Practical Recording Techniques

Fifth Edition
Practical Recording Techniques

The Step-by-Step Approach to Professional Audio Recording

Fifth Edition

Bruce Bartlett
Jenny Bartlett
To family, friends, and music.
DEDICATION ........................................................................................................................................v
PREFACE .............................................................................................................................................ix
ACKNOWLEDGMENTS ..................................................................................................................xiii

CHAPTER 1  Music: Why You Record.......................................................... 1
CHAPTER 2  The Recording Chain ............................................................... 5
CHAPTER 3  Sound, Signals, and Studio Acoustics...................................... 15
CHAPTER 4  Equipping Your Studio ............................................................ 37
CHAPTER 5  Monitoring ............................................................................... 67
CHAPTER 6  Microphones ........................................................................... 79
CHAPTER 7  Microphone Technique Basics .............................................. 101
CHAPTER 8  Microphone Techniques ........................................................ 123
CHAPTER 9  Digital Recording ................................................................. 165
CHAPTER 10  Effects and Signal Processors ............................................. 195
CHAPTER 11  Mixers and Mixing Consoles ................................................ 237
CHAPTER 12  Mixer Operation ................................................................. 257
CHAPTER 13  Computer Recording ......................................................... 289
CHAPTER 14  Judging Sound Quality ....................................................... 331
CHAPTER 15  Session Procedures, Mastering, and CD Burning .............. 357
CHAPTER 16  The MIDI Studio: Equipment and Recording Procedures .... 381
CHAPTER 17  On-Location Recording of Popular Music ......................... 407
CHAPTER 18  On-Location Recording of Classical Music ......................... 439
CHAPTER 19  Surround Sound: Techniques and Media ......................... 457
CHAPTER 20  Web Audio and Online Collaboration .............................. 493
APPENDIX A dB or Not dB ................................................................. 509
APPENDIX B Optimizing Your Computer for Multitrack Recording .......... 521
APPENDIX C Impedance ....................................................................... 535
APPENDIX D Where to Learn More ..................................................... 541

GLOSSARY ..................................................................................................................................... 547
INDEX ...............................................................................................................................................607
Practical Recording Techniques Demo Web Site .............................................631

ONLINE at www.elsevierdirect.com/companions/9780240811444
See the Practical Recording Techniques Demo Web Site section for the passcode to access this site.
Recording is a highly skilled craft combining art and science. It requires technical knowledge as well as musical understanding and critical listening ability. By learning these skills, you can capture a musical performance and reproduce it with quality sound for the enjoyment and inspiration of others.

Your recordings will become carefully tailored creations of which you can be proud. They will be a legacy that can bring pleasure to many people for years to come.

This book is intended as a hands-on, practical guide for beginning recording engineers, producers, musicians—anyone who wants to make better music recordings by understanding recording equipment and techniques. I hope to prepare the reader for work in a home studio, a small professional studio, or an on-location recording session.

*Practical Recording Techniques* offers up-to-date information on the latest music recording technology, such as hard-disk and Flash memory recorders, computer recording, loop-based recording, keyboard and digital workstations, MIDI, surround sound, Web audio, and online collaboration. But it also guides the beginner through the basics, showing how to make quality recordings with the new breed of inexpensive home-studio equipment.

The first chapter answers the question, “Why do we record?” Next, the book overviews the recording chain to instill a system concept. The basics of sound, signals and studio acoustics are explained so that you’ll know what you’re controlling when you adjust the controls on a piece of recording equipment or build a studio. Then advice is given on equipping a home studio for any style of recording, with examples of equipment manufacturers.

Studio setup is covered next, including cables and connections, choosing monitor speakers, and preventing hum.
Each piece of recording equipment is explained in detail, as well as the control-room techniques you’ll use during actual sessions. Two chapters are devoted to the technology of digital recording, audio for video and MIDI sequencing. A major chapter on computer recording covers the latest ways of creating and recording music. Two sections on remote recording cover techniques for both popular and classical music.

A special chapter explains how to judge recordings and improve them. The engineer must know not only how to use the equipment, but also how to tell good sound from bad.

The latest developments in recording are surround sound, Web audio, and online collaboration. All these topics are covered in detail in their own chapters.

Finally, four appendices explain the decibel, suggest how to optimize your computer for multitrack recording, explain impedance, and suggest further education.

On the book’s Web site at www.elsevierdirect.com/companions/9780240811444 are audio samples that demonstrate various topics explained in the book. Throughout the text, references to specific Web site tracks guide the reader to relevant audio demonstrations.

Based on my work as a professional recording engineer, this book is full of tips and shortcuts for making great-sounding recordings, whether in a professional studio, project studio, on-location, or at home. You’ll find many topics not covered in similar texts:

- Loop-based recording
- Hum prevention tips
- The latest monitoring methods
- Examples of mic models by type
- Microphone selection guide
- Tonal effects of microphone placement
- Glossary of sound-quality descriptions
- The latest types of digital recorders
- Up-to-date coverage of computer recording
- Optimizing your computer for multitrack recording
- Documenting the recording session
- Audio-for-video techniques
- On-location recording
Troubleshooting bad sound; guidelines for good sound
Audio on the Web
Selling your music online
File sharing for online collaboration
Surround sound, DVD, and Blu-ray
Thank you to Nick Batzdorf of Recording magazine for giving me permission to draw from my “Take One” series. For my education, thank you to the College of Wooster, Crown International, Shure Brothers Inc., Astatic Corporation, and all the studios I’ve worked for.

Thank you to Catharine Steers, Beth Howard, Emma Baxter, Becky Golden-Harrow, Dawnmarie Simpson, and Joanne Tracy at Focal Press/Elsevier for their fine work and support.

My deepest thanks to Jenny Bartlett for her many helpful suggestions as a layperson consultant and editor. She made sure the book could be understood by beginners.

A note of appreciation goes to Sting, Uncle Earl, The Beatles, Led Zeppelin, the Pat Metheny Group, and Samuel Barber (“Adagio for Strings”), among many others, whose music inspired the chapter “Music: Why You Record.”

We appreciate the following manufacturers who provided photos of their products: Edirol, Boss, Kong, Alesis, Mackie, Frontier Design, Crown International, Audio-Technica, M-Audio, TASCAM, Zoom, Eventide, Rane, Lexicon, CamelAudio, Izotope, Line 6, RML Labs, E-MU, PreSonus, Digidesign, Cakewalk, Propellerhead Software, CD Baby, TuneCore, and imeem (Snocap, Inc.).

Finally, to the musicians I’ve recorded and played with, a special thanks for teaching me indirectly about recording.