Dedications

To my wife
Jennifer, for her unconditional love, boundless patience, and incredible inspiration. You are my amazing muse.

To my parents
Bennett and Judith, who taught me to work smart and dream big.

To my grandparents
George and Eve Jacobson and Bernard and Helen Greenwald, for their love, encouragement, and early gifts of a guitar and an 8-mm movie camera, which sparked my lifelong passion for music, film, and technology.

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Additional DVD Items
AJA: Timecode Calculator
SequenceLiner: Andreas Kiel, Spherico
Apple: ProRes Decoder
Essentials of Multi-Cam Editing, Steve Martin, Ripple Training
QTChange: Bouke Våhl, VideoToolshed
FOREWORD

While we may take it for granted, something truly magical happens when we open our eyes and view the world. Although we see things in three dimensions, we’re limited in that our vision only affords us one angle at a time. And that’s why it’s always thrilling to see a live action event covered from multiple angles and, by extension, multiple points of view. If you were suddenly faced with the challenge of deciding where to place multiple cameras to cover a live event—be it sports, a musical, a music concert, a live television recording before an audience—what would you do? Where would you put those cameras? What would they focus on? Would you need to switch the cameras live or would everything be recorded for later editing? How would you ensure that you would be able to synchronize all the footage so that everything would be prepared for later postproduction? And, to be sure, the questions go on and on. There are many of them, and a clear, precise workflow must be established when you have any multicamera situation.

I can remember, early in my career, being faced with so many multicamera covered events where no one thought about the hapless editor who had to put the footage together. Where were my sync points? How could I establish sync? Why did they have to turn off the camera? Didn’t they realize the life of agony their actions were going to put both the editor and the director through later on? And, surely, we all learn the tricks of the trade. Oh, you don’t have any nice sync points? Well wait, that guy over there—he’s in all three camera angles. Look, he’s just lit a cigarette. That’s our sync point! And as absurd as that example sounds, anyone who has done this for a living knows it’s completely true!

What you are about to read is a comprehensive and exhaustive explanation of everything you need to consider and know about approaching multicamera-based projects. Mastering Multicamera Techniques has been written by a proven expert in the field who has over thirty years of experience and has directed and edited hundreds of multicamera productions. As an inventor of a multicamera system, I wish that this book existed earlier because so many problems could have been avoided if people had the practical and educational information that this book provides in abundance.

Enjoy this book and trust that it provides every angle on what you need to know before those multiple cameras roll and after the audience has departed.

Tom Ohanian
Academy Award® and two-time Emmy® recipient
Avid Media Composer, Film Composer, and Multicamera systems inventor
INTRODUCTION

Multicamera production is surging. And not just situation comedies but the number of network studio shows, music, sports, feature films and special events employing multiple cameras for maximum coverage is greater than ever.

At another end of the spectrum, boutique event production companies are empowered with a pair of inexpensive digital HDSLR cameras, and teenagers are making their own podcasts and broadcasts, often with more technological savvy than people three times their age. Multicamera techniques are being used everywhere, by virtually everyone interested in the modern moving image—and it seems the trend is growing. Multicamera DVDs and on-line programs allow everyone to direct and switch their own angles live from their TVs and cell phones! And with multicamera shooting powers come great multicamera editing responsibilities … and opportunities.

Multicamera editing is a specialty and has become a major subcategory of editing. Moreover, these days, all of the top-selling editing platforms support multicam; there is even software that will automatically sync your angles without timecode. But software is no substitute for creativity (at least not yet!), so although the technology is more accessible, the genre itself still needs true human talent.

Because the multicam production and postproduction workspaces are different from those for single-camera production, this book will explore what makes multicam unique, from its advantages to its challenges. The goal is to demystify the multicam universe, allowing anyone with a couple of cameras (or more) to learn the same methods, and perhaps even achieve the same results, as the masters of multicam.

The idea for this book originated while I was directing and editing a multicamera concert in early 2000. I decided to hire an assistant editor with multicam experience. Finding someone qualified, however, proved difficult, because there was no established training track. So I decided to train that person myself. And when I looked for a book or some other resource to supplement my efforts, I came up short. Knowing that I may need to train multiple assistants over time inspired me to take heavy notes on the processes and outline methods learned by way of troubleshooting, improvising and workarounds.

The style throughout is conversational with information rooted in multicamera television technology, history, and culture.
Everybody Has an Angle

Primarily, *Mastering Multicamera Techniques* was written by an editor, for editors. However, it also contains case studies and interviews with more than 100 other editors, producers, directors, engineers, assistants and audio and color post professionals who provide a wealth of insight to anyone seeking a global perspective on multicam techniques, from shooting to preparing deliverable masters. Throughout the book you’ll find round table-like discussions with these experts in sections called The Multi-Expert Approach. Whether you’re cutting your 50th episode of *Project Runway*, researching techniques for concerts and music video productions, or producing weddings and events, there’s something in here for you.

What You’ll Learn

This is much more than a book on editing. Because multicamera preproduction directly links the shooting process with post, we’ll tie it all together with techniques, tips, tricks, and perspectives. You’ll learn camera synchronization, editing sync map secrets, and multicamera math solutions plus strategies for educating others on your team and providing feedback to producers and directors. The book’s narrative is meant to resemble the full trajectory of a multicam project. There are six sections, ordered as in a complete production:

1. Preproduction
2. Production
3. Timecode and Sync: calibrating and synchronizing cameras
4. Postproduction: systems, software, and preparing the project
5. Editing: styles and techniques
6. Deliverables: conforming and mastering

Following the chapters on the techniques, we’ll explore Multicamera Madness! with colorful case studies, featuring fun projects like a 10-camera RED shoot for the rock band Journey and a mixed-platform 26-camera concert film with Sir Paul McCartney. There’s a special feature on history and the important innovations the production team from *I Love Lucy* gave us. Plus, there is a technical report on the film processes for the Rolling Stones movie *Shine a Light* and a look at multicamera HDSLR challenges plus some of my favorite research articles—and more. Due to space limits in the book, mini versions of the case studies are printed here. Fully extended versions can be found on the companion DVD at the back of this book and on-line at [www.masteringmulticam.com](http://www.masteringmulticam.com)
Companion DVD

The companion DVD also consists of some very exciting multicamera footage from two of the greatest musical “Sirs”: Elton John and Paul McCartney. Both clips are exclusive to this book and have never been released. Band on the Run is a “leftover” track from Paul McCartney: The Space Within US concert film that was edited by Zoran Jevromov and myself. Elton’s clip is recorded live from his 2009 tour specifically for this book and as part of a technology test for Telestream’s Pipeline products. I captured all the clips live on-location concurrently onto one MacPro tower with and an eSata RAID. My Final Cut Pro multicamera line cut of Love Lies Bleeding was edited and finished before the capturing was complete. Load them up and cut your own concert clips from more than 20 angles!

For a detailed list see the Companion DVD appendix

1 Multicamera Madness Bonus Chapters
A) Supporting The Director
B) HDSLR and Multicam
C) On-Set Editing
D) No Such Thing as a Firewire Drive
E) How and When to Use Auxiliary Timecode
F) Genlocking And Tri-Level Sync

2 Multicamera Video Clips


Elton John live in concert: Love Lies Bleeding (1:00) 5 angles and 1 linecut. ProRes 422 (LT) NTSC 720x480 29.97

3 Video Tutorials

The Essentials of Multicamera Editing: Final Cut Pro Training video clip from RippleTraining.com. Additional video tutorial links are also provided for Avid Media Composer, Sony Vegas and Adobe Premiere Pro

4 Free Applications

AJA DataCalc; SequenceLiner; QT_CHANGE
5 Research Links

Weblinks for blogs, research and equipment websites (html)

The Gist

My goal is to convey a strategic understanding of multicamera production and editing, enabling you to make the most of your multicam productions. The goal is not to teach you how to use and navigate editing programs step by step. That’s the domain of basic classes, software manuals, and how-to tutorials. (There are basic multicam tutorials on the companion DVD from each of the major NLE systems.) We will spend a bit of time discussing different software specs, but only enough to establish a foundation for understanding technique and workflows strategically.

My Qualifications

When I was 5 years old, two things happened to determine my fate. My grandfather George and Grandmother Eve gave me their used 8mm home movie camera for my birthday, and I went to a live studio taping of Bozo the Clown. I will never forget the feeling of walking into the TV studio and the excitement of the live show. I got the TV bug then, and I’ve been hooked ever since.

I have been a television professional for the past 30 years and have worked in every capacity of the live multicamera show from cable puller to camera operator, editor, director, and executive producer. I have been fortunate enough to work with the greatest names in the entertainment business and have learned from the best. I am a graduate of the Film Production Technology program from Valencia Community College (curriculum designed by Steven Spielberg), and programs in film producing and directing from New York University (NYU) UCLA. I am a member of the Motion Picture Editors Guild (MPEG Local 700/Hollywood), a certified Avid editor and a Certified Apple Pro in Final Cut. Starting in 1980, I worked my way through all the production departments ending up as a director/cameraman shooting ENG packages and live network sports and music programs. The past 15 years have been devoted to editing and postproducing network multicamera productions for A&E, CBS, MTV, E!, and PBS, several of which have been nominated for prime-time Emmy™ Awards.

Some of my multicam credits include director for Barenaked Ladies, Sugar Ray, and Cheap Trick live in concert; as editor of feature length concert films and documentaries featuring artists such as the Rolling Stones, Aerosmith, Paul McCartney, U2, Keith Urban and Luciano Pavarotti; and as editor for network talk shows such
as the *Montel Williams Show*, the *Rachael Ray Show*, and *Isaac Mizrahi*.

Currently, I am the owner of Category-5 Entertainment, Inc. in New York City, a boutique production company that specializes in multicamera productions, editing and color correction for network television, music and entertainment industry projects.

In between projects, I teach classes and present live workshops and seminars at conventions and trade group conferences.

I loved writing this book and hope it helps you achieve your multicamera goals. I would also love to receive your feedback. Please report any praise, errors or omissions for future revised editions to info@masteringmulticam.com. To contact me or to learn more about my work, visit www.masteringmulticam.com and subscribe to my blog: “Cutting it Close”.

Enjoy!

—Mitch Jacobson

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**The Icons Used in this Book**

*Gear Up*—Recommendations for gear that makes the job easier or adds quality to the final production.

*Further Reading*—Recommended books or resources that let you explore a topic in greater depth.

*To Watch*—Recommend video sources that will aid in your understanding of podcasting.

*Web Link*—External websites that offer additional resources or information.

*Noteworthy*—Learn important “gotchas” or pitfalls that can put your production at risk.

*Technical Tips*—How-to’s or important advice on how to get the job done.