engineers, 1993.

Contains the official standard definitions used by IEEE for over 30,000 terms. Includes drawings, diagrams, and acronyms.

Douglas-Young, John. *Illustrated Encyclopedic Dictionary of Electronics*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1987.

Covers up-to-date information for the generalist and specialist and combines ready-reference data with essential in-depth information. Covers all major areas of electronics. Includes illustrations.

Harper, Charles A., and Martin B. Miller. *Electronic Packaging, Microelectronics, and Interconnection Dictionary*. New York: McGraw-Hill, 1993.

A compilation of technical terminology as used in industry. It is written with the input of four major groups: JEDEC, EIA, IPC, and ISHM. Includes an appendix for acronyms, symbols, and abbreviations.

Loveday, George. *Microprocessor Sourcebook for Engineers*. London: Pitman; New York: Wiley, 1986.

This book, arranged in a dictionary format (A-Z), contains in a concise manner critical reference information about microprocessors. It is especially useful in the service and testing areas of microelectronics.

HANDBOOKS AND TABLES

The titles included in this very selective list are mainly specialized sources in integrated circuits. Some other, more basic types of reference works are listed as well, keeping in mind that the basic foundations of electrical engineering are essential for working in ICs. These types of works usually include numerical data, definitions, formulations, testing procedures, and descriptions of designs, processes, materials, and equipment.

Beadle, W.E., J.C.C. Tsai, and R.D. Plummer, eds. *Quick Reference Manual for Silicon Integrated Circuit Technology*. New York: Wiley, 1985.

A collection of difficult-to-locate data, charts, formulas, and graphs useful for design engineers.

Burr-Brown Corp. *Integrated Circuits Data Book*. Tucson, AZ.: Burr-Brown Corp., 1986.

Includes a large number of ICs with critical data for design and testing.

Coombs, Clyde F., ed. *Printed Circuits Handbook*. 3rd ed. New York: McGraw-Hill, 1988.

Covers all aspects of printed wiring technology, including design, manufacturing, test, and repair of wiring boards and assemblies.

Cowan, Sam. *Handbook of Digital Logic with Practical Applications*. New York: Prentice-Hall, 1985.

Topics covered range from Boolean algebra and logic circuits to microprocessors and memory chips. It includes step-by-step functioning details for microprocessors, rapid conversion between numbers systems, and Karnaugh maps.

Cypress Semiconductor. *CMOS BiCMOS Data Book*. San Jose, CA: Cypress Semiconductor, 1989.

Contains valuable detailed information on metal oxide semiconductors, logic circuits, and integrated circuits.

Di Giacomo, Joseph., ed. *VLSI Handbook: Silicon, Gallium Arsenide, and Superconductor Circuits*. New York: McGraw-Hill, 1989.

Contains concise critical facts about VLSI microelectronics. It provides information about fabrication and systems applications with data on performances.

Gilleo, Ken, ed. *Handbook of Flexible Circuits*. New York: Van Nostrand Reinhold, 1992.

An encyclopedic description of flexible circuits with an emphasis in providing a good understanding of this technology.

Fink, Donald G., and Donald Chistiansen, eds. *Electronics Engineers' Handbook*. 3rd ed. New York: McGraw-Hill, 1989.

A comprehensive review of electronic engineering for quick reference facts and a general coverage of the subject. Written by more than 170 experts, it explains the latest designs used by the industry.

Glendinning, William B., and John N. Helbert, eds. *Handbook of VLSI Microlithography: Principles, Technology, and Applications*. Park Ridge, NJ: Noyes Publications, 1991.

This book has extensive and practical coverage of microlithography including the technical aspects of wafer production, coating, imaging, processing, treatment, etching, and doping.

Helms, Harry L. *Handbook of Practical I.C. Circuits*. Englewood Cliffs, NJ: Prentice-Hall, 1987.

This handbook contains a collection of IC "recipes" for working on and debugging circuits that are ready to use. Ideal for getting some practical design experience using popular ICs.

Hicks, Tyler G., and S. Davis Hicks, eds. *Standard Handbook of Engineering Calculations*. 3rd ed. New York: McGraw-Hill, 1994.

Covers all major areas of engineering; presents calculating procedures most often used by engineers.

Intel Corporation. *Components Quality/Reliability Handbook*. Santa Clara, CA: Intel Corporation, 1991.

Covers semiconductor wafers in great detail.

Intel Corporation. *Microcommunications Handbook*. Santa Clara, CA: Intel Corporation, 1989.

Covers telecommunication equipment, electronic filters, and interface circuits.

Jakubowski, Andrzej, W. Marciniak and H.M. Przewlocki. *Diagnostic Measurement in LSI/VLSI Integrated Circuits Production*. Singapore; Teaneck, NJ: World Scientific, 1991.

This book presents techniques used for testing in the design and construction of ICs.

Kaufman, Milton, and Arthur H. Seidman, eds. *Handbook of Electronics Calculations for Engineers and Technicians*. 2nd ed. New York: McGraw-Hill, 1988.

Contains a large number of worked-out problems, avoiding pure theoretical questions and concentrating, instead, on practical solutions.

Lacy, Edward A. *Complete Guide to Understanding Electronics Diagrams*. Englewood Cliffs, NJ: Prentice-Hall, 1989.

Written with the contribution of several major electronic companies, this book presents an extensive number of diagrams in use today.

Ledermann, Walter, ed. *Handbook of Applicable Mathematics*. Chichester; New York: Wiley, 1980-1991.

A six-volume series with a supplement and an index written for professionals in need of solid mathematical background. The books are written with the purpose of explaining key mathematical concepts to a "mature" audience.

Lenk, John D. *Handbook of Digital Electronics*. Englewood Cliffs, NJ: Prentice-Hall, 1981.

A basic treatment of digital circuits for engineers and students. It provides a simplified system of tests and troubleshooting.

Matisoff, Bernard S. *Handbook of Electronic Packaging Design and Engineering*. 2nd ed. New York: Van Nostrand Reinhold, 1990.

This book is intended for students and engineers working on packaging; it is an up-to-date presentation of the subject. It covers all the aspects of packaging electronic products: physical, environmental, repair and maintenance, manufacturing, appearance, and costs.

Mazda, F.F., ed. *Electronics Engineer's Reference Book*. 6th ed. London; Boston: Butterworths, 1989.

This book, done in cooperation with the UK electronic industry and educational institutions, includes a chapter on "Electronic Design and Instrumentation." It also has a chapter on applications which covers communications, fiber-optics, networks, computers, among other topics.

Meiksin, Z.H., and Philip C. Thackray. *Electronic Design with Off-the-Shelf Integrated Circuits*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1987.

A step-by-step guide for designing electronic systems with off-the-shelf ICs.

Money, Steve A. *Microprocessor Data Book*. 2nd ed. San Diego: Academic Press, 1990.

For the designer of electronic systems this book provides a ready account of available microprocessor devices. It includes a glossary and a list of manufacturers.

Moss, T.S., ed. *Handbook on Semiconductors*. Rev. and enl. ed. Amsterdam; New York: North-Holland Pub. Co., 1992-<1993>.

A four-volume set covering: band theory and transport properties; optical properties of solids; materials, properties, and preparations; and device physics. Valuable for people working in semiconductor physics or device development.

Motorola Semiconductor Products, Technical Information Center. *Motorola CMOS/NMOS Special Functions Data*. Phoenix, AZ: Motorola Inc., 1988.

A collection of important data on special logical functions.

Needham, Wayne Maurice. *Designer's Guide to Testable ASIC Devices*. New York: Van Nostrand Reinhold, 1991.

This is a guide for first-time ASIC (applications-specific integrated circuits) designers; it covers logic circuits and is intended for ASIC users interested in implementing testability techniques.

Purdue University, Center for Information and Numerical Data Analysis and Synthesis. *Materials Properties Numerical Data Synthesis, Purdue University, Center for Information and Numerical Data Analysis and Synthesis (CINDAS)*. West Lafayette, IN.

Provides evaluated data to generate reliable values for thermophysical, mechanical, and electronic properties of materials. Available online from CINDAS.

Seidman, Arthur H., ed. *Integrated Circuits Applications Handbook*. New York: Wiley, 1983.

Divided into 20 chapters, each written by an expert in the field, this handbook offers a practical orientation to integrated circuits at an elementary mathematical level.

Turino, Jon L. *Design to Test: A Definitive Guide for Electronic Design, Manufacture, and Service*. 2nd ed. New York: Van Nostrand Reinhold, 1990.

Provides a foundation for the problem of designing for testing. It covers access for control and observability, test methodology, fault grading, test techniques and methods of implementations. Includes many practical examples.

Williams, Arthur B., ed. *Designer's Handbook of Integrated Circuits*. New York: McGraw-Hill, 1984.

Includes an extensive selection of ICs grouped according to applications; circuits are evaluated on a comparative basis. Each chapter is written by an expert.

Zorich, Robert. *Handbook of Quality Integrated Circuit Manufacturing*. San Diego: Academic Press, 1991.

Its emphasis is on manufacturing operations; it focuses on defect analysis and elimination, equipment downtime, yield enhancement, inventory management, and statistical process control.

DIRECTORIES: PRODUCT INFORMATION, TRADE CATALOGS

Product information and trade catalogs are essential when working with the design, testing, and production of integrated circuits. The main purpose of this material is to provide factual information about specific products, usually including important data for testing. In most cases the title is a good description of the item. For that reason, no attempt was made to describe each one of the titles listed, with the exception of major databases. This is also a representative list, since a large number of products are available on the market.

Advanced Micro Devices. *Memory Products Data Book*. Sunnyvale, CA: Advanced Micro Devices, 1989.

Burr-Brown Corp. *Integrated Circuits Data Book*. Tucson, AZ: Burr-Brown Corp., 1986.

Dallas Semiconductor Corporation. *Dallas Semiconductor 1990-91 Product Data Book*. Dallas, TX: Dallas Semiconductor Corp., distributed by Hall-Mark Electronics Corp., 1990.

D.A.T.A. Business Publishing. *Integrated Circuits. Digital*. San Diego, CA: D.A.T.A. Business Publishing, 1976-. Formerly: *Digital Integrated Circuits*. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Integrated Circuits. Linear*. San Diego, CA: D.A.T.A. Business Publishing, 1968-. Formerly: *Linear Integrated Circuits*. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Interface Integrated Circuits: D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1977-. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Microprocessor Integrated Circuits: D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1981-. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Memory Integrated Circuits: D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1968-. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Integrated Circuits: Alternate Sources and Replacements. D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1990-.

Continues: *Integrated Circuits: Alternate Sources*. Also available on CD-ROM.

D.A.T.A. Business Publishing. *Optoelectronics: D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1971-. Also available on CD-ROM.

D.A.T.A. Business Publishing. *International Semiconductor Directory, and Discrete Semiconductors: D.A.T.A. Digest*. San Diego, CA: D.A.T.A. Business Publishing, 1979-. Also available on CD-ROM.

Dummer, G.W.A., and J.M. Robertson, eds. *German Microelectronics Data. 1968/69-*. New York: Pergamon Press, 1969-.

General Semiconductor Industries, Inc. *Data Book, 1993*. Tempe, AZ: General Semiconductor Industries, 1993.

Helms, Harry. ed. *Linear IC Devices, Source Book. 1987-*. Englewood Cliffs, NJ: Prentice-Hall, 1987-.

Information Handling Services. *Vendor Catalogs*. Englewood, CO: IHS CD-ROM Information Service, Information Handling Services.

This is the largest collection of industrial catalogs in the world. It includes over 17,000 worldwide vendors and their catalogs, with more than 2.5 million pages of information. Industrial catalogs from electrical/electronic components, engineering testing equipment, and communications equipment are included.

Information Handling Services. *Electronic Components Data: IC/Discrete Parameter Database*. Englewood, CO: IHS CD-ROM Information Service, Information Handling Services.

This database includes parametric data and complete datasheets on commercial/ military integrated circuits and semiconductors. Over 1.4 million devices (commercial and military integrated circuits and semiconductors) plus thousands of vendor datasheets are included.

Intel Corporation. *Microcommunications*. Mt. Prospect, IL: Intel, 1992.

Intersil, Inc. *Component Data Catalog*. Cupertino, CA: Intersil, 1986.

Maxim Integrated Products. *Maxim 1989 Integrated Circuits Data Book*. Sunnyvale, CA: Maxim Integrated Products, 1988.

Motorola, Inc. *Motorola Linear and Interface Integrated Circuits*. Phoenix, AZ: Motorola, 1990.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola CMOS Application-Specific Standard and Linear Integrated Circuits*. Austin, TX: Motorola, 1991.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola MECL Integrated Circuits*. Rev 5. Phoenix, AZ: Motorola, 1993.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola Linear and Interface Integrated Circuits*. Phoenix, AZ: Motorola, 1990.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola High-Speed CMOS Logic Data*. Rev 4. Phoenix, AZ: Motorola, 1989.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola Military ALS/FAST/LS/TTL Data*. 1st ed. Austin, TX: Motorola, 1989.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola Master Cross Reference Guide: Numeric-Alpha Listing*. 5th ed. Austin, TX: Motorola, 1986.

Motorola Semiconductor Products Inc., Technical Information Center. *Optoelectronics Device Data*. Phoenix, AZ: Motorola, 1989.

Motorola Semiconductor Products Inc., Technical Information Center. *Linear and Interface Integrated Circuits*. Phoenix, AZ: Motorola, 1989.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola High-Speed CMOS Integrated Circuits*. Austin, TX: Motorola, 1983.

Motorola Semiconductor Products Inc., Technical Information Center. *Motorola Master Selection Guide*. Rev 5. Phoenix, AZ: Motorola, 1992.

National Semiconductor Corporation. *LS/S/TTL Logic Databook*. Santa Clara, CA: National Semiconductor Corp., 1988.

National Semiconductor Corporation. *Interface Databook*. Santa Clara, CA: National Semiconductor Corp., 1988.

National Semiconductor Corporation. *Linear Databook*. Santa Clara, CA: National Semiconductor Corp., 1978- .

National Semiconductor Corporation. *Linear Applications Databook*. Santa Clara, CA: National Semiconductor Corp., 1986.

National Semiconductor Corporation. *Data Acquisition Linear Devices Databook*. Santa Clara, CA: National Semiconductor Corp., 1989.

National Semiconductor Corporation. *Semiconductor Master Selection Guide*. Santa Clara, CA: National Semiconductor Corp., 1990.

RCA Corporation, Solid State Division. *RCA Integrated Circuits for Linear Applications*. Somerville, NJ: RCA Solid State, 1986.

RCA Corporation, Solid State Division. *RCA High-Speed CMOS Logic Integrated Circuits*. Somerville, NJ: RCA Solid State, 1986.

RCA Corporation, Solid State Division. *COS/MOS Digital Integrated Circuits*. Somerville, NJ: RCA Solid State, 1977- .

RCA Corporation, Solid State Division. *RCA Integrated Circuits for Linear Applications*. Somerville, NJ: RCA Solid State, 1986.

Texas Instruments Incorporated. *The Integrated Circuits Catalog for Design Engineers*. 1st ed. Dallas: Texas Instruments, 1971- .

Texas Instruments Incorporated, Semiconductor Group. *The Semiconductor Memory Data Book for Design Engineers*. 1st ed. Dallas: Texas Instruments, 1975- .

Texas Instruments Incorporated, Semiconductor Group. *The Interface Circuits Data Book for Design Engineers*. 2nd ed. Dallas: Texas Instruments, 1981. Suppl. 1986.

Texas Instruments Incorporated, Semiconductor Group. *Linear Circuits Data Book*. Dallas: Texas Instruments, 1984- .

Texas Instruments Incorporated. *Master Selection Guide. 1990: Catalog of Semiconductor Products and Services*. Dallas: Texas Instruments, 1990.

Texas Instruments Incorporated. *LSI Logic Data Book*. Dallas: Texas Instruments, 1986.

Texas Instruments Incorporated. *Interface Circuits Data Book*. Dallas: Texas Instruments, 1987.

Texas Instruments Incorporated. *Advanced CMOS Logic Designer's Handbook*. Dallas: Texas Instruments, 1987.

Texas Instruments Incorporated. *The TTL Logic Data Book*. Dallas: Texas Instruments, 1988.

STANDARDS AND SPECIFICATIONS

Engineering standards are rules for the uniformity, size, quality, performance, shape, definition, and testing of manufactured products. Standards and specifications for electronic circuiting and semiconductor devices are fundamental pieces of information in the manufacturing process. The sources listed in this section are some of the most basic that can be used when searching for information about specific specifications, organizations responsible for engineering standards, or for something like a particular device, measurement, or testing procedure.

American National Standards Institute. *Catalog of American National Standards*. New York: American National Standards, 1977- .

This is an annual listing by subject of standards approved by ANSI.

Information Handling Services. *Industry/National/International Standards: Worldwide Standard Service*. Englewood, CO: IHS CD-ROM Information Service, Information Handling Services, 1993- .

This CD-ROM product contains a complete collection of the full text of current documents from 76 organizations, including EIA, IPC, ASTM, SAE, IEEE, ANSI, UL, and IPC. A comprehensive index provides access to bibliographic data for 137,000 documents from 400 organizations.

Information Handling Services. *Index and Directory of Industry Standards*. Englewood, CO: Information Handling Services; Santa Ana, CA: Distributed by Global Engineering Documents, 1983- .

The 1993 edition is a five-volume set containing listings of U.S. and international standards. It covers all the major organizations involved in standardization for the electronic industry such as: IEEE, EIA, RAC, A2LA, SEMI, ANSI, IPC, AIA/NAS, NFP(A), ISHM, UL, SAE, ASTM, ASAE, and NEMA. Formerly: *Index and Directory of U.S. Industry Standards*.

Information Handling Services. *Military Specifications and Standards Service: Locator Index*. Englewood, CO: Information Handling Services, 1990- .

A list of military specifications and standards usable for companies doing business with federal contractors.

International Electrotechnical Commission. *Catalogue of Publications: World Standards for Electrical and Electronic Engineering*. Geneva, Switzerland: International Electrotechnical Commission, 1984- .

Provides information about electrical and electronic standards approved by IEC.

Nathan, Vasantha, ed. *Directory of Engineering Document Sources: A Consolidated Cross-Index of Document Initialisms Assigned by Government & Industry Organizations to Technical/Management Specifications, Standards, Reports, and Related Publications*. 4th ed. Clayton, MO: Global Engineering Documents, 1989.

Includes a comprehensive index to documents available from Global Engineering Documents. It includes engineering standards and specifications.

National Standard Association. *Standards & Specifications*. Bethesda, MD: National Standard Association, updated monthly. Online Vendor: Dialog, 1950- .

United States. Dept. of Defense. *Index of Specifications and Standards*. Washington D.C.: Department of Defense, distributed by Supt. of Docs., U.S. G.P.O., 1960- .

MAJOR PERIODICALS

The following is a list of periodicals with a strong coverage of the literature of integrated circuits. This is a selected list taken from the most often cited journals in integrated circuits sections of the *Electrical and Electronics Abstracts* published by the Institution of Electrical Engineering. Most of these titles are published in English; representative titles published from across the world are included. Periodicals are very important to engineers because they publish results of current research and development and provide current trends as well. Therefore, the journal is one of the most frequently used forms of literature for engineers.

Advanced Packaging. Libertyville, IL: IHS Publishing, quarterly, 1984-. Formerly: *Hybrid Circuit Technology*.

EDN Magazine (Electronics Design News). Newton, MA: Cahners Publishing Co., 26/year, 1956-. Online vendors: DIALOG, Mead Data, Data-Star, DataTimes and Westlaw.

Electronic Design. Cleveland, OH: Penton Publishing Inc., 26/year, 1952-. Online vendors: DIALOG, Mead Data Central, Data-Star, DataTimes, Dow Jones, and Westlaw.

Electronic Packaging and Production. Newton, MA: Cahners Publishing Co., monthly, 1961-.

Electronic Product Design. Kent, UK: IML Techpress, monthly, 1980-.

Electronics Letters. London, UK: Institution of Electrical Engineers, 25/year, 1965-. Online vendor: OCLC.

Elektronik. Munich, Germany: Franzis-Verlag GmbH, 26/year, 1954-.

EI. (Elektronik Industrie). Heidelberg, Germany: Dr. Huthig Verlag, monthly, 1969-.

Elektronik Praxis. Wurzburg, Germany: Vogel-Verlag KG, bi-monthly, 1966-.

Elektronika. Warsaw, Poland: Al. Swierczewskiego, monthly, 1960-.

Elektronica Oggi. Milan, Italy: Gruppo Editoriale Jackson, monthly, 1968-.

Fuji Electric Review. Tokyo, Japan: Fuji Electric Co., semi-annually, 1955-.

Hybrid Circuits: Journal of the International Society for Hybrid Microelectronics-UK. Ayr, UK: Wela Publications Ltd., 3/year, 1982-.

IEE Proceedings G (Circuits, Devices and Systems). Stevenage, Herts, UK: Institution of Electrical Engineers, bi-monthly, 1980-. Formerly *IEE Proceedings G: Electronic Circuits and Systems*.

IEEE Electron Device Letters. New York: Institute of Electrical and Electronics Engineers, monthly, 1980-. Formerly: *Electron Device Letters*.

IEEE Journal of Solid-State Circuits. New York: Institute of Electrical and Electronics Engineers, monthly, 1966-.

IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications. New York: Institute of Electrical and Electronics Engineers, monthly, 1992-. Supersedes in part: *IEEE Transactions on Circuits and Systems* (1973).

IEEE Transactions on Components, Hybrids and Manufacturing Technology. New York: Institute of Electrical and Electronics Engineers, quarterly, 1978-.

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems. New York: Institute of Electrical and Electronics Engineers, monthly, 1982-.

IEEE Transactions on Computers. New York: Institute of Electrical and Electronics Engineers, monthly, 1952-.

IEEE Transactions on Electron Devices. New York: Institute of Electrical and Electronics Engineers, bi-monthly, 1952-.

IEEE Transactions on Neural Networks. New York: Institute of Electrical and Electronics Engineers, bi-monthly, 1990-.

IEEE Transactions on Nuclear Science. New York: Institute of Electrical and Electronics Engineers, bi-monthly, 1954- .

IEEE Transactions on Semiconductor Manufacturing. New York: Institute of Electrical and Electronics Engineers, quarterly, 1988-.

IEICE Transactions on Electronics. Tokyo, Japan: Institute of Electronics, Information and Communication Engineers, monthly, 1962- .

IETE Technical Review. New Delhi: India: Institution of Electronics and Telecommunication Engineers, bi-monthly, 1984- .

Integration, The VLSI Journal. Amsterdam, Netherlands: North Holland, bi-monthly, 1983- .

International Journal of Computer Aided VLSI Design. Norwood, NJ: Ablex Publishing Corp., quarterly, 1989-1990.

JEE (Journal of Electronic Engineering). Tokyo, Japan: Dempa Publications Inc., monthly, 1964- . Formerly: *Japan Electronic Engineering*.

Journal of the Electrochemical Society. Manchester, NH: Electrochemical Society, monthly, 1902- .

Journal of the Institute of Electronics, Information and Communication Engineers. Tokyo, Japan: Institute of Electronics, Information and Communication Engineers, monthly, 1917- . Formerly: *Journal of the Institute of Electronics and Communication Engineers of Japan*.

Journal of the Institution of Electronics and Telecommunication Engineers. New Delhi, India: Institution of Electronics and Telecommunication Engineers, bi-monthly, 1955- .

Journal of the Japan Society of Precision Engineering. Tokyo, Japan: Japan Society for Precision Engineering, monthly, 1933- .

Journal of the Korean Institute of Telematics and Electronics. Seoul, South Korea: Institute of Telematics and Electronics, bi-monthly, 1964- .

Journal of Vacuum Science and Technology B (Microelectronics Processing and Phenomena). New York: Published for the American Vacuum Society by the American Institute of Physics, bi-monthly, 1983- . Supersedes in part: *Journal of Vacuum Science and Technology*.

Microcontamination. Santa Monica, CA: Canon Communications Inc., monthly, 1983- .

Microelectronic Engineering; an Interdisciplinary Journal of Semiconductor Manufacturing Technology. Amsterdam, Netherlands: North Holland, 16/year, 1983- .

Microelectronics Journal. Oxford, UK: Elsevier Advanced Technology, 8/year, 1967- . Incorporates: *Journal of Semi-Custom ICs* (1983-1991) and *Semi-Custom IC Yearbook* (1983-1991).

Microelectronics and Reliability. Oxford, UK: Pergamon Press, 15/year, 1962- .

Mitsubishi Denki Giho. Tokyo, Japan: Mitsubishi Electric Corp., monthly, 1926- . Formerly: *Mitsubishi Denki Technical Review*.

NEC Technical Journal. Tokyo, Japan: Nippon Electric Co. Ltd., monthly, 1947- .

Revista Espanola de Electronica. Barcelona, Spain: Ediciones Tecnicas Rede S.A., monthly, 1954- .

Semiconductor International. Des Plaines, IL: Cahners Publishing Co., monthly, 1978- .

Slaboproudy Obzor/Electronics and Telecommunications Review.

Prague, Czechoslovakia: Nakladatelstvi Technicke Literatury, monthly, 1933- .

Solid-State Electronics. Oxford, UK: Pergamon Press, monthly, 1960- .

Solid State Technology. Tulsa, OK: PennWell Publishing Co., monthly, 1958- . Online vendors: Data-Star, DIALOG, and Westlaw.

Surface Mount Technology. Libertyville, IL: Lake Publishing Corp., monthly, 1987- .

Thin Solid Films. Lausanne, Switzerland: Elsevier Sequoia S.A., semi-monthly, 1967- .

Transactions of the Institute of Electronics, Information and Communication Engineers A. Tokyo, Japan: Institute of Electronics, Information and Communication Engineers, monthly, 1989- . Supersedes in part: *IEICE Transactions Part A*.

Transactions of the Institute of Electronics, Information and Communication Engineers C-II. Tokyo, Japan: Institute of Electronics, Information and Communication Engineers, monthly, 1989- . Supersedes in part: *IEICE Transactions, Section C*.

MAJOR PROCEEDINGS

Conference proceedings are the most timely and detailed source of technical information in integrated circuits; often they can be more important than the journal literature. They appear in many different forms, e.g., as special issues of journals, or as books in a series. Often a conference proceeding is an up-to-date review of the state-of-the-art in an area and becomes a textbook or a treatise. The following is a selected list of proceedings of the major conferences that are held regularly with a strong coverage of recent developments in integrated circuits. Publications were selected from the INSPEC database based on the number of citations related to the subject; only titles reviewed in the last three years are listed.

ACM/IEEE Design Automation Conference. Proceedings. New York: IEEE, 1964-. Sponsors: ACM and IEEE.

Advanced Research in VLSI and Parallel Systems: Proceedings. Cambridge, MA: MIT Press, 1992-. Sponsors: Brown University and MIT.

Australian Microelectronics Conference. Proceedings. Edgecliff, NSW, Australia: Institution of Radio and Electronic Engineering, 1982-. Sponsors: Institution of Radio and Electronic Engineering, Australia and The Institution of Engineering, Australia.

Conference Proceedings. CCVLSI. Canadian Conference on Very Large Scale Integration. Ottawa, Ont., Canada: Carleton Univ., 1990-. Sponsors: Carleton University; University of Ottawa; Communications Research Center; and IEEE.

Electrical Overstress/Electrostatic Discharge Symposium Proceedings. Rome, NY: EOS/ESD Assoc., 1979-. Sponsors: EOS/ESD and IEEE.

Electronics Division Colloquium on Design for Testability. London, UK: IEE, 1988-. Sponsor: IEE.

ESSDERC. European Solid State Device Research Conference. Amsterdam, Netherlands: Elsevier Publishing Co., 1971-. Sponsors: Ecole Polytechnique Federale, Lausanne; ASCOM; IBM; and IEEE.

EURO ASIC. Los Alamitos, CA: IEEE Computer Society Press, 1987-. Sponsor: IEEE. (ASIC= Applications-specific integrated circuits)

European Design Automation Conference. Proceedings. Washington, DC: IEEE Computer Society Press, 1990-. Sponsors: IEEE and EDAC.

Extended Abstracts, International Conference on Solid State Devices and Materials. Tokyo, Japan: Business Center for Academic Societies of Japan, 1969-. Sponsors: Japan Society of Applied Physics; Institution of Electronics, Information and Communication Engineering of Japan; and IEEE.

IEEE/CHMT International Electronic Manufacturing Technology Symposium. Proceedings. New York: IEEE, 1986-. Sponsor: IEEE.

IEEE Gallium Arsenide Integrated Circuit Symposium. Technical Digest. New York: IEEE, 1979-. Sponsor: IEEE.

IEEE International Symposium on Circuits and Systems. New York: IEEE, 1968-. Sponsor: IEEE.

IEEE/SEMI Advanced Semiconductor Manufacturing Conference and Workshop. New York: IEEE, 1990-. Sponsors: IEEE and Semiconductor Equipment & Materials International.

IEEE/SEMI International Semiconductor Manufacturing Science Symposium. New York: IEEE, 1989-. Sponsors: IEEE and Semiconductor Equipment & Materials International.

IEEE VLSI Test Symposium. Digest of Papers. New York: IEEE, 1983-. Sponsor: IEEE.

IEPS. Proceedings of the Technical Conference. International Electronics Packaging Conference. Wheaton, IL: International Electronics Packaging Society, 1981-. Sponsor: EPS.

Integrated Circuit Metrology, Inspection and Process Control. Proc. SPIE-Int. Soc. Opt. Eng. Bellingham, WA: The International Society for Optical Engineering, 1987- . Sponsor: SPIE.

International Electron Devices Meeting. Technical Digest. New York: IEEE, 1955- . Sponsor: IEEE.

International Symposium on Advances in Interconnection and Packaging. Proc. SPIE-Int. Soc. Opt. Eng. Bellingham, WA: The International Society for Optical Engineering, 1991- . Sponsor: SPIE.

ISTFA International Symposium for Testing and Failure Analysis. The Failure Analysis Forum for Microelectronics and Advanced Materials. Conference Proceedings. Materials Park, OH: ASM International, 1975- . Sponsor: ASM.

Microelectronics Conference: Enabling Technology. Preprints of Papers. Barton, ACT, Australia: The Institution of Engineering, Australia, 1982- .

Microtech. Proceedings of International Hybrid Microelectronics Society for United Kingdom. Abington, UK: Welding Institute, 1966- .

Midcon Conference Record. Ventura, CA: Electronic Conventions Management, 1977- . Sponsor: IEEE and ERA.

Physical Concepts of Materials for Novel Optoelectronic Device Applications. International Symposium. Proc. SPIE-Int. Soc. Opt. Eng. Bellingham, WA: The International Society for Optical Engineering, 1991- . Sponsor: SPIE.

Proceedings. Electronic Components and Technology Conference. New York: IEEE, 1951- . Sponsors: IEEE and Electronics Industry Association.

Proceedings. Great Lakes Symposium on VLSI. Los Alamitos, CA: IEEE Computer Society Press, 1991- . Sponsor: IEEE.

Proceedings. International Conference on Wafer Scale Integration. Los Alamitos, CA: IEEE Computer Society Press, 1989- . Sponsor: IEEE.

Proceedings. International IEEE VLSI Multilevel Interconnection Conference. New York: IEEE, 1984- . Sponsor: IEEE.

Proceedings. International Test Conference. Los Alamitos, CA: IEEE Computer Society Press, 1970- . Sponsor: IEEE.

Proceedings of the IEEE Custom Integrated Circuits Conference. New York: IEEE, 1979- . Sponsor: IEEE.

SOUTHEASTCON. Proceedings. New York: IEEE, 1963- . Sponsors: IEEE; South Central Belt; Northern Telecom; and AT&T.

Symposium on VLSI Circuits. Digest of Technical Papers. New York: IEEE, 1987- . Sponsors: IEEE; Japan Society of Applied Physics; and The Institution of Electronics, Information and Communication.

Symposium of VLSI Technology. Digest of Papers. New York: IEEE, 1981- . Sponsors: Japan Society of Applied Physics and IEEE Electron Devices Society.

IMPORTANT BOOKS

This section includes a very selective list of textbooks and treatises representative of a large body of literature on integrated circuits. This list covers research-oriented and theoretical treatments, as well as more practical types of books used by undergraduate students. Further works can be found in libraries' catalogs under specific authors, titles, or subject headings.

Barna, Arpad, and Dan I. Porat. *Integrated Circuits in Digital Electronics*. 2nd ed. New York: Wiley, 1987.

The book provides a link between elementary theory and practical applications.

Chirlian, Paul M. *Analysis and Design of Integrated Electronic Circuits*. 2nd ed. New York: Harper & Row, 1987.

Covers core material for junior and senior level students with an emphasis on integrated circuits applications. Includes numerical examples.

Dewilde, Patrick, and Zhen-Qiu Ning. *Models for Large Integrated Circuits*. Boston: Kluwer Academic Publishers, 1990.

This book deals with global modeling of large integrated circuits. It covers important physical effects of such circuits, as well as fundamental modeling solutions.

Ferry, David K., Lex A. Akers, and Edwin W. Greeneich. *Ultra Large Scale Integrated Microelectronics*. Englewood Cliffs, NJ: Prentice-Hall, 1988.

Research coverage of modeling of devices and circuit topology for ULSI. The areas studied are: Si MOS, Si bipolar, and GaAs field-effect transistors. It also covers ULSI design limitations such as: packing density, device interactions, and thermo and quantum limits.

McEvoy, K., and J.V. Tucker, eds. *Theoretical Foundations of VLSI Design*. Cambridge, England; New York: Cambridge University Press, 1990.

This is a collection of papers concerned with hardware design and with a strong orientation in computer science.

Muller, Richard S., and Theodore I. Kamins. *Device Electronics for Integrated Circuits*. 2nd ed. New York: Wiley, 1986.

A textbook for teaching the subject which emphasizes the concepts that underlie the operation of integrated circuit devices.

Parr, E. Andrew. *The Logic Designer's Handbook: Circuits and Systems*. 2nd ed. Oxford; Boston: Newnes, 1993.

For students and engineers, this book is a good source of data for CMOS and TTL devices. The book uses logic symbols most commonly used in industry.

Reinhard, D.K. *Introduction to Integrated Circuit Engineering*. Boston: Houghton Mifflin, 1987.

Written for seniors or beginning graduate students, the book emphasizes both circuit design and fabrication technology. It also includes lab experiments with basic IC fabrication processes.

Ruska, Walter S. *Microelectronic Processing: An Introduction to the Manufacture of Integrated Circuits*. New York: McGraw-Hill, 1987.

Comprehensive and practical coverage of microelectronic processing, fabrication methods, and fundamentals of processing techniques. Contains sections on equipment and practical details.

Schilling, Donald L., Charles Belove, Tuvia Apelewicz, and Raymond J. Saccordi. *Electronic Circuits, Discrete and Integrated*. 3rd ed. New York: McGraw-Hill, 1989.

Provides an insight into the analysis and design of electronic circuits, both discrete and integrated. It is a text book for junior level students.

Shoji, Masakazu. *CMOS Digital Circuit Technology*. Englewood Cliffs, NJ: Prentice Hall, 1988.

The author presents a detailed, in-depth systemization of properties of CMOS circuits.

Tarui, Y., ed. *VLSI Technology: Fundamentals and Applications*. Berlin, New York: Springer-Verlag, 1986.

The book summarizes the research done by the Japanese VLSI Technical Research Association. The results are based on silicon devices, microfabrication technology, crystal technology, and process, test, and device technologies.

Time-Life Books. *The Chipmakers*. Alexandria, VA: Time-Life Books, 1990.

Presents a historical perspective of the semiconductor industry in America.

Watts, R.K., ed. *Submicron Integrated Circuits*. New York: Wiley, 1989.

A comprehensive treatment about the design and construction of integrated circuits. Intended for engineers, scientists and industrial managers.

MAJOR INTEGRATED CIRCUITS AND MANUFACTURERS

Sometimes the best source of information about integrated circuits is the manufacturer itself. Manufacturers also have highly specialized engineering staffs that can be excellent resources. The following is a partial list of major manufacturers of integrated circuits in the United States. Libraries have comprehensive industrial directories that can provide you with extensive listings of corporate institutions engaged in the design, testing, development, and distribution of integrated circuits and products.

Advanced Micro Devices
901 Thompson Place
Sunnyvale, CA 94086
408-732-2400

American Micro Systems
3800 Homestead Road
Santa Clara, CA 95051
408-246-0330

Analog Devices, Inc.
1 Technology Way
P.O. Box 9106
Norwood, MA 02062
617-329-4700

AT&T Microelectronics
1 Oak Way
Berkeley Heights, NJ 07922
800-372-2447

Dallas Semiconductor
4401 Beltwood Parkway South
Dallas, TX 75244-3292
214-450-0448

Datel, Inc.
11 Cabot Boulevard
Mansfield, MA 02048
508-339-3000

EXAR Corp.
2222 Qume Drive
P.O. Box 49007
San Jose, CA 95161
408-434-6400

Fairchild Semiconductor
10400 Ridgeview Court
Cupertino, CA 95014
408-864-6250

Ferranti Electric, Inc.
E. Bethpage Road
Plainview, NY 11803
516-293-8383

Fujitsu Microelectronics, Inc.
I.C. Division
3545 N. First Street
San Jose, CA 95134
408-922-9000

GEC Plessey Semiconductors
Cheney Manor
Swindon, Wiltshire, SN2 2QW
United Kingdom 0793-518000

General Electric Solid State
Bldg 7, Electronics Park
Syracuse, NY 13221
315-456-0123

Harris Corporation
Harris Microwave Semiconductor
1530 McCarthy Boulevard
Milpitas, CA. 95035
408-433-2222

Harris Corporation
Harris Semiconductor
1301 Woody Burke Road
P.O. Box 883
Melbourne, FL 32901
407-724-3000

Hughes Aircraft Co.
Micro-electronics Prod.
Division
500 Superior Avenue
Newport Beach, CA 92658
714-759-2727

Intel Corp.
3065 Bowers Avenue
Santa Clara, CA 95052
408-987-8080

Intersil, Inc.
2450 Walsh Boulevard
Santa Clara, CA 95051
408-996-5000

ITT Semiconductors
55 Merrimack Street
Lawrence, MA 01873
508-688-1881

Maxim Integrated Products, Inc.
120 San Gabriel Drive
Sunnyvale, CA 94086
408-737-7600

Microwave Semiconductor Corp.
100 School House Road
Somerset, NJ 08873
201-563-6474

Motorola Semiconductor Prod., Inc.
5005 E. McDowell Road
P.O. Box 20912
Phoenix, AZ 85036
602-244-6900

National Semiconductor Corp.
2900 Semiconductor Drive
Santa Clara, CA 95052
408-721-5000

NEC Electronics Inc.
401 Ellis Street
PO Box 7241
Mountain View, CA 94039
510-960-6000

North American Phillips Corp.
Philips Components
Discrete Products Division
2001 West Blue Heron Boulevard
Riviera Beach, FL 33404-9984
407-881-3200

Precision Monolithics
1500 Space Park Drive
Santa Clara, CA 95050
408-245-9211

Raytheon Co.
Semiconductor Division
350 Ellis Street
Mountainview, CA 94049
415-968-9211

RCA Solid State Division
Rt 202
PO Box 591
Somerville, NJ 08876
201-685-6000

Rockwell International Corp.
Digital Communications Division
4311 Jamboree Road
P.O. Box C
Newport Beach, CA 92658
714-833-4700

Signetics Corp.
811 E. Arques Avenue
Sunnyvale, CA 94086
408-991-2000

Silicon General, Inc.
11861 Western Avenue
Garden Grove, CA 92641
714-898-8121

Siliconix, Inc.
2201 Laurelwood Road
Santa Clara, CA 95054
408-246-8000

Solitron Devices, Inc.
3301 Electronics Way
West Palm Beach, FL 33407
407-848-4311

Sprague Electric Co.
Semiconductor Group
Beechwood at Biotech
363 Plantation
Worcester, MA 01605
508-795-1300

Standard Microsystems Corp.
35 Marcus Boulevard
Hauppague, NY 11787
516-273-3100

Teledyne Inc. Teledyne
Components
1300 Terra Bella Avenue
Mountainview, CA 94039
415-968-9241

Texas Instruments, Inc.
13500 N Central Expressway
PO Box 655474
Dallas, TX 75265
214-995-2011

Toshiba America, Inc.
9775 Toledo Way
Irvine, CA 92718
714-455-2000

TRW Inc. TRW Products Inc.
4243 Campus Point Court
PO Box 2472
La Jolla, CA 92038
619-457-1000

Varian Assoc. Inc.
Electron Devices
611 Hansen Way
Palo Alto, CA 94303
415-592-1221

VLSI Technology, Inc.
1109 McKay Drive
San Jose, CA 95131
408-434-3100

Zilog
210 Hacienda Avenue
Campbell, CA 95008-6600
408-370-8000

APPENDIX: SELECTED INFORMATION SERVICES

CARL Systems, Inc.
CARL Systems Network
3801 E. Florida Avenue
Suite 300
Denver, CO 80203
303-758-3030

CD Plus Technology-CDP Online
Formerly: BRS Online
333 7th Avenue
New York, NY 10001
212-563-3006

D.A.T.A. Business Publishing
15 Inverness Way East
P.O. Box 6510
Englewood, CO 80150
303-799-0381

Data-Star
Haymarket House
1 Oxenden Street
London, SW1Y 4EE
ENGLAND
071-839 1427

DataTimes Corporation
Parkway Plaza, Suite 450
1400 Quail Springs Parkway
Oklahoma City, OK 73134
405-751-6400

DIALOG Information Services, Inc.
3460 Hillview Avenue
Palo Alto, CA 94304
415-858-3785

Dow Jones and Company, Inc.
Dow Jones News/Retrieval
P.O. Box 300
Princeton, NJ 08543-0300
609-520-4000

Engineering Information, Inc.
Castle Point on the Hudson
Hoboken, NJ 07030
201-216-8500

European Space Agency (ESA)-
Information Retrieval Service
ESRIN, Via Galileo Galilei
1-00044 Frascati (Rome)
ITALY
06-941801

Information Handling Services (IHS)
15 Inverness Way East
Englewood, CO 80150
303-790-0600

Mead Data Central, Inc.
9443 Springboro Pike
P.O. Box 933
Dayton, OH 45401-0933
513-865-6800

OCLC Online Computer Library Center, Inc.-
OCLC EPIC
6565 Frantz Road
Dublin, OH 43017
614-764-6000
ORBIT
8000 Westpark Drive
McLean, VA 22102
703-442-0900

Purdue University-Center for Information and
Numerical Data
Analysis and Synthesis (CINDAS)
2595 Yeager Road
West Lafayette, IN 47906
317-494-9393

STN International
F1Z Karlsruhe
PO Box 2465
D-76012 Karlsruhe 1
GERMANY
07247-808555

U.S. National Aeronautics and Space Administration
(NASA)-Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934
301-621-0100

University Microfilms
International (UMI)
300 N. Zeeb Road
Ann Arbor, MI 48106
313-761-4700

West Publishing Corp.-WESTLAW
620 Opperman Drive
Eagan, MN 55123
612-687-7000