

## Audio Power Amplifier Design Handbook Fifth Edition

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This invaluable textbook covers the theory and circuit design techniques to implement CMOS (Complementary Metal-Oxide Semiconductor) class-D audio amplifiers integrated circuits. The first part of the book introduces the motivation and fundamentals of audio amplification. The loudspeaker's operation and main audio performance metrics explains the limitations in the amplification process. The second part of this book presents the operating principle and design procedure of the class-D amplifier main architectures to provide the performance tradeoffs. The circuit design procedures involved in each block of the class-D amplifier architecture are highlighted. The third part of this book discusses several important design examples introducing state-of-the-art architectures and circuit design techniques to improve the audio performance, power consumption, and efficiency of standard class-D audio amplifiers.

Self on Audio: The collected audio design articles of Douglas Self, Third Edition is the most comprehensive collection of significant articles in the technical audio press. This third edition features 45 articles that first appeared in Elektor, Linear Audio, and Electronics World. Including expanded prefaces for each article, the author provides background information and circuit commentary. The articles cover both discrete and opamp preamplifier design, mixing console design, and power amplifier design. The preamplifier designs are illuminated by the very latest research on low noise and RIAA equalization. The famous series of 1993 articles on power amplifier distortion is included, with an extensive commentary reflecting the latest research on compensation and ultra-low distortion techniques. This book addresses the widened scope of technology that has become available to the audio designer over the last 35 years. New materials include: Prefaces that explain the historical background of the articles, why they were written, and the best use of the technology of the day Extensive details, including schematics, of designs that preceded or followed the design in each article, giving an enormous amount of extra information and a comprehensive overview of how author's design approaches have evolved New directions for the technology, describing new lines of thought such as curvilinear Class-A

This book is essential for audio power amplifier designers and engineers for one simple reason...it enables you as a professional to develop reliable, high-performance circuits. The Author Douglas Self covers the major issues of distortion and linearity, power supplies, overload, DC-protection and reactive loading. He also tackles unusual forms of compensation and distortion produced by capacitors and fuses. This completely updated fifth edition includes four NEW chapters including one on The XD Principle, invented by the author, and used by Cambridge Audio. Crosstalk, power amplifier input systems, and microcontrollers in amplifiers are also now discussed in this fifth edition, making this book a must-have for audio power amplifier professionals and audiophiles. Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. THE AUDIOPHILE'S PROJECT SOURCEBOOK Build audio projects

that produce great sound for far less than they cost in the store, with audio hobbyists' favorite writer Randy Slone. In *The Audiophile's Project Sourcebook*, Slone gives you—

- Clear, illustrated schematics and instructions for high-quality, high-power electronic audio components that you can build at home
- Carefully constructed designs for virtually all standard high-end audio projects, backed by an author who answers his email
- 8 power-amp designs that suit virtually any need
- Instructions for making your own inexpensive testing equipment
- Comprehensible explanations of the electronics at work in the projects you want to construct, spiced with humor and insight into the electronics hobbyist's process
- Complete parts lists

"*The Audiophile's Project Sourcebook*" is devoid of the hype, superstition, myths, and expensive fanaticism often associated with 'high-end' audio systems. It provides straightforward help in building and understanding top quality audio electronic projects that are based on solid science and produce fantastic sound!

**THE PROJECTS YOU WANT, FOR LESS**

Balanced input driver/receiver circuits  
Signal conditioning techniques  
Voltage amplifiers  
Preamps for home and stage  
Tone controls  
Passive and active filters  
Parametric filters  
Graphic equalizers  
Bi-amping and tri-amping filters  
Headphone amplifiers  
Power amplifiers  
Speaker protection systems  
Clip detection circuits  
Power supplies  
Delay circuits  
Level indicators  
Homemade test equipment

This comprehensive, up-to-date reference book digests years of technical information and technology into a single, authoritative source. The most authoritative audio reference book on the market, it offers the professional audio engineer a guide to audio electronics, circuits and equipment. New chapters cover transformers, compact disks, MIDI, audio in broadcasting, sound for the cinema and session details.

All the design and development inspiration and direction an audio engineer needs in one blockbuster book! Douglas Self has selected the very best sound engineering design material from the Focal and Newnes portfolio and compiled it into this volume. The result is a book covering the gamut of sound engineering. The material has been selected for its timelessness as well as for its relevance to contemporary sound engineering issues.

An authoritative reference on all aspects of audio engineering and technology including basic mathematics and formulae, acoustics and psychoacoustics, microphones, loudspeakers and studio installations. Compiled by an international team of experts, the second edition was updated to keep abreast of fast-moving areas such as digital audio and transmission technology. Much of the material has been revised, updated and expanded to cover the very latest techniques. This is a new paperback version.

"A single-source design reference providing expert guidance on analog filter and circuit design *Analog Filter and Circuit Design Handbook* emphasizes the operational amplifier (op-amp) as the key building block, and provides a strong foundation of understanding of how op-amps work and what their limitations are. The book contains numerous circuit examples that provide mathematical functions on analog signals in both a linear and non-linear manner. Audio applications such as audio power amplifiers and cross-over networks are included. Extensive coverage of both active and passive filters Discusses audio power amplifiers, various types of waveforms, and non-linear amplifier applications Leads you through how IC operational amplifiers work, their critical parameters, and how to properly choose the appropriate amplifier for a given application Tables help you select

the proper device for your requirements; combining amplifiers made by different manufacturers into a single table saves you from having to perform extensive searches among different manufacturers' websites. Includes free downloads: Filter Solutions from Nuhertz Technologies--enables the design of Elliptic Function low-pass filters up to the tenth order ELI 1.0--allows the design of odd-order elliptic function LC low-pass filters up to a complexity of 15 nulls (transmission zeros) or the 31st order Fltrform--an EXCEL spreadsheet arranged by chapter that contains all the significant formulas to simplify some of the calculations "--

"This second edition of Small Signal Audio Design is the essential and unique guide to the design of high-quality analogue circuitry for preamplifiers, mixing consoles, and many other signal-processing devices. You will learn to use inexpensive and readily available parts to obtain state-of-the-art performance in all the vital parameters of noise, distortion, crosstalk, etc. This practical handbook provides a repertoire of circuit blocks from which almost any type of audio system can be built. Essential points of theory that determine practical performance are lucidly and thoroughly explained, with the mathematics at a minimum. Virtually every page reveals nuggets of specialized knowledge not found elsewhere. Douglas' background in design for manufacture ensures he keeps a wary eye on the cost of things. Learn how to: - Make amplifiers with apparently impossibly low noise - Design discrete circuitry that can handle enormous signals with vanishingly low distortion - Use ordinary bipolar transistors to make amplifiers with an input impedance of more than 50 Megohms - Transform the performance of low-cost-opamps, and 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 effectively - Build reliable power-supplies, with many practical ways to keep both the noise and the cost down"--

Designing Tube Preamps for Guitar and Bass is the most comprehensive guide to the design of tube-based preamplifiers for musical instrument use, in a single volume. From the input to the phase inverter this book discusses in detail the inner workings and practical design of every part of a conventional guitar preamp, including the use of triodes, pentodes, tone controls, effects loops and much more. This second edition is fully revised and includes four new chapters covering noise, signal switching, topology, and grounding. Aimed at intermediate-level hobbyists and circuit designers, it explores how to manipulate distortion and maximise performance for the perfect tone. With easy-to-read explanations, minimal math and over 250 diagrams and figures, it is an essential handbook for any tube amp enthusiast!

Master the art of audio power amplifier design This comprehensive book on audio power amplifier design will appeal to members of the professional audio engineering community as well as the hobbyist. Designing Audio Power Amplifiers begins with power amplifier design basics that a novice can understand and moves all the way through to in-depth design techniques for the very sophisticated audiophile and professional audio power amplifier designer. This is the single best source of knowledge for anyone who wants to design an audio power amplifier, whether for fun or profit. Develop and hone your audio design skills with in-depth coverage of these and other topics: Basics of audio power amplifier design MOSFET power amplifiers and error correction Static and dynamic crossover distortion demystified Understanding negative feedback and the controversy surrounding it Advanced

negative feedback compensation techniques Sophisticated DC servo design Audio measurements and instrumentation Overlooked sources of distortion SPICE simulation for audio amplifiers, including a tutorial SPICE transistor modeling, including the EKV model for power MOSFETs Thermal design and the use of ThermalTrak transistors Four chapters devoted to class D amplifiers Supplemental material available at [www.cordellaudio.com](http://www.cordellaudio.com) includes: \* Ready-to-run amplifier simulations \* Key transistor models \* Other bonus materials Make Great Stuff! TAB, an imprint of McGraw-Hill Professional, is a leading publisher of DIY technology books for makers, hackers, and electronics hobbyists.

This much-anticipated volume builds on the author's popular work, *RF Power Amplifiers for Wireless Communications* (Artech House, 1999), offering you a more in-depth understanding of the theory and design of RF power amplifiers. An invaluable reference tool for RF, digital and system level designers, the book enables you to efficiently design linear RF power amplifiers, and includes detailed discussions on envelope power management schemes and linearization techniques.

Go beyond designing ordinary power amplifiers. The *Modern Tube Power Amplifier Design* book introduces readers to design techniques that yields distortion specs that rivals its transistor counterparts. In this book, methods of attaining distortion figures below 0.1% total harmonic distortion are discussed. There are amplifiers claiming very low output distortion, but they are usually specked at one frequency, and at output power. The method discussed in this book covers frequencies ranging from 100 to 10 kHz. The book covers complete basics of power amplifier designs, so the designer can build single, push-pull, class A, and class AB amps using triode, and pentode output tubes. The book also covers various methods of distortion lowering techniques in power amplifier design so low distortion can be achieved consistently. The book is written in a way so a designer can come up with their own comprehensive design strategy for designing truly high performance tube power amplifier. Use the design methods in this book to design modern tube power amplifiers that rivals those from high end audio manufacturers.

Design and build awesome audio amps. Amateur and professional audiophiles alike can now design and construct superior quality amplifiers at a fraction of comparable retail prices with step-by-step instruction from the *High-Power audio Amplifier Construction Manual*. Randy Slone, professional audio writer and electronics supply marketer, delivers the nuts-and-bolts know-how you need to optimize performance for any audio system--from home entertainment to musical instrument to sound stage. Build a few simple projects or delve into the physics of audio amplifier operation and design. This easy to understand guide walks you through: Building the optimum audio power supply; Audio amplifier power supplies and construction: Amplifier and loudspeaker protection methods; Stability, distortion, and performance; Audio amplifier cookbook designs; Construction techniques; Diagnostic equipment and testing procedures; Output stage configurations, classes, and device types; Crossover distortion physics; Mirror-image input stage topologies.

Reviews of previous editions: Jam-packed with theory, circuit analysis, and DIY basics, it will walk you through all stages of design so that you can create your own wonders. Jones is an ex-BBC engineer with a cool writing style and you'll find it a no-pain education. *Hi-Fi News and Record Review Valve Amplifiers* is an extremely well written book, containing a wealth of information

that all audio designers and builders will find useful. Glass Audio Valve Amplifiers is a market leader for one simple reason: in this specialist area it is recognized as the most complete guide to valve and vacuum tube amplifier design, modification, analysis, construction and maintenance. It is truly the all you need to know guide, and enables audio and circuit designers to succeed with their valve amplifier designs and projects. This book enables readers to understand, create, reconfigure and personalize high-end, audiophile quality amplifiers. Following a step-by-step approach to design, with little maths and lots of know-how, it starts with a brief review of electronic fundamentals relevant to valve amplifiers, simple stages, compound stages, linking stages together, and finally, complete designs. The new material included in this Fourth Edition ensures this book will stay at the top of any audio designer's or enthusiast's reference list. What's new: Chapter 1: Charge amplifiers Chapter 2: Additional circuits, semiconductor constant current sources expanded Chapter 3: Entire new section on noise Chapter 4: Lots of new measurements to explode or explain audio folklore Chapter 5: Astonishingly quiet, but cheap and simple HT supply Chapter 6: New power amplifier Chapter 7: New hybrid balanced RIAA stage, attenuator law faking VA3's focus was on distortion, but in VA4, focus is pushed towards background noise reduction. If that wasn't enough, there's more explanation, more measurements, more references, and plenty of new one-liners, any one of which might save hours of trouble. \* The practical guide to analysis, modification, design, construction and maintenance of valve amplifiers \* The fully up-to-date approach to valve electronics \* Essential reading for audio designers and music and electronics enthusiasts alike

Linear Audio Vol 1 is the second issue of a series of printed bookzines dedicated to technical audio and perception. The international team of authors for this issue again offers technical audio articles on a wide ranging number of subjects, from projects and concepts to book reviews and musings: Power amplification: Ian Hegglun developed A family of high-efficiency class-A power amplifiers allowing 'green' class-A amplifiers based on inherent square-law output devices, with only half of the usual dissipation. Loudspeakers and cross-overs: Jean-Claude Gaertner concludes his Project 21 DSP-based active speaker system, complemented with an RF-based remote multichannel level control by Jan Didden. Ramkumar Ramaswamy approaches crossovers from the analog side with A universal Continuous-Time active filter. Circuit design: Scott Wurcer attacks noise right at the start with a Low-noise microphone pre-amp design. Bruno Putzeys bravely steps forward and utters The F-word - or, why there is no such thing as too much feedback. Kendall Castor-Perry has Some Feedback about Electrolytic Capacitors allowing small electrolytics to look like large ones. Engineering reports: Ed Simon dug into resistor distortion and found that regarding Resistor Linearity - There's more to ohm than meets the eye. Ovidiu Popa writes On the noise performance of Low Noise Input Stages. Douglas Self found that capacitors can get better with Self-improvement for capacitors - inearization over time. Book reviews: Jean-Pierre Vanderreydt reviews Bob Cordell's Audio Power Amplifier Design, likes what he reads and en passant gives some hints for a second edition, while Stuart Yaniger is pleased with Menno van der Veen's High End Valve Amplifiers 2 - New Models and Application. Musings: For those of us chasing that elusive life-like audio reproduction system, Rudy van Stratum relates his very recognizable personal Adventures of a diy-audio-addict. Another collection of articles that I'm sure you'll enjoy and

learn from. Jan Didden Publisher/Editor

Small-Signal Audio Design is an essential for audio equipment designers and engineers for one simple reason; it enables you as a professional to develop reliable, high-performance circuits. This practical handbook not only teaches you the basic fundamentals but shows you how to apply opamps and discrete transistors in the preamplifier and signal-processing areas of audio and other low-frequency areas. It provides you with the necessary in-depth information, with presentations on the technologies that power the equipment- hi-fi preamplifiers, audio mixers, electronic crossovers, among others. Full of valuable information it includes exceptional audio mixer material, based on the authors 19 year design experience, revealing a lot of specialized information that has never been published before. Get answers to your most critical questions, insight into development techniques, and best-practices on optimizing features that will define your product's success.

Practical Audio Amplifier Circuit Projects builds on the introduction to electronic circuits provided in Singmin's innovative and successful first book, Beginning Electronics Through Projects. Both books draw on the author's many years of experience as electronics professional and as hobbyist. As a result, his project descriptions are lively, practical, and very clear. With this new volume, the reader can build relatively simple systems and achieve useable results quickly. The projects included here allow a hobbyist to build amplifier circuits, test them, and then put them into a system. Progress through a graduated series of learning activities culminates in unique devices that are nevertheless easy to build. Learn the basic building blocks of audio amplifier circuit design and then apply your knowledge to your own audio inventions. Targets the intermediate to advanced reader with challenging projects that teach important circuit theories and principles Provides a ready source of audio circuits to professional audio engineers Includes an electric guitar pacer project that lets you "jam" with your favorite band!

This book is the essential reference for audio power amplifier designers and engineers. Author Douglas Self covers all the issues of distortion and linearity, power supplies, protection, reliability and layout. He also tackles unusual forms of compensation and unexpected sources of distortion such as capacitors and fuses. This much expanded and updated Fifth Edition includes four NEW chapters, one of them dedicated to the XD crossover-displacement principle, invented by the author, and used by Cambridge Audio. The book has a wealth of new material on four-stage amplifier architectures, current-mirrors, power transistors with internal sensing diodes, amplifier bridging, subtle distortion mechanisms, input stage common-mode distortion, double input stages, amplifier stability, output stages with gain, transformers and hum fields, inrush current suppression, DC servo design, thermal protection, the subtleties of cooling fan control, advanced line input stages, ultra-low-noise design, high and low-pass filtering, testing and safety, infra-red control, signal activation, 12V trigger, level indication and much more. There is significantly expanded material on professional power amplifiers as used in sound reinforcement and PA applications. This book is a must-have for audio power amplifier professionals and audiophiles, amateur constructors and anyone with intellectual curiosity about the struggle towards technical excellence. \*Provides everything you want to know in one volume, offering an essential guide to design principals and practice \*Includes numerous graphs and an easy to read layout to illustrate points and aid complete understanding.

\*Includes the author's own amplifier designs for readers to build upon and adapt

Highly Linear Integrated Wideband Amplifiers: Design and Analysis Techniques for Frequencies from Audio to RF deals with the complicated issues involved in the design of high-linearity integrated wideband amplifiers for different operating frequencies. The book demonstrates these principles using a number of high-performance designs. New topologies for high linearity are presented, as well as a novel method for estimating the intermodulation distortion of a wideband signal. One of the most exciting results presented is an enhanced feedback configuration called feedback boosting that is capable of very low distortion. Also important is a statistical method for relating the intermodulation distortion of a wideband signal to the total harmonic distortion (THD) of a single tone. The THD, as opposed to the intermodulation distortion of the wideband signal, is easy to measure and use as a design parameter. Three different applications where high linearity is needed are identified, namely audio power amplifiers, wideband IF amplifiers and RF power amplifiers. For these applications high-performance integrated amplifier designs using novel topologies are presented together with measurement results. The audio amplifiers are built in CMOS and are capable of driving 8Ω loudspeaker loads directly without using any external components. One of the designs can operate on a supply voltage down to 1.5V. Both bipolar and CMOS wideband IF amplifiers are built; they are fully differential and have linearity from DC to 20 MHz. Finally, an RF power amplifier is built in CMOS, without using inductors, in order to investigate what performance can be achieved without them. Highly Linear Integrated Wideband Amplifiers: Design and Analysis Techniques for Frequencies from Audio to RF is an excellent reference for researchers and designers of integrated amplifiers, and may be used as a text for advanced courses on the topic.

A vast range of audio and audio-associated ICs are readily available for use by design engineers and technicians. This handbook is a comprehensive guide to the most popular and useful of these devices, including about 370 circuits with diagrams. It deals with ICs such as low frequency linear amplifiers, dual pre-amplifiers, audio power amplifiers, charge coupled device delay lines, bar-graph display drivers, and power supply regulators. It shows how to use these devices in circuits ranging from simple signal conditioners and filters to complex graphic equalisers, stereo amplifier systems, and echo/reverb delay line systems. Not only does this Handbook contain a huge collection of circuits using state-of-the-art and readily available ICs, but also it gives a thorough grounding in theoretical information relating to the various aspects of modern audio systems and to various dedicated types of audio ICs. Newnes Circuits Manuals and User's Handbooks by Ray Marston cover a wide range of electronics subjects in an easy-to-read and non-mathematical manner, presenting the reader with many practical applications and circuits. They are specifically written for the practising design engineer, technician, and the experimenter, as well as the electronics students and amateur. The ICs and other devices used in the practical circuits are modestly priced and readily available types, with universally recognised type numbers. Ray Marston has proved, through hundreds of circuits articles and books, that he is one of the leading circuit designers and writers in the world. He has written extensively for Popular Electronics, Electronics Now, Electronics and Beyond, Electronics World, Electronics Today International and Electronics Australia, amongst others. Other books by Ray Marston from

Newnes include: Modern CMOS Circuits Manual Power Control Circuits Manual Modern TTL Circuits Manual Electronic Alarm Circuits Manual Optoelectronics Circuits Manual Instrumentation and Test Gear Circuits Manual Diode, Transistor and FET Circuits Manual Timer/Generator Circuits Manual Electronic Circuits Pocket Library in 3 volumes: Linear IC Pocket Book (Vol 1) Passive and Discrete Circuits Pocket Book (Vol 2) Digital Logic IC Pocket Book (Vol 3) Comprehensive guide to vast range of audio ICs available Over 400 circuits with diagrams Easy-to-read

Integrated Audio Amplifiers in BCD Technology is the first book to describe the design of Audio Amplifiers using a Bipolar CMOS DMOS (BCD) process. It shows how the combination of the 3 processes, made available by advances in process technology, gives rise to the design of more robust and powerful audio amplifiers which can be more easily implemented in digital and mixed-signal circuits. Integrated Audio Amplifiers in BCD Technology starts with an introduction to audio amplifiers which includes a comparison of amplifier classes, general design considerations and a list of specifications for integrated audio power amplifiers. This is followed by an extensive discussion of the properties of DMOS transistors which are the key components in BCD technologies. Then the theory and the design of chargepump circuits is considered. In most BCD technologies only n-type DMOS transistors are available. Therefore a boosted supply voltage is required to achieve rail-to-rail output capability which can be generated with a chargepump. The new solutions that are found can also be used for many applications where DC-DC conversion with low output ripple is needed. Finally the design of audio power amplifier in BCD technology is discussed. The design concentrates on a new quiescent control circuit with very high ratio between quiescent current and maximum output current and on the output stage topologies. The problem of controlling the DMOS output transistors over a wide range of currents either saturated or non saturated requires a completely new design of the driving circuits that utilize of the special properties of the DMOS transistor. Integrated Audio Amplifiers in BCD Technology is essential reading for practising analog design engineers and researchers in the field. It is also suitable as a text for an advanced course on the subject. With a foreword by Ed van Tuijl. Many digital control circuits in current literature are described using analog transmittance. This may not always be acceptable, especially if the sampling frequency and power transistor switching frequencies are close to the band of interest. Therefore, a digital circuit is considered as a digital controller rather than an analog circuit. This helps to avoid errors and instability in high frequency components. Digital Signal Processing in Power Electronics Control Circuits covers problems concerning the design and realization of digital control algorithms for power electronics circuits using digital signal processing (DSP) methods. This book bridges the gap between power electronics and DSP. The following realizations of digital control circuits are considered: digital signal processors, microprocessors, microcontrollers, programmable digital circuits. Discussed in this book is signal processing, starting from analog signal acquisition, through its conversion to digital form, methods of its filtration and separation, and ending with pulse control of output power transistors. The book is focused on two applications for the considered methods of digital signal processing: an active power filter and a digital class D power amplifier. The major benefit to readers is the acquisition of specific knowledge concerning discussions on the processing of signals from voltage or current sensors using a digital signal processor

and to the signals controlling the output inverter transistors. Included are some Matlab examples for illustration of the considered problems.

The audio amplifier is at the heart of audio design. Its performance determines largely the performance of any audio system. John Linsley Hood is widely regarded as the finest audio designer around, and pioneered design in the post-valve era. His mastery of audio technology extends from valves to the latest techniques. This is John Linsley Hood's greatest work yet, describing the milestones that have marked the development of audio amplifiers since the earliest days to the latest systems. Including classic amps with valves at their heart and exciting new designs using the latest components, this book is the complete world guide to audio amp design. John Linsley Hood is responsible for numerous amplifier designs that have led the way to better sound, and has also kept up a commentary on developments in audio in magazines such as *The Gramophone*, *Electronics in Action* and *Electronics and Wireless World*. He is also the author of *The Art of Linear Electronics* and *Audio Electronics* published by Newnes. Complete world guide to audio amp design written by world famous author Covers classic amps to new designs using latest components Includes the best of valves as well as best of transistors

The Newnes Know It All Series takes the best of what our authors have written to create hard-working desk references that will be an engineer's first port of call for key information, design techniques and rules of thumb. Guaranteed not to gather dust on a shelf! Audio engineers need to master a wide area of topics in order to excel. The *Audio Engineering Know It All* covers every angle, including digital signal processing, power supply design, microphone and loudspeaker technology as well as audio compression. A 360-degree view from our best-selling authors Includes such topics as fundamentals, compression, and test and measurement The ultimate hard-working desk reference; all the essential information, techniques and tricks of the trade in one volume Whether you are a dedicated audiophile who wants to gain a more complete understanding of the design issues behind a truly great amp, or a professional electronic designer seeking to learn more about the art of amplifier design, there can be no better place to start than with the 35 classic magazine articles collected together in this book. Douglas Self offers a tried and tested method for designing audio amplifiers in a way that improves performance at every point in the circuit where distortion can creep in – without significantly increasing cost. Through the articles in this book, he takes readers through the causes of distortion, measurement techniques, and design solutions to minimise distortion and efficiency. Most of the articles are based round the design of a specific amplifier, making this book especially valuable for anyone considering building a Self amplifier from scratch. Self is senior designer with a high-end audio manufacturer, as well as a prolific and highly respected writer. His career in audio design is reflected in the articles in this book, originally published in the pages of *Electronics World* and *Wireless World* over a 25 year period. An audio amp design cookbook, comprising 35 of Douglas Self's definitive audio design articles Complete designs for readers to build and adapt An anthology of classic designs for electronics enthusiasts, Hi-Fi devotees and professional designers alike

*Linear Audio Vol 1* is the second issue of a series of printed bookzines dedicated to technical audio and perception. The

international team of authors for this issue again offers technical audio articles on a wide ranging number of subjects, from projects and concepts to book reviews and musings: Power amplification: Ian Hegglun developed A family of high-efficiency class-A power amplifiers allowing 'green' class-A amplifiers based on inherent square-law output devices, with only half the usual dissipation. Loudspeakers and cross-overs: Jean-Claude Gaertner concludes his Project 21 DSP- based active speaker system, complemented with an RF-based remote multichannel level control by Jan Didden. Ramkumar Ramaswamy approaches crossovers from the analog side with A universal Continuous-Time active filter. Circuit design: Scott Wurcer attacks noise right at the start with a Low-noise microphone pre-amp design, while Bruno Putzeys bravely steps forward and utters The F-word - or, Why there is no such thing as too much feedback. Kendall Castor-Perry has Some Feedback about Electrolytic Capacitors allowing small electrolytics to look like large ones. Engineering reports: Ed Simon dug into resistor distortion and found that regarding Resistor Linearity - There's more to ohm than meets the eye, while Ovidiu Popa writes On the noise performance of Low Noise Input Stages. Douglas Self found that capacitors can get better with Self-improvement for capacitors - Linearization over time. Book reviews: Jean-Pierre Vanderreydt reviews Bob Cordell's Audio Power Amplifier Design, likes what he reads and en passant gives some hints for a second edition, while Stuart Yaniger is pleased with Menno van der Veen's High End Valve Amplifiers 2 - New Models and Application. Musings: For those of us chasing that elusive life-like audio reproduction system, Rudy van Stratum relates his very recognizable personal Adventures of a diy-audio-addict. Another collection of articles that I'm sure you'll enjoy and learn from. But, don't forget to listen to your music! jan didden Publisher/Editor

The most complete and practical modern reference on audiophile vacuum tube technology! Destined to become a true classic in its field, this unique DIY design & construction manual presents the theory and practice of amplifier design & construction in a balanced way. For those who dislike formulas and want proven, practical, ready-to-build designs, dozens of such commercial, tried & tested circuits are explained and analyzed. Just get your soldering iron ready and start building! Absolute beginners will benefit from the methodological approach, starting with DC circuits, then moving into AC voltages and currents and their circuits. The first few chapters of Volume 1 are a complete training course in fundamentals of electronics. Although the focus is on audiophile or "hi-fi" vacuum tube amplifiers, those interested in tube guitar amps will also benefit from the wealth of material presented, most of which directly applies to tube guitar amps as well. Apart from various audio circuits, electronic components, power supplies and tests & measurements are also covered in depth. Even tube testing and tube testers are discussed at great length, as is troubleshooting, repairing and modifying (upgrading) tube gear. The advanced topics that other books don't even mention, such as audio transformer design, construction and testing, make this reference manual a valuable addition to your technical library. For those familiar with solid state devices, such as bipolar transistors and FETs, an easy and seamless transition into tube technology is provided in the book, which adopts a unifying approach to amplification and rectification devices, be they of

solid state or vacuum tube kind. This practical DIY manual is richly and professionally illustrated with photographs of tubes, components and amplifiers, circuit diagrams, tube pinouts, curves and loadlines, graphs and charts. Hundreds of such valuable illustrations make it easy to comprehend issues. There is no need to search for, download and print such information, saving you valuable time. All the information required to design and build tube amplifiers is compiled in one place. Who is this book for? Audiophiles and guitar players wanting to learn how tubes and tube amplifiers work. DIY constructors who wish to take their knowledge and building skills to a higher level. Buyers and sellers of tubes and tube equipment who need a better understanding of tube technology. Electronic technicians and engineers familiar with solid state devices and circuits, who want to expand their knowledge of tubes and their circuits. Anyone who wants to learn how to design, build, test, fix, or upgrade tube gear. Contents of Volume 2: PRACTICAL SINGLE-ENDED PENTODE AND ULTRALINEAR DESIGNS PUSH-PULL OUTPUT STAGES PRACTICAL PUSH-PULL AMPLIFIER DESIGNS BALANCED, BRIDGE AND OTL (OUTPUT TRANSFORMERLESS) AMPLIFIERS THE DESIGN PROCESS FUNDAMENTALS OF MAGNETIC CIRCUITS AND TRANSFORMERS MAINS TRANSFORMERS AND FILTERING CHOKES POWER SUPPLIES FOR TUBE AMPLIFIERS AUDIO TRANSFORMERS TROUBLESHOOTING AND REPAIRING TUBE AMPLIFIERS UPGRADING & IMPROVING TUBE AMPLIFIERS SOUND CONSTRUCTION PRACTICES AUDIO TESTS & MEASUREMENTS TESTING & MATCHING VACUUM TUBES "

"Directory of members" published as pt. 2 of Apr. 1954- issue

This book is essential for audio power amplifier designers and engineers for one simple reason ... it enables you as a professional to develop reliable, high-performance circuits. The Author Douglas Self covers the major issues of distortion and linearity, power supplies, overload, DC-protection and reactive loading. He also tackles unusual forms of compensation and distortion produced by capacitors and fuses.

The Design of Active Crossovers is a unique guide to the design of high-quality circuitry for splitting audio frequencies into separate bands and directing them to different loudspeaker drive units specifically designed for handling their own range of frequencies. Traditionally this has been done by using passive crossover units built into the loudspeaker boxes; this is the simplest solution, but it is also a bundle of compromises. The high cost of passive crossover components, and the power losses in them, means that passive crossovers have to use relatively few parts. This limits how well the crossover can do its basic job. Active crossovers, sometimes called electronic crossovers, tackle the problem in a much more sophisticated manner. The division of the audio into bands is performed at low signal levels, before the power amplifiers, where it can be done with much greater precision. Very sophisticated filtering and response-shaping networks can be built at comparatively low cost. Time-delay networks that compensate for physical misalignments in speaker

construction can be implemented easily; the equivalent in a passive crossover is impractical because of the large cost and the heavy signal losses. Active crossover technology is also directly applicable to other band-splitting signal-processing devices such as multi-band compressors. The use of active crossovers is increasing. They are used by almost every sound reinforcement system, by almost every recording studio monitoring set-up, and to a small but growing extent in domestic hifi. There is a growing acceptance in the hifi industry that multi-amplification using active crossovers is the obvious next step (and possibly the last big one) to getting the best possible sound. There is also a large usage of active crossovers in car audio, with the emphasis on routing the bass to enormous low-frequency loudspeakers. One of the very few drawbacks to using the active crossover approach is that it requires more power amplifiers; these have often been built into the loudspeaker, along with the crossover, and this deprives the customer of the chance to choose their own amplifier, leading to resistance to the whole active crossover philosophy. A comprehensive proposal for solving this problem is an important part of this book. The design of active crossovers is closely linked with that of the loudspeakers they drive. A chapter gives a concise but complete account of all the loudspeaker design issues that affect the associated active crossover. This book is packed full of valuable information, with virtually every page revealing nuggets of specialized knowledge never before published. Essential points of theory bearing on practical performance are lucidly and thoroughly explained, with the mathematics kept to an essential minimum. Douglas' background in design for manufacture ensures he keeps a wary eye on the cost of things. Features:

- Crossover basics and requirements
- The many different crossover types and how they work
- Design almost any kind of active filter with minimal mathematics
- Make crossover filters with very low noise and distortion
- Make high-performance time-delay filters that give a constant delay over a wide range of frequency
- Make a wide variety of audio equaliser stages: shelving, peaking and notch characteristics
- All about active crossover system design for optimal noise and dynamic range

There is a large amount of new material that has never been published before. A few examples: using capacitance multipliers in biquad equalisers, opamp output biasing to reduce distortion, the design of NTMTM notch crossovers, the design of special filters for filler-driver crossovers, the use of mixed capacitors to reduce filter distortion, differentially elevated internal levels to reduce noise, and so on. Douglas wears his learning lightly, and this book features the engaging prose style familiar from his other books *The Audio Power Amplifier Design Handbook*, *Self on Audio*, and the recent *Small Signal Audio Design*.

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