


INCLUDES
AUDIO CD

PRODUCING GREAT SOUND for FILM & VIDEO

Third Edition



Jay Rose



Producing Great Sound for Film and Video

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Jay Rose



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Producing Great Sound for Film and Video

Third Edition

To Cat: you're still my inspiration.

Acknowledgments

This book is now in its third edition, and a lot of very fine people helped it get there. Matt Kelsey and Dorothy Cox of CMP Books, and filmmaker and journalist Jim Feeley, helped bridge the tremendous gap between my thinking about a book and actually turning out the first edition; copy editor Lydia Linker provided tremendous support for the second. I'm grateful for the working professionals who let me pick their brains about the techniques they use. First among them would be location sound guru G. John Garrett. I also got help from the late Bob Turner of *Videography Magazine*, veteran boom operator Chris O'Donnell, and PBS narrators Wendie Sakakeeny and Don Wescott. Omnimusic president Doug Wood contributed audio examples for the book's CD. Dave Talamas and Ramon Fabregas of Talamas Broadcast Equipment provided cameras for my lab measurements.

Special thanks to Richard Pierce, noted audio design consultant, author, and reviewer for the Audio Engineering Society, for the countless times he answered my phone calls about the finer points of acoustics and digital audio. And thanks to Dave Moulton, Grammy-nominated engineer, nationally-respected audio educator and researcher, and author of *Total Recording*, for reviewing the first edition's manuscript and offering suggestions.

I'm particularly grateful to my new publisher and the technical experts they assembled to review my ideas and manuscript. Elinor Actipis, Cara Anderson, Robin Weston, and Paul Gottehrer of Focal Press provided the support and professionalism that made this edition possible. Steve Buss, Don Hall, Bart Weiss, Neil Wilkes, and Chris Woolf—working filmmakers and college instructors—gave me valuable insights and suggested changes. Of course, any of their ideas I misinterpreted is my own fault.

Thanks also to readers of my column at *DV* magazine, members to the online *Audio Solutions* forum at www.DV.com, e-mail correspondents, and readers who have posted critical comments of the first two editions at www.Amazon.com. Your suggestions (and brickbats) helped shape this book.

It's customary for authors to thank their families, and mine has been uniquely helpful. My late wife Carla, who wrote some 32 successful books about computer graphics during her career, taught me the practical realities of getting a manuscript out the door. My son Dan, Assistant Chief Engineer at The WBUR Group and consultant to other stations in the Boston area, continues to be my anchor to all things technical.

Introduction

There's a good chance you picked up this book because you're working on a project and having trouble with its sound. So we've included a list of Frequently Asked Questions: common film and video sound problems, and either how to fix them or—if the fix is complicated—where to go in this book for the answers.

This section is set apart with gray borders at the end of the book. Turn to it if you have to put out fires in a hurry.

But read the rest of this book if you want tracks that are truly hot.

I'm going to try to guess some things about you. You may have taken a few film or video courses, but most of your production knowledge is self-taught. You improve your skills by watching projects you've produced, seeing what you don't like, and changing it the next time. You look at still frames of your own work and others, to analyze lighting or composition. You compare your own editing techniques with what's on television and the movies you rent. Since you're primarily an artist, your eyes are your guide. You can see what you've done wrong.

One other guess: You've discovered it's almost impossible to learn how to make a good soundtrack that way. There are too many variables. If the finished mix has dialog that's hard to understand, there's no intuitive way to tell whether it was because the boom was placed badly, levels weren't set properly in post, or if it was mixed on the wrong kind of speakers. Often, trying to fix one sound problem makes some other part of the track worse.

Even if you also play a musical instrument, your sense of aesthetics doesn't bail you out when the track isn't working. There's a reason for this:

- Good soundtracks aren't just a question of art. You also have to understand the science.

In this book, we cover both.

IT'S NOT ROCKET SCIENCE

Don't be scared about the science part. The math is mainly stuff you learned in elementary school, and the physics is common sense.

Don't be scared of the art, either. This isn't a book on the aesthetics of sound. There are plenty of books with critical essays of classic directors and theories about sound design, but they're completely irrelevant to what we're trying to do here. I'm not going to try to change what you think is good.

And don't be scared of me. The "art" of this book is the tricks, shortcuts, and industry practices that have been developed over more than 75 years of talking pictures, and that I've been working with personally for more than three decades. I've dealt with everything from sales videos to theatrical features, engineered every kind of facility from local stations to large post houses, helped design some of the industry's standard pieces of digital audio gear, and seen the projects I work on win Clios, an Emmy, and hundreds of other awards. I've learned a lot, and had a lot of friends help me. This book is an attempt to share as much as I can.

HOW THIS BOOK IS ORGANIZED

The first section of this book is an explanation of how sound works. It covers the physics of sound in space and the technology of digital recording. I've put this material in front because it's important. I've also put it in plain English, without jargon or complicated formulas, and with plenty of drawings and examples. It shouldn't take more than a couple of evenings to read.

Then we get to step-by-step advice, which is the bulk of these pages. First, pre-production: how to plan the track, figure the budget, and pick the location. Second, acquisition: how microphones work and are affected by practical acoustics, how to use them on location and in the studio, how to get the best audio results from cameras and recorders, and how to work with the people and things that make sound. Finally, postproduction: editing voices, adding and editing music and effects, processing for the best possible sound, and mixing for various viewing situations.






There's also an accompanying CD with examples and tutorials. I made it an audio CD, playable on any standard stereo, rather than a CD-ROM because I wanted you to be able to hear it on the best speakers you own. There should be no problem importing the tutorials into your editing system.

DO IT YOURSELF?

There are a couple of simple projects in this book, for building helpful tools that aren't commonly available off-the-shelf. They require a little bit of soldering but no other special techniques. If you don't want to tackle them, ask a local high school hardware hacker or amateur radio enthusiast. I've chosen parts that should be available at any electronics store or Web site. I've also included Radio Shack part numbers for ordering convenience. Parts from other sources will work just as well, but they sure have a lot of stores—they claim more than 6,000 on their Web site—so they might be easiest to find.

THOSE LITTLE ICONS

I wanted to call attention to a few points, so I asked the publisher to set them apart (like this). They're identified with little icons:

- —The asterisk is for *Tidbits*, interesting little facts that may help you understand the material better.
- —The question marks are *Queries*, answers to questions I'm occasionally asked about an unusual aspect of sound.
- —The exclamation points are *Warnings*, to help you get through an operation more efficiently.
- —The lightning bolt identifies a *Hazard*, where you should be particularly careful of electricity within the equipment.
- —The camera shutter is *Breaking News*. Some upcoming laws may affect our work; this points out what to look for.

These are fairly broad categories and subject to interpretation, so each icon has a subhead explaining what its text is talking about.

About This Book and Audio Postproduction

The first edition of *Producing Great Sound* sold well enough that my publisher asked for another, with much more detail about the postproduction process. That book, *Audio Postproduction*, includes almost 150 pages just about processing: tutorials, explanations, examples, practical tips, and specific recipes for equalization, compression, and the other processes necessary to build a good mix, including a chapter on removing noise from bad recordings. It also has long sections about editing, postproduction sound and music sources, debugging sync and NLE problems, and soundproofing and wiring an audio post setup. It comes with a one-hour audio CD of new diagnostics, examples, and tutorials aimed at postproduction. But it doesn't cover any aspect of location sound at all.

With *Audio Postproduction* on the shelf, I felt free to expand the production side of this book. There are sections on choosing microphones, boom and lav technique, and wireless mics. There's coverage of techniques used in creating a feature film Hollywood style, shortcuts and timesavers that are often used on smaller productions, and how to pick the best from both. There's a chapter on getting the best results with in-camera sound and with separate audio recorders, including specific measurements and tips for some popular camera models. I've kept the chapters about audio postproduction that were in the first edition (with some updates to cover more elaborate styles of filmmaking), so *Producing Great Sound* can still serve as a guide to the entire production process.

Some parts of the two books necessarily overlap. The basics of sound, digital recording, accurate monitoring, and editing belong in both books. But I've written about them differently in each, to give you a better chance of understanding these important concepts.

In other words, it's entirely reasonable to own both *Audio Postproduction* and this edition of *Producing Great Sound*. But if you can get only one:

- Choose this book for an overview of the entire audio process with a strong emphasis on sound at the shoot;
- Choose *Audio Postproduction* for a complete discussion of turning that sound into a polished, finished soundtrack.

STAYING UP-TO-DATE

While styles change, the techniques behind good audio remain constant. The physics of sound aren't going to change without a major overhaul of the universe. You should be able to hang onto this book for a while.

My intention is to share the *what* and *why*, as well as the *how*. While there are recommendations for getting the best results from some current cameras and other equipment, I explain the principles involved so you can apply the information to next year's equipment. While I demonstrate editing techniques using software available today, the step-by-step instructions aren't designed for any particular program or platform. The tutorials are appropriate for any decent program, Windows or Mac, and just about any collection of software or hardware processors. You can use this book with tools you have now, and keep using it when you upgrade.

For the most current information, check the magazines and online forums. I particularly recommend *DV* magazine and their Web site www.DV.com. They've got up-to-date product reviews, recommendations, and how-to features, and I've been writing for them since late 1995. There are also tutorials, examples, and pointers to my other writing at my own Web site: www.dplay.com

Or ask a friendly professional: we're not territorial, and are usually willing to share ideas and information. You can reach me through my Web site.

How to Create a Great Soundtrack (in a Quarter of a Page)

Here are the rules:

- Know what you're doing before you start.
- Plan the sound as carefully as you plan the picture.
- Get good elements.
- Treat them with respect.
- Do as little processing as possible until the mix.
- Listen very carefully while you mix.
- Follow the tips in this book.

The rest is just details.

Contents

	<i>Acknowledgments</i>	<i>xi</i>
	<i>Introduction</i>	<i>xiii</i>
	<i>About This Book and Audio Postproduction</i>	<i>xvii</i>
	<i>How to Create a Great Soundtrack (in a Quarter of a Page)</i>	<i>xix</i>
SECTION I	AUDIO BASICS	1
Chapter 1	How Sound Works	3
	Music-Sicle?	3
	The Life of a Sound	4
	Fast Pressure Changes are Heard as Sounds	5
	Somewhat Slower Pressure Changes are Heard as Envelopes	9
	Slow Changes of Pressure are Loudness	11
	Echoes in Small Rooms	15
	Very Slow Changes of Pressure are Weather	19
Chapter 2	How Digital Audio Works	20
	Why Digital?	20
	Turning Analog to Digital	23
	Audio Data Reduction	36
Chapter 3	Audio on a Wire	41
	Analog Wiring	41
	Digital Wiring	54
SECTION II	PLANNING AND PREPRO	59
Chapter 4	Planning for Sound	61
	The Need for Sound	61
	Think About The Overall Track	65
	Elements of the Soundtrack	72
	Spoken Words	72
	Music	77

	Sound Effects	80
	Special Effects and Processing	81
	The Layers of a Track	82
Chapter 5	Budgeting, Scheduling, and Preproduction	83
	Budgeting for Sound	84
	Allow Time for Sound	90
	Checking Locations	95
SECTION III PRODUCTION SOUND		103
Chapter 6	Microphones and Room Acoustics	105
	About Microphones	106
	Rooms and Recording	125
Chapter 7	Production Mic Technique	128
	What Kind of Mic to Use?	129
	Using Boom Mics	130
	Using Lavalieres	140
	Controlling Wind Noise	146
	Using Wireless	147
	Room Tone	156
Chapter 8	Production Recording	157
	Getting Audio Into a Recorder	157
	Camera Settings	164
	Double System	172
	Mixers and Preamps	177
	Connecting to the Recorder	179
	Adjusting the Volume	181
Chapter 9	Recording Voice-Overs, ADR, and Effects	184
	Engineering a Voice Recording	185
	Directing The Voice-over	195
	Recording Sound Effects	206
SECTION IV POSTPRODUCTION		215
Chapter 10	Postproduction Workflow	217
	Linear and Nonlinear Editing	217
Chapter 11	Postproduction Hardware	232
	Monitoring	232
	Computer Input/Output	243
	The Mixer	244
	Moving Signals Around the Editing Suite	254
	Wiring The Postproduction Suite	256
	Mixing -10 Dbv and +4 Dbu Equipment	259

Chapter 12	Levels and Digitizing	263
	Digital Audio Transfers	264
	Digitizing Analog Signals	271
	Metering and Lineup Tones	278
	Synchronization	283
Chapter 13	Editing Voices	293
	The Right Tools for Editing Voice	294
	Editing I: Cutting in Silences	296
	Editing II: Sounds with Hard Attacks	297
	Editing III: Hearing Phonemes	300
	Editing IV: Theatrical Film Dialog	305
	Editing V: The Tricks	308
	Editing VI: Keeping Track of Sync	309
	A Final Exercise	313
Chapter 14	Working with Music	314
	Deciding What Music You'll Need	315
	Sources of Music	317
	Selecting Music from a Library	328
	Music Editing	330
Chapter 15	Sound Effects	339
	We Don't Need No Stinkin' Reality	339
	Sources for Sound Effects	341
	Choosing Effects	344
	Placing Sound Effects	345
Chapter 16	Processing	352
	How any Effect can Wreck a Sound	353
	When to Apply Processing	354
	Equalizers	356
	Compressors	363
	Reverberation	369
	Noise Reduction	375
	Combining Effects	378
	Learning More	379
Chapter 17	The Mix	380
	Setting up for the Mix	381
	Preparing for Someone Else to Mix	395
	After the Mix	397
	The Last Thing You Should Do	398
Chapter 18	"Help! It Doesn't Sound Right!"	399
	Problems With On-Camera Dialog	399
	Too Many Background Noises	401

Dialog Problems Introduced by the Recorder	402
Postproduction Audio Issues	403
Narration Problems	406
Computer Doesn't Play Audio Well	406
Editing Problems	407
Mix Problems	408
The Mix Sounded Great on the Desktop or Mixing Studio, but Bad on the Air or in the Conference Room	408
The Mix Proportions Were Right, but It Was Too Soft/Loud/Distorted on the Air	408
Some Elements Sound Fine in Stereo, but Disappear when the Tape Is Broadcast, Played on VHS, or Seen on the Web	409
Other Common Questions	410
Appendix A Glossary	412
Appendix B Resources	418
Organizations	420
Appendix C CD Contents	422
<i>Index</i>	429

Section I

Audio Basics

These three chapters are the technical stuff: How sound exists and what happens when it gets to your brain, how it can be turned into electronic impulses and then computer data, and how the impulses and the data can be carried over wires. It's the foundation for everything else in this book.

I've avoided formulas. If you made it through grade-school science and math, and have normal common sense, you should be able to understand these concepts. I've also used visual analogies in many of the explanations . . . my thinking is that if you want to make films, you're probably already pretty good at seeing the world.

But it is technical, and some people have a problem with that. You can skip this material—if you must—and go directly to the practical tips and techniques that comprise this book's other chapters. But I don't recommend doing that. Once you're read these few chapters, the rest of the book makes a lot more sense. In fact, since you'll know how sound actually works, you'll find yourself getting better tracks without having to memorize a bunch of rules.

And that will make it easier to concentrate on the fun stuff.