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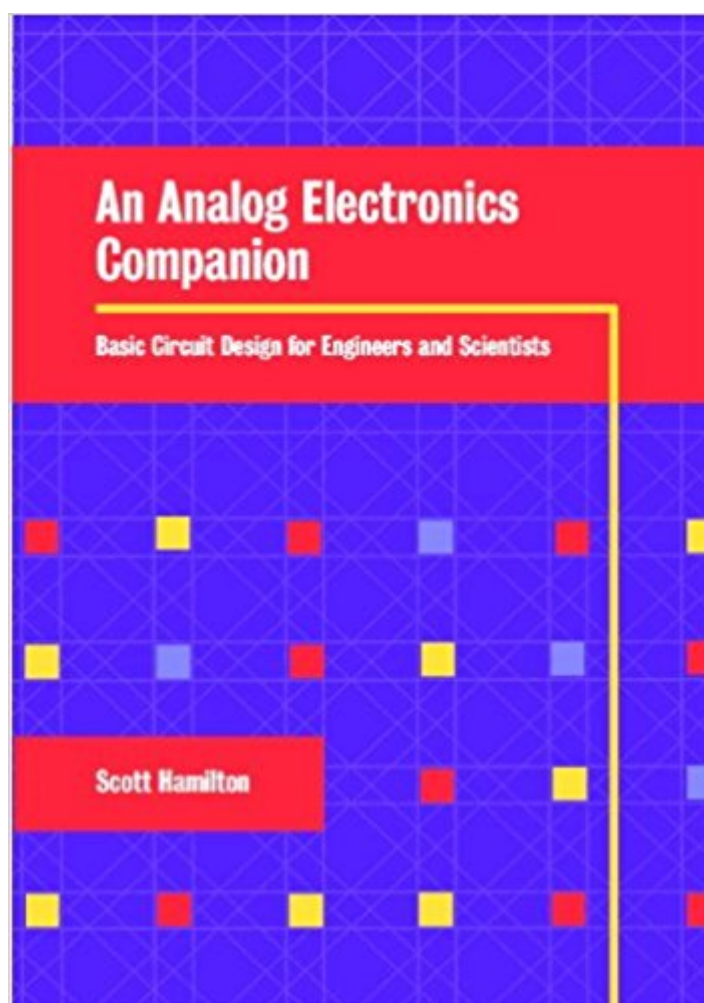# An Analog Electronics Companion: Basic Circuit Design For Engineers And Scientists



An Analog Electronics Companion

Basic Circuit Design for Engineers and Scientists

Scott Hamilton

# Synopsis

Engineers and scientists frequently have to get involved in electronic circuit design even though it may not be their specialty. Writing for the inexperienced designer, Hamilton begins by reviewing the basic mathematics and physics needed to understand circuit design. He then goes on to discuss individual components (resistors, capacitors etc.) and commonly encountered circuit elements such as differentiators, oscillators, filters and couplers. A major bonus is the inclusion of a CD with the student edition of the PSpice simulation software, together with models of most of the circuits covered.

# Book Information

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# Customer Reviews

"Worth It!" Bill Schweber, EDN"...subjects are treated in a concise, clear and self-contained fashion, always helped by a broad exhaustive bibliography, and cover all the necessary aspects for electronic design..." Measurement Science and Technology, www.iop.org"...readers can partake of a plethora of well-crafted instruction, seasoned with just the right amount of levity. I enthusiastically endorse the book, particularly to those who have never benefited from the simulation experience." Physics Today"Particularly useful for the student is the inclusion of a CD-ROM containing PSpice circuit simulation software, with numerous examples as discussed throughout the body of the text. All in all this book provides a clear and easy to understand discussion of analog electronic circuit design suitable for the new student or as a handy reference for more expert scientists." Contemporary Physics

Engineers and scientists frequently find themsleves having to design electronics circuits even though this may not be their specialty. This book is specifically designed for these situations, and has two major advantages: it assumes little prior knowledge of electronics and it takes a modular approach, so you can find just what you need. The book covers the basic mathematics, physics and component descriptions and describes commonly encountered circuit elements such as oscillators and filters. PSpice models are included together with the student edition of the PSpice simulation software package.

This book bills itself as a book to introduce non-EEs to analog electronics design. Sadly, the author insists on teaching primarily via mathematics. News to author: mathematics isn't suited to tutorial material. Yes, the formula describing the physics of a capacitor may illustrate the operation of real devices, but it does not tell me what a capacitor is useful for. In my experience, you need that intuitive understanding first, before you understand the gory details. This book is not wrong, per se; I am sure the mathematics and electronics are all quite rigorous. I did learn some things by reading it. But, I wouldn't recommend it to another DIYer in a million years.If you're a non-EE and want to learn analog electronics, take the $120, spend $75 of it on Horowitz and Hill's _Art of Electronics_, and do something else with the $45 you've saved. In the same number of total pages as in the Hamilton book, AoE will teach you more about analog electronics, it will teach it in a way you can grasp a lot quicker, and the book will be useful for reference later. And, the part of AoE following that will teach you basic digital electronics, which Hamilton doesn't even touch.If, later, you want more physics or mathematics, there must be better books than this one to build on what AoE gives you. I haven't found that better book yet, but I really regret buying the Hamilton book. I almost threw this book away until I remembered how much I paid for it.

If you want to learn circuit design from scratch, this is not the book. There are many books, from Sedra and Smith's Microelectronics for EE's to Horowitz and Hill's Art of Electronics for non-EE's. This is an excellent book as a SECOND look (after you have some experience) in electronics to gain insight into a great many topics, many of which are not discussed in a first course (such as the idea of Elmore's delay in analyzing transient response of a transfer function, or how Kramers-Kronig conditions on attenuation and dispersion in materials relate to gain and phase in circuit transfer functions and how Bode/Fano bandwidth limits are related to the real and imaginary parts). Basically, I believe this is a core dump of a physicist's life experience with circuits. It is not complete.

It sometimes does not flow well if used as a text. However, he writes really well, with humor, and is quite readable. The book also comes with a CD with a version of Spice, and the author uses Spice to describe unusual, interesting examples showing how lock-in amplifiers really work, or how feedback in a circuit pre-distorts signals to correct non-linearities in the feedback path or distortion. This is truly a great "companion" book to browse for insight or to expand your knowledge, after you already know something about analog electronics. Digital circuits are not covered.

This is an excellent book, which I'm enjoying, but it's nothing like what the blurb says.It's not an introduction to anything. It's a set of essays on interesting topics that bridge the gap between electronics and physics. The quotes from characters like Heaviside are entertaining; the derivations are clear; and the style is lively and fast-paced. Read it *after* working through something like Horowitz and Hill's The Art of Electronics.

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