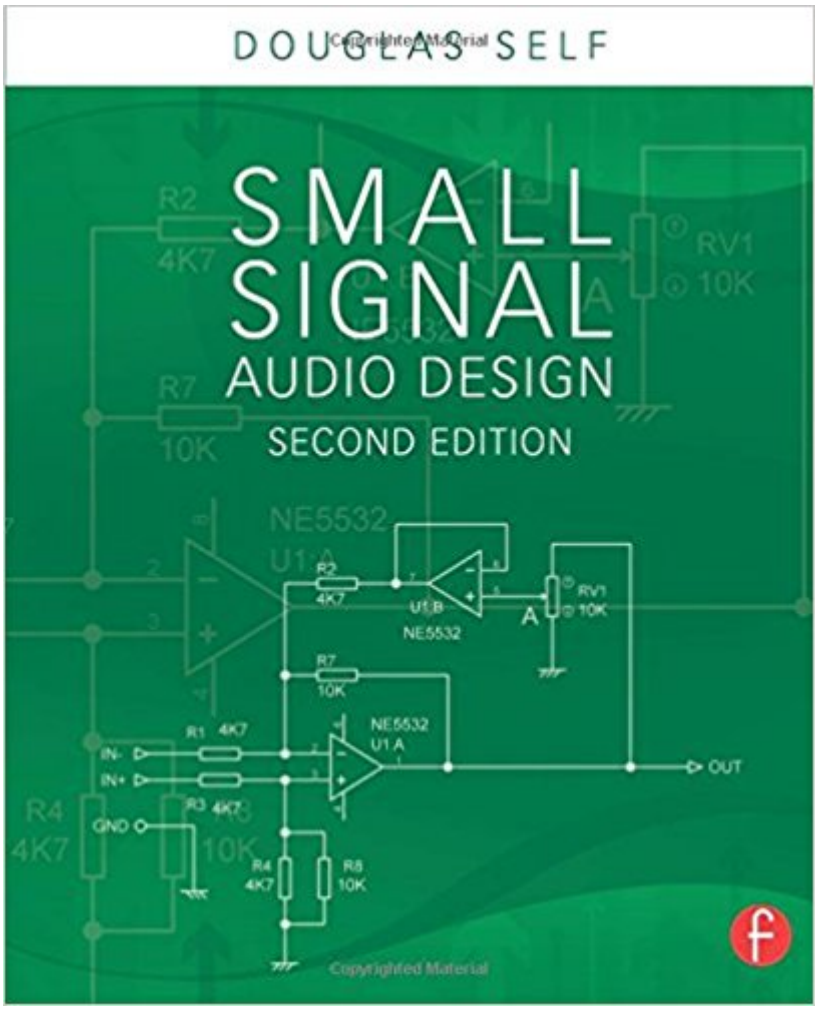
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Small Signal Audio Design



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Synopsis

Learn to use inexpensive and readily available parts to obtain state-of-the-art performance in all the vital parameters of noise, distortion, crosstalk and so on. With ample coverage of preamplifiers and mixers and a new chapter on headphone amplifiers, this practical handbook provides an extensive repertoire of circuits that can be put together to make almost any type of audio system. A resource packed full of valuable information, with virtually every page revealing nuggets of specialized knowledge not found elsewhere. Essential points of theory that bear on practical performance are lucidly and thoroughly explained, with the mathematics kept to a relative minimum. Douglas' background in design for manufacture ensures he keeps a wary eye on the cost of things. Includes a chapter on power-supplies, full of practical ways to keep both the ripple and the cost down, showing how to power everything. Douglas wears his learning lightly, and this book features the engaging prose style familiar to readers of his other books. You will learn why mercury cables are not a good idea, the pitfalls of plating gold on copper, and what quotes from Star Trek have to do with PCB design. Learn how to: make amplifiers with apparently impossibly low noise design discrete circuitry that can handle enormous signals with vanishingly low distortion use humble low-gain transistors to make an amplifier with an input impedance of more than 50 Megohms transform the performance of low-cost-opamps, how to make filters with very low noise and distortion make incredibly accurate volume controls make a huge variety of audio equalisers make magnetic cartridge preamplifiers that have noise so low it is limited by basic physics sum, switch, clip, compress, and route audio signals The second edition is expanded throughout (with added information on new ADCs and DACs, microcontrollers, more coverage of discrete op amp design, and many other topics), and includes a completely new chapter on headphone amplifiers.

Book Information

Paperback: 770 pages
Publisher: Focal Press; 2 edition (August 24, 2014)
Language: English
ISBN-10: 0415709733
ISBN-13: 978-0415709736
Product Dimensions: 7.5 x 1.8 x 9.2 inches
Shipping Weight: 2.8 pounds (View shipping rates and policies)
Average Customer Review: 4.8 out of 5 stars 8 customer reviews
Best Sellers Rank: #216,713 in Books (See Top 100 in Books) #79 inÃ Â Books > Engineering &

Transportation > Engineering > Civil & Environmental > Acoustics #115 inÃ Â Books > Science & Math > Physics > Acoustics & Sound #58981 inÃ Â Books > Textbooks

Customer Reviews

"Self provides solid, well-explained technical information throughout the book, all gained from years of experience and a thorough understanding of the entire topic, and all verified by measurement and practical applications in the field. His book exudes skilful engineering on every page, and I found it a very refreshing, enjoyable, and inspirational read. Self writes in his preface that he dares to hope that he has moved analogue audio design a bit further forward. He certainly has for me, and if you have the slightest interest in audio circuit design this book has to be considered an essential reference. Very highly recommended." - Hugh Robjohns, Sound on Sound Magazine

Douglas Self studied engineering at Cambridge University, then psychoacoustics at Sussex University. He has spent many years working at the top level of design in both the professional audio and hifi industries, and has taken out a number of patents in the field of audio technology. He currently acts as a consultant engineer in the field of audio design.

This is the second edition of Small Signal Design. It’s a fascinating book if you are interested in electronic design in the audio field. Mr. Self has included very through explanations of transistor and op amp circuits related to small signal audio design. He explains how circuits work and which characteristics of circuits are important. He builds many of the circuits to prove out theory and his simulations. He then explains the use of these circuits in various pieces of electronic equipment.This latest edition has a lot more material on design of circuitry that interfaces with for example; phone cartridges. I’m not interested in designing such circuitry, but I still found those sections very interesting and worthwhile, because they added to my overall knowledge of design. This latest edition must be at least 100 pages longer than the first edition, which I also own, and the added pages are very valuable.I use the knowledge I have gained from Mr. Self’s books to better understand audio equipment and to help decide which equipment is well designed. These aren’t easy subjects and a couple of readings of the books are required; but, I’ve found that after reading this book and Mr. Self’s book on power amplifiers, I can often look pictures of circuits boards from various pieces of equipment, or the circuit boards themselves, and have an excellent idea of their actual circuitry. I can reference datasheets from say op amps, and tell which ones have better specifications for a particular application. That means Mr. Self is doing a great job of educating me;

with some work on my part!If you enjoy the technical part of audio, especially electronics, this a wonderful book. I also enjoy Mr. Self’s humor which makes the material much more interesting.

If you want to design audio equipment learn basic DC and AC circuitry and then read the heck out of this book.

Like all of Douglas Self’s books, a model of clarity. Good explanations, good pictures, good measurements and simulations that well illustrate the principles. In addition, his light tone and occasional bits of humor make reading it quite pleasant.

Amazing, complete insightful new small signal design techniques from a genius!

Great!

Very good and informative book with moments of humor ! Rare in a highly technical manual .

For content alone I would rate this book five stars. It’s full of information and insights that seem valuable on just about any level, from fully designed circuits that can be used more or less as they are by audio DIY’ers, to ideas and insights sure to be useful to professional engineers. I learned something on new on just about every page. Douglas Self is obviously a master of analog audio design, and he shares his knowledge generously in this book.The reason I rated it four stars is the tone, which, to me, was grating from the start, and which became very tiresome long before the end. The overall tone is vehemently positivist and disparaging toward views about audio that the author regards as "subjectivist" and "obsolete." But surely a large percentage of his audience must hold these views that he disparages. For example, a major portion of the book--several chapters long--is devoted to an in-depth study of the design of phono preamps. This is sure to be appealing to readers who like the vinyl medium and want to design circuits for vinyl playback. There must be far more vinyl aficionados designing homebrew preamps for their own enjoyment than there are professional engineers designing phono preamps anymore. But the author states and restates ad nauseum his view that vinyl was a bad idea from its very inception, and that it’s now thoroughly obsolete.The fact is, people listen to music in order to enjoy the experience, and some people find that they prefer analog media, particularly vinyl. This is quite easy to support objectively. Simply put, vinyl sounds different from CD or MP3. All of these media have measurable "imperfections." The

author concentrates strictly on the quantity of these "imperfections" and ignores their qualitative differences. But it’s easy to see that vinyl, as a very direct, physical analog medium, exhibits types of noise and distortion that are by nature "organic," meaning akin to sounds produced in nature by other physical phenomena. Digital media exhibit types of noise and distortion that are by nature "synthetic," meaning not akin to sounds produced physically in nature. For one thing, even though there’s more distortion measurable in vinyl, that level of organic distortion may be preferable to many listeners to the smaller level of synthetic distortion evident in digital. For another thing, it’s entirely possible that the distortion in the medium imparts something pleasing to the sound, up to a point, and that artists and recording engineers making recordings for vinyl took the sound of vinyl into account while making their choices, so that these recordings don’t sound quite right without that sound.There are similar facts to consider when discussing the sound of class-A discrete transistor circuitry versus the sound of op-amp circuitry. The nonlinearities in a bipolar transistor per se are caused directly by physics, and the exponential current versus voltage relationship is a smooth curve with an organic shape. Crossover distortion produced by the class-AB output stages of op amps, however, is less "organic," in the sense that the shape of the nonlinearity isn’t as smooth or directly connected to physics. What’s more, crossover distortion is symmetrical, producing only odd harmonics, while transistor nonlinearities are asymmetrical, producing all harmonics. Surely there are objective differences to the sounds of these two types of distortion, and it’s conceivable that one kind is more pleasing to listen to than the other.Of course it’s true that there are large doses of placebo effect in the world of audio, which the author seems to be reacting against. But then even in the world of pro recording, the best microphone preamps are still prized for the characteristic sound they impart, not for their perfect transparency. This is more than ever the case in this digital age. And, well, any characteristic sound must be caused by distortion.It’s worth knowing how to achieve low noise and distortion. But the end goal is still a listening experience, and some of us love analog audio because of its inherent connection with nature, how it sounds, how it breathes. A statement like "vinyl is obsolete" implies that it is simply irrational to prefer vinyl to more modern media. But in fact there’s much room for debate on the point of whether digital media actually improve on vinyl in terms of the overall listening experience. And then there are personal preferences to consider.In this book, it’s as if the author were writing a book to subsistence farmers, a book about subsistence farming, in which he continuously extolled the virtues of city life and disparaged the outmoded life of the subsistence farmer.Odd.

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