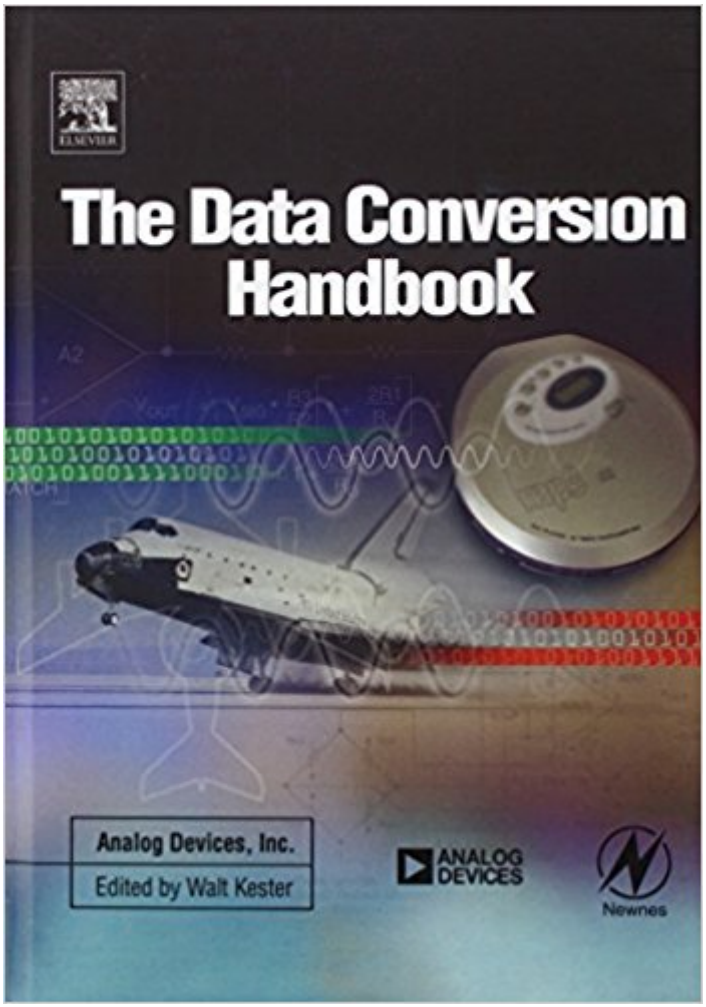
Data Conversion Handbook (Analog Devices)



Synopsis

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

Book Information

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Customer Reviews

"Listed as noteworthy book by Bill Schweber from EDN Magazine" - EDN Feb 2005

The world’s leading experts at Analog Devices bring you a design reference on a par with ’The Art of Electronics’ for data conversion!

If you’re doing circuit and system design involving analog-digital conversion, you need this book. Packed with detailed information from the industry leader in converter chips. Lots of tips and information about typical problems and how to avoid them, including power supply noise, layout considerations, keeping the digital transients out of the analog signal chain (not to mention the inputs of the ADC), etc. A very practical and useful book for mixed-signal design engineers.

Nowadays practically all electronic procceses are digital, but the phenomens in the real world are analog, so the translation between one and other domains are fundamental. This is a great book in all the aspects in ADC/DACs. But it cover more than this, as: amplifiers, filtering, samplig, and PCB design techniques in order to mix analog and digital design.Plenti of pictures, schematics and diagrams, is written in the clear style as Analog Devices is used to do.I think is the best book I never saw in this topic

As an electrical engineer who has been out of school for a few years, I found this book to be tremendously helpful in covering topics I either never really delved into or only took intro courses on. It provided excellent explanations on both data conversion concepts and the hardware used to realize them. I found the handbook’s explanation of device parameter specifications to be incredibly useful, giving the knowledge needed to pick the right part for my job. They also have testing and analysis procedures for different elements and great example circuits. Great book. I definitely recommend it.

Ontime deliveray, as described,highly recommend

At last! A modern book on data conversion worthy to succeed our 1986 landmark Analog-Digital Conversion Handbook (3rd edition). The Data Conversion Handbook is based on the book, Analog-Digital Conversion, a comprehensive set of notes for a recent Analog Devices seminar series on data converters.In a digital world, A/D and D/A conversion is essential to translate between analog real-world physical variables and the abstract 1s and 0s of digital processing. The book’s nine chapter titles offer a hint of its breadth, as well as its orientation to practical designing with and use of converters: Data-converter history; Fundamentals of sampled-data systems; Data-converter architectures; Data-converter process technology; Testing data converters; Interfacing to data converters; Data-converter support circuits; Data-converter applications; and Hardware design techniques.The first chapter, data-converter history, starts with the early 18th-century background in hydraulic water-metering systems in the Ottoman empire, then-when electricity came into use-from the 19th century telegraph era through the 1950s. The chapter then covers progress-decade-by-decade-in technology, circuitry, and applications of converters during the late 20th and early 21st centuries. Where relevant, historical contexts are also noted in some of the later chapters.The second chapter, fundamentals of sampled-data systems, sets the stage for hardware design-discussing coding and quantizing, sampling theory, data-converter ac errors, general data-converter specifications, and definitions of specifications.Chapter 3, data-converter architectures, discusses DAC architectures, ADC architectures, and sigma-delta converters. Although it concentrates on the most popular designs, it seeks not to neglect any significant approach. For example, among DACs it discusses the Kelvin divider (string DACs), thermometer (fully decoded DACs), binary-weighted DACs, R-2R DACs, segmented DACs, oversampling interpolating DACs, multiplying DACs, intentionally nonlinear DACs, counting pulsewidth-modulated (PWM) DACs, cyclic serial DACs, and "other low-distortion architectures"-and naturally, the sigma-delta converter section includes sigma-delta DACs.The fourth chapter covers a wide range of data-converter process technologies, from the early vacuum-tube converters, through solid-state modular and hybrid converters, to bipolar, complementary-bipolar (CB), and CMOS integrated-circuit processes. Also covered are thin-film resistor and calibration processes; and there is a section on smart partitioning: optimizing performance, space, and cost by intelligent choice of process partitioning within a package.Chapter 5 provides in-depth discussions of a wide variety of testing techniques for static and dynamic performance characteristics of DACs and ADCs. The following chapter, interfacing to data converters, has a major section devoted to analog interface considerations in driving ADC inputs. Other sections in this chapter include ADC and DAC digital

interfaces (and related issues), buffering DAC analog outputs, data-converter voltage references, and sampling-clock generation.Chapter 7, data-converter support circuits, discusses in depth such important analog auxiliary circuits as voltage references; low-dropout (LDO) linear regulator circuits; analog-, digital-, and video switches (including cross-point types) and multiplexers; and sample (track)-and-hold circuits.The foregoing chapters, some 60% of the book, amount to a virtual appetizer for the banquet of tutorial material in the last two chapters: data-converter applications (Chapter 8) and hardware design techniques (Chapter 9). These two chapters amount to a practical course on design solutions and techniques that can enrich the portfolio of any designer, from the technician and recent graduate to the hardened systems engineer.The wide-ranging coverage in Chapter 8 is apportioned among eight topics: precision measurement and sensor conditioning, multichannel data-acquisition systems, digital potentiometers, digital audio, digital video and display electronics, software radio and IF sampling, direct digital synthesis, and precision analog microcontrollers.Finally, Chapter 9's 185 pages are in themselves essentially a textbook for the hardware designer. Its eight topical areas are labeled: passive components, pc-board design issues, analog power-supply systems, overvoltage protection, thermal management, EMI/RFI considerations, low-voltage logic interfacing, and breadboarding & prototyping. Chapter 9 is followed by a comprehensive subject index and an indexed listing of Analog Devices products mentioned in the book.This book will be a valuable addition to the library of the student, the practicing circuit design engineer and technician, and anyone else who needs a good practical grasp of what is needed for a successful marriage between the analog and digital worlds.----------[i] Full disclosure: Dan Sheingold also wrote a Foreword for the book (page xvii).

I bought this book after the High Speed Analog seminar given by Analog Devices. Several chapters show modern types of data converters, interfacing to the analog signal sources and to the digital circuitry. It is a must for engineers who want not only to use the data conversion products but also understand what is going on there. I would highly recommend this book also to teachers dealing with this subject as an excellent source of information on state of art data converters presently available on the market.Daniel Valuch, RF engineer, CERN, Geneva, Switzerland.

I found this book to be very thorough and useful for ADC and DAC. I was able to use it as a reference to learn and later explain the details of different types of ADC/DAC systems. I'd recommend having this on your shelf. It's a pretty quick and detailed reference and I think it's the

best money I've spent in the last 5 or so reference books I bought.

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