

Adobe® Premiere® Pro

STUDIO TECHNIQUES

Jeff I. Greenberg

with Tim Kolb, Christine Steele, and Luisa Winters



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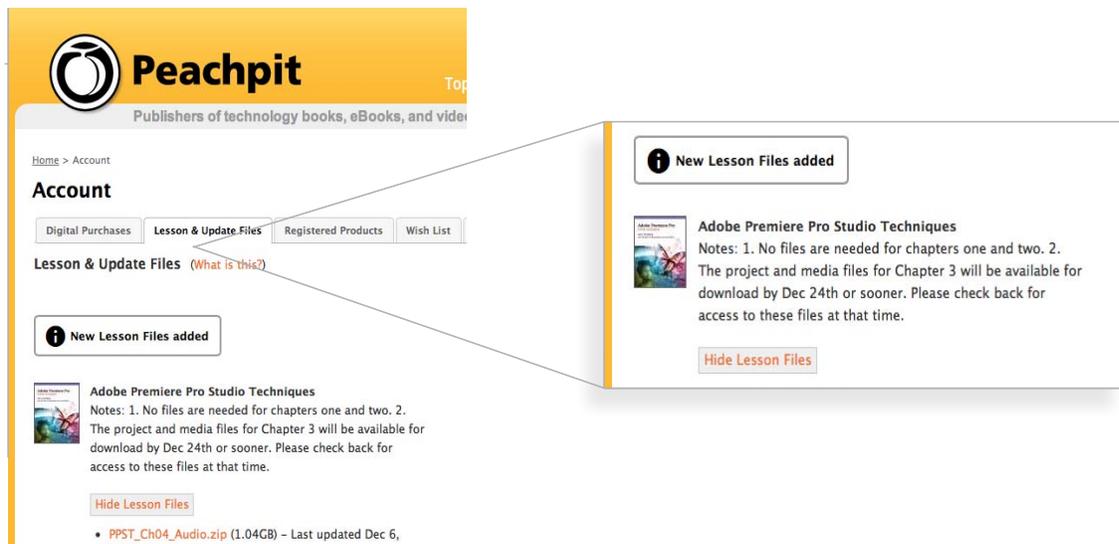
Adobe® Premiere® Pro Studio Techniques

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About the Authors

Jeff I. Greenberg



Jeff I. Greenberg has nearly two decades of experience as a Postproduction consultant and Master Instructor (trainer for other trainers) for Adobe, Apple, and Avid, specializing in the areas of editorial, workflow, compositing, sound, color grading, and compression.

Consistently voted as one of the top seminar speakers/interviewers, audiences' feedback includes depth of subjects covered, approachability, and student-centered teaching that helps keep them up to date on industry standards. Jeff teaches seminars at events such as NAB, IBC, CES, and Inter BEE. He's the chair for the Editors Retreat, an annually held exclusive getaway for editors.

Jeff is a published author of several books on the subject of editing and postproduction, including *An Editor's Guide to Adobe Premiere Pro* (Peachpit, 2012). Jeff writes for various blogs and creates training materials for Lynda.com and macProVideo.com. He's happy to talk to you about consulting and helping you find solutions for your training needs at his company J Greenberg Consulting (www.JGreenbergConsulting.com).

Tim Kolb



Tim Kolb has spent nearly 30 years in video production in a variety of roles, including director, DP, videographer, editor, compositor/visual effects artist, and even some time as a software product manager. Tim is an Adobe Premiere Master Instructor and an Adobe Certified Instructor. His writing credits include books and articles for trade magazines and websites, and he is the technical editor for *Adobe Premiere Pro Classroom in a Book* (Adobe Press, 2014). Recognition for his production work includes multiple American Advertising Awards, Tellys, International Television Association honors, a Chicago Film Festival Hugo, and an Emmy.

Christine Steele



Christine Steele has edited film and video for Disney, Paramount, Warner, Pixar, Showtime, Frontline, MSNBC, Electronic Arts, VH1, ABC, and PBS. She edited *Air Racers 3D*, which is now screening in IMAX theaters worldwide.

Christine also produces documentaries and music videos. She served as the Postproduction Supervisor and Supervising Editor for Paramount's feature

documentary *talhotblond*, now available on Netflix and Amazon.com. She also supervised the postproduction of *Free Radio* for VH1 and worked as lead editor for all episodes of the Animated TV show *Da Jammies*. Christine won a ProMax award for editing promos for ABC's *Desperate Housewives*.

An Adobe Master Trainer and content creator who enjoys the art of storytelling, Christine Steele uses moving pictures and sound to inspire others. She is currently editing a documentary series for PBS using Adobe Premiere Pro.

Luisa Winters



Luisa Winters is an Adobe Premiere Master Instructor, an Adobe Certified Instructor, and an Apple Certified Trainer. She is an accomplished videographer, editor, 3D animator, and graphics designer. Her compositions have been seen on broadcast TV as well as in private video productions. She has created and edited scores of video and web projects for dozens of corporate, government, and educational, commercial, and private clients. An accomplished nonlinear editor and instructor, Luisa has conducted training sessions and master classes for Adobe After Effects, Photoshop, Adobe Premiere Pro, Flash, Dreamweaver, Captivate, and Encore DVD.

Luisa has led sessions and workshops in almost every U.S. state and in several countries across the world. She has been a featured speaker at NAB every year since 2005 and has been a featured instructor for Government Video Expo, DV Expo, CES, and PMA.

About the Technical Editor

Maxim Jago



Maxim Jago is a filmmaker, award-winning film scriptwriter, teacher, stage presenter, communications consultant, and the author or co-author of multiple books and courses, including *Adobe Premiere Pro Classroom in a Book* (Adobe Press, 2014) and *Adobe Premiere Pro: Learn by Video* (Adobe Press and Peachpit, 2014). He is an Adobe Master Trainer, Grass Valley Master Trainer, Avid Certified Instructor, and the creator of the ESP Teaching System, which helps make complex technologies more accessible and meaningful for creative minds. As well as speaking at conferences internationally, Maxim has been published in magazines, has been quoted in books on film production, and has taught media production all around the world. His training company is 123 Training (123training.co.uk), and his filmmaker website is www.maximjago.com.

Foreword

When I wrote *Adobe Premiere Pro 2.0 Studio Techniques* back in 2006, the landscape of nonlinear editing, not to mention the technology in the film and video business, was nothing like it is today. There were few HD video cameras, formats like DigiBeta and DVCam were still considered standard and acceptable delivery formats, and HDV was a thing. There was little discussion of 4k, and RED was the color of the Adobe logo. It's amazing to reflect on how much has changed in the last seven years and mostly all for the better and benefit of the users and artists.

Ironically, the end of 2006 marked a major career turning point for me as I partnered with my friends Mike “Mouse” McCoy and Scott Waugh as the CTO and head of postproduction for our company, Bandito Brothers.

In a very real way, the edited component of Bandito Brothers was born and raised in Adobe Premiere Pro. The techniques I described in the previous volumes were used day in and day out as part of our post workflow. Having learned the application inside and out, we created and ran an efficient and contained postproduction pipeline that gave us complete control of all the projects we edited. We mixed and matched every format we could get our hands on, and developed a language and style that represented who we were, which now serves as the visual foundation of who we are.

While we remain deep in technology and the latest and greatest tools, Adobe Premiere Pro is still an integral part of our postproduction pipeline. With the recent Creative Cloud version of Adobe Premiere Pro, the buzz around the industry is no longer about Avid or Final Cut Pro but finally about our old friend Adobe Premiere Pro.

The principal idea of the *Studio Technique* series is to thrust you deeper into ideas and advanced methods of working with the tools. Lessons guide you down a path to get to a destination. But along the way you learn a bunch of tricks that make you more proficient in not only the end result, but in the details of getting there—quicker methods to complete tasks, shortcuts, workflow tips, and ways to make your content look better and your flow be more efficient.

When I wrote the previous volumes of this series, it was just me and my own collective experience. With this latest volume, readers now have the luxury of learning from a bevy of experts and professionals to create an even more dynamic and broader range of techniques that are essential to honing your skills.

At the end of the day, the tool does not make the artist. The work is made meaningful by the passion that goes into it and the content that carries it. Honing your skills and perfecting your craft enables you to get closer to creating exactly what is in your head to the best of your abilities. For me, becoming an expert in Adobe Premiere Pro was a means to fulfilling a lifelong dream of making movies, telling stories, and being a part of something I believed in. I trust that this latest volume will ensure you safe travel along your own journey and help you understand Adobe Premiere Pro in new and more powerful ways. It's exciting when your old friend gets better with age.

—Jacob Rosenberg

Jacob Rosenberg is a Director and the CTO of Bandito Brothers in Culver City, California. His directorial debut film, Waiting for Lightning, was released in 2012 by Samuel Goldwyn Films.

Introduction

Jeff I. Greenberg

On This Rare Occasion Please Read the Introduction

If you've picked up this book, we want to encourage you to look through its contents and discover the techniques that will put you further on the path to becoming an advanced user of Adobe Premiere Pro.

In this *Studio Techniques* book, it's assumed you've used Adobe Premiere Pro and that you're no longer a novice. Maybe you've never used every Adobe tool, but you've acquired footage and edited and delivered output. We expect that some of you have read the *Adobe Premiere Pro Classroom in a Book* or equivalent, and others may have been using Adobe Premiere Pro for years.

We also assume that you understand the concepts of real-world delivery schedules, clients who are unreasonably demanding, and headache-producing market pressures. Perhaps you even have friends and family that you're able to spend time with occasionally.

The pressures that an editor is under today seem much greater than a decade ago when concepts such as "offline editor only," "picture lock," and a reasonable delivery schedule ruled the day. Nowadays, footage is being thrown at the busy editor from every direction, clients often don't make up their minds (although they truly never have!), and there's constant pressure to always be upgrading software and hardware.

This book gives you the advanced tips and techniques that can make your workflow smoother and your editing faster. It includes techniques that could literally take months or *years* to discover on your own.

What makes this book extraordinary is that it's not a "how to" use Adobe Premiere Pro book; rather, it dives into practical, real-world techniques used by editors working in the trenches with the software every day and teaching others to use it as well. Not only do the four authors who wrote this book earn their living as editors working day-to-day in film, television, and video postproduction, but they also have been "blessed" by Adobe and made Adobe Premiere Pro Master Instructors. This gives them the distinction of teaching instructors and Adobe Certified Experts on how to teach Adobe Premiere Pro to others in the Adobe way.

Hitting a Moving Target

One of the best features of Adobe Creative Cloud is the flexibility it gives Adobe to roll out an update, which is fantastic as a user. But it's *not so great* for an author, especially when a chapter has been finished and put to bed. Major changes can wreak havoc with your sanity and sleeping patterns when you wake up in the middle of the night screaming because much of what you've written must be revised. This book has been written as much as possible in a *general* way—not specifically tied to a particular version. And as significant updates that affect the content occur, they'll be addressed with errata on the web page with the downloadable files (see “A Note About Downloadable Content”).

A Note About Overlap

All of the authors had quite a bit of freedom to write about concepts they felt were important to the techniques they were writing about, *even* if there was some overlap. For you, the advantage of this overlap is that it can help you understand the “why” behind the techniques—sometimes from multiple points of view. For example, it's valuable to remap the keyboard. Hearing the reason for it from an editorial point of view is different than hearing it from a colorist's point of view.

How This Book Works

For the most part, each chapter is readable in isolation. When necessary, other relevant chapters are referenced. While trying to maintain a similar style, authors were given the liberty to write in their own voice. Multiple authors provide the flexibility for different viewpoints in editorial and a faster writing process. Any of these authors are skilled enough to have written the entire text!

We offer you loads of gems throughout the book in Tips (something cool) and Notes (something to watch out for), but many are also scattered throughout the text.

You'll know *some* of the techniques discussed in this book, but I can assure you that you won't know all of them. Yes, in some cases you might be able to jump through a chapter quickly, but if you're weak in a given chapter's topic, we highly recommend a deep read. The following sections provide a brief overview on each chapter.

- ▶ Chapter 1: “Editing in Adobe Premiere Pro” discusses some of the specific functionality that makes Adobe's nonlinear editor nimble and quick in this all-too-soon to be 4k world. Topics include what makes Adobe Premiere Pro so special, and what differentiates a consumer camera and a cinema camera.

The chapter also explains that you should give special attention to hardware system design, performance monitoring, and the order in which you may want to approach using and learning the tools in Adobe Creative Cloud.

- ▶ Chapter 2: “Setup and Organizing” offers wonderful tips on how to best set up Adobe Premiere Pro and your media *prior* to starting a project. If you create and build a Common Media folder with a preconfigured project, you’ll be able to start new projects faster that are optimized to your system. You’ll learn to adjust preferences to improve working with Adobe Premiere Pro as well as learn how to set up caches throughout Adobe Creative Cloud applications. And if you’re a narrative- or transcript-based editor, be sure to check out the section “Speech and Script Technologies” at the end of the chapter.
- ▶ Chapter 3: In “Editing Techniques,” Christine Steele gives you great insights on how to edit smarter and faster with some power techniques. And just because you’ve been editing for years doesn’t mean you should skip the “Editing Essentials” section. The techniques provided for three-point editing and replace editing could change the way you work! If trimming mystifies you, there are loads of details about the different ways you can trim efficiently. If you’re a razor blade and delete editor, this information will open up new ways to work.
- ▶ Chapter 4: In “Professional Audio,” Luisa Winters helps demystify the audio workflow process by describing smart techniques in order of process—from adjusting prior to the edit to using sophisticated submixing and audio FX. She also explains the methods of performing noise reduction and fixing clipped audio in Adobe Audition.
- ▶ Chapter 5: Tim Kolb takes a very practical approach to effects in “Advanced Compositing and Effects,” showing you how you can think “outside the box.” The techniques he shows are very much about the type of play you often do to get an effect to work. He starts with some simple elements and builds on them to create more complex effects.
- ▶ Chapter 6: “Color Correction” helps you understand the way light and video scopes work. Many examples are provided, and also included is a generalized recipe on which order to adjust the Three-Way Color Corrector. Shot matching and Secondaries are explored as well to help you do everything possible directly within Adobe Premiere Pro. Extend your knowledge outside of Adobe Premiere Pro by moving your material to Adobe Speed-Grade and back with this quick usable crash course on its interface.
- ▶ Chapter 7: “Exporting Strategies” is about unlocking some of the cool techniques in Adobe Premiere Pro and Adobe Media Encoder. Some great presets are built right in the chapter, which should help you get an idea of what to adjust when you want to tweak the presets in both tools.

- ▶ Chapter 8: Workflow is always difficult to write about because no two workflows are identical. And if you're reading about a workflow that doesn't apply to you, it can be difficult to find what's important. In "Workflow Management," Tim Kolb approaches workflow by giving you specific techniques that aren't obvious, which are guided by his years of experience working with Adobe Premiere Pro.

What's Not in This Book

We tried to include as much varied content as we could that represented the other video-related tools in Adobe Creative Cloud. But this is mostly an Adobe Premiere Pro book. However, Adobe Premiere Pro doesn't exist in a vacuum, so we included the key details that are necessary to know about the other video-based applications.

Here are some items that you won't find in the book:

- ▶ **No tape-based techniques.** We know you're saying, "But I still use tape." We're not in any way, shape, or form saying you shouldn't use tape. In fact, the authors romantically wish they were still using tape.
Most of the situations we've been in in the last five years or so have been tapeless worlds, which is the reason we didn't include any material about tape-based work.
- ▶ **Only the key Adobe Creative Cloud applications.** Yes, we're huge fans of the entire Adobe tool set, but although tools like Adobe Illustrator, Adobe Bridge, Adobe InDesign, and Adobe Dreamweaver have loads of value, they're not linchpins of video editing.

A Note About Downloadable Content

Not every chapter has media. Chapters 1, 2, 7, and 8 *do not* contain projects. Chapter 2 has a script and clip to use with the speech recognition section, and a template of folders to help you organize your own projects. Chapters 3, 4, 5, and 6 have complete projects and media that you can download that work with specific examples from the text. Chapter 6 also has two broadcast legal looks to use in Adobe Premiere Pro with the Lumetri filter. Chapter 7 has a surprise! I've build the presets from the chapter for download as well.

Throughout this book, you'll see examples of scenes that are used to demonstrate various concepts and techniques. The downloadable content includes a wide variety of corresponding media clips that you can use as a playground for experimenting with the techniques discussed.

To access the Project and Lesson files, please follow these steps.

1. On a Mac or Windows computer, go to www.peachpit.com/redeem and enter this code: 23AA613BB0A2.
2. If you do not have a Peachpit.com account, you will be prompted to create one.
3. The download files will be listed in the Lesson & Update Files tab on your Account page.
4. Click the file links to download them to your computer.

This process may take some time to complete, depending on the speed of your computer and Internet connection.

Note that if updates to this book are posted, those updates will also appear on your Account page at www.peachpit.com.

Special Thanks

As the lead author, the only real power I get to abuse is lavishing thanks upon others. Without these people, this book would have never have happened. There are so many people to thank that even narrowing down the number to what you see here was difficult.

This is an indulgence, but here is a personal note from me (Jeff) to you the reader: If you find *anything* in this book that makes your life easier (and there should be lots!) and if you ever meet any of these wonderful people, take a moment and let them know! Writing, like editing, is done in a small room with what often feels like only negative feedback.

My Co-authors

This book has been a massive effort. During the writing major life forces were at work, which make book writing all that more difficult. Let me start by thanking each of my co-authors and their families. I'm sorry I had to take so much of their time:

Christine Steele. When Christine signed on to write about editing, I tried to warn her about how much work goes into writing a chapter. She amazingly managed to fit in the writing in addition to a new project she's editing for PBS.

Luisa Winters. Luisa was a superstar, writing a great chapter on audio and turning it around remarkably fast during her busy schedule. I've worked with

Luisa for years, so the result was no surprise given her knowledge base and her professional skills.

Tim Kolb. Tim contributed so much technical knowledge to the book. His chapter on workflow really ties down some small nuances that I've never seen before in print.

Maxim Jago. Maxim is the unofficial co-author of this book. He agreed to do the technical edit, and luckily for us he went far and beyond. Maxim even wrote several sections in a couple of chapters. I absolutely couldn't have shepherded this book without my friend Maxim on board.

Shawn Lamb. Thank you for your extra work early on in the audio chapter.

Peachpit Press

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Karyn Johnson. Karyn's cool head prevailed, especially toward the end of the deadline when the doors inevitably come off the machine.

Rebecca Gulick. I would not have taken this role and the book wouldn't have happened if it wasn't for Rebecca. She was a rock for me, especially in the early days of the book. Thank you so much!

Anne Marie Walker. This is the third book you've copyedited for me. I hope I'm not the only author ever to tell you this: I'm stunned at how much better my writing sounds because of your deft hand.

Adobe

And then there are those people inside the walls. Thanks to all those who work at Adobe and help fools like me rave about what I love (and on occasion what drives me crazy!):

Michelle Gallina. I know you're now off in Adobe After Effects land, but this book and the Master Trainer program wouldn't exist without you! You are my favorite person at Adobe, and I am indebted to you for your help and support.

David Helmly. So many times there was a minor question or some obscure switch I needed help with, and time after time you've been there for me.

Mitch Wood. I should print and frame the massive email of answers you've helped with and send you a photo! Thank you so much.

Additionally, the Adobe people that I absolutely, positively have to thank for all their support include Bill Roberts, Al Mooney, Meagan Keane, Steve Ford, Patrick Palmer, Dennis Radeke, Todd Kopriva, Kevin Monahan, Jason Levine, Colin Smith, Anita Engleman, Ellen Wixted, and Leonard Rosenthol.

Friends and Colleagues

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William Robinson (Robbie) Carman for your wisdom, guidance, and sanity (yeah, Catherine too).

Stu Bass for a quick insight into how his episodic TV projects are set up.

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Those people who are near and dear to my soul: Dorn Hetzel, Gabeba Baderoon, Yossy Tessone, Jack Reilly, Jeff and Jen Smith, Jeff and Holly Preston, and Rich Frumer.

My Family

Isn't it terrible that family comes last all too often?

First, to Amy, my wife: I love you so very much. You've been my sanity and my beacon of hope at some downtimes while cranking out this book. I hear you loud and clear about publishing and deadlines.

To my daughter Sophia, although you're too young to read this, later in life you'll laugh as you see photos of you hidden in this book. Dada loves you.

It's important that I mention of course my close family: Scott, Rachelle, Morgan, and Maddox; Al and Dee; Roger, Elanna, Jesse, Juliette, and Gabrielle; Steven, Avra, Jake, Sam, and Nate; Charles and Amy. Now you'll have to own a copy of the book.

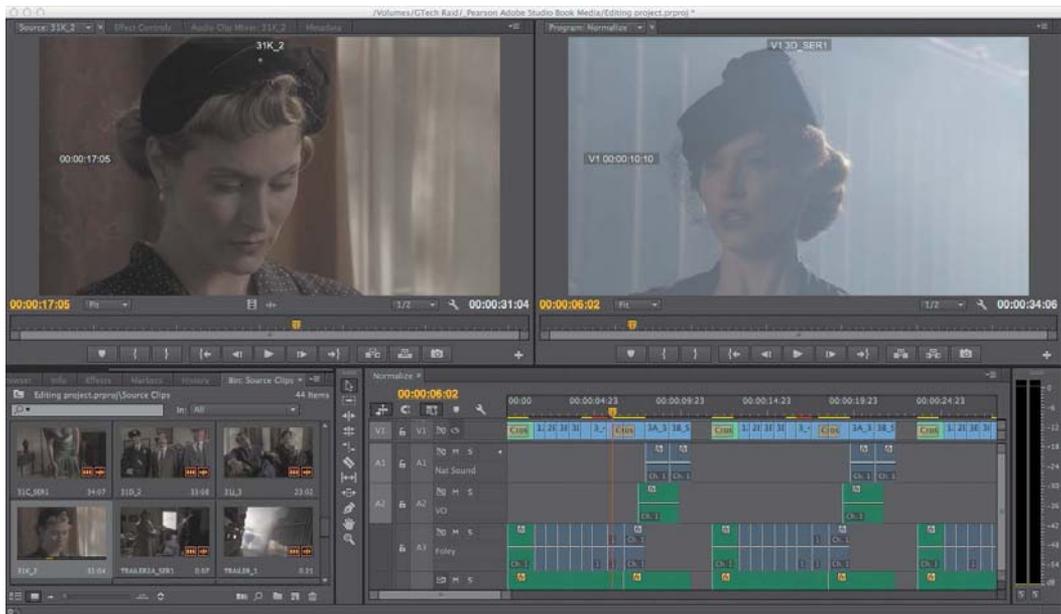
CHAPTER

1

Editing in Adobe Premiere Pro

[If you haven't already downloaded the Project and Lesson files, click here for instructions.](#)

Author: Jeff I. Greenberg



Film editing is now something almost everyone can do at a simple level and enjoy it, but to take it to a higher level requires the same dedication and persistence that any art form does.

—Walter Murch

Editing in Adobe Premiere Pro

At one point this chapter was called the “New Method of Editing,” except it’s not new. It’s about three or four years old and was introduced in CS5. What is the “new” way of editing? It’s a pair of ideas that basically mean *the tools should get out of your way*:

- ▶ Just drop your footage in a project and edit.
- ▶ Use whatever tools you feel are best for the job.

Once upon a time you were limited by the video formats you could use. If your tool didn’t support it, you had to jump through hoops to get the footage to work (see “Transcode Is a Dirty Word” later in this chapter.)

You shouldn’t be *forced* to work in a specific frame rate or frame size, or be limited to just broadcast frame sizes. You should be able to output for broadcast as well as for digital signage (where the video is vertical), museum installations (nearly every one is custom), and mobile devices.

And the workflow you choose or build should wrap around tools you’re familiar with. In fact, you should use whatever tools from Adobe you prefer and use other companies’ tools where you feel appropriate. Adobe Premiere Pro has fantastic interoperability with other third-party tools, whether it’s a Digital Audio Workstation (DAW), a compositor, or a color correction suite, even though Adobe provides all of these.

The beautiful thing? As content creators, we shouldn’t care. Use what you need. Pick a format. Pick an output. Don’t neglect planning and testing, and make sure your pipeline works; your tools shouldn’t stand in your way.

Best of all, Adobe Premiere Pro packaged in an interface that's recognizable to editors. It's the common 2-up editing interface, with a Timeline that feels familiar.

The biggest hurdle for you the editor, is picking up the depth and the techniques that are available in Adobe Premiere Pro, beneath the immediate surface—that's what this book is about.

This chapter explores some of the areas that are more abstract, like the overview of the general workflow in Adobe Creative Cloud, and progresses to concrete subjects, like choosing appropriate hardware.

Format Agnostic

In a given year I see at least ten formats that come from hundreds of cameras: XDCam, P2 cards (**Figure 1.1**), Red R3d files, and even footage from iPhones and other smartphones.



Figure 1.1 P2 cards are one of the key digital formats used in Electronic News Gathering (ENG).

Traditionally, trying to make all these pieces fit have caused editors major headaches. In fact, I believe there's someone sitting in a room right now making up a new format just to give editors more headaches.

The message I'm trying to relay is to stop sweating. When I encounter a new format, I just throw it at Adobe Premiere Pro. So far, it's almost always worked. And if it doesn't work now, I know the next Adobe Premiere Pro update will make it work.

This flexibility doesn't stop at cameras. It extends to other nonlinear editors (NLEs) through XML and AAF. For this reason, Adobe Premiere Pro is the hub that intersects with my camera and all my software.

TIP

It's all too common for productions to want to use prosumer cameras. Although they're not optimum for professional work, Adobe Premiere Pro handles their files beautifully. Just be sure to hold the cameras sideways!

Any Camera Format

There are three generalized camera types: prosumer, professional, and cinema. I use the term generalized because the distinction between these formats *used* to be very black and white. Now, it's a gray haze because some of these cameras can cross boundaries.

Therefore, it's crucial to know which formats you have to work with. Each type has different advantages and limitations.

Prosumer cameras

No longer are there consumer cameras. Everything *can* be used on professional productions. Therefore, everything is prosumer.

The idea that I can use my iPhone (**Figure 1.2**) or iPad to shoot glorious 1080 video is both wonderful and maddening at the same time. It's become almost a bad joke that on set a client can use his cell phone and shoot video just to give you an alternate shot (or give an opinion of what he envisions the shot should be).

What makes a prosumer camera *prosumer* is mostly the small sensor size and high compression of the video. Uncompressed video eats about 6 GB per minute. But that same 6 GB can capture about an hour of video on my iPhone. The best camera can be the camera in your pocket because it goes with you anywhere and everywhere. That's the beauty of these prosumer cameras.

Figure 1.2 The easiest camera to shoot with is the one you have in your pocket.



The other limitation of prosumer cameras, aside from compression, is that they have a very small chip, which affects how they capture light and focus. The chip creates all sorts of struggles in low-light situations to capture a decent image. More often than not, these cameras end up producing lots of noise.

Professional cameras

As with prosumer cameras, professional cameras typically shoot HD, but they have a couple of different features that make them attractive to the pro market.

The footage they capture is less compressed. In many ways, the less compressed the footage is, the easier it will be to edit, color correct, and output. Sometimes you have the ability to change lenses on these cameras, and the lenses are engineered with a higher grade of glass, meaning that you can shoot cleaner, sharper images with the added benefit of adjustable apertures and f-stops (**Figure 1.3**).

They may also have features like jam sync of timecode (making two cameras' clocks exactly match, which is fantastic for multicam shoots), zebra striping (in-camera exposure awareness), and possibly some input adjustment of metadata like essence marks (essentially clip markers made by some cameras while shooting). Such features make these cameras “run and gun” devices—perfect for everyday use and ENG.



Figure 1.3 Professional cameras have critical features that place them in a class above consumer/prosumer cameras.

Cinema cameras

The hallmarks of a cinema camera are that these cameras can produce formats idealized for postproduction with less compression, such as Avid’s DNxHD and Apple’s ProRes, and some can deliver raw sensor data.

Cameras in this category often shoot greater than HD (2k, 4k, and beyond), which provides the flexibility of being able to deliver footage at these higher resolutions or just in HD and reframe the content as needed (**Figure 1.4**).

Figure 1.4 The RED Scarlet-X shoots 5k on a sensor that’s greater in size than a frame of 35mm film.



Cinema cameras may not be as flexible or optimized for “run and gun” shooting. For example, it may be necessary to capture dual sound—sound on the camera and on an outboard device—and then sync both in post. These cameras require much more customization; not just to the camera body. Lenses, battery packs, SSD (solid state drive) storage systems, camera mounts, and device acquisition systems (such as the AJA Ki Quad Pro) are all items that will increase your costs in addition to the camera body.

Often, when a cinema camera is used on a shoot, there’s additional on set support, such as a DIT (Digital Imaging Technician) and possibly an on set editor and/or colorist to assist with the image.

Tape-based cameras

Because of the debate about the inclusion of tape-based cameras in this book, sadly, little will be mentioned about them.

Each author loved the permanence of tape (or film!). But realistically, in the past five years the amount of tape we've worked with has been nearly nil. So, this book won't cover much tape-based information because the industry has moved away from it.

File-based camera flexibility

Every camera type mentioned previously is now primarily file based, storing data on a card or a chip, not on a video tape. Video tape has this nasty limitation of forcing you to work in real time.

A unique ability in Adobe Premiere Pro is that you can check the cards from these cameras while on set. It's not a file listing, but it gives you a chance to view the actual footage.

Handling cards (such as P2, CF cards, or SD cards) on set is commonly done by a DIT who does this sort of work and more (including backing up and checking the files for consistency). However, all too frequently this job gets lumped with the tasks of a DP or assistant editor.

The ability to quickly check a card and hoverscrub (where you hover over a clip and scrub to preview the clip) for content allows for the quick analysis and checking of the card content, ensuring that the footage looks good before the media is copied and the card is reformatted for reuse.

Using the Media Browser to preview media

Because it's all too common to encounter editors who aren't aware of the Media Browser, it's worth mentioning and describing here. You can find the Media Browser in the default workspace in the lower-left panel (**Figure 1.5**).

If you're not familiar with the Media Browser, this is an epiphany because you can browse a card *visually*.

In Adobe Premiere Pro's Media Browser (which is essentially the same as Adobe Prelude's Ingest panel) is a view of the



Figure 1.5 The Media Browser (maximized here due to the accent (') key), is the fastest way to look at a card.

media. Merely navigate to the card (on the left side of the Media Browser are the Volumes on your system), and the card contents become available to you visually as thumbnails.

You can hoverscrub these clips (pass your mouse over the clip), and the thumbnail changes to show different sections of the clip. Double-clicking the thumbnail will place the clip in the Source Monitor *but not add it to your project!* This is a great way to view the clip using the JKL keys and other playback tools.

Unless you drag it into the Project panel or Timeline, this clip, which is living out on a card, *isn't part of your project* and yet can be played back full screen.

And you can *edit* directly from the card. The obvious *danger* is if you eject the card, the media is gone. But this concept of being able to view media on a *live card* is *fantastic!*

Adobe Prelude, a dedicated tool in Adobe Creative Cloud, is discussed in Chapter 2, "Setup and Organizing" and Chapter 8, "Workflow Management." Prelude can view clips as well as do a more important step: It can handle your file-based media correctly by ensuring that a copy is made.

Now that you've seen how flexible Adobe Premiere Pro is with media (more about this in Chapter 2), it's worth looking at other NLE interoperability.

Final Cut Pro

It's likely that Adobe Premiere Pro isn't your primary editorial tool. Even if it is, clients may come to you with projects from Apple's Final Cut Pro (**Figure 1.6**) that they would like continued or revised.

Because of XML (eXtensible Markup Language), it's possible to import a project from Final Cut Pro into Adobe Premiere Pro and relink it to the QuickTime files (if you have them).

This ability to export XML exists for Apple's Final Cut Pro version 7 and earlier. If you're utilizing Final Cut Pro X, you'll need a tool from Intelligent Assistance to convert the XML from Final Cut Pro X to the XML of Final Cut Pro 7 so it's compatible with Adobe Premiere Pro.



In the Program or Record Monitor, pressing Ctrl+` (accent key) will fill the screen with the video. Over and over again you'll see the accent key (`) mentioned in this book. It's probably the most useful feature because it enables you to maximize a panel when you mouse over it.



Figure 1.6 Final Cut Pro's ability to export XML permits cross-platform interoperability.

Export XML

When you export an XML file from Final Cut Pro, it's important to be aware of a couple of possible speed bumps:

- ▶ Make sure that all your media is connected prior to your XML export.
- ▶ Be aware of any camera codecs that need rewrapping into QuickTime, such as XDCam and clips from P2 cards.
- ▶ If you're working with Final Cut Pro X, you'll need translation software to make the XML file more compatible.

What translates?

The elements that translate to Adobe Premiere Pro include clips (including multiclips), dissolves, most transfer modes, scale, crop, rotation, opacity, audio keyframes, several audio filters, and several video filters (including the Three-Way Color Correctors).

The elements that don't translate are mostly "generated," such as titles, generators, and motion elements.

After importing an XML file, a report is generated if errors occurred. This Final Cut Pro Translation report is a text file. Double-click it to open it and show the names of the clips and timecodes of where errors occurred.

Media considerations

QuickTime media is the architecture of all the video media that comes from Final Cut Pro. QuickTime is installed on all Macs and merely needs to be installed on a Windows computer. Apple's own professional codec, ProRes, is readable on both platforms but only writable on the Macintosh.

To relink clips and sequences, simply select everything in a project and choose File > Relink Media.

One issue you need to be aware of is *rewrapped* media. File-based media from XDCam and P2 cards are normally natively stored in the MXF (Materials eXchange Format) architecture, which is a rich media architecture and is similar to QuickTime in that there are different codecs available within the MXF container. Final Cut Pro ingests these files by taking them out of MXF and rewrapping them

as QuickTime files. This is an issue because these codecs have to be licensed to use. If you do not have Final Cut Pro installed on your system, you're not licensed to use these codecs in QuickTime.

On a Mac, owning any of the Apple ProApps (Compressor, Motion, Final Cut Pro X, or Logic) grant the system a license to use these codecs.

On Windows, it's necessary to purchase a license from Calibrated Software. It has several packages that will add the appropriate licensed codecs to QuickTime, making the rewrapped media available to QuickTime.

Avid

Importing from Avid Media Composer (**Figure 1.7**) is limited to a single sequence (not a project like Final Cut Pro). What's exciting about the Adobe Premiere Pro CC release is the licensing of Avid's DNxHD codec. All Avid media is now available to Adobe Premiere Pro.

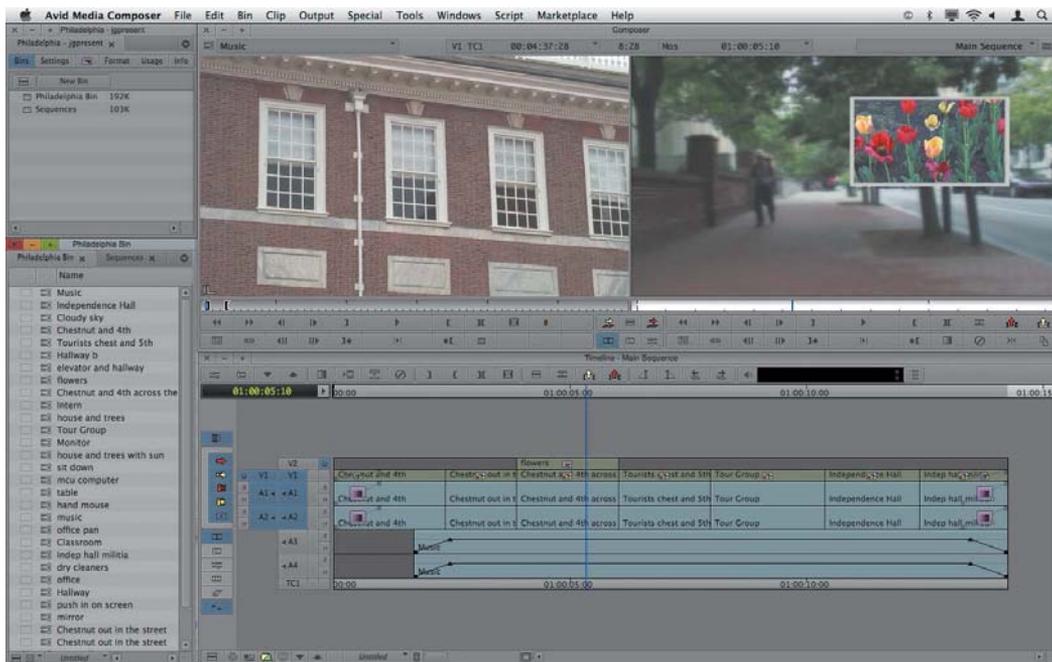


Figure 1.7 AAF exports from Avid Media Composer. Symphony, and Newscutter can translate to Adobe Premiere Pro but only on a sequence-by-sequence basis.

TIP

Do you need to bring bins across from an Avid sequence? Build sequences of all the clips in a bin on a single sequence, and then export the AAF for the sequence that represents the bin.

Export AAF

When you export an AAF from Avid Media Composer, you need to do a few things first:

- ▶ Make sure you select the Edit Protocol in the Export dialog.
- ▶ Set Media to Link if you want to link to the existing media.
- ▶ Set Media to Consolidate to copy existing media. The best place for media to be copied is in a folder in the same location as the AAF file.
- ▶ Convert Audio Sample Rate to Project so all of your audio is a single sample rate.

The following should be tested prior to exporting to avoid problems:

- ▶ Mixed frame rates
- ▶ Clips linked via Avid Media Access (AMA)

What translates?

The clips and tracks import without a problem. Key items like cross dissolves and audio clip gains also come across cleanly.

Media considerations

Media support from Avid Media Composer is very robust: It's possible for Adobe Premiere Pro to reconnect to AMA media, file-based MXF (such as XDCam and P2), and DNxHD; the latter is new in Adobe Premiere Pro.

Less certain for successful sequence/media transfers are situations with mixed media sizing (SD in HD projects) and mixed frame rates.

Transcode Is a Dirty Word

Transcoding video refers to the process of re-encoding video files to an architecture + codec that your NLE can handle or can handle with less stress on your system.

For example, many NLEs have struggled with h.264 files (regardless of containers such as QuickTime, MTS, or MXF) because of the very lossy nature of this distribution codec (**Figure 1.8**). Some editorial systems can't handle them. Some formats suffer and drop frames so heavily that editing is difficult or unrealistic.

Name	Date Created	Size	Kind
 00008.MTS	Mar 15, 2013 10:56 AM	562.7 MB	MPEG...Stream
 00017.MTS	Mar 15, 2013 11:32 AM	553.5 MB	MPEG...Stream
 00028.MTS	Mar 15, 2013 12:32 PM	555.5 MB	MPEG...Stream
 00032.MTS	Mar 15, 2013 12:51 PM	691.4 MB	MPEG...Stream
 00035.MTS	Mar 15, 2013 1:08 PM	91.1 MB	MPEG...Stream
 00036.MTS	Mar 15, 2013 1:11 PM	303.4 MB	MPEG...Stream
 00038.MTS	Mar 15, 2013 1:19 PM	153.5 MB	MPEG...Stream
 00042.MTS	Mar 15, 2013 1:46 PM	190.6 MB	MPEG...Stream

Figure 1.8 This is a directory of MTS – MPEG Transport Stream files. Here they're h.264 wrapped in the MPEG architecture. Many NLEs struggle or require multiple steps to use this type of media, often forcing editors to transcode.

Some formats, such as R3D files that contain RAW information from the camera sensor, ask your system to push large amounts of data, making it difficult for playback. Transcoding used to be common in these situations. But Adobe Premiere Pro handles these formats without transcoding due to the Mercury Playback Engine (see the section “Mercury Engine” later in this chapter).

So, why transcode? One of Adobe Premiere Pro's strengths is that you should just be able to import and edit!

Every Format Should Import

Adobe Premiere Pro can import any and every video format. Part of the advantage of Adobe Creative Cloud is the ability for Adobe to rapidly implement new formats as they become available. While writing this book, Adobe in fact improved these capabilities. For example, Adobe added the ability to import the format from RED Dragon sensor footage.



Place your media caches on your fastest storage, preferably on a USB 3 or a Thunderbolt connected SSD drive. More about this in detail in Chapter 2.

CLOSE-UP

To Transcode or Not to Transcode

Although transcoding is considered evil, there are two great reasons to transcode: performance and portability:

- ▶ **Performance.** Some formats, even on the best hardware, stress out a system, particularly heavily compressed h.264 video and larger formats with high data rates (2k and above media, such as RED R3d or ArriRaw). On older hardware transcoding may be a *necessity* to get any decent playback at all. Multicam editing, especially beyond four streams, may also stress a system enough that transcoding may help.

The best transcoding choice for performance is to use a postproduction codec (as long as you have the bandwidth), such as Avid's DNxHD (DNxHD 145 or 220) or Apple's ProRes (ProRes 422 or HQ).

- ▶ **Portability.** Whether it's to share the project with another editor or have the flexibility of working on a laptop on an airplane, the idea of making a "smaller" version of the video is generically called *proxy* or *offline* editing. The easiest way to make smaller media files is by choosing a codec/data rate combination that is low (such as DNxHD 36 or ProRes Proxy) and that is optimized for postproduction and provides an adequate enough picture.

At the very end of the edit, you'll need to relink the sequence to the full quality footage.

TIP

If you're working in a news/fast turnaround environment, it's ideal to select Use Previews in the Export Media dialog. This option forces Adobe Premiere Pro to use previews (lower-quality processing) for faster output.

Proper Media Handling

The golden rule when you're working with various file-based media is to organize it outside of Adobe Premiere Pro. It's crucial to have copies of your media. Linking to clips that are on media cards is dangerous, because it's likely the cards will be ejected and reformatted.

See the section "Start Organized and Sleep at Night" in Chapter 2.

Mercury Engine

The Mercury Playback Engine (MPE) is the technology that permits the real-time acceleration of formats and effects in Adobe Premiere Pro. The key elements that power this technology include:

- ▶ **64-bit architecture.** This moves more data through the computer's CPU and can address more RAM compared to 32-bit architectures.
- ▶ **Multithreading.** Tasks can be broken down into smaller jobs and doled out to multiple cores on each CPU.
- ▶ **RAM.** Utilize as much RAM as the system has, shared between multiple applications. Be sure to have 2 to 3 GB of RAM per core (see the section "System Design" later in this chapter.)
- ▶ **Video card.** Some effects and processing are accelerated and offloaded from the CPU (a general processor) to the GPU (Graphical Processing Unit), which is optimized to process video (some cards have over 100 cores and some over 1000!). The right types of video card (CUDA and Open CL) with at least 1 GB of RAM are vital to obtain this acceleration.

Leveraging the MPE

The key to maximizing the capabilities of the MPE is twofold: one part is in your system design (mentioned later in this chapter); the other part is how you choose to do your workflow.

Most of the MPE benefits are invisible. You can't see how the Mercury Playback Engine permits areas that just "work" like processing footage that might have needed transcoding.

The ideal strategy is to select only accelerated effects (marked in **Figure 1.9**) in the Effects panel. Certain items, such as scaling, deinterlacing, blending modes, and color space conversions, also benefit from using the right video card.

Don't render (Adobe calls the render files *Previews*) unless you absolutely need to. Often, footage and effects will play back without needing any rendering at all—even if the *Timeline has a red line!* An exception to this would be workflows that have crucial time-based deliverables—usually same day productions, such as news. It's devastating to discover that output will take longer than you expected because of extra rendering that was left for processing until the output stage.

Turn on the dropped frame indicator (**Figure 1.10**) in the Settings menu on the Program Monitor. You'll see a green light to the right of the timecode as long as playback is working. If you encounter a problem, the light will turn yellow. Mousing over the dropped frame indicator shows you how many frames were dropped.

When playback is sluggish, that's a sign to take one of three actions:

- ▶ **Drop the video resolution.** Adobe Premiere Pro's default is to play back at half ($\frac{1}{2}$) resolution. For HD and SD sizes, the only option is to drop the Playback Resolution to $\frac{1}{4}$ (**Figure 1.11**). When you pause the video, Adobe Premiere Pro will still show the full resolution of the image. Even at $\frac{1}{4}$ resolution, the image was still decent. It's not like you're doing a one-to-one pixel mapping on your screen. The video has been reduced to "fit," so why would you calculate those pixels for playback? If you work on a sequence that's greater than HD, such as 2k from an Arri Alexa, you'll unlock more resolution choices, such as $\frac{1}{8}$ and $\frac{1}{16}$.
- ▶ **Build renders (previews).** Consider building renders. Just press the Return (Enter) key on your keyboard. Once the preview is created, it'll be played instead of the individual original media. Any change will require new previews to be created.
- ▶ **Consider transcoding.** See the earlier sidebar "To Transcode or Not to Transcode."



Consider rendering Adobe After Effects compositions in Adobe Premiere Pro's Timeline. Although the Dynamic Link feature is fantastic for making changes, the playback depends on Adobe After Effects having cache files for the composition. By rendering in Adobe Premiere Pro, you reduce the strain on your system.

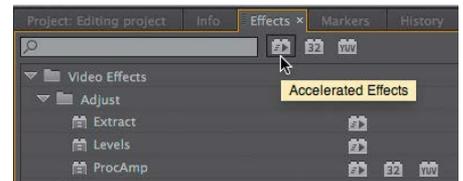


Figure 1.9 Using accelerated effects maximizes the playback of effects by offloading complex calculations to the GPU—a dedicated processor for graphics.



Figure 1.10 The dropped frame indicator is green, indicating no dropped frames.

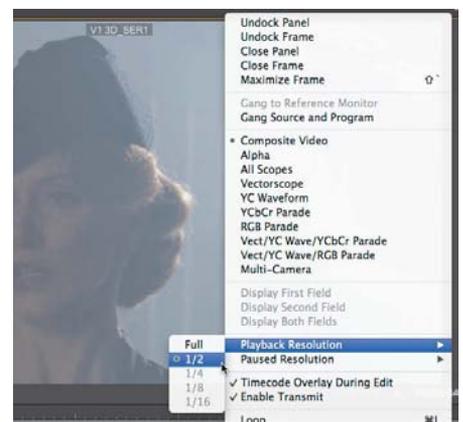


Figure 1.11 Playback resolution choices are based on the size of the sequence.

CLOSE-UP

CUDA or Open CL Architecture

Originally, Adobe optimized systems for cards that supported CUDA architecture (developed by nVidia), which allowed offloading of pixel pushing from the CPU to the video card that was optimized for graphics. Some cards have over 100 CPUs.

After CUDA, Adobe implemented Open CL (a similar technology supported by ATI/AMD). It doesn't matter which technology you adopt, as long as you choose a card that supports one of these two architectures.

Mercury Transmit I/O

The Mercury Transit architecture allows Adobe Premiere Pro to “transmit” the Mercury Engine processing to output cards (used for monitoring or tape output).

Do you have an output card? If so, you'll get all the great acceleration on output (a feature that earlier versions of Adobe Premiere Pro did not have). This technology is applicable *only* if you have an output card or breakout box (Figure 1.12), such as the those from AJA, Black Magic Designs, BlueFish, or Matrox. Given that some of these devices are less than \$300 (like the AJA T-Tap), professional editors consider this sort of outboard monitoring (*especially* for color correction) a mandatory addition.

It's crucial that you make sure your GPU and the specific type of I/O you're using are supported by the Mercury Engine.



Figure 1.12 Breakout cards and boxes permit the professional evaluation of video on studio monitors (not to be confused with a regular LCD or LED flat panel). The AJA IO 4k will handle 4k and Ultra HD over Thunderbolt 2.

Greater than HD

At one point HD was a dream to most editors, and SD was the standard. Today, everyone shoots in HD (they might look at SD in their archives). If larger formats, such as 2k, 3k, 4k, and above, aren't on your radar, they *will* be on your competitors' radar. And the MPE is what will power this greater than HD future. See the section “System Design” to get insights on how and what to buy to utilize these technologies.

Adobe Creative Cloud

In May of 2013, Adobe switched from a perpetual licensing model (physical boxes) to a Software as a Service (SAS) model.

The major benefit of Adobe Creative Cloud is obvious: Get every major Adobe tool, and download what you need from a selection of nearly 20 different tools spanning video photography, print, and web (**Figure 1.13**).

Although some people just buy Adobe Premiere Pro, nearly everyone we've met has chosen the Creative Cloud package, giving them more tools than they know what to do with.

The access to so many tools is amazing (and a little overwhelming); it's worth noting that there are some practical benefits beyond *just* the software.

Sync Settings

Adobe has added the capability to synchronize settings, such as your preferences and keyboard shortcuts. This capability is tied to your Adobe ID and is probably the most valuable *professional* benefit for editors. Your customizations are saved, *and* they can be transferred from system to system.

When you sit down on *your* system, you want it to be *exactly* adjusted the way you want. But what if you need to work on someone else's system? Or what if you want to use Adobe Premiere Pro on a second system (see the section "Two Licenses")? What if you need to reset your settings? Sync Settings enables you to do all of these tasks easily.

When you launch Adobe Premiere Pro, you'll see that Sync Settings to Adobe Creative Cloud is part of the Welcome dialog, as shown in **Figure 1.14** on the next page.

On a Mac, the Sync Settings is located in the Premiere Pro menu; on Windows it's in the Edit menu. Initially, it's the login for the Adobe ID that was used to install the software.

From the Creative Cloud, Sync Settings uploads and downloads your personalized adjustments on a per application setting. These settings include:

- ▶ **Preferences.** Almost all the preferences, ranging from the General category through the Trim settings.
- ▶ **Workspace Layouts.** The unique way you customize the arrangement of the different windows and panels.

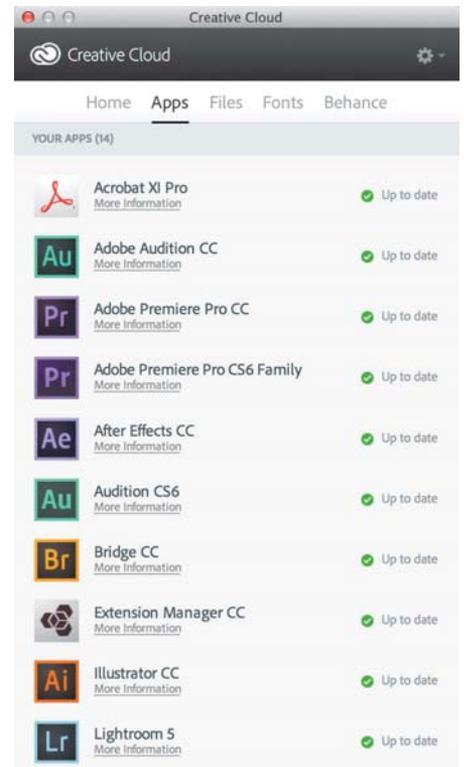


Figure 1.13 The Creative Cloud application runs in either the menu bar of OS X or the system tray in Windows. It's the heart of installing applications, managing fonts, and identifying what was installed or modified in Adobe Creative Cloud.

- ▶ **Keyboard Shortcuts.** Any keyboard adjustments are also capable of being synced.

Figure 1.14 Signing into the Adobe Creative Cloud account permits you to sync key settings. The account sign in can be the owner's Adobe ID, a different user, or even a "free" Adobe ID. When signed in, the user's email will appear here.



Not everything is synced. The most important items that are ignored are *cache files* (which speed up some media handling), because they're always going to be unique to your local system.

Multi-user systems are still commonly found in many facilities, where two editors share the same machine and often the same logon. The Adobe Creative Cloud settings are *initially* tied to the license, but don't have to be.

Sync doesn't rely on ownership of Adobe Creative Cloud

It's possible to create an Adobe ID *without* buying or downloading anything. You do get some storage space (2 GB) and a couple of other features as a "free user" of the Creative Cloud.

So starting a free membership grants you an Adobe ID. With that ID you can sync your preferences. To sign up, go to <http://creative.adobe.com> and choose Get started (**Figure 1.15**).

If you're a working freelancer and you don't own Creative Cloud (and even if you do), this ID allows you to transfer settings via the Internet from location to location. Just re-

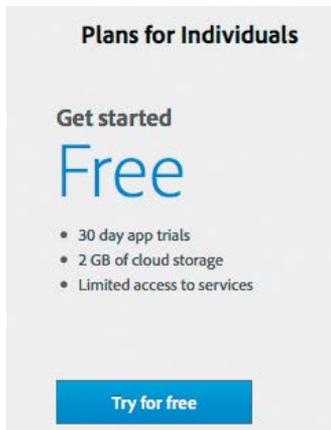


Figure 1.15 This free method of acquiring an ID permits users to easily transfer their favorite settings without being tied to the purchase of Adobe Creative Cloud.

member to sign out when you're finished. You don't want someone else updating or changing your keyboard!

Key preferences

Some users constantly tweak their settings. It's important that if you fall into this category, you *save your settings to the Cloud* on a regular basis. When you choose to Sync Settings via the menu, a dialog asks which you want to do, upload or download. You can automate this option via the Preferences, as shown in **Figure 1.16**.

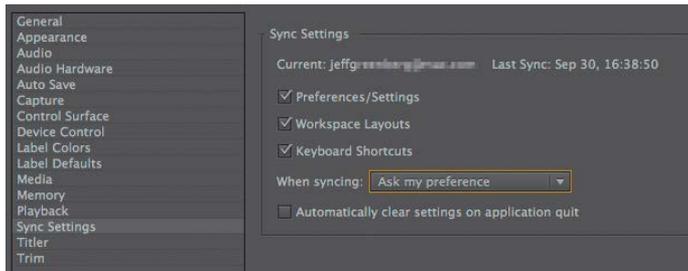


Figure 1.16 By using the drop-down When Syncing menu, Sync Settings allows you to choose what is synced and whether it should be uploaded or downloaded to the current system.

If your facility consists of freelancers or you're working in other situations where users constantly come and go, it's valuable to adjust the Sync Settings to "Automatically clear settings on application quit." Then, when someone quits for the day, that person can reset Adobe Premiere Pro for the next user automatically.

Two Licenses

You can always have multiple installs of Adobe applications, but prior to this release you were limited to running the software on only one machine at a time per license.

Starting with Adobe Premiere Pro CC, you're able to have two *live* licenses. This makes it easy and convenient to work any way you'd like, for example on a Mac and Windows machine, two different machines in an office, or on your work system and home system.

When you sign in to a *third license instance*, Adobe Creative Cloud logs out the other two users.

Frequent Updates

Although nobody (except Adobe) can exactly say when new feature rollouts will occur, they should occur more frequently than boxed software releases. No longer is Adobe tied to 18-month “major” releases.

Prior to the Adobe Creative Cloud release, Adobe (like most software companies) could legally only add major new features to software with major version changes (for the inquisitive, it’s the Sarbanes-Oxley Act that created this issue).

With the new subscription model, it’s possible for Adobe to quickly react to technological needs, such as new camera formats, bleeding-edge technology innovations, and rapid bug fixes.

Storage Space

Although not included with the initial release of Creative Cloud, Adobe is including 20 GB of desktop-based sync storage (Figure 1.17) with versioning and private folder sharing. This will make it easy for users to share and sync projects invisibly between machines or be accessible from a web browser. Additional storage space will be available for purchase.

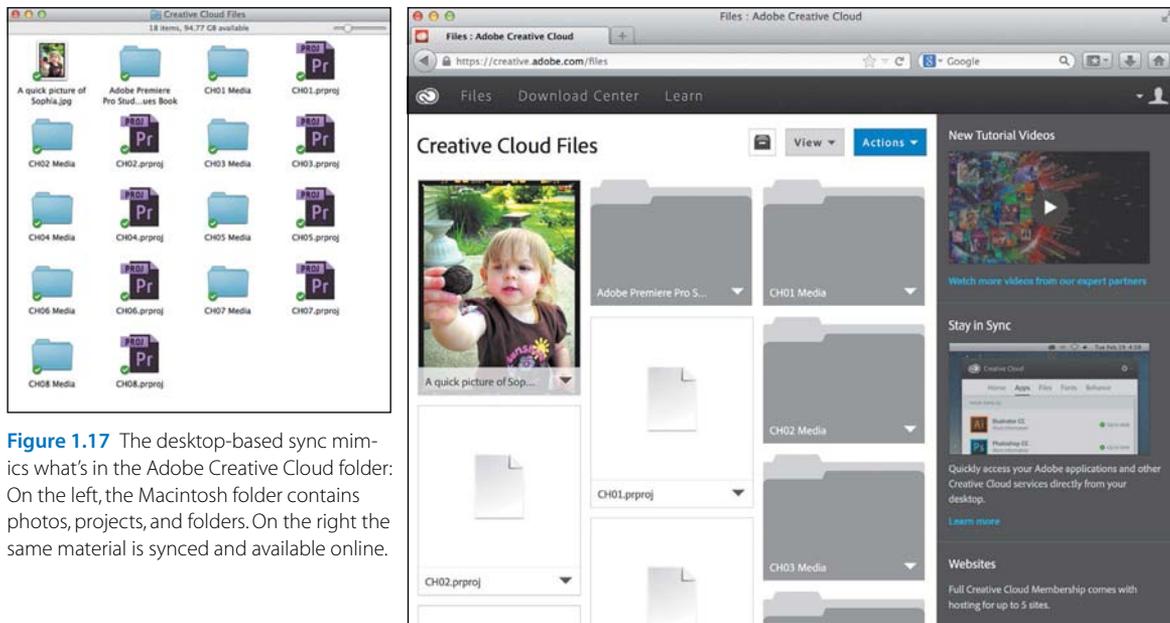


Figure 1.17 The desktop-based sync mimics what’s in the Adobe Creative Cloud folder: On the left, the Macintosh folder contains photos, projects, and folders. On the right the same material is synced and available online.

In many ways, this type of storage is the ultimate live backup for projects. Having additional versions of a file will not count against the storage space (unlimited versions are stored for ten days). It's unclear if this will work for Adobe Premiere Pro projects, but it's certain to work for other tools, such as Adobe Photoshop.

Typekit Fonts

You'll have the license to use some 175 plus Typekit fonts for your video, web, and print needs. Getting away from using the default fonts of Helvetica, Arial, Times, and Palatino can *only* be good for your productions.

To access these fonts, use the Adobe Creative Cloud application (**Figure 1.18**) to log into the Typekit website and see the fonts you have access to. The font must be labeled as “desktop” to be used on your system.

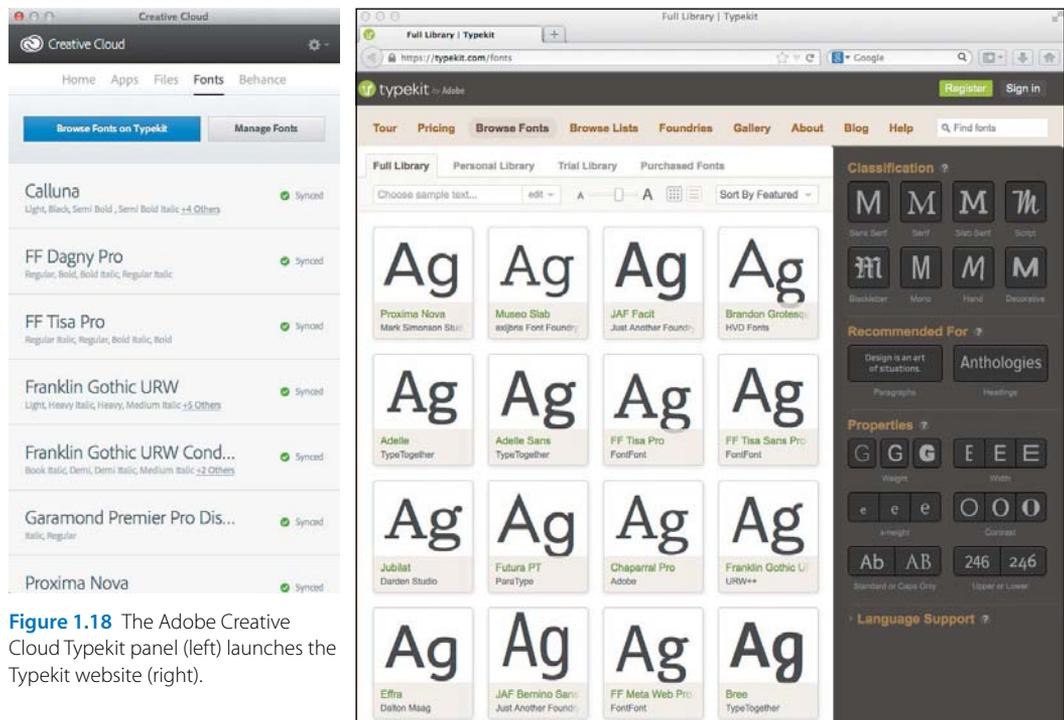


Figure 1.18 The Adobe Creative Cloud Typekit panel (left) launches the Typekit website (right).

Behance /Behance ProSite

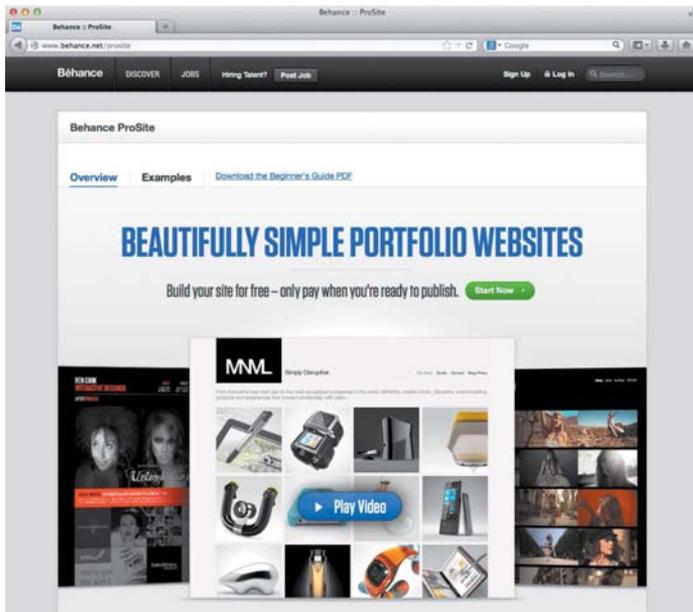
Behance is a service that permits the publishing of projects into online portfolios. There is also a professional social network (you can follow and be followed). Publishing your work and discovering others' work can be done from the Adobe Creative Cloud application.

Currently (third quarter 2013), Behance is just available for Adobe Photoshop and Adobe Illustrator documents.

Behance ProSite (**Figure 1.19**) is a full web hosting service with drag-and-drop templates that will help you utilize your uploaded content and create a portfolio driven website in minutes. That content can include your work, additional pages, your resume, and much more.

As with Typekit, currently Behance ProSite is geared more toward those who want to output to print and the web. But we hope to see some expansion into showcasing video directly from Adobe Premiere Pro soon.

Figure 1.19 Behance ProSite used to cost more than \$100 a year, but it is now free for Adobe Creative Cloud members.



System Design

The most difficult pill to swallow about hardware in the video production industry is how short-lived purchases can be.

To do word processing, I can use a computer from 2007 and it does the same thing as my current system. Technically speaking, I might even be able to use hardware nearly a decade old for word processing.

This is *not* the case with postproduction. If hardware lasts 18 to 24 months, that's ideal. Four years is the *maximum*. Outside of that window of time, the innovations speed the work so significantly that the purchase of new hardware just makes sense.

If performance gains yield a difference of 12 minutes a day, that's an hour a week. That's also *50 hours* a year—a working week's worth of time-savings. This efficiency isn't just for rendering or outputting; it's for everything.

There won't be any holy wars—Mac versus Windows or build it yourself versus a preconfigured box—in this section. The goal here is provide you with valuable information so you can make smart hardware decisions well beyond the publication date of this book.

If the following component sections (**Figure 1.20**) feel overwhelming because of the number of factors to balance, feel free to jump to the section “Too Many Hardware Choices?” later in this chapter.



Figure 1.20 This Intel motherboard supports Thunderbolt, an interface faster than USB 3.

TIP

Be sure to check Adobe's specification page on Adobe Premiere Pro at www.adobe.com/products/premiere/tech-specs.html before you buy hardware.

NOTES

Never, ever, purchase a system designed at the “minimum” configuration. Although it will work, meeting just the minimum requirements guarantees the worst performance.

The essential message I want to convey is *balance*. Buying the best CPU but ignoring the amount of RAM in the machine is equivalent to buying a Ferrari but only being allowed to use two cylinders. I cannot stress enough that each component should be balanced across your system. Just investing entirely in RAM or the fastest CPU will be less effective than balancing both.

One thing is certain; if your motherboard has only USB 2 or FireWire drive connections, it's time to purchase new hardware.

CPU

The CPU is the brain of your system (**Figure 1.21**). It is one of the cornerstones to maximizing the behavior of the MPE. For a balanced system, the critical ingredients are the number of cores (and hyperthreading), cache size, and clock speed.

Here are some general rules when choosing a CPU:

- ▶ Intel CPUs, particularly the i7 and Xeon CPUs, are the fastest choice for your money today. Pay attention to the latest chipsets. The Haswell architecture chip sets are beginning to become available in desktops and laptops. This architecture is newer than the third generation Ivy Bridge architecture. Those laptops that implement the newer generation will often contain a slower chip (clock speed) than the prior generation for lower power requirements and better battery life—meaning equal or better performance with longer battery life.
- ▶ The number of cores is more important than clock speed. Hyperthreading is crucial and allows one core to act as two virtual processors.
- ▶ AMD chips generally won't match Intel performance due to the lack of support of SSE 4.1 (a specific set of instructions that permit the acceleration of data through the chip).



Figure 1.21 A picture of the i7 CPU from Intel.

RAM

Make sure your system isn't starved for RAM (**Figure 1.22**). It should have approximately 2–3 GB per core. Purchasing a system with eight cores *but only* 8 GB of RAM will create a problem in which the cores will be starved for needed RAM.

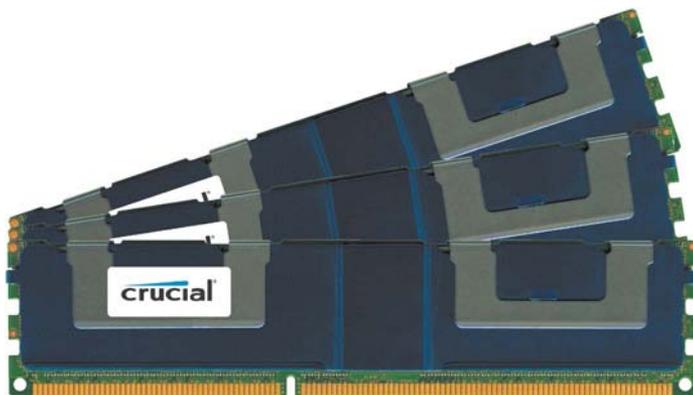


Figure 1.22 Make sure any RAM you purchase has sufficient speed for your system. Two to three gigabytes per core is the minimum. Keep in mind that other tools like Adobe After Effects can quickly use all the RAM in a system.

With multiple CPUs, or cores, many processes occur in parallel. Some processes take longer to finish, and in lower memory situations, the RAM isn't freed up, forcing an individual CPU to wait.

An easy test to determine if your system is starved for RAM is to process some stock effects (nonaccelerated) and check your CPU performance (see “Measuring System Performance” later in this chapter). If your machine is low on RAM, it may be worth trying to disable hyperthreading. Hyperthreading refers to the technology where one core can behave as if it was two (as mentioned in the “CPU” section). By turning off hyperthreading in low RAM situations, it may be possible to achieve better performance, although I'd recommend buying more RAM instead!

TIP

If you'll be running other software (such as a browser or email) while editing, it's best to increase the memory allocation for other applications in the Adobe Premiere Pro Preferences.



NOTES

For you Apple users out there, the only time Apple updates the video driver is when it does an OS revision (e.g., 10.8.3 to 10.8.4). It's smart to download your video driver directly to have the latest update.



TIP

Getting the best performance from RED footage requires at least one RED Rocket board. For laptop users, several companies make a Thunderbolt chassis for a RED Rocket board.



TIP

Multiple GPU cards will accelerate export but not playback. This is significant for systems that are intended for use with Adobe After Effects, which can also benefit from multiple video cards.



NOTES

Laptop users should be aware that you might not be able to upgrade the video card on your laptop. Make sure you purchase the best video card within your budget.

Video Card

The right video card (**Figure 1.23**) is *crucial* for accelerated effects via the MPE. I'd almost go as far as to say that buying a system that supports the MPE is an easy choice to make. This acceleration advantage is one of main reasons for buying Adobe Premiere Pro. So why wouldn't you plan to get a video card that supports it?



Figure 1.23 nVidia's Tesla K20 card has 5 GB of RAM and 2496 cores.

Make sure the card supports CUDA or OpenCL and that it has at least 1 GB of RAM. If you're working in formats larger than HD, more RAM is a necessity. A 4k frame requires about 510 MB of video RAM.

Video cards have innovations every year. Top-of-the-line cards can be very expensive (over \$2000) but can provide maximum acceleration—more than 15x that of a system *without* the card *but only* for certain key effects. It won't necessarily provide acceleration for everything.

Storage

With file-based camera systems being the norm, storage becomes the consumable rather than the video tapes of the past.

Making the right storage choices is just as important as choosing the right processor or the amount of RAM. The biggest need is *speed* but in the right places.

Connections

The drive connection (cable) shouldn't be the bottleneck in your system. Internally, try to connect via the fastest plug on your motherboard. Today, SATA (Serial Advanced Technology Attachment) is the most common internal connection.

Externally, I strongly encourage you to move to USB 3 or Thunderbolt (**Figure 1.24**). Both are faster than most internal connections. At this point (third quarter 2013), I recommend that you divest yourself of hardware that has USB 2 or FireWire because the newer connections are ten or more times faster.



Caches

Configuring caches on the fastest storage possible is vital for making Adobe Premiere Pro as snappy as possible. The connection point (if not internal) is crucial for accessing these cache files; it's best to use USB 3 or Thunderbolt.

CLOSE-UP

Adobe After Effects and Adobe SpeedGrade

In addition to helping you future-proof hardware purchases for Adobe Premiere Pro, there are some extra wrinkles that are worth mentioning if you'll be using the same system for heavy compositing or color correction:

- ▶ **Adobe After Effects** can utilize *multiple* video cards as long as they belong to the same CUDA generation (all cards are CUDA 2.0 compatible). This application will utilize as much RAM as it can, with a minimum of 2–3 GB per CPU. A separate cache SSD drive is suggested for its specialized disk cache.
- ▶ **Adobe SpeedGrade** is very sensitive to the video card. The GPU delivers most of this application's real-time capabilities and speeds output (beyond the base ability to play footage).

Figure 1.24 Thunderbolt is a new connection from Intel. The protocol can handle 10 Gb/s in a single channel, twice as fast as USB 3 and more than ten times faster than FireWire.



If you want the media to be portable (from system to system), configure the Media Caches (found in the Preferences) with the actual media.



RAID (Redundant Array of Information Disks) is a storage technology where multiple disks are grouped together. Different configurations provide different benefits. See the sidebar “Raid-5 Helps to Maintain Your Sanity.”



Objects with moving parts (drives, cars, etc.) break. You can count on it. In fact, you can bet on it happening a day before delivery.

The top choice for fast storage is SSD. An SSD is also ideal for Adobe After Effects. SSDs have no moving parts; their speed is merely just reading and writing to memory chips.

If the cost of an SSD is too high, consider creating a RAID-0 (two or more drives that act as a striped set). Each drive increases the overall speed as it lowers the waiting time for mechanical parts to move the read/write heads.

Media

Speed is a *less important* factor in the straight playback of media. Most drives (USB 2 or FireWire) can play back two streams of media of nearly every HD format short of uncompressed HD.

Redundancy is a more important issue. For the best combination of speed and storage, a RAID-5 (four drives with a section of each for redundancy) provides the best blend of abilities. If one drive dies, nothing is lost.

The alternative is to fully back up every piece of live media on a regular basis. Having a level of redundancy means sleeping well at night knowing your media is safe.

Projects

Projects should be on some cloud-based backup system, like the Creative Cloud’s desktop sync. Although this feature is just beginning to roll out while this book is being written, some frequently mentioned Cloud alternatives include Dropbox, and Google Drive, or cloud backups such as CrashPlan or Mozy.

By having your project in the cloud, it’s automatically backed up as you work. One caveat (mentioned in detail in Chapter 2) is that you probably don’t want your Preview files sitting in the cloud (where they would be *by default*). They can grow quite large and waste space because they’re considered temporary.

CLOSE-UP

Raid-5 Helps to Maintain Your Sanity

Expect something to go wrong is a postproduction truism. Most media professionals (that'd be you!) purchase drives as individual units. But this is generally the worst choice you can make. What if a drive dies? You should purchase a second drive to manually duplicate all of your material.

A RAID allows for a more sophisticated joining of drives. Here are the most common types of RAIDs and descriptions of their usage:

- ▶ **Raid-0** consists of two (or more) drives and stripes (alternates) the data between each drive. This means faster access (because there are two read/write heads rather than one) but at the cost of reliability. If either drive fails, all the data is lost. The advantage of a Raid-0 lies in its speed.
- ▶ **Raid-1** consists of two drives and writes the data twice, once to each drive. The advantage is pure redundancy. If one drive dies, the other contains all the data. The disadvantage of a Raid-1 is that half of your storage is dedicated to a backup. This is great as a "bulletproof" live mirror but not great from a performance point of view.
- ▶ **Raid-5** consists of four or more drives (**Figure 1.25**) and stripes them like a Raid-0 (favoring speed), but copies some redundancy information to the other drives. You get nearly the performance of a Raid-0, but if a drive dies, the remaining drives can permit recovery of the lost data. The only real negative is that 33 percent of each drive in a four drive array is lost to redundancy information. A Raid-5 is suggested as the minimum choice for media professionals because it provides nearly the performance of a Raid-0 with the reliability of a Raid-1, sacrificing only one quarter of the total media.



Figure 1.25 A Raid-5 requires at least four drives and a dedicated RAID controller, such as this model from G-Technology.

OS considerations

If you're working on a Macintosh system, the optimal drive format is HFS+. Because most hard drives sold aren't formatted this way, it's a good practice to format a brand-new hard drive on purchase. If you plug an HFS+ drive into a Windows system, a utility called MacDrive allows Windows to read and write to the HFS+ format.

If you're using a Windows system, the optimal drive format is NTFS. Many hard drives come formatted for FAT32, so it's a good practice to reformat a brand-new hard drive on purchase. If you plug an NTFS drive into a Macintosh system, a utility called Paragon NTFS allows a Mac to read and write to the NTFS format.

If you're working cross-platform, the simplest way to work is to format your drives as ExFAT, which will work on both platforms and no third-party software is needed. ExFAT isn't as reliable as HFS+ or NTFS and has some slight overhead, slowing down the speed of a drive's read and write access.

Computer Monitor

Strictly speaking, the computer monitor you use makes no difference whatsoever. Don't confuse a cheap monitor with a *broadcast monitor* (see the sidebar "Real-world Setup" in Chapter 6).

Some editors prefer to use two screens; some prefer very large screens (greater than 1920x1080); and some prefer screens with matte coatings (to avoid distorting black points).

Hardware Monitoring Card

A hardware monitoring card acts as a "black box" connector to transmit the video from your computer to scopes and broadcast monitors (**Figure 1.26**). Although the sidebar "Real-world Setup" in Chapter 6 provides some detail, a hardware output is invaluable for *truly* being able to professionally monitor your playback and connect scopes.

This piece of hardware can actually be a box or a card and is available from companies such as AJA, Black Magic Designs, Bluefish 4444, and Matrox.



Figure 1.26 The AJA T-Tap is one of the most inexpensive ways to perform output monitoring. Plug Thunderbolt into your system and then plug in a broadcast monitor via HDMI or HD-SDI.

Measuring System Performance

Measuring system performance goes beyond just using the Dropped Frame indicator (see the section "Leveraging the MPE" earlier in this chapter). Although it's important to know that you've dropped frames, the more difficult question to answer is *why isn't my system performing well?*

Unfortunately, there is no magic performance tool that will indicate exactly how well *your specific* machine will perform with *your specific* video formats in *your specific* workflow.

But there are tools on Macs and Windows machines that will monitor playback and rendering. By checking these tools while playing back footage (or rendering) you can observe where your bottlenecks may be.

Apple's Activity Monitor

The Activity Monitor (located in your Utilities folder) permits the monitoring of the CPU, RAM, and Disk Activity via tabs at the bottom of the window. It's assumed that you'll look at these tabs (**Figure 1.27**) while you're playing (or rendering) video. The following list describes these tabs in detail:

- ▶ **CPU.** With the CPU tab active, you can watch the percentage of CPU usage. It can go up to 100 percent per core, so, for example, it's possible to see 600 percent on an eight core system. Adding the floating CPU window (Window> Floating CPU Window > Horizontal [or Vertical]) will display a live bar graph, showing how hard each core is working.
- ▶ **System Memory.** The item to keep your eye on in this tab is Swap Used. All modern operating systems have relatively unlimited virtual memory. They *page* (write) RAM to the system hard drive when they run out of memory. This slows down your system because it takes time to perform this writing (and later reading) to (and from) your hard drive. Although this is one of the major speed advantages of having your OS run from an SSD, it's optimum to use as little swap space as possible.



Figure 1.27 The Activity Monitor shown here is being taxed heavily by the simultaneous use of Adobe Premiere Pro and Adobe Media Encoder.

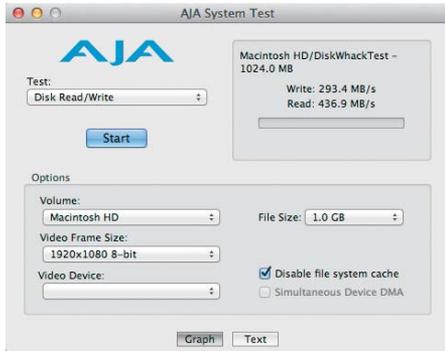


Figure 1.28 A drive speed test, like the AJA System Test, should be used regularly to make sure your system's performance doesn't degrade over time.

- ▶ **Disk Activity.** It's necessary to use a utility, such as the AJA System Test (Figure 1.28) or the Black Magic Disk Speed Test, to max out the read and write speeds your drive can handle. Play back footage in Adobe Premiere Pro and observe the Disk Activity tab. If your drives are nearing their peak speed, they are likely the bottleneck issue.

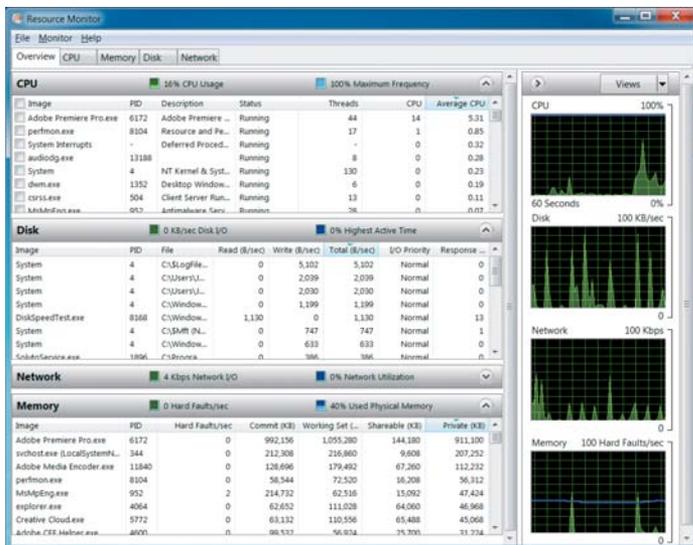
Window's Resource Monitor

Most users are familiar with the Task Manager (Ctrl+Alt+Del), which has some monitoring capabilities, but a more thorough set of monitoring capabilities is found in the Resource Monitor (Figure 1.29).

To start the Resource Monitor in Windows 7, choose Start > All Programs > Accessories > System Tools > Resource Monitor. There's also a button in the Task Manager that brings up the Resource Monitor. The following list explains each tab in more detail:

- ▶ **Overview.** On the Overview tab are four bar graphs on the right side; each shows system utilization. Watch the CPU, Memory, and Disk Active graphs and see if any graph has filled its display.

Figure 1.29 The Resource Monitor in Windows 7. The tabs along the top allow focusing on how well Windows is performing while under load.



- ▶ **CPU.** With the CPU tab active (not in the overview image), watch the percentage of CPU usage. CPU – Total shows the average usage across all processors. Each processor is individually labeled and measured.
- ▶ **Memory.** Pay attention to the Physical Memory used at the top of the window. If it's over 80%, it's time to add more RAM.
- ▶ **Disk Activity.** It's necessary to use a utility such as the AJA Disk System Test or the Black Magic Disk Speed Test (**Figure 1.30**) to max out the speed of read and write speeds your drive can handle while watching the Peak speed. Then play back footage in Adobe Premiere Pro. If your drives are nearing their peak speed, they are likely the bottleneck issue.

The Resource Monitor has changed a little in Windows 8, but generally the same concepts apply to evaluate machine performance along with the requirement of a speed test utility.

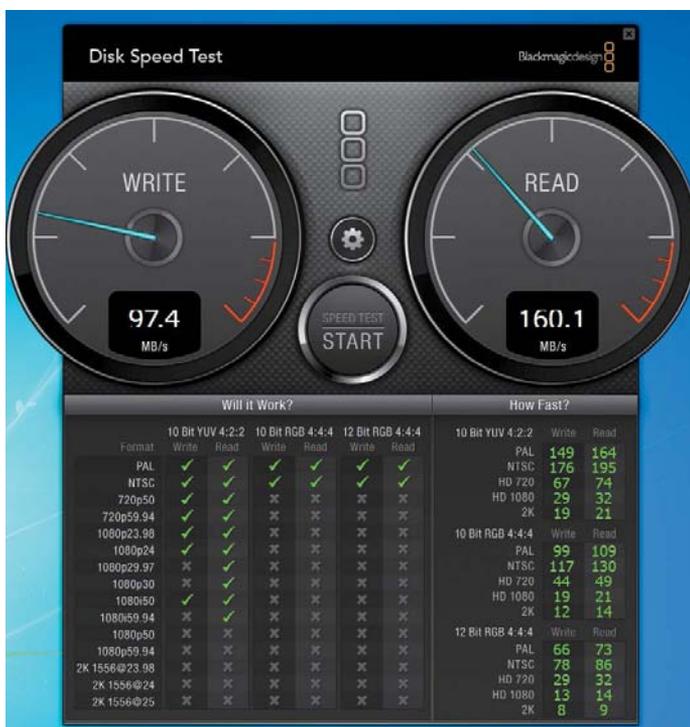


Figure 1.30 On Windows, the Black Magic Disk Speed Test requires you to download one of the drivers for its video software, such as for the line of Intensity output devices. On a Mac, this software can be found in the App store.

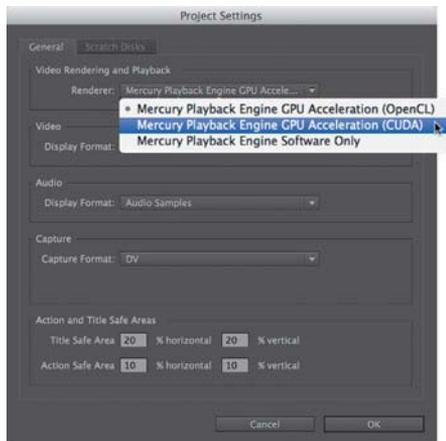


Figure 1.31 When you change the MPE to Software Only, there should be lots of red bars in your Timeline.

GPU card performance

Video card performance is *harder* to measure than disk speed if you have enough RAM. The best way to determine how much assistance your system is getting from the GPU is to *turn off* the GPU and then compare how your system runs when it is *unaccelerated*.

To turn off the acceleration (**Figure 1.31**), choose File > Project Settings, and then choose Software Only from the drop-down menu.

If you don't also see a CUDA or OpenGL choice available, your video card either may not be capable of performing MPE acceleration (make sure you have at least 1 GB of GPU RAM) or your driver may be out of date.

Too Many Hardware Choices?

What if you're not a "do it yourself" sort of user? Perhaps you don't want to build or configure a system, or risk being unsure if you purchased an optimized system.

Consider using a VAR (Value Added Reseller) that specializes in video. There's a certain advantage to being able to buy all of your hardware from a single vendor; the vendor will configure it, possibly set it up, and likely have the associated hardware (such as switchers and black burst generators) that a professional user may need.

On the Apple side, an Apple is an Apple. When you're buying a Mac (**Figure 1.32**) you'll generally buy the same box regardless of whether you purchase it direct or from a reseller. Just be aware that you cannot upgrade many of the Apple products with memory or video cards after the initial purchase.

On the Windows side, HP continues to produce top-of-the-line hardware (**Figure 1.33**) and aggressive systems with specific custom design for professional video users that are also optimized for the Adobe products.



Some Apple machines have RAM and video cards permanently soldered to their motherboards, and there may be little or no upgrades possible. Consult <http://everymac.com> for details on your specific hardware.



Figure 1.32 Apple's Retina MacBook Pro works well with Adobe Creative Cloud. Just make sure you max out the RAM because there's no changing it after the fact.



Figure 1.33 HP offers optimized products, like the Z820 desktop model (shown here), and mobile workstations, like the 8770w, specifically for pro video needs.

Breathing Life into Old Hardware

The struggle is always to maximize the life of existing hardware equipment. There comes a point when it's not worth upgrading. A system that can work more efficiently just one hour a week (at the very minimum) pays for itself within a year. If you cannot afford new equipment, breathe life into what you already have.

The availability of hardware improvements depend on the system you own. Some motherboards can handle only certain chips. Some video cards may not fit in specific systems. Here are some general tips on what to upgrade and in what order:

- ▶ **SSD.** Getting an SSD for a caching drive and a system drive will make your system seem fast and new.
- ▶ **High-speed external port.** Get a card for your older desktop that allows you to use USB 3 or Thunderbolt.
- ▶ **RAID.** A Raid-0 will provide the fastest performance (at the cost of higher vulnerability). Be sure to have a daily backup when you're using a RAID-0 for media.
- ▶ **Video card.** Get a new GPU. The faster it is and the more RAM it has, the better.