

THE COMPUTER MUSIC AND DIGITAL AUDIO SERIES



James L. Zychowicz,
Series Editor

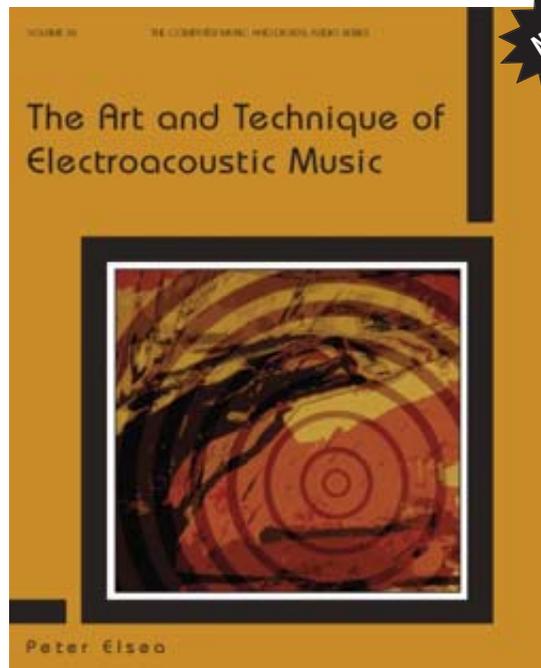
A-R's Computer Music and Digital Audio Series (DAS) is a vital source for publications on music, digital-audio technology, computer-music programming, and many innovative projects in this field.

The series includes monographs and textbooks of current interest and enduring value for computer-music specialists, audio engineers, performers, multimedia programmers, and others.

The names of the authors in the series read like a who's who in the field of computer music, and we take pride in publishing their best work.

For more information on this series, please visit our website:
www.areditions.com/cmdas.

LATEST RELEASES



The Art and Technique of Electroacoustic Music

Peter Elsea

Electroacoustic music is no longer relegated to the basements of a few academic institutions. It is now in the mainstream of music, pervading all styles from the avant-garde to pop. Even classical works are routinely scored on a computer and a synthesized demo is a powerful tool for previewing a piece. The fundamental skills of electroacoustic composition are now as essential to a music student as ear training and counterpoint. *The Art and Technique of Electroacoustic Music* is unique reference on those fundamental skills. Useful to all musicians who work

in the field, this book can also be used as a text for an undergraduate level series of courses or as a guide for self-learning. The student is guided from the fundamentals of acoustics through the basics of recording, composition with the tools of musique concrète, and music production with MIDI instruments, softsynths and Digital Audio Workstations. Later sections of the book cover synthesis in depth and provide introductions to high powered computer composition languages including Csound, ChuckK, and Max/MSP. A final section presents the challenges and techniques of live performance.

Peter Elsea was principal instructor and director of the Electronic Music Program at the University of California, Santa Cruz from 1980 until retirement in 2013. During his tenure, the program gained an international reputation for breadth and rigor. Alumni of the program have won or been nominated for Oscars and Clio's for scores and sound designs or become chart-topping performers. Many others have found a place in the music software industry, designing tools that constantly advance the state of the art. Elsea's career began at the University of Iowa Center for New Music in 1972, where he studied under Peter Todd Lewis and Lowell Cross and worked closely with many prominent electroacoustic composers of the day. He is widely known as an internet author, with his posted articles referenced by thousands of sites around the web.

Contents include: • Building the Studio • Fundamental Concepts and Techniques • Sound • Recording Sounds • Sound after Sound Processing Sounds • Layering Sounds • Music Store Electroacoustic Music • MIDI • Sequencing Programs • Samplers • Synthesis • Fundamentals of Synthesis • Voicing Synthesizers • FM Synthesis • New Approaches to Synthesis • Research-style Synthesis • Composing on a QWERTY Keyboard • Coding for Real-time Performance • Programming with Boxes and Lines • Synthesis in Hardware • Live Electroacoustic Music • The Electroacoustic Performers • Composing for Electronic Performance • Bibliography • Index

DAS26 ISBN 978-0-89579-741-4 (2013) xxiii + 513 pp. \$80.00
Includes DVD-ROM with examples used in the text

Designing Audio Objects for Max/MSP and Pd

Eric Lyon (with a foreword by David Zicarelli and an afterword by Miller Puckette)

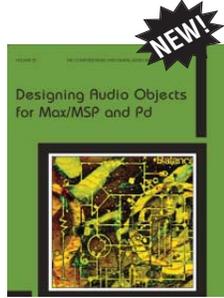
Max/MSP and Pd are the data flow audio programs electronic musicians prefer for their rapid prototyping capabilities, graphical resemblance to analog synthesizer patching, and a wide variety of available synthesis and processing methods. However, a powerful element of these programs is surprisingly under-utilized: the ability to create (in C) new audio externals to process audio with sample-level precision.

Learning how to write externals for Max/MSP and Pd in C opens an entirely new world of creative possibilities for electronic musicians. This book guides the reader step-by-step through the process of designing externals, from concept through implementation. Twelve externals are presented, each revealing new sonic, musical, and programming possibilities.

The multi-platform approach of this book supports the compilation of Pd externals on Linux, Mac OS X, and Windows, and the compilation of Max/MSP externals on Mac OS X and Windows. The CD-ROM contains complete code for all projects presented in the book. The Max/MSP externals are designed for use with Max 5; a supplementary chapter on the CD-ROM describes how to update Max 5 code to make use of 64-bit processing with Max 6.

Contents include: • Introduction to Building Externals • Introduction to Signals • Designing a Max External • Variable Delay with Feedback • Building a Better Oscillator • A Sample-accurate Sequence • Buffer Operations • Spectral Processing • Another Look at *vdelay~* • Attributes in Max/MSP • Debugging • Porting a Csound Unit Generator to Max • Dynamic Stochastic Synthesis • Max for Live • What Next? • Afterword • Bibliography

DAS25 ISBN 978-0-89579-715-5 (2012) xxx + 340 pp. \$50.00
Includes CD-ROM



Experiments in Musical Intelligence

David Cope

In twenty years of working in artificial intelligence, I have seen nothing more thought-provoking than David Cope's *Experiments in Musical Intelligence*. What is the essence of musical style, indeed of music itself? Can great new music emerge from the extraction and recombination of patterns in earlier music? Are the deepest of human emotions triggerable by computed patterns of notes? This lovingly written book about a deeply held vision of musical creativity should, I think, earn its place as one of the most significant adventures of the late twentieth century.

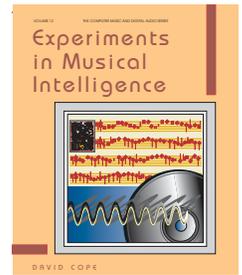
—Douglas Hofstadter, author of *Gödel, Escher, Bach* and *Fluid Concepts and Creative Analogies*

Contents include: • Background and Overview • The Analysis Component • The Pattern-Matching Component • The Object System • The ATN Component • An Application-Level Program and Sample Output • Conclusions and the Future • Bibliography • Index

DAS12

Includes new CD-ROM

Forthcoming



Computers and Musical Style

David Cope

"Cope's work may be the first to bring to the broader community of scholars a host of issues that have been hotly discussed by biotechnology and artificial intelligence researchers in recent years. . . . It is an original and important undertaking that deserves the attention of all who share this interest."

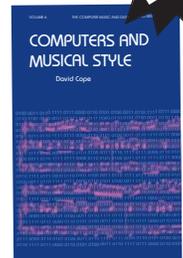
—Eleanor Selfridge-Field

Journal of the American Musicological Society

On the basis of his research in artificial intelligence, composer David Cope demonstrates that computers can compose music. Cope furnishes a step-by-step guide for analyzing and replicating musical style using his computer program, *Experiments in Musical Intelligence*. His computer compositions in the style of Bach, Mozart, Stravinsky, and others sound new and yet alarmingly familiar. He then shows how today's composers can use *Experiments in Musical Intelligence* effectively.

Contents include: • A Brief Background of Automated Music Composition • Musical Style Representations • LISSP Programming • Style Replication • Musical Examples • Computer-Assisted Composition • Bibliography • Index

DAS6 ISBN 978-0-89579-256-3 (2013) xvii + 246 pp. \$50.00
Includes new CD-ROM



AVAILABLE TITLES

A-Life for Music: Music and Computer Models of Living Systems

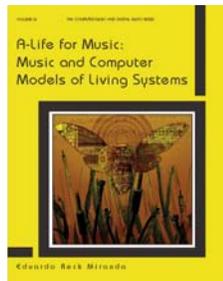
Eduardo Reck Miranda

Artificial Life, or A-Life, aims at the study of all phenomena characteristic of natural living systems, through computational modeling, wetware-hardware hybrids, and other artificial media. Its scope ranges from the investigation of the emergence of cognitive processes in natural or artificial systems to the development of life or life-like properties from inorganic components. A number of musicians, in particular composers and musicologists, have started to turn to A-Life for inspiration and working methodology. This edited volume features thirteen interconnected chapters written by researchers and practitioners in this exciting emerging field of computer music, and includes a CD with various examples music related to A-Life.

Eduardo R. Miranda holds a master of science degree in music technology from the University of York and a Ph.D. in the field of music and artificial intelligence from the University of Edinburgh. He is currently professor in computer music at the University of Plymouth, where he heads the Interdisciplinary Centre for Computer Music Research (ICCMR). He is the author of *Composing Music with Computers* and *Computer Sound Design: Synthesis Techniques and Programming* (Focal Press/Elsevier) and a co-author of *New Digital Musical Instruments: Control and Interaction Beyond the Keyboard*, vol. 21 of the Computer Music and Digital Audio Series (A-R Editions).

Contents include: • Artificial Anuran Choruses / David M. Michael • Multi-Agent Modeling of Complex Rhythmic Interactions in Real-Time Performance / Arne Eigenfeldt • Using Coevolution in Music Improvisation / David Plans and Davide Morelli • Structural Coupling in a Society of Musical Agents / Peter Beys • Transformation and Mapping of L-Systems Data in the Composition of a Large-Scale Piece of Music / Nigel Morgan • Generative Composition with Nodal / Jon McCormack and Peter McIlwain • Evolutionary Morphing for Music Composition / Andrew R. Brown, Rene Wooller, and Eduardo R. Miranda • The Evolving Drum Machine / Matthew J. Yee-King • Autonomous Evolution of Piano Pieces and Performances with Ossia II / Palle Dahlstedt • A Biophysically Constrained Multi-Agent Systems Approach to Algorithmic Composition with Expressive Performance / Alexis Kirke and Eduardo R. Miranda • Artificial Evolution of Tuning Systems / Jean-Julien Aucouturier • Replication, Parataxis, and Evolution: Meme Journeys through the First Movement of a Mozart Sonata / Steven Jan • An Ontomemetic Approach to Musical Intelligence / Marcelo Gimenes and Eduardo R. Miranda • Bibliography • Index

DAS24 ISBN 978-0-89579-673-8 (2011) xxviii + 301 pp. \$90.00
Includes CD-ROM



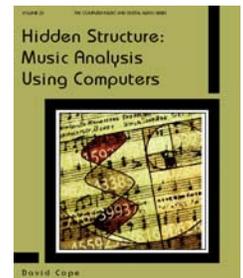
Hidden Structure: Music Analysis Using Computers

David Cope

Today's computers provide music theorists with unprecedented opportunities to analyze music more quickly and accurately than ever before. Where analysis once required several weeks or even months to complete—often replete with human errors, computers now provide the means to accomplish these same analyses in a fraction of the time and with far more accuracy. However, while such computer music analyses represent significant improvements in the field, computational analyses using traditional approaches by themselves do not constitute the true innovations in music theory that computers offer. In *Hidden Structure: Music Analysis Using Computers* David Cope introduces a series of analytical processes that—by virtue of their concept and design—can be better, and in some cases, only accomplished by computer programs, thereby presenting unique opportunities for music theorists to understand more thoroughly the various kinds of music they study.

Contents include: • Background • Lisp, Algorithmic Information Theory • Register and Range in Set Analysis • Computer Analysis of Scales in Post-Tonal Music • Function and Structure in Post-Tonal Music • Generative Models of Music • A Look to the Future • Bibliography • Glossary

DAS23 ISBN 978-0-89579-640-0 xxix + 344 pp. \$65.00
Includes CD-ROM



Fundamentals of Digital Audio, New Edition

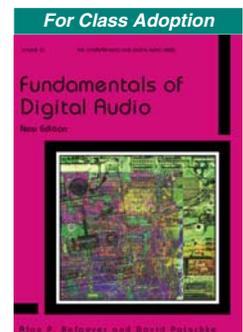
Alan P. Kefauver and David Patschke

In *Fundamentals of Digital Audio*, Alan P. Kefauver and David Patschke present a systematic overview of the elements for digital recording and reproducing sound. With ideas grounded in the principles of acoustics, the authors explore the essential issues involved in preserving, transferring, and modifying sound recordings in the digital domain. In addition to references on historic methods of sound reproduction, this book includes detailed information about the latest digital audio technology.

Fundamentals of Digital Audio is an essential textbook for anyone who wants to better understand or work with recorded sound using today's digital equipment. The book contains many diagrams and illustrations through which the authors share their expertise with the reader. Among the books that treat this subject both comprehensively and understandably, the new edition of *Fundamentals of Digital Audio* should continue to be an indispensable text in this area.

Contents include: • The Basics • The Digital PCM Encoding Process • The Digital Decoding Process • Other Encoding/Decoding Systems • Data Compressions Formats • Tape-Based Storage and Retrieval Systems • Disk-Based Storage Systems • Digital Audio Editing • The Digital Editing and Mastering Session • Signal Interconnection and Transmission • Glossary • Further Reading/Bibliography

DAS22 ISBN 978-0-89579-611-0 xiv + 190 pp. \$46.00



New Digital Musical Instruments: Control and Interaction beyond the Keyboard

Eduardo Reck Miranda and Marcelo M. Wanderley

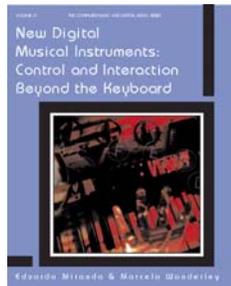
In a unique book on emerging technology Miranda and Wanderley focus on musical instruments that use the computer as the main sound-generating device. Such instruments often consist of a gestural controller driving the musical parameters of a sound synthesizer in real-time.

With very few exceptions, electronic musical synthesizers have been designed since the very early models to be played with a piano-like keyboard. Astonishingly, the appearance of the digital synthesizer and the definition of the MIDI protocol did not change this trend. It is not by chance that in pop-music parlance, performers who played the synthesizers were often referred to as keyboard players.

With the emergence of software-based synthesizers and the availability of increasingly faster and more affordable personal computers, musicians started to implement their own digital musical instruments and create demands for controllers other than the keyboard itself. The authors also discuss various types of biosignals and the techniques that render these signals useful for musical control. Finally, chapter five discusses an interesting route to new instrument design, which involves the provision of artificial intelligence in order to render such instruments interactive.

Contents include: • Musical Gestures: Acquisition and Mapping • Gestural Controllers • Sensors and Sensor-to-Computer Interfaces • Biosignal Interfaces • Towards Intelligent Musical Instruments • References • Plus a CD-ROM with filmclips

DAS21 ISBN 978-0-89579-585-4 xxii + 286 pp. \$50.00
Includes CD-ROM



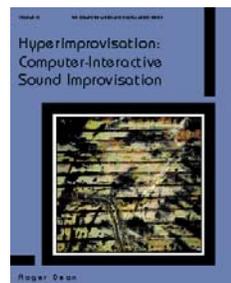
Hyperimprovisation: Computer-Interactive Sound Improvisation

Roger Dean

Hyperimprovisation is the first book to focus on the unique potential of computer-interactive sound improvisation. Instrumental improvisation, through the intermediacy of computers, allows musicians to create and modify large scale and long term structures at a highly polyphonic level, yet still in real-time. Computers also allow the construction of hyperinstruments, with many levels of explicit control of sound generation and transformation. Further, networked improvisation allows mutual—or competitive!—adaptation of the performing interfaces and mechanisms by several performers, again, in real-time. The achievements and future possibilities of the “hyperimprovisation” which is released by computer technology are explored in this book.

Contents include: • Environment and Antecedents • Into the Interface: Instrument ↔ Computer • Sound Routes and MIDI Maps • Hyperimprovisation: The Software Shoots • Into the Ether • Some Futures of Interactive Sound

DAS19 ISBN 978-0-89579-508-3 xxvi + 206 pp. \$50.00
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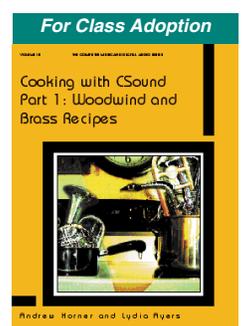
Cooking with CSound Part 1: Woodwind and Brass Recipes

Andrew Horner and Lydia Ayers

Cooking with CSound offers a fresh approach to using the software to create effective sounds. This book contains a collection of software synthesis designs for the woodwind and brass instruments, which you can bake into compositional curries, casseroles and soufflés in your computer. Whether you are a composer, researcher, student, or hobbyist, the ready-to-use designs found in this volume will provide you with a rich set of sounds. The designs are in the Csound software synthesis language, which is available free on the web. The book includes a tutorial for those new to Csound, and a wide variety of effects for customizing the instrument designs. A chapter on pitch representation also allows readers to use customized tunings and scales.

Contents include: • Csound • The Instrument Design • Woodwind Instruments • Brass Instruments • Global Effects: A Digital Mixing Board • Note-Specific Effects • Representing Pitch • Seasoning Touches

DAS18 ISBN 978-0-89579-507-6 xii + 205 pp. \$50.00
Includes CD-ROM



The Algorithmic Composer

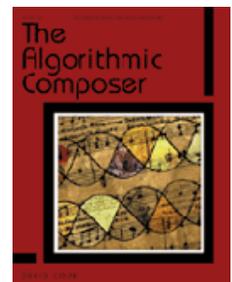
David Cope

The Algorithmic Composer describes the need for, concepts of, and use of computer-assisted composition and includes a CD-ROM containing the Alice (ALgorithmically Integrated Composing Environment) program. Alice extends user-composed passages, develops potentials of composer-created germ ideas, and offers new ideas when inspiration temporarily wanes.

In addition, his discussion of structure involves an understanding of signatures and pattern-matching, as well as heirarchical patterns as they play into composition. In this groundbreaking book Cope not only discusses the possibilities that exist for computer-assisted composition, but also challenges preconceived notions of invention by computer. His vision encompasses a “music of the future” that fuses computerized craft with human ingenuity. Above all, *The Algorithmic Composer* makes a bold statement on tomorrow’s music.

Contents include: • A Brief Background of Algorithmic Composition • Fundamentals: Markov Chains, Randomness and Recognition, Association Nets • Tonal Inference and Deriving Rules • Creativity in Algorithmic Composition • The Alice Program

DAS16 ISBN 978-0-89579-454-3 viii + 285 pp. \$50.00
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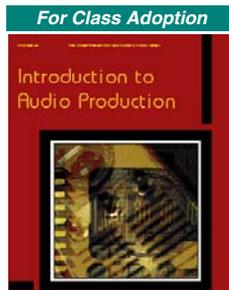
Introduction to Audio Production

Peter Utz

Introduction to Audio Production presents a concise overview of audio production, as well as how to set up and use the most common types of audio equipment to make and play back recordings. Utz leads the reader step-by-step through the process of selecting microphones, positioning them to receive the clearest sound, then connecting them properly to mixers and amplifiers. Digital and analog audio recording techniques are taught, along with methods of mixing, manipulating, editing and “sweetening” the sound as well as copying it for distribution on tape, compact discs, and other media. Practical skills, useful in the studio or in field production, are emphasized, such as when to use certain types of cables, connectors, inputs, and outputs. This book is an essential guide to anyone working in the field.

Contents include: • Basics of Audio • Microphones • Sound-Mixing Techniques Sound • Amplifiers, Speakers, and Public Address Systems • Analog Copying, Editing, and Overdubbing • Digital Audio Recording

DAS20 ISBN 978-0-89579-512-0 xii + 268 pp. \$37.00



Knowledge-Based Programming for Music Research

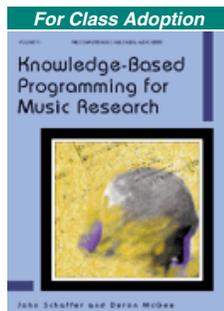
John Schaffer and Deron McGee

In *Knowledge-Based Programming for Music Research*, Schaffer and McGee explore expert systems for applications in artificial intelligence (AI). The text concerns (1) basic principles for knowledge-based programming, (2) concepts and strategies for programming these systems, (3) a “universal data” model for music analysis, and (4) examples that concern specific aspects of design and application. The authors also investigate Prolog (programming in logic), one of the most widely used computer languages for AI, and base some of their applications on the recent implication-based theories of Eugene Narmour.

The text is designed for musicians at various levels and could also be used in courses on computer-music programming. Parts of the book have been successfully used in courses on computer programming for music research, with which the authors have direct experience. The text includes extensive examples of code for use in individual Prolog applications and a comprehensive bibliography.

Contents include: • Introduction • A Prolog Overview • Introduction to Logic Programming • Programming Knowledge-Based Systems • A Generalized Model for Encoding Musical Data • A Knowledge-Based Intelligence Tutoring Engine • KIRS: A Knowledge-Based Simulation • Tonal Harmonic Model: Middle-Tiered Control Heuristics • Tonal Harmonic Model: Program Code • Implication-Realization English Rule Base: After Narmour • KIRS Program Code • Bibliography

DAS13 ISBN 978-0-89579-378-2 x + 396 pp. \$50.00



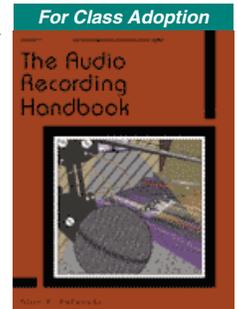
The Audio Recording Handbook

Alan P. Kefauver

The Audio Recording Handbook is a comprehensive guide about every aspect of the recording process. Kefauver explores loudspeakers and microphones and also current audio signal processing devices. He covers at length issues of reverberation, equalizers, compressors, noise reduction, and other processes for recording, processing, and editing sound. *The Audio Recording Handbook* also covers recording, mixdown, and editing sessions, which brings together everything covered in the text.

Contents include: • Measuring Sound • Microphone Technique • Loudspeakers • Analog Audio Recording Systems • Digital Audio Systems • Synchronization Systems • Sound Processing Devices • The Recording Console • The Recording Process • The Mixdown Session

DAS17 ISBN 978-0-89579-462-8 xii + 606 pp. \$55.00



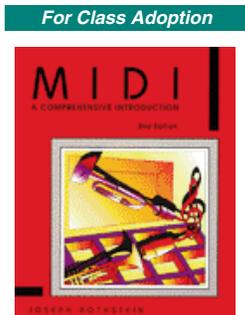
MIDI: A Comprehensive Introduction, 2nd ed.

Joseph Rothstein

Rothstein’s book provides a practical guide for anyone seeking a thorough discussion of the basic principles of MIDI. The text focuses on MIDI hardware and software as a single integrated system. In addition to describing categories of MIDI instruments, accessories, and personal computer software, Rothstein explains what they do, what to look for in each, and how to get it all to work together. With this book, you will be able to evaluate, assemble, and manage a complex hardware/software MIDI system.

Contents include: • Musical Acoustics • Computer Music Basics • MIDI Hardware—How to Choose It, How to Use It • Choosing and Using Sequencer Software • Getting It All to Work Together • Understanding MIDI Messages • Synchronization • Programming in MIDI • Getting Help

DAS7 ISBN 978-0-89579-309-6 xviii + 263 pp. \$29.00



The Compact Disc Handbook, 2nd ed.

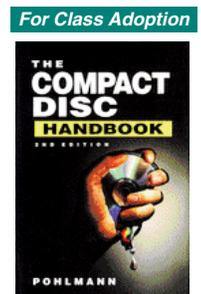
Ken C. Pohlmann

The compact disc is the most exciting audio invention since Edison’s tinfoil cylinder recorder. Ken Pohlman has completely updated his popular guide to CD technology—with new sections on the optical and electronic principles underlying the CD format as well as the latest details on new CD player designs.

For audio and multimedia enthusiasts, CD owners, recording engineers, and manufacturers, *The Compact Disc Handbook* remains the most comprehensive reference book on this technology.

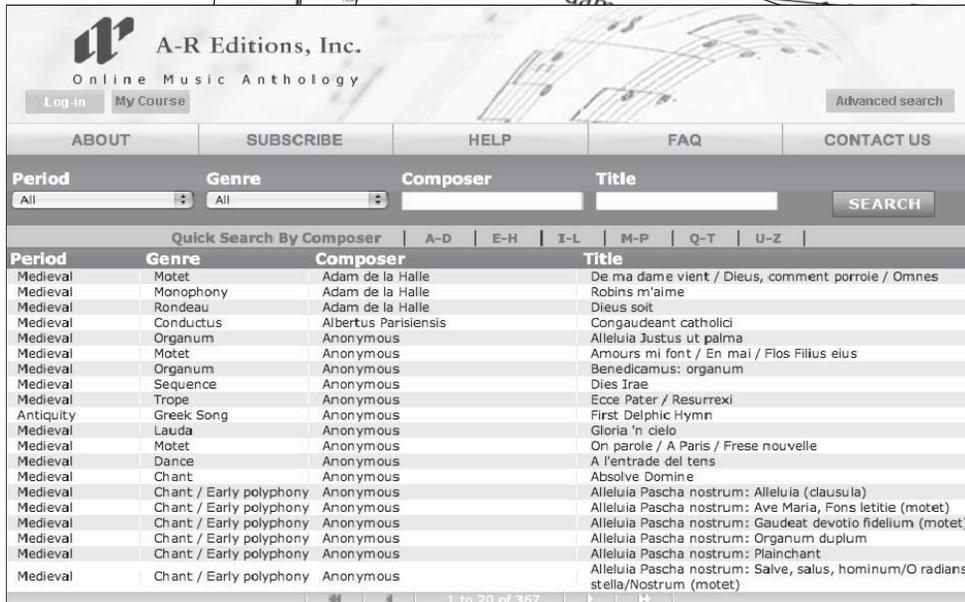
Contents include: • Fundamentals of Digital Audio • The Compact Disc System • CD Player Design • Practical Concerns • Diverse Disc Formats • Disc Manufacturing

DAS5 ISBN 978-0-89579-300-3 xvi + 339 pp. \$35.00



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Medieval	Conductus	Albertus Parisiensis	Congaudeant catholici
Medieval	Organum	Anonymous	Alleluia Justus ut palma
Medieval	Motet	Anonymous	Amours mi font / En mai / Flos Filius eius
Medieval	Organum	Anonymous	Benedicamus: organum
Medieval	Sequence	Anonymous	Dies Irae
Medieval	Trope	Anonymous	Ecce Pater / Resurrexi
Antiquity	Greek Song	Anonymous	First Delphic Hymn
Medieval	Lauda	Anonymous	Gloria 'n dieo
Medieval	Motet	Anonymous	On parole / A Paris / Frese nouvelle
Medieval	Dance	Anonymous	A l'entree del tens
Medieval	Chant	Anonymous	Absolve Domine
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Alleluia (clausula)
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Ave Maria, Fons letitie (motet)
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Gaudeat devotio fidelium (motet)
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Organum duplum
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Plainchant
Medieval	Chant / Early polyphony	Anonymous	Alleluia Pascha nostrum: Salve, salus, hominum/O radians stella/Nostrum (motet)

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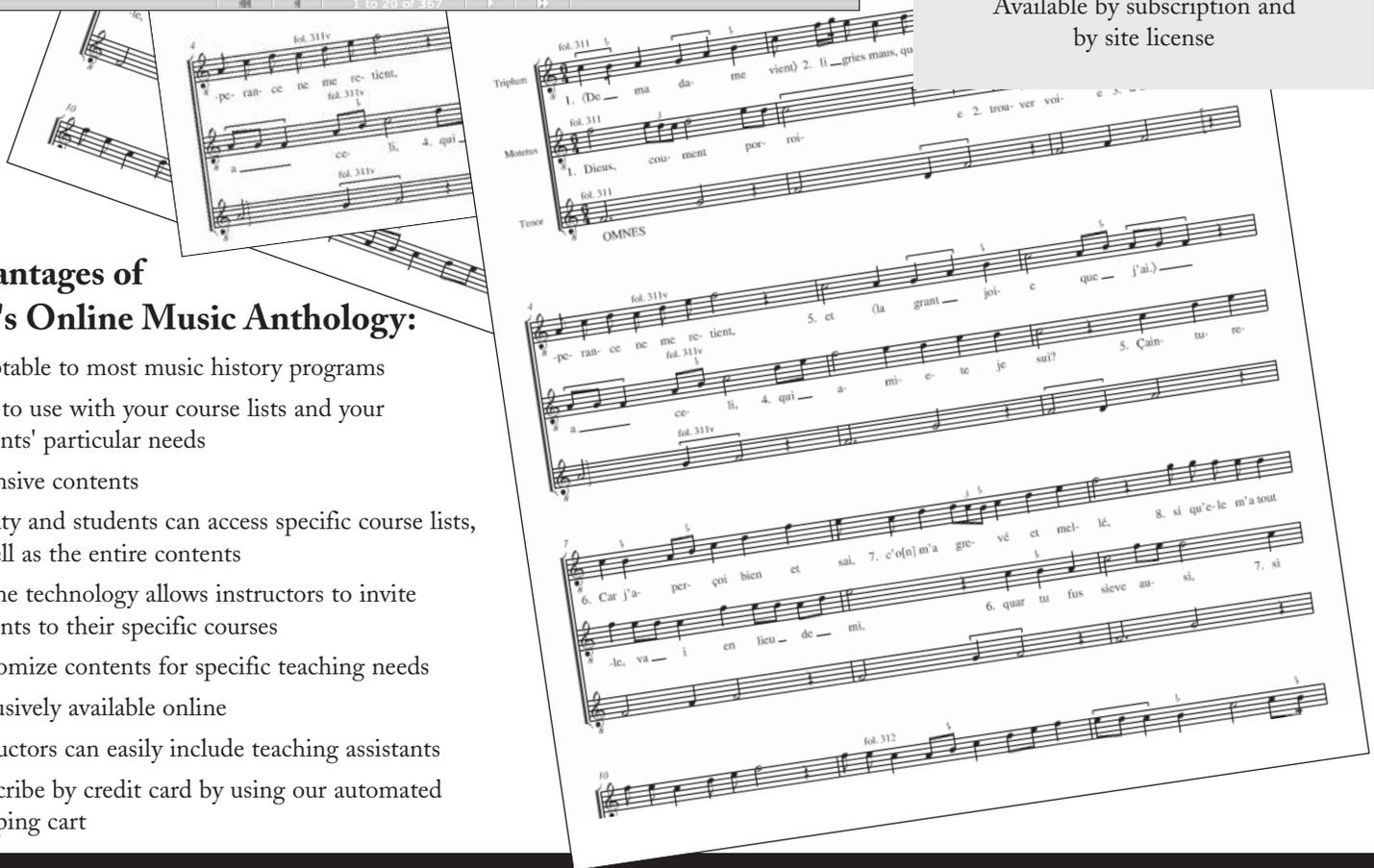
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