



Cinema Tools 4

User Manual

Copyright © 2009 Apple Inc. All rights reserved.

Your rights to the software are governed by the accompanying software license agreement. The owner or authorized user of a valid copy of Final Cut Studio software may reproduce this publication for the purpose of learning to use such software. No part of this publication may be reproduced or transmitted for commercial purposes, such as selling copies of this publication or for providing paid for support services.

The Apple logo is a trademark of Apple Inc., registered in the U.S. and other countries. Use of the “keyboard” Apple logo (Shift-Option-K) for commercial purposes without the prior written consent of Apple may constitute trademark infringement and unfair competition in violation of federal and state laws.

Every effort has been made to ensure that the information in this manual is accurate. Apple is not responsible for printing or clerical errors.

Note: Because Apple frequently releases new versions and updates to its system software, applications, and Internet sites, images shown in this manual may be slightly different from what you see on your screen.

Apple
1 Infinite Loop
Cupertino, CA 95014
408-996-1010
www.apple.com

Apple, the Apple logo, Final Cut, Final Cut Pro, Final Cut Studio, FireWire, Mac, Mac OS, Monaco, and QuickTime are trademarks of Apple Inc., registered in the U.S. and other countries.

Cinema Tools, Finder, and OfflineRT are trademarks of Apple Inc.

AppleCare is a service mark of Apple Inc., registered in the U.S. and other countries.

Other company and product names mentioned herein are trademarks of their respective companies. Mention of third-party products is for informational purposes only and constitutes neither an endorsement nor a recommendation. Apple assumes no responsibility with regard to the performance or use of these products.

Production stills from the film “Koffee House Mayhem” provided courtesy of Jean-Paul Bonjour. “Koffee House Mayhem” © 2004 Jean-Paul Bonjour. All rights reserved. <http://www.jeanpaulbonjour.com>

Production stills from the film “A Sus Ordenes” provided courtesy of Eric Escobar. “A Sus Ordenes” © 2004 Eric Escobar. All rights reserved. <http://www.kontentfilms.com>

Contents

Preface	7 Welcome to Cinema Tools
	7 About Cinema Tools
	8 About the Cinema Tools Documentation
	8 Additional Resources
Chapter 1	9 An Overview of Using Cinema Tools
	9 Editing Film Digitally
	12 Why 24p Video?
	13 Working with 24p Sources
	13 Offline and Online Editing
	14 Creating the Cinema Tools Database
	16 Capturing the Source Clips with Final Cut Pro
	19 Preparing the Clips for Editing
	20 Creating Cut Lists and Other Lists with Cinema Tools
	21 How Much Can Be Done from Final Cut Pro?
Chapter 2	23 Before You Begin Your Film Project
	23 An Introduction to Film Projects
	24 Before You Shoot Your Film
	24 Which Film to Use?
	25 Transferring Film to Video
	28 Frame Rate Basics
	34 Audio Considerations
	38 Working in Final Cut Pro
Chapter 3	41 Cinema Tools Workflows
	41 Basic Film Workflow Steps
	42 Film Workflow Examples
	46 Basic Digital Intermediate Workflow Steps
	49 Digital Intermediate Workflow Using a Telecine
	51 Working with REDCODE Media
Chapter 4	53 Creating a Cinema Tools Database
	53 An Introduction to Cinema Tools Databases

	54	Deciding How You Should Create the Database
	58	Creating and Configuring a New Database
Chapter 5	65	Working with Databases
	65	Opening an Existing Database
	66	Viewing Database Properties
	66	About the Detail View Window
	67	Settings in the Detail View Window
	73	About the List View Window
	74	Settings in the List View Window
	76	Finding and Opening Database Records
	77	Settings in the Find Dialog
	80	Backing Up, Copying, Renaming, and Locking Databases
	80	About the Clip Window
	81	Settings in the Clip Window
	84	Accessing Information About a Source Clip
Chapter 6	85	Entering and Modifying Database Information
	85	About Working with Database Information
	86	Importing Database Information
	91	Entering Database Information Manually
	96	Using the Identify Feature to Calculate Database Information
	98	Deleting a Database Record
	98	Choosing a Different Poster Frame for a Clip
	99	Changing the Default Database Settings
	100	Changing All Reel or Roll Identifiers
	101	Verifying and Correcting Edge Code and Timecode Numbers
Chapter 7	105	Capturing Source Clips and Connecting Them to the Database
	105	About Source Clips and the Database
	105	Preparing to Capture
	109	Generating a Batch Capture List from Cinema Tools
	115	Connecting Source Clips to the Database
	120	Fixing Broken Clip-to-Database Links
Chapter 8	123	Preparing the Source Clips for Editing
	123	An Introduction to Preparing Source Clips for Editing
	123	Determining How to Prepare Source Clips for Editing
	125	Using the Conform Feature
	127	Reversing the Telecine Pull-Down
	139	Making Adjustments to Audio Speed
	139	Synchronizing Separately Captured Audio and Video
	141	Dividing or Deleting Sections of Source Clips Before Editing

Chapter 9	143 Editing with Final Cut Pro
	143 About Easy Setups and Setting the Editing Timebase
	144 Working with 25 fps Video Conformed to 24 fps
	146 Displaying Film Information in Final Cut Pro
	150 Opening Final Cut Pro Clips in Cinema Tools
	150 Restrictions for Using Multiple Tracks
	151 Using Effects, Filters, and Transitions
	157 Tracking Duplicate Uses of Source Material
	158 Ensuring Cut List Accuracy with 3:2 Pull-Down or 24 & 1 Video
Chapter 10	159 Generating Film Lists and Change Lists
	159 An Introduction to Film Lists and Change Lists
	160 Choosing the List Format
	161 Lists You Can Export
	166 Exporting Film Lists Using Final Cut Pro
	174 Creating Change Lists
	189 Working with XSL Style Sheets
Chapter 11	193 Export Considerations and Creating Audio EDLs
	193 About Common Items You Can Export for Your Project
	194 Considerations When Exporting to Videotape
	194 Considerations When Exporting Audio
	195 Exporting an Audio EDL
Chapter 12	201 Working with External EDLs, XML, and ALE Files
	201 Creating EDL-Based and XML-Based Film Lists
	206 Working with ALE Files
Chapter 13	209 Working with 24p Video and 24 fps EDLs
	210 Considerations When Originating on Film
	211 Editing 24p Video with Final Cut Pro
	217 Adding and Removing Pull-Down in 24p Clips
	227 Using Audio EDLs for Dual System Sound
Appendix A	229 Film Background Basics
	229 Film Basics
	234 Editing Film Using Traditional Methods
	236 Editing Film Using Digital Methods
Appendix B	241 How Cinema Tools Creates Film Lists
	241 Film List Creation Overview
	242 About the Clip-Based Method
	243 About the Timecode-Based Method

Appendix C	245 Solving Problems
	245 Resources for Solving Problems
	245 Solutions to Common Problems
	247 Contacting AppleCare Support
Glossary	249

Welcome to Cinema Tools

Cinema Tools is a powerful database that tracks Final Cut Pro edits for conforming film, digital intermediate, and 24p video projects.

This preface covers the following:

- About Cinema Tools (p. 7)
- About the Cinema Tools Documentation (p. 8)
- Additional Resources (p. 8)

About Cinema Tools

In today's post-production environment, it's common for editors and filmmakers to find themselves faced with a confounding array of formats, frame rates, and workflows encompassing a single project. Projects are often shot, edited, and output using completely different formats at each step.

For editors and filmmakers who specifically want to shoot and finish on film or use a digital intermediate workflow, Cinema Tools becomes an essential part of the post-production process when editing with Final Cut Pro. For example, when working with film you need to be able to track the relationship between the original film frames and their video counterparts. Cinema Tools includes a sophisticated database feature that tracks this relationship regardless of the video standard you use, ensuring that the film can be conformed to match your Final Cut Pro edits.

Cinema Tools also provides the ability to convert captured video clips to 24-frame-per-second (fps) video. For NTSC, this includes a Reverse Telecine feature that removes the extra frames added during the 3:2 pull-down process commonly used when transferring film to video or when downconverting 24p video.

Cinema Tools, in combination with Final Cut Pro, provides tools designed to make editing film digitally, using digital intermediate processes involving Color, and working with 24p video easier and more cost effective, providing functionality previously found only on high-end or very specialized editing systems.

The integration between Cinema Tools and Final Cut Pro makes it possible to perform the most common Cinema Tools tasks directly from Final Cut Pro—Cinema Tools performs the tasks automatically in the background.

About the Cinema Tools Documentation

Cinema Tools comes with the *Cinema Tools 4 User Manual* (this document), which provides detailed information about the application. This comprehensive document describes the Cinema Tools interface, commands, and menus and gives step-by-step instructions for creating Cinema Tools databases and for accomplishing specific tasks. It is written for users of all levels of experience. This manual documents not only all aspects of using the Cinema Tools application, but also all related functions within Final Cut Pro.

Note: This manual is not intended to be a complete guide to the art of filmmaking. Much of the film-specific information presented here is very general in nature and is supplied to provide a context for the terminology used when describing Cinema Tools functions.

Additional Resources

Along with the documentation that comes with Cinema Tools, there are a variety of other resources you can use to find out more about Cinema Tools.

Cinema Tools Website

For general information and updates, as well as the latest news on Cinema Tools, go to:

- <http://www.apple.com/finalcutstudio/finalcutpro/cinematools.html>

Apple Service and Support Websites

For software updates and answers to the most frequently asked questions for all Apple products, go to the general Apple Support webpage. You'll also have access to product specifications, reference documentation, and Apple and third-party product technical articles.

- <http://www.apple.com/support>

For software updates, documentation, discussion forums, and answers to the most frequently asked questions for Cinema Tools, go to:

- <http://www.apple.com/support/cinematools>

For discussion forums for all Apple products from around the world, where you can search for an answer, post your question, or answer other users' questions, go to:

- <http://discussions.apple.com>

An Overview of Using Cinema Tools

1

Cinema Tools combined with Final Cut Pro gives unprecedented power to film, digital intermediate, and 24p video editors.

This chapter covers the following:

- Editing Film Digitally (p. 9)
- Why 24p Video? (p. 12)
- Working with 24p Sources (p. 13)
- Offline and Online Editing (p. 13)
- Creating the Cinema Tools Database (p. 14)
- Capturing the Source Clips with Final Cut Pro (p. 16)
- Preparing the Clips for Editing (p. 19)
- Creating Cut Lists and Other Lists with Cinema Tools (p. 20)
- How Much Can Be Done from Final Cut Pro? (p. 21)

Editing Film Digitally

Computer technology is changing the film-creation process. Most feature-length films are now edited digitally, using sophisticated and expensive nonlinear editors designed for that specific purpose. Until recently, this sort of tool has not been available to filmmakers on a limited budget.

Cinema Tools provides Final Cut Pro with the functionality of systems costing many times more at a price that all filmmakers can afford. If you are shooting with 35mm or 16mm film and want to edit digitally and finish on film, Cinema Tools allows you to edit video transfers from your film using Final Cut Pro and then generate an accurate cut list that can be used to finish the film.

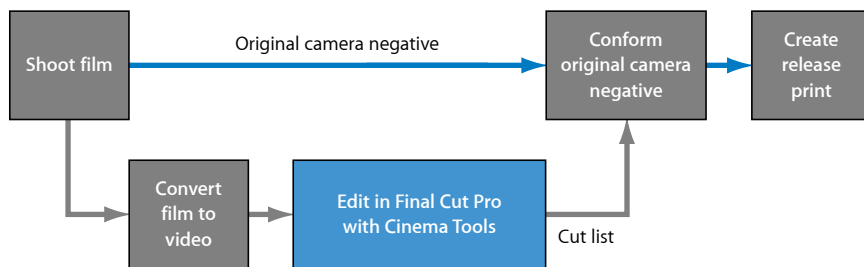
Even if you do not intend to conform the original camera negative, as in a digital intermediate workflow, Cinema Tools provides a variety of tools for capturing and processing your film's video. See [About the Digital Intermediate Process](#) for more information.

How Does Cinema Tools Help You Edit Your Film?

For many, film still provides the optimum medium for capturing images. And, if your goal is a theatrical release or a showing at a film festival, you may need to provide the final movie on film. Using Final Cut Pro with Cinema Tools does not change the process of exposing the film in the camera or projecting the final movie in a theater—it's the part in between that takes advantage of the advances in technology.

Editing film has traditionally involved the cutting and splicing together of a film workprint, a process that is time-consuming and tends to discourage experimenting with alternative scene versions. Transferring the film to video makes it possible to use a nonlinear editor (NLE) to edit your project. The flexible nature of an NLE makes it easy to put together each scene and gives you the ability to try different edits. The final edited video is generally not used—the edit decisions you make are the real goal. They provide the information needed to cut and splice (conform) the original camera negative into the final movie. The challenge is in matching the timecode of the video edits with the key numbers of the film negative so that a negative cutter can accurately create a film-based version of the edit.

This is where Cinema Tools comes in. Cinema Tools tracks the relationship between the original camera negative and the video transfer. Once you have finished editing with Final Cut Pro, you can use Cinema Tools to generate a cut list based on the edits you made. Armed with this list, a negative cutter can transform the original camera negative into the final film.



If your production process involves workprint screenings and modifications, you can also use Cinema Tools to create change lists that describe what needs to be done to a workprint to make it match the new version of the sequence edited in Final Cut Pro. See [Basic Film Workflow Steps](#) for more details about this workflow.

What Cinema Tools Does

Cinema Tools tracks all of the elements that go into the making of the final film. It knows the relationship between the original camera negative, the transferred videotapes, and the captured video clips on the editing computer. It works with Final Cut Pro to store information about how the video clips are being used and generates the cut list required to transform the original camera negative into the final edited movie.

Cinema Tools also checks for problems that can arise while using Final Cut Pro, the most common one being duplicate uses of source material: using a shot (or a portion of it) more than once. Besides creating duplicate lists, you can use Cinema Tools to generate other lists, such as one dealing with opticals—the placement of transitions, motion effects (video at other than normal speed), and titles.

Cinema Tools can also work with the production audio, tracking the relationship between the audio used by Final Cut Pro and the original production audio sources. It is possible to use the edited audio from Final Cut Pro when creating an Edit Decision List (EDL) and process (or finish) the audio at a specialized audio post-production facility.

It's important to understand that you use Final Cut Pro only to make the edit decisions—the final edited video output is not typically used, since the video it is edited from generally is compressed and includes burned-in timecode (window burn) and film information. It is the edit-based cut list that you can generate with Cinema Tools that is the goal.

About the Digital Intermediate Process

As movies become more sophisticated and the demand for digitally generated special effects grows, the *digital intermediate* process, also known as *DI*, has become increasingly important to filmmakers. This process often starts with a high-quality scan of the original film. This scan results in extremely high-quality video, often in the form of digital picture exchange (DPX) image sequences whose quality rivals or surpasses that of film. This high-quality video can then be edited, manipulated, and color corrected digitally. The big difference between this process and the telecine-based film editing process described previously is that the DI process does not actually conform the original camera negative—instead, the final digital output is either printed to film or distributed directly.

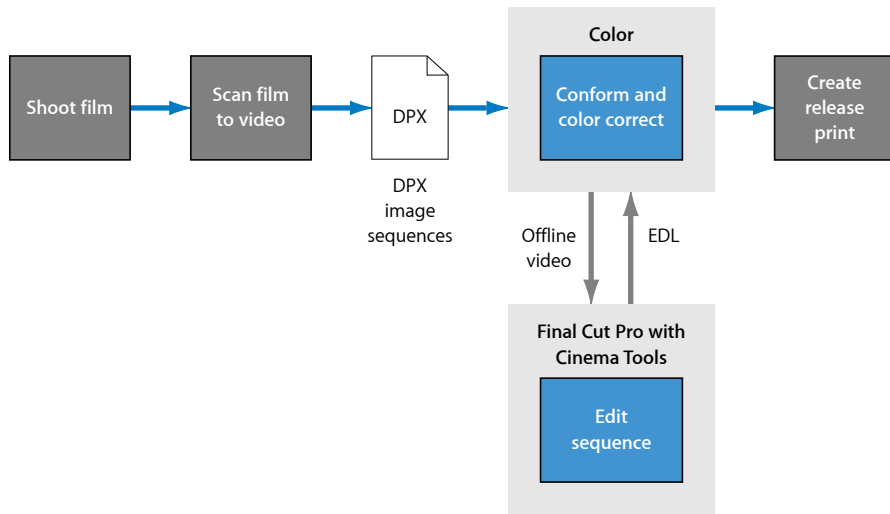
The term *DI* is also used to describe the editing, digital manipulation, and color correction processes used when the source of the video is a high-resolution camera system that does not use film at all, such as the RED ONE camera.

The video clips created most often during this process are referred to as *2K video image sequences*. An image sequence is actually a folder containing individual image files for each video frame. Because of the large size of these video clips, they are not generally edited directly. Instead, lower-resolution versions of the files are created, usually based on the Apple ProRes 422 codec, and then edited.

Once the edit is finished, the next step is to use Color to apply any needed color correction. This color correction is applied to the original 2K media. To accomplish this, an Edit Decision List (EDL) is exported from Final Cut Pro. This EDL is used to match the edits to the 2K media, allowing Color to conform and color correct the 2K media.

Cinema Tools databases can be used in this process to match the EDL to the 2K media, linking the reel names and timecode of each edit to entries in a database created from a folder of 2K image sequence clips. Using a Cinema Tools database provides powerful tools to diagnose and resolve any issues that occur, such as nonmatching reel names.

See [Basic Digital Intermediate Workflow Steps](#) and [Digital Intermediate Workflow Using a Telecine](#) for details about this workflow.



Why 24p Video?

The proliferation of high definition (HD) video standards and the desire for worldwide broadcast distribution have created a demand for a video standard that can be easily converted to all other standards. Additionally, a standard that translates well to film, providing an easy, high-quality method of originating and editing on video and finishing on film, is needed.

24p video provides all this. It uses the same 24 fps rate as film, making it possible to take advantage of existing conversion schemes to create NTSC and PAL versions of your project. It uses progressive scanning to create an output well suited to being projected on large screens and converted to film.

Additionally, 24p video makes it possible to produce high-quality 24 fps telecine transfers from film. These are very useful when you intend to broadcast the final product in multiple standards.

Working with 24p Sources

With the emergence of 24p HD video recorders, there is a growing need for Final Cut Pro to support several aspects of editing at 24 fps (in some cases, actually 23.98 fps). To this end, Final Cut Pro and Cinema Tools provide the following:

- The import and export of 24 fps and 23.98 fps EDLs
- The ability to convert NTSC 29.97 fps EDLs to 23.98 fps or 24 fps EDLs
- A Reverse Telecine feature to undo the 3:2 pull-down used when 24 fps film or video is converted to NTSC's 29.97 fps
- The ability to remove 2:3:3:2 or 2:3:2:3 pull-down from NTSC media files so you can edit at 24 fps or 23.98 fps
- The ability to output 23.98 fps video via FireWire at the NTSC standard of 29.97 fps video
- The ability to match the edits of videotape audio with the original production audio tapes and generate an audio EDL that can then be used to recapture and finish the audio if you intend to recapture it elsewhere for final processing

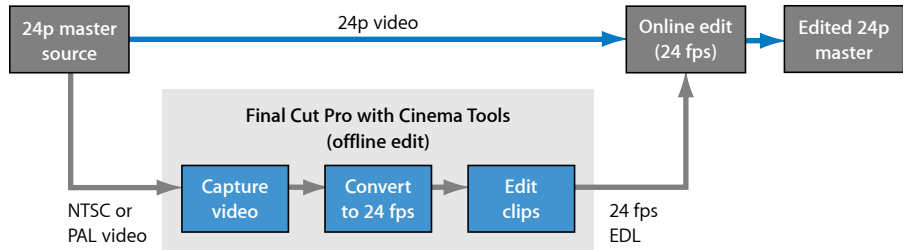
Several of the features mentioned above are included with Final Cut Pro and do not require Cinema Tools; however, this manual describes all of these features because they relate to working with 24p, which is of specific interest to many filmmakers. See [Frame Rate Basics](#) for more information about working with the different frame rates.

Offline and Online Editing

If you are working with a high-resolution 24p format, such as uncompressed HD video, you may need to make lower-resolution copies of your footage to maximize your computer's disk space and processing power. In this case, there are four basic steps to the editing process:

- *Production (generating the master video):* Transfer film to or natively shoot on uncompressed 24p HD video.
- *Offline edit:* Convert footage to NTSC or PAL video (which is generally lower-resolution than 24p) and edit it.
- *Project interchange:* Export a Final Cut Pro project or an EDL containing your final edit decisions.

- *Online edit*: Replace low-resolution footage and create a full-resolution master.



See [Editing 24p Video with Final Cut Pro](#) for more information.

Creating the Cinema Tools Database

There are a number of issues to take into account when you create your database.

How the Database Works

The database can contain one record or thousands of records, depending on how you decide to use Cinema Tools. These records are matched to the edits made in Final Cut Pro so that the cut list can be created. To be valid in a film workflow, a record must have values for the camera, daily, or lab roll, as well as the edge code (key numbers or ink numbers). In addition, the record must either have a clip connected to it or have video reel and video timecode (In point and duration) values.

When you export the cut list after editing the video in Final Cut Pro, Cinema Tools looks at each edit and tries to find the appropriate record in its database to determine the corresponding key numbers or ink numbers (edge code). Cinema Tools first looks for a record connected to the media file used in the edit. If a record is found, Cinema Tools then locates the file, adds a note to the cut list, and moves on to the next edit.

If no record is found using an edit’s media file, or the file is not located, Cinema Tools looks at the video reel number to see if any of its records have the same number (“001” is not the same as “0001”). If so, it then looks to see if the edit’s In and Out points fall within the range of one of the records. If this condition is also met, the edit is added to the cut list, and Cinema Tools moves on to the next edit.

If a record cannot be found that uses an edit’s clip pathname or video reel number with suitable timecode entries, “<missing>” appears in the cut list and a note is added to the missing elements list. If a record is found but is incomplete (missing the key number, for example), “<missing>” is placed in those fields and a note is added to the missing elements list.

See [An Introduction to Film Lists and Change Lists](#) and [How Cinema Tools Creates Film Lists](#) for details about this process and the missing elements list.

A Detailed or Simple Database?

Cinema Tools is designed to allow you to create a record for an entire camera roll, for each take, or somewhere in between, depending on how you like to work. Each record can contain:

- Scene, shot, and take numbers with descriptions
- The film's camera roll number, edge code, and related video timecode and reel number
- The sound roll and timecode
- A clip poster frame showing a representative frame from the clip
- Basic settings such as film and timecode format

The records can be entered manually or imported from a telecine log. You can modify, delete, and add records to the database as required, even if it is based on the telecine log. You can also merge databases. For example, if you are working with dailies, you can create a new database for each session and merge them all together when the shoot is complete.

The telecine log from scene-and-take transfers, where only specified film takes are transferred to video, can provide the basic information for the database. You can add additional records, comments, and other information as needed.

The telecine log from camera-roll transfers typically provides information for a single record—the edge code and video timecode used at the start of the transfer. Assuming continuous film key numbers and video timecode throughout the transfer, that single record is sufficient for Cinema Tools to generate a cut list for that camera roll.

Importing Telecine Logs

You have a choice of importing the telecine log using Cinema Tools or Final Cut Pro. You can choose either method according to your workflow.

In both cases, you have the option of assigning a camera letter, which is appended to the take entries, to the import. This is useful in those cases where multiple cameras were used for each take. See [Assigning Camera Letters](#) for more information.

See [Importing Database Information from a Telecine Log or ALE File](#) for more information about importing telecine logs.

- *Importing telecine logs using Cinema Tools:* To import a telecine log into Cinema Tools, you must first have a database open. The database can be an existing one that you want to add new records to, or it can be a new one with no records.

Once the records have been imported, you can export a batch capture list from Cinema Tools that you can import into Final Cut Pro to automate the clip capture process.

- *Importing telecine logs using Final Cut Pro:* When you import a telecine log using Final Cut Pro, you choose whether to import it into an existing Cinema Tools database or whether a new database should be created.

As records are added to the selected Cinema Tools database, each record also creates an offline clip in the Final Cut Pro Browser so that clips can be batch captured. The film-related information from the telecine log is automatically added to each clip. You can show this information in a variety of ways while editing the clips in Final Cut Pro. See [Displaying Film Information in Final Cut Pro](#) for more information.

Manually Entering Database Records

The most common reason to manually enter a record into the database is that there is no log available from the film-to-video transfer process. Some film-to-video transfer methods, such as film chains, do not provide logs.

Each record in a database should represent a media file that has continuous timecode and key numbers. With scene-and-take transfers, each take requires its own record because film key numbers are skipped when jumping from take to take during the transfer.

With camera-roll transfers, because the film roll and video recorder run continuously from start to finish, you require only one record for the entire clip, even if you later break it into smaller clips (that retain the original timecode) and delete the unused portions. This is because Cinema Tools can use an edit's video reel number and edit points to calculate the appropriate key numbers, as long as the video reel and edit point information is part of a record.

To manually enter database records, you need to know the key number and video timecode number for a frame of the clip. This is easiest when the transfer has these values burned in to the video.

See [Creating a Cinema Tools Database](#) for details about creating and managing Cinema Tools databases.

Capturing the Source Clips with Final Cut Pro

How you capture the source clips with Final Cut Pro depends in large part on the actual media used for the telecine transfer.

- *If you have a telecine log file and the clips are provided using a tape-based system:* In this case, you start by importing the telecine log file into either Cinema Tools or Final Cut Pro. If you import the telecine log file into Cinema Tools, you then export a batch capture list for Final Cut Pro. If you import the telecine log file into Final Cut Pro, you can use the batch capture process to capture the clips.

Note: Capturing video clips from a tape-based device may require third-party hardware. When using serial device control, make sure to calibrate its capture offset. See the Final Cut Pro documentation for more information. Also see [Setting Up Your Hardware to Capture Accurate Timecode](#) for more information about capturing your clips.

- *If you do not have a telecine log file and the clips are provided using a tape-based system:* In this case, you use the Final Cut Pro Log and Capture window to manually capture each clip. Once the clips are captured, you can create a Cinema Tools database based on them using the Synchronize with Cinema Tools command. In some cases, third-party hardware is required.
- *If the clips are provided using a file-based system, such as on a hard disk or DVD-ROM disc:* In this case, most often you also have a telecine log file. You can import the telecine log file into Final Cut Pro, copy the files to your computer, and connect them to your Final Cut Pro project.
- *If your clips are coming directly from a digital acquisition source, such as camcorders using solid-state cards:* In this case, you use the Log and Transfer window in Final Cut Pro to ingest the clips. You then use the Synchronize with Cinema Tools command to create a Cinema Tools database based on the clips.

Recompressing the Captured Files

Regardless of how you captured your video, you may decide to recompress the files to make them smaller and easier to work with. For example, taking advantage of the correct codec may allow you to edit on an older portable computer.

About Compression

Compression, in terms of digital video, is a means of squeezing the content into smaller files that require less hard disk space and potentially less processor power to display. The tradeoff is lower-quality images.

It's important to remember that the edited video that results from Final Cut Pro when used with Cinema Tools is not typically going to be used in an environment where high quality would be expected. The most common use of the edited video is to give the negative cutter a visual guide to go along with the cut list. This means that the quality of the video only needs to be good enough to make your edit decisions and read the window burn values. However, because your edit decisions are sometimes based on subtle visual cues, it's best not to get too carried away with excess compression.

Important: Do not use long-GOP codecs, such as most MPEG-2, XDCAM, H.264, or HDV codecs. In addition to being difficult to edit, these files cannot take advantage of the Reverse Telecine feature.

Capturing Tactics

There are several approaches to capturing your video and audio. Determining which is right for you depends on a number of factors, including whether you have device control of the source tape deck and the transfer type used (camera-roll or scene-and-take).

Device Control

A primary consideration when determining how to capture video and audio is whether Final Cut Pro supports device control for the deck you use. Device control allows you to capture precisely the video and audio you want in a way that can be exactly repeated, if necessary. You can even set up a “batch capture” that automates the process, freeing you to do other tasks.

Capturing without device control presents several challenges. Clips that are captured manually do not have precise start and end times. If you intend to match start and end times from a telecine log, you must trim the clips after capturing them. Additionally, without device control, a clip’s timecode does not match the timecode on the tape. Final Cut Pro has a provision for changing a clip’s timecode, but in order for that timecode to match the source tape, you must have a visual reference (a hole-punched or marked frame) with a known timecode value.

For more information about device control, see the Final Cut Pro documentation.

Camera-Roll Transfers

Camera-roll transfers require you either to capture the entire tape or to manually capture a clip for each take. As long as the tape uses continuous video timecode and film key numbers, Cinema Tools requires only a single database record showing the relationship between the two.

If Final Cut Pro has device control of your source deck, the best method for capturing the desired takes is to use the Final Cut Pro Log and Capture window and enter the In and Out points and reel number for each. You can then use batch capture to finish the process. It’s not necessary to create a database record for each clip, as long as you do not change the timecode.

Without device control, you must manually capture either the individual takes you want or the entire tape. You may need to trim a take that you capture manually, and you will also have to manually set its timecode to match the source tape. An advantage to capturing the entire tape is that you only have to set the clip’s timecode once (assuming that the source tape had continuous timecode). The drawback is the amount of disk space required, although once the tape is captured, you can use Final Cut Pro to create subclips of the useful takes and then delete the unused material.

See [Capturing Source Clips and Connecting Them to the Database](#) for details about capturing clips.

Scene-and-Take Transfers

Scene-and-take transfers generally result in records in the Cinema Tools database that are suitable for performing a batch capture. You can export a capture list from Cinema Tools and import it into the Final Cut Pro Browser. Final Cut Pro can then perform a batch capture (assuming it can control the source device), creating clips as directed by the Cinema Tools list. These clips can then be easily linked to records in the Cinema Tools database.

Finishing with High-Quality Video

If you intend to provide a high-quality video output when you have finished the project, there are several issues you might need to consider.

When capturing video for the initial offline edit, you can capture with relatively high compression and include burned-in timecode and key numbers. The compression makes it easier for your computer to work with the video and requires less hard disk space, allowing you to capture more video to use for making your edit decisions.

After you have finished the offline edit, you can use Final Cut Pro to recapture just the video actually used in the edits, using a high-quality codec and a version of the video without burned-in timecode and key numbers.

See [Working with 24p Video and 24 fps EDLs](#) for more information about this process. Also see your Final Cut Pro documentation for more information about offline and online editing workflows.

Preparing the Clips for Editing

Cinema Tools includes two features you can use to help prepare the captured clips for editing.

Reverse Telecine

The Reverse Telecine feature (for NTSC transfers only) provides a means of removing the extra fields added during the 3:2 pull-down process of the telecine transfer. You need to do this when you intend to edit the video at 23.98 fps. See [Frame Rate Basics](#) for information about what a 3:2 pull-down is and why you might want to reverse it. See [Reversing the Telecine Pull-Down](#) for details about using the Reverse Telecine feature.

Note: The Reverse Telecine feature cannot be used with temporally compressed video such as MPEG-2-format video.

Conform

The Conform feature is useful both to correct errors in video clips and to change the frame rate (timebase) of a clip. Cinema Tools lets you select the frame rate you want to conform a clip to.

In order to understand the Conform feature, you need to know a bit about the nature of QuickTime video files. Each video frame within a QuickTime file has a duration setting that defines the length of time that a particular frame is displayed (normal NTSC- or PAL-based QuickTime video has the same duration assigned to all frames). For example, the NTSC video rate has a value of 1/30 of a second (actually 1/29.97 of a second) assigned to each frame. The PAL video rate is 1/25 of a second.

Occasionally, captured video clips have some frames whose durations are set to slightly different values. Although the differences are not visible when playing the clip, they can cause problems when Cinema Tools creates the cut list or when you use the Reverse Telecine feature. In these cases, you can conform the clip to its current frame rate.

There are also times when you may want to change the frame rate of a clip. If you transferred 24 fps film to video by speeding it up (either to 29.97 fps for NTSC or to 25 fps for PAL—in each case ensuring a one-to-one relationship between the film and video frames), the action during playback will be faster than in the original film, and the audio will need to have its playback speed adjusted to compensate. You can use the Conform feature to change the clip's frame rate to 24 fps, making it play back at the original film rate and stay in sync with the audio. See [Using the Conform Feature](#) for details.

Note: Make sure to use the Conform feature on a clip *before* editing it in Final Cut Pro. Also make sure the editing timebase in the Final Cut Pro Sequence Preset Editor is set at the same rate you are conforming to.

See [Determining How to Prepare Source Clips for Editing](#) for more information.

Creating Cut Lists and Other Lists with Cinema Tools

There are a number of other useful lists that can be generated at the same time as a cut list. One film list file can contain any of the following:

- *Missing elements list:* A list of any required information that could not be found in the database
- *Duplicate list:* A list of duplicate usages of the same source material
- *Optical list:* A list for the effects printer, describing any transitions and motion effects
- *Pull list:* A list to aid the lab in pulling the required negative rolls
- *Scene list:* A list of all the scenes used in your program and the shots used in the opticals

You can also export a change list, useful if your production process involves workprint screenings and modifications. The change list assumes a workprint has been cut to the specifications of a cut list (or prior change list) and it specifies further changes to make to the workprint, based on edits you have made to the sequence in Final Cut Pro. See [When Are Change Lists Used in a Film Workflow?](#) for a flow chart of the workprint and change list process.

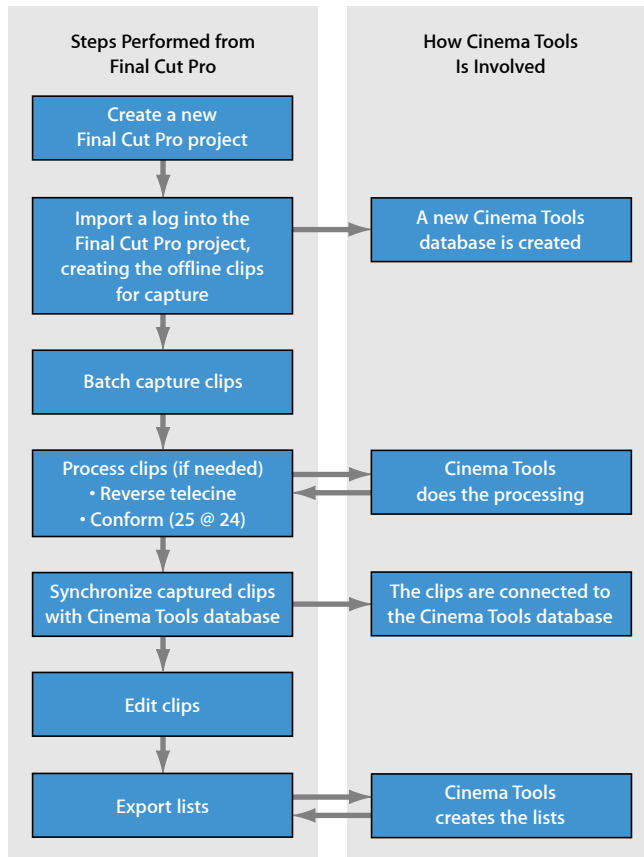
See [An Introduction to Film Lists and Change Lists](#) for more details about all the film-related lists that are available.

How Much Can Be Done from Final Cut Pro?

Because of the high level of integration between Cinema Tools and Final Cut Pro, you have several options for each stage in your project's workflow. For example, should you import the telecine log into Cinema Tools and export a batch capture list for Final Cut Pro, or should you import the telecine log directly into Final Cut Pro? Your situation and preferred working methods will often make this decision for you. Among the Cinema Tools–related functions you can perform directly from Final Cut Pro are:

- Importing telecine log files
- Conforming 25 fps video to 24 fps
- Reversing the telecine pull-down (using the last settings in Cinema Tools)
- Opening a clip in the Cinema Tools Clip window
- Synchronizing a Cinema Tools database to a group of selected clips
- Exporting film lists and change lists

Following is a diagram showing an ideal workflow that focuses on using Final Cut Pro methods.



In this workflow, you can focus on using Final Cut Pro, and Cinema Tools performs tasks in the background as needed. You must use Cinema Tools manually if you want to add information to the database beyond what the telecine log provided, or if you have a unique issue with reverse telecine and need to configure its settings.

Start planning your project early to ensure its success.

This chapter covers the following:

- An Introduction to Film Projects (p. 23)
- Before You Shoot Your Film (p. 24)
- Which Film to Use? (p. 24)
- Transferring Film to Video (p. 25)
- Frame Rate Basics (p. 28)
- Audio Considerations (p. 34)
- Working in Final Cut Pro (p. 38)

An Introduction to Film Projects

Successful film production requires thorough planning well before exposing the first frame. Besides the normal preparations, additional issues must be considered when you intend to edit the film digitally. These issues may affect the film you use, how you record your sound, and other aspects of your production.

This chapter provides basic information about many of the issues you will face:

- Which film to use
- Choices for transferring the film to video
- Frame rate issues between the film, your video standard, and your editing timebase
- Audio issues such as which recorder and timecode to use and how to synchronize the audio with the video
- Issues with Final Cut Pro such as selecting a sequence timebase and using effects

Note: Much of this information is very general in nature and is not intended to serve as a complete guide to filmmaking. The digital filmmaking industry changes rapidly, so what you read here is not necessarily the final word.

Before You Shoot Your Film

Before you begin your project, make sure to discuss it with all parties involved in the process:

- Those providing equipment or supplies used during the production
- Those involved in the actual production
- The facility that will develop your film, create workprints, and create the release print
- The video transfer facility
- The editor using Cinema Tools and Final Cut Pro (if it is not you)
- The negative cutter
- The audio post-production facility

These are people who are experts in their fields. They can provide invaluable information that can make the difference between a smooth, successful project and one that seems constantly to run into obstacles.

Be Careful How You Save Money

There are a number of times throughout the film production process when you will get to choose between “doing it right” and “doing it well enough.” Often your budget or a lack of time drives the decision. Make sure you thoroughly understand your workflow choices before making decisions that could end up costing you more, both in time and money, in the long run. Problems based on choices made early in the process—for example, deciding not to have a telecine log made—could take you by surprise later.

Having professional facilities handle the tasks they specialize in, especially when you are new to the process, is highly recommended. You may actually save money by spending a little for tasks that you could do yourself, such as using an audio post-production facility.

Also, do not underestimate the importance of using the cut list to conform a workprint before conforming the negative. Although creating and editing a workprint adds costs to the project, incorrectly conforming the original camera negative will cause irreparable harm to your film.

Which Film to Use?

One of the first steps in any film production is choosing the film format to use. Cinema Tools requirements must be taken into account when making this choice.

Cinema Tools supports 4-perf 35mm, 3-perf 35mm, and 16mm-20 film formats. See [Film Basics](#) for details about these formats.

Your budget will likely determine which format you use. Although it's generally best to use the same film format throughout your production, Cinema Tools does not require it. Each database record has its own film format setting.

Transferring Film to Video

In order to digitally edit your film, you need to transfer it to video so that it can be captured by the computer. There are a few ways to do this, but an overriding requirement is that there be a reliable way to match the film's key numbers to the edited video's timecode. This relationship allows Cinema Tools to accurately calculate specific key numbers based on each edit's In and Out point timecode values.

You also need to make decisions regarding film and video frame rates used during the transfer. These affect the editing timebase and impact the accuracy of the cut list that Cinema Tools generates.

Telecines

By far the most common method of transferring film to video is to use a telecine. Telecines are devices that scan each film frame onto a charge-coupled device (CCD) to convert the film frames to video frames. Although a telecine provides an excellent picture, for the purposes of Cinema Tools the more important benefit is that it results in a locked relationship between the film and video, with no drifting between them.

Telecines are typically gentler on the film and offer sophisticated color correction and operational control as compared to film chains, described in *Transfer Techniques That Are Not Recommended*. Another advantage is that telecines can create video from the original camera negative—most other methods require you to create a film positive (workprint) first. (Although from a budget viewpoint it may be a benefit not to create a workprint, workprints are generally created anyway since they provide the best way to see the footage on a large screen and spot any issues that might impact which takes you use. Even more importantly, they allow you to test the cut list before working on the negative.)

In addition to providing a high-quality transfer, most modern telecines read the key numbers from the film and can access the video recorder's timecode generator, burning in these numbers on the video output. An additional benefit of the telecine transfer method is its ability to provide synchronized audio along with the video output. It can control the audio source and burn in the audio timecode along with the video timecode and the key numbers.

But What If You Want a Clean Master?

If you plan to conform the original camera negative, the presence of burned-in timecode and key numbers on the video clips you edit in Final Cut Pro may not be a problem, especially if you are working with a highly compressed video format.

The burned-in numbers can be a problem, however, if you intend to use the edited video for screenings or for broadcast. As valuable as they are to the editor, the burned-in numbers can be distracting when watching an edited project. There are two common methods you can use to minimize this problem:

- Letterbox the video during capture using a 2:35 aspect ratio so that there is enough room below the video to show the numbers.
- Flash the burn-in information on the first frame only. Although not quite as useful as a continuous burn-in, this does provide the editor with the ability to ensure that the relationship of the edge code to the timecode is correct.

In most cases, telecines produce a log file that can provide the basis for the Cinema Tools database. This allows you to automate capturing the video into the computer.

Increasingly, telecine facilities can also capture the video clips for you, providing the clips on a DVD disc or FireWire drive, along with the telecine log and videotapes.

Transfer Techniques That Are Not Recommended

There are a couple of transfer techniques that are worth mentioning just to point out why you should *not* use them.

Film Chains

You should avoid using a film chain if at all possible. Film chains are relatively old technology, as compared to telecines. A film chain is basically a film projector linked to a video camera. Film chains typically do not support features such as reading the key numbers or controlling video recorders, and they cannot create a positive video from a film negative. You must create a workprint to use a film chain.

Using a film chain is usually less expensive than using a telecine, although the cost of creating a workprint partly offsets the lower cost. The biggest challenge is being able to define the relationship between the film's key numbers and the video timecode. This is usually accomplished with hole punches (or some other distinct frame marker) at known film frames.

Important: Older film chains may not synchronize the film projector to the video recorder, potentially causing the film-to-video relationship to drift.

Recording a Projected Image with a Camcorder

Because of the greatly increased chances for error and the additional time you have to spend tracking key numbers, this method of transfer is strongly discouraged and should not be considered.

Projecting your film and recording the results using a video camcorder is a method that, although relatively inexpensive, almost guarantees errors in the final negative cutting. Telecines and film chains are usually able to synchronize the film and video devices, ensuring a consistent transfer at whatever frame rates you choose. The projector's and video camcorder's frame rates may be close to ideal but will drift apart throughout the transfer, making it impossible to ensure a reliable relationship between the film's key numbers and the video timecode. You will have to spend extra time going over the cut list to ensure the proper film frames are being used. Additionally, there may be substantial flicker in the video output, making it difficult to see some frames and determine which to edit on.

Because the video is not actually used for anything except determining edit points, its quality doesn't matter too much. As with film chains, you have to create a workprint to project. Being able to proof your cut list before the original camera negative is worked on is very important with this type of transfer.

How Much Should You Transfer?

Deciding how much of your film to transfer to video depends on a number of issues, the biggest one probably being cost. The amount of time the telecine operator spends on the transfer determines the cost. Whether it is more efficient to transfer entire rolls of film (a "camera-roll" transfer), including bad takes and scenes that won't be used, or to spend time locating specific takes and transferring only the useful ones (a "scene-and-take" transfer) needs to be determined before starting.

Camera-Roll Transfers

Cinema Tools uses a database to track the relationship between the film key numbers and the video and audio timecode numbers. The database is designed to have a record for each camera take, but this is not required. If you transfer an entire roll of film continuously to videotape, Cinema Tools needs only one record to establish the relationship between the key numbers and the video timecode. All edits using any portion of that single large clip can be accurately matched to the original camera negative's key numbers. A drawback to this transfer method is the large file sizes, especially if significant chunks of footage will not be used.

Additionally, because of the way it is recorded, audio is difficult to synchronize at the telecine during a camera-roll transfer. During a production, the sound recorder typically starts recording before film starts rolling and ends after filming has stopped. You also will often shoot some film without sound (known as *MOS shots*). This means you cannot establish audio sync at the start of the film roll and expect it to be maintained throughout the roll. Instead, each clip needs to be synced individually. The Cinema Tools database includes provisions for tracking the original production sound rolls and audio timecode.

Once captured, a single large clip can be broken into smaller ones, allowing you to delete the excess video. Even with multiple clips, it is possible for Cinema Tools to generate a complete cut list with only one database record. Another approach is to manually add additional records for each clip, allowing you to take advantage of the extensive database capabilities of Cinema Tools. See [Creating the Cinema Tools Database](#) for a detailed discussion of these choices.

Scene-and-Take Transfers

Scene-and-take transfers are a bit more expensive than camera-roll transfers, but they offer significant advantages:

- Scene-and-take transfers make it easier to synchronize audio during the transfer.
- Because the telecine log contains one record per take, it establishes a solid database when imported into Cinema Tools.
- With an established database, Cinema Tools can export a batch capture list. With this list (and appropriate device control), Final Cut Pro can capture and digitize the appropriate takes with minimum effort on your part.

Maintaining an accurate film log and using a timecode slate can help speed the transfer process and reduce costs.

Frame Rate Basics

When transferring film to video, you need to take into account the differences in film and video frame rates. Film is commonly shot at 24 frames per second (fps), although 25 fps is sometimes used when the final project is to be delivered as PAL video (as opposed to the more common technique of just speeding up 24 fps film to 25 fps). Video can have a 29.97 fps rate (NTSC), a 25 fps rate (PAL), or either a 24 fps or 23.98 fps rate (24p), depending on your video standard.

The frame rate of your video (whether you sync the audio during the telecine transfer or not) and the frame rate you want to edit at can determine what you need to do to prepare your clips for editing. You may find it useful to read [Determining How to Prepare Source Clips for Editing](#) before you make any decisions about frame rates.

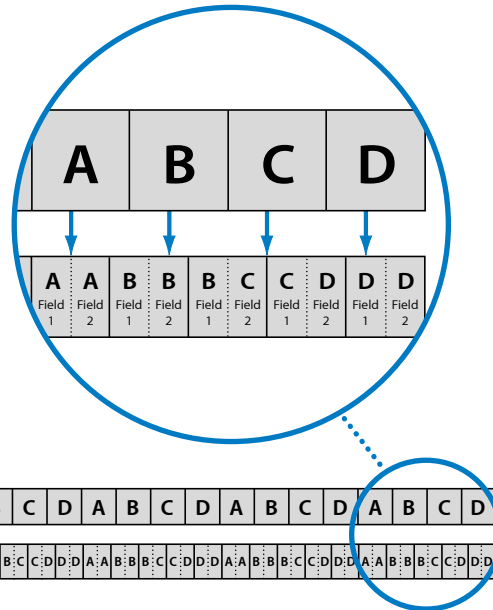
Working with NTSC Video

The original frame rate of NTSC video was exactly 30 fps. When color was added, the rate had to be changed slightly, to the rate of 29.97 fps. The field rate of NTSC video is 59.94 fields per second. NTSC video is often referred to as having a frame rate of 30 fps, and although the difference is not large, it cannot be ignored when transferring film to video (because of its impact on audio synchronization, explained in *Synchronizing the Audio with the Video*).

Another issue is how to distribute film's 24 fps among NTSC video's 29.97 fps.

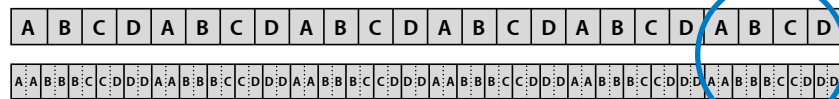
The most common approach to distributing film's 24 fps among NTSC video's 29.97 fps is to perform a 3:2 pull-down (also known as a 2:3:2:3 pull-down). If you alternate recording two fields of one film frame and then three fields of the next, the 24 frames in 1 second of film end up filling the 30 frames in 1 second of video.

Note: The actual NTSC video frame rate is 29.97 fps. The film frame rate is modified to 23.98 fps in order to create the 3:2 pattern.

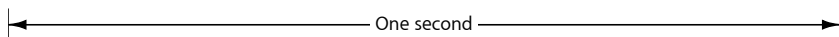


3:2 Pull-Down

Before (23.98 fps)



After (29.97 fps)



As shown above, the 3:2 pattern (actually a 2:3:2:3 pattern because frame A is recorded to two fields followed by frame B recorded to three fields) repeats after four film frames. Virtually all high-end commercials, movies, and non-live television shows use this process prior to being broadcast.

Note that there is not a one-to-one correspondence between film frames and video frames after this pull-down occurs. The duration of a video frame is four-fifths the duration of a film frame. Because of this discrepancy, if you tried to match a specific number of whole video frames to some number of whole film frames, the durations would seldom match perfectly. In order to maintain overall synchronization, there is usually some fraction of a film frame that must be either added to or subtracted from the duration of the next edit. This means that in the cut list, Cinema Tools occasionally has to add or subtract a film frame from the end of a cut in order to maintain synchronization. For this reason, if you edit 3:2 pull-down video, the Cinema Tools cut list is only accurate to within +/- 1 frame on each edit.

This accuracy issue is easily resolved by using the Reverse Telecine feature (or third-party hardware or software) to remove the extra fields and restore the film's original 24 fps rate before you begin editing digitally, providing a one-to-one relationship between the video and film frames. Setting the Final Cut Pro editing timebase in the Sequence Preset Editor to 24 fps (or 23.98 fps—see *Synchronizing the Audio with the Video*) allows you to edit the video and generate a very accurate cut list. See *Determining How to Prepare Source Clips for Editing* for more information about issues related to these options.

What's an A Frame?

You will see and hear references to "A" frames whenever you are involved with 3:2 pull-down video. As the previous illustration shows, the A frame is the only one that has all its fields contained within one video frame. The others (B, C, and D frames) all appear in two video frames. Because the A frame is the start of the video five-frame pattern, it is highly desirable to have one as the first frame in all video clips. It's common practice to have A frames at non-drop frame timecode numbers ending in "5" and "0."

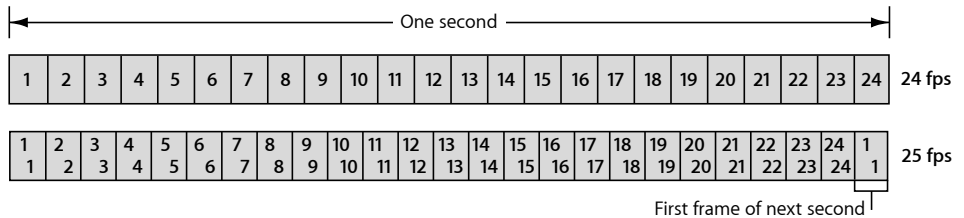
See *About A Frames* for more information.

Working with PAL Video

The PAL video frame rate is exactly 25 fps. There are two methods used when transferring film to PAL: running the film at 25 fps (referred to as the *24 @ 25* method), and adding two extra fields per second (similar to NTSC's 3:2 pull-down, referred to as the *24 & 1* method, or the *24 @ 25 pull-down* method).

24 @ 25 Method

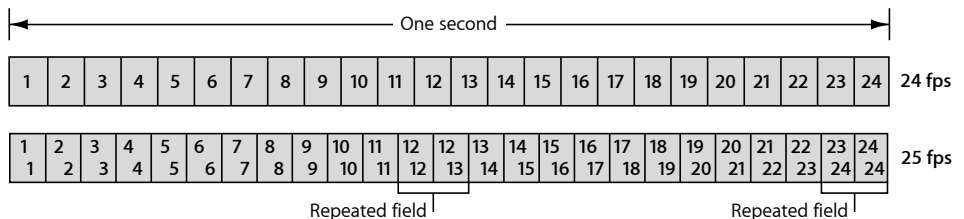
Running the film at 25 fps sets up a one-to-one relationship between the film and video frames. The drawback is that the action in the film is sped up by 4 percent, and the audio will need an identical speed increase to maintain synchronization. To take advantage of the wide variety of 25 fps video equipment available, you can choose to edit with the action 4 percent faster. Another option is to use the Cinema Tools Conform feature to change the clip's timebase to 24 fps, correcting the speed. The video can then be edited with Final Cut Pro as long as the sequences using it have a 24 fps timebase.



Note: Final Cut Pro includes an Easy Setup and sequence preset with “24 @ 25” in their names, as well as a timecode format named “24 @ 25.” These are all intended to be used with clips that originated as PAL 25 fps video but have been conformed to 24 fps video. See *Working with 25 fps Video Conformed to 24 fps* for more information.

24 & 1 Method

Adding two extra video fields per second (also known as the *24 @ 25 pull-down* method in Final Cut Pro) has the advantage of maintaining the original film speed, at the expense of losing the one-to-one film-to-video frame relationship. This method records an extra video field every twelfth film frame.



Working with 24p Video

With its frame rate and progressive scanning, 24p video is well suited for use with telecine transfers. It uses the same frame rate as film, providing a one-to-one relationship between the film and video frames without requiring a frame rate conversion.

Your Final Cut Pro system needs to be equipped with specialized hardware to capture 24p video, either as compressed or uncompressed clips. Alternatively, some DV cameras, such as the Panasonic AG-DVX100 camcorder, can shoot 24p video and use the 2:3:3:2 pull-down method to record it to tape at 29.97 fps (the NTSC standard). Using Final Cut Pro and Cinema Tools, you can capture this video and remove the 2:3:3:2 pull-down so that you can edit it at 24 fps. See [Adding and Removing Pull-Down in 24p Clips](#) for more information.

Note: When used as part of an NTSC system, the 24p videotape recorder's (VTR's) frame rate is actually 23.976 fps (referred to as *23.98 fps*) to be compatible with the NTSC 29.97 fps rate.

Timecode Considerations

There are several general issues related to timecode that you should be aware of. If you're using NTSC video, you can also choose between two timecode formats.

General Timecode Tips

When using video or audio equipment that allows you to define the timecode setting, it is recommended that you set the "hours" part of the timecode to match the tape's reel number. This makes it much easier to recognize which reel a clip originated from. It is also best to avoid "crossing midnight" on a tape. This happens when the timecode turns over from 23:59:59:29 to 00:00:00:00 while the tape is playing.

You have the option to use *record run* or *free run* timecode during the production:

- *Record run timecode:* The timecode generator pauses each time you stop recording. Your tape ends up with continuous timecode, because each time you start recording it picks up from where it left off.
- *Free run timecode:* The timecode generator runs continuously. Your tape ends up with a timecode break each time you start recording.

To avoid potential issues while capturing clips, it is strongly suggested that you use the record run method, which avoids noncontinuous timecode within a tape.

Whenever a tape has noncontinuous timecode (with jumps in the numbers between takes), make sure to allow enough time (handles) for the pre-roll and post-roll required during the capture process when logging your clips. See the Final Cut Pro documentation for additional information about timecode usage.

About NTSC Timecode

Normal NTSC timecode (referred to as *non-drop frame* timecode) works as you would expect—each frame uses the next available number. There are 30 frames per second, 60 seconds per minute, and 60 minutes per hour. Because NTSC's actual frame rate of 29.97 fps is a little less than 30 fps, non-drop frame timecode ends up being slow (by 3 seconds and 18 frames per hour) when compared to actual elapsed time.

To compensate for this, *drop frame* timecode skips ahead by two frames each minute, except those minutes ending in “0.” (Note that it is only the numbers that are skipped—not the actual video frames.) This correction makes the timecode accurate with respect to real time but adds confusion to the process of digital film editing.

With non-drop frame timecode, once you find an A frame, you know that the frame at that frame number and the one five away from it will always be A frames. For example, if you find an A frame at 1:23:14:15, you know that all frames ending in “5” and “0” will be A frames. With drop frame timecode, you are not able to easily establish this sort of relationship.

Note: It is standard practice to have A frames at non-drop frame timecode numbers ending in “5” and “0.”

It is highly recommended that you use non-drop frame timecode for both the video and audio in all film editing projects, even though both Cinema Tools and Final Cut Pro are able to use either type. Whichever you use, make sure to use the same for both the video and audio tapes.

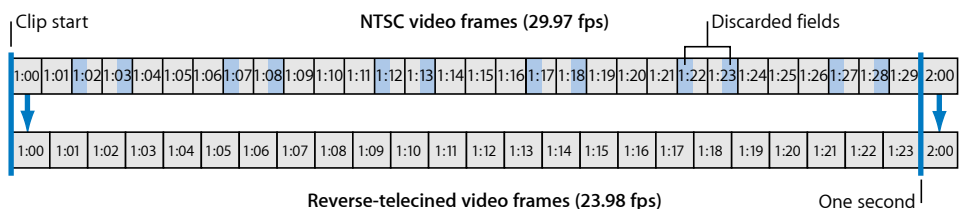
Note: PAL timecode does not have this issue—it runs at a true 25 fps.

What Happens to the Timecode After Using Reverse Telecine?

The Reverse Telecine feature (used to change 29.97 fps video to 23.98 fps video) directly affects the timecode of the video frames. Because Cinema Tools must generate new 23.98 fps timecode for the frames (based on the original timecode), you may see a difference between the burned-in timecode numbers and the numbers shown in Final Cut Pro. Though the timecode discrepancies between the window burn and Final Cut Pro timecode may be confusing, Cinema Tools tracks the new timecode of the 23.98 fps video and is able to match it to its original NTSC or PAL values, and thus back to the film’s key numbers.

Note: The Reverse Telecine feature is most often used to convert the NTSC video to 23.98 fps to match the audio timecode, but it can also convert the video to 24 fps.

This is what happens to the timecode: reverse telecine removes six frames per second, so the timecode numbers continue to match at the beginning of each second. This means that a clip that lasts for 38 seconds when played at its NTSC rate of 29.97 fps will still last for 38 seconds when played at the reverse-telecined rate of 23.98 fps.



In the above illustration, the blue NTSC fields represent fields that are removed during the reverse telecine process on a clip using traditional 3:2 pull-down. (See [Adding and Removing Pull-Down in 24p Clips](#) for information about 2:3:3:2 pull-down.) The window burn NTSC timecode will be different from what Final Cut Pro shows for all frames except the first one of each second, regardless of the clip's length.

What Happens to the Timecode After Using Conform?

There are three common situations you would use the Conform feature for:

- *Converting PAL 25 fps video to 24 fps:* The timecode is not changed, which ensures that an EDL exported after the clips are edited will accurately refer to the original PAL timecode. The drawback is that the timecode, at 25 fps, no longer accurately represents the true passage of time when played at 24 fps because each frame is displayed for a slightly longer time. See [Working with 25 fps Video Conformed to 24 fps](#) for more information.
- *Conforming 29.97 fps video to 29.97 fps:* The timecode is not changed. This process is used to correct issues in a QuickTime file prior to using the Reverse Telecine feature. See [Solutions to Common Problems](#) for more information.
- *Converting NTSC 29.97 fps video to 23.98 fps:* The timecode is altered, with a number skipped every five frames. This conform situation is rarely used.

See [Using the Conform Feature](#) for more information.

Audio Considerations

Because the audio for a film is recorded separately on a sound recorder, there are a number of issues that you must be aware of and plan for:

- *What type of sound recorder to use:* For more information, see [Choosing a Sound Recorder](#).
- *What timecode format to use:* For more information, see [Choosing an Audio Timecode Format](#).
- *How to mix the final audio:* For more information, see [Mixing the Final Audio](#).
- *How to synchronize the audio with the video:* For more information, see [Synchronizing the Audio with the Video](#).

Choosing a Sound Recorder

When choosing a sound recorder, you have several options: an analog tape recorder (typically a Nagra), a Digital Audio Tape (DAT) recorder, or a digital disc recorder. Whether analog or digital, make sure the recorder has timecode capability.

Choosing an Audio Timecode Format

Unlike video or film, which must be structured with a specific frame rate, audio is linear with no physical frame boundaries. Adding timecode to audio is simply a way to identify points in time, making it easier to match the audio to video or film frames.

During the shoot, you have the choice of which audio timecode standard to use (typically 30 fps, 29.97 fps, 25 fps, 24 fps, or 23.98 fps). You also have the choice, with 30 fps and 29.97 fps, of using drop frame or non-drop frame timecode. For NTSC transfers, it is highly recommended that you use non-drop frame timecode for both the video and audio (although Cinema Tools can work with either). See [About NTSC Timecode](#) for more information about drop frame and non-drop frame timecode.

A consideration for the audio timecode setting is how the final audio will be mixed:

- *If the final mix is to be completed using Final Cut Pro:* The setting needs to match the Final Cut Pro Editing Timebase setting in the Sequence Preset Editor.
- *If the final mix is to be completed at an audio post-production facility:* The timecode needs to be compatible with the facility's equipment.

Note: Make sure to consult with the facility and make this determination before the shoot begins.

In general, if you are syncing the audio during the telecine transfer, the timecode should match the video standard (29.97 fps for NTSC, 25 fps for PAL, or 24 fps for 24p). Check with your sound editor before you shoot to make sure the editor is comfortable with your choice.

Mixing the Final Audio

The way you mix the final audio depends on how complicated the soundtrack is (multiple tracks, sound effects, and overdubbing all add to its complexity) and your budget. You can either finish the audio with Final Cut Pro or have it finished at a post-production facility.

Finishing the Audio with Final Cut Pro

If you capture high-quality audio clips, you can finish the audio for your project with Final Cut Pro, which includes sophisticated audio editing tools. Keep in mind, however, that good audio is crucial to a good film, and a decision *not* to put your audio in the hands of an audio post-production facility familiar with the issues of creating audio for film might lead to disappointing results.

You can export the audio from Final Cut Pro as an Open Media Framework (OMF) file for use at an audio post-production facility. An exported OMF file contains not only the information about audio In and Out points, but also the audio itself. This means that, for example, any sound effects clips you may have added are included. When you use an OMF file, the recording quality must be as high as possible, as this is what the audience will hear. Make sure to use a good capture device and observe proper recording levels.

Exporting Audio EDLs

Another approach is to use lower-quality clips in Final Cut Pro and then export an audio Edit Decision List (EDL) for use at an audio post-production facility. There they can capture high-quality versions of the audio clips straight from the original production audio source and edit them based on the audio EDL. For this to work, the timecode and roll numbers of the original sound rolls must be kept track of and used to create the audio EDL.

Audio clips captured as part of video clips do not retain their original timecode and roll numbers, and the Final Cut Pro EDL cannot be used by an audio post-production facility. This is most common with clips created from scene-and-take transfers, where the audio is synchronized to the film and recorded onto the videotape, losing the original audio timecode. But because the telecine log from the transfer generally contains timecode and reel number information for both the video and audio, importing this log into the Cinema Tools database allows the database to track audio usage, and you can export an audio EDL from Cinema Tools once you finish editing.

See [Exporting an Audio EDL](#) for details about the process.

Synchronizing the Audio with the Video

The production audio for a film is recorded separately on a sound recorder; this is known as *dual* (or *double*) *system* recording. Synchronizing the audio with the film and video, ensuring good lip-sync, is a critical step in making a movie. How you synchronize depends on the equipment used and when syncing is done. There are also considerations related to your video standard, how the telecine transfer was done, and the timecode used that directly impact the process.

There are three times when audio synchronization is important:

- During the telecine transfer
- During editing
- While creating the release print

Different strategies may be required to maintain sync at each of these times. Make sure you have planned accordingly.

Synchronization Basics

Synchronizing the audio with the video image can be fairly easy as long as some care was taken during the shoot. There are two aspects to synchronizing your audio: establishing sync at a particular point in each clip, and playing the audio at the correct speed so that it stays in sync.

While shooting, you must provide visible and audible cues to sync on. The most common method is to use a clapper board (also called a *slate* or *sticks*) at the beginning of each take. Even better, you can use a timecode slate that displays the sound recorder's timecode. To sync the audio with the video, position the video at the first frame where the slate is closed, then locate the sound (or timecode) of the related audio. Note that production requirements occasionally require the slate to occur at the end of the take, generally with the slate held upside down.

Because the film is often either slightly sped up or slowed down during the telecine transfer, the audio must also have its speed changed. If the audio is being synced during the transfer, the speed change is handled there. If the audio is being synced to the videotape after the transfer, the speed change must happen then.

Synchronizing During the Telecine Transfer

During the shoot, you typically start the sound recorder a little before the camera rolls and stop it a little after the camera stops. Because you end up recording more audio than film, you cannot play the audio tape and the film through several takes and have them stay in sync. If you want the telecine transfer to record synchronized audio on the videotape, you must either use the scene-and-take transfer method, synchronizing each take on its own, or create a synced sound roll before performing a camera-roll transfer.

A large benefit to synchronizing during the telecine transfer, aside from having videotapes with synchronized audio ready to be captured, is that the telecine log usually includes the audio timecode and sound roll number information. Importing the log into Cinema Tools makes it possible to export an audio EDL so that an audio post-production facility can recapture the audio clips at a higher quality later, if needed.

- *NTSC transfers:* When transferring film to NTSC video, it is always necessary to run the film 0.1 percent slower than 24 fps (23.976 fps, typically referred to as *23.98 fps*) to compensate for NTSC video's actual frame rate of 29.97 fps (instead of an ideal 30 fps). Because the film has been slowed down, audio too must be slowed to maintain sync.
- *PAL transfers:* PAL transfers using the 24 @ 25 method (speeding up the film to 25 fps) require that the audio also be sped up if you are syncing the audio during the telecine transfer or if you intend to edit the video at this rate.

If you are transferring the film to video using the 24 & 1 method (recording an extra video field every twelfth film frame), you should run the audio at its normal speed regardless of where sync is established. Use 25 fps timecode for the audio in this case.

Synchronizing in Final Cut Pro

If you don't synchronize your sound and picture onto tape via the telecine transfer, they are captured into Final Cut Pro as separate audio and video clips. You can then synchronize them in Final Cut Pro, using the clapper board shots. See [Synchronization Basics](#) for more information. After you synchronize two or more clips, you can link them together as one clip, using the Final Cut Pro merged clips feature. See [Synchronizing Separately Captured Audio and Video](#) and the Final Cut Pro documentation for more information.

Working in Final Cut Pro

Decisions you make regarding the telecine transfer and how you work with audio affect how you use Final Cut Pro during the editing process.

Setting the Editing Timebase for Sequences

In Final Cut Pro, you must set the editing timebase for sequences to match the frame rate of the captured clips.

Important: Do not place clips into a sequence if the clips and sequence have different frame rates. If you do, the resulting film list is likely to be inaccurate. For example, if you want to edit at 24 fps, make sure your clips' frame rates are all set at 24 fps (either by using the Reverse Telecine feature or the Conform feature).

See [About Easy Setups and Setting the Editing Timebase](#) and the Final Cut Pro documentation for details about setting the editing timebase for sequences.

Outputting to Videotape When Editing at 24 fps

One of the benefits of editing at 24 fps is that you get a one-to-one relationship between the film and video frames, allowing for very accurate cut lists. A drawback is that you need a 24p VTR to directly record video as 24 fps—you cannot easily record the video on standard NTSC or PAL video equipment. This can be a problem if you want to record a videotape of the edited project, either to show others or to give the negative cutter a visual reference to use along with the cut list, but there are solutions:

- *If you're working with NTSC video:* You can use the pull-down insertion feature in Final Cut Pro to apply a pull-down pattern to the video, thus outputting it at 29.97 fps. See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for details. There are also third-party cards and applications that can perform a 3:2 pull-down on the video, allowing it to run at the NTSC 29.97 fps rate.
- *If you're working with PAL video:* If you know that you will want to record a videotape when finished, it's easiest to edit at 25 fps (with the film having been sped up to maintain the one-to-one relationship).

Using Effects

Final Cut Pro provides extensive effects capabilities, including common film effects such as dissolves, wipes, speed changes, and text credits. Keep in mind that the video output of Final Cut Pro is not intended to be transferred to film, and these effects must be created by a facility specializing in opticals, or created digitally using high-resolution scans of footage to be composited. See [Using Effects, Filters, and Transitions](#) for more information, including an outline of the basic workflow for including effects and transitions in your digitally edited film.

The primary purpose of Cinema Tools is to export film lists based on edits made in Final Cut Pro. You can also use Cinema Tools in workflows involving Color, DPX image sequences, and REDCODE media files. There are a few critical steps that are necessary for these workflows, but for the most part, the Cinema Tools workflow you should follow depends on the equipment you use, your video standard, and how you like to work.

This chapter covers the following:

- [Basic Film Workflow Steps](#) (p. 41)
- [Film Workflow Examples](#) (p. 42)
- [Basic Digital Intermediate Workflow Steps](#) (p. 46)
- [Digital Intermediate Workflow Using a Telecine](#) (p. 49)
- [Working with REDCODE Media](#) (p. 51)

Basic Film Workflow Steps

This section details a Cinema Tools database workflow for working with film. See [Film Workflow Examples](#) for possible scenarios. See [How Much Can Be Done from Final Cut Pro?](#) for information about which steps can be done directly in Final Cut Pro.

The typical Cinema Tools film workflow is outlined below.

Stage 1: [Creating the Cinema Tools Database](#)

The heart of Cinema Tools is its database, where the relationships between the elements of your movie (the film, video, and audio) are established and tracked. Although there is no actual requirement that the database be created prior to editing, it can provide some useful tools to help with capturing clips and planning the edit.

See [Creating the Cinema Tools Database](#) for more information.

Stage 2: [Capturing the Source Clips with Final Cut Pro](#)

You must capture the video and audio on your editing computer. How you do this depends in large part on the actual media used for the telecine transfer.

See [Capturing the Source Clips with Final Cut Pro](#) for more information.

Stage 3: Connecting the Clips to the Database

Once you have captured the source clips, you can connect them to the Cinema Tools database (also known as *linking* the clips to the database). Connecting a clip to the database gives Cinema Tools the ability to access a record's clip while creating the cut list, reducing the chance of timecode entry problems.

When creating a cut list, Cinema Tools starts by looking at the clip pathname used in the edit and matching it back to the database. Being able to work with the clip file in this way reduces the chances of a timecode error, which can cause inaccurate records in the cut list. This is especially important when editing at 24 fps. See [How Cinema Tools Creates Film Lists](#) and [Connecting Source Clips to the Database](#) for more information.

Stage 4: Preparing the Clips for Editing

Cinema Tools has two powerful features that can be used on your clips prior to editing them: the Reverse Telecine feature and the Conform feature.

See [Preparing the Clips for Editing](#) for more information.

Stage 5: Editing the Clips in Final Cut Pro

You edit the clips in Final Cut Pro much as you would for any video project, but there are a few important things to keep in mind. See [Editing with Final Cut Pro](#) for descriptions of these considerations.

Stage 6: Creating Cut Lists and Other Lists with Cinema Tools

Once you have edited your clips and are satisfied with your digitally edited project, you are ready to generate film-related lists that describe how to cut the negative or workprint. The cut list provides a list of the edits and of titling information.

See [Creating Cut Lists and Other Lists with Cinema Tools](#) for more information.

Film Workflow Examples

The following sections detail several Cinema Tools database workflow scenarios. Keep in mind that there are many possible variations of these workflows, and you often do not have to follow the steps exactly in order. It's also possible to use parts of several workflows. See [Basic Film Workflow Steps](#) for details about specific steps. For a discussion of the integration between Final Cut Pro and Cinema Tools, see [How Much Can Be Done from Final Cut Pro?](#)

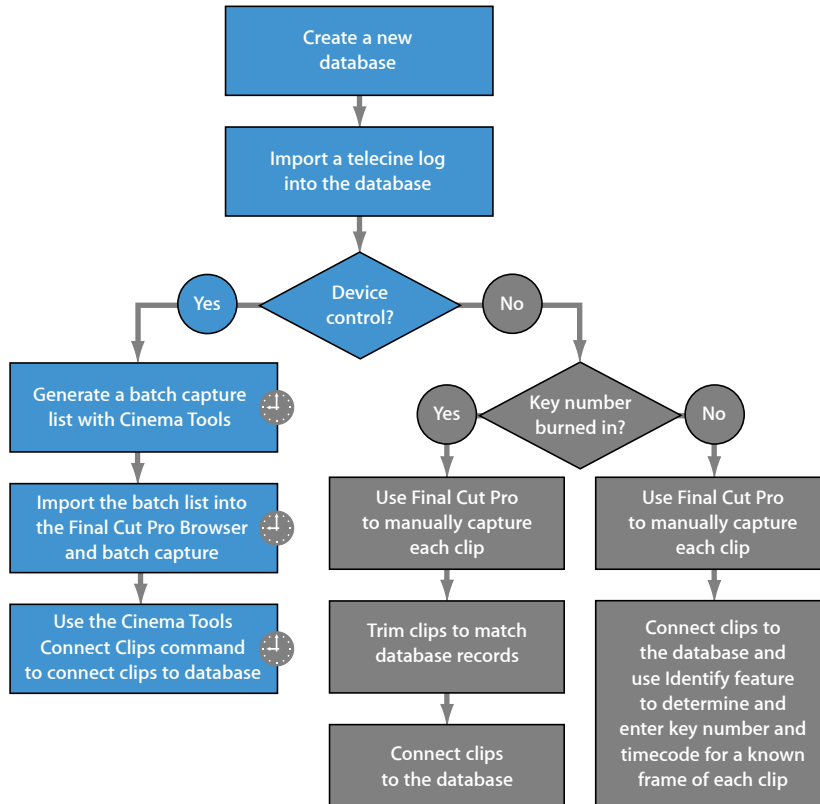
Following are sections covering two groups of workflows—those that use scene-and-take transfers ([If You Used Scene-and-Take Transfers](#)) and those that use camera-roll transfers ([If You Used Camera-Roll Transfers](#)). These workflows are further divided depending on whether a telecine log is available and whether you have device control of your video player during the capture process.

If You Used Scene-and-Take Transfers

Because scene-and-take transfers require a database record for each take (because of noncontinuous key numbers), an important first consideration is whether or not a telecine log is available.

Workflow for a Scene-and-Take Transfer with a Telecine Log

Importing a telecine log automatically creates the database entries.



⌚ Indicates steps that use automated processes.

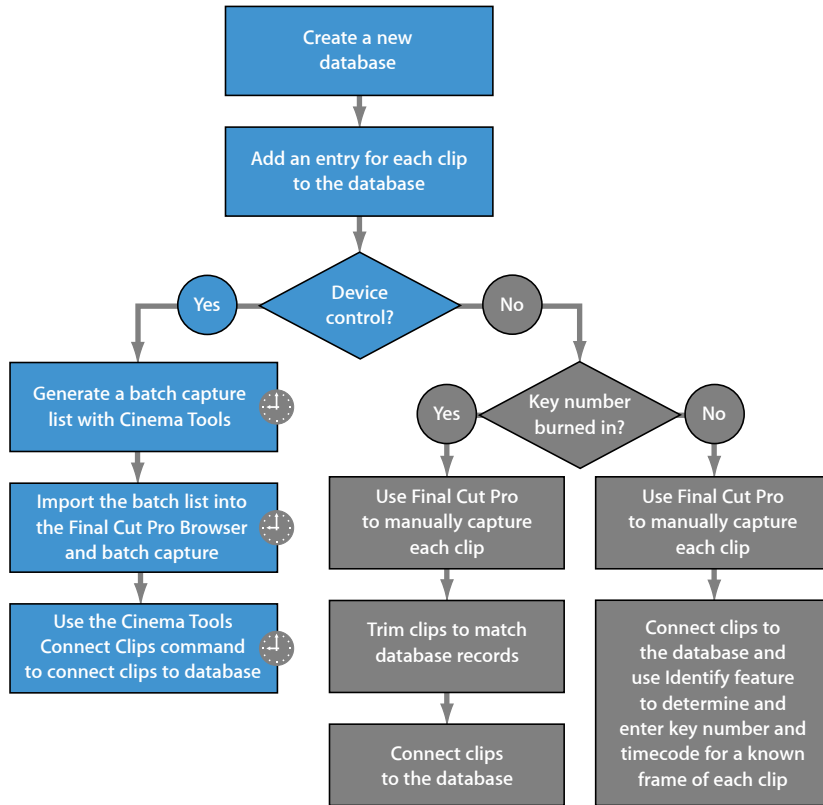
The blue boxes show the preferred workflow, which contains the most automated steps and produces the most accurate cut list.

Workflow for a Scene-and-Take Transfer Without a Telecine Log

With no telecine log to import, you can do either of the following:

- *Manually add entries to the database for each clip:* With this workflow (outlined in the following diagram), you export a batch capture list with Cinema Tools. If you have device control and you already know the In and Out points of the clips, this method can be efficient.

- *Manually capture the clips with Final Cut Pro and use the Synchronize with Cinema Tools command to create the Cinema Tools database:* This workflow is most useful when you don't know the exact In and Out points for each clip or if you do not have device control. You can also create the Cinema Tools database by dragging the folder containing the clips to the Cinema Tools application icon. You can use the Identify feature of Cinema Tools to determine and enter the key number information for each database record.



⚙ Indicates steps that use automated processes.

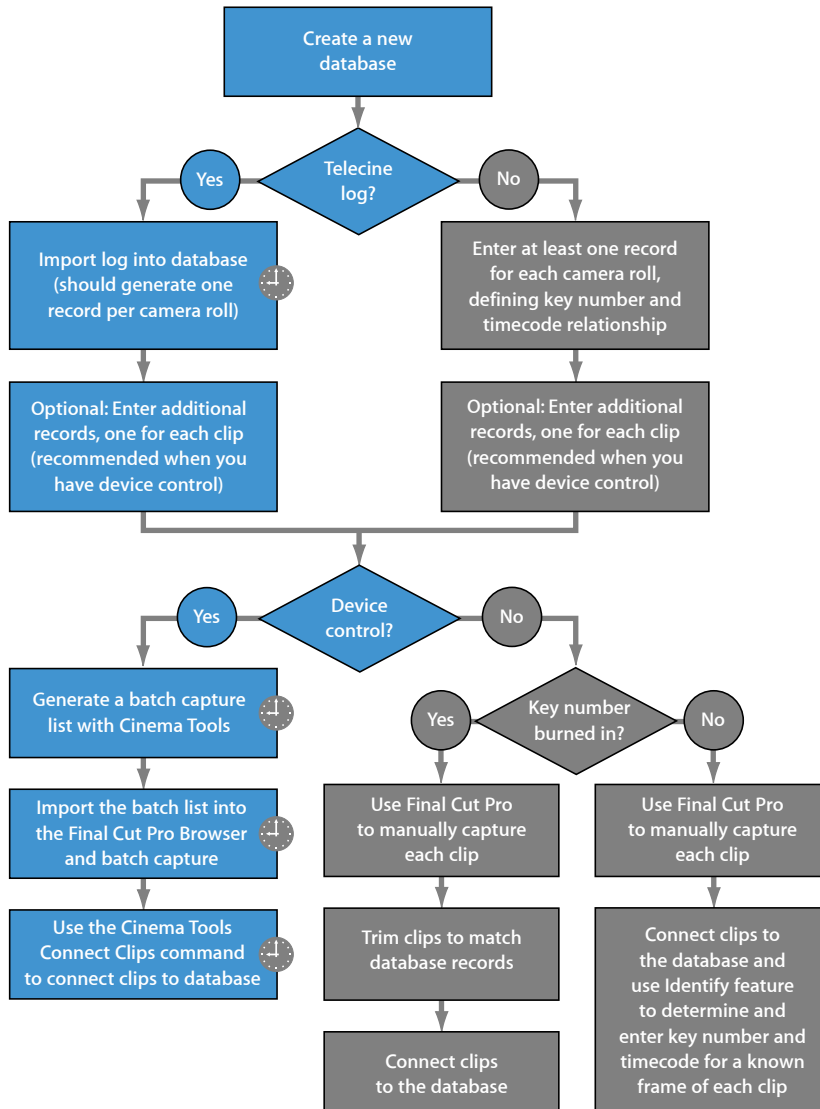
The blue boxes show the preferred workflow, which contains the most automated steps and produces the most accurate cut list.

If You Used Camera-Roll Transfers

The primary consideration when using camera-roll transfers is the film list generation method you intend to use. See [How Cinema Tools Creates Film Lists](#) for an explanation of the two available methods. Make sure to sync the audio to the video before you capture the clips.

Clip-Based Workflow for a Camera-Roll Transfer

The clip-based method is more reliable because there are fewer variables.

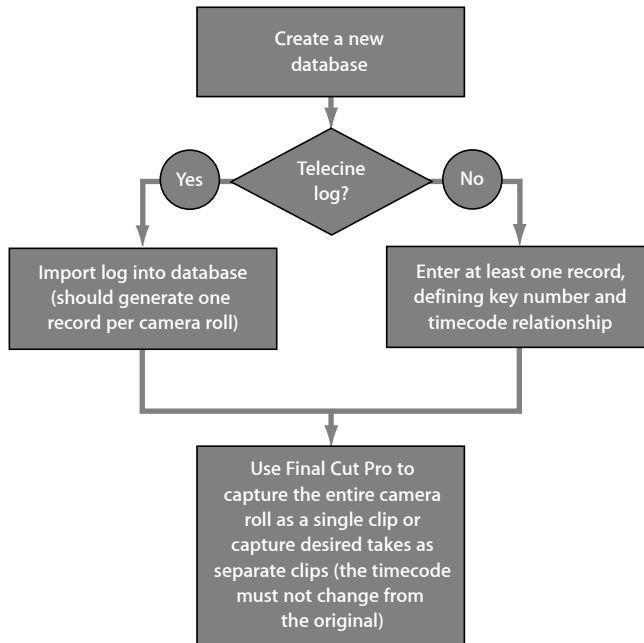


⊕ Indicates steps that use automated processes.

The blue boxes show the preferred workflow, which contains the most automated steps and produces the most accurate cut list.

Timecode-Based Workflow for a Camera-Roll Transfer

The timecode-based method must be used in certain situations, such as when generating a list from an external EDL or when the clip files are offline.



Basic Digital Intermediate Workflow Steps

The digital intermediate (DI) process generally refers to any workflow that involves source video of 2K resolution or higher, whether from a high-quality film scan or a digital camera, and that results in new output media being generated for distribution instead of relying on conforming the original camera negative. The output can be high-resolution digital files or a film print made from the files.

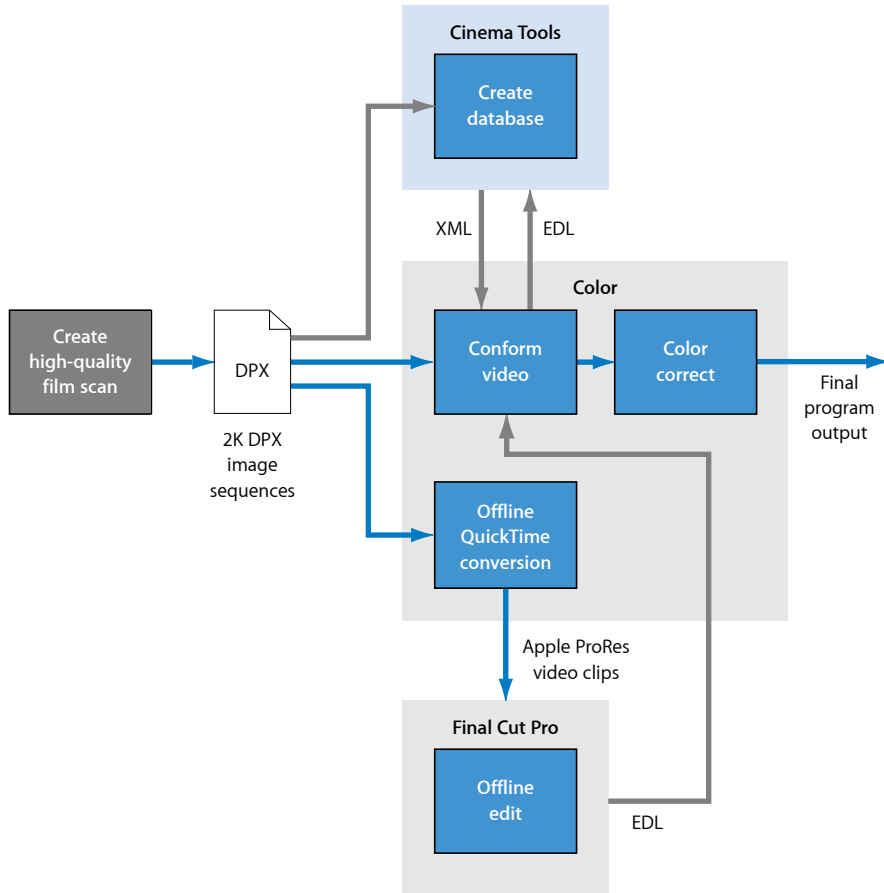
The primary goal of this workflow is to edit low-resolution versions of the source video clips in Final Cut Pro but have Color be able to color correct the original full-resolution source video clips and output the final movie. This is accomplished by exporting an Edit Decision List (EDL) from Final Cut Pro that Color uses to match to clip records in a Cinema Tools database.

There are two common approaches that you can take in a DI workflow:

- *Scan all of the film:* This is the simplest approach but requires a lot of disk storage space for the large video files that result. This approach is detailed in this section.

- *Use a telecine for all of the film, and then scan only the clips that are used:* This approach is a bit more complicated and uses a telecine to provide the offline video for Final Cut Pro to edit. This approach is detailed in the [Digital Intermediate Workflow Using a Telecine](#) section.

A typical scan-based DI workflow is outlined below.



Stage 1: Creating Apple ProRes Files for Final Cut Pro

Final Cut Pro cannot work directly with the DPX image sequences that are typically used in this workflow. You can use Color to create QuickTime files (usually based on an Apple ProRes codec) from the DPX image sequences. Using Color ensures that the QuickTime files have the correct reel number (the folder name that contains the actual DPX files) and timecode (as embedded in the DPX files).

You can create these downconverted files in Color by creating a new project with Render File Type set to QuickTime and Export Codec set to the codec you want to use. Then simply edit all the shots you want to convert into the Timeline, add them to the Render Queue, and click Start Render. See the Color documentation for more information.

Stage 2: Creating the Cinema Tools Database

A Cinema Tools database for a DI workflow is much simpler than a database for a typical film workflow because there is often no film information to track. You can create the database by simply dragging the folder that contains the original media files to the Cinema Tools application icon (it doesn't matter whether Cinema Tools is already open or not). A dialog appears asking if you want to create a new database. The new database creates a record for each clip found in the folder and its subfolders.

Note: If you create a Cinema Tools database by dragging a folder containing many DPX files to the Cinema Tools application icon, the process can take a long time and it might appear that Cinema Tools is not responding. Be sure to give Cinema Tools plenty of time to process the clips.

Once you have created the database, you can easily add new clips to it as they become available by dragging them to the List View window.

Stage 3: Editing the Clips in Final Cut Pro

You edit the downconverted video clips in Final Cut Pro much as you would for any video project, but there are a few important things to keep in mind. See [Editing with Final Cut Pro](#) for descriptions of these considerations.

Stage 4: Exporting an EDL File from Final Cut Pro

After you have completed editing the downconverted video clips in Final Cut Pro, you export an EDL. This file contains a list of every edit, with the reel names of the source clips and their In and Out point timecode numbers.

Stage 5: Importing the EDL into Color

When you import an EDL into a Color project, you can choose the folder that contains the source clips the EDL refers to. You can choose the folder that contains the original DPX clips and have Color connect the EDL records to the clips, or you can choose the Cinema Tools database you created from the clips.

The advantages of choosing the Cinema Tools database are:

- You can easily correct any issues there might be between the EDL and the actual clips. For example, if a reel name does not match, you can change the reel name in the Cinema Tools database to match the name listed in the EDL.
- Once you have created the Cinema Tools database, choosing it when importing an EDL into Color can be faster than choosing the folder with the clips. Choosing the database becomes especially useful if you end up importing the EDL into Color multiple times as additional clips become available.

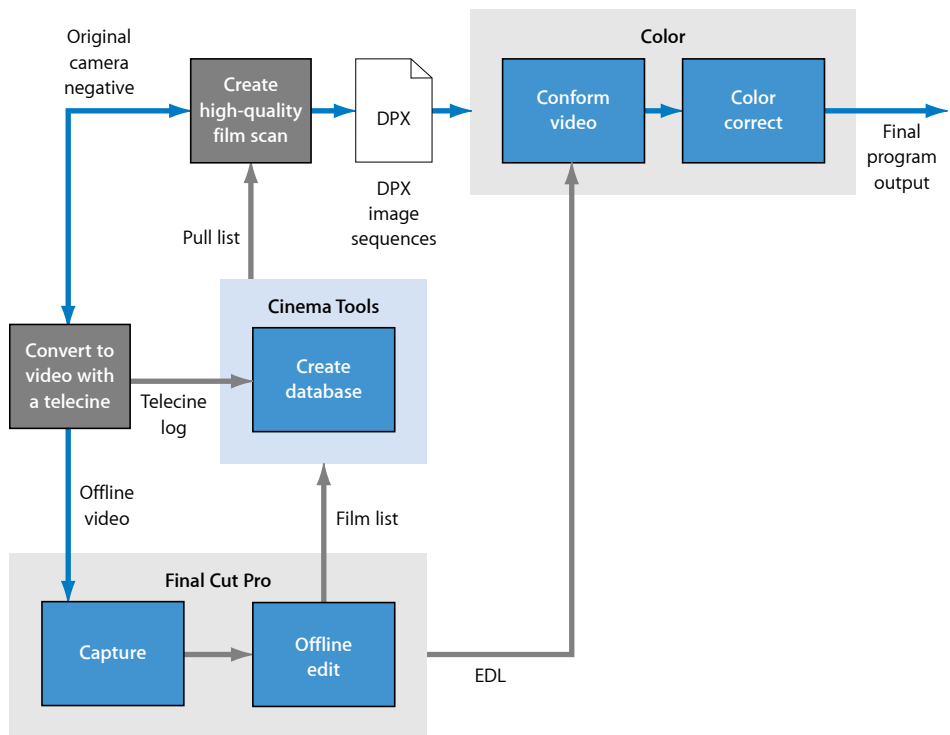
- If the EDL refers to clips on more than one volume, a Cinema Tools database can connect to all of the clips. Color can automatically connect to the clips on only one volume, and you must manually connect to the clips on the other volumes.

Stage 6: Finishing the Project in Color

Once you have imported the EDL into Color and matched it to the source clips, the clips are conformed to match the edits, and you can proceed with the usual color correction process. Color is then used to render the final output video.

Digital Intermediate Workflow Using a Telecine

Using a telecine to create the offline video clips to edit with Final Cut Pro requires far less storage space than using a film scan for all of the film footage. After the edit is finished, you use Cinema Tools to generate the pull list, which is used to create scans for only the video clips that are actually used in the program. The drawbacks of this method are that the original camera negative must be processed twice and the clips from each process must use the same reel names and timecode.



Stage 1: Creating the Offline Video Clips

Using a telecine, you create the offline video clips that Final Cut Pro uses to edit the program. You should try to create offline video clips with the same frame rate as the DPX image sequence clips you will create with the film scan when the offline edit is finished. You also need to make sure the reel name and timecode of the telecine clips will match those of the clips from the film scan.

Note: Cinema Tools and Color use the name of the folder containing the DPX image sequence files as the reel name.

You should also generate a telecine log file that Cinema Tools can use to create a database for exporting the pull list used by the film scanner.

Stage 2: Creating the Cinema Tools Database

You create a Cinema Tools database using the telecine log file. This database is used to generate the pull list after you finish editing the program.

Stage 3: Editing the Clips in Final Cut Pro

You edit the offline video clips in Final Cut Pro much as you would for any video project, but there are a few important things to keep in mind. See [Editing with Final Cut Pro](#) for descriptions of these considerations.

Stage 4: Exporting the Pull List

After you have finished editing the offline video clips, you can export a Cinema Tools film list that includes the pull list used to scan the high-quality video clips used in the program.

Stage 5: Creating the High-Quality Video Clips

The pull list is used by a film scanner to create high-quality video clips, usually DPX image sequences, that are then used to finish the program in Color.

It is critical that the reel names and timecode of the scanned clips match what the telecine process provided for the offline video clips.

Stage 6: Exporting an EDL File from Final Cut Pro

After you have completed editing the offline video clips in Final Cut Pro, you export an EDL. This file contains a list of every edit, with the reel names of the source clips and their In and Out point timecode numbers.

Stage 7: Importing the EDL into Color

When you import an EDL into a Color project, you can choose the folder that contains the source clips the EDL refers to. You can choose the folder that contains the scanned DPX clips and have Color connect the EDL records to the clips, or you can choose a Cinema Tools database you create from the clips.

The advantages of choosing the Cinema Tools database are:

- You can easily correct any issues there might be between the EDL and the actual clips. For example, if a reel name does not match, you can change the reel name in the Cinema Tools database to match the name listed in the EDL.
- Once you have created the Cinema Tools database, choosing it when importing an EDL into Color can be faster than choosing the folder with the clips. Choosing the database becomes especially useful if you end up importing the EDL into Color multiple times as additional clips become available.
- If the EDL refers to clips on more than one volume, a Cinema Tools database can connect to all of the clips. Color can automatically connect to the clips on only one volume, and you must manually connect to the clips on the other volumes.

Stage 8: Finishing the Project in Color

Once you have imported the EDL into Color and matched it to the source clips, the clips are conformed to match the edits, and you can proceed with the usual color correction process. Color is then used to render the final output video.

Working with REDCODE Media

Working with media recorded using the RED ONE camera requires that your computer have RED Final Cut Studio support software installed. See the RED Digital Cinema Camera Company website at <http://www.red.com/support> for more information.

Each REDCODE media file is made up of several files inside a folder with an .RDC extension. For example, you can have a folder with the name H046_C001_1002VL.RDC that contains the following files:

- H046_C001_1002VL_001.R3D
- H046_C001_1002VL_F.mov
- H046_C001_1002VL_H.mov
- H046_C001_1002VL_M.mov
- H046_C001_1002VL_P.mov

The file with the .R3D extension is the actual media clip—the other files in the folder with .mov extensions are QuickTime movies that are optionally created by the RED ONE camera, providing different resolutions of the media file.

To add a record that is connected to a REDCODE clip to a Cinema Tools database, you need to drag the .RDC folder that contains the media files or any of the .mov files in the folder to the Cinema Tools List View window. Alternatively, you can drag a folder that contains multiple .RDC folders (representing multiple REDCODE clips) to the Cinema Tools application icon to create a new database based on the clips.

When you play the clip in the Clip window, a .mov file (usually the one with “_M” in its name) is played.

Important: There has to be at least one .mov file in the folder for Cinema Tools to be able to play the clip in the Clip window.

At the heart of Cinema Tools is its database, providing powerful organizational tools.

This chapter covers the following:

- An Introduction to Cinema Tools Databases (p. 53)
- Deciding How You Should Create the Database (p. 54)
- Creating and Configuring a New Database (p. 58)

An Introduction to Cinema Tools Databases

A Cinema Tools database contains records that:

- Describe your source clips
- Track the relationship between the film rolls and edge code (key numbers, ink numbers, or both) and the video reels and timecode
- Can also track other elements such as scenes, shots, and takes, as well as sound rolls and audio timecode

You generally create a database for each film or video project. Alternatively, you can create databases for sections of your project and later merge them all into one large database.

When you work on film projects, the database makes it possible for you to export film lists that tell the negative cutter how to cut your original camera negative. When you work on projects using a digital intermediate workflow, the database makes it easier to manage your original full-resolution media.

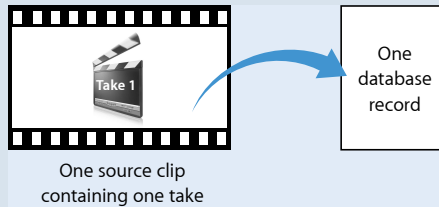
Beyond creating film lists, you may want to use the database as an organizational tool. It can function similarly to the code book traditionally used in the post-production of film, tracking important elements such as the scene, shot, and take; the camera and lab rolls; the edge code numbers; the video reels and timecode numbers; the sound rolls and audio timecode numbers; and the source clips.

Depending on your situation, you may be able to simplify the database creation process by building the database from a telecine log or by creating just one database record per camera roll.

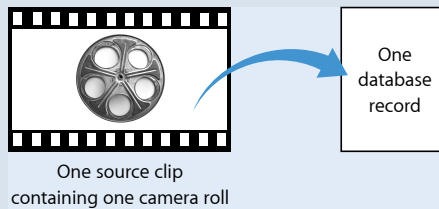
Understanding the Basic Structure of a Cinema Tools Database

A database is made up of records, and each record describes one source clip. There are three different types of source clips for which you might create a database record:

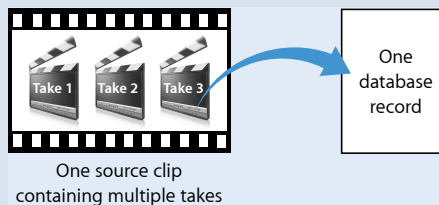
- *If you used a scene-and-take transfer:* You'll have one database record for each take, where each source clip is one take.



- *If you used a camera-roll telecine transfer:* You'll have one database record per camera roll, where each source clip is one camera roll (typically containing several takes).



- *If you have broken down source clips into groups of takes:* Each database record is associated with one source clip that contains several takes.



Deciding How You Should Create the Database

The way you create the database depends on how you want to use it and whether or not you have a telecine log or Avid Log Exchange (ALE) file.

If you haven't done so yet, take a look at [Cinema Tools Workflows](#) for general information. Use these examples to guide you in determining the basic steps you need to take to create your database and capture your clips. The steps you take, and the order of those steps, differ depending on a number of factors, most of which are summarized in the workflow examples.

Capturing Before You Create the Database

When using a traditional film workflow, it is possible to capture your source clips before creating your database, and to build the Cinema Tools database by importing a batch capture list created in Final Cut Pro. This approach is not as easy as building a database from a telecine log or ALE file because you then need to manually add the key number and film roll information to each database record. See [Importing Database Information from a Batch Capture List](#) for more information.

When using a digital intermediate workflow, you will need to capture, or more often transfer, your video files from their source media using the Final Cut Pro Log and Capture or Log and Transfer window. You can then create the Cinema Tools database by simply dragging the folder with the captured files to the Cinema Tools application icon.

If You Have a Telecine Log or ALE File

A telecine log, sometimes referred to as a *FLEx file*, is a file created by the telecine technician during a telecine transfer. You can also use an Avid Log Exchange (ALE) file as you would use a telecine log. The telecine log records the key numbers of the original camera negative and the timecode of the video transfer, and tracks the relationship between them.

Advantages of Using a Telecine Log or ALE File

Creating your database from a log is ideal because it provides these advantages:

- *Time savings:* You can create database records from a telecine log. You don't have to manually create and enter details in each record. You can then generate a batch capture list from the database, expediting the capture process.
- *Accuracy and completeness:* Assuming the log you use is accurate, you'll instantly have an accurate database and you won't have to worry about your own potential data entry errors. Using the database batch capture list also ensures that the source media files you capture match your database information.

To build a database from an existing log

- 1 Create a new, empty database.

See [Creating and Configuring a New Database](#) for more information.

- 2 Generate the database records from the log.

See [Importing Database Information from a Telecine Log or ALE File](#) for more information.

If You Do Not Have a Telecine Log or ALE File

Although it's faster and more efficient to use a log, you can build a database without one. This is the most common approach with digital intermediate workflows.

To create a database without a log

- 1 Create a new, empty database.

See [Creating and Configuring a New Database](#) for more information.

- 2 Enter database records manually.

See [A Potential Database Shortcut for Camera-Roll Transfers](#) and [Entering Database Information Manually](#) for more information.

Note: Alternatively, you could capture your source clips before creating your database and then build the Cinema Tools database by importing a batch capture list created in Final Cut Pro. See [Importing Database Information from a Batch Capture List](#) for more information.

Is Your Edge Code Number-to-Timecode Relationship Continuous or Noncontinuous?

The edge code number-to-timecode relationship in a camera roll is *continuous* if the camera roll was transferred to video without stopping.

The edge code number-to-timecode relationship is *noncontinuous* if:

- You used a scene-and-take telecine transfer, where the video recording was stopped and restarted in between takes
- The film roll was made up of takes that were spliced together before it was transferred to video

Note: Occasionally the edge code number-to-timecode relationship is broken if, during filming, the camera crew opened up a camera to check, clean, or change parts of the camera (often called *checking the gate*). When the camera is opened for such purposes, the film is typically unthreaded and then rethreaded. When the film is rethreaded, it may be on a different perforation number. This means that at the telecine, the telecine technician needs to stop, reframe, and make an edit, thus breaking the edge code number-to-timecode relationship in the camera roll. This should be evident in the telecine log.

A Potential Database Shortcut for Camera-Roll Transfers

If you used a camera-roll transfer and need to manually create your database, you may be able to save time by creating one database record per camera roll, depending on whether or not the edge code number-to-timecode relationship is continuous for each camera-roll transfer.

If the Edge Code Number-to-Timecode Relationship Is Continuous on Each Roll

You can create one database record per camera roll, and Cinema Tools can use the timecode-based method of locating database records in order to create film lists. In this case, each camera roll acts as one source clip.

As long as you create an accurate database record for the camera roll, Cinema Tools will be able to accurately create film lists. However, if you also connect the source clips to the database records, you are providing extra insurance that the match-back will go smoothly even if there is a timecode error. See [Timecode-Based Workflow for a Camera-Roll Transfer](#) and [How Cinema Tools Creates Film Lists](#) for more information.

Even if you have a continuous edge code number-to-timecode relationship, you may want to take the time to create database records for each source clip for your own organizational and tracking purposes. For example:

- A database can be used to cross-check which take is on which sound roll and which lab roll contains a negative you need.
- You may want to have records for each clip so that you can add notes about different clips.
- Database records provide a poster frame of each clip for quick visual reference, and you can access and play the whole clip from the database.

If the Edge Code Number-to-Timecode Relationship Is Noncontinuous on Each Roll

You need to create separate database records for each clip and connect each clip to its record. Each database record must include the key number or ink number of the first frame of the associated source clip, so that Cinema Tools can adequately track the edge code number-to-timecode relationships throughout your sequence.

Additional Uses for the Database

Optionally, you may want to use the database for purposes beyond simply matching video back to film, and this can affect how you create databases:

- *Individual databases for dailies:* If you have daily shoots that you want to process and track separately, you can create new individual databases for each daily session. If you do create individual databases for dailies, consider naming each database file by the date of the daily. Eventually, you can merge the databases into a master database by importing all the databases into one database.

- *Creating an audio Edit Decision List (EDL):* If you plan to give an audio EDL to the audio post-production facility, make sure that the audio timecode, video timecode, and sound roll information is entered in each database record. Creating the database by importing a telecine log is the easiest and most efficient way to make sure that all the necessary information is entered in the database.

Creating and Configuring a New Database

When you create a new Cinema Tools database, you make default selections for your project settings in the New Database dialog.

Note: When you import data from a telecine log, the film standard, video timecode rate, audio timecode rate, and telecine speed are typically included in the log and are automatically set in Cinema Tools. Data from the telecine log takes precedence over the defaults, so even if your default settings are different from the telecine log data, Cinema Tools uses the settings in the telecine log.

You can create a new database using Cinema Tools or Final Cut Pro.

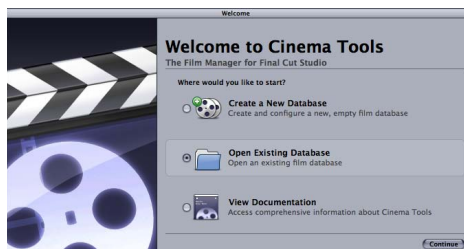
Creating a New Database Using Cinema Tools

You can create a new database and configure its default settings directly in Cinema Tools.

Note: If a database is already open when you create a new one, the currently open database is closed.

To create a new database

- 1 Do one of the following:
 - Open Cinema Tools and click Create a New Database in the Welcome dialog, if it appears. The Welcome dialog generally appears only the first time you open Cinema Tools.



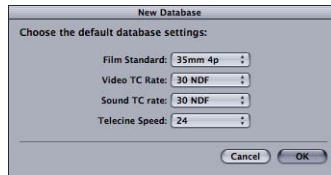
After that, Cinema Tools opens the database that was open the last time you closed Cinema Tools. If there was no database open when you closed Cinema Tools, the Welcome dialog appears again.

- Choose Database > New Database (or press Command-Shift-N).

- Drag one or more folders with clips from a Finder window to the Cinema Tools application icon.

Note: If you drag a mixture of selected clips and folders to the application icon, a dialog appears advising you not to mix the two types of items. Dragging selected clips to the application icon does not create a new database, but opens the clips in the Clip window instead.

- 2 In the New Database dialog, choose default settings for your database and click OK. See [Settings in the New Database Dialog](#) for information about the settings.



Note: The settings in this dialog can be left at their default values when you are creating a database from video clips and do not intend to track any film-related information in the database records.

- 3 In the “Create a new database” dialog, choose a location and enter a filename for the database.

An empty database is created, and you are ready to enter information in it. See [About Working with Database Information](#) for more information.

Important: If you created the database by dragging a folder that contains many clips, especially if they are DPX image sequences, it can take Cinema Tools a significant amount of time to process and add all of the clips to the new database. Cinema Tools may appear to have stopped responding during this time. Be sure to allow plenty of time for Cinema Tools to finish processing the folder of clips.

Creating a New Database Using Final Cut Pro

There are two methods you can use to create a Cinema Tools database while using Final Cut Pro:

- Synchronize a set of clips with a new database.
- Import a telecine log file into a new database.

Synchronizing a Set of Selected Clips to Create a New Database

You can use the Synchronize with Cinema Tools command if you have one or more clips in the Final Cut Pro Browser that you would like to add to a new Cinema Tools database. This can be useful when you have manually captured a set of clips but have no telecine log to go with them, or when you want to create a separate database for a set of clips already in a database.

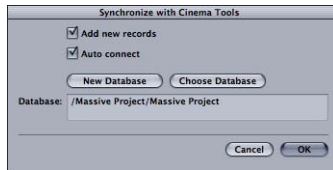
To create a new database using the Synchronize with Cinema Tools command

- 1 In the Final Cut Pro Browser, select the clips that you want to add to a new Cinema Tools database.

These can be clips that are already in a database, or they can be new clips that are not in a database.

- 2 Choose Tools > Synchronize with Cinema Tools.

A dialog appears that allows you to configure the synchronization process.



The Database field shows the currently selected database.

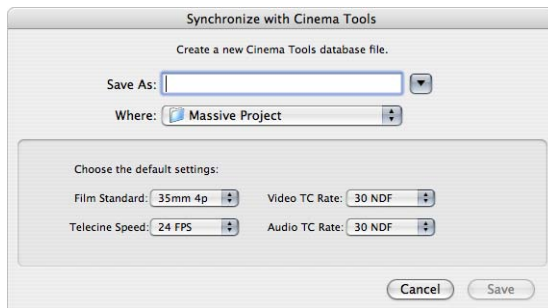
- 3 Select the “Add new records” checkbox.

This option must be selected when you are synchronizing with a new database.

- 4 Select the “Auto connect” checkbox if you want the database to automatically connect the clips to any new records that are created in the database.

- 5 Click New Database to create a new Cinema Tools database.

- 6 In the dialog that appears, enter a name and location for the database, and configure its default settings. See [Settings in the New Database Dialog](#) for information about these settings.



- 7 To close the dialog, click Save when finished.

- 8 Click OK.

A new Cinema Tools database is created, and the selected clips, along with any film-related information they might contain, are added to it.

See [Synchronizing Final Cut Pro Clips with Cinema Tools](#) for more information about the Synchronize with Cinema Tools command, including how to use it to synchronize clips to an existing database.

Importing a Telecine Log File to Create a New Database

When you import a telecine log file into Final Cut Pro, you can choose to import it into a new or existing Cinema Tools database. See [Importing Telecine Logs Using Final Cut Pro](#) for more information.

Settings in the New Database Dialog

When you make choices in the New Database dialog, keep the following points in mind:

- Choosing a default setting does not lock you into using that setting in the database records. Default settings are applied automatically to new database records, but you can change the film standard, video timecode rate, and audio timecode rate for each clip individually in the Detail View window.
- When you import data from a telecine log, the film standard, video timecode rate, audio timecode rate, and telecine speed are typically included in the log and are automatically set in Cinema Tools. Data from the telecine log takes precedence over the defaults, so even if your default settings are different from the telecine log data, Cinema Tools uses the settings in the telecine log.
- The settings in this dialog can be left at their default values when you are creating a database from video clips and do not intend to track any film-related information in the database records, such as in a typical DI workflow.

If you need to change default settings you already made, see [Changing the Default Database Settings](#) for information.

Tip: If you are combining existing databases or want to check information such as default settings, filenames, and modification dates for an existing database, choose Database > Database Properties. The Database Properties dialog displays the full pathname and size of the database file, as well as the creation and modification dates. You can see the default project settings for the film standard, video timecode rate, and audio timecode rate.

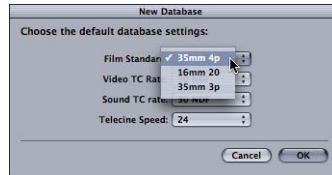
The New Database dialog contains the following settings:

- *Film Standard:* Cinema Tools supports the 4-perf 35mm, 3-perf 35mm, and 16mm-20 formats. (See [Film Background Basics](#) for information about these standards.)

Normally you use the same film stock throughout a film, so the film standard doesn't change. However, if you need to, you can set the film standard for each shot individually in the Detail View window. For example, if you have some clips that are reverse but most are normal, you can specify the reverse film standard in the Detail View window for those clips.

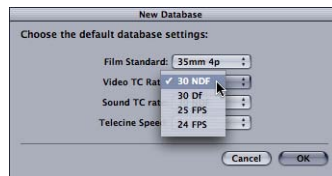
Choose the standard film type used for your project from the Film Standard pop-up menu:

- *35mm 4p*: 35mm film, 4 perforations per frame
- *16mm 20*: 16mm film, 20 frames per key number
- *35mm 3p*: 35mm film, 3 perforations per frame



- *Video TC Rate*: Cinema Tools supports four different video timecode rates. See [Film Background Basics](#) for information about timecode rates. The film lab that transfers your film to video can tell you what kind of timecode is recorded on the videotape. Choose the type of timecode recorded on the videotapes for your project from the Video TC Rate pop-up menu:

- *30 NDF*: Non-drop frame NTSC timecode at 29.97 fps
- *30 DF*: Drop frame NTSC timecode at 29.97 fps
- *25 FPS*: PAL timecode at 25 fps
- *24 FPS*: Video timecode at 24 fps or 23.98 fps

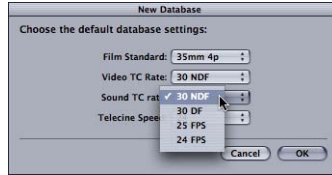


- *Sound TC Rate*: Usually, timecode is recorded along with the soundtracks on the production sound rolls. That timecode can be used to locate the audio that goes with any particular clip, and many systems can use that timecode to synchronize the audio with the video. The primary purpose for entering the sound roll and audio timecode information in the database is for matching audio back to an audio Edit Decision List (EDL). See [Exporting an Audio EDL](#) for more information.

Choose the type of timecode recorded on your production sound rolls from the Sound TC Rate pop-up menu:

- *30 NDF*: Non-drop frame NTSC timecode at 29.97 fps
- *30 DF*: Drop frame NTSC timecode at 29.97 fps
- *25 FPS*: PAL timecode at 25 fps

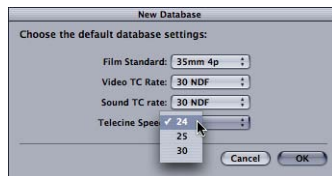
- *24 FPS*: Video timecode at 24 fps or 23.98 fps



- *Telecine Speed*: Telecine speed (shown as TK Speed in the Detail View window, the Clip window's Identify pane, and optionally in the Final Cut Pro Browser window) refers to the frame rate of the film in the telecine equipment during the transfer to video.

From the Telecine Speed pop-up menu, you choose the speed at which the film was transferred:

- *24*: 24 fps or 23.98 fps telecine film speed
- *25*: 25 fps telecine film speed
- *30*: 29.97 fps telecine film speed



If you are working with NTSC video, you usually choose 24 fps as the telecine film speed, though the actual telecine film speed is approximately 23.98 fps. The Telecine Speed pop-up menu also allows you to choose a setting of 30 fps because it is possible to transfer film to NTSC video with the film running at a speed of 30 fps (actually 29.97 fps).

If you are working with PAL video, see [Frame Rate Basics](#) for a discussion of the PAL frame rate choices.

If your film was transferred to video at a telecine film speed of 24 fps, choose 24 fps as the telecine film speed. If your film was transferred to video at a telecine film speed of 25 fps, choose 25 fps.

To work with the database, you need to know how to open it, find specific records, and access information about a record's clip. This chapter also details using the List View, Detail View, and Clip windows.

This chapter covers the following:

- Opening an Existing Database (p. 65)
- Viewing Database Properties (p. 66)
- About the Detail View Window (p. 66)
- Settings in the Detail View Window (p. 67)
- About the List View Window (p. 73)
- Settings in the List View Window (p. 74)
- Finding and Opening Database Records (p. 76)
- Settings in the Find Dialog (p. 77)
- Backing Up, Copying, Renaming, and Locking Databases (p. 80)
- About the Clip Window (p. 80)
- Settings in the Clip Window (p. 81)
- Accessing Information About a Source Clip (p. 84)

Opening an Existing Database

The first step in working with a database is to open it.

To open an existing database

Do one of the following:

- Choose Database > Open Database (or press Command-Shift-O), then select the database in the dialog.
- Drag a database file from a Finder window to the Cinema Tools application icon.

All the records in the open database are listed in the List View window, and the Detail View window shows the first record's details. See [About the Detail View Window](#) and [About the List View Window](#) for details about using these two windows.

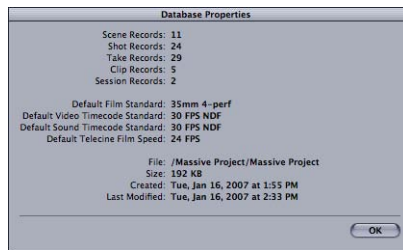
Note: The current database closes if one is already open.

Viewing Database Properties

You can use the Database Properties dialog to see a wide variety of information about the current database, including its default settings and statistics about the records.

To open the Database Properties dialog

- Choose Database > Database Properties (or press Command-I).



About the Detail View Window

You use the Detail View window to view, enter, and change information in a database record. When you open an existing database, the Detail View window displays the first record. The specific numbers in the Detail View window (reels, rolls, and key and ink numbers) all describe values for the first frame of the source clip associated with the database record.

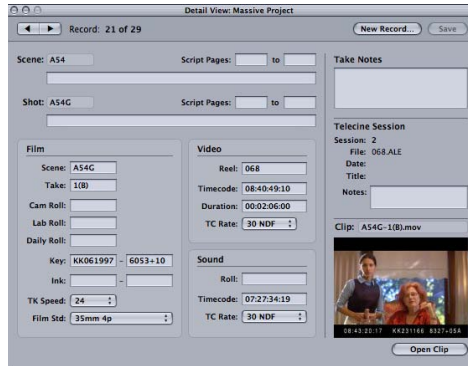
The Detail View window appears along with the List View window whenever you open a database.

To view the Detail View window

Do one of the following:

- Choose Window > Detail View (or press Command-2).
- If necessary, drag the List View window to a different screen position.

- If necessary, click the Detail View window to bring it to the front.



See [Settings in the Detail View Window](#) for more information about the Detail View window.

Settings in the Detail View Window

The Detail View window includes a number of fields and buttons for creating a database record. Only a few of these settings are required for the purpose of using the database to create a cut list or change list. The required settings depend on the type of list you will create and the method you will use to create it.

These settings are required if you intend to generate a cut list or change list for a film-based project:

- Lab, camera, or daily roll
- Key number or ink number

Additionally, each source clip must be connected to a record, unless you can use the timecode-based method for cut list or change list generation (see [A Potential Database Shortcut for Camera-Roll Transfers](#)).

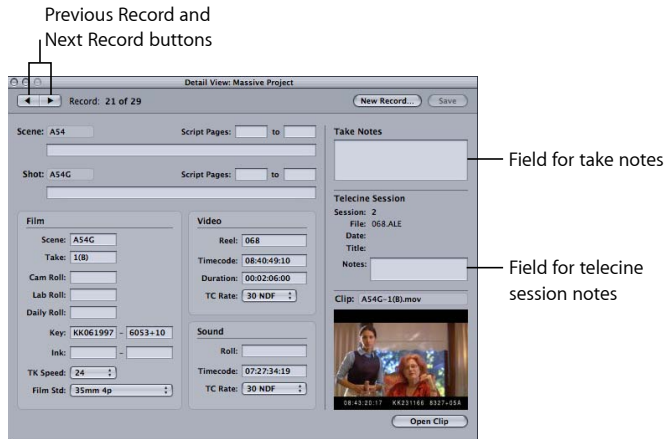
To use the timecode-based method for cut list or change list generation, these elements are also needed:

- Video reel
- Video timecode and duration

These settings are required if you intend to export an audio EDL:

- Each source clip must be connected to a record, or each record must have the video reel and video timecode and duration entered.
- Each record must have the sound roll, audio timecode, and audio timecode rate (Sound TC Rate) entered.

The Detail View window contains the following fields and buttons:



Database Fields and Buttons

These fields and buttons apply to the entire database.

- *Previous Record and Next Record buttons (arrows)*: Click these buttons to switch to the previous or next record (as currently sorted and displayed in the List View window).

Note: One of these buttons is dimmed when you are at the beginning or end of the list and there isn't a previous or next record.

As a shortcut, you can use the Left Arrow and Right Arrow keys on your keyboard. If you have made changes to the current record, a dialog appears asking if you want to save those changes.

- *New Record button*: Click to create a new database record. In the dialog that appears, enter the scene and take identifiers for the new database record. See *Using Scene, Shot, and Take Identifiers* for more information.
- *Save button*: Click when you have added or modified data in the current database record. Your added or modified information is not recorded unless you click Save.
- *Telecine Session area*: This area, in the middle-right part of the window, lists the name of the telecine log file imported into the database (if applicable).
- *Telecine Session Notes field*: Enter any notes you want to include about the telecine session.

Note: This field is available only if you have imported a telecine log file into the database.

Scene and Shot Description Fields

You only need to enter this data once per scene. Once you enter it, it is added to all existing and new records for the same scene.

- *Scene description field*: Enter a description of the scene.

- *Shot description field:* Enter a description of the shot.
- *Script Pages fields:* Enter the starting and ending script pages associated with the scene and the shot.

Film Settings

The following settings relate specifically to the film. In general, you can ignore these settings if your project does not involve film or you are not intending to finish the project by conforming the original camera negative.

- *Scene field:* Use this field to enter or modify the identifier for the scene. See [Using Scene, Shot, and Take Identifiers](#) for more information.
- *Take field:* Enter a take identifier here. Takes are usually identified as numbers, but you can enter whatever text you want to use to identify the take, up to 15 characters. If there are multiple takes in the source clip, think of the take identifier as a subclip identifier.
- *Cam Roll field:* (If you intend to create a cut list or change list for a film-based project, one of the film roll fields must be completed.) If editing material from camera rolls, enter the camera roll identifier given to the roll of film by the camera assistant during production. The camera roll identifier should be the same as that which appears on the slate for the take.

Note: In many cases the camera roll and the lab roll are the same thing and can be given the same identifier. You can choose to enter data in either one or both of these fields. You should, however, be consistent. When creating a cut list or change list, Cinema Tools gives you the choice of showing the camera roll, lab roll, or daily roll. Whichever one you choose, it must be present in every database record, or Cinema Tools will report an error when you export a film list.

- *Lab Roll field:* (If you intend to create a cut list or change list for a film-based project, one of the film roll fields must be completed.) If editing material from lab rolls, enter the identifier given to the lab roll by the laboratory that processed the film. Or, enter an identifier for a roll created from select takes, for printing. (Sometimes such a roll is referred to as the *A negative*.) In many cases the lab roll and the camera roll are the same thing and can be given the same identifier—see the note above.
- *Daily Roll field:* (If you intend to create a cut list or change list for a film-based project, one of the film roll fields must be completed.) If editing material from daily rolls, enter the identifier given to the daily roll from which this source clip originated.

- *Key fields:* (If you intend to create a cut list or change list for a film-based project, these fields or the ink number fields are required.) The first field should contain the key prefix that is constant throughout a roll of film. For example, for the key number KJ 29 1010 5867+07, the key prefix is “KJ 29 1010,” which you enter as “KJ291010.” You can enter up to eight characters (including spaces, although most often you will be skipping the spaces, as in this example). In the second field, enter the second part of the key number—the frame number—for the first frame of the clip. For example, for the key number KJ 29 1010 5867+07, the frame number is “5867+07.” The frame number identifies each foot or half foot within the reel, plus the frame count number. If you know the key number for another part of the clip, the Identify feature can determine and enter the key number (Key fields) for the first frame of your clip. See [Calculating Edge Code and Timecode Numbers](#) for more information.
- *Ink fields:* (If you intend to create a cut list or change list for a film-based project, these fields or the Key fields are required.) In the first field enter the prefix number, and in the second field enter the frame number. For example, in the ink number 123 4567+08, the prefix is “123” and the frame number is “4567+08,” indicating that the frame occurs at 4567 feet and 8 frames.
- *TK Speed pop-up menu:* This pop-up menu gives you the option of individually specifying the telecine transfer film speed for each database record. If the database record was created from a telecine log, this setting should already be correct and there should be no need to change it. If you are creating the database manually, the setting in this pop-up menu should reflect the telecine film speed setting you chose when you set your project defaults. See [Settings in the New Database Dialog](#) for more information.
- *Film Std pop-up menu:* This pop-up menu gives you the option of individually specifying the film standard for each database record. If the database record was created from a telecine log, this setting should already be correct and there should be no need to change it. If you are creating the database manually, the setting in this pop-up menu should reflect the setting you chose in the New Database dialog.

For clips that are in reverse direction, you can specify a reverse direction for the film standard by choosing either the 35.4p.rev (for 4-perf 35mm) or 16.20.rev (for 16mm-20) item. Reverse-direction film is film that has key numbers going in a descending rather than an ascending order. You’ll see this when, for example, film has been shot in reverse, or when a film roll was loaded into the camera “tails out,” so that the key numbers are in reverse order. See [Settings in the New Database Dialog](#) for more information.

For clips that use the 3-perf 35mm standard, you choose the perforation offset of the key number. This offset (3-perf•1, 3-perf•2, or 3-perf•3) refers to the relationship of the perforation marked with the symbol “•” and the film frame at that point. See [3-Perf 35mm Offsets](#) for more information.

Note: Reverse-direction 3-perf 35mm film is not supported.

Video Settings

The following settings relate specifically to the video clips.

- *Video Reel field:* (Unless all the clips you will be editing are connected to the database, this field is required if you intend to create a cut list or change list or audio EDL.) Enter the identifier of the video reel that contains this take. This field is essential for creating an accurate cut list or change list. When you connect a clip to a database record that does not yet contain the reel identifier, Cinema Tools looks for this information in the clip file and automatically enters it in the database record. Make sure you enter the exact, correct identifier here, so that the database record can be properly matched to the shot after you digitally edit your program. For example, “001” is not the same as “0001.”

Important: When connecting DPX image sequences to a database, Cinema Tools uses the name of the folder containing the DPX image sequence files as the video reel name. This folder name should not be changed during a DI project.

- *Video Timecode field:* (Unless all the clips you will be editing are connected to the database, this field is required if you intend to create a cut list or change list or audio EDL.) Enter the timecode number of the video frame that represents the first frame of the clip. The relationship between the key numbers and the timecode is established when the film is transferred to video, and this information is usually entered automatically when you create the database from a telecine log. When you connect a clip to a database record that does not yet contain the clip timecode, Cinema Tools looks for this information in the clip file and automatically enters it in the database record. You can also determine the timecode value for this field by looking at the first frame of the clip, provided that both the key number and the timecode are burned in to the video.

Tip: If you enter the video reel and timecode information in the Detail View window, you can use the database to locate source material on the videotape while you are editing. For example, if you are editing a clip and there is something in the clip that you are unsure about because you can't see it clearly, you may want to view it on the videotape because the video is of higher quality. You can check the clip's database record to find which video reel contains the material and the timecode location on the reel.

- *Video Duration field:* (Unless all the clips you will be editing are connected to the database, this field is required if you intend to create a cut list or change list or audio EDL.) Enter the timecode duration of the source clip. The value for this field can come from a telecine log. If you connect a clip to a database record that does not yet contain the clip timecode duration, Cinema Tools looks for this information in the clip file and automatically enters it in the database record. Because duration is expressed as hours, minutes, seconds, and frames, you might find it more informative than the length of the film expressed as feet and frames. The timecode duration is significant if you intend to perform a batch capture, or if you will be creating a cut list or change list by matching the edited program back to the video reel and timecode.
- *Video TC Rate pop-up menu:* This pop-up menu displays the default video timecode rate that you chose when you created the database, or the format that was indicated by the telecine log you imported to create the database. The lab that transfers your film to video can tell you which kind of video timecode is recorded on the videotape. See *Settings in the New Database Dialog* for more information.

Sound Settings

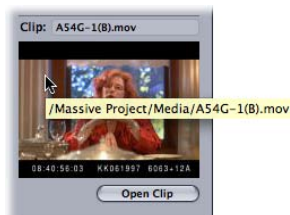
The following settings relate specifically to the audio clips.

- *Sound Roll field:* (Required if you intend to create an audio EDL.) Enter the sound roll name.
- *Sound Timecode field:* (Required if you intend to create an audio EDL.) Enter the starting audio timecode number for the clip. The audio timecode standard can be different from the video timecode standard.
- *Sound TC Rate field:* (Required if you intend to create an audio EDL.) Enter the type of timecode used on your production sound rolls.

Clip Button and Settings

The following apply specifically to the clip linked to this record.

- *Take Notes field:* Enter any notes you want to include about the source clip.
- *Clip thumbnail:* The thumbnail display shows the poster frame of the connected clip. Additionally, placing the pointer over the thumbnail display shows a tooltip with the clip's location. This can be especially useful if the clip is missing because it lets you know where Cinema Tools thinks the clip should be.



See [Choosing a Different Poster Frame for a Clip](#) for more information about the poster frame.

- **Connect Clip/Open Clip button:** If a clip has not been connected to the database record, this button is labeled Connect Clip. If a clip has already been connected, the button is labeled Open Clip.
 - Click Connect Clip to select a source clip to connect to this record. When you select a clip, it is connected to the database record, and the first frame of the clip appears in the box below the Connect Clip/Open Clip button.
 - Click Open Clip to open a Clip window for the connected clip. If the related clip is not found, a dialog opens so that you can select the correct clip.
 - Press the Command key to change Open Clip to Disconnect Clip. Click Disconnect Clip to disconnect the clip from the database record.

About the List View Window

The List View window displays a list of database records in the open database. It might show a complete list of all database records, or, if you use the Find feature, it might show only those records that are found (the “found set”). The List View and Detail View windows appear whenever you open a database.

To view the List View window

Do one of the following:

- Choose Window > List View (or press Command-1).
- Drag the Detail View window to a different screen position.
- Click the List View window to bring it to the front.

State	Lab Roll	Cam Roll	Keycode	Clip
A54B-1(A)			KK231166 8235+03	
A54B-1(B)			KK051354 4423+01	
A54B-2(A)			KK231166 8307+03	
A54B-2(B)			KK051354 4492+01	
A54C-3(A)			KK061997 8590+13	
A54C-3(B)			KK061997 7122+09	
A54C-4(A)			KK061997 7892+12	
A54C-4(B)			KK061997 7329+09	
A54D-2(A)			KK061997 8210+01	
A54D-2(B)			KK061997 4870+08	
A54D-3(A)			KK061997 8319+02	
A54D-3(B)			KK061997 5067+08	
A54E-1(A)			KK061997 8424+08	
A54E-1(B)			KK061997 5284+00	
A54F-1(A)			KK061997 8626+06	
A54F-1(B)			KK061997 5490+04	
A54F-2(A)			KK061997 3861+01	
A54F-2(B)			KK061997 5872+02	
A54G-1(B)			KK061997 6053+10	A54G-1(B).mov
A54G-2(A)			KL062112 7285+12	
A54G-3(A)			KK061997 4311+08	
A54G-3(B)			KK061997 6368+15	A54G-3(B).mov
A54G-4(A)			KK061997 4430+03	
A54H-2(A)			KK231166 3863+10	
A54H-2(B)			KK051354 2853+01	A54H-2(B).mov
A54J-1(A)			KK231166 4079+04	A54J-1(A).mov
A54K-1(A)			KK231166 4280+04	A54K-1(A).mov

The Show All and Find buttons allow you quickly either to show all of the records in the open database (click Show All) or to show a specific set of records by using the Find dialog (click Find). See [Finding and Opening Database Records](#) for information about using the Find button.

The pop-up menu at the top-left corner of the window lets you choose the display mode, determining the type of information that appears. See [Settings in the List View Window](#) for details about the different display modes and how to use the columns to select records to work with.

By default, the columns in the List View window are sorted by the Slate value, in ascending order. You can sort the data based on any displayed column by clicking the column's name. The name changes color to indicate it is controlling the sort, and an arrow appears to show the sort direction. An arrow pointing up indicates an ascending sort order, and an arrow pointing down indicates a descending order. Click the column's name to change the sort direction.

Sorting the columns can make it easy to locate records with missing items. For example, clicking the Cam Roll column name groups together all records without an entry in that field and places them at the top or bottom of the list, depending on the arrow's direction.

You can also locate a record using a specific key number or timecode number by sorting the columns. For example, clicking the Keycode column name puts the records in order based on their key numbers. You can then scroll through the list and locate a record using a specific film frame.

Settings in the List View Window

The List View window shows a set of columns based on the display mode you choose in the pop-up menu at the top-left corner of the window.

Slate	Lab Roll	Cam Roll	Keycode	Clip
A54B-1(A)			KK231166 8235+03	
A54B-1(B)			KK051354 4423+01	
A54B-2(A)			KK231166 8307+03	
A54B-2(B)			KK051354 4492+01	
A54C-3(A)			KK061997 8590+13	
A54C-3(B)			KK061997 7122+09	
A54C-4(A)			KK061997 7892+12	
A54C-4(B)			KK061997 7329+09	
A54D-2(A)			KK061997 8210+01	
A54D-2(B)			KK061997 4870+08	
A54D-3(A)			KK061997 8319+02	
A54D-3(B)			KK061997 5067+08	
A54E-1(A)			KK061997 8424+08	
A54E-1(B)			KK061997 5284+00	
A54F-1(A)			KK061997 8626+06	
A54F-1(B)			KK061997 5490+04	
A54F-2(A)			KK061997 3861+01	
A54F-2(B)			KK061997 5872+02	
A54G-1(B)			KK061997 6053+10	A54G-1(B).mov
A54G-2(A)			KK062112 7285+12	
A54G-3(A)			KK061997 4311+08	
A54G-3(B)			KK061997 6368+15	A54G-3(B).mov
A54G-4(A)			KK061997 4430+03	
A54H-2(A)			KK231166 3863+10	
A54H-2(B)			KK051354 2853+01	A54H-2(B).mov
A54J-1(A)			KK231166 4079+04	A54J-1(A).mov
A54K-1(A)			KK231166 4280+04	A54K-1(A).mov

List View Window Controls

The following controls along the top of the List View window determine the columns that appear and allow you to choose the records that are shown.

- *Display mode pop-up menu*: Use this pop-up menu to configure the List View window to show the columns most useful to you.
 - *Keycode*: Displays information about the film, including key numbers and rolls.
 - *Video*: Displays video timecode and reel information.
 - *Sound*: Displays audio timecode and sound roll information.
 - *Ink Numbers*: Displays information about the workprint, including ink numbers and daily rolls.
- *Show All*: Click this button to show all of the records in the current database.
- *Find*: Click this button to open the Find dialog. You can use the Find dialog to choose which records appear in the List View window. See [Settings in the Find Dialog](#) for more information.

List View Window Columns

The following columns can appear in the List View window, depending on the the display mode you choose.

- *Columns that appear in all display modes*: The following columns appear in all display modes:
 - *Slate*: A combination of the Scene and Take fields, separated by a hyphen
 - *Clip*: The name of the clip connected to each database record
- *Keycode display mode columns*: The following columns appear in the Keycode display mode:
 - *Lab Roll*: The value entered in the Lab Roll field (in the Detail View window)
 - *Cam Roll*: The value entered in the Cam Roll field
 - *Keycode*: The value entered in the Key field
- *Video display mode columns*: The following columns appear in the Video display mode:
 - *Reel*: The value entered in the Video Reel field
 - *Timecode*: The value entered in the Video Timecode field
- *Sound display mode columns*: The following columns appear in the Sound display mode:
 - *Roll*: The value entered in the Sound Roll field
 - *Timecode*: The value entered in the Sound Timecode field
- *Ink Numbers display mode columns*: The following columns appear in the Ink Numbers display mode:
 - *Lab Roll*: The value entered in the Lab Roll field

- *Daily Roll*: The value entered in the Daily Roll field
- *Ink Number*: The value entered in the Ink field

Finding and Opening Database Records

You typically open database records in the Detail View window by selecting the record in the List View window. The set of records displayed in the List View window is often referred to as the *found set*, because you use the Find command to specify which records are listed there.

Note: You can select only one record at a time.

To select a database record in the List View window

Do one of the following:

- Click any displayed record.
- Double-click a record to have its clip open in the Clip window.
- Use the keyboard's Up Arrow key to select the record before the currently selected one.
- Use the keyboard's Down Arrow key to select the record after the currently selected one.
- Use the keyboard's Page Up key to jump up one page of records in the list.
- Use the keyboard's Page Down key to jump down one page of records in the list.

Once you have selected a record, it stays selected as you change the display mode.

Important: You cannot change the settings in any of the records in the List View window. Use the Detail View window to make changes.

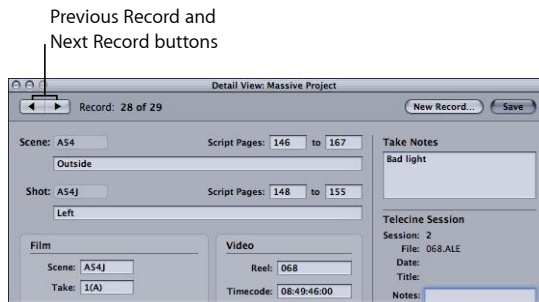
To display specific records in the List View window

- Use the Find dialog.

See the instructions for using the Find command (below) for details.

To navigate through records within the Detail View window

- Click the Previous Record and Next Record buttons.



To find a key number

- In the List View window, choose Keycode from the pop-up menu, then click the Keycode column heading to sort by key number.

See [About the List View Window](#) for more details.

To use the Find command to find records in the open database

- 1 Open the Find dialog by doing one of the following:
 - Choose Database > Find (or press Command-F).
 - Click the Find button in the List View window.



- 2 Configure the settings and click Find Records.

See [Settings in the Find Dialog](#) for more information.

Alternatively, you can click Show All Records if you want to see all of the database records.

Settings in the Find Dialog

The settings in the Find dialog make it easy to find specific records based on their Scene and Take values.



The Find dialog contains the following settings:

- *Scene and Take*: The values you enter in the Scene and Take fields depend on what you want to do:
 - *To find all the records in the open database*: Leave the Scene and Take fields blank and click Show All Records.

- *To find all the records for a particular scene or shot:* Enter the identifier for that scene or shot in the Scene field, leave the Take field blank, then click the Find Records button. (The Take field is disabled unless you select the “Show only exact matches” checkbox.) For example, if you enter “1” in the Scene field and then click Find Records, Cinema Tools finds all records associated with scene 1, including the shots 1, 1A, 1B, 1C, and so on. If you enter “1A” in the Scene field, only the records for shot 1A are found.
- *To find the record for a specific scene and take:* Select “Show only exact matches,” enter the scene and take identifiers in the Scene and Take fields, then click Find Records. See [Scene, Shot, and Take Number Details](#) for more information.
- *Results:* Choose one of the following from the Results pop-up menu:
 - *Replace Current Found Records:* Found records replace the records displayed in the List View window.
 - *Add to Current Found Records:* Found records are added to the set in the List View window. The Add to Current Found Records option is useful when you want to find records for more than one scene, but not for all scenes. For example, to see only the records for scenes 5 and 6, choose Replace Current Found Records, enter “5” in the Scene field, then click Find Records. Then, choose Add to Current Found Records, enter “6” in the Scene field, and click Find Records. Only the records for scenes 5 and 6 appear in the List View window.
- *Show only exact matches:* Select this checkbox to find a specific record that matches the Scene and Take field entries.

Scene, Shot, and Take Number Details

The way Cinema Tools interprets scene numbers can lead to unexpected results when using the Find dialog.

Cinema Tools looks at a scene number as having up to four parts:

- *Prefix*: This is an optional set of one or more letters in front of the scene number, usually used to indicate a new, unique scene added to the script. For example, the “A” in scene A54C-3. Prefixes don’t always indicate unique scenes, however—the actual letters used in the prefix control how they affect using the Find dialog. Prefixes using the letters A, B, C, and D are treated as indicating unique scenes. Prefixes using any of the other letters are not treated as indicating unique scenes.
- *Scene number*: This is the first set of numbers. Depending on the prefix, it might be the entire scene number, although with some prefixes (A,B, C, or D), the prefix becomes part of the scene number. For example, in the A54C-3 example the scene is “A54.” In the example E54C-3, the scene is “54.”
- *Suffix*: This is a set of one or more letters after the scene number, indicating the shot for the scene. For example, the “C” in scene A54C-3.
- *Take number*: This is the number after the suffix (shot indicator) that identifies a specific take. Usually it is preceded by a hyphen (which you don’t enter in the Find dialog). For example, the “3” in scene A54C-3.

The tricky part is determining whether the prefix indicates a unique scene or not. Prefixes using letters from A to D are treated as referring to unique scenes. Prefixes using letters from E to Z are treated as being modifiers to the scene number, but not unique scenes.

For example, if you use the Find dialog to search for scene 54, it will find 54, G54, and K54 (all are considered to be scene 54) but will not find A54, B54, C54, or D54 (which are all considered to be different scenes from scene 54).

Suffixes indicate shots that are part of the scene. If you search for scene 54, you will find all shots for scene 54, such as 54A and 54F, but not B54A, because the prefix makes this a different scene.

Take numbers are related to specific shots, which in turn are related to specific scenes. If you search for scene 54, you will find all shots and takes for that scene.

If you enter “54A” in the Find dialog’s Scene field, you will find only those records for shot A of scene 54; you will not find records for scene 54B.

Entering a number in the Take field will find only shots using that take. For example, entering “54A” in the Scene field and “3” in the Take field will find only record 54A-3. Entering “54” in the Scene field (with no shot specified) and “3” in the Take field will find any records for scene 54 that have a take 3, such as 54A-3 and 54D-3.

Backing Up, Copying, Renaming, and Locking Databases

As is the case with all important data, it is wise to store backup copies of your Cinema Tools database files and to lock the database files if you want to make sure they are not modified or deleted. Do this by using any of the standard desktop methods for copying and locking files. You can back up your files on your computer's hard disk or on separate removable media. If you are going to lock a database file, make sure that the database is closed before you lock it.

You can also use any standard desktop method to rename a database file. Changing a database filename (as opposed to a source clip filename) does not affect the content of the database or any of the database functions.

Important: Changing a source clip filename (by editing it in the Finder) is not recommended because it breaks the link between the source clip and the database. However, you can reconnect clips to the database using the Reconnect command.

About the Clip Window

You use the Clip window to play the selected clip, identify the timecode and key number of a specific frame, view general information about the clip, and process it with the Reverse Telecine and Conform features.

To open the Clip window

Do one of the following:

- Choose File > Open Clip (or press Command-O), locate a clip, then click Choose.
- Click Open Clip in the Detail View window (if a clip is connected to the current record).
- Click Connect Clip in the Detail View window, then select a clip (if one has not already been connected to the record).
- Drag one or more (up to 20 total) clips from a Finder window to the Cinema Tools application icon. A Clip window opens for each clip.

Note: If you drag a folder containing clips to the Cinema Tools icon, a new database is created. See [Creating a New Database Using Cinema Tools](#) for more information.

You can have multiple Clip windows open at one time. They are dynamically added to and removed from the Window menu as you open and close them.



See [Settings in the Clip Window](#) for information about the buttons and settings in the Clip window.

Settings in the Clip Window

You can play the clip by clicking the Play button (the triangle to the left of the timeline) or by pressing the Space bar. To play the clip using the Space bar, you must make sure that an Identify pane text field is not currently selected—you can press the Tab key as needed or click the Analysis button to deselect the text fields.

Important: Depending on your computer, high-resolution video, such as 2K media, may not play back smoothly.

If the clip has audio, you can control the volume by clicking the speaker icon next to the Play button and then dragging the volume slider. You can also drag the playhead to scroll through the clip. You can click the left arrow and right arrow buttons at the right side of the timeline or press your keyboard's Left Arrow and Right Arrow keys to step through the clip one frame at a time.



Most of the buttons along the bottom of the window open additional windows or dialogs and are also available as commands in the Clip menu. The two buttons in the upper-right corner determine what information is shown on the right side of the window.

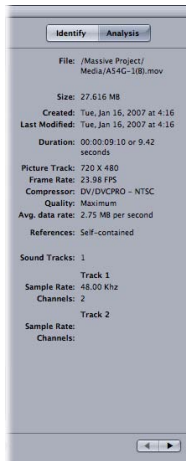
Buttons Along the Bottom of the Window

- *Set Poster Frame*: Assigns the currently displayed frame to the Detail View window's thumbnail display.
- *Disconnect Clip*: The Disconnect Clip button changes depending on whether the current clip is connected to the database. With a clip connected (as shown above), the button is labeled Disconnect Clip. Click Disconnect Clip to disconnect the clip from the database.
- *Enter in Database*: If the current clip is not connected to the database, the Disconnect Clip button is labeled Enter in Database. Click Enter in Database to open a dialog where you can connect the clip to an existing record or a new record by entering scene and take values.
- *Reverse Telecine*: Opens the Reverse Telecine dialog.
- *Conform*: Opens the Conform Clip dialog.
- *Previous Clip and Next Clip buttons (arrows)*: The left and right arrows in the lower-right corner of the Clip window make it easy to switch to the previous or next record (as currently sorted and displayed in the List View window) that has a clip assigned to it.

Note: These buttons are active only when the current clip is linked to a record in the current database and that record is part of the List View window's found set. Additionally, one of these buttons is dimmed if there isn't a previous or next clip.

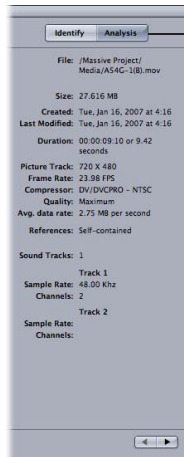
Buttons in the Upper-Right Corner

- *Identify*: Click to show the Identify pane, which displays the clip's information from the Cinema Tools database it is connected to. You can use the Identify pane to enter film and timecode information in the database or to get information about the frame that is currently displayed in the Clip window. Additionally, the settings update to show the information for each frame as you move through a clip. See [Using the Identify Feature to Calculate Database Information](#) for more information about using the Identify feature.
- *Analysis*: Click to show the Analysis pane, which displays the clip's file information. This information includes both file specifics (name and size, where it is located, and when it was created) and content specifics (duration, frame rate, frame size, and compression type used).



Accessing Information About a Source Clip

The Analysis pane of the Clip window gives you access to specific information about a source clip.



Click the Analysis button to display the Analysis pane.

The Analysis pane displays the full path (location) and name of the file, along with its size and dates of creation and modification. You can also see the duration of the movie contained in the clip.

Information is also listed for each track in a clip:

- *For video tracks:* You see the frame size and frame rate, the compressor used and the compression quality, the average data rate, and whether it is a self-contained or reference media file. See [The Difference Between Self-Contained and Reference Media Files](#) for more information.
- *For audio tracks:* You see the sample rate and the number of channels for up to two tracks.

Once you have created and configured your Cinema Tools database, you are ready to start entering information.

This chapter covers the following:

- About Working with Database Information (p. 85)
- Importing Database Information (p. 86)
- Entering Database Information Manually (p. 91)
- Using the Identify Feature to Calculate Database Information (p. 96)
- Deleting a Database Record (p. 98)
- Choosing a Different Poster Frame for a Clip (p. 98)
- Changing the Default Database Settings (p. 99)
- Changing All Reel or Roll Identifiers (p. 100)
- Verifying and Correcting Edge Code and Timecode Numbers (p. 101)

About Working with Database Information

As described in *Deciding How You Should Create the Database*, there are two basic approaches to creating your project database:

- You can generate the database by importing a telecine log, ALE file, or Final Cut Pro batch capture list.
- You can enter information manually or by dragging a folder of clips to the Cinema Tools application icon.

See *Importing Database Information* for information about the different methods you can use to import information into your database.

Even if you do generate a database with a telecine log, you may want to make modifications and additions to the database records at a later time. You can do this by using the Detail View window or the Clip window. (In the Clip window, you can only modify existing database records.) See [Entering Database Information Manually](#) for more information. Also see [Using the Identify Feature to Calculate Database Information](#) for details about how to determine various types of database information.

You can modify any information in the database by editing settings in the Detail View window and the Identify pane of the Clip window. Some of the calculations you make using the Identify feature update preexisting information, modifying the database automatically. See the following for more information:

- [Deleting a Database Record](#)
- [Choosing a Different Poster Frame for a Clip](#)
- [Changing the Default Database Settings](#)
- [Changing All Reel or Roll Identifiers](#)

Also see [Verifying and Correcting Edge Code and Timecode Numbers](#) for details about how to ensure that you have correct values in your database.

Important: Before you can enter information in the database, you need to have an existing database. See [Creating and Configuring a New Database](#) for details about creating a new, empty database.

Importing Database Information

You can create a database by importing information from a telecine log or ALE file, a Final Cut Pro batch capture list, or an existing Cinema Tools database.

Importing Database Information from a Telecine Log or ALE File

You can enter information in the database by importing the telecine log from the film-to-video transfer.

Cinema Tools currently supports the following telecine logs:

- ATN log files from Aaton
- FLX (Film Log EDL Exchange, commonly known as *FLEx*) log files from TLC (Time Logic Controller software)
- Film Transfer List (FTL) log files from Evertz
- Avid Log Exchange (ALE) files (not technically telecine logs, but contain similar information for your database)

You can import telecine log files using either Cinema Tools or Final Cut Pro. See [Importing Telecine Logs Using Cinema Tools](#) and [Importing Telecine Logs Using Final Cut Pro](#) for more information.

Assigning Camera Letters

Whether you import the telecine log file using Cinema Tools or Final Cut Pro, you have the option of having Cinema Tools dynamically assign a camera letter to all records that are imported. The camera letter uses the first letter of the camera roll value and is appended to the take entry of each record.

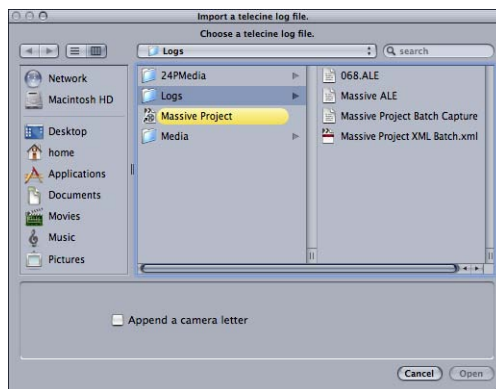
This is useful in those cases where multiple cameras were used for each take, with the letters making it easy to distinguish between the clips from different cameras. Additionally, if you set up a multiclip in Final Cut Pro, the camera letters are used to create the different angles.

Importing Telecine Logs Using Cinema Tools

To import a telecine log into Cinema Tools, you must first have a database open. The database can be an existing one to which you want to add new records, or it can be a new one with no records.

To import a telecine log using Cinema Tools

- 1 Do one of the following:
 - Open an existing Cinema Tools database. See [Opening an Existing Database](#) for more information.
 - Create a new Cinema Tools database. See [Creating and Configuring a New Database](#) for more information.
- 2 Import the telecine log file by choosing File > Import > Telecine Log (or pressing Command-L).
- 3 In the dialog that appears, select the telecine log or ALE file.



- 4 To assign a camera letter to the imported records, select the “Append a camera letter” checkbox (the camera letter is dynamically determined by the first letter of the camera roll value, if present, and is appended to the Take entry of each record).
- 5 Click Open.

The data in the log is entered in the open database, and each new record is displayed in the List View window.

When Cinema Tools has finished creating the records from a telecine log, it tells you how many events there were in the log and how many of those events were imported into the database. Sometimes events in a telecine log refer to edits in which no film was transferred. For those events, no record is created in the database.

After the records have been imported, you can export a batch capture list from Cinema Tools that you can import into Final Cut Pro to automate the clip capture process. See [Generating a Batch Capture List from Cinema Tools](#) for more information.

Importing Telecine Logs Using Final Cut Pro

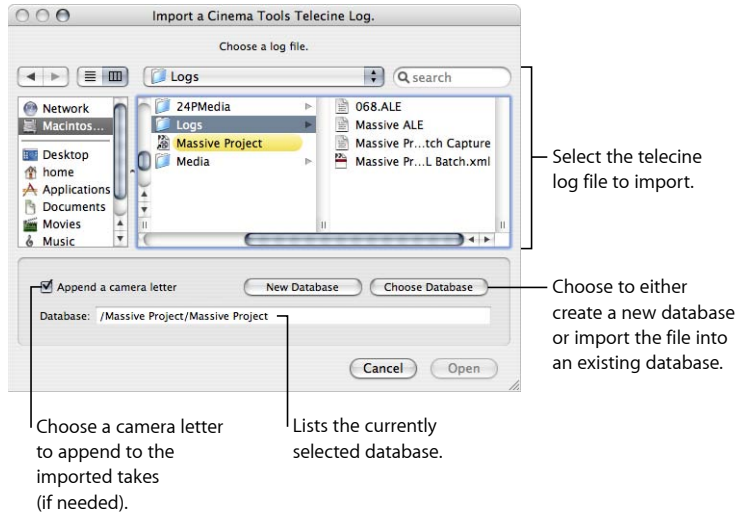
When you import a telecine log using Final Cut Pro, you choose whether you want to import it into an existing Cinema Tools database or whether a new database should be created.

When records are added to the selected Cinema Tools database, each record creates an offline clip in the Final Cut Pro Browser so that the clips can be batch captured. Each of these clips also has the film-related information contained in the log file added to it.

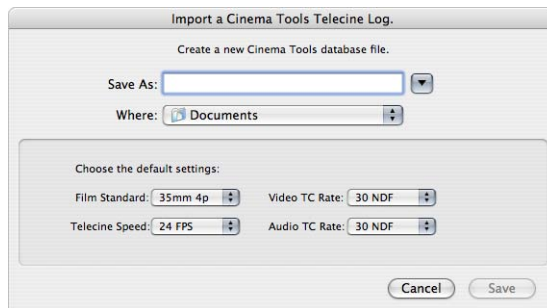
To import a telecine log using Final Cut Pro

- 1 Create a new project or open an existing project.
This project will contain the offline clips created when the telecine log file is imported.
- 2 Select the project in the Browser.
- 3 Choose File > Import > Cinema Tools Telecine Log.

The Import a Cinema Tools Telecine Log dialog appears.



- 4 Use the top half of the dialog to select the telecine log file to import.
- 5 To assign a camera letter to the imported records, select the “Append a camera letter” checkbox (the camera letter is dynamically determined by the first letter of the camera roll value, if present, and is appended to the Take entry of each record).
- 6 Do one of the following:
 - *To create a new Cinema Tools database to import the telecine log file into:* Click New Database. This opens a new dialog where you can enter a name and location for the database, as well as configure its default settings. See [Settings in the New Database Dialog](#) for information about these settings. Click Save when finished.



- *To open a dialog where you can select an existing database to import the telecine log file records into:* Click Choose Database. Click Open when finished.

The selected database, whether new or previously existing, is listed in the Database field of the Import a Cinema Tools Telecine Log dialog.

- 7 Click Open to import the selected telecine log file into the selected Cinema Tools database.

After the records have been imported and the offline clips have been added to the Browser, you can use Final Cut Pro to batch capture the clips. See the Final Cut Pro documentation for information about batch capturing clips.

Importing Database Information from a Batch Capture List

You may want to create database records by importing a Final Cut Pro batch capture list if:

- You don't have a telecine log or Avid Log Exchange (ALE) file
- You have already batch captured the clips you want into Final Cut Pro and you want database records to be created for those source clips instead of the takes listed in your telecine log

Creating database records from a Final Cut Pro batch capture list is not ideal because you lose the advantages of using a telecine log or ALE file to build your database. For example, a Final Cut Pro batch capture list does not contain the key number and camera or lab roll information that would be imported from a telecine log. See [Advantages of Using a Telecine Log or ALE File](#) for more information.

Tip: In most cases, instead of exporting a Final Cut Pro batch capture list and importing it into a Cinema Tools database, you should use the Final Cut Pro Synchronize with Cinema Tools feature. See [Synchronizing Final Cut Pro Clips with Cinema Tools](#) for more information.

To import database information from a Final Cut Pro batch capture list

- 1 Make sure that a Cinema Tools database is open.
- 2 In Cinema Tools, choose File > Import > Final Cut Pro Batch List.
- 3 In the dialog that appears, select the batch capture list you exported from Final Cut Pro.
- 4 Click Open to import the batch capture list.

The data in the batch capture list is used to create database records.

Note: The source clips are not yet connected to database records. You still need to use the Connect Clips command to connect them. See [Using the Connect Clips Command](#) for more information.

- 5 In each database record, enter the edge code number information and film roll identifier. (These items are required to create a cut list or change list.)

Note: Because a Final Cut Pro batch capture list includes everything in the Final Cut Pro Browser, it may include clips or sequences that you don't want. For this reason, you should delete any database records you don't need. See [Deleting a Database Record](#) for more information.

Importing an Existing Cinema Tools Database

One Cinema Tools database can be imported into another Cinema Tools database. There are a few reasons why you might want to do this:

- You may want to create separate databases for organization and archiving purposes and then bring them all together in a master database. For example, you might want to create separate databases for your dailies. If you want to manage your dailies by creating a date-named database for each of the dailies, you can import the telecine log for that daily session, export a batch capture list, capture the clips, and use the Cinema Tools Connect Clips command to connect all the clips to that date-named database file. Then, you can import that database file into a master database that contains all of the daily databases.
- You may need to correct a database that has incorrect project defaults. To do this, you create a new, empty database with the correct defaults and then import your original database file into the new one.

To import one database file into another

- 1 Open the database into which you want to import another database file by choosing Database > Open Database (or pressing Command-Shift-O) and then selecting the database in the dialog.
- 2 Choose File > Import > Database.
- 3 In the dialog that appears, select the database you want to import.

Entering Database Information Manually

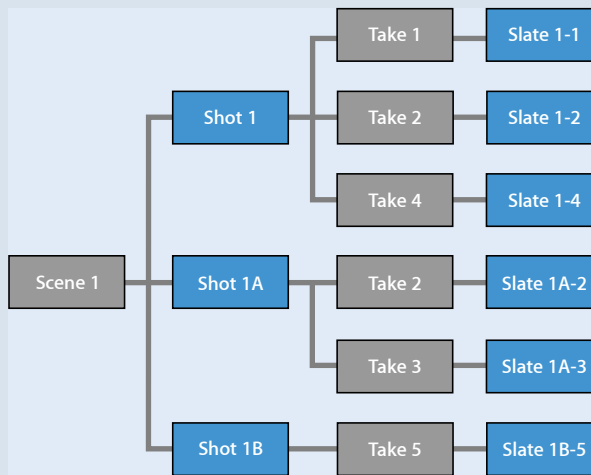
You can use the Detail View window to manually edit database records. Before you can edit information in a database, you need to create database records.

Note: If a database record has already been created for a clip, you can also use the Identify pane of the Clip window to enter information. See [Using the Identify Feature to Calculate Database Information](#) for details.

Understanding the Relationship Between Scenes, Shots, and Takes

To enter scene, shot, and take information in the database, you first need to know how scenes, shots, and takes are understood by the database.

A motion picture production is composed of a series of scenes, and each scene is typically composed of a number of shots or angles. A shot is a continuous film recording that does not have any cuts. In shooting the film, there may be a number of takes for each shot, so a take is a version of a shot. There can be many shots for each scene. The diagram below shows an example of the relationship between scenes, shots, and takes as they might exist in a Cinema Tools database.

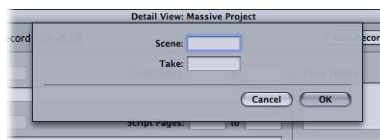


Creating a New Database Record

You must create database records if you are manually entering database information.

To create a new, empty database record

- 1 Do one of the following:
 - Choose Database > New Record (or press Command-N).
 - Click New Record in the Detail View window.
- 2 In the dialog that appears, either enter identifiers for the scene and take or leave these fields blank, then click OK. See [Using Scene, Shot, and Take Identifiers](#) for more information.



Note: You don't have to enter anything in the Scene and Take fields in order to use Cinema Tools to match your digital edits back to your original camera negative. You can leave these fields blank or enter their values later. Also keep in mind that the scene and take entries are used to create the clip names if you export a batch capture list. See [Generating a Batch Capture List from Cinema Tools](#) for more information.

The Detail View window appears after you click OK.

To create new database records with connected clips

Do one of the following:

- Choose File > Import > Files, choose one or more media files to import in the dialog that appears, then click Open.
- Choose File > Import > Folders, choose one or more folders that contain media files you want to create database records from, then click Open.
- Drag one or more media files or folders from a Finder window to the Cinema Tools List View window.

Note: You cannot drag a mix of media files and folders to the List View window.

A dialog appears that tells how many new records were created. Each record includes the video reel, video timecode, clip duration, and timecode rate settings from its connected clip.

Note: New records are not created for any clips that are already connected to other records in this database.

Using Scene, Shot, and Take Identifiers

An identifier can be any combination of numbers and letters (up to 15 characters).

- *Take identifier:* If the source clip associated with a database record contains more than one take, you can think of the take identifier as a source subclip identifier. If the source clip associated with a database record contains just one take, you can think of the take identifier as a source clip identifier.
- *Scene identifier:* The identifier you enter in the Scene field actually identifies both the scene and the shot (camera position) for the clip. For the Scene identifier, most people enter the number or letter combination that appears in the Scene field on the slate. The typical method for identifying scenes and shots is to use a number for the scene and add a letter to specify the shot in the scene. So when a slate says “Scene 12B,” it is referring to shot B in scene 12. You see this reflected in the Detail View window; the first number you enter in the Scene field appears next to the word “Scene” in the Detail View window. Next to the word “Shot,” both the number and the letter appear. For example, if you enter “1D” in the Scene field, you see the following at the top-left corner of the Detail View window:
 - “1” next to the word “Scene”
 - “1D” next to the word “Shot”

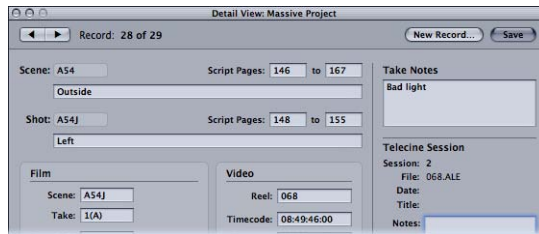
Tip: In the Scene field, you can enter a letter (A through D) before the first number, and the letter will be part of the scene identifier. Adding a letter to the beginning of a scene identifier is a useful naming scheme when you need to add a scene in the middle of an existing series of scenes. For example, between scene 1 and scene 2 you could add a scene named A2, so the new order would be scene 1, scene A2, scene 2, scene 3, and so on. Adding other letters (E through Z) does not add a new scene. For example, scene G2 is the same as scene 2. See [Scene, Shot, and Take Number Details](#) for more information.

About the Descriptive Scene and Shot Data

All the shots for a scene are related to that scene, and all the source clips for a shot are related to that shot. Because the database remembers these relationships, you only need to enter the descriptive data for each scene and shot once.

When you enter or change the descriptive data for a scene, that same data appears for all the other shots associated with that scene, both in existing database records and any records you create later that have the same scene identifier. Similarly, any descriptive data you enter for a shot appears in existing database records with the same shot identifier.

In the example below, all records for scene A54 will have the same descriptive text (“Outside”) and page numbers (146 to 167). All takes for this shot (A54J) will have the same descriptive text (“Left” in this example) and page numbers (148 to 155). Each take for that shot will also have a unique Take Notes entry.

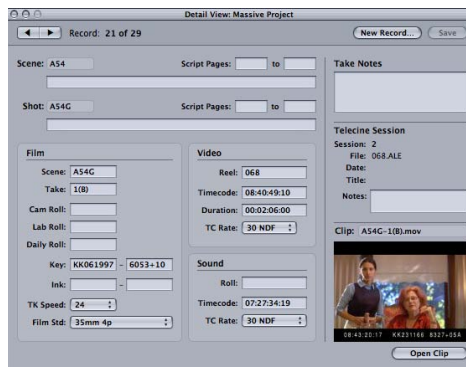


Entering Information in a Database Record

Once you have created a database record, you can enter the information about its clip.

To enter information in a database record

- 1 Make sure the record is displayed in the Detail View window. (If necessary, click the record in the List View window to open it in the Detail View window.)



See Finding and Opening Database Records for more information.

- 2 Enter information and settings in the Detail View window.

Settings in the Detail View Window describes all the settings and specifies which ones are required if you plan to use the database to generate cut lists or change lists.

You can press the Tab key to navigate from one field or setting to another.

Tip: When you connect a clip to a database record and the record does not yet contain the clip timecode, reel, and timecode duration, Cinema Tools looks for this information in the clip file and automatically enters it in the database record.

If you know the edge code or timecode number for another frame in a clip, the Identify feature can help you determine the correct timecode or edge code number for the first frame of a clip. See [Using the Identify Feature to Calculate Database Information](#) for details.

3 Click Save.

Until you save, data in the Detail View window is not entered in the database. You can choose Database > Revert Record (or press Command-R) to revert to the last saved version of the record.

Using the Identify Feature to Calculate Database Information

You can use the Clip window's Identify feature to determine the key number, ink number, or timecode values for clips in the database. The database requires these values for the first frame of the clip, but you might not have them if you aren't creating database records from a telecine log or if your clips lack window burn.

Note the following requirements for using the Identify feature to determine or verify edge code or timecode values:

- You need to know a key number, ink number, or timecode value for at least one frame in the clip.
- The clip needs to have a database record.
- The key number-to-timecode relationship must be continuous. See [Is Your Edge Code Number-to-Timecode Relationship Continuous or Noncontinuous?](#) for more information.

Keep in mind that with the Identify feature, the Key, Ink, Video Timecode, and Sound Timecode fields should always reflect the values of *the frame currently displayed in the Clip window*, whereas in the Detail View window these fields are associated with the first frame of the clip. The Identify feature will, however, calculate and enter the first-frame values you see in the Detail View window.

Calculating Edge Code and Timecode Numbers

If you know the edge code (key number or ink number) and timecode values for any frame in a clip, you can use the Identify feature to determine these values for the first frame of the clip, and that information is automatically entered in the database.

This feature is especially useful if you are working with video that does not have window burn, because without window burn you have to track the timecode and edge code by physically marking one frame in each clip. If the frame that is marked is not the very first frame of the clip, the Identify feature can calculate what the values are for the first frame, and those values are automatically entered in the database.

To enter the edge code and timecode values in the database

- 1 If it isn't already open, open the clip in the Clip window in one of the following ways:
 - Choose File > Open Clip (or press Command-O) and use the dialog to select the clip.
 - Click Open Clip in the Detail View window of the clip's database record.

- 2 Click Identify in the Clip window to display the settings for the current frame.

- 3 Locate the marked frame in the clip playback area.

Tip: Use the arrow keys on your keyboard to move forward and backward frame by frame.

The Identify settings update to show the information for each frame as you move through a clip, so you can locate the marked frame.

- 4 Enter the edge code and timecode values for the marked frame (the frame showing in the Clip window) in the appropriate fields.

Note: You may be using ink numbers instead of key numbers, or vice versa. If so, you can leave the field you aren't using blank.

Enter the key number or ink number for the marked frame.

Enter the video timecode value for the marked frame.

Note: If you decide you want to reset the values to what they were when you opened the clip in the window, click Revert.

- 5 When identifying a 3-perf 35mm clip, you must also choose the offset (3-perf*1, 3-perf*2, or 3-perf*3) from the Film Std pop-up menu.

Note: You should not need to change the Film Std setting if you are using any of the other film formats.

- 6 Click Save.

The clip's database record is immediately updated with the values for the first frame of the clip. Additionally, the clip's duration is calculated and entered.

About Modifying Data with the Identify Feature

You can use the Identify feature for a clip only if a database record has been created for that clip. The Clip window's Identify pane includes fields and pop-up menus for settings that also appear in the Detail View window. You can modify these settings with the Identify feature, but keep the following important facts in mind:

- The Identify pane's Key, Ink, Video Timecode, and Sound Timecode fields should always reflect the values of *the frame currently displayed in the Clip window*, whereas in the Detail View window these fields are associated with the first frame of the clip. Therefore, what you see or enter in the Identify pane of the Clip window could be different from what you see or enter in the Detail View window. See [Using the Identify Feature to Calculate Database Information](#) for details.
- The Identify feature can track the key numbers only if the key number-to-timecode relationship is continuous, as it is with most camera-roll transfers. See [Is Your Edge Code Number-to-Timecode Relationship Continuous or Noncontinuous?](#) for more information.

If you changed the values in the window and want to go back to previous values, click Revert instead of Save. After you click Save, the database record is updated, and these changes are reflected in the Detail View window.

Deleting a Database Record

You may find that you have records that you no longer need. You can delete them from a database.

Note: Be careful when you delete a database record, because there is no way to undo this command.

To delete a database record

- 1 Open the database record in the Detail View window, or select it in the List View window.
- 2 Choose Database > Delete Record (or press Command-Delete).

Note: When you delete a database record that is connected to a source media file, you don't delete the file from your hard disk. You delete only the database record.

Choosing a Different Poster Frame for a Clip

By default, when you connect a clip to a database record, a small picture of the first frame of the clip appears in the Detail View window. This picture is called the *poster frame*. You can choose to display a different frame of the clip if the first frame of the clip is hard to recognize, as with black frames.

The default clip poster frame does not appear in the Detail View window until after:

- The clip has been connected to a database record
- The clip has been opened in the Clip window

To choose a new poster frame for a clip

- 1 If it isn't already open, open the clip in the Clip window in one of the following ways:
 - Choose File > Open Clip (or press Command-O) and use the dialog to select the clip.
 - Click Open Clip in the Detail View window of the clip's database record.
- 2 In the clip playback area, locate the frame you want to use as the poster frame.

Tip: Use the arrow keys on your keyboard to move forward and backward frame by frame.



Click the Set Poster Frame button to have the current frame appear as the thumbnail image in the Detail View window.

You can drag the playhead to locate and display the frame you want to use as the clip poster frame.

- 3 Click Set Poster Frame when the clip playback area displays the frame you want to use. The new poster frame appears in the Detail View window of the clip.

Note: Regardless of the poster frame you set, the Clip window always opens to the first frame of the clip.

Changing the Default Database Settings

Although you cannot directly change a database's default settings, you can get the same effect by creating a new database with the proper settings and importing the original database into it.

To change the default settings for a database

- Create a new database with the default settings you want, then import your original database into the new one. See [Importing an Existing Cinema Tools Database](#) for more information.

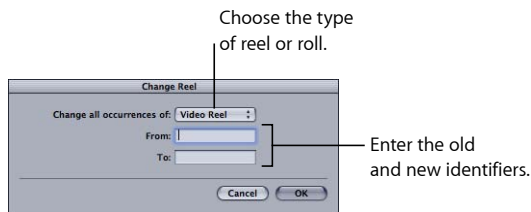
Changing All Reel or Roll Identifiers

There may be times when you want to change all occurrences of a reel or roll identifier in a database. For example, you might need to change a reel identifier that is not EDL-compatible to one that is EDL-compatible. Or, you might need to change the reel or roll identifier in a database to match identifiers that are actually used in an EDL or to correct situations where reel identifiers are not exact matches, such as “0001” and “001.”

Note: If you will be exporting a batch capture list from the database, it’s best to make the reel or roll identifier changes before exporting the list.

To change all instances of a reel or roll name in a database

- 1 Click the Show All button in the List View window to make sure that all of the database records are listed in the List View window.
- 2 Choose Database > Change Reel.
- 3 Make the following settings in the Change Reel dialog:
 - Choose the type of roll or reel.
 - In the From field, enter the identifier that you want to change.
 - In the To field, enter the new identifier.
- 4 Click OK.



After you click OK, all records displayed in the List View window are searched, and each time the roll or reel identifier that you want to change is found, it is replaced by the new identifier.

Verifying and Correcting Edge Code and Timecode Numbers

Assuming you know the timecode, key number, or ink number values for a frame in a clip—either by a marked frame or by window burn—you can use the Identify feature to verify these values for the clip. Verification is important because your cut list or change list is only as accurate as these values.

Verifying values with the Identify feature is especially useful when:

- You find a discrepancy between the timecode and ink numbers or key numbers in the window burn and those values in the Cinema Tools database or in Final Cut Pro
- You entered the values manually and need to double-check your data entry work

Important: The Identify feature can track edge code numbers only if the edge code number-to-timecode relationship is continuous, as it is with most camera-roll transfers. See [Is Your Edge Code Number-to-Timecode Relationship Continuous or Noncontinuous?](#) for more information. If the edge code number-to-timecode relationship is noncontinuous, you can verify and correct the edge code number and timecode values for the source clips by visually checking these values against the window burn and, if necessary, manually updating the edge code number and timecode values in Cinema Tools and the timecode values in Final Cut Pro.

To verify and correct the edge code and timecode values entered for a clip

- 1 If it isn't already open, open the clip in the Clip window in one of the following ways:
 - Choose File > Open Clip (or press Command-O) and use the dialog to select the clip.
 - Click Open Clip in the Detail View window of the clip's database record.

- In the clip playback area, locate a frame near the beginning of the clip for which you know the correct edge code number or timecode value. This is easy if your video has window burn.



- If necessary, click Identify to show the record's settings.
- Look at the Key, Ink, and Video Timecode fields in the Identify pane to see if the numbers match the window burn of the frame in the Clip window. (You may be using ink numbers instead of key numbers, or vice versa. If so, you can leave the field you aren't using blank.)
- If any of the Key, Ink, or Video Timecode fields are incorrect, enter the correct numbers in the fields.
- In the clip playback area, locate a frame near the end of the clip and repeat steps 4 and 5.
 - If the edge code number and timecode values are correct at the beginning of the clip, but not at the end of the clip:* Frames may have been dropped during capture, in which case you should recapture the clip. See [Avoiding Dropped Frames](#) for more information. It might also be because the clip doesn't have a continuous edge code number-to-timecode relationship, in which case the Identify feature cannot help you confirm the edge code number and timecode values because it works by a calculation based on a continuous edge code number-to-timecode relationship.
 - If the timecode value is incorrect:* There is a good chance that the timecode is wrong in Final Cut Pro. Open the same frame in Final Cut Pro and see if the timecode value is correct. If it isn't, make sure to correct the timecode in Final Cut Pro. You can do this by using the Modify Timecode dialog. See the Final Cut Pro documentation for more information about how to modify the timecode.

If you used serial device control, the timecode mismatch may have happened because you didn't set the appropriate timecode offset in Final Cut Pro for the specific deck you used. You need to make this setting once per deck, per computer. For more information, see the section about calibrating the timecode signal in the Final Cut Pro documentation.

- 7 If you entered new numbers in the fields, click Save. Otherwise, if the values were already correct, close the window.

Capturing Source Clips and Connecting Them to the Database

7

Establishing the relationships between the source clips and the Cinema Tools database is key to a successful project.

This chapter covers the following:

- About Source Clips and the Database (p. 105)
- Preparing to Capture (p. 105)
- Generating a Batch Capture List from Cinema Tools (p. 109)
- Connecting Source Clips to the Database (p. 115)
- Fixing Broken Clip-to-Database Links (p. 120)

About Source Clips and the Database

Once you have created the project database, it's time to capture your source clips with Final Cut Pro. (Source clips are the media files you start with when you begin editing.)

After capturing, you establish connections between the database records and the source clips.

Tip: Use the scenarios in *Cinema Tools Workflows* to guide you in determining the basic steps you need to take to capture your source clips and connect them to the database. The steps you need to take, and the order of those steps, differ depending on factors that are summarized in the workflow examples. For example, in some situations it is not necessary to connect the clips to the database.

Preparing to Capture

Detailed information about capturing clips is provided in the Final Cut Pro documentation. Before you capture, you need to pay attention to a few factors that can affect your project:

- Avoiding dropped frames during the capture process
- How your hardware is set up for video capture
- Considerations regarding the capture of audio

- How to prepare for batch capturing (if you have a video deck with device control)
- Considerations for capturing source clips individually (if you do not have device control)

A Caution About Using OfflineRT Media with Cinema Tools

When you capture media with the OfflineRT Easy Setup in Final Cut Pro, your captured media is highly compressed, allowing you to capture more source clips to your hard disk—approximately 2 hours of video per gigabyte (GB) of hard disk space. However, it can be very difficult, if not impossible, to read the key number and timecode information in the window burn after capturing with OfflineRT compression. You typically need to see the window burn in order to verify and correct the key number and timecode values and to use the Cinema Tools Reverse Telecine feature. For this reason, OfflineRT may not be ideal for Cinema Tools users.

For more information about OfflineRT, see the Final Cut Pro documentation.

Avoiding Dropped Frames

If computer performance is impeded or if your scratch disk is not fast enough, frames may be dropped during the capture process, meaning one or more individual frames are not captured at all. When a frame is dropped during capture, the frame before it is repeated. As a result, a frame you see while editing may not be the frame you see when the film is cut. Dropped frames can cause timecode errors, which can result in an incorrect cut list and interfere with the reverse telecine process. You can prevent this problem in Final Cut Pro by setting the program to stop capturing and to notify you when a frame is dropped.

To set Final Cut Pro to stop capturing when frames are dropped

- 1 In Final Cut Pro, choose Final Cut Pro > User Preferences.
- 2 In the General tab, make sure “Abort capture on dropped frames” is selected.

When this option is selected, a message appears when frames are dropped during capture and the capture is stopped.

If dropped frames occur, first make sure that other programs are not open, so that performance is not slowed. Then, recapture the source clip.

If you attempt to use the Reverse Telecine feature for a source clip that contains dropped frames, a warning appears.

Setting Up Your Hardware to Capture Accurate Timecode

The ability of Final Cut Pro to capture frame-accurate timecode for each clip is also dependent upon the proper setup of your capture hardware. When using DV decks, this is easy. In Final Cut Pro 3 and later, capturing video with a DV deck using FireWire for both device control and video and audio input results in 100 percent accurate timecode. If you are instead capturing from a deck using serial device control—for example, a Digital Betacam or Beta SP deck—there are a couple of important steps you need to take during setup to ensure timecode accuracy.

What Is Device Control?

Device control makes it possible for Final Cut Pro to control your video camera or video deck. If your video camera or deck uses a protocol supported by Final Cut Pro, Final Cut Pro can exchange timecode and device control data with the camera or deck. If you have device control, you can cue and capture several source clips at once (called *batch capturing*). If you do not have device control, you need to capture source clips individually. See the Final Cut Pro documentation for supported device control protocols.

Before you capture from a deck using serial device control, you need to take these steps to ensure all-important timecode accuracy:

- Genlock your deck with your video capture interface.
- Calibrate the timecode offset.

Genlocking the Deck and Video Capture Interface

In addition to connecting the serial device control cable from your deck to your computer (using a recommended serial interface adapter) and connecting the necessary video and audio connectors, you must also make sure that your deck is genlocked with your video capture interface. *Genlocking* refers to locking two video devices together using a blackburst generator.

If your deck and video capture device support genlock (also called *external sync*), connect them to a common signal generator (usually a blackburst generator, which outputs a continuous black video signal). This is done using the genlock connectors found on your video deck and video capture interface (these may also be labeled *reference video*). Genlocking your deck with your video capture interface synchronizes these devices, ensuring timecode accuracy.

Important: If you are capturing from a deck using serial device control and your video capture interface cannot be genlocked with the deck, the accuracy of the timecode captured with your clips cannot be guaranteed.

Calibrating the Timecode Offset

Even when your deck and video capture interface are genlocked together, if you are going to use serial device control instead of FireWire device control to capture, it is still essential to calibrate the capture offset (found in the Final Cut Pro Device Control Presets tab) prior to capture. To use serial device control, you need to make this setting once per deck, per computer. For more information, see the section about calibrating the timecode signal in the Final Cut Pro documentation.

Considerations Before Capturing Audio

Before you capture your audio with Final Cut Pro, you need to take into account the following:

- *If you have an audio deck that can adjust the audio speed to sync to your editing frame rate when necessary:* Use the audio deck to do this before you capture the audio into your computer. See [Determining How to Prepare Source Clips for Editing](#) to find out how you might need to adjust your audio speed.
Note: If you don't have an audio deck, there are other ways you can adjust the audio speed after capturing. See [Making Adjustments to Audio Speed](#) for more information.
- *If you will be editing at 24 fps (the same frame rate at which the film was recorded):* Capture the audio at the speed at which it was recorded.
- *Before capturing an audio clip that you plan to sync to a video clip:* Make sure your device-controllable audio deck is genlocked to a video capture interface installed in your computer. (See the Final Cut Pro documentation for more information about genlocking your audio deck to a video capture interface.) Also, in Final Cut Pro, select the "Sync audio capture to video source if present" option in the General tab of the User Preferences window.

Considerations Before Capturing Clips Individually

Clips can also be captured individually with Final Cut Pro, without using device control. (See the Final Cut Pro documentation for details about capturing clips individually.)

When you capture your clips, remember these points:

- If you don't use device control, Final Cut Pro cannot receive the correct timecode for the clips during capture. This means you need to correct the timecode for each and every source clip in Final Cut Pro. To do this, open each clip in the Viewer and note the timecode value that appears in the window burn of the first frame of the clip. Then choose **Modify > Timecode** and enter the value from the window burn in the Source field, selecting the Drop Frame checkbox if appropriate. Finally, make sure to update the key number information for the clip in the Cinema Tools database by using the Identify feature. See [Verifying and Correcting Edge Code and Timecode Numbers](#) for more information.

- You don't want to drop any frames while capturing because that can result in an incorrect cut list and will interfere with the reverse telecine process.
- If your video has non-drop frame timecode, make sure that Non-Drop Frame is chosen from the Default Timecode pop-up menu in the Final Cut Pro Device Control Presets tab. A quick way to do this is to choose DV-NDF in the Easy Setup dialog in Final Cut Pro. (Refer to the Final Cut Pro documentation for more details about using Easy Setups.)
- The naming of the source clips is important because you will need to connect clips to database records. To make the connection process as smooth as possible, use an easy naming scheme with the scene and take identifiers. For example, the clip for scene 33, take 1 could be named "33-1." Hyphens are fine in a clip name, but do not use a slash (/) or colon (:).

Generating a Batch Capture List from Cinema Tools

If you have a video deck or camera with device control, such as a DV-format camera with FireWire or a high-end video deck or camera, batch capturing is the most convenient way to bring media into your computer. With batch capture, you connect a video deck or camera to your computer and, based on a Cinema Tools–generated list of the source clips, Final Cut Pro copies all of the source clips from the tape to your computer. In other words, when you use batch capture, you do not need to use your video deck or camera to manually locate each source clip before you capture it with Final Cut Pro.

To set up a batch capture, you specify the clips you want to capture (after your Cinema Tools database has been created) and Cinema Tools generates a list based on the information in the database. After you import this batch capture list into Final Cut Pro, those source clips appear in the Browser as offline clips, meaning they are logged and ready to be batch captured. When your source media is on multiple tapes, you can still use batch capture. When you begin the batch capture, you see a list of all the video reels needed. When all the clips from one reel are captured, you are prompted to select another reel.

Advantages of Using a Cinema Tools Batch Capture List

Using a Cinema Tools batch capture list provides several benefits:

- *Time savings:* You can let Cinema Tools generate your batch capture list for you instead of creating it manually yourself.
- *Accuracy:* The batch capture list captures source clips that match your database records.
- *Convenient source clip filenaming:* When you batch capture from a database batch capture list, your source clip files are named with a naming scheme based on the scene and take identifiers. For example, scene 10, take 1 would be given the filename "10-1."
- *Automatic linking between source clips and the database:* With the Connect Clips command, you can automatically link your captured source clips to the appropriate database records.

Note: You do not *have* to create a batch capture list from a Cinema Tools database. An alternative is to first batch capture your clips with Final Cut Pro and then generate a database from your Final Cut Pro batch capture list. However, this is not ideal because you lose some of the advantages of building your database from a telecine log or Avid Log Exchange (ALE) file. Most importantly, the key number and camera roll information is not added to each database record, so you have to enter that information manually. See [Importing Database Information from a Batch Capture List](#) for more information.

About Standard and XML Batch Capture List Differences

You have the option with Cinema Tools of creating either a standard or XML-based batch capture list. In both cases, you can choose whether to include all records in the found set or just those records that have valid video reel, timecode start, and timecode duration values and are not already connected to a clip.

- *Standard batch capture lists:* These are plain text files that contain reel, clip name (based on the shot and take fields), comment, and timecode information. You choose whether to output a video or audio list.
- *XML batch capture lists:* These lists contain the same information as the standard lists, including both the audio and video information, plus all of the film information such as edge code values, film type, and telecine speed. This additional information is added to each clip's entry in the Final Cut Pro Browser, where it can be displayed.

Tip: When set to include all records in the current found set, exported XML batch capture lists can actually be thought of as an XML representation of the database for those records. Your facility may find additional uses for these lists beyond capturing clips.

How Cinema Tools Names Batch-Captured Clips

If you capture clips with a batch capture list, and if there is both a scene and a take identifier in the database record, Cinema Tools creates a clip name using the scene and take identifiers, separated by a hyphen. For example, the clip for scene 10, take 1 would be named "10-1." If there are no scene and take identifiers, Cinema Tools creates a clip name based on the video reel and timecode. For example, a clip from reel 001 that begins at timecode value 01:35:30:15 would be named "001-01.35.30.15."

When naming the clips, Cinema Tools makes sure that none of the clips have the same name. For example, clips from different cameras may have had the same scene and take identifiers. When this happens, the clip names are distinguished by adding the roll or reel identifiers to clips after the first one. For example, the clips for scene 4, take 4 in roll 1A and roll 1B would be named "4-4" and "4-4B," respectively. If there were no roll or reel identifiers found, those clips would be named "4-4" and "4-4_1."

Note: Before exporting a batch capture list from Cinema Tools, it's best to sort by Slate in the List View window to see if any clips have the same Slate column descriptions. If any clips have exactly the same information in the Slate column, modify the Scene or Take fields in those database records so that they are not the same. This helps ensure that none of the clips in the batch capture list have the same name.

Important: In order to make the clip-connecting process as automated as possible, do not change the filenames that Cinema Tools creates for the source clips when they are captured.

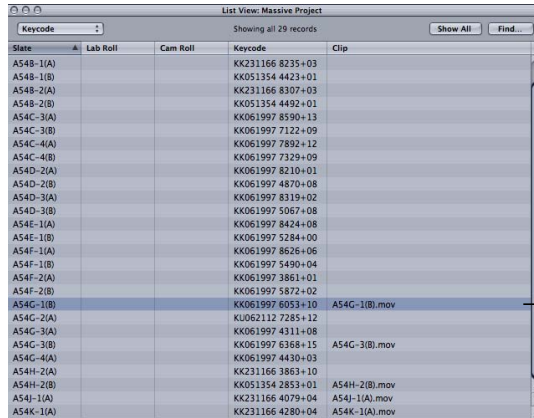
Using Standard Batch Capture Lists

Exporting standard batch capture lists and importing them into Final Cut Pro is a straightforward process.

To export a standard batch capture list from Cinema Tools

- 1 Make sure that the List View window displays the database records of the clips you want to capture.

To display all of the records in the database, click Show All in the List View window.

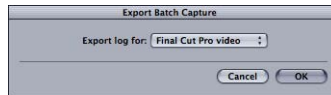


State	Lab Roll	Cam Roll	Keycode	Clip
A54B-1(A)			KK231166 8235+03	
A54B-1(B)			KK051354 4423+01	
A54B-2(A)			KK231166 8307+03	
A54B-2(B)			KK051354 4492+01	
A54C-3(A)			KK061997 8590+13	
A54C-3(B)			KK061997 7122+09	
A54C-4(A)			KK061997 7892+12	
A54C-4(B)			KK061997 7329+09	
A54D-2(A)			KK061997 8210+01	
A54D-2(B)			KK061997 4870+08	
A54D-3(A)			KK061997 8319+02	
A54D-3(B)			KK061997 5067+08	
A54E-1(A)			KK061997 8424+08	
A54E-1(B)			KK061997 5284+00	
A54F-1(A)			KK061997 8626+06	
A54F-1(B)			KK061997 5490+04	
A54F-2(A)			KK061997 3861+01	
A54F-2(B)			KK061997 5872+02	
A54G-1(B)			KK061997 6053+10	A54G-1(B).mov
A54G-2(A)			KU062112 7285+12	
A54G-3(A)			KK061997 4311+08	
A54G-3(B)			KK061997 6368+15	A54G-3(B).mov
A54G-4(A)			KK061997 4430+03	
A54H-2(A)			KK231166 3863+10	
A54H-2(B)			KK051354 2853+01	A54H-2(B).mov
A54J-1(A)			KK231166 4079+04	A54J-1(A).mov
A54K-1(A)			KK231166 4280+04	A54K-1(A).mov

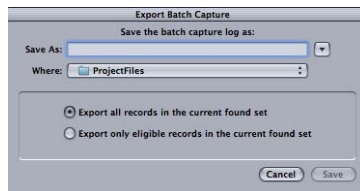
In the List View window, display the database records for which you want to capture clips.

Important: The batch capture list will include only database records that have video reel, timecode start, and timecode duration values. Also, any database records that are already connected to a clip do not appear in the batch capture list.

- 2 Choose File > Export > Batch Capture.



- 3 In the Export Batch Capture dialog, choose what you want to capture, then click OK:
 - *Final Cut Pro Video*: Choose this option to capture all video and audio contained in the source clips. When you choose this option, the batch log includes the video reel and video timecode information entered in each clip's database record.
 - *Final Cut Pro Audio*: Choose this option to capture only the audio from the source clips. When you choose this option, the batch log includes the sound roll and audio timecode information entered in each clip's database record.
- 4 In the dialog that appears, select a location and enter a name for the batch capture list.



- 5 Do one of the following:
 - *To include all records in the batch file*: Click "Export all records in the current found set."

- To include only those records that have video reel, timecode start, and timecode duration values and are not already connected to a clip: Click “Export only eligible records in the current found set.”

6 Click Save.

A plain text batch capture list is created and saved to the designated location.

Tip: You can edit the batch capture list in a text editor. However, make sure that you do not delete or overwrite the Tab characters that separate the fields in each line. You can delete lines for clips you don’t want to capture.

To import a standard Cinema Tools batch capture list into Final Cut Pro

- 1 Either open an existing project or create a new project in Final Cut Pro.
- 2 In Final Cut Pro, choose File > Import > Batch List at [current fps], where “current fps” is the sequence preset frame rate.

You can change the sequence preset frame rate by choosing Audio/Video Settings from the Final Cut Pro menu.

- 3 In the dialog that appears, select the batch capture list you exported from Cinema Tools, then click Choose.

The clips appear in the Browser as offline clips, ready to be batch captured. See the Final Cut Pro documentation for details about batch capturing.

Important: If your video has non-drop frame timecode, make sure that Non-Drop Frame is chosen from the Default Timecode pop-up menu of the preset you choose in the Final Cut Pro Device Control Presets tab (located in the Audio/Video Settings window) before you begin capturing.

Using XML Batch Capture Lists

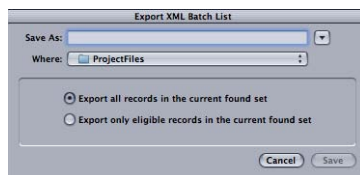
Exporting XML batch capture lists from Cinema Tools and importing them into Final Cut Pro is similar to the process used for standard batch capture lists.

To export an XML batch capture list from Cinema Tools

- 1 Make sure that the List View window displays the database records of the clips you want to capture.

To display all of the records in the database, click Show All in the List View window.

- 2 Choose File > Export > XML Batch List.



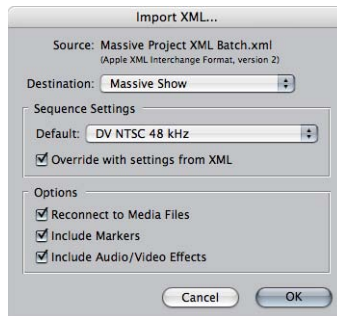
- 3 In the dialog that appears, select a location and enter a name for the batch capture list.
- 4 Do one of the following:
 - *To include all records in the XML file:* Click “Export all records in the current found set.”
 - *To include only those records that have video reel, timecode start, and timecode duration values and are not already connected to a clip:* Click “Export only eligible records in the current found set.”
- 5 Click Save.

An XML batch capture list is created and saved to the designated location.

To import an XML Cinema Tools batch capture list into Final Cut Pro

- 1 In Final Cut Pro, choose File > Import > XML.
- 2 In the dialog that appears, select the XML batch capture list you exported from Cinema Tools, then click Choose.

The Import XML dialog appears.



- 3 Choose the project to add the batch list clips to using the Destination pop-up menu. You can also create a new project using this pop-up menu.
- 4 Choose the default sequence preset to use from the Default pop-up menu.
- 5 When importing XML files exported from Cinema Tools, you can leave all of the checkboxes unselected.
- 6 Click OK to import the XML file.

The clips appear in the Browser as offline clips, ready to be batch captured. See the Final Cut Pro documentation for details about batch capturing.

Additionally, you can see the film details, such as keycode information and telecine film speed (TK speed), in the Browser. See [Showing Film-Related Information in the Browser](#) for information about adding film columns to the Browser.

Connecting Source Clips to the Database

Because source clips and database records can be created by different means at different times, you may need to establish the link between a source clip and its record after they both exist. This process is called *connecting a clip to a record*. How you connect clips to the database depends on how you captured your clips.

- *If you created your database by dragging a folder of clips to the Cinema Tools application icon:* All of the records were automatically connected to the clips. You can use the Connect Clips command to connect the records to a different set of clips later if necessary, or to reconnect the source clips if they are moved to a different disk.
- *If you captured your source clips by using a batch capture list:* Use the Connect Clips command to automatically connect all your source clips to the database. See [Using the Connect Clips Command](#) for more information.
- *If you did not capture your source clips by using a batch capture list:* You need to individually connect source clips to database records by using either the Detail View window or the Clip window. These two methods are equally easy and accessible, so the one you choose may depend on which window happens to be open. The Clip window is most convenient if you're interested in selecting a new poster frame for each clip as you go, or if you want to use the Conform or Reverse Telecine feature on each clip immediately after you connect it to the database.

Keep in mind these basic rules for connecting clips:

- Each database record can have a maximum of one clip connected to it, and each clip can be connected to a maximum of one database record in the same database. In other words, you can't have two clips connected to one database record, and you can't have one clip connected to two different records in the same database. (However, a clip can be connected to records in multiple databases. For example, you could have a clip connected to a record in a master database and to a record in a second, smaller database that represents an edited sequence.) See [Synchronizing a Set of Selected Clips to Create a New Database](#) for more information. Also, a database record does not have to have a clip connected to it.
- You can connect source clips to database records any time between the time you capture the clips and the time you export lists.
- If you are working with camera-roll transfer video that has a continuous key number-to-timecode relationship, you can use the timecode-based method of film list generation so you don't have to connect your source clips to database records. See [A Potential Database Shortcut for Camera-Roll Transfers](#) and [How Cinema Tools Creates Film Lists](#) for more information.

Avoid Moving or Renaming Your Source Clips in the Finder

Once a source clip is connected to the database, that link must be intact when you generate any film lists. If the link is broken, the lists will be incomplete. A clip-to-database link is broken if:

- The source clip filename is changed
- The source clip file is moved or deleted

See [Fixing Broken Clip-to-Database Links](#) for information about fixing broken links.

Using the Connect Clips Command

You can use the Connect Clips command to connect source clips to the database in a variety of situations:

- *If you captured clips using a batch capture list:* The Connect Clips command can connect your captured source clip files to the appropriate database records. This process requires that the reel name and the timecode of the captured clips match those of the database entries.
- *If you moved your connected clips to a new location:* Once you have clips connected to your database, moving the clips to a different folder or disk causes the clips to be disconnected. You can use the Connect Clips command to reconnect the records to the relocated clips.
- *If you renamed one or more of your clips:* Once you have clips connected to your database, renaming the clips causes them to be disconnected. As long as the clips still have the same reel number and timecode information, you can use the Connect Clips command to reconnect the records to the renamed clips.
- *If some clips have been updated and put in a different folder:* If you have created different versions of some connected clips (for example, versions that have been color corrected or recaptured using a different codec) and have put the new clips in a separate folder, you can use the Connect Clips command to connect records to those new clips.

Important: Records connected to DPX image sequence clips use the folder name that contains the image sequence files as the reel name, and the name of the first image as the clip name. If you change the name of the folder that contains the image sequence files, you have effectively changed the clip's reel name, and you cannot use Connect Clips to reconnect to the DPX image sequence clip.

The Connect Clips command uses a record's video reel and timecode values when trying to connect records in the found set to clips in the selected folder (and its subfolders). You also need to keep the following in mind when using the Connect Clips command:

- Only records with video reel and timecode entries can be connected to a clip.

- If a record in the found set matches a clip in the selected folder, the record is connected to that clip, even if the record already had a connected clip. This is useful when you have moved a set of clips to a new location and want to reconnect them to their records.
- Any records that do not match clips in the selected folder are not modified—if a record is already connected to a clip in a different folder, it remains connected to that clip if no matching clip is found in the selected folder.

To use the Connect Clips command to connect clips to the database

- 1 Make sure that the List View window displays the records to which you want to connect clips.

To display all of the records in the database, click Show All in the List View window.

State	Lab Roll	Cam Roll	Keycode	Clip
A54B-1(A)			KK231166 8235+03	
A54B-1(B)			KK051354 4423+01	
A54B-2(A)			KK231166 8307+03	
A54B-2(B)			KK051354 4492+01	
A54C-3(A)			KK061997 8590+13	
A54C-3(B)			KK061997 7122+09	
A54C-4(A)			KK061997 7882+12	
A54C-4(B)			KK061997 7329+09	
A54D-2(A)			KK061997 8210+01	
A54D-2(B)			KK061997 4870+08	
A54D-3(A)			KK061997 8319+02	
A54D-3(B)			KK061997 5067+08	
A54E-1(A)			KK061997 8424+08	
A54E-1(B)			KK061997 5284+00	
A54F-1(A)			KK061997 8626+06	
A54F-1(B)			KK061997 5490+04	
A54F-2(A)			KK061997 3861+01	
A54F-2(B)			KK061997 5872+02	
A54G-1(B)			KK061997 6053+10	A54G-1(B).mov
A54G-2(A)			KL062112 7285+12	
A54G-3(A)			KK061997 4311+08	
A54G-3(B)			KK061997 6368+15	A54G-3(B).mov
A54G-4(A)			KK061997 4430+03	
A54H-2(A)			KK231166 3863+10	
A54H-2(B)			KK051354 2853+01	A54H-2(B).mov
A54J-1(A)			KK231166 4079+04	A54J-1(A).mov
A54K-1(A)			KK231166 4280+04	A54K-1(A).mov

In the List View window, display the database records to which you want to connect clips.

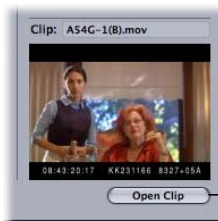
- 2 Choose Database > Connect Clips.
- 3 In the dialog that appears, navigate to the folder where the clips are located. All clips in the folder and its subfolders are available for Cinema Tools to connect to.
- 4 Click Open.

For every database record, Cinema Tools looks in the selected folder and its subfolders for a clip with a matching video reel and timecode value. Each time Cinema Tools finds a matching clip, it connects the clip to the correct database record.

Additionally, poster frames are automatically created for each record that gets a clip connected.

Connecting Clips Using the Detail View Window

In the Detail View window, you can tell whether a database record is connected to a clip by looking at the button below the clip poster frame.



The Open Clip button replaces the Connect Clip button if a clip is already connected to the record.

If the button is labeled Open Clip, the current database record has a clip connected to it. If the button is labeled Connect Clip, there is no clip connected to the database record.

To use the Detail View window to connect a clip to a database record

- 1 Open the database record in the Detail View window.

See [Finding and Opening Database Records](#) for details.

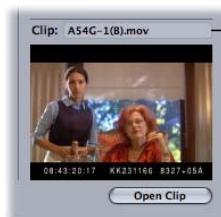
- 2 Click the Connect Clip button.

Note: If the button is labeled Open Clip, the database record already has a clip connected to it. If you want to connect a different clip to the record, you need to disconnect the current clip first.

- 3 In the dialog that appears, select a clip to connect to the current database record.

When you select the clip, three things happen:

- The clip is connected to the database.
- A poster frame of the first frame of the clip appears in the Detail View window, and above the poster frame you see the name of the clip.



The name of the clip appears above the clip poster frame.

Tip: Additionally, placing the pointer over the thumbnail display shows a tooltip with the clip's location. This can be especially useful if the clip is missing because it lets you know where Cinema Tools thinks the clip should be.

- A Clip window opens for the clip. If you want a different frame to represent the clip in the database, go to that frame, then click the Set Poster Frame button. See [Choosing a Different Poster Frame for a Clip and Settings in the Clip Window](#) for more information.

Note: If you don't want the Clip window to open after you connect a clip, press the Command key when you click the Connect Clip button.

To use the Detail View window to disconnect a captured clip

- 1 Open the database record in the Detail View window and press the Command key. The Open Clip button changes to Disconnect Clip.
- 2 Click Disconnect Clip.

Note: Clicking this button breaks the link between the source clip and the record so that they are no longer connected. It does not delete the clip from your hard disk.

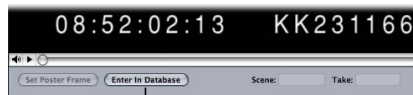
Connecting Clips Using the Clip Window

When a clip has not been connected to a database record, the Clip window contains a button labeled Enter in Database. If a clip is already connected, the button is labeled Disconnect Clip.

The Enter in Database button offers you a way to connect a source clip to an existing database record or create a new database record and connect the clip to it.

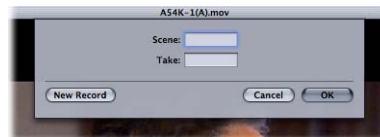
To use the Clip window to connect a source clip to the database

- 1 Choose File > Open Clip to open the clip in the Clip window, then select the clip in the dialog.
- 2 Click the Enter in Database button.



This button changes to Disconnect Clip when the clip is connected to a database.

- 3 Enter a scene and take identifier for the source clip in the dialog that appears.



Important: Text entries are case sensitive. Additionally, do not enter the hyphen that separates the take number from the scene/shot value.

See [Using Scene, Shot, and Take Identifiers](#) for more information.

4 Do one of the following:

- Click OK to connect this clip to the existing record in the database that corresponds to the scene and take you entered in the dialog. If no record exists for that scene and take, a new record is created.
- Click New Record to create a new record, even if there already is an existing record that corresponds to the scene and take you entered.

In either case, the source clip in the Clip window is connected to the record, so the relationship is established in the database. A source clip can be connected to a record in more than one database, but within one database it can only be connected or related to one record. If the source clip is moved or renamed, the relationship should be re-created.

To use the Clip window to disconnect a captured clip

- 1 Open the clip in the Clip window.
- 2 Click Disconnect Clip.

Note: Clicking this button breaks the link between the source clip and the record so that they are no longer connected. It does not delete the clip from your hard disk.

Fixing Broken Clip-to-Database Links

When a source clip that has been connected to the database is renamed or moved, the link between the clip and the database breaks and the clip needs to be reconnected. For individual clips, clicking the Open Clip button in the Detail View window opens a dialog that lets you reconnect the clip to the database record. If a group (folder) of source clips has been moved, you can use the Connect Clips command in the Database menu to update any broken links to clips that are in the folder you select.

Reconnecting Individual Clips

You can easily reconnect a single clip whose link to the database has been broken because the clip was renamed or moved.

To reconnect a source clip that has been renamed or moved

- 1 Open the database record in the Detail View window.
See *Finding and Opening Database Records* for details.
- 2 Click Open Clip.
- 3 In the dialog that appears, click Reconnect, then select the clip.

The clip is connected to the database record.

Locating Broken Links and Reconnecting Groups of Clips

For clips that have been moved or renamed, the Connect Clips command in the Database menu makes it easy to locate and fix the broken links for several clips in one folder. This command updates any broken links to clips that are in the selected folder and its subfolders.

Note: When a disk volume containing clips is unmounted, Cinema Tools cannot find the clips until the volume is mounted again. You don't need to use the Connect Clips command to fix this kind of temporarily broken link. To reestablish such connections, simply mount the disk volume that contains the missing clips.

To locate and fix links that are broken because source clips have been moved

- 1 Make sure that the List View window displays the set of records that you want to search for broken links.

To display all of the records in the database, click Show All in the List View window.

- 2 Choose Database > Connect Clips.
- 3 In the dialog that appears, navigate to the folder where the clips are located.

All clips in the folder and its subfolders are available for Cinema Tools to connect to.

- 4 Click Open.
- 5 In the dialog, select the correct clip for the current record and click Open.

For every database record, Cinema Tools looks in the selected folder and its subfolders for a clip with a matching video reel and timecode value. Each time Cinema Tools finds a matching clip, it connects the clip to the correct database record.

Additionally, poster frames are automatically created for each record that gets a clip connected.

Preparing the Source Clips for Editing

8

Spending some time with your source clips before you start editing can make the editing experience smoother.

This chapter covers the following:

- An Introduction to Preparing Source Clips for Editing (p. 123)
- Determining How to Prepare Source Clips for Editing (p. 123)
- Using the Conform Feature (p. 125)
- Reversing the Telecine Pull-Down (p. 127)
- Making Adjustments to Audio Speed (p. 139)
- Synchronizing Separately Captured Audio and Video (p. 139)
- Dividing or Deleting Sections of Source Clips Before Editing (p. 141)

An Introduction to Preparing Source Clips for Editing

After the Cinema Tools database has been created and your source clips have been captured, there are a few key steps to take before you begin editing. See [Determining How to Prepare Source Clips for Editing](#) for information about these processes.

If your audio and video were captured separately, see [Synchronizing Separately Captured Audio and Video](#) for more information.

Also, in the interest of efficient use of disk space, you may want to eliminate some of the content you captured before you begin editing. See [Dividing or Deleting Sections of Source Clips Before Editing](#) for information.

Determining How to Prepare Source Clips for Editing

The steps you need to take to prepare your clips for editing depend on the telecine speed, whether you have NTSC or PAL video, and which frame rate you plan to use for editing.

Your main goals are to:

- Set the video frame rate to match the frame rate at which you want to edit

- Maintain or restore audio/video sync

Note: See [Working with 24p Video and 24 fps EDLs](#) for information about working with 24p video.

Choosing an Editing Frame Rate

In general, it's a good idea to edit at the frame rate at which the picture was originally filmed and recorded. For example, if you film, record, and edit at 24 fps, the audio, the video, and the original sound and picture are at the same rate. When you edit at the same speed at which you filmed and recorded, you can digitize directly from the original sound recordings because the picture and sound are in sync. No adjustments need to be made for synchronization purposes.

There is an exception to this recommendation: in an NTSC environment, where you need to use NTSC equipment and output to NTSC tapes, you may prefer to edit at 23.98 fps because then you can take advantage of the Real-Time Effects pull-down feature in Final Cut Pro that lets you output your 23.98 fps video to an external FireWire device as 29.97 fps video. You can choose from three different pull-down patterns (2:3:2:3, 2:3:3:2, and 2:2:2:4). These pull-down patterns are not available with 24 fps video.

Note: Additionally, Final Cut Pro includes two pull-down options for 24 fps PAL video that allow you to output the 24 fps video to an external FireWire device as 25 fps video.

See [Adding Pull-Down to 23.98 fps Video](#) for more information about adding a pull-down using Final Cut Pro. See the Final Cut Pro documentation for more information about using the Real-Time Effects pull-down feature.

Keep in mind that if you record at 24 fps and then convert to 23.98 fps, your video is running at a speed slightly slower than that of the original recording. Because it is slower, it is called *pulled down*. When video is pulled down, the digitized audio also needs to be pulled down, either by slightly slowing down the playback of the original audio source while digitizing (for example, in the telecine transfer process), or by adjusting the speed of the clip to 99.9 percent after capturing.

Ways You Can Prepare the Source Clips

There are a few different ways to adjust your source clips to the frame rate at which you want to edit:

- *Use specialized hardware to capture at your chosen frame rate:* If you have the right equipment, you can use it to convert the frame rate in real time while the clips are captured and adjust the audio speed to match. When you do this, the clips are already in sync and do not require the Cinema Tools Reverse Telecine or Conform feature for frame rate conversion.

- *Use the Reverse Telecine feature:* If your clips have the NTSC standard frame rate of 29.97 fps, you can use the Reverse Telecine feature to reverse the 3:2 pull-down that was used to convert the clips to 29.97 fps, thus removing the extra fields created by the pull-down and converting the clips to 23.98 fps or 24 fps. When clips contain both audio and video, the Reverse Telecine feature also adjusts the audio speed so that the audio and video remain in sync after the frame rate is changed.
- *Use the Conform feature:* If your clips have the PAL standard frame rate of 25 fps, you can use the Conform feature to convert them to the frame rate at which you want to edit. When clips contain both audio and video, the Conform feature also adjusts the audio speed so that the audio and video remain in sync after the frame rate is changed.

Note: If the audio is separate and not contained in the source clips, you also need to sync audio and video clips and merge them together as one clip in Final Cut Pro. See [Synchronizing Separately Captured Audio and Video](#) for more information.

Using the Conform Feature

Conforming a clip to a frame rate means that each frame in the clip is given an equal duration in seconds based on a frame rate you specify. For example, if you conform a clip with 360 frames to 24 frames per second, each frame becomes 1/24 of a second, and the total duration of the clip is 360/24 seconds, or 15.0 seconds. Use the Conform feature to change the frame rate of a clip to the frame rate at which you want to edit. If the clip contains audio and video, the Conform feature also adjusts the audio rate so that the audio and video remain in sync.

Refer to [Ways You Can Prepare the Source Clips](#) for help in deciding whether or not you should use the Conform feature.

Important: Conforming modifies the actual source media file. You must have read-and-write access to the media file for the Conform feature to be available. Additionally, you cannot use the Undo command to restore the file to its original frame rate; however, you can use the Conform feature a second time to return the file to its original frame rate if necessary.

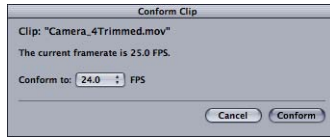
Conforming One Clip at a Time

You can individually conform each clip.

To conform a clip in Cinema Tools

- 1 Choose File > Open Clip, then select the clip in the dialog.
- 2 In the Clip window, click the Conform button.

- 3 In the Conform Clip dialog, choose a new frame rate from the “Conform to” pop-up menu, then click Conform.



You can also conform 25 fps clips to 24 fps from within Final Cut Pro.

To conform a clip in Final Cut Pro

- 1 Select one or more clips in the Browser to conform from 25 fps to 24 fps.
- 2 Choose Tools > Conform 25 to 24.

The clips are conformed to 24 fps.

Note: If any of the selected clips are not 25 fps, a warning appears stating that one or more clips will not be processed.

Batch Conforming Several Clips at a Time

As an alternative to conforming the frame rate of each clip individually, you can use the Batch Conform feature to conform the frame rates of all the clips in a selected folder.

To batch conform in Cinema Tools

- 1 Make sure all the clips you want to conform are in the same folder.
- 2 Choose File > Batch Conform.
- 3 In the dialog that appears, select any clip file in the folder that contains the clips you want to conform, then click Choose.

Note: You only need to select one clip file. All the clips in the folder will be conformed.

- 4 In the Batch Conform dialog, choose a frame rate from the “Conform to” pop-up menu, then click Conform.



After the batch conform process is completed, the following occur:

- The clips are conformed to the chosen frame rate and placed in a Cinema Tools–created subfolder named “Conformed [*frame rate*],” where “frame rate” is the new frame rate for the clips. A folder might be named Conformed 24.0, for example.

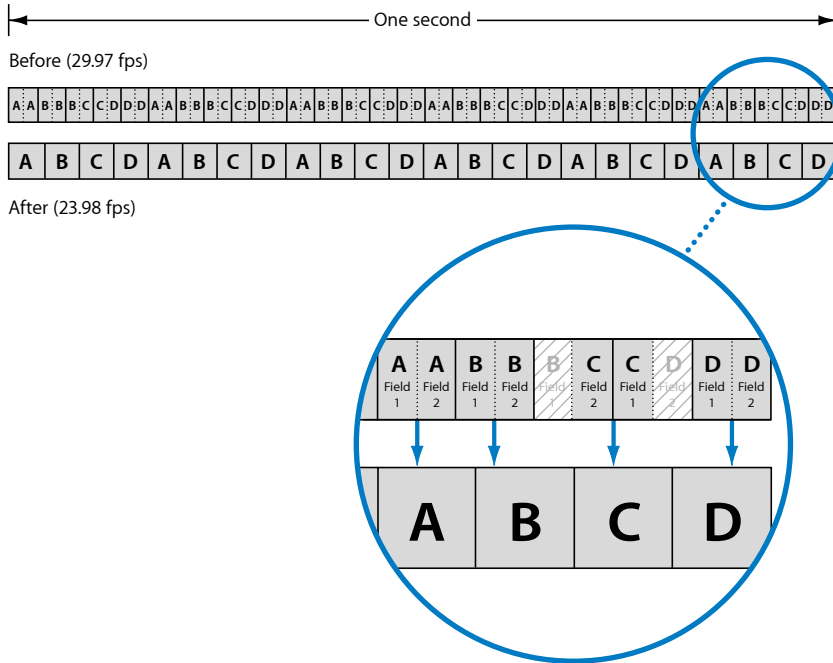
- If Cinema Tools is unable to complete the conform process for a clip, that clip is moved into a Cinema Tools–created subfolder named Skipped. (A clip is not processed if it doesn't contain a video track, if the frame rate is not supported, or if no codec is found for the video track.)
- A text file named “conform.log” appears at the top level of the folder. This log gives the date and time that the process started and ended, for each clip. If any problems were encountered, such as running out of disk space or memory, an error message describing the problem also appears in the log.

Reversing the Telecine Pull-Down

When you use a telecine to transfer your 24 fps or 23.98 fps film to 29.97 fps NTSC video, the typical way the film's frames are distributed into the NTSC frames is by the 3:2 pull-down method. The 3:2 pull-down method, described in *Working with NTSC Video*, inserts extra fields of video. The reverse telecine process removes the extra fields (as shown in the illustration below), changing the frame rate of the video to the original film frame rate. In other words, the reverse telecine process *reverses the 3:2 pull-down*. Reversing (or removing) the 3:2 pull-down provides a one-to-one relationship between the video and film frames so that your cut lists are accurate.

Note: The Reverse Telecine feature cannot be used with temporally compressed video, such as MPEG-2-format video.

3:2 Pull-Down Removal



Important: If your source clips originated from a special type of DV camcorder that shoots 24p, such as the Panasonic AG-DVX100 camcorder, a simpler form of the Reverse Telecine dialog appears. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for instructions for reversing the pull-down for clips that originated from a 24p-capable DV camera.

Tips for Using Reverse Telecine

Following are some tips for using reverse telecine:

- Reverse telecine works best if the captured video does not have any dropped frames. If you attempt to use the Reverse Telecine feature on a clip that has dropped frames, a warning appears. See [Avoiding Dropped Frames](#) for more information.
- If you have to reverse the pull-down for several clips, you might want to use the Batch Reverse Telecine feature instead, because it allows several clips to be processed at once. See [Using Batch Reverse Telecine](#) for more information.
- Reversing the 3:2 pull-down with software is a time-consuming process; you'll need to allow waiting time while your computer does its work. Hardware reverse telecine, performed by a third-party capture card while the video is captured into your computer, is a speedier option.

Determining the Field Capture Information

You need to enter field capture information in the Reverse Telecine dialog. Typically, all of your clips are generated with the same hardware and settings, so you only need to look at a few frames of one clip to determine the field capture mode. A clip can be captured as one field or both fields, with field 1 or field 2 dominance.

Look at the key number and timecode window burn on the video frames to determine the frame sequence and verify whether the video has one or two fields. The key number window burn usually includes the A, B, C, and D frame type indicators. (Also, the timecode often has the number "1" at the end to indicate field 1, and "2" to indicate field 2.) In the Clip window, use the arrow keys on your keyboard to step through a few frames of a clip and observe the sequence of film frame numbers. Refer to the table below to find out your field information.

If the repeating frame sequence is	Then your video contains	In the Reverse Telecine dialog, select as capture mode
AA, BB, BC, CD, DD or A1A2, B1B2, B3C1, C2D1, D2D3	Both fields, with field 1 dominance	Field 1 - Field 2
AB, BB, CC, DD, DA, or A2B1, B2B3, C1C2, D1D2, D3A1	Both fields, with field 2 dominance	Field 2 - Field 1
A, B, B, C, D or A1, B1, B3, C2, D1	One field, with field 1 dominance	Field 1 Only
A, B, C, D, D or A2, B2, C1, D1, D3	One field, with field 2 dominance	Field 2 Only

What Is Field Dominance?

The field dominance of a captured clip is determined by the telecine hardware and is usually not configurable by the user. Video frames are composed of two fields; one field consists of all the even lines of the video, and the other field consists of all the odd lines. At the telecine, the two fields are scanned at different times, which means that the film frame can advance between the time that the first field is scanned and the time that the second field is scanned.

- *When only one field is captured:* Field 1 dominance means that only field 1 is captured, and field 2 dominance means that only field 2 is captured.
- *When both fields are captured:* Field 1 dominance means that each captured frame is digitized from two video fields, but field 1 occurs earlier.

Note: With field 1 dominance, the two video fields digitized into each captured frame should have the same timecode address, because SMPTE timecode is specified as beginning on field 1. Field 2 dominance, when both fields are captured, means that field 2 occurs earlier and that the captured frame contains video fields with two different timecode values.

About A Frames

If your video has window burn, the easiest way to locate an “A” frame is to look at the key number in the video frame, which typically has a letter after it indicating the frame type. This letter is called the *frame type indicator*. A frames include any frame with a frame type indicator that begins with “A,” including an AA (also known as A1A2), AB (also known as A2B1), A1, or A2 frame. When you view the video a frame at a time, the frame type indicator for an A frame shows an “A” and the frame number is solid (not flickering between two frames).



The frame type indicator in the window burn tells you this is an A frame.

If you are using non-drop frame timecode and your source clips have not yet been edited, there is a reliable five-frame pattern where an A frame occurs every five frames. Usually, any timecode number ending in “0” or “5” is an A frame (for example, 1:23:14:10 and 1:23:14:15).

During batch reverse telecine, if a clip starts on a timecode number that is not evenly divisible by five (that is, timecode numbers ending in “5” or “0”), Cinema Tools trims frames from the beginning of the clip so that the clip starts on the next frame with a timecode number that ends in “0” or “5.” This is done to make sure that all source clips start on an A frame. Clips that are trimmed are noted in the batch reverse telecine log file, which is named “reverse.log.”

When key numbers are not burned in to the video, finding an A frame is much more difficult. If there is a lot of motion in the video, you might be able to distinguish one of the original film frames from the next in the video. In that case, look for a video frame made up of two fields from the same original film frame, which has different film frames before and after it. Such a frame would be an A frame.

Using Reverse Telecine on a Single Source Clip in Cinema Tools

Use single-clip reverse telecine to perform reverse telecine on one clip. You can also perform reverse telecine on clips using Final Cut Pro. See [Using Reverse Telecine on Source Clips in Final Cut Pro](#) for more information.

In most cases, you need window burn to use the Reverse Telecine feature because you need to examine the key numbers or timecode in the clip itself to make reverse telecine settings. However, if your source clips originated from a certain type of camcorder that shoots 24p, such as the Panasonic AG-DVX100 camcorder, you do not need window burn in order to reverse the pull-down. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for specific information.

Note: For reverse telecine to function properly, a media file cannot be in use by any other application. Also, a clip cannot be open in the Finder, nor can it be write-protected. If you perform reverse telecine on clips that are open in another application, an alert message appears warning you that the file is busy.

To use the single-clip Reverse Telecine feature on a clip in Cinema Tools

- 1 Choose File > Open Clip, then select the clip in the dialog.
- 2 In the Clip window, position the playhead so that a still frame with clearly readable window burn is displayed.

You need to see the window burn in order to identify the frame type for the Reverse Telecine dialog. Often the first frame will do, but any frame in the clip can be displayed. (Reverse telecine will be applied to the entire clip, regardless of which frame is displayed.)

- 3 In the Clip window, click Reverse Telecine.

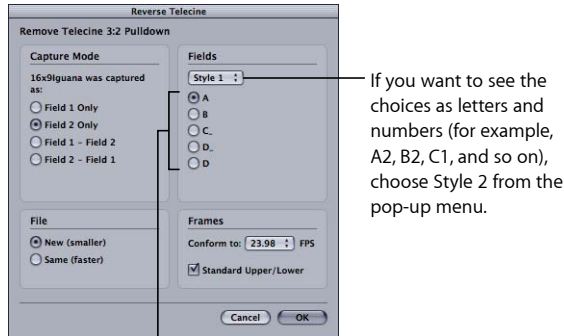
- 4 In the dialog that appears, select the capture mode that indicates the correct field capture for the clip:
 - *Field 1 Only*: Select this option if the video contains only field 1.
 - *Field 2 Only*: Select this option if the video contains only field 2.
 - *Field 1 - Field 2*: Select this option if the video contains both fields, and field 1 is the dominant field (the first field to appear).
 - *Field 2 - Field 1*: Select this option if the video contains both fields, and field 2 is the dominant field.

See [Determining the Field Capture Information](#) for details.

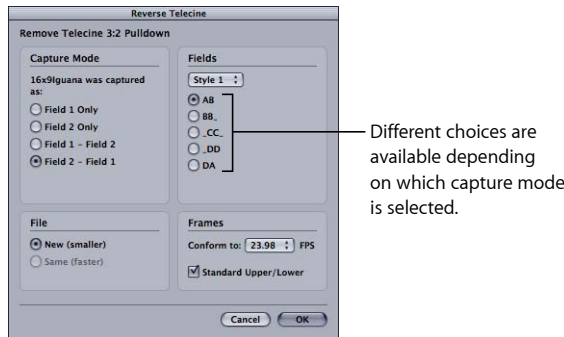
Note: If Cinema Tools finds pull-down information embedded in the source clips, a simpler version of this dialog appears. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for more information.

- 5 In the Fields area, use the pop-up menu to choose the style of frame types to show (Style 1 shows letters only, and Style 2 shows letters with field numbers), then select the frame type that matches the type of frame currently displayed in the Clip window.

Your frame type choices vary depending on the field capture mode you selected.



Select the frame type that corresponds to the frame showing in the Clip window.



6 Select “New (smaller)” or “Same (faster)” to specify the kind of file you want the Reverse Telecine feature to create:

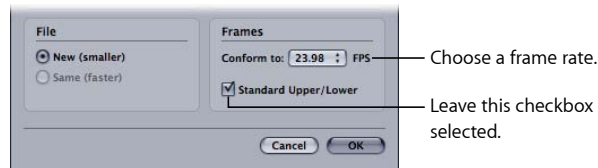
- *New (smaller)*: This option creates a new clip file that does not contain the extra frames introduced by the 3:2 pull-down. The new file is about 20 percent smaller, but this method is slower. Regardless of whether the original file was reference or self-contained, this method creates a self-contained file. See [The Difference Between Self-Contained and Reference Media Files](#) for more information.
- *Same (faster)*: This option modifies the current clip file so that the extra frames are not visible to the editing system, but the data is not removed from the file. This process is faster but does not reduce the size of the file. The resulting file is self-contained if it was originally self-contained, or reference if it was originally reference.

Note: This “Same (faster)” method is available only when the clip has been captured or recompressed to have only one field per frame. This is because reversing the 3:2 pull-down for a clip with two fields per frame requires deinterlacing two different frames, removing one field from each of those two frames, and then making a new frame out of the other two fields. When new frames are being created, a new movie file must be created.

Tip: If you choose the “New (smaller)” method, the original file is no longer needed, but it is not automatically deleted. A dialog suggests naming the new file the same name as the original, with the extension .rev added. To delete the original file by replacing it with the new one, remove the .rev extension in the dialog so that the new file has the same name as the original. Keep in mind, though, that if you delete the original file, you cannot use reverse telecine a second time if you want to try a different setting.

- 7 From the “Conform to” pop-up menu, choose the frame rate that allows you to maintain or restore audio/video sync:
 - 23.98: This frame rate is useful if you want to later use the Final Cut Pro pull-down feature that lets you output 23.98 fps video as 29.97 fps video. (See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.)
 - 24.0: You may want to conform and edit the clips at this rate if you plan to include them in a project that contains other clips that are exactly 24 fps.

Note: If the audio and video are contained in the same clip, and you choose 24.0 from this pop-up menu, the Reverse Telecine feature increases the audio speed by a very small percentage so that it is in sync with 24 fps instead of 23.98 fps.



- 8 Leave the Standard Upper/Lower checkbox selected.

The Standard Upper/Lower checkbox should be selected unless you find that the reverse telecine process does not produce the correct results. It is only relevant when both video fields are captured; it has no effect if only one field was captured. See [Checking Your Reverse Telecine Results](#) for more information.

- 9 Click OK to start the reverse telecine process.

If you selected the “New (smaller)” file option, you are asked to give the new reversed clip a name and location. If the original clip was connected to a database record, the new reversed clip replaces its connection to the record (regardless of whether or not the new clip overwrites the old clip).

Note: Occasionally there are clips with individual frame durations that are longer than they should be. This situation can cause the Reverse Telecine feature to report one or more dropped frames, when in fact there aren't any. If you see this message, try using the Conform feature to conform the clip to 29.97 fps before starting the reverse telecine process again. The Conform feature ensures that all the frames are the same length. See [Using the Conform Feature](#) for more information.

As long as you created a new file (by default, with the extension .rev) and did not delete the original file, you can perform reverse telecine a second time if necessary (for example, to try a different field setting).

To prepare to use the single-clip Reverse Telecine feature a second time

- 1 Disconnect the current reversed file from its database record.
- 2 Connect the original file to the database record.
- 3 Rename or move the current reversed file if you want to keep it from being overwritten.

Now you can perform the steps for using the single-clip Reverse Telecine feature on a clip in Cinema Tools as described previously in this section.

Checking Your Reverse Telecine Results

After a telecine 3:2 pull-down transfer, the upper field is typically field 1 and the lower field is field 2, except when using DV. Normally, when the Standard Upper/Lower checkbox is selected, Cinema Tools determines what needs to be done and the clips are processed correctly. However, on rare occasions, video is captured or processed in such a way that field orders are switched, and this can result in flawed reverse telecine results.

To check your results, look at the frames of a clip that has been processed by reverse telecine. As you look at each frame in the clip, you should see the sequence of A, B, C, and D frames repeat and each letter should be clearly legible. You should not see any interfield flicker. The film frame numbers should increase sequentially, and those digits should also be clearly legible. If not, try using the reverse telecine process again, but without selecting the Standard Upper/Lower checkbox.

Using Reverse Telecine on Source Clips in Final Cut Pro

Final Cut Pro includes a menu command that allows you to perform reverse telecine on the clips selected in the Browser.

It is important to understand that, although Final Cut Pro initiates the reverse telecine process, it is Cinema Tools that actually performs the task. Additionally, you are not presented with the same choices as when using reverse telecine directly in Cinema Tools—the settings that are used for the reverse telecine process using Final Cut Pro are the last settings that were used in Cinema Tools. Therefore, you should always perform reverse telecine on a clip directly in Cinema Tools to verify the proper settings before processing clips using Final Cut Pro.

Important: Performing reverse telecine using Final Cut Pro modifies the original media file—you do not have the option of creating a new media file as you do when using Cinema Tools. You must have read-and-write privileges for the media files.

To use Final Cut Pro to perform reverse telecine on source clips

- 1 In the Final Cut Pro Browser, select the clips you want to process.

Note: Only files using a frame rate of 29.97 fps will be processed.

- 2 Choose Tools > Cinema Tools Reverse Telecine.

Cinema Tools opens and performs the reverse telecine, displaying a dialog that shows the task's progress.

Using Batch Reverse Telecine

If you need to reverse the telecine 3:2 pull-down of several clips, you can use the Batch Reverse Telecine command to process several clips at once.

Note: If your source clips originated from a certain type of DV camcorder that shoots 24p, such as the Panasonic AG-DVX100 camcorder, see [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for more information.

Preparing to Use Batch Reverse Telecine

There are a couple of things you should do before using batch reverse telecine:

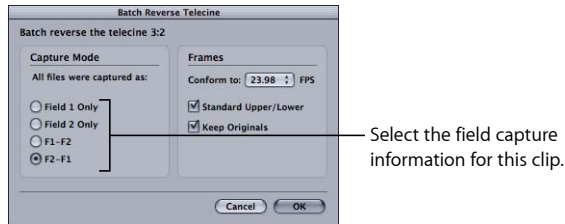
- Before you start a batch reverse telecine process, use the single-clip reverse telecine process on one of your clips and check the results to make sure the settings you plan to use work correctly. See [Using Reverse Telecine on a Single Source Clip in Cinema Tools](#) for instructions.
- If you are working with video that contains two fields, make sure that all your clips have the same field dominance. See [Determining the Field Capture Information](#) for more information. Some digitizing hardware may switch unpredictably between field 1 and field 2 dominance. If you find that some of your clips have one and some have the other, you can separate your clips into two field dominance batches and batch process them separately.

Using Batch Reverse Telecine for Multiple Source Clips

Before you use batch reverse telecine to process multiple source clips, make sure to read [Preparing to Use Batch Reverse Telecine](#).

To use batch reverse telecine

- 1 Place all the clips that you want to process in one folder.
- 2 Choose File > Batch Reverse Telecine.
- 3 In the dialog that appears, select any source clip file in the folder that contains the source clips, then click Choose.
- 4 In the Batch Reverse Telecine dialog that appears, select the capture mode that indicates the correct field capture for the clip:
 - *Field 1 Only*: Select this option if the video contains only field 1.
 - *Field 2 Only*: Select this option if the video contains only field 2.
 - *F1 - F2*: Select this option if the video contains both fields, and field 1 is the dominant field (the first field to appear).
 - *F2 - F1*: Select this option if the video contains both fields, and field 2 is the dominant field.



See [Determining the Field Capture Information](#) for details.

Note: If Cinema Tools finds pull-down information embedded in the source clips, a simpler version of this dialog appears. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for more information.

- 5 From the “Conform to” pop-up menu, choose the frame rate that allows you to maintain or restore audio/video sync:
 - 23.98: This frame rate is useful if you want to later use the Final Cut Pro pull-down feature that lets you output 23.98 fps video as 29.97 fps video. (See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.)
 - 24.0: You may want to conform and edit the clips at this rate if you plan to include them in a project that contains other clips that are exactly 24 fps.

Note: If the audio and video are contained in the same clip, and you choose 24.0 from this pop-up menu, the Reverse Telecine feature increases the audio speed by a very small percentage so that it is in sync with 24 fps instead of 23.98 fps.
- 6 Leave the Standard Upper/Lower checkbox selected.

The Standard Upper/Lower checkbox should be selected unless you find that the batch reverse telecine process does not produce the correct results. See [Checking Your Reverse Telecine Results](#) for more information.

- 7 To save the original clips in a separate folder, leave the Keep Originals checkbox selected. If you don't want to save the original clips, deselect it. (When you deselect the checkbox, the original clips are deleted as each new clip is created.)

Important: You cannot undo a reverse telecine operation. If you do not save the original clips and later find out that one of the settings was incorrect, you will need to recapture the clips to correct the setting and perform reverse telecine on the clips a second time.

- 8 Click OK to start the batch reverse telecine process.

After the process is complete, the following occur:

- For each clip in the folder, a new clip with the same name is created and placed in a Cinema Tools–created subfolder named Reversed.
- If you selected Keep Originals, the original files are placed in a Cinema Tools–created subfolder named Originals.
- If Cinema Tools is unable to complete the reverse telecine process for a clip, that clip is moved into a Cinema Tools–created subfolder named Skipped. A clip is not processed if it doesn't contain a video track, if the frame rate is not supported, or if no codec is found for the video track.
- A text file appears at the top level of the folder you started with, named "reverse.log." This log gives the date and time that the process started and ended, as well as a start time for each clip. If any problems were encountered, such as running out of disk space or memory, an error message describing the problem also appears in the log.

Additionally, you will need to use the Reconnect command to connect the newly created reverse-telecined clips to their records. See [Fixing Broken Clip-to-Database Links](#) for more information.

Using Batch Reverse Telecine a Second Time

If, after performing the batch reverse telecine, you decide you need to change a setting and redo the batch reverse telecine, perform the following steps.

To prepare to use batch reverse telecine a second time

- 1 Move the clips from the Originals folder to their original folder.
Note: If you did not select Keep Originals, you must recapture the original clips.
- 2 If you would like to keep the current reverse telecine versions of the clips while creating the new versions, you need to move them from the Reversed folder to another folder or rename the Reversed folder (for example, to Reversed 1).
You can leave the current files where they are if you would like them to be overwritten.
- 3 Similarly, you need to move or rename the "reverse.log" file if you would like to save it.

- 4 Follow the steps in [Using Batch Reverse Telecine for Multiple Source Clips](#) to perform the batch reverse telecine.

Note: If you connected the original reverse-telecined clips to the database records using the Reconnect command, the new reverse-telecined clips should automatically be connected to the database.

Making Adjustments to Audio Speed

If you need to make audio speed adjustments in order to reestablish synchronization with the video, there are various ways you can do this.

Note: The reverse telecine and conform processes automatically adjust the audio speed in a clip to match changes made to the video frame rate of the same clip.

- You can adjust the speed with the Final Cut Pro Speed command. First, unlink the audio and video clips. Select the audio clip in the Timeline, then choose **Modify > Speed** and enter a new speed percentage. For example, to slow down an audio clip by 0.1 percent, enter “99.9.” Relink the audio and video clips when you have finished modifying the speed of the audio clip.
- Some sound recorders and audio playback equipment can have their playback speed adjusted to sync with the video. When using such equipment, you can capture the audio with the correct speed for synchronization.
- You can use specialized equipment, such as that available from Aaton, designed to control and adjust the audio for proper sync with any video rate. You use this equipment before capturing the audio into your computer.
- If you don’t need the audio speed adjusted for editing, but you do need it adjusted for the finished project, you can have the audio finished at an audio post-production facility that can adjust the speed.

Synchronizing Separately Captured Audio and Video

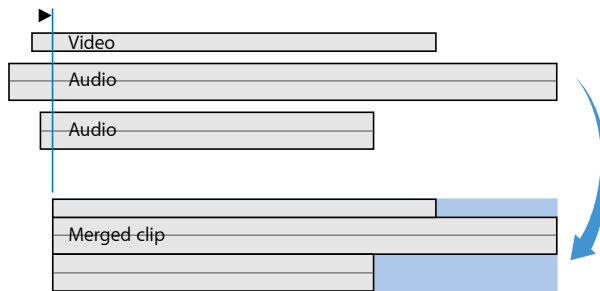
If your sound and picture were not synchronized onto videotape, but were instead captured separately, you can synchronize them in Final Cut Pro.

In Final Cut Pro, a feature called *merged clips* lets you link one or more source media files together so that they become one clip. First you synchronize them, and then you merge them into one clip.

The clapper boards (also called *slates*) in your shots provide the audible and visible cues on which to sync your audio and video clips. There are a couple of different techniques you can use to synchronize clips before merging them, depending on how you shot your footage.

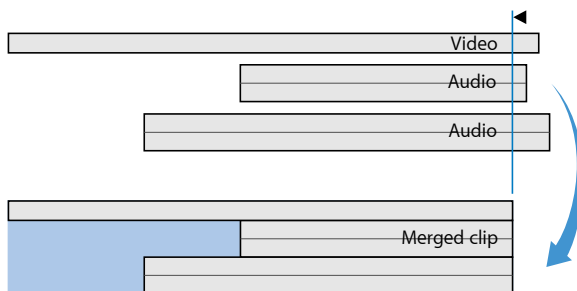
- *If your video and audio clips do not span exactly the same timecode values, and you slated all your shots at the beginning with a clapper board:* You can use In points to line up all the clips you want to merge.

When you do this, the beginning of the resulting merged clip corresponds to the In point you used, and all the clips line up at that point. The end of this merged clip corresponds to the end of the clip with the latest timecode value.



- *If your video and audio clips do not span exactly the same timecode values, and you have one or more shots that you tail-slatted at the end:* You can use Out points to line up all the clips you want to merge.

When you do this, the end of the resulting merged clip corresponds to the Out point you used, and all clips line up at that point. The beginning of this merged clip corresponds to the beginning of the clip with the earliest timecode value.



For details about how to synchronize and merge clips in Final Cut Pro, see the section in the Final Cut Pro documentation that describes working with merged clips.

Dividing or Deleting Sections of Source Clips Before Editing

Before you edit your media in Final Cut Pro, you have the option of further dividing or eliminating parts of source clips. If you used a batch capture list and device control for capturing, you may have captured your source clip files exactly as you want them. On the other hand, you may feel that the captured source clips need to be broken down into individual takes, or you may want to eliminate some of the content you captured before you begin editing in order to make efficient use of available disk space.

Strategies for Breaking Down Source Clips Before Editing

Before you begin, if the edge code number-to-timecode relationship is *not* continuous throughout the camera roll from which a source clip came, be aware that there are a couple of important things you need to do after you break down source clips:

- Create a new database record for the new source clip that is created when you break down a clip, and make sure the new source clip is connected to the database record.
- Update the clip's database record so that the edge code number information is correct for the clip's new first frame. (This is necessary only if you delete material from the beginning of a clip.)

Note: See [Is Your Edge Code Number-to-Timecode Relationship Continuous or Noncontinuous?](#) for more information.

There are a variety of ways to break down source clips before editing:

- An easy way to break source clip files into smaller source clips is to use Final Cut Pro. First, make one or more subclips from the clip in the Browser. You can then use the Media Manager to delete any part of the clip that you did not select as a subclip. See the section about creating and working with subclips in the Final Cut Pro documentation for more information.
- Another way to select and save portions of a clip is to use QuickTime Pro. If you use QuickTime Pro for this purpose, make sure to choose "Make movie self-contained" in the "Save as" dialog. See [The Difference Between Self-Contained and Reference Media Files](#) for more information.
- If you are using hole-punched or otherwise marked frames (rather than window burn) to identify the key numbers for each of your source clips, make sure you do not trim off any of the marked frames.
- If the telecine transfer involved the 3:2 pull-down method, it's a good idea to start each source clip on an A frame. After the 3:2 pull-down, A frames are the only film frames that are not divided into two video frames. Because of this and because the A frame is the start of the video five-frame pattern, it is preferable to have one as the first frame in all video clips. See [About A Frames](#) for more information.

The Difference Between Self-Contained and Reference Media Files

There are two basic video and audio file types that you need to be aware of, especially if you are breaking a large media file into smaller ones using QuickTime Pro. Because video files tend to be large, the type of media file you create can have a large impact on your hard disk space.

- *Self-contained media files:* A self-contained media file is complete; you can delete the original file and its duplicate will still play on its own. For that reason, self-contained media files are typically large files. It's a good idea to save your media as self-contained if you intend not to use large portions of the original, and then you can delete the original once you have saved the bits you want.
- *Reference media files:* A reference media file is a file with dependencies on the original media file. Reference files do not contain any actual media content—they contain only pointers to a specific part of the original media file. The files for these clips are small. If you delete, move, or rename the original media file, any files that refer to it will no longer play, because they cannot locate the original.

One way to tell if a media file is self-contained or reference is to open it in the Cinema Tools Clip window and click the Analysis button. The Analysis pane displays this information. Another way to tell is to look at its file size—media files with dependencies have small (20 kilobyte or so) file sizes, whereas self-contained media files, even short ones, can have file sizes up to hundreds of megabytes or more.

Deleting a Source Clip File

To eliminate an unwanted source clip file before you start editing, drag the clip to the Trash. Then, if there is a record for that clip in the Cinema Tools database, delete that database record. Refer to [Deleting a Database Record](#) for more information.

Once your source clips have been captured and prepared, you can edit them in Final Cut Pro. However, there are a number of issues to consider before you begin editing material that originated on film.

This chapter covers the following:

- About Easy Setups and Setting the Editing Timebase (p. 143)
- Working with 25 fps Video Conformed to 24 fps (p. 144)
- Displaying Film Information in Final Cut Pro (p. 146)
- Opening Final Cut Pro Clips in Cinema Tools (p. 150)
- Restrictions for Using Multiple Tracks (p. 150)
- Using Effects, Filters, and Transitions (p. 151)
- Tracking Duplicate Uses of Source Material (p. 157)
- Ensuring Cut List Accuracy with 3:2 Pull-Down or 24 & 1 Video (p. 158)

About Easy Setups and Setting the Editing Timebase

Cinema Tools installs Easy Setups that were created to make setting up Final Cut Pro convenient for Cinema Tools users. When you select an Easy Setup in Final Cut Pro, your sequence presets, capture presets, device control presets, and external video presets are all set for you so that you don't have to select them individually. Cinema Tools users may want to take advantage of these Easy Setups:

- *23.98fps from DV PAL*: Choose this Easy Setup to capture PAL video and to set the editing timebase to 23.98 fps. This option assumes you will conform the captured video to 23.98 fps.
- *24fps from DV PAL*: Choose this option to capture PAL video and to set the editing timebase to 24 fps. This option assumes you will conform the captured video to 24 fps.
- *23.98fps from DV NTSC*: Choose this option to capture NTSC video (in the non-drop frame timecode format) and to set the editing timebase to 23.98 fps. This option assumes you will reverse telecine the captured video to 23.98 fps.

- *24fps from DV NTSC*: Choose this option to capture NTSC video (in the non-drop frame timecode format) and to set the editing timebase to 24 fps. This option assumes you will reverse telecine the captured video to 24 fps.
- *DV NTSC NDF*: Choose this option to capture NTSC video (in the non-drop frame timecode format) and to set the editing timebase to 29.97 fps. This option assumes you will not perform reverse telecine on the captured video.
- *DV PAL 24 @ 25*: Choose this option to capture PAL video and set the editing timebase to 24 fps, but use 25 fps timecode. This option assumes you will conform the 25 fps video to 24 fps.

Refer to the Final Cut Pro documentation for details about accessing and working with Easy Setups.

Important: If you don't use an Easy Setup, you still need to set the editing timebase, before you begin editing, to the frame rate of your source clips. This ensures that new sequences you create in Final Cut Pro are set for the frame rate at which you want to edit. See the Final Cut Pro documentation for details about setting the editing timebase in the Sequence Preset Editor.

All Easy Setups designed specifically for Cinema Tools users, except for “DV PAL 24 @ 25,” have the name *Cinema Tools* in the title. For example, “Cinema Tools - 23.98fps from DV NTSC.”

By default, the Easy Setups for Cinema Tools users do not appear in the pop-up menu in the Choose Setup dialog. To see all the Easy Setups in the pop-up menu, including the ones for Cinema Tools, select the Show All checkbox in the dialog.

Or, to add specific Easy Setups to the pop-up menu, you can add an asterisk (*) to the end of the Easy Setup filename. For example, you would edit the “Cinema Tools - 23.98fps from DV NTSC” filename to look like this: “Cinema Tools - 23.98fps from DV NTSC*.”

The Easy Setup files are found in the following location: /Library/Application Support/Final Cut Pro System Support/Custom Settings/.

Working with 25 fps Video Conformed to 24 fps

The most commonly used method for transferring 24 fps film to PAL video is the 24 @ 25 method (described in *24 @ 25 Method*). Because this method requires the film to play 4 percent faster, you might have audio sync issues—at the least the onscreen action will be sped up.

To help with the audio sync issues, you can use the Conform feature to slow the video back down to its original 24 fps rate. Because the conform process does not alter the 25 fps timecode created during the film transfer, you have the option of retaining that timecode format while you edit in a 24 fps editing timebase. This can be useful for those situations where your negative cutter prefers to receive a 25 fps EDL instead of a film cut list for film match-back.

See [Using the Conform Feature](#) for more information about conforming video.

About the Timecode

When you conform 25 fps video to 24 fps, the clip's timecode rate is defined as 24 @ 25.

Note: Because the timebase and playback are based on 24 fps, the 25 fps timecode no longer accurately represents the true passage of time. For example, 38 seconds of video will actually take 40 seconds to play.

You can see the timecode rate for a clip in the Item Properties window.

To verify a clip's timecode rate

- 1 In the Browser, select the clip to be verified.
- 2 Do one of the following to open the Item Properties window:
 - Choose Edit > Item Properties > Logging Info.
 - Control-click the clip, then choose Item Properties > Logging Info from the shortcut menu.

Clips that have been conformed from 25 fps to 24 fps display "24 @ 25" in the TC Rate row.

About the Sequence Presets

There are two sequence presets designed for 24 fps PAL video:

- *DV PAL 48 kHz - 24 @ 25:* This preset uses a 24 fps editing timebase and 25 fps timecode for both the source and record In and Out points, retaining the original source 25 fps timecode. The DV PAL 24 @ 25 Easy Setup uses this sequence preset. When you export an EDL, it will be based on 25 fps timecode values. This should be used when you intend to export a 25 fps EDL and not a cut list.
- *DV PAL 48 kHz - 24:* This preset uses a 24 fps editing timebase and 24 fps timecode for both the source and record In and Out points, replacing the original source 25 fps timecode. This should be used when you intend to export a cut list.

Displaying Film Information in Final Cut Pro

You can display a variety of film-related information while editing the film's clips in Final Cut Pro. There are four areas you can control:

- *Item Properties window:* The Film tab of the Item Properties window lists the film-related information for a clip. See [Showing Film-Related Information in Item Properties](#) for details.
- *Browser:* You can add columns that show film-related information such as key numbers and telecine film speed (TK Speed). This information also appears in the Item Properties window. See [Showing Film-Related Information in the Browser](#) for details.
- *Viewer and Canvas:* You can choose to include the keycode and ink numbers with the timecode values in the overlay. See [Showing Film-Related Overlays in the Viewer and Canvas](#) for more information.
- *Timeline, Viewer, and Canvas:* You can choose to show the frame count in a “feet and frames” mode. See [Showing Film-Based Frame Counts](#) for more information.

To show film-related information in Final Cut Pro, you must first import the information from Cinema Tools. There are three ways to do this:

- When you import an XML batch capture list exported from Cinema Tools, the film-related information is also imported. See [Using XML Batch Capture Lists](#) for more information.
- Use Final Cut Pro to import a telecine log file. This adds any film-related information contained in the log file to the offline clips. See [Importing Telecine Logs Using Final Cut Pro](#) for more information.
- Use the Synchronize with Cinema Tools command, described in the next section, [Synchronizing Final Cut Pro Clips with Cinema Tools](#).

Important: You do not need to import or show film-related information in Final Cut Pro to export film lists.

Synchronizing Final Cut Pro Clips with Cinema Tools

You cannot manually update a clip's film information in Final Cut Pro—the information must be imported from a Cinema Tools database. Final Cut Pro includes the ability to synchronize one or more selected clips with a Cinema Tools database. This is especially useful when you have imported a telecine log and captured the clips: synchronizing the clips with their database automatically connects the clips to their records. You can also create a new database, which adds the information for each clip to its record.

Tip: Creating a new database from a group of clips that are already part of another database allows you to create specialized databases from Final Cut Pro. All of the film-related information that the clips already contain is automatically added to their records in the new database.

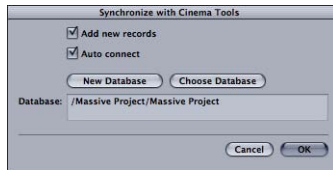
To synchronize Final Cut Pro clips with a Cinema Tools database

- 1 In the Final Cut Pro Browser, select the clips that you want to synchronize with a Cinema Tools database.

These can be clips that are already in the database and need their information updated, or they can be clips that are not in the database. In that case, a new record is added to the database for each clip, with any applicable information added to each record.

- 2 Choose Tools > Synchronize with Cinema Tools.

A dialog appears that allows you to configure the synchronization process.



The Database field shows the currently selected database.

- 3 Select the “Add new records” checkbox if you want the database to automatically have new records added for selected clips that are not already in the database.

This option must be selected when you are synchronizing with a new database.

- 4 Select the “Auto connect” checkbox if you want the database to automatically connect the clips to any new records that are created in the database.

- 5 Do one of the following:

- *If the database shown in the Database field is the correct one:* Click OK. (The Database field is updated if you use the New Database or Choose Database button.)
- *To create a new Cinema Tools database:* Click New Database. This opens a dialog that allows you to enter a name and location for the database, as well as configure its default settings. See [Settings in the New Database Dialog](#) for information about these settings. Click Save when finished.



- *To choose an existing database:* Click Choose Database. This opens a dialog that allows you to select an existing database to synchronize with. Click Open when finished.
- 6 If you used either the New Database or Choose Database button, click OK.

The selected clips are synchronized with the selected database.

Showing Film-Related Information in Item Properties

The Film tab of the Item Properties window contains the film-related information for each clip.

To see film-related information in the Item Properties window

- 1 Select the clip in the Browser.
- 2 Do one of the following:
 - Choose Edit > Item Properties > Film.
 - Control-click the clip, then choose Item Properties > Film from the shortcut menu.
 - Press Command-9 to open the Item Properties window, then click the Film tab.

Note: Comments added to a record in Cinema Tools or a record in a telecine log file appear in the Take Note row.

Showing Film-Related Information in the Browser

You can add columns to the Browser to show the specific film-related information you require.

To add columns to the Browser

- Control-click the heading for the column before which you want to insert the new column, then choose the column to add from the shortcut menu.

See the Final Cut Pro documentation for more information about arranging columns in the Browser.

Note: Comments added to a record in Cinema Tools or a record in a telecine log file appear in the Take Note column.

Showing Film-Related Overlays in the Viewer and Canvas

You can configure the Viewer and Canvas overlays to show a clip's keycode and ink numbers in addition to the timecode.

To show film-related overlays in the Viewer and Canvas

- 1 Click in the Viewer or Canvas to make it active.
- 2 Choose View > Show Overlays (or press Option-Control-W).

- 3 To configure the overlay, choose View > Timecode Overlays to see a list of items you can display. Click an item to either display or hide it. (Checkmarks appear next to items that are shown.)

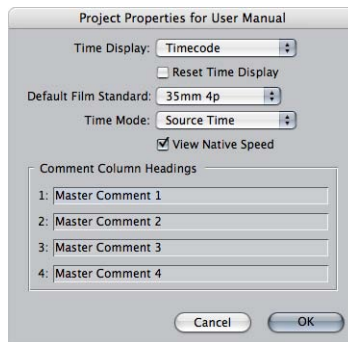
Showing Film-Based Frame Counts

You can set a project's timecode display format to a Feet+Frame mode, giving film editors a more familiar way to judge project length. This setting affects the time display along the top of the Timeline, as well as the timecode fields along the top of the Viewer and Canvas.

To set a project to display the Feet+Frame mode

- 1 Select the project's tab in the Browser.
- 2 Choose Edit > Project Properties.

The Project Properties window appears.



- 3 Choose Feet+Frame from the Time Display pop-up menu.
- 4 Choose the film standard from the Default Film Standard pop-up menu. The film standard defines how many frames are in a foot.

Important: To ensure that correct film lists are exported, make sure to choose the film standard set in the Cinema Tools database.

See the Final Cut Pro documentation for more information about the Project Properties window.

You can also individually control the timecode display of the Timeline, Viewer, and Canvas.

To change the timecode display of the Timeline, Viewer, or Canvas

- Control-click a timecode field in the window whose timecode display you want to change, then choose the mode from the shortcut menu.

For the Viewer and Canvas, this affects both timecode fields along their tops, and in the case of the Viewer, the timecode fields of its tabs. For the Timeline, this affects the timecode shown along the top of the window and in the Current Timecode field. The timecode displays in the Transition Editor and Trim Edit windows are also affected.

Important: The feet and frame values that are shown are not the same as keycode or ink numbers. The feet and frame values always start at 0000+00 at the beginning of the sequence or clip.

When using the Feet+Frame timecode display mode, you can enter values in the same places you can enter timecode values. For example, you can enter a value in the Current Timecode field of the Viewer to position its playhead. To ensure the number you enter is correctly interpreted by Final Cut Pro, make sure to use one of the following characters to separate the feet and frame values: plus sign (+), ampersand (&), period (.), or comma (,).

Opening Final Cut Pro Clips in Cinema Tools

You cannot directly change any items in a Cinema Tools database while in Final Cut Pro. However, you can open a clip in Cinema Tools from Final Cut Pro to make changes to that clip's database record. Once you have done this, you need to synchronize that clip so that the changes appear in Final Cut Pro.

To open a clip in Cinema Tools from Final Cut Pro

- 1 Select a clip or a group of clips in the Browser.
- 2 Choose View > Open in Cinema Tools.

The clip opens in a Cinema Tools Clip window. If you selected multiple clips, each opens in its own Clip window. Any changes you make, such as to a camera roll number, are added to the clip's database record.

After you have finished making the changes, you can synchronize the clips in Final Cut Pro with the modified Cinema Tools database. See [Synchronizing Final Cut Pro Clips with Cinema Tools](#) for more information.

Restrictions for Using Multiple Tracks

Final Cut Pro allows you to edit in multiple video tracks and multiple audio tracks. Although there are advantages to using numerous tracks, there are some restrictions to keep in mind when you are using Final Cut Pro with Cinema Tools:

- When you export your film lists, you specify the video track to base the list on. If you have included titles and superimposed images on a second video track, you must export a second film list to include that information.

- If you are going to export an audio Edit Decision List (EDL), you need to limit the audio to the first eight tracks in the Final Cut Pro Timeline. See [Exporting an Audio EDL](#) for more information.

Using Effects, Filters, and Transitions

Final Cut Pro and other Final Cut Studio applications provide extensive effects capabilities for video, including common film effects such as dissolves, wipes, motion effects, titles, color correction, and compositing. If your final output uses standard broadcast SD or HD resolutions, these effects can often be included directly in the final output. However, if your output is going to be higher-resolution video for digital projection (such as a 2K DPX image sequence), if the output will be converted to film using a digital film printer, or if you intend to conform the original camera negative, these effects will generally be used only to preview the final effect, which will be created at a visual effects facility.

Effects and transitions are usually created for digitally edited film in the following ways (because of the changing and diverse nature of the industry, your actual experience may vary):

- *Basic transitions, titles, and motion effects for DI workflows:* These effects are typically re-created by a digital visual effects facility. The facility uses a Cinema Tools–generated film list to either pull the already scanned DPX image sequences for the required video or have high-quality scans of the original film made, providing final-resolution video clips to work with. See [Special Considerations for Effects in a DI Workflow](#) for more information.
- *Basic transitions, titles, and motion effects for film workflows:* These effects are typically re-created by a facility specializing in optical or contact printing, which uses the instructions given in a Cinema Tools–generated film list. Certain types of transitions can be created through contact printing (sometimes called *A/B roll printing*), where the emulsion sides of the original camera negative and the print stock are in contact as the original film is projected onto the print stock. Transitions, titles, and motion effects can be made through optical printing, where effects are created via a process of manipulating and projecting the original camera negative onto print stock through the lens on an optical printer. This process is often called *creating opticals*. See [Contact Printing vs. Optical Printing](#) for more information about factors to consider when choosing whether to use optical printing or contact printing.
- *Complex effects that involve compositing for all workflows:* Effects such as chroma-keying, animation, and repositioning can be re-created digitally at high resolution at a digital visual effects facility.

If you are using a DI workflow that uses low-bandwidth versions of the program's clips, draft versions of the effects are made and edited into the program, replacing the temporary placeholder effects (if present). The original high-resolution effects are used during the finishing process.

If you are using a traditional film workflow, the effects must be output back to film using a digital film recorder. This is sometimes called the *film-digital-film* method. First, the original camera negative is scanned digitally; then the scanned digital copy is imported into a digital film workstation, and your special effects are created there before being recorded back to film. There are digital effects labs that offer this service, using your film list as a guide in determining the location and duration of motion effects and of superimposed compositing effects such as blue-screen effects. Although the film-digital-film method can produce wonderful effects, be aware that it can be more expensive than optical printing.

- *Effects involving filters and color correction:* Digital film restoration and artifact removal are other types of digital manipulation that commonly occur with the film-digital-film method. This kind of digital manipulation is tracked by the filter effects list, which is part of the optical list.

In a DI workflow, you can use Color to perform many of these types of digital manipulation. Color is capable of outputting DPX image sequences, which can be used to print back to film. In a film workflow, any color correction or filterlike effects in your finished film are created by a specialist at a film-printing facility or via the film-digital-film method. You can work directly with a color specialist (often known as a *color timer*) to include color correction in your film.

Special Considerations for Effects in a DI Workflow

There are a wide variety of approaches to working with effects when you are using a DI workflow. There are also an increasing number of third-party applications available that specialize in the various aspects of the process, such as tracking effect revisions.

Following is a list of issues that you need to be aware of while working on your project:

- If you have not already created high-quality film scans of the parts of the video involved in the effect, you must do that first. You can use the optical list section of a film list to identify the film rolls and frames that need to be pulled and scanned. There are many methods you can use to generate that film list—for example, you can place all effects in their own track and specify that track when exporting the film list.
- The digital visual effects facility generally provides the final effects using your final output video format and resolution. Make sure to retain all original metadata such as key numbers and timecode so the effects can be tracked back to the original film frames. Otherwise you must manually verify that the correct frames were used to create the effects, which can be time-consuming.
- You need to create temporary versions of the effects to use in your offline edit of the program. In some cases, the visual effects facility may provide these. If so, make sure the facility knows which codec to use and your sequence settings so that the clips will not have to be reencoded or rendered. These temporary versions of the effects clips also need to have the same timecode as the original video clips.

- The effects clips are often not tracked by the Cinema Tools database.

Including Titles, Supers, and Transitions in a Film Workflow

The following workflow shows you how effects, supers (superimposed images or frames), and transitions might be added to a film that is edited in Final Cut Pro. This is a very basic workflow, containing steps for including both opticals and contact-printed effects in your film, though you may have only one or the other.

Important: With the fast-changing, diverse nature of the industry, your best workflow option may be different from the workflow described here. Make sure you consult your lab for the most accurate instructions and options for your unique situation.

Stage 1: Confirming Support and Needs with the Lab

Depending on your budget, before you edit you should check with the lab (the optical house or other facility that will print your effects) to find out what it can offer. Often the lab has standard effects for you to choose from—custom effects may cost substantially more or not be available at all. The lab can also educate you about exactly what you need to provide.

Stage 2: Creating Effects and Transitions in Final Cut Pro

It's helpful to experiment with styles and durations in Final Cut Pro. That way you'll be confident in communicating what you need to your lab.

Because you can export a separate cut list for each video track, you can add titles and superimposed images to multiple video tracks—for example, as alternative versions—and choose which to include in the exported film list.

Stage 3: Exporting a Film List

When you've finished editing your program, export a film list. See [An Introduction to Film Lists and Change Lists](#) for more information. The film list can contain a number of different types of lists. The optical list includes descriptions of transition, filter, and motion effects. You will also need to export a film list for each video track that contains titles or superimposed images. If you are going to have all of your transitions contact printed instead of having opticals created, choose "All are cuts" from the Transitions pop-up menu. See [Dividing Transitions Between a Contact and Optical Printer](#) for related information.

Stage 4: (Optical Printing) Giving the Film List and Any Appropriate Footage to the Lab

If you are having effects and transitions created as opticals, your lab uses the specifications and descriptions in your film list as a guide for creating the opticals. The lab needs relevant film footage from which to create the opticals. The optical lab may want you to provide interpositives, or the lab may print the interpositives. The lab may also request a videotape of your movie to use as a reference. If you've made a workprint, you can provide it to the lab as a reference, or you can give the lab a color copy ("dupe") of the parts of the workprint that contain the opticals. Discuss the options with your lab. See [About Interpositives](#) for more information about working with interpositives.

Stage 5: (Optical Printing) Adding the Opticals to Your Project

Transfer the opticals using a telecine, add them to the database, capture them into your sequence, and export a cut list.

If you are having opticals created for your film, this step is ideal because it provides a cut list that most accurately documents the opticals, and because it allows you to preview the opticals in your sequence and see if you like the way they work.

Alternatively, if you have a workprint, the negative cutter may be able to use it as a guide for cutting the opticals into your film so that you don't need to transfer them to video and create a new cut list. Make sure to check with your negative cutter to find out what is required.

Stage 6: (Optical Printing) Giving the Optical Negative to the Negative Cutter

Assuming you have screened the opticals and are happy with them, give the optical negative, along with the original camera negative and your entire film list, to the negative cutter. With the film list (and the workprint if there is one) as a guide, the negative cutter cuts and splices the effects into your film.

Stage 7: (Contact Printing) Giving the Film List to the Contact Printer

When the conformed negative is ready to be printed by the contact printer, make sure the contact printer is given a film list that includes information about your titles and supers and any transitions you want printed into the film.

Note: The negative cutter makes a list of printer cues, including transition needs, and this list is given to the printer with the cut original camera negative.

About Interpositives

Because the original footage is negative, the whole film must be printed from negative images in order to result in a normal, positive film image. This means you want your opticals to be negative when they are spliced into your original camera negative. The optical lab typically uses a low-contrast film print (of the relevant parts of the original camera negative) called an *interpositive* as the raw source footage from which to assemble the opticals. After the opticals are assembled from the interpositive, they are printed as optical negatives that can be spliced into the original camera negative.

Usually, before the final interpositive is created, one or more trial prints are made with the guidance of a color specialist to find the proper combination of exposure and color balance.

Note: In some cases, when opticals need a very stable image (as with images behind text), a *registration interpositive* is required. Registration interpositive printing minimizes unwanted lateral film motion in the optical printer gate. The optical lab will tell you when a registration interpositive is needed.

Contact Printing vs. Optical Printing

Choosing between contact printing and optical printing depends on several factors. The good news is you can have some effects created one way and others another way. Here are factors you may want to weigh:

- *Saving original footage:* Contact printing requires the original camera negative to be cut and spliced. Optical printing essentially results in a new negative being made, so the original footage can be used again elsewhere.
- *Previewing:* If your transitions are printed on a contact printer, you don't have the option of seeing the finished transitions before the negative is cut, but if they are printed optically, you do. After they are printed, transitions and motion effects may not appear exactly as they did within your digital editing system. If you want to know exactly how a transition is going to appear in the finished film, have it made optically before finalizing the cut. Then, transfer the optical to video. You can edit the transferred optical into your digital program to see how it will look.
- *Cost:* If you have standard-length transitions and there are a lot of them, it will probably cost less to have them printed on a contact printer.

Although optical printing has the advantage of resulting in a new negative being made that you can edit into your digital program to see how it looks and include in your cut list, the optical's negative must first be transferred to video at an additional cost.

It's a good idea to compare quotes for having your transitions printed in different ways.

- *Length:* Contact printing requires that the length of the transition be one of a set of standard lengths, whereas optical printing does not. Cinema Tools identifies the set of standard lengths for 24 fps or 23.98 fps media as 16, 24, 32, 48, 64, and 96 frames in duration. Cinema Tools identifies the set of standard lengths for 29.97 fps media as 20, 30, 40, 60, 80, and 120 frames in duration. (Make sure to check with your contact printer about the standard lengths required for different frame rates.)

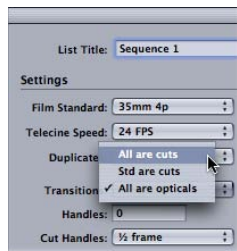
Comparing Quotes

To get quotes to compare costs of contact and optical printing, you need to export two versions of the film list.

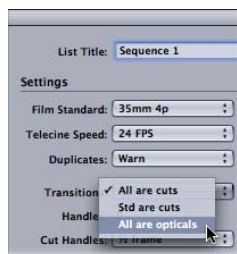
To export different film lists to give to the printers for quotes

- 1 In the Export Film Lists dialog, choose “All are cuts” from the Transitions pop-up menu to export a film list for a contact printing quote.

Note: See [An Introduction to Film Lists and Change Lists](#) for details about the Export Film Lists dialog.



- 2 After exporting that list, choose “All are opticals” from the Transitions pop-up menu to export a film list for an optical printing quote.



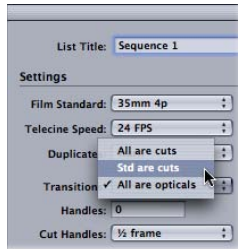
Dividing Transitions Between a Contact and Optical Printer

You can have standard-length transitions created by a contact printer and the rest of the transitions created as opticals.

You do this by exporting a film list in which standard-length transitions are listed as cuts for printing on a contact printer, and nonstandard-length transitions are listed as opticals.

To export a film list supporting both contact and optical printing

- In the Export Film Lists dialog, choose “Std are cuts” from the Transitions pop-up menu.



See [Exporting Film Lists Using Final Cut Pro](#) for more information about generating a film list.

Tracking Duplicate Uses of Source Material

Cinema Tools makes it possible to track multiple uses of the same source material in your edited sequence. There are two basic reasons to do this:

- *If you want to use the same source material more than once in your project:* You can export a duplicate (“dupe”) list and give it to your lab as a part of a duplicate negative order.
- *If you don’t want to spend the money required to create a duplicate negative:* You need to be careful not to edit in a way that uses the same source material more than once because there is only one original camera negative. When editing digitally, it’s so easy to use the same material twice that you may not even realize that you’ve done it, but Cinema Tools lets you check for duplicate usages on a regular basis.

In determining whether or not any frames have been used more than once, Cinema Tools assumes that, because of typical A and B roll film splicing (also called *checkerboarding*), at least one-half of a frame will be lost at both the In point and the Out point of each cut of film. In Cinema Tools, these frames are called *cut handles*. Some negative cutters may want to use more than a half-frame on each side of a cut. In the Export Film Lists dialog, you can specify up to five and one-half frames of cut handles. If you inadvertently include, in a sequence, frames that are needed as cut handles, Cinema Tools reports them as duplicate usages in the duplicate list and the double usage warnings.

It’s important to check for duplicate usages before you lock the picture and prepare to have the original camera negative cut. See [Duplicate List](#) and [Double Usage Warnings](#) to find out how to export a duplicate list and include duplicate usage information in a film list.

If you are editing your project as multiple sequences (for example, one sequence for each reel), it's best to place all the sequences together before exporting a duplicate list. This way Cinema Tools can find duplicate usages across the entire feature. An easy approach is to place all the sequences into a nested sequence before generating a duplicate list.

However, when you intend to export a film list, do not nest part of one sequence into another sequence. Only whole-sequence nesting is supported when you export a Cinema Tools list. See the Final Cut Pro documentation for information about creating a nested sequence.

Ensuring Cut List Accuracy with 3:2 Pull-Down or 24 & 1 Video

With 3:2 pull-down NTSC video or 24 & 1 PAL video (also known as *24 @ 25 pull-down* video in Final Cut Pro), a film frame that is matched back from your edits may turn out to be the one before or the one after your original edit point. (See [Frame Rate Basics](#) for an explanation.)

With 3:2 pull-down NTSC video, you can avoid such match-back inaccuracies by using the Cinema Tools Reverse Telecine feature or third-party reverse telecine hardware to reverse the 3:2 telecine pull-down before you begin editing.

If you did not reverse the 3:2 pull-down in NTSC video (or if you are working with 24 & 1 PAL video), you can still avoid cut list inaccuracies through careful editing. Your goal for each clip is to make sure that the frame showing the slate, or the last frame of the previous shot, doesn't end up in the final film:

- When setting edit points for a clip, be careful not to place the In point at the first good frame in the clip, or the Out point at the last frame. In other words, set the In point at least one frame after your shot starts and the Out point at least one frame before the last frame in the shot.
- If you must edit on the first or last frame of a shot, make a note of the key number from the window burn, and review the cut list later to confirm that the key number is the same in the cut list.
- Avoid putting In or Out points at frames with two fields that came from two different frames of the film. For example, don't place an edit at a BC or CD frame.

Cinema Tools can create a variety of lists from your edited project.

This chapter covers the following:

- An Introduction to Film Lists and Change Lists (p. 159)
- Choosing the List Format (p. 160)
- Lists You Can Export (p. 161)
- Exporting Film Lists Using Final Cut Pro (p. 166)
- Creating Change Lists (p. 174)
- Working with XSL Style Sheets (p. 189)

An Introduction to Film Lists and Change Lists

When you've finished editing and are ready either to have the original camera negative cut or to conform a workprint, it's time to export a film list. Using the information in the database, Cinema Tools translates the edits made in Final Cut Pro into information a negative cutter can use as a guide. This information is provided in the form of a cut list. A number of other lists that are useful for film can be exported with the cut list. All of these lists, including the cut list, are called *film lists*.

One film list file can contain several related lists, including any of the following:

- *Cut list*: A list of edits and titling information (also known as an *assemble list*)
- *Missing elements list*: A list of any required information that could not be found in the database
- *Duplicate list*: A list of duplicate usages of the same source material
- *Optical list*: A list for the effects printer, describing any transition, filter, and motion effects
- *Pull list*: A list to aid the lab in pulling the required negative rolls
- *Scene list*: A list of all the scenes used in your program and the shots used in the opticals

You can generate another type of list, called a *change list*, after an initial cut list has been created or when you want to compare two XML versions of a Final Cut Pro sequence. In a film workflow, the change list assumes a workprint has been cut to the specifications of a cut list (or prior change list) and specifies further changes to make to the workprint, based on edits you have made to the sequence in Final Cut Pro. See [Creating Change Lists](#) for more information.

Choosing the List Format

Cinema Tools provides three format options for exporting your lists:

- *PDF file*: A format for easy viewing that contains only the information that you specify
- *XML file*: A format for use with other software that contains all of the film information from the sequence
- *Style sheet–based file*: A format controlled by a style sheet that you choose. You can use the style sheets provided by Cinema Tools, including a plain text style sheet.

See [Exporting Film Lists Using Final Cut Pro](#) for information about creating film lists using Final Cut Pro and [Creating EDL-Based and XML-Based Film Lists](#) for information about creating film lists using Cinema Tools.

About PDF-Format Film Lists

Exporting a PDF-format film list creates a file that can be opened in Preview or any other PDF viewer. You can choose which items to include in the list and even set their order.

Tip: Although you cannot directly edit the text in a PDF file when viewing it with Preview, you can use the Preview annotation tool to add comments. See [Preview Help](#) for more information.

About XML-Format Film Lists

Exporting an XML-format film list creates a file that contains all film-related information from the Final Cut Pro sequence.

Important: XML-format film lists are not related to the other XML files you can export from Final Cut Pro.

Unlike PDF-format film list files, which are intended to be printed and read, XML-format film list files are formatted so that other applications can reliably extract specific data from the film list. The XML format is intended to be used to exchange information between software applications. The purpose of XML-format film lists is to provide all of the film information about a Final Cut Pro sequence in a format that the user can incorporate into other custom software being used in the film workflow.

Note: You can open an XML-format film list in a text editor, such as TextEdit, to see the structure and information it contains.

See [XML Film List Basics](#) for more information about the contents of XML film lists.

About Style Sheet–Based Film Lists

Cinema Tools includes support for custom film lists. These film lists are based on Extensible Stylesheet Language Transformations (XSLT) files, or, as they are referred to in Cinema Tools, *style sheets*. Cinema Tools includes style sheets and support for custom style sheets that you create.

XSLT-based style sheets are commonly used to extract information from XML files. When you export a style sheet–based film list, Cinema Tools first exports an XML-format film list and then processes that XML output with the selected style sheet, resulting in exactly the output items and layout the style sheet specifies.

The Cinema Tools–supplied style sheet files are located in /Library/Application Support/Final Cut Studio/Cinema Tools/ and all have an .xsl file extension. When you choose Add Style Sheet from the Style Sheet pop-up menu in the Export Film Lists dialog to import a custom style sheet, the style sheet is copied to /Users/username/Library/Application Support/Final Cut Studio/Cinema Tools/.

Note: You can also manually copy your custom style sheets to either of these folders to have them appear in the Style Sheet pop-up menu without having to use Add Style Sheet first.

See [Working with XSL Style Sheets](#) for information about customizing style sheets to better match your workflow.

Lists You Can Export

You can export a number of useful lists by using the Export Film Lists dialog. When you export a film list, one film list file is generated, and that file contains all the lists you selected in the dialog. Any lists that you did not specifically select are not included in the exported film list file.

Note: All of the lists you choose to include in the film list are based on the video track you choose in the Track pop-up menu. You can select a different track and export a second list if needed. For example, if your sequence contains titles (including any “supers”—superimposed images or frames) on video track 2, you can export a second film list that includes the edit information for them. This makes it possible for you to configure alternative title tracks and export film lists for each version.

Cut List

The first list you can select to export is the cut list. The cut list you export from Final Cut Pro is the list that contains the instructions for cutting the original camera negative or workprint to match the digitally edited program. Cut lists are also known as *assemble lists*.

Missing Elements List

The missing elements list lists all of the clips in a sequence for which a corresponding database record either was not found or did not contain all of the necessary information. It is important that you export and examine a missing elements list to make sure that there are no elements missing before the negative cutter begins conforming the negative.

For each clip listed in the missing elements list, the element that is missing is specified. The shot number where that clip appears in the cut list is called out on a separate line.

If any of the following are missing, they are listed in the missing elements list:

- Lab, camera, or daily roll
- Key number or ink number

Additionally, each source clip must be connected to a record, unless you can use the timecode-based method for cut list generation (see [A Potential Database Shortcut for Camera-Roll Transfers](#)). To use the timecode-based method for cut list generation, each record must also include these elements:

- Video reel
- Timecode and duration

Resolving Missing Elements

Resolving a missing element means finding the corresponding database record, if it exists, and filling in the missing information, or creating a new database record if none exists. To locate the database record, there are two basic approaches.

If the Name of the Clip Is in the Missing Elements List

You can use the clip name to look for the clip in the List View window. In the List View window, click Clip to sort the records by clip name. Or, if the clip name includes its scene identifier, you can use the Find command to search for the clip by the scene identifier. If no database record is found for the clip, create one and connect the clip to it. Use the Identify feature in the Clip window to enter the required information.

If the Video Reel and Timecode Appear in the Missing Elements List

You can use the video reel and timecode information to look for an existing database record for the clip. In the List View window, choose Video from the pop-up menu at the top of the window. Click Reel or Timecode to sort the records by the video reel or timecode. Look for the missing video reel or timecode value (or a similar timecode value). Keep in mind that the timecode value given in the missing elements list is not likely to match the database record exactly because the timecode value in the database corresponds to the first frame of the clip. You know it's a match if the timecode value in the missing elements list occurs before the end of the timecode duration specified in the database record.

Note: Remember that the video reel name must appear exactly as it appears in the missing elements list. For example, reel "001" does not match reel "0001."

- *If you find the timecode value, but the video reel name doesn't match the one listed in the missing elements list:* Update the reel name in the database record or change it in Final Cut Pro.
- *If the reel name matches one or more records in the database, but the missing elements list tells you that the database record is missing:* The timecode is incorrect. The best way to resolve this is to create a new database record and connect the source clip to it. Then you can use the Identify feature to determine and enter the edge code and timecode information for the clip. If you create a new database record, delete the incorrect record that the new record replaces. Alternatively, you can update the Video Timecode or the Video Duration field in the database record, but then you also have to update the Key and Ink fields.

Duplicate List and Double Usage Warnings

When editing digitally, it's easy to include a clip or part of a clip more than once in the edited program. When this happens, you either have to create a duplicate negative or reedit the program to remove the duplicate usages, because the footage exists only once on the original camera negative. But first you have to know where the duplicate usages are, and that is the purpose of the duplicate list and double usage warnings.

Duplicate List

The duplicate list is what you give to your lab if you want the lab to pull specific shots from your negative rolls and make duplicate negatives for you. It documents every shot for which there is one or more duplicate usages.

Note: Content that is part of an optical is not counted as a duplicate usage. However, placing a dissolve transition between two clips that have no other source footage available between them (such as two clips that were originally one clip) results in a duplicate usage.

Double Usage Warnings

If you choose Warn from the Duplicates pop-up menu in the Export Film Lists dialog, a warning message appears where duplicate usages occur in the cut list. The message tells you exactly which frames have been used more than once and exactly where in your editing project they are used. All of these messages also appear in a double usage warning list.

Optical List

The optical list serves as a master list for transition, filter, and motion effects. If there is a series of connected transition and motion effects, the optical list combines them and describes them as a single optical. You give the optical list to the optical house to outline how the effects shots are to be assembled.

Note: Titles, which are another kind of optical, use a second video track and are not part of the optical list. You can export a separate cut list for the track that contains the titles.

See [Using Effects, Filters, and Transitions](#) for more information.

An optical list actually consists of up to four separate lists:

- *Optical list:* This list contains an entry for each cut list event that uses an optical effect. Based on the type of optical effect, each entry links to one of the three effects lists (described next) that are also included with the optical list. These effects lists include the actual details of the optical effect.
- *Transition effects list:* This list contains an entry for each optical list entry that contains a transition effect, such as a cross dissolve or wipe. See [Transition Effects List](#) for more information.
- *Filter effects list:* This list contains an entry for each optical list entry that contains a filter effect, such as a blur or color correction. See [Filter Effects List](#) for more information.

- *Motion effects list:* This list contains an entry for each optical list entry that contains a motion effect, such as a time remapping speed change. See [Motion Effects List](#) for more information.

How the List Entries Are Linked

If an optical list entry contains multiple types of effects, such as a transition, a filter, and a motion effect, the optical list entry only links to one of the effects lists.

- *If the optical list entry includes a transition effect:* The optical list entry links to an entry in the transition effects list. If the optical list entry also includes a filter effect, the transition effects list entry links to a filter effects list entry, which links to a motion effects list entry if a motion effect is also included.
- *If the optical list entry contains only a filter and a motion effect:* The entry links to a filter effects list entry, which links to a motion effects list entry.
- *If the optical list entry contains only a motion effect:* The entry links directly to a motion effects list entry.

Each entry in the effects lists includes the original optical list entry number and the original cut list event number the entry applies to, making it easy to relate the different lists to each other.

Transition Effects List

The transition effects list contains information about the fades, dissolves, and other transitions from your edited program. Transitions can be treated as cuts or as opticals, based on what you choose from the Transitions pop-up menu in the Export Film Lists dialog. If you choose to treat all transitions as cuts, the transition effects list is empty, and the transitions are listed as cuts in the cut list.

Filter Effects List

The filter effects list contains information, including the actual filter name and its category, related to any filter effects applied to the sequence.

Motion Effects List

If a shot has a speed other than the normal forward speed of 24 fps, an entry is made in the motion effects list, and the optical list refers to the motion effects list for that shot.

A digital editing system can assign almost any arbitrary speed to a clip to create a motion effect digitally, but neither videotape nor film can perfectly reproduce every speed that the digital editing system can assign. Therefore, be aware that the optical negative that is made is not necessarily going to look exactly the way the motion effect looked in the editing system.

Important: Because of the frame rate changes involved in motion effects, key numbers that are reported in the motion effects list are not guaranteed to be accurate. If you have a window burn of the key numbers, you should check to make sure that the key numbers in the motion effects list are accurate and correct them when necessary.

Pull List

The pull list is the same as the cut list, except that the shots appear in the order in which they can be found on the negative rolls. The lab can refer to the pull list when going through your negative rolls to find the shots that will be cut into the film. Each item in the pull list displays the shot number from the cut list.

Scene List

The scene list lists all of the shots that are used in the cut list, with each shot listed only once. You can use the scene list to order prints of the shots in your program so that you can conform a workprint before the negative is cut.

Optical Scene List

If you select “Optical list” and “Scene list” in the Export Film Lists dialog, an optical scene list is generated along with the scene list. The optical scene list is a list of all the shots used in all the opticals and motion effects, with each shot listed only once. The lab can use this list to pull the footage needed to make the opticals.

Exporting Film Lists Using Final Cut Pro

In most situations you will use Final Cut Pro to export any of the lists described in the previous sections. As long as you have an EDL or XML file based on a Final Cut Pro sequence, you can also export film lists directly from Cinema Tools. See [Creating EDL-Based and XML-Based Film Lists](#) for more information.

In either case, one film list file is generated, and that file contains all the lists you selected in the export dialog.

Exporting the Film Lists

Exporting film list files works similarly for PDF-format, XML-format, and style sheet–based film lists.

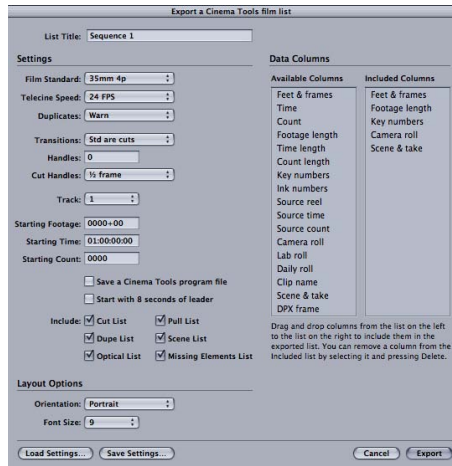
To export a film list file

- 1 In the Final Cut Pro Browser or Timeline, select the sequence for which you want to create a list.
- 2 Choose File > Export > Cinema Tools Film Lists.
A dialog appears so you can choose the format of the list.
- 3 Choose the format of the list from the List Format pop-up menu.

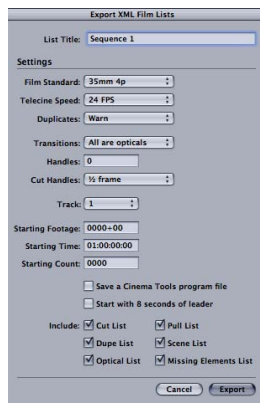
The options are PDF, XML, and With Style Sheet. See [About PDF-Format Film Lists](#), [About XML-Format Film Lists](#), and [About Style Sheet–Based Film Lists](#) for information about these formats.

- 4 If you chose With Style Sheet from the List Format pop-up menu, choose a style sheet from the Style Sheet pop-up menu.
- 5 Click Continue.

The Export Film Lists dialog appears. The settings in the dialog vary based on the format you chose in the List Format pop-up menu. Following is the dialog for the PDF list format.



Following is the dialog for the XML and With Style Sheet list formats.



- 6 Configure the settings in the dialog.
See [Settings the Export Dialogs Have in Common](#) for settings information.

If you expect to make changes to this Final Cut Pro sequence and want to export a change list later, make sure to select “Save a Cinema Tools program file.” You can use that program file to export a change list that compares this version of the sequence to another version.

Note: You can use a Final Cut Pro XML file of the sequence in place of the Cinema Tools program file when you export a change list.

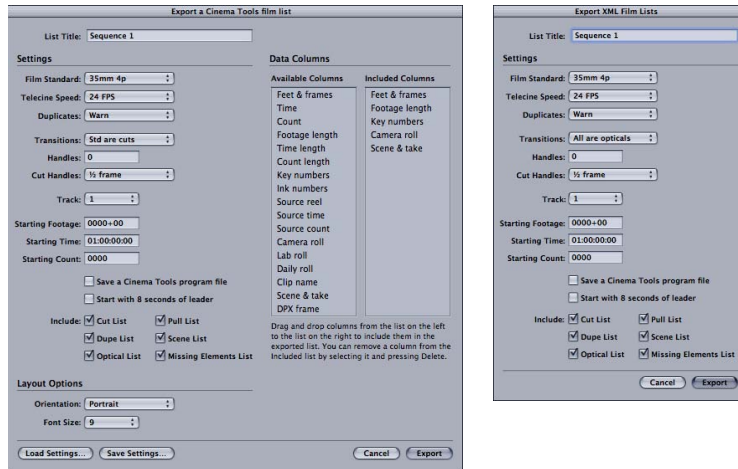
- 7 Click Export.
- 8 If you selected “Save a Cinema Tools program file,” enter a filename and location for the file in the dialog that appears.
Important: Give the program file a name that clearly identifies the sequence and the version, so that you can easily locate it later when you need to export a change list that compares this sequence to a newer version.
- 9 In the next dialog that appears, enter a filename for the film list, choose a location, and click Save.
- 10 In the dialog that appears, select the database file that Cinema Tools should use to produce the lists that you have selected. (Select the database you created for source media used in this sequence.)

A film list is generated as a file that contains all of the lists you have selected. If you exported a PDF-format list, it automatically opens in Preview (or the application you have set as your default for opening PDF files).

After exporting a film list, you should compare the edge code (key numbers or ink numbers) in the film list to the edge code in the window burn at the In point frame of each edit. Although it can be time-consuming to go through all of the edits and compare the edge code numbers, it prevents the loss of time and money caused by incorrect cuts. It’s particularly important to check the edge code numbers if you are not conforming a workprint before cutting your negative.

Settings the Export Dialogs Have in Common

The settings available in the export dialogs vary depending on which output format you choose from the List Format pop-up menu, but all versions have the same basic settings. The dialog that appears when you choose PDF from the List Format pop-up menu contains additional formatting settings. See [PDF Configuration Settings in the Export Film Lists Dialog](#) for more information about configuring PDF film lists.



The export dialogs have these settings in common:

- **List Title:** Enter a name for the film list file you are going to export.
- **Film Standard:** Choose the film standard that matches the type of film you are using. This should be the same as the film standard setting you used when you created the project database. Cinema Tools uses the film standard that you choose here to calculate footage counts in the cut list.
- **Telecine Speed:** Select the speed at which the film was transferred:
 - *If you are working with NTSC video:* You would typically choose 24 fps, though the actual speed of the film in the telecine was approximately 23.98 fps.
 - *If you edited NTSC video that was transferred at 29.97 fps:* Choose 30 fps.
 - *If your film was transferred to video at 24 fps:* Choose 24 fps.
 - *If your film was transferred to video at 25 fps:* Choose 25 fps.
- **Duplicates:** Choose whether you want to be notified when duplicate usage of source material is found. If you choose Warn, a warning message appears in the cut list every time a duplicate usage occurs. The message tells you exactly which frames have been used more than once and exactly where in your editing project they are used. All of these messages also appear in a double usage warning list. If you choose Ignore, these double usage warnings do not appear.

- *Transitions*: Choose how transitions should be listed in the film list. See [Contact Printing vs. Optical Printing](#) for more information.

Note: Cinema Tools identifies the set of standard lengths for 24 fps or 23.98 fps media as 16, 24, 32, 48, 64, and 96 frames in duration. Cinema Tools identifies the set of standard lengths for 29.97 fps media as 20, 30, 40, 60, 80, and 120 frames in duration. (Make sure to check with your contact printer about the standard lengths required for different frame rates.)

There are three choices for how transitions are listed in a film list:

- *All are cuts*: All transitions are represented by a cut in the middle of the transition, regardless of whether or not the transitions are of standard length. Choose this option if you are exporting a list for use in conforming a workprint. Cinema Tools also inserts notes to indicate where the start and end of the transition should be for both the outgoing and incoming clips. These notes can be used as a guide in marking the transitions on the conformed workprint.
- *Std are cuts*: Those transitions that are of standard length are listed as cuts, and those that are of nonstandard length are described as opticals. This is the option that you choose if you're going to have your transitions printed on a contact printer. If you choose this option, standard-length transitions appear in the cut list, not the optical list, and are shown as a cut in the middle of the transition. The starting and ending points of the transition also appear in the cut list as three lines for a dissolve and two lines for a fade. The cut list contains all of the information that the negative cutter requires to prepare the A and B rolls for these transitions.
- *All are opticals*: All clips that are part of a fade or dissolve are listed in the optical list. Choose this option if you want all of your fades and dissolves to be printed optically, regardless of their length.
- *Handles*: Your negative cutter or optical printer may want to have some spare frames on either side of a transition. These extra frames are called *transition handles*. Enter a number between 0 and 32. When checking to see if any frames are used more than once, Cinema Tools adds this number of frames plus one-half to the head of the incoming shot and the tail of the outgoing shot for each transition. (The setting you choose for cut handles does not apply to transitions.)
- *Cut Handles*: In determining whether or not any frames have been used more than once, Cinema Tools assumes that at least one-half of a frame is destroyed at both the In point and the Out point of each cut. Some negative cutters may want to use more than a half-frame on each side of a cut. You can specify up to five and one-half frames of cut handles. If you inadvertently include, in a sequence, frames that are needed as cut handles, Cinema Tools reports them as duplicate usages in the duplicate list and the double usage warnings.
- *Track*: You can choose the video track to base the exported list on.

- *Starting Footage*: Enter a starting number to use for the film list's "Feet & frames" value. The default value is 0000+00.

Following are some tips for how to use the "Starting" entries:

- *If you are generating a cut list for conforming the negative*: You typically want to start at zero.
- *If you are editing your film by scene or by reel*: You may want to enter a starting point in the "Starting" fields that is the same as the ending point of the preceding scene or reel. This field is automatically filled in with the sequence starting point you have set in the Final Cut Pro Timeline.
- *If you want to generate a cut list with timecode so that you can compare events in the list with edits in Final Cut Pro or in the EDL*: Start the cut list at the same timecode value as the Timeline sequence or the EDL start time.
- *Starting Time*: Enter a starting timecode number for the film list's Time value. The default value is the sequence's starting timecode value.
- *Starting Count*: Enter a starting frame count number for the film list's Count value. The default value is 0000.
- *Save a Cinema Tools program file*: A program file can be used if you want to later create a change list for this sequence, reflecting any edits you make after this point.

Note: You can also use a Final Cut Pro XML file for this sequence to create a change list. See [About Exporting Change Lists](#) for more information.

A program file is also needed if you want to export an audio EDL from Cinema Tools. Exporting an audio EDL from Final Cut Pro is more automated and does not require a Cinema Tools program file. See [Exporting an Audio EDL](#) for more information.

- *Start with 8 seconds of leader*: Choose whether or not to start the cut list with 8 seconds of leader. Eight seconds is the standard length of Academy or SMPTE leader. If you select this option, 8 seconds of leader is inserted at the beginning of the cut list. If you have already included a leader clip at the beginning of the sequence, do not select this checkbox. (It's better to use a leader clip in your sequence instead of selecting this option in the cut list because the timecode in the digital sequence will not match the timecode in the cut list unless a leader clip actually exists in the sequence.)

Note: The Extras folder on the Final Cut Studio installation disc contains a folder with head leader clips and a document explaining how to use them.

- *Film list checkboxes*: Select the list types to include in the exported film list.
 - *Cut List*: Select to include a cut list. See [Cut List](#) for more information.
 - *Dupe List*: Select to include a duplicate list. See [Duplicate List and Double Usage Warnings](#) for more information.
 - *Optical List*: Select to include an optical list. See [Optical List](#) for more information.
 - *Pull List*: Select to include a pull list. See [Pull List](#) for more information.

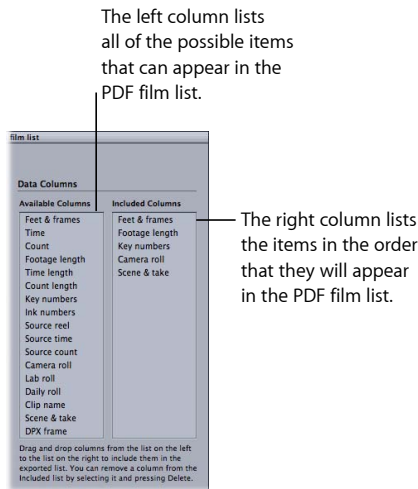
- *Scene List*: Select to include a scene list. See [Scene List](#) for more information.
- *Missing Elements List*: Select to include a missing elements list. See [Missing Elements List](#) for more information.

PDF Configuration Settings in the Export Film Lists Dialog

When exporting a PDF-format film list, you can control which items appear in the list and their order. This allows you to create a film list that includes exactly the information you require.

To add items to the PDF film list

- Drag items from the left column to the right column.



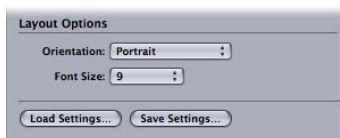
To remove items from the PDF film list

- Select items in the right column and press Delete.

To set the order of the items in the PDF film list

- Drag items up and down in the right column.

The width of the PDF film list is limited, and it is possible to add more items than will actually appear in the list. By using the settings in the Layout Options area of the Export Film Lists dialog, you can customize the PDF page layout and font size so that more selected columns will fit.



To customize the PDF page layout

- 1 Choose Portrait or Landscape from the Orientation pop-up menu.
- 2 Choose a font size from the Font Size pop-up menu.

You can save and load settings files that include the column configuration and the Orientation and Font Size settings. Additionally, most of the other settings in the dialog are also saved as part of the settings file. The exceptions are the Track, Starting Footage, Starting Time, and Starting Count settings.

Being able to save and load settings files for this dialog makes it easy to configure multiple Cinema Tools systems to export lists with the same configuration.

Note: The dialogs you use to export film lists and change lists automatically remember the last settings you used and will use those settings the next time the dialog appears.

To save the current settings

- 1 Click the Save Settings button.
- 2 Enter a filename and location for the settings file in the dialog that appears.
- 3 Click Save.

To load a settings file

- 1 Click the Load Settings button.
- 2 Select the settings file and click Open.

Following is a list of the items you can choose to include in your exported PDF film list.

Item name	PDF name	Shows
Feet & frames	Footage	Running footage count starting with the Starting Footage value
Time	Time	Running timecode starting with the Starting Time value
Count	Count	Running frame count starting with the Starting Count value
Footage length	Length	Length of each event in feet and frames
Time length	Length	Length of each event in timecode
Count length	Length	Length of each event in frames
Key numbers	Prefix and Key	Starting source key number of each event
Ink numbers	Prefix and Ink	Starting source ink number of each event
Source reel	Reel	Source reel number
Source time	Src Time	Starting source timecode value of each event
Source count	Src Count	Starting and ending source frame counts
Camera roll	Cam Roll	Camera roll number

Item name	PDF name	Shows
Lab roll	Lab Roll	Lab roll number
Daily roll	Dly Roll	Daily roll number
Clip name	Clip Name	Source clip name
Scene & take	Scene and Take	Scene and take settings
DPX frame	DPX Frame	Starting and ending frame DPX filenames

Creating Change Lists

A change list reports the differences between two versions of a sequence edited in Final Cut Pro. For film-based projects, the purpose of the change list is to describe the changes that need to be made to the workprint or negative since it was conformed to a prior version of the sequence. For DI projects, change lists are used to let other departments, such as the sound department or closed captioning department, know the details about changes you have made to the sequence.

When you export a change list, you can also choose to include in the change list file a *change pull list*, which lists film rolls in the order in which they need to be pulled to add any new film to the workprint, and a *discard list*, which lists any sections that need to be removed.

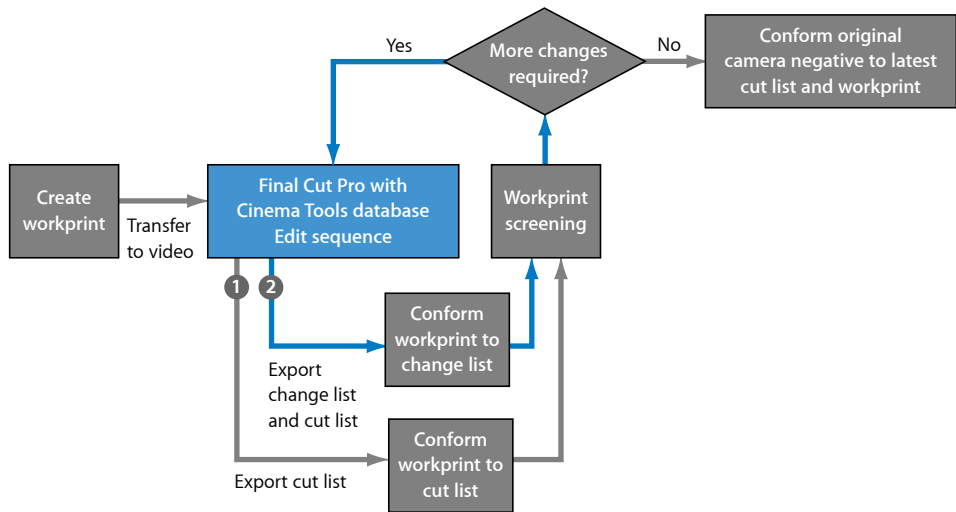
When you export a change list file from Final Cut Pro, you can also export a new cut list (and other standard film lists) for the sequence.

When creating the change list, Cinema Tools uses a variety of methods to match up the original and new edits to generate the change list. Following is a list of the methods in order from most reliable to least reliable:

- Each clip's unique identifier
- The reel number and timecode values
- Keycode (key numbers or ink numbers)
- Clip name

When Are Change Lists Used in a Film Workflow?

Change lists are typically used in a cyclical workflow that involves digital editing, sound conforming, and workprints.



Following is a typical workprint-based change list workflow.

Stage 1: Making a Workprint Video

Make a workprint from the original camera negative, with ink numbers applied to the edge, and make a telecine transfer video of the workprint.

Stage 2: Exporting a Cut List of the Edited Workprint Video

Edit the workprint video in a digital editing system and export a cut list (usually based on ink numbers) to use as a guide to conform the workprint, as well as either a Cinema Tools program file or a Final Cut Pro XML file from the sequence to use when exporting the change list.

Stage 3: Projecting the Cut Workprint

Project the cut workprint for screenings, and make decisions to cut or add to the movie.

Stage 4: Making Changes in the Editing System

Make any changes to the movie in the digital editing system.

Stage 5: Exporting a Change List to Conform the Workprint to the Changes

Export a change list, which provides instructions for modifying the workprint to conform to the new version of the movie.

Stage 6: Conforming the Workprint Using the Change List

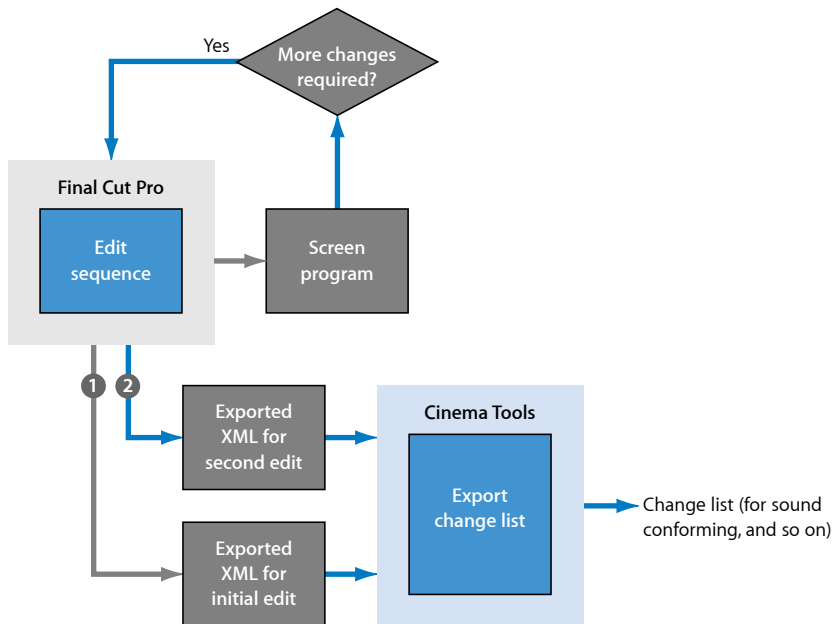
With the change list as a guide, conform the workprint to match the new version of the movie.

Stages 3 through 6 are repeated until it is decided that the picture is locked. Finally, the original camera negative is cut to match the final workprint and cut list.

When Are Change Lists Used in Other Workflows?

Change lists can be used in a variety of other workflows, including those that do not involve film at all. These include digital intermediate, sound conforming, and closed caption workflows—any workflow where you need to know what has changed between two edited versions of a program.

The key to being able to export a change list is to have available either a Final Cut Pro XML file or a Cinema Tools program file that represents the previous version of the sequence. If you export the change list using Final Cut Pro, the file representing the previous sequence version is compared against the current sequence. If you choose to export the change list using Cinema Tools, you will need a second Final Cut Pro XML file or a Cinema Tools program file that represents the current sequence. See [About Exporting Change Lists](#) for details to help you choose how to export your change lists.



Following is a typical workflow for using Final Cut Pro XML files to export a change list for use in a nonfilm project.

Stage 1: Completing the Initial Edit of the Program

Edit your program using Final Cut Pro as usual.

Stage 2: Exporting an XML File of the First Version of the Program

After you have finished the initial edit of your program and are ready to screen it and have other departments such as sound conforming and closed captioning begin working on it, you need to export a Final Cut Pro XML file for the program's sequence. This XML file provides a snapshot of the current state of the project. It is required if you end up making changes to the project later and want to export a change list.

Note: An alternative approach is to save a copy of the initial sequence. You can later export the Final Cut Pro XML file by opening that saved initial sequence.

Stage 3: Screening the Program and Making Changes

After you screen your program, you may find that you need to make some changes to it. Make the changes as needed.

Stage 4: Exporting an XML File of the Revised Program

After you have finished the second edit of the program and are again ready to screen it, you can either export the change list directly from Final Cut Pro or export a new Final Cut Pro XML file and use Cinema Tools to export the change list.

Note: If there is a chance of additional revisions, you should export a new Final Cut Pro XML file even if you are going to generate the change list using Final Cut Pro, because the XML file will be needed to generate future change lists.

Stage 5: Exporting a Change List

The biggest difference between exporting a change list using Final Cut Pro and exporting one using Cinema Tools is that with Final Cut Pro you can choose to include any of the other traditional film lists along with the change list. There are other potentially significant differences discussed in [About Exporting Change Lists](#).

- *To export a change list from Final Cut Pro:* You select the first version's XML file (Final Cut Pro assumes you want to compare this with the current sequence, so the second XML file is not used) and choose the type of list to export (PDF-format, XML-format, or style sheet-based).
- *To export a change list from Cinema Tools:* You simply select the two XML files to compare and choose the type of list to export (PDF-format, XML-format, or style sheet-based).

Stage 6: Using the Change List

How you use the change list depends on the style of change list you chose to output (PDF-based, XML-based, or a custom output based on a style sheet) and who the list is intended for. A PDF version of the change list might be used by the sound department to manually adjust the parts of the program the sound editors are working with, or an XML version might be part of an automated process providing the closed captioning department with new video clips to work on.

About Exporting Change Lists

You can export change lists from either Final Cut Pro or Cinema Tools. This section describes the differences between the two methods. See [Exporting Change Lists Using Final Cut Pro](#) and [Exporting Change Lists from Within Cinema Tools](#) for details about the change list export process.

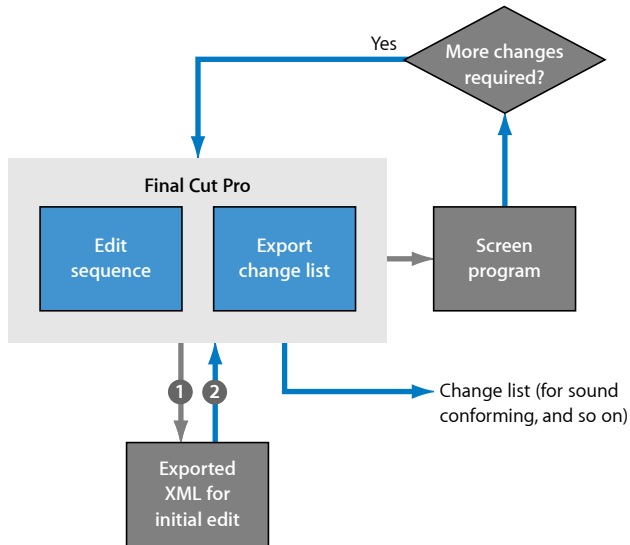
This section also describes the differences between using Final Cut Pro XML files and Cinema Tools program files when exporting change lists.

Exporting from Final Cut Pro

When you export a change list from Final Cut Pro, the following rules apply:

- In addition to the change list–specific change pull list and discard list, you have the option to include all of the standard film lists such as a cut list, a duplicate list, and so on.
- The change list's frame rate is determined by the Telecine Speed setting in the Export Change List dialog. If you choose a Cinema Tools program file to represent the original edit, the program file must be based on the same telecine speed. This means that you can only export a change list from Final Cut Pro that uses a frame rate supported by a Cinema Tools database (24 fps, 25 fps, or 30 fps). However, you can export a change list from Cinema Tools that is based on nonsupported frame rates such as 50 fps or 59.94 fps.
- You must select a Cinema Tools database. If you are not concerned about film-based settings such as key numbers or camera rolls, you can select any database, or even create an empty database in Cinema Tools to be used for this purpose.

The following diagram shows the basic process when exporting a change list from Final Cut Pro. After you finish the initial edit of the program, you export a Final Cut Pro XML file (or a Cinema Tools program file if you are using a film-based workflow) and screen the program. If changes are required, you make the edits in the sequence and then export a change list that compares the file representing the initial edit with the current sequence.



Exporting from Cinema Tools

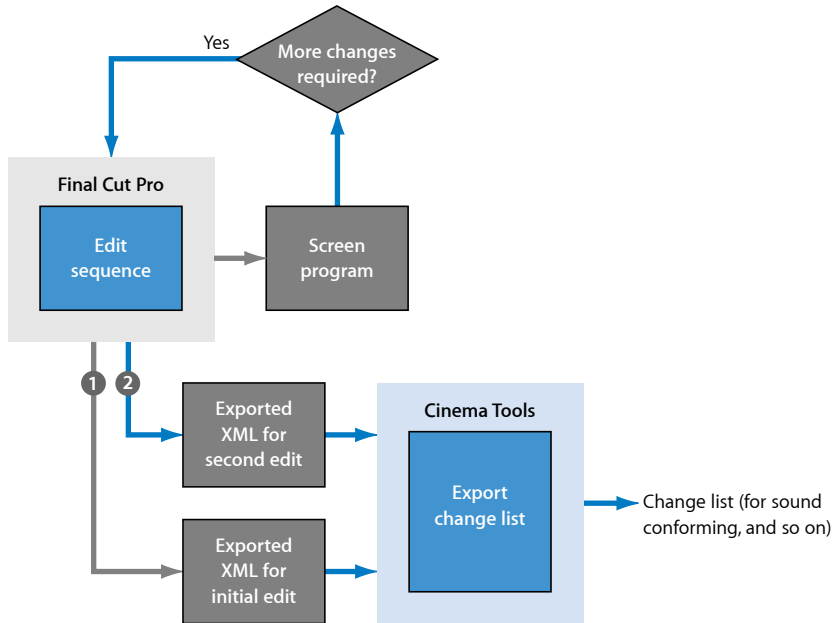
When you export a change list from Cinema Tools, the following rules apply:

- You must have two files: one that represents the original sequence and another that represents the new sequence.
- You can use a mixture of Final Cut Pro XML files and Cinema Tools program files as the original and new sequences.
- The frame rates of the original and new files must be the same.
- By using Final Cut Pro XML files for the original and new versions of the sequence, you can output a change list with a frame rate that is not actually supported by a Cinema Tools database, such as 59.94 fps or 50 fps. This can be useful in nonfilm-based DI workflows. (Cinema Tools program files always use a frame rate supported by Cinema Tools databases.)

Note: Change lists exported from Final Cut Pro are always based on Cinema Tools–supported telecine speed (TK Speed) frame rates, as specified in the Export Film Lists dialog. These frame rates include 24 fps, 25 fps, and 30 fps.

- You cannot export any of the standard film lists, such as a cut list or a duplicate list, along with the change list, as you can from Final Cut Pro. You can include the change list–specific change pull list and discard list.

The following diagram shows the basic process when exporting a change list from Cinema Tools. After you finish the initial edit of the program, you export a Final Cut Pro XML file (or a Cinema Tools program file if you are using a film-based workflow) and screen the program. If changes are required, you make the edits in the sequence and then export a new Final Cut Pro XML file. In Cinema Tools, you export the change list by comparing the file representing the initial edit and the file representing the current edit.



Should You Use XML or Program Files?

There are a few differences between using a Final Cut Pro XML file and a Cinema Tools program file when exporting a change list. These differences can help you decide which approach is the best for you to take.

- When you export a Cinema Tools program file, you must also export a film list. If you do not need a film list, exporting a Final Cut Pro XML file is simpler. If you do need a film list, it is easy to add a Cinema Tools program file to that process and avoid having to go through a second export process to create the Final Cut Pro XML file.

- Cinema Tools program files must use a valid telecine speed (24 fps, 25 fps, or 30 fps) as the frame rate. If you are not working on a film project and are using a frame rate other than the supported telecine speed frame rates, exporting a Final Cut Pro XML file retains the sequence's frame rate. This frame rate is maintained if you export the change list using Cinema Tools.

Exporting Change Lists Using Final Cut Pro

Exporting a change list is similar to exporting a cut list. Take note of the following before you start:

- *Only one video track is compared:* A change list describes the difference between a selected video track in one sequence and a selected video track in another sequence. It does not describe any other video or audio tracks.
- *Avoid modifying the Cinema Tools database between exporting change lists:* When a database is altered after the previous list was exported, the new change list may not be reliable. However, if you did alter the database after you exported the previous list, you can eliminate this risk by exporting a new cut list for the previous sequence and saving a new program file. Then, use that program file when you export the change list.
- *If you have each reel in a separate sequence in Final Cut Pro, and you want to do some reel balancing:* Perform the reel balancing edits after any other changes. See [If You Need to Reel Balance](#) for more information.

See [Exporting Change Lists from Within Cinema Tools](#) for information about exporting change lists using Cinema Tools. See [About Exporting Change Lists](#) for information about how the change list export process differs between Final Cut Pro and Cinema Tools.

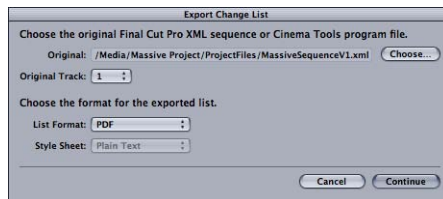
About Change Lists, Effects, Gaps, and Soundtracks

If you add motion effects to a program, an optical will have to be made, and the length of that section of film changes, affecting the sync. The film assistant who conforms the workprint needs to know where to put in *slug* (fill leader or substitute footage) in order to preserve synchronization while the optical is being made. For this reason, Cinema Tools lists motion effects in the change list similarly to the way it displays leader information. For motion effects, “Insert Leader” appears in the Do This column, and “Effect” is displayed under the First/Last Key column. Gaps in a sequence are also described as leaders in change lists.

A change list does not provide information about transitions, superimposed titles (“supers”), filters, or soundtracks. However, to see whether or not any transitions or supers were changed or added, you can export a cut list and an optical list for each of the sequences and compare the lists. Or, if you are marking the transitions on the workprint, you can export a cut list with the change list and run the conformed workprint through the synchronizer, noting where the transitions start or end at different places in the cut list.

To export a change list using Final Cut Pro

- 1 In Final Cut Pro, select the new version of the sequence, then choose File > Export > Cinema Tools Change List.
- 2 In the dialog that appears, click Choose to bring up a dialog to choose either the Cinema Tools program (.pgm) file that you saved when you exported a film list for the previous version of the sequence or the Final Cut Pro XML file you exported for the previous version of the sequence. (They contain needed information about the previous sequence.)



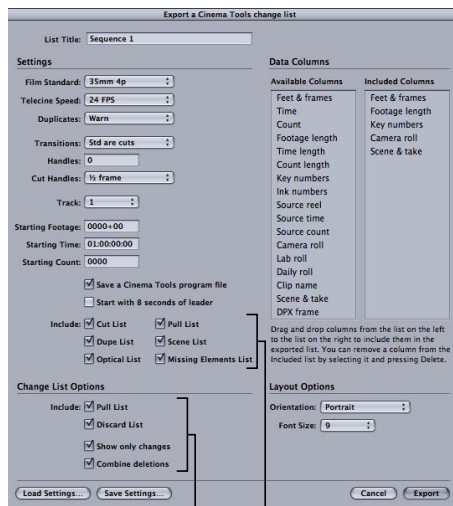
- 3 If you chose a Final Cut Pro XML file, choose the track number to compare from the Original Track pop-up menu.
- 4 Choose the type of list to output from the List Format pop-up menu.
The choices are PDF, XML, and With Style Sheet. See [About PDF-Format Film Lists](#), [About XML-Format Film Lists](#), and [About Style Sheet–Based Film Lists](#) for information about these formats.
- 5 If you chose With Style Sheet from the List Format pop-up menu, choose a style sheet from the Style Sheet pop-up menu.

6 Click Continue.

There are two different dialogs that can appear: one for PDF output and one for XML and With Style Sheet output. The differences are similar to those between the Export Film Lists and Export XML Film Lists dialogs.

7 In the Export Change List dialog that appears, configure the settings, then click Export.

See [Settings in the Export Change List Dialog](#) for details.



These lists provide information about the changes.

These lists provide information about the entire sequence.

When you select film list options such as Cut List and Pull List in the Settings area of the Export Change List dialog, the change list file includes (in addition to the selected change list options) the same content you would get if you exported those lists from the Export Film Lists dialog.

Note: Keep in mind that the following settings should be the same for the two sequences you are comparing: Film Standard, Telecine Speed, whether key numbers or ink numbers are in the Included Columns area, and whether the “Start with 8 seconds of leader” checkbox is selected. The two sequences must also have the same editing timebase (set in Final Cut Pro).

8 In the dialog that appears, enter a filename and choose a location.

9 Click Choose Database to choose the database associated with the clips in the sequences you are comparing. (Make sure you select the same database that was used when the previous list was exported.)

- 10 Click Save.
- 11 If you selected “Save a Cinema Tools program file,” enter a filename and location for the file in the dialog that appears, then click Save.

Give the program file a name that clearly identifies the sequence and the version, so that you can easily locate the file later if you need to export another change list.

A change list file is generated that contains all the lists you selected in the Export Change List dialog.

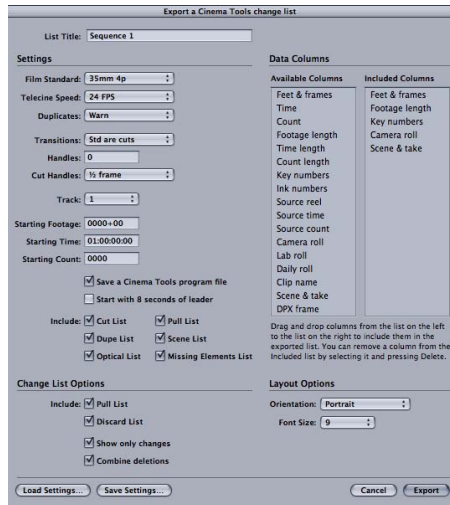
If You Need to Reel Balance

In *reel balancing*, heads and tails of reels are reapportioned to make sure the length of each reel is in the right range.

If you want to do any reel balancing in Final Cut Pro, perform the reel balancing edits separately from any other changes. For instance, to move a scene from the head of one reel to the tail of another, first conform the two reels to the change lists exported from their associated sequences. Then, in Final Cut Pro, cut the scene from the head of the sequence for reel 1 and paste it at the tail of the sequence for reel 2. Finally, export new change and cut lists for both sequences and use those lists as a guide for balancing the two reels. Note that shots deleted from one reel should be exactly the same length as the shots added to the other reel.

Settings in the Export Change List Dialog

The Export Change List dialog that you access from within Final Cut Pro contains the same settings as the Export Film Lists dialog (described in [Settings the Export Dialogs Have in Common](#)) and, if you chose PDF from the List Format pop-up menu, the same PDF column options (described in [PDF Configuration Settings in the Export Film Lists Dialog](#)), with the exceptions and additions described below.



The Export Change List dialog contains these settings that are either not available in the Export Film Lists dialog or are used differently:

- *Transitions*: The best choice for handling transitions when you export a change list is “All are cuts,” in which transitions are represented by a cut in the middle of the transition, regardless of whether or not the transitions are of standard length. Cinema Tools inserts notes in the cut list (exported with the change list) to indicate where the start and end of the transition should be for both the outgoing and incoming clips. These notes can be used as a guide in marking the transitions on the conformed workprint. See [Settings the Export Dialogs Have in Common](#) for information about the other settings.
- *Change List Options*: The following options control what is included in change lists:
 - *Pull List*: Select to include a change pull list, which lists any film that needs to be newly added to the workprint.
 - *Discard List*: Select to include a discard list, which lists only clips that need to be removed from the workprint.
 - *Show only changes*: If this option is selected, the change list displays entries for new edits only. Unchanged footage is not listed. (However, if the Cut List checkbox is selected, a cut list is included in the change list file, listing all the footage in the sequence, including the unchanged footage.)

- *Combine deletions:* If this option is selected, footage deletions that are contiguous are listed as one deletion rather than individual deletions. This instructs the film assistant to cut them as a *lift*, a series of pieces removed as one piece and stored intact, rather than as individual pieces. Film assistants tend to prefer seeing and performing the series as one deletion because it saves time and effort.

About the PDF Items and Change Lists

Unlike cut lists, for the most part change lists cannot be customized. Change lists provide specific information and must have the columns to support that information. However, the items you drag to the right column in the Export Change List dialog can affect the type of data that appears in those columns. You need to add one item from each of these four categories:

- *Time measurement:* "Feet & frames," Time, or Count
- *Name identifier:* "Scene & take" or "Clip name"
- *Roll number:* "Camera roll," "Lab roll," or "Daily roll"
- *Edge code:* "Key numbers" or "Ink numbers"

Important: If you add multiple items of one type (for example, if you add both "Key numbers" and "Ink numbers" to the right column in the Export Change List dialog), the one that appears first in the right column is used by the change list.

If you choose to include a cut list with your change list, you can add additional items to the right column and arrange them in the order in which they should appear in the cut list.

Note: Although XML output contains all change list information, the style sheet you choose for the Style Sheet output format determines which information appears in the output. If you use the supplied Plain Text style sheet, the information included in the output depends on how the last PDF-format style sheet was output. In other words, what you choose for the above four categories when you output a PDF-format change list also affects the Style Sheet output when you choose the Plain Text style sheet.

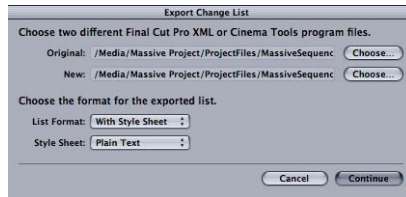
Exporting Change Lists from Within Cinema Tools

If the most recent version of a sequence is not available or conveniently accessible, or if it is damaged, you can still create a change list as long as you have the exported program (.pgm) files or XML (.xml) files for the two sequences you need to compare. You can export the change list from Cinema Tools using the program or XML files instead of exporting the change list from Final Cut Pro (where you need to select a sequence).

When you export a change list from within Cinema Tools, you cannot include a cut list or any of the other film lists that you can export using the Export Film Lists dialog; you can only export lists and information specific to change lists. See [About Exporting Change Lists](#) for information about how the change list export process differs between Final Cut Pro and Cinema Tools.

To open the Export Change List dialog in Cinema Tools

- 1 Choose File > Export > Change List.



- 2 In the dialog that appears, choose the original and new program or XML files to be compared.

You can use a mix of program and XML files if necessary.

- 3 Choose the output format of the change list from the List Format pop-up menu.

The choices include PDF, XML, and With Style Sheet. See [About PDF-Format Film Lists](#), [About XML-Format Film Lists](#), and [About Style Sheet–Based Film Lists](#) for information about these formats.

- 4 If you chose With Style Sheet from the List Format pop-up menu, choose a style sheet from the Style Sheet pop-up menu.
- 5 Click Continue.
- 6 Configure the settings in the Export Change List dialog that appears, then click Export.

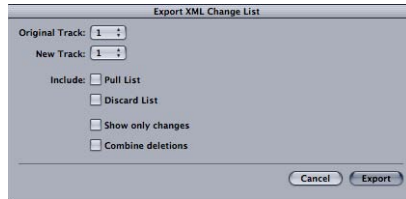
Note: The settings in the dialog change based on the output format you chose from the List Format pop-up menu. See [Settings in the Cinema Tools Export Change List Dialog](#) for details about the settings you see in this dialog.

Settings in the Cinema Tools Export Change List Dialog

The settings available in the Export Change List dialog when exporting from Cinema Tools change based on the output format you chose from the List Format pop-up menu.

Settings Common to All Output Formats

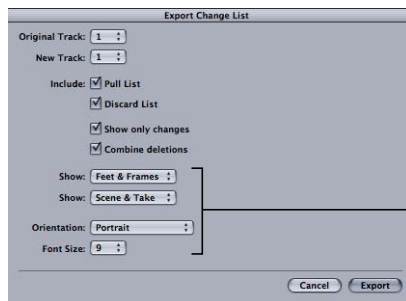
Following are the settings that appear in all versions of the Export Change List dialog when exporting a change list from Cinema Tools.



- *Original Track*: Choose the video track to compare from the original sequence.
- *New Track*: Choose the video track to compare from the new sequence.
- *Pull List*: Select to include a change pull list, which lists any film that needs to be newly added to the workprint.
- *Discard List*: Select to include a discard list, which lists only clips that need to be removed from the workprint.
- *Show only changes*: If this option is selected, the change list displays entries for new edits only. Unchanged footage is not listed.
- *Combine deletions*: If this option is selected, footage deletions that are contiguous are listed as one deletion rather than individual deletions. This instructs the film assistant to cut them as a *lift*, a series of pieces removed as one piece and stored intact, rather than as individual pieces. Film assistants tend to prefer seeing and performing the series as one deletion because it saves time and effort.

Settings Only in the PDF Output Format

The following settings appear only if you chose PDF from the List Format pop-up menu.



Settings available only for PDF-format change lists

Note: Although XML output contains all change list information, the style sheet you choose for the Style Sheet output format determines which information appears in the output. If you use the supplied Plain Text style sheet, the information included in the output depends on how the last PDF-format style sheet was output. In other words, the settings for the two Show pop-up menus that appear when you output a PDF-format change list also affect the Style Sheet output when you choose the Plain Text style sheet.

- *Show (upper):* Choose the time measurement to use. The choices are Feet & Frames, Time, and Count.
- *Show (lower):* Choose how to identify each event. The choices are Scene & Take and Clip Name.
- *Orientation:* Choose Landscape or Portrait for the PDF output. Using Portrait allows you to use a larger font.
- *Font Size:* You can choose a font size for the output.

Working with XSL Style Sheets

If you have no prior experience working with Extensible Stylesheet Language (XSL) style sheets but are reasonably comfortable looking at XML data, you can create your own custom style sheets. There are many books and Internet resources available to help you learn about working with XML data using XSL style sheets.

Important: The following information is intended to give you a basic understanding of the process and is not a complete reference guide.

A good place to start is to export an XML film list and look at it in a text editor. TextEdit can be used to view and edit XML and XSL files, although if you find yourself frequently working with these file types, you should get a specialized application with built-in tools specifically for working with these sorts of files, such as Oxygen or BBEdit.

XML Film List Basics

XML film lists begin with a list of items showing the settings in the Export Film Lists dialog. This is followed by sections for each type of list you included in the film list, such as a cut list and pull list. Each of these list sections include the appropriate events, and each event includes a complete list of the items that Cinema Tools tracks. Following is a simplified example of this structure.

```

<ctlists>
  Settings from the Export Film Lists dialog
  <cutlist>
    <items>
      First event
        Items in this event
      Second event
        Items in this event
    </items>
  </cutlist>
  <pulllist>
    <items>
      First event
        Items in this event
      Second event
        Items in this event
    </items>
  </pulllist>
</ctlists>

```

When you set up a style sheet, you generally start by defining the list information you want to output (cut list, pull list, and so on). You then define the specific items in that list's events that you want included in the output, such as key numbers and source timecode start and end points.

Pull List Style Sheet Example

A simple style sheet to start out with is the supplied Pull List style sheet. Make a copy of the file (see [About Style Sheet–Based Film Lists](#) for details about where to find the file) and give it a name you can easily recognize.

When you open the copy of the Pull List style sheet in a text editor, there are two main sections that appear, with these lines at their head:

- `<xsl:template match="ctlists/pulllist/items">`: This section lists the column headings for all of the items that are included in the list. The path that is listed, `ctlists/pulllist/items`, directs this section to the events in the pull list area of the film list.
- `<xsl:for-each select="pull">`: This section lists the specific items in each pull list event to output. (Each event in a pull list is wrapped by a `pull` element.)

If you want to add or remove an item from the pull list output, you need to make a change to both sections—the first section that controls the column headings and the second section that specifies the data to put under those headings.

For example, if you want this style sheet to output ink numbers and not key numbers, you would make the following changes:

- *In the heading section:* Modify the following three lines:
 - Change `<xsl:text>Key Prefix</xsl:text>&tab;` to `<xsl:text>Ink Prefix</xsl:text>&tab;`
 - Change `<xsl:text>First Key</xsl:text>&tab;` to `<xsl:text>First Ink</xsl:text>&tab;`
 - Change `<xsl:text>Last Key</xsl:text>&tab;` to `<xsl:text>Last Ink</xsl:text>&tab;`

If other names better suit your workflow, you can enter whatever text you like into the data part of these lines. Additionally, if you want to leave the original lines as they are and just add new lines for the ink numbers, you can do that, but keep in mind that this will make the output wider, which could make the output file difficult to print if that's your final goal.

Another option is to change the key number-based lines into comments by preceding each line with `<!--` and following each with `-->`. For example, `<!--<xsl:text>Key Prefix</xsl:text>&tab;-->` is treated as a comment and is ignored when the file is used to process the XML film list.

- *In the item selection section:* Modify the following three lines:
 - Change `<xsl:value-of select="keyprefix"/>&tab;` to `<xsl:value-of select="inkprefix"/>&tab;`
 - Change `<xsl:value-of select="keynumstart"/>&tab;` to `<xsl:value-of select="inknumstart"/>&tab;`
 - Change `<xsl:value-of select="keynumend"/>&tab;` to `<xsl:value-of select="inknumend"/>&tab;`

If you added or removed lines in the heading section, you must add or remove lines in this section as well. The values you use here, such as `inkprefix`, must exactly match the way they appear in the film list XML file. The order of the items is important as well, because that order determines how the items match the heading names.

After you have modified the Pull List XSL file, you can try it out and verify that you get the correct output.

After you've edited your project, you may want to export to videotape, export the audio, or export an audio EDL based on the edited project.

This chapter covers the following:

- [About Common Items You Can Export for Your Project](#) (p. 193)
- [Considerations When Exporting to Videotape](#) (p. 194)
- [Considerations When Exporting Audio](#) (p. 194)
- [Exporting an Audio EDL](#) (p. 195)

About Common Items You Can Export for Your Project

The primary goal of using Cinema Tools is to generate an accurate cut list. For most projects, you may also want to create other helpful items from your edited program:

- *A videotape of the program:* This may be useful so that you can show the program to others or provide a visual guide to the negative cutter. There are a number of considerations to take into account, such as the editing frame rate and any required specialized hardware. See [Considerations When Exporting to Videotape](#) for details.
- *A file containing the program's audio:* You usually create this file if you want to use the program's audio but finish it using a specialized application or an audio post-production facility. There are a couple of approaches you can take to do this, and several issues you must be aware of. See [Considerations When Exporting Audio](#) for details.
- *An audio EDL:* This is required when you intend to recapture the audio using specialized equipment and reedit it using the audio timecode from the edited program. See [Exporting an Audio EDL](#) for details.

Considerations When Exporting to Videotape

You may want to make a videotape of your edited program, either to make it easier to view the program or to provide a visual reference for the negative cutter. There are a few ways to create a videotape from an edited sequence, and these methods are explained in the Final Cut Pro documentation. However, if you edited video at 24 fps and you want to create a PAL or NTSC videotape, there are additional considerations explained here.

When you make a videotape from a 24 fps sequence, some video output devices create an NTSC or PAL signal by inserting extra fields as needed to go from 24 fps to 25 fps or 29.97 fps. Such a tape is generally fine for viewing, but not as accurate as it should be if it is to be used as a visual reference in cutting the negative. Make sure to let your negative cutter know if there are issues with the videotape (for example, if the video occasionally displays the wrong frame).

Considerations When Exporting Audio

Depending on your project's needs, you may be able to use the edited audio from Final Cut Pro directly in the film's release print. More often you will want to finish the edited audio using a specialized application or a facility specializing in audio finishing. This is typically where sound effects, music, and any dialogue are added or enhanced.

There are a couple of items to consider when exporting audio:

- *The type of audio file required:* You can export an Open Media Framework (OMF) or Audio Interchange File Format (AIFF) file.
- *The audio speed:* Depending on how the video was transferred, you may have slightly altered the speed of the audio to maintain synchronization.

If you decide to recapture and reedit the audio at an audio post-production facility, see [Exporting an Audio EDL](#) for details.

OMF Files

An OMF file contains not only the audio, but also a description of the audio edits. Digital Audio Workstations (DAWs) that can import OMF files can take advantage of having the edit In and Out points along with other information, such as cross fades, enabling them to make small changes. OMF files typically contain all of the audio tracks used in the program (other export formats have limits).

Another advantage of OMF files is that they can contain the audio and edit information from non-timecode-based sources, such as audio CDs. (Audio EDLs describe only edits using timecode-based sources and do not include any references to sources such as audio CDs.)

See the Final Cut Pro documentation for information about exporting OMF files.

AIFF Files

An AIFF file contains only the audio and cannot be easily changed. You must export a separate file for each audio track. As with OMF files, AIFF files can contain the audio from non-timecode-based sources, such as audio CDs. (Audio EDLs describe only edits using timecode-based sources.)

See the Final Cut Pro documentation for information about exporting multiple tracks as AIFF files.

Audio Speed

Often the playback speed of the edited audio is slightly different from what it was when it was originally recorded (its natural speed). This compensates for film speed changes made during the telecine transfer. Anytime you are editing at 29.97 fps or 23.98 fps, the audio is running 0.1 percent slower than its natural speed. If you are editing at 25 fps and the telecine transfer film rate was 25 fps, the audio is 4 percent faster.

This speed difference is maintained when you export an AIFF or OMF file. Make sure to find out the requirements of your audio post-production facility with regard to audio speed issues before you export the files.

Exporting an Audio EDL

Just as the final edited video from Final Cut Pro is not generally used when conforming the negative, the edited audio might not be used. If you intend to recapture and reedit your audio at an audio post-production facility, you need an audio Edit Decision List (EDL) indicating how the audio clips are used in the edit.

Although the Final Cut Pro EDL contains both video and audio information, it may not contain references to the timecode and roll numbers from the original production sound rolls, depending on how the clips were captured and how the video was synced to the audio. A Cinema Tools database makes it possible to generate an audio EDL with the original production audio timecode and sound roll information.

Where's the Audio Timecode?

Film productions use dual system recording (separate camera and audio deck) for capturing the pictures and sound. You must sync the two of them together, either during the telecine transfer or before capturing the clips with Final Cut Pro.

If your audio is synced during the telecine transfer and recorded onto the audio tracks of the videotape, the timecode and roll number of the original sound roll is no longer part of the clip, and all edits within Final Cut Pro refer only to the video timecode and reel number. Fortunately, the telecine log created during the transfer usually contains the audio information and adds it to the database when you import the log into Cinema Tools. You can also manually enter the audio information if no telecine log is available.

Using Cinema Tools to Export an Audio EDL

Cinema Tools can export an audio EDL as long as its database contains accurate audio information (an audio timecode number that corresponds to the first video frame of the clip and the sound roll number) in each record. Because of the way audio is recorded during the production (using dual system recording—a separate sound recorder that is started and stopped independently of the camera), the Cinema Tools Export Audio EDL function is applicable only when the project database has a record for each take (as with scene-and-take transfers).

It is critical that the value in the Sound Timecode field correspond directly to the first video frame of the clip. This is typically the case when you import the audio information from a telecine log. Use the Clip window's Identify feature to enter (or verify) the audio timecode value for a known point in the clip (most often at slate close). Based on this value, Cinema Tools calculates the timecode for the first frame. See [Using the Identify Feature to Calculate Database Information](#) for more information.

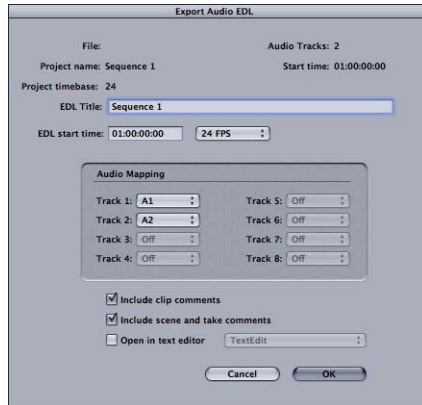
After you have finished editing and have added the audio timecode and sound roll information to the database, you are ready to export the audio EDL.

You generally open the Export Audio EDL dialog from within Final Cut Pro. You can also open it from within Cinema Tools if necessary, although additional steps are required, including the creation of a program file in the Export Film Lists dialog. See [Using the Export Audio EDL Feature from Cinema Tools](#) for more information.

To export an audio EDL from Final Cut Pro using Cinema Tools

- 1 In the Final Cut Pro Timeline or Browser, select the sequence from which you want to export an audio EDL.
- 2 Choose File > Export > Cinema Tools Audio EDL.

Cinema Tools opens and its Export Audio EDL dialog appears.



- 3 Enter and select settings in the Export Audio EDL dialog, then click OK. See [Settings in the Export Audio EDL Dialog](#) for settings information.
- 4 In the dialog that now appears, select the Cinema Tools database file to use, then click Choose.

Once you select the database, Cinema Tools starts matching events in the sequence to it:

- For each edit involving a track enabled in the Export Audio EDL dialog, Cinema Tools searches the database to see if that edit's video clip is connected to any database records. If not, it uses the edit's video reel number to try to locate a record that includes the edit's timecode In and Out points. See [Audio Track Usage](#) for more information about audio tracks.
- If Cinema Tools finds a suitable record, it checks whether that record includes audio information (audio timecode and sound roll number). If so, an entry is added to the EDL and Cinema Tools moves on to the next edit.
- Cinema Tools may not be able to match all audio edits within the sequence. This may be due to incomplete database records or the use of audio from sources other than the logged sound rolls. For those edits that cannot be matched back to the database, an entry is added to the EDL using the sound roll and audio timecode information from the sequence, with an asterisk placed by the roll name. A comment stating that no matching database record was found is also added to the EDL entry.

Cinema Tools creates two files during the export: a CMX 3600 EDL format file and a text file containing information about the EDL export:

- The CMX 3600 EDL format is widely used as a standard for EDL interchange and should be acceptable at virtually all facilities.

- The text file created along with the EDL file uses the EDL's filename with a .txt extension. The file contains information regarding the sequence used and all the settings of the Export Audio EDL dialog, including the number of tracks and their mapping. It also lists any errors that occurred during the export.

Settings in the Export Audio EDL Dialog

Cinema Tools uses information from the sequence to fill in several fields in the top part of the Export Audio EDL dialog.



- *File:* The name of the Cinema Tools program file just opened. This is used only when exporting an audio EDL directly from Cinema Tools. See [Using the Export Audio EDL Feature from Cinema Tools](#) for more information.
- *Audio Tracks:* The number of audio tracks used in the edit.
- *Project name:* The name of the Final Cut Pro sequence on which the file is based.
- *Project timebase:* The frame rate of the sequence in the Timeline.
- *Start time:* The sequence start time as assigned in the Final Cut Pro Audio/Video Settings window.
- *EDL Title:* The name of the EDL. By default, it is the same as the project name from the sequence.
- *EDL start time and timecode format:* The start time for the EDL and the timecode format to be used. By default, the start time is the same as the start time from the sequence. This should not be changed unless your audio post-production facility has a specific requirement.

- *Audio Mapping:* Use these pop-up menus to assign each of the eight possible sequence audio tracks to the four audio EDL tracks (the maximum supported by audio EDLs). See *Audio Track Usage* for details about configuring these settings.



- *Include clip comments:* When this option is selected, the audio EDL includes the name of the clip file (if known) as a comment for each event in the list.
- *Include scene and take comments:* When this option is selected, the audio EDL includes the scene and take numbers as comments for each event in the list.
- *Open in text editor:* When this option is selected, the exported audio EDL opens in the text editor specified in the pop-up menu. Because the audio EDL is actually a text file, the TextEdit application is typically used.

Audio Track Usage

Although Final Cut Pro supports many audio tracks, the Cinema Tools Export Audio EDL feature includes only the first eight, and audio EDLs support a maximum of four. The Export Audio EDL dialog provides settings for each of the eight possible audio tracks, allowing you to map them to the four EDL tracks.

The track configuration pop-up menus are active for those tracks included in the sequence—all others are unavailable. Although it is possible to map multiple tracks to a single EDL track, this frequently results in errors and confusion in the resulting EDL.

Because there is no way to fit the eight audio tracks into the four EDL tracks, you must export two EDLs—one EDL with tracks 1 through 4 enabled (and the others off), and the other EDL with tracks 5 through 8 enabled. Be aware that some sound editors may prefer a single track per EDL, requiring you to export multiple audio EDLs. Make sure to consult with your sound editor before you export the audio EDL.

Using the Export Audio EDL Feature from Cinema Tools

You will most often use the Cinema Tools Export Audio EDL feature from within Final Cut Pro. You can use this feature from within Cinema Tools, but because Cinema Tools does not have the edited sequence directly available, an additional step is required to create a Cinema Tools program file.

Final Cut Pro creates a Cinema Tools program file if you select “Save a Cinema Tools program file” in the Export Film Lists dialog. A Cinema Tools program file contains information about the edit sequence in a format that can be used by Cinema Tools to create the audio EDL. Other settings within the Export Film Lists dialog, such as whether or not the various available lists are included, have no effect on the program file.

To open the Export Audio EDL dialog from within Cinema Tools

- 1 In Cinema Tools, choose File > Export > Audio EDL from Program DB.
- 2 In the dialog that appears, select the program file to use, then click Open.

The Export Audio EDL dialog appears.

You can use Cinema Tools to work on projects started on other systems.

On occasion you may find that you want to create film lists, including a cut list, based on edits from an editing system other than Final Cut Pro, or from a Final Cut Pro installation on a different computer. For this reason, Cinema Tools lets you generate film lists based on Edit Decision Lists (EDLs) created with Final Cut Pro and other systems, as well as film lists based on Final Cut Pro XML files.

Cinema Tools also lets you import and export Avid Log Exchange (ALE) files. These files contain most of the film, video, and audio information in a Cinema Tools database, in a format supported by most film-based editing systems. ALE files do not contain any edit-based information (as is found in an EDL).

This chapter covers the following:

- [Creating EDL-Based and XML-Based Film Lists](#) (p. 201)
- [Working with ALE Files](#) (p. 206)

Creating EDL-Based and XML-Based Film Lists

The same considerations you have to take into account when creating film lists from within Final Cut Pro apply to other video editing applications. You must:

- Have a complete and accurate Cinema Tools database that includes the film and timecode information
- Have video timecode and reel numbers in the EDL or XML file that exactly match those in the Cinema Tools database
- Be prepared to deal with audio speed issues that may affect synchronization with the picture

All of the considerations related to the telecine transfer, including whether the scene-and-take or camera-roll method was used, apply as well. The telecine log from a scene-and-take transfer is still the best way to build your Cinema Tools database. See [Creating a Cinema Tools Database](#) for information about building a Cinema Tools database.

Important: When you export film lists from an EDL or XML file, Cinema Tools has to use the timecode-based method of film list creation. For this reason, you must be careful to have accurate video timecode values in the database, because they alone, and not the actual clips, provide the edit information for generating the lists.

There are two ways you can generate film lists from an EDL:

- *Use the Cinema Tools Export commands:* This is the easiest approach. See [Before You Use the Cinema Tools Export Commands](#) for more information.
- *Import the EDL into a Final Cut Pro sequence:* This method requires a bit more effort but displays the edit points in a timeline fashion (with no video or audio if the clips are not available). If the clips are available, it is possible to actually play and modify the sequence before you export the lists. For information about importing an EDL, see the Final Cut Pro documentation. See [An Introduction to Film Lists and Change Lists](#) for details about generating film lists from within Final Cut Pro.

Before You Use the Cinema Tools Export Commands

In addition to the Cinema Tools database, a suitable EDL or XML file is required to create film lists from within Cinema Tools.

EDL Requirements

Cinema Tools supports EDLs that comply with the CMX 3600 and GVG formats. As a general rule, any options to include “pre-read” or “B-reels” should be disabled, because these apply directly to tape-based editing. If necessary, Cinema Tools can work with pre-read events, but the name of the pre-read reel must be PREREAD. Make sure that comments are included, because these can display the clip, transition, and effects names. They will be recognized by Cinema Tools and included in the cut list comments.

The reel names that appear in the EDL must match those used in the Cinema Tools database. Even a slight difference, such as an added space or an extra leading “0” (“001” instead of “0001”) can cause problems.

Be aware that some editing systems modify the reel names when exporting an EDL. The CMX 3600 format allows a maximum of eight characters with only numbers and uppercase letters (no spaces). Often a reel conversion list is appended to the end of the EDL to make it easier to resolve any naming issues that occur.

You can use the Cinema Tools Change Reel command to change all occurrences of a particular reel name in the database to match the EDL (for example, you can change all instances of reel Tape 004 to TAPE004). See [Changing All Reel or Roll Identifiers](#) for more information.

Note: To reduce the chance of issues with the EDL file, select Generic Edits in the Reel Conflicts section of the EDL Export Options dialog.

EDL Video Standards

EDLs are built on references to video timecode points. This means that EDLs have a frame rate, typically either 29.97 fps (NTSC), 25 fps (PAL), or 24 fps or 23.98 fps (based on either the film rate or the 24p video rate). Additionally, NTSC EDLs must contain a line near the beginning that starts with “FCM.” This comment specifies whether the timecode is drop frame or non-drop frame. PAL and 24 fps timecode are always non-drop frame and do not require the FCM line (although it may appear as non-drop frame).

When you use an EDL file to generate a film list, you must identify the EDL’s frame rate in the selection dialog. See [Exporting Film Lists from Cinema Tools](#) for more information.

XML Requirements

Cinema Tools supports Final Cut Pro XML files. Because XML files contain a lot more information about an edited sequence than an EDL file, XML is the preferred format to use when exporting film lists using Cinema Tools.

Exporting Film Lists from Cinema Tools

In Cinema Tools, the processes for exporting film lists based on EDL files and film lists based on Final Cut Pro XML files are nearly the same. In both cases you can choose to export a PDF-format, XML-format, or style sheet–based film list.

To generate film lists using the Cinema Tools Export command

- 1 Open the Cinema Tools database corresponding to the EDL or XML file you will use to create the film lists.

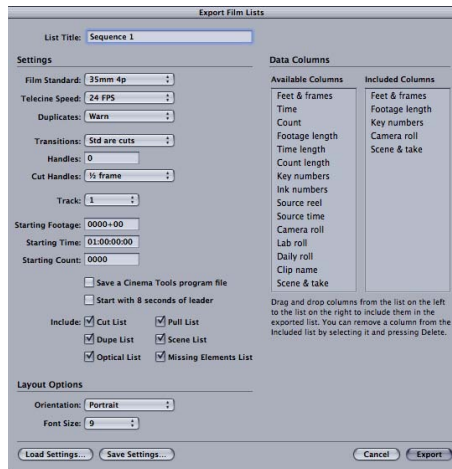
This ensures that the frame rate of the list and the database match.

- 2 Do one of the following:
 - *To export a film list based on an EDL file:* Choose File > Export > Film Lists from EDL.
 - *To export a film list based on an XML file:* Choose File > Export > Film Lists from XML.
- 3 Select the EDL or XML file in the dialog that appears.
- 4 If you are using an EDL file, choose the list’s frame rate from the EDL Frame Rate pop-up menu.

XML files contain a parameter that defines their frame rate.
- 5 Choose the output format of the film list from the List Format pop-up menu.

The choices are PDF, XML, and With Style Sheet. See [Choosing the List Format](#) for more information about these formats.
- 6 If you chose With Style Sheet, choose a style sheet from the Style Sheet pop-up menu.
- 7 Click Continue.

A dialog appears in which you can configure the information in the output file. The settings in the dialog vary depending on the output format you chose from the List Format pop-up menu. See [Settings the Export Dialogs Have in Common](#) and [PDF Configuration Settings in the Export Film Lists Dialog](#) for details about the settings.



- 8 Click Export.
- 9 Choose a location and name for the film list file to be created, then click Save.
- 10 If you chose to have a Cinema Tools program file created in the Export Film Lists dialog, choose a location and name for the file, then click OK.

The film list is generated.

Note: If Cinema Tools has any problems processing the EDL file, a “parsing error” message appears that includes the line number that caused the problem. See [What Actually Happens to the EDL](#) for more information.

What Actually Happens to the EDL

Once you start the film list export, Cinema Tools first processes the EDL file and creates a version for its own internal use. During this processing, Cinema Tools looks for errors that would make the EDL unsuitable to use for creating a film list. If it encounters nonstandard or unexpected text, the export is halted and an error message appears listing the line number where the processing failed. This is referred to as a *parsing error*.

Problems in an EDL can often be repaired by manually editing its contents. Because EDLs are actually plain text files, they can be opened in TextEdit. Be careful: often the line number listed is not the actual problem; the real issue may be with the line before. Experiment with deleting lines and comparing them to similar ones that occur previously in the EDL to help determine the problem. See [Using TextEdit to Make Changes to an EDL](#) for more information.

Cinema Tools also looks for conflicts within the EDL, such as when two edits overlap (known as a *dirty list*). Cinema Tools cleans these edits, removing any portions that would be recorded over by any edits that follow. Any transitions or supers that are completely overlapped by a following edit are removed. If the transition or super is only partly overlapped by a following edit, it is flagged as a conflict, the later edit is removed, and an entry is added to the cut list indicating that this was done.

When Cinema Tools successfully processes an EDL, it places an entry in the messages section of the film list showing a summary of events that it processed. This entry lists how many of each type of event occurred (cut, dissolve, wipe, and key). The number of events in the list should match the number of events in the EDL.

About Using EDLs with DPX Image Sequence Media

A common DI workflow involves editing your program using offline media files, exporting an EDL of the program, and then using that EDL to export a film list based on a Cinema Tools database connected to the original DPX image sequence media. In this case, Cinema Tools tries alternative methods to match edits to database records if the preferred methods don't work.

Important: Although these alternative methods may help you export a film list in cases where there is incomplete information, they also increase the chances of matching an edit to an incorrect record. Be sure to carefully review the resulting film list to ensure its accuracy.

Following are the differences in how Cinema Tools matches edits to database records if the records are connected to DPX image sequence media:

- *If Cinema Tools fails to find a match based on the timecode extracted from a DPX image sequence:* It attempts to interpret the image sequence filenames as timecode values and use those values instead.
- *If Cinema Tools fails to find a match based on using the name of the folder that contains the DPX image sequence files as the reel name:* It tries to match edits to records based on the timecode alone.

Important: To prevent issues with DPX image sequence reel names, you should never rename the folder that contains the image sequence files, and you should never move the files from the folder or change their names.

Using TextEdit to Make Changes to an EDL

By default, TextEdit saves files in the Rich Text Format (RTF), but the EDL needs to be a plain text file. Follow these steps to edit an EDL in TextEdit and save it in a plain text format.

Warning: Use great care when editing an EDL file—some items that appear meaningless can be very important. Make sure you have a backup copy available in case you alter your working copy beyond usability.

To edit an EDL file in TextEdit

- 1 Open TextEdit.
- 2 Choose File > Open, then locate the EDL file and click Open.
- 3 Choose Format > Make Plain Text, then click OK in the dialog that appears.
The font changes to Monaco, a fixed-width font that ensures the text columns line up properly. The name changes to Untitled.
- 4 Make your text edits, then choose File > Save.
By default, the name is Untitled, and a .txt extension is appended to it.
- 5 Enter a name for the file and replace the .txt extension with .edl (or whatever was used in the original file), then click Save.
A dialog appears asking if you want to have .txt appended to the end of your filename.
- 6 Click “Don’t append.”

If you often find yourself editing plain text files, you may want to configure TextEdit preferences to make it easier.

Note: Double-clicking a filename with an .edl extension opens it in a read-only window in Final Cut Pro.

Working with ALE Files

The Avid Log Exchange (ALE) file format was created so that the contents of film-based databases could be transferred between systems. Cinema Tools supports importing and exporting ALE files, making it possible to share databases with other systems.

As with EDL files, ALE files are plain text files that can be opened and edited with any text editor. A difference is that they are tab-delimited, making them a bit more difficult to read. Although it is possible to edit the contents with a text editor, you must use great care to avoid corrupting the file by accidentally deleting a tab character.

Supported ALE Fields

Each line in an ALE file corresponds to one database record. Cinema Tools supports the following ALE fields.

Film-Related Fields

- *Camroll*: Contains the number used for the Cam Roll field.
- *Labroll*: Contains the number used for the Lab Roll field.

- *Daily roll*: Contains the number used for the Daily Roll field.
- *Ink number*: Contains the Ink field values.
- *KN Start*: Contains the Key field values.

Video-Related Fields

- *Tape*: Contains the Video Reel field value.
- *Start*: Contains the Video Timecode field value.
- *End*: Within Cinema Tools, this is a calculated value created by adding the Video Duration field to the Video Timecode field.
- *Duration*: Contains the contents of the Video Duration field.
- *TC 24*: Contains a 24 fps–based Video Timecode value that is used in place of the Start value if the database you are importing this file into is set for 24 fps timecode. Additionally, if the ALE file does not include a Sound TC column, the TC 24 column values are added to the database as the Sound Timecode values.

Audio-Related Fields

- *Tracks*: Cinema Tools inserts “VA1” into this field during export.
- *Soundroll*: Contains the contents of the Sound Roll field.
- *Sound TC*: Contains the contents of the Sound Timecode field, representing the timecode value of the first frame.

General Fields

- *Name*: When exporting, contains the filename of the connected clip (if there is one), or a Cinema Tools–created name combining the scene and take numbers (if they have been entered), or, as a last resort, the video reel and timecode values separated by a hyphen.
- *Scene*: Contains the Scene field contents.
- *Take*: Contains the Take field contents.
- *Notes*: Contains any notes you may have included in the database record.

Importing an ALE File

You import an ALE file with the Import Telecine Log command. You can import an ALE file into an existing Cinema Tools database or into its own new database. It’s recommended that you import into a new database—you can always import that database into another one later. You can also import the ALE file using either Final Cut Pro or Cinema Tools.

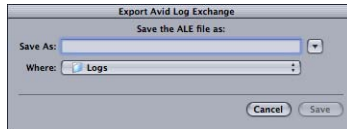
See [Importing Database Information from a Telecine Log or ALE File](#) for more information about importing ALE and telecine log files using either Final Cut Pro or Cinema Tools.

Exporting an ALE File

Cinema Tools exports an ALE file based on the current found set. To avoid problems, make sure all of the records are complete and accurate prior to exporting.

To export an ALE file

- 1 Create a found set that contains the records you want to export. (See [Finding and Opening Database Records](#) for details about creating a found set.)
- 2 In Cinema Tools, choose File > Export > Avid Log Exchange.
- 3 Enter a name and location for the new file. It's recommended that you add an .ale extension to the filename.



- 4 Click Save to export the file.

Cinema Tools provides several tools that are useful when editing 24p video.

The proliferation of high definition (HD) video standards and the desire for worldwide distribution have created a demand for a video standard that can be easily converted to all other standards. Additionally, a format that translates well to film, providing an easy, high-quality method of originating and editing on video and finishing on film, is needed.

24p video provides all this. It uses the same 24 fps rate as film, making it possible to take advantage of existing conversion schemes to create NTSC and PAL versions of your project. It uses a progressive scanning scheme and usually an HD image to create an output well suited to being projected on large screens and converted to film.

Additionally, 24p video makes it possible to produce high-quality 24 fps telecine transfers from film. These are very useful when you intend to broadcast the final product in multiple standards.

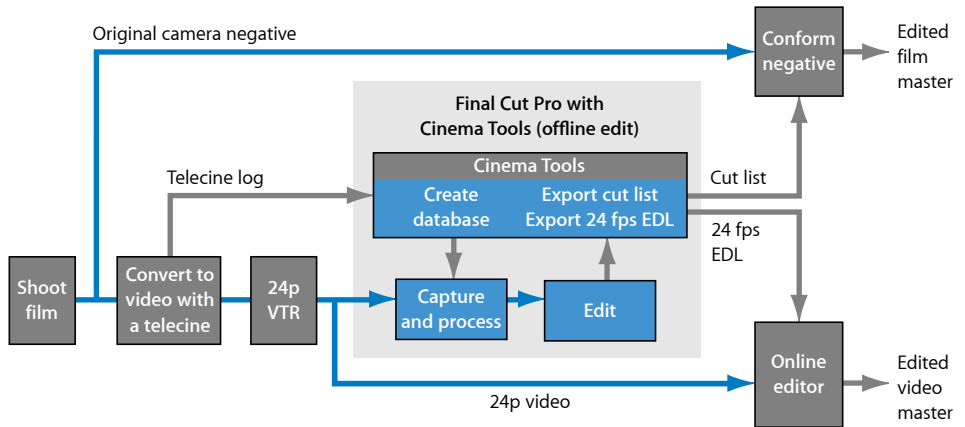
Note: Several of the features mentioned here are included with Final Cut Pro and do not require Cinema Tools; however, these features are described here because they relate to working with 24p video, which is of specific interest to many filmmakers.

This chapter covers the following:

- Considerations When Originating on Film (p. 210)
- Editing 24p Video with Final Cut Pro (p. 211)
- Adding and Removing Pull-Down in 24p Clips (p. 217)
- Using Audio EDLs for Dual System Sound (p. 227)

Considerations When Originating on Film

When editing 24p material that originated on film, you need to be aware of a number of special circumstances.



- If you intend to conform the film to match the edited video, you must have its edge code tracked by a Cinema Tools database. (See [Film Edge Code](#) for details about edge code.)
- The film must be transferred to video using a telecine. Typically the offline telecine video output contains burned-in video and audio timecode, as well as key numbers. These burned-in values (known as *window burn*) are invaluable when you intend to later conform the film. Unfortunately, their visibility is a problem if you also intend to use the 24p video to produce a video version of the program. For this reason, if you intend to produce both a conformed film and an edited video version of the project, you might have the telecine run on two decks simultaneously, one with the window burn and the other without.
- Whether you're shooting film or 24p video, sound is almost always recorded separately from the picture, with a separate sound recorder. This is often referred to as *recording dual system sound*. Although 24p productions can record the sound on the 24p video recorder, providing synced audio that is easily captured with Final Cut Pro, film productions do not have the option of recording sound on the film, so the audio must be synced to the picture at some point later in the process. The preferred workflow is to synchronize the audio during the telecine transfer. This makes it easy to capture the audio along with the video clips for editing with Final Cut Pro. The Cinema Tools database can track the original sound roll numbers and audio timecode and generate an audio EDL that can be used to recapture and edit the audio at an audio post-production facility.

See [Telecines](#) for information about telecine transfers. See [Exporting an Audio EDL](#) for information about exporting audio EDLs.

Editing 24p Video with Final Cut Pro

The excellent quality of 24p video presents a challenge when it comes to editing—the bandwidth and storage space it requires. Editing minimally compressed 24p video directly in Final Cut Pro requires that you have a system with a large, fast hard disk and specialized capture hardware. Even with a properly configured system, you may be able to capture only the video you actually intend to use, not the typical 20 to 100 hours you may have shot.

The typical approach to editing 24p video with Final Cut Pro involves two steps: an offline edit, using compressed 24p clips or downconverted (to standard definition NTSC) and compressed clips, followed by an online edit with recaptured, uncompressed clips.

What Is Downconverted Video?

It is often necessary to use HD video, such as 24p, in systems designed for standard definition (SD) NTSC video. The process of converting HD video to SD video is called *downconverting*. Most HD VTRs have an option that provides SD video outputs. Several specialized hardware downconverters are also available. See [Understanding Aspect Ratios](#) for information about dealing with the aspect ratio differences between the standards when downconverting.

Using a Final Cut Pro System for 24p Offline and Online Editing

Using the same Final Cut Pro system for both offline and online editing makes the process as simple and error-free as possible. The workflow when using the same system for both purposes is outlined below.

Stage 1: Capturing Your 24p Video as Compressed Clips

Capturing your 24p video using a lower-resolution codec makes it easier to capture and edit the video without running into storage or performance issues.

Stage 2: Performing an Offline Edit of the Clips

Edit the program using the lower-resolution video clips.

Stage 3: Creating a Duplicate Project That Uses Only Needed Video

You can use the Final Cut Pro Media Manager to create a duplicate project containing only the video actually used in the program. This is usually much less than half of the originally captured video.

Stage 4: Deleting the Original Clips

Because the next step is to recapture the video using its native codec, you can delete the original lower-resolution video clips.

Stage 5: Recapturing the Material in the Duplicate Project

Now that you know exactly which video clips your project needs, you can recapture the video at its native resolution.

Even if your Final Cut Pro system is not configured to edit uncompressed 24p video, it can serve as an offline editor and export a 24 fps EDL to be used by a 24p online editing system. Even better, if your 24p online editing system uses Final Cut Pro, you can simply copy the project from the offline system, allowing you to preserve far more information about the edit than with an EDL alone.

See [Using Final Cut Pro as a 24p Online Editor](#) and [Using Final Cut Pro as a 24p Offline Editor](#) for more information about each option.

Using 24p Video with Final Cut Pro and Cinema Tools

Final Cut Pro and Cinema Tools give you the ability to handle various situations related to editing 24p video:

- *Importing 24 fps EDLs:* Use for performing an online edit of 24p material that has been offlined on another system. See [Using Final Cut Pro as a 24p Online Editor](#) for more information.
- *Exporting 24 fps EDLs:* Use for performing an offline edit of 24p material with a 24 fps editing timebase. See [Using Final Cut Pro as a 24p Offline Editor](#) for more information.
- *Converting an EDL to or from 24 fps:* Use for performing an offline edit of 24p material using an NTSC editing timebase or for doing an online edit of 24p material that has been offlined on an NTSC system. See [Using Final Cut Pro as a 24p Offline Editor](#) for more information.
- *Removing 2:3:3:2 or 2:3:2:3 pull-down:* Use if you are capturing your source clips from a digital video camcorder that applied 2:3:3:2 or 2:3:2:3 pull-down to 24p video. This feature cleanly eliminates the redundant frame fields created by the pull-down, without any recompression, so you can edit at 23.98 fps or 24 fps. See [Working with 2:3:3:2 Pull-Down](#) for more information.
- *Adding pull-down:* Use to output 23.98 fps video in a format that you can play on an NTSC device, such as an NTSC monitor, and to record it as 29.97 fps video. This feature lets you output 23.98 fps video via FireWire at the NTSC standard of 29.97 fps video. See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.
- *Creating an audio EDL when using dual system sound:* Use if you intend to recapture the audio elsewhere for final processing. See [Using Audio EDLs for Dual System Sound](#) for more information.

Using Final Cut Pro as a 24p Online Editor

An important consideration when using Final Cut Pro as your online editor is how to import the offline edit information. When using a separate system as the offline editor, there are three methods you can use to get edit information from the offline system (presented in order of preference):

- *Copy the project:* Can be used when a separate Final Cut Pro system is the offline system and you used a 24 fps editing timebase for the offline edit.

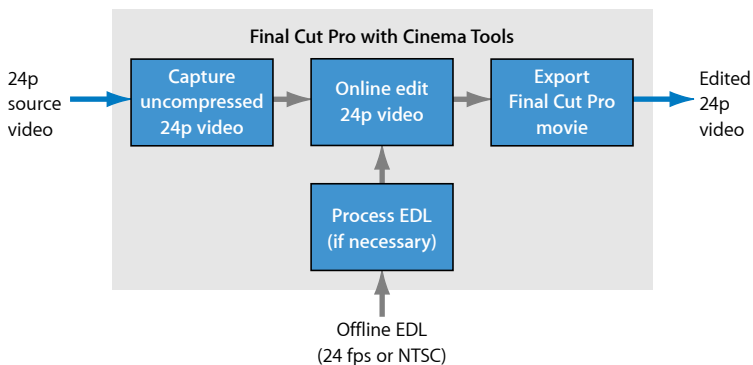
- *Import a 24 fps EDL:* Can be used when your offline system supports exporting 24 fps EDLs.
- *Import an NTSC EDL:* Can be used when your offline system can only edit downconverted NTSC versions of the 24p video and export an NTSC EDL.

Copying the Project

Copying the project from an offline Final Cut Pro system to the online Final Cut Pro system provides not only the edit In and Out point information but also all other information related to the project, such as filter and effects usage. To use this method, you must have edited using a 24 fps timebase on the offline system.

About Importing EDLs

When using non-Final Cut Pro offline systems (or a Final Cut Pro system editing downconverted NTSC versions of the 24p video), you must import an EDL. Final Cut Pro provides both 24 fps EDL import and NTSC-to-24 fps EDL conversion.



Important: Before importing any EDL into Final Cut Pro, make sure that the editing timebase for the sequence is the same frame rate as the EDL. If the frame rate of the EDL is different from the editing timebase of the sequence, the EDL will not be imported correctly.

Importing 24 fps EDLs

Whenever the offline editor is not a Final Cut Pro system, the best way to import information about the offline edit is to provide an EDL. EDLs contain only the basic information about an editing project: the In and Out edit points for the first two video tracks and the first four audio tracks, information for simple transitions, and any notes you have added.

To import a 24 fps EDL into Final Cut Pro

- 1 Open an existing Final Cut Pro project or create a new one.
- 2 Choose File > Import > EDL.
- 3 Configure the Import Options dialog, then click OK.

Note: If the dialog does not allow you to choose 24 fps as the editing timebase, it's probably because the Easy Setups included with Cinema Tools are not installed. If they are not installed, reinstall Cinema Tools.

- 4 Select the name and location of the EDL file, then click Choose.

A new sequence opens in the project, containing the edits of the EDL, all indicating that the media is offline. The Browser contains a list of the media used in the edit. You can then use the Final Cut Pro Media Manager to capture the clips for the online edit. See the Final Cut Pro documentation for details about capturing clips, importing EDLs, and configuring the Import Options dialog.

Importing NTSC EDLs

You can perform an offline edit of your downconverted 24p video on an NTSC system and export an EDL that can be converted and used by an online Final Cut Pro system. To import an NTSC EDL for use with a 24p project, you first need to convert the NTSC 29.97 fps EDL to 24 fps (or, most often, to 23.98 fps).

Note: Cinema Tools does not support converting PAL EDLs to 24 fps.

See [Converting NTSC EDLs to 24 fps](#) for more information. After you have converted the EDL, you can import the 24 fps EDL into Final Cut Pro using the process described in [Importing 24 fps EDLs](#), above.

Using Final Cut Pro as a 24p Offline Editor

Editing 24p HD video generally requires that you first edit it with an offline system. This allows you to choose the actual footage you want to use while working with downconverted or compressed versions of the 24p video.

When the online system also uses Final Cut Pro, it is highly recommended that you perform the offline edit using a 24 fps timebase. This allows you to open the project with the online system and maintain all special settings, effects, and filters—elements that are not included in an EDL.

With online systems other than Final Cut Pro systems, you need to provide a 24 fps EDL from the project.

Cinema Tools provides two tools that make it easier to use Final Cut Pro for 24p offline editing:

- *Reverse Telecine and Conform features:* These features are useful when you have captured downconverted versions of the 24p video and want to convert them back to 24 fps.
- *NTSC-to-24 fps EDL conversion:* This is useful when you must edit using an NTSC 29.97 fps timebase but need a 23.98 fps or 24 fps EDL.

For offline editing, it is preferred that the 24p video be compressed and captured directly, with no frame rate conversions. This removes the possibility of errors during video and timecode rate conversions and eliminates the need to convert the video's aspect ratio (see [Understanding Aspect Ratios](#)). However, this requires specialized hardware, so the following alternatives using standard downconverted versions of the 24p video have been developed.

Using the Reverse Telecine and Conform Features

24p video is often downconverted to make it easier to use with standard video equipment. Cinema Tools provides tools to convert NTSC or PAL captured clips back to their original 24 fps video, enabling you to edit using a 24 fps timebase:

- *NTSC*: Converting 24p video to NTSC video requires using a pull-down method that adds redundant fields, maintaining the action's original speed (1 second of 24p video equals 1 second of NTSC video). The Reverse Telecine feature removes the pull-down by removing the extra fields and restores the original 24 fps rate. See [Reversing the Telecine Pull-Down](#) for information about using the Reverse Telecine feature. If your source clips originated from a special type of DV camcorder that shoots 24p, such as the Panasonic AG-DVX100 camcorder, a simpler form of the Reverse Telecine dialog appears. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for information about reversing the pull-down for clips that originated from a 24p-capable digital video camcorder.
- *PAL*: There are several methods of converting 24p video to PAL. The most common is to play the tape 4 percent faster, providing a one-to-one relationship between the 24p and PAL frames, but speeding up the action by 4 percent. Cinema Tools and Final Cut Pro provide a Conform feature that you can use to restore the video back to 24 fps in order to edit it at 24 fps in Final Cut Pro. See [Frame Rate Basics](#) for information about frame rate issues.

Converting NTSC EDLs to 24 fps

You may decide to edit the downconverted NTSC version of the 24p video using a standard NTSC 29.97 fps timebase; however, most 24p online editing systems require a 23.98 fps or 24 fps EDL.

Cinema Tools includes a feature that allows you to convert NTSC 29.97 fps EDLs to 23.98 fps or 24 fps. This makes it possible for you to perform an offline edit of your downconverted 24p video on an NTSC system and export an EDL that can be converted and used by an online system.

Note: Cinema Tools does not support converting PAL EDLs to 24 fps.

To convert an NTSC EDL to 24 fps, you need the EDL file to be converted in the CMX 3600 or GVG format. You do not need a Cinema Tools database.

To convert an NTSC EDL to 24 fps

- 1 In Cinema Tools, choose File > Export > Converted EDL > 24 FPS from 30 FPS.
- 2 In the dialog that appears, locate and choose the EDL file to convert.
- 3 In the next dialog, choose the name and location for the new file to be created, then click Save.

The new EDL file is identical to the original, with the exception of the timecode values and effects durations, which have been converted to match the new frame rate.

Important: 24p timecode is always non-drop frame, and the NTSC timecode to be converted must also be non-drop frame. Cinema Tools does not prevent you from converting an NTSC drop frame–based EDL, but instead treats it as if it were non-drop frame. The exported 24 fps EDL will contain errors, and Cinema Tools inserts a warning message into the EDL.

You can now import the 24 fps EDL into Final Cut Pro using the process described in [Importing 24 fps EDLs](#).

Understanding Aspect Ratios

When capturing NTSC or PAL video from 24p sources, you typically choose how to handle the differences in their aspect ratios.

SD video (NTSC or PAL) has a 4:3 (1.33) aspect ratio. This means the picture is 75 percent as tall as it is wide. Many 24p formats use a 16:9 (1.78) aspect ratio that is closer to the common film aspect ratio of 1.85 and is the same as that of the widescreen broadcast HD formats.

Many HD VTRs can downconvert 16:9 video to SD 4:3 video. Final Cut Pro systems not capable of capturing 24p video directly can capture using one of these SD video outputs for editing.

See the Final Cut Pro documentation for detailed information about the options for converting 16:9 video to 4:3 video.

Adding and Removing Pull-Down in 24p Clips

Cinema Tools and Final Cut Pro have pull-down removal and addition features that address issues specific to working with 24p video. Pull-down is a process that adds redundant fields to video in order to distribute 24 frames per second into the NTSC standard of 29.97 frames per second. See [Frame Rate Basics](#) for more information. Some camcorders, such as the Panasonic AG-DVX100, are designed to shoot in progressive mode at 24 fps (literally 23.98 fps) and then record the video to tape as a 60-field interlaced signal by applying a special kind of pull-down called *advanced 2:3:3:2 pull-down*. With Final Cut Pro or Cinema Tools, you can remove the redundant fields created by the camera's pull-down, so that you can edit at 23.98 fps or 24 fps.

When you edit 23.98 fps video, you may need to output it to an NTSC monitor, record it to an NTSC videotape, or send it to another type of NTSC device. Because the NTSC standard specifies a frame rate of 29.97 fps, Final Cut Pro gives you a way to add pull-down back in to the video as you output it. To accommodate various circumstances, Final Cut Pro provides a few different types of pull-down patterns for outputting your 23.98 fps video as 29.97 fps video: 3:2 pull-down, 2:3:3:2 pull-down, and 2:2:2:4 pull-down. (See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for a description of these pull-down patterns.)

The sections that follow describe a number of ways that you can use Final Cut Pro or Cinema Tools to remove advanced 2:3:3:2 pull-down or 2:3:2:3 pull-down from digital video clips. You can:

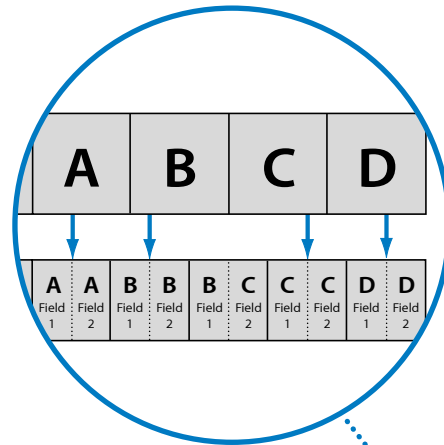
- Use Final Cut Pro to remove 2:3:3:2 pull-down while capturing, or after capturing
- Use Cinema Tools to remove 2:3:3:2 or 2:3:2:3 pull-down on one clip at a time
- Use Cinema Tools to remove 2:3:3:2 or 2:3:2:3 pull-down on several clips at a time

What Is 2:3:2:3 Pull-Down?

A 2:3:2:3 pull-down pattern is exactly the same as a 3:2 pull-down pattern, except that it is applied by a digital video camcorder (as opposed to any other type of equipment that could apply the same pattern of pull-down). This manual uses the term 2:3:2:3 when referring to the pull-down that comes from a 24p digital video camcorder; this type of pull-down can be removed using the automated form of reverse telecine. See [Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools](#) for more information.

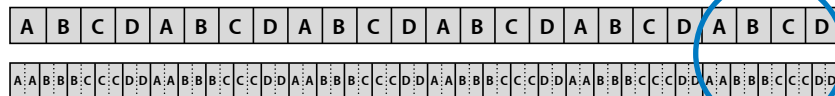
Working with 2:3:3:2 Pull-Down

Some camcorders, such as the Panasonic AG-DVX100, are designed to shoot in progressive mode at 24 fps (actually 23.98 fps) and then record the video to a tape as a 60-field interlaced signal by applying 2:3:3:2 pull-down to it. The 2:3:3:2 pull-down is similar in concept to 3:2 pull-down but has a different pattern of field repetition, as illustrated below.

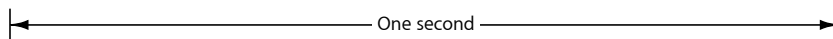


2:3:3:2 Pull-Down

Before (23.98 fps)



After (29.97 fps)

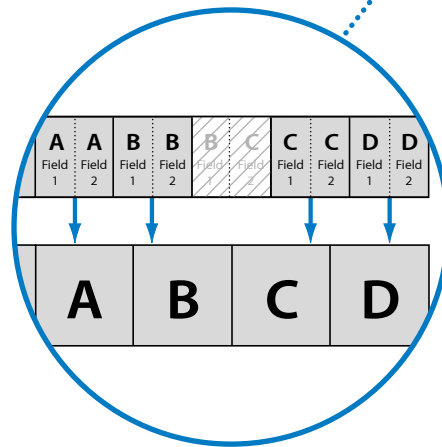
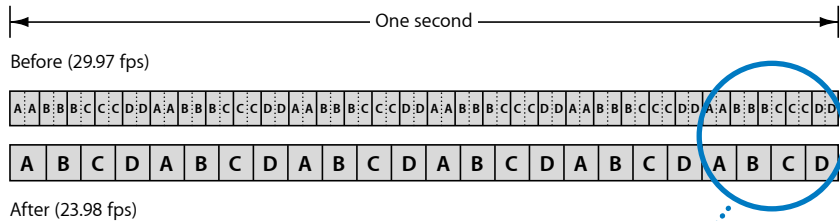


There are some advantages to shooting with, and then removing, 2:3:3:2 pull-down instead of working with 3:2 pull-down:

- Final Cut Pro can easily remove the 2:3:3:2 pull-down while you are capturing, so that you can edit 24 fps (actually 23.98 fps) progressive video.

- Unlike 3:2 pull-down removal, removing a 2:3:3:2 pull-down does not require the recompression and re-creation of any frames, so it results in a better picture quality. Final Cut Pro eliminates the redundant fields by simply pulling out the frames containing fields with two different images (the frames that were constructed from two different original frames). Only frames containing one still image are left, resulting in a clean picture.

2:3:3:2 Pull-Down Removal



You can remove the 2:3:3:2 pull-down with Final Cut Pro while capturing the source media, or with Final Cut Pro or Cinema Tools after capturing.

Note: See 2:3:3:2 Pull-Down for information about applying 2:3:3:2 pull-down to video (rather than removing it from video).

Removing 2:3:3:2 Pull-Down with Final Cut Pro

You can remove 2:3:3:2 pull-down with Final Cut Pro either while capturing the video or after the clips have been captured.

To remove the pull-down while capturing from a digital video source

- 1 In Final Cut Pro, choose Final Cut Pro > Audio/Video Settings.
- 2 Click the Capture Presets tab.
- 3 Select the preset you want to use, then click Edit.
- 4 Select “Remove Advanced Pulldown and/or Duplicate Frames from FireWire sources.”

At some point after removing the 2:3:3:2 pull-down, you may want to output the video with 2:3:3:2 pull-down added back to recapture it with the camera. Or, for NTSC broadcast or distribution, you may want to apply the more conventionally supported 3:2 pull-down. You can output 24p video in either of these pull-down patterns. See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.

To remove the pull-down in Final Cut Pro after capturing

- 1 In Final Cut Pro, select the clips or sequence.
- 2 Choose Tools > Remove Advanced Pulldown.

Removing 2:3:3:2 or 2:3:2:3 Pull-Down with Cinema Tools

Clips captured from digital video camcorders that shoot 24p, such as the Panasonic AG-DVX100 camcorder, have the pull-down pattern (also called *cadence*) information embedded in a way that Cinema Tools can read. If Cinema Tools detects this cadence information when you use the Reverse Telecine feature, the Automated Reverse Telecine dialog appears. It's a simplified version of the regular Reverse Telecine dialog.

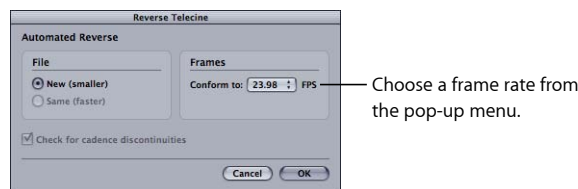
Note: The Reverse Telecine feature cannot be used with temporally compressed video such as MPEG-2-format video.

You can use automated reverse telecine to remove the pull-down either from one clip at a time or from a group (batch) of clips.

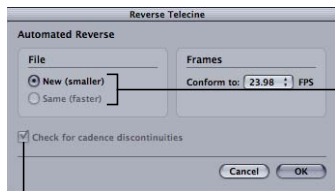
To use automated reverse telecine to remove the pull-down in a single clip

- 1 Choose File > Open Clip, then select the clip in the dialog.
- 2 In the Clip window, click Reverse Telecine.
- 3 Choose a frame rate from the "Conform to" pop-up menu:
 - 23.98: This frame rate is useful if you want to later use the Final Cut Pro pull-down feature that lets you output 23.98 fps video as 29.97 fps video. (See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.)
 - 24.0: You may want to conform and edit the clips at this rate if you plan to include them in a project that contains other clips that are exactly 24 fps.

Note: If the audio and video are contained in the same clip, and you choose 24.0 from this pop-up menu, the Reverse Telecine feature increases the audio speed by a very small percentage so that it is in sync with 24 fps instead of 23.98 fps.



- 4 Select “New (smaller)” or “Same (faster)” to specify the kind of file you want to create:
- *New (smaller)*: Creates a new media file that does not contain the extra frames introduced by the pull-down. The new file is about 20 percent smaller than before, but this method is slower. Regardless of whether the original file was reference or self-contained, this method creates a self-contained file. (See [The Difference Between Self-Contained and Reference Media Files](#) for more information.)
 - *Same (faster)*: Modifies the current media file so that the extra frames are not visible to the editing system, but the data is not removed from the file. This process is faster but does not reduce the size of the file. The resulting file is self-contained if it was originally self-contained, or reference if it was reference.



If you select New, the file will be smaller. If you select Same, the processing will be faster.

When New is selected, “Check for cadence discontinuities” is on. For Same, you can deselect it to speed up processing.

If you selected “Same (faster),” you can choose whether Cinema Tools checks for cadence discontinuities.

While removing the pull-down, Cinema Tools looks for breaks in the pull-down cadence. If any breaks are found, it adjusts the processing to accommodate those discontinuities. A cadence discontinuity might occur if a recording was stopped and then started again at another point in the five-frame sequence.

Checking for cadence discontinuities is more time-consuming for the Same file option than it is for the New file option, so if you select “Same (faster),” you can deselect the “Check for cadence discontinuities” checkbox for the fastest possible processing.

Note: If this checkbox is deselected and cadence discontinuities exist in the clip, or if the cadence changes from 2:3:3:2 to 2:3:2:3 (or any other pattern) in the middle of a clip because the settings were changed during the recording, reverse telecine cannot be properly performed on the clip.

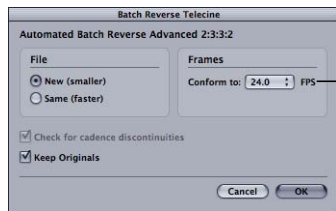
- 5 Click OK to start the pull-down removal process.

If you selected the New file option, you are asked to give the new reversed clip a name and location. If the original clip was connected to a database record, the new reversed clip replaces its connection to the record (regardless of whether or not the new clip overwrites the old clip).

To use automated batch reverse telecine to remove the pull-down from several clips at once

- 1 Place all the clips that you want to process in one folder. (Make sure that they are all clips that were captured from a 24p digital video camcorder.)
- 2 Choose File > Batch Reverse Telecine.
- 3 In the dialog that appears, select any source clip file in the folder that contains the clips you want to process, then click Choose.
- 4 Choose a frame rate from the “Conform to” pop-up menu:
 - 23.98: This frame rate is useful if you want to later use the Final Cut Pro pull-down feature that lets you output 23.98 fps video as 29.97 fps video. (See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for more information.)
 - 24.0: You may want to conform and edit the clips at this rate if you plan to include them in a project that contains other clips that are exactly 24 fps.

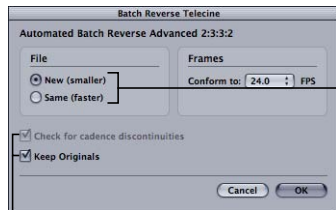
Note: If the audio and video are contained in the same clip, and you choose 24.0 from this pop-up menu, the Reverse Telecine feature increases the audio speed by a very small percentage so that it is in sync with 24 fps instead of 23.98 fps.



Choose a frame rate from the pop-up menu.

- 5 Select “New (smaller)” or “Same (faster)” to specify the kind of files you want to create:
 - *New (smaller)*: Creates new clip files that do not contain the extra frames introduced by the pull-down. The new files are about 20 percent smaller than before, but this method is slower. Regardless of whether the original files were reference or self-contained, this method creates self-contained files. (See [The Difference Between Self-Contained and Reference Media Files](#) for more information.)
- If you select “New (smaller),” you can also choose to keep or delete the original clip files. To save the original clips in a separate folder, select the Keep Originals checkbox.

- *Same (faster)*: Modifies the current clip files so that the extra frames are not visible to the editing system, but the data is not removed from the files. This process is faster but does not reduce the size of the files. The resulting files are self-contained if they were originally self-contained, or reference if they were reference.



If you select New, the file will be smaller. If you select Same, the processing will be faster.

For Same, you can deselect “Check for cadence discontinuities” to speed up processing. For New, selecting Keep Originals saves the original clips in a folder.

If you selected “Same (faster),” you can choose whether Cinema Tools checks for cadence discontinuities.

While removing the pull-down, Cinema Tools looks for breaks in the pull-down cadence. If any breaks are found, it adjusts the processing to accommodate those discontinuities. A cadence discontinuity might occur if a recording was stopped and then started again at another point in the five-frame sequence.

Checking for cadence discontinuities is more time-consuming for the Same file option than it is for the New file option, so if you select “Same (faster),” you can deselect the “Check for cadence discontinuities” checkbox for the fastest possible processing.

Note: If this checkbox is deselected and cadence discontinuities exist in the clip, or if the cadence changes from 2:3:3:2 to 2:3:2:3 (or any other pattern) in the middle of a clip because the settings were changed during the recording, reverse telecine cannot be properly performed on the clip.

6 Click OK to start the pull-down removal.

After the process is complete, the following occur:

- If you selected “New (smaller),” for each clip in the folder, a new clip with the same name is created and placed in a Cinema Tools–created subfolder named Reversed. If you selected Keep Originals, the original files are placed in a Cinema Tools–created subfolder named Originals. If you selected “Same (faster),” the new versions of the clips replace the old versions, in their original folder.

- If Cinema Tools is unable to complete the reverse telecine process for a clip, that clip is moved into a Cinema Tools–created subfolder named Skipped. A clip is not processed if it doesn't contain a video track, if the frame rate is not supported, if the clip does not contain cadence information, or if there is no codec found for the video track.
- A text file appears at the top level of the folder you started with, named “reverse.log.” This log gives the date and time that the process started and ended, as well as a start time for each clip. If any problems were encountered, such as running out of disk space or memory, an error message describing the problem also appears in the log.

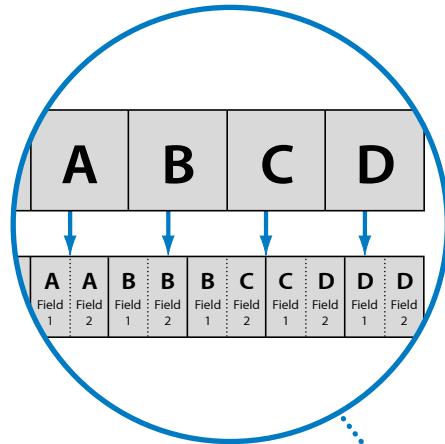
Pull-Down Patterns You Can Apply to 23.98 fps Video

When editing 23.98 fps video, you may want to output it to an NTSC monitor, record it to an NTSC videotape, or send it to another type of NTSC device. When you need to do this, you can use the pull-down addition feature in Final Cut Pro. Pull-down addition is a software method of converting 23.98 fps video to the NTSC standard of 29.97 fps.

There are three pull-down patterns that Final Cut Pro can apply to 23.98 fps video.

3:2 Pull-Down

3:2 pull-down is the same type employed by a telecine. See *Working with NTSC Video* for more information. Because 3:2 pull-down is the conventionally supported pull-down pattern for NTSC devices, you need to use this pull-down pattern to record to an NTSC device, such as an SD television, an MPEG-2 encoding device, or a high-end finishing system.

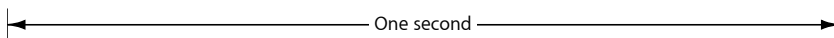


3:2 Pull-Down

Before (23.98 fps)



After (29.97 fps)



2:3:3:2 Pull-Down

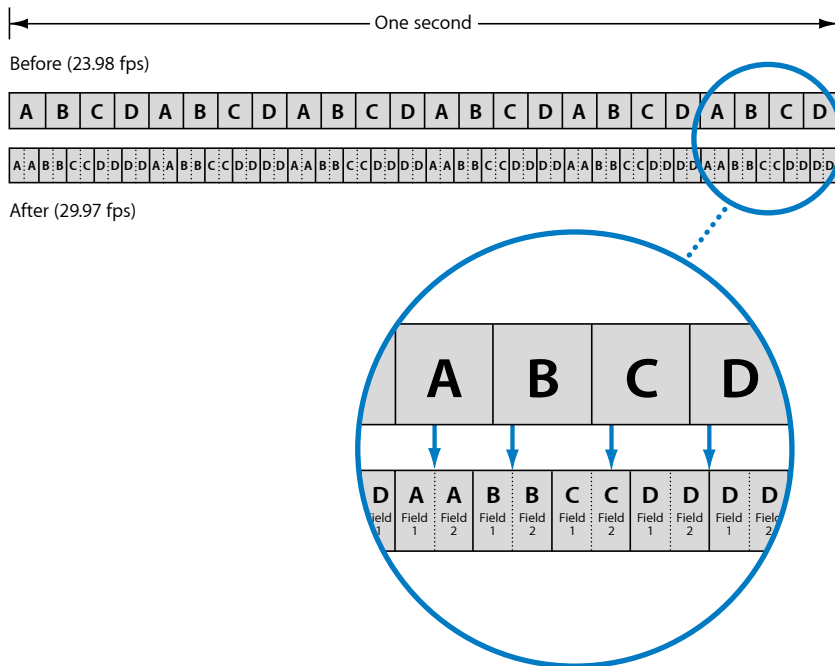
Another type of pull-down you can use is 2:3:3:2 pull-down. As with 3:2 pull-down, the “3” in the pattern represents three fields, where one redundant field is added to the original two fields of a frame. See *Working with 2:3:3:2 Pull-Down* for details about this pattern and the advantages it provides.

Although 3:2 pull-down is the conventionally supported pattern for NTSC devices, you may want to use 2:3:3:2 pull-down to output video that you can record to tape and yet later convert back to 23.98 fps with the advantages of 2:3:3:2 removal (the ability to remove the pull-down without the recompression and re-creation of any frames).

2:2:2:4 Pull-Down

The 2:2:2:4 pull-down pattern is not typically supported for recording devices or cameras, but because it requires the least amount of processing power, it's a good choice if you are editing 23.98 fps video and want to preview it with as many real-time effects as possible on an NTSC monitor. This pattern is also useful if you need to output video for display from an older, slower computer (or a computer with a heavy processing load) that drops frames when you try to output 3:2 or 2:3:3:2 pull-down video.

2:2:2:4 Pull-Down



Adding Pull-Down to 23.98 fps Video

Final Cut Pro lets you add pull-down to 23.98 fps video as you output it via FireWire. As discussed in the previous section, this is useful when you are editing 23.98 fps video and want to output it to an NTSC device.

Important: You must have a FireWire device connected and the sequence must have a 23.98 fps timebase for the pull-down options to appear. They do not appear if the sequence has a 24 fps timebase.

To add pull-down back in while sending 23.98 fps video to an NTSC device via FireWire

- 1 In Final Cut Pro, select the sequence in the Timeline.
- 2 Choose the type of pull-down to use from the RT pop-up menu in the Timeline.

See [Pull-Down Patterns You Can Apply to 23.98 fps Video](#) for details about the available patterns.

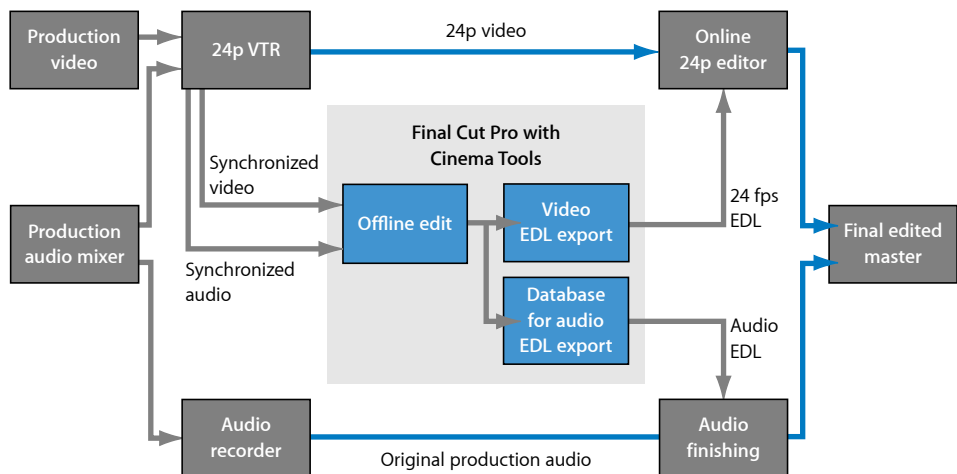
3 Output the video using your FireWire connection.

Refer to the Final Cut Pro documentation for details about outputting video.

The pull-down is performed on the video that is sent out of your computer via FireWire.

Using Audio EDLs for Dual System Sound

As with film productions, 24p video productions almost always record the sound separately from the picture, with a separate sound recorder. This is referred to as using *dual system sound*. This audio is often simultaneously recorded onto the videotape of the 24p VTR, making it easy to later capture both the video and audio, with the audio already synced to the video for the edit.



In most cases, once you have finished editing, you will want to recapture the audio from the original production sound rolls and finish it at an audio post-production facility. The difficulty is that the EDL from Final Cut Pro does not know the roll numbers and audio timecode of the original production sound rolls; it only has the videotape information. Because the production sound recorder is started and stopped independently of the VTR, its timecode will not match the VTR's.

Using its database feature, Cinema Tools can match the edits using the videotape audio with the original production sound rolls and generate an audio EDL that can then be used to recapture and finish the audio.

You must create a Cinema Tools database before you can use this feature. See [Creating and Configuring a New Database](#) for details about creating a database and [Exporting an Audio EDL](#) for details about exporting an audio EDL from Cinema Tools.

Before you use Cinema Tools to edit your film, it's helpful to have a general understanding of a few film properties and be familiar with the traditional film editing method. This appendix provides basic background information about film and how it is edited, both traditionally and digitally.

Most of this information is very general and is not intended to be a complete guide (or the final word) on the film process. There are a wide variety of resources that can provide detailed information on the subject.

This appendix covers the following:

- Film Basics (p. 229)
- Editing Film Using Traditional Methods (p. 234)
- Editing Film Using Digital Methods (p. 236)

Film Basics

There are a number of things that differentiate the various film standards. The most common are:

- *Frame size*: For more information, see [Frame Size](#).
- *Perforation arrangement (how many sprocket holes per frame)*: For more information, see [Perforations](#).
- *Film edge codes, including key numbers and ink numbers*: For more information, see [Film Edge Code](#).
- *Speed (how many frames per second)*: For more information, see [Speed](#).

The following sections discuss these points as they relate to Cinema Tools.

Frame Size

Cinema Tools supports two common film frame sizes: 16mm and 35mm. The aspect ratio (height versus width) of each size is different.

Because of its lower costs, 16mm film is typically used for productions with smaller budgets. If you intend to shoot 16mm but release your project as 4-perf 35mm, you should use Super 16mm film. It has perforations along only one edge and a larger frame that more closely matches the 4-perf 35mm aspect ratio.



16mm format



Super 16mm

35mm film is most commonly used for theatrical releases, with 4 perforations per frame (4-perf) being the most prevalent version. Another common version uses 3 perforations per frame (3-perf). There are other versions of 35mm, such as 8-perf, but they are not currently supported by Cinema Tools.



35mm format
4-perf



35mm format
3-perf

Perforations

Camera and projection equipment uses the perforations, also known as *sprocket holes*, along one or both edges of film to pull it past the shutter.

16mm Film

16mm film has a single perforation for each frame, which comes out to 40 perforations per foot. 16mm is available as single perforated (perforations along one edge only, allowing the space for an optical track, or in the case of Super 16mm film, for a larger frame) and double perforated (perforations along both edges). Cinema Tools supports single and double perforated 16mm film as long as it has a key number every 20 frames. See [Key Numbers](#) for more information.

35mm Film

35mm film has 64 perforations per foot. Cinema Tools supports the 4-perf 35mm and 3-perf 35mm formats for all types of film lists and change lists. These are by far the most common 35mm formats.

The 4-perf 35mm film format has 16 frames per foot. The 3-perf 35mm format does not have a whole number of film frames in a foot (there are 21 and one-third per foot). To avoid tracking fractions of frames, the 3-perf 35mm format is considered to have a pattern of two 21-frame feet followed by a 22-frame foot. See [3-Perf 35mm Offsets](#) for more information.

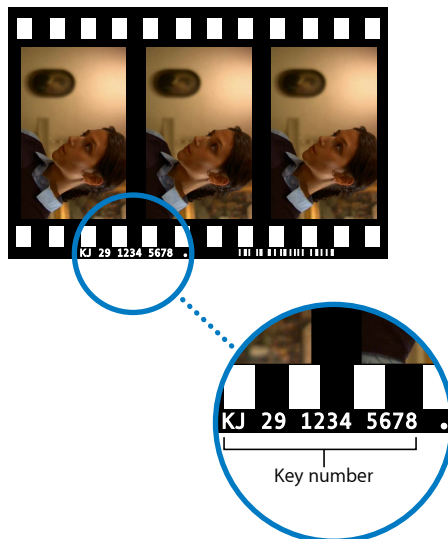
Film Edge Code

To aid in locating specific film frames, film manufacturers place numbers along the edge of the film. These key numbers (also known as *latent edge code*) appear when the film is developed. For workprints, film labs can add numbers called *ink numbers* (also known as *Acma* numbers).

Edge code is essential to your Cinema Tools database because it makes it possible for you to export cut lists or change lists that specify exactly where your negatives or workprints need to be cut in order to match your digital edits.

Key Numbers

Key numbers provide both an identification number for each roll of film and an incremental footage count number used to identify specific film frames. They often appear as both regular text and as a bar code.



Each film standard uses key numbers differently:

- 16mm film can have a key number every 20 frames (most common) or 40 frames, depending on the film stock. Cinema Tools supports the 16mm-20 format.
- 35mm film has a key number every 64 perforations (which works out to every 16 frames with the 4-perf format, or 21 and one-third frames with the 3-perf format).

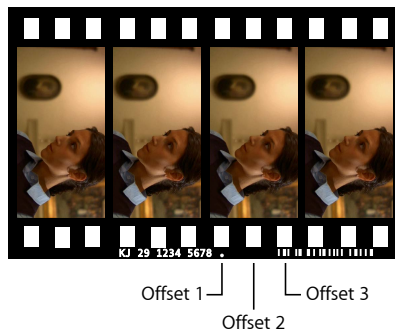
Unlike video timecode, which provides a unique number for each video frame, key numbers do not appear on every frame of film. For this reason, when identifying a specific frame in a log book or in Cinema Tools, key numbers have a frame count extension added specifying the actual frame. A “+08” at the end of a key number indicates it is the eighth frame from that key number’s first frame.

In the previous illustration, the actual key number for the center frame is KJ 29 1234 5678+00. The “.” following the number indicates frame 00 for that key number. (With 4-perf film—the kind shown in the illustration—there are 16 frames per key number, with the first one starting at “00.”) The frame to the right would be KJ 29 1234 5678+01. The frame to the left would be the last frame of the previous key number, KJ 29 1234 5677+15. (16mm film places the “.” at the beginning of the key number.)

35mm film also has mid-foot markers halfway between the zero frame markers. These help to identify a midpoint (the “+08” frame in the previous example) and reduce the chance of a miscount. These markers use the same key number with a “+32” appended (indicating the perforation number, not the frame number) in a smaller font.

3-Perf 35mm Offsets

Because the 3-perf 35mm format does not have a whole number of frames between each key number, an additional “perforation offset” number is added to the end of the key number. This number indicates the relationship of the perforation marked with a “.” and the frame at that position.



Ink Numbers

Ink numbers, frequently used for workprints, are another method of encoding the edge of film in order to track feet and frames. Ink numbers are added to workprints and corresponding magnetic-stripe film soundtracks (called *mag tracks*) after the workprint and the mag track have been synchronized. On transferred workprints, ink numbers are easier to read than key numbers, and they provide a counting mechanism that is synchronized for both the soundtrack and the workprint. Ink numbers are sometimes called *Acmade numbers* because Acmade makes a machine that is used to print ink numbers. Machines that print ink numbers are commonly rented or owned and run by film crews.

The typical style of ink numbering is a three-digit prefix followed by a character or space, followed by four digits representing the footage number, followed by digits representing the frame offset. For example, in ink number 123 4567+08, “123” is the prefix and “4567+08” is the frame number, indicating that the frame occurs at 4567 feet and 8 frames. The ink numbers encoded on the film do not actually include the last part (the frame offset number). Rather, the frame offset is calculated by the telecine and appears in the telecine log.

The prefix may contain fewer or more than three digits, and the numbering technique for the prefix is usually determined by an editing assistant. For example, the numbering could be associated with the scene number, as in “042” for the footage in scene 42. Or, the prefixes might represent daily roll numbers.

Window Burn

As part of the telecine transfer process (described in *Transferring Film to Video*), the key number is typically burned in to the video (along with the video and audio timecode), helping to identify specific frames. The burned-in numbers are called *window burn*.



It is much easier to use Cinema Tools if you can see the key numbers. You can use Cinema Tools without the window burn, but it requires more effort on your part to ensure that edits are being tracked properly.

Note: After you have captured your video but before you start editing, check the burned-in key numbers and timecode to make sure they match the actual ones on the film and videotape. There are a variety of reasons why the window burn values might not be correct, ranging from incorrectly entered values to faulty automatic detection. Any errors at this point will result in serious problems when the negative is conformed. The most common way to verify these numbers is to have the lab or transfer facility physically punch a hole or otherwise mark a film frame, note its key number, and compare it to the burned-in key number when viewing the transferred video. Make sure you verify this at least once for each camera roll (preferably for each take). Compare the timecode in the window burn with the value the videotape deck displays.

Speed

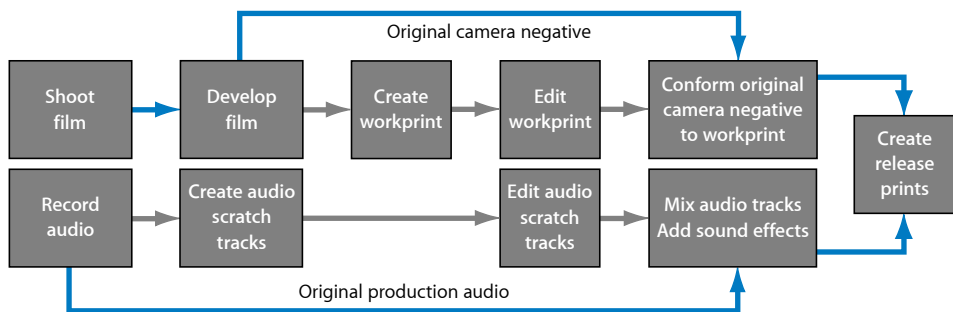
Film normally has a frame rate of 24 frames per second (fps). This means a new image is exposed or projected 24 times a second. To ease conversion to video frame rates, it is common to run the film at rates other than 24 fps during the telecine transfer.

Cinema Tools supports film transferred to video with the telecine running at the rates of 23.98 fps, 24 fps, 25 fps, and 29.97 fps (often referred to as 30 fps). See [Frame Rate Basics](#) for more information about frame rates.

Editing Film Using Traditional Methods

The traditional process of editing film has changed little over the years. Although the equipment has improved dramatically, the steps are basically the same. Following is a simplified workflow outlining the film editing process.

Note that the original camera negative is almost never used during the creative editing part of the process. The negative must be handled as little as possible, and then by professionals in the proper environment, to avoid damaging it.



Stage 1: Shooting the Film and Recording the Sound

Audio is always recorded separately from the film, on a separate sound recorder. This is known as *shooting dual system sound*. While shooting the film, you need to include a way to synchronize the sound to the picture. The most common method is to use a clapper board (also called a *slate* or *sticks*) at the beginning of each take. There are a number of other methods you can use, but the general idea is to have a single cue that is both audible and visible (you can see what caused the noise).

Stage 2: Developing the Film

The developed film is known as the *original camera negative*. This negative will eventually be conformed to create the final movie and must be handled with extreme care to avoid scratching or contaminating it. Normally, the negative is used to create a workprint (film positive) and then put aside until the negative is conformed.

Stage 3: Creating the Workprint

The workprint is created from the original camera negative and gives you a copy of the raw film footage to use for the editing process. Because workprints are film positives, they can be projected and used as dailies, letting you view what has been shot.

Stage 4: Creating Audio Scratch Tracks

An audio scratch track is similar to the film's workprint—it's a copy of the production audio to use while editing. Depending on the type of mechanical film editor you intend to use, you will often create an audio scratch track on magnetic film. Magnetic film, known as *single stripe*, *three stripe*, *mag stock*, and *fullcoat*, uses perforations like regular film but is coated with magnetic material. Once the magnetic film is synced with the film on the editor, both the audio scratch track and the workprint are run in tandem, maintaining their sync during editing.

Stage 5: Editing the Workprint

This is the point when you make decisions regarding which parts of the film footage you want to use and how you want it laid out. Editing the workprint involves physically cutting and splicing at each edit point. Changing your mind about the exact placement of a cut or trying an alternative edit is time-consuming and tends to be hard on the film. (This is the part of the process that digital editing greatly facilitates.) When you are satisfied with the edited workprint, you send it to the negative cutter.

Stage 6: Conforming the Negative

The negative cutter uses the edited workprint as a guide to make edits to the original camera negative. This process is called *conforming*. Because there is only one negative, it is crucial that no mistakes are made at this point. As opposed to the cutting and splicing methods used when working with the workprint, the cutting and splicing methods used for conforming the negative destroy frames on each end of the edit. This makes extending an edit virtually impossible and is one of the reasons you must be absolutely sure of your edit points before beginning the conform process.

Stage 7: Editing the Audio

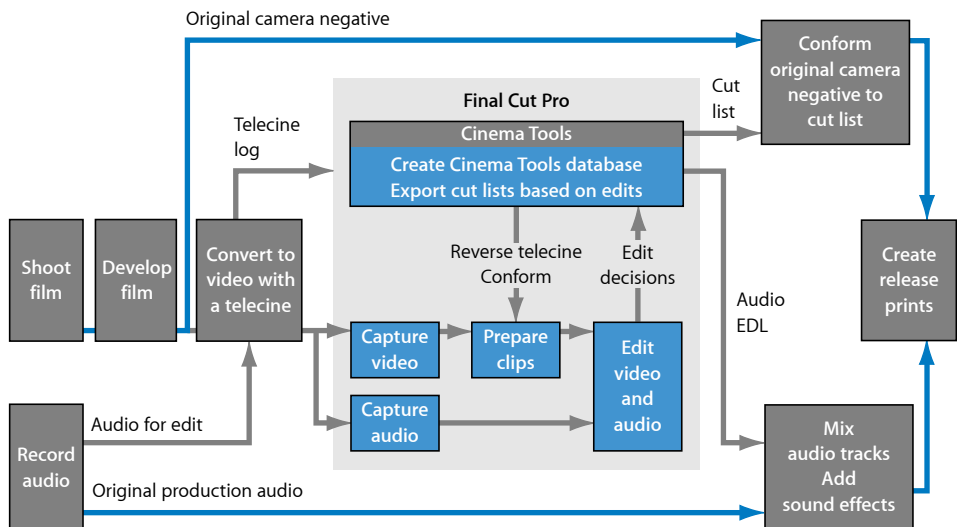
You typically “rough-cut” the audio while editing the workprint. While the negative is being conformed, the audio is edited (using the original sound rolls) and finished with sound effects and any required dialogue enhancements.

Stage 8: Creating the Answer and Release Prints

After the original camera negative has been conformed and the audio finalized, you can have an answer print created. This print is used for the final color timing, where the color balance and exposure for each shot are adjusted to ensure the shots all work well together. You may need to create several answer prints before you are happy with the results. Once you are satisfied with the answer print, the final release print is made.

Editing Film Using Digital Methods

The process of editing film digitally is constantly evolving, but the basic concept remains the same—you start and end on film, with only the creative part of the editing process changing. Following is a simplified workflow outlining the basic process. (See *Cinema Tools Workflows* for a more detailed explanation of this process.)



Although this workflow appears more complicated than the traditional editing method, many of these steps can be automated. For most filmmakers, the benefits of being able to edit digitally easily offset any added procedures.

Several parts of this process are the same as for the traditional method—as mentioned earlier, it is only the middle part of the film editing process that is affected by editing digitally.

Stage 1: Shooting the Film and Recording the Sound

Audio is always recorded separately from the film, on a separate sound recorder. This is known as *shooting dual system sound*. While shooting the film, you need to include a way to synchronize the sound to the picture. The most common method is to use a clapper board (also called a *slate* or *sticks*) at the beginning of each take. There are a number of other methods you can use, but the general idea is to have a single cue that is both audible and visible (you can see what caused the noise).

Stage 2: Developing the Film

The developed film is known as the *original camera negative*. This negative will eventually be used to create the final movie and must be handled with extreme care to avoid scratching or contaminating it. The negative is used to create a video transfer (and typically a workprint, as with the traditional method) and then put aside until the negative is conformed.

Stage 3: Transferring the Film to Video

The first step in converting the film to a format suitable for use by Final Cut Pro is to transfer it to video, usually using a telecine. Telecines are devices that scan each film frame onto a charge-coupled device (CCD) to convert the film frames to video frames. Although the video that the telecine outputs is typically not used for anything besides determining edit points, it's a good idea to make the transfer quality as high as possible. If you decide against making workprints, this may be your only chance to determine if there are undesirable elements (such as microphone booms and shadows) in each take before committing to them. The video output should have the film's key number, the video timecode, and the production audio timecode burned in to each frame.

The actual videotape format used for the transfer is not all that important, as long as it uses reliable timecode and you will later be able to capture the video and audio digitally on the computer prior to editing. An exception is if you intend to use the video transfer to also create an edited video version of the project, perhaps for a video trailer. This requires two tapes to be made at the transfer—one that is high quality and without window burn, and another that has window burn.

It is strongly recommended that the audio be synced to the video and recorded onto the tape along with the video during the telecine process. There are also methods you can use to sync the audio after the telecine process is complete—the important thing is to be able to simultaneously capture both the video and its synchronized audio with Final Cut Pro.

Stage 4: Creating a Cinema Tools Database

The key to using Cinema Tools is its database. The database is similar to the traditional code book used by filmmakers. It contains information about all elements involved in a project, including film key numbers, video and audio timecode, and the actual clip files used by Final Cut Pro. Depending on your situation, the database may contain a record for each take used in the edit or may contain single records for each film roll. The film-to-video transfer process provides a log file that Cinema Tools can import as the basis of its database. It is this database that Cinema Tools uses to match your Final Cut Pro edits back to the film's key numbers while generating the cut list.

There is no requirement that the database be created before the video and audio are captured, or even before they are edited. The only real requirement is that it must be created before a cut list can be exported. The advantage of creating the database before capturing the video and audio is that you can then use it to create batch capture lists, allowing Final Cut Pro to capture the clips. The database can also be updated and modified as you edit.

Stage 5: Capturing the Video and Audio

The video created during the telecine process must be captured as a digital file that can be edited with Final Cut Pro. The way you do this depends on the tape format used for the telecine transfer and the capabilities of your computer. You need to use a third-party capture card to capture files from a Betacam SP or Digital Betacam tape machine. If you are using a DVCAM source, you can import directly via FireWire. To take advantage of the batch capture capability of Final Cut Pro, you should use a frame-accurate, device-controllable source.

As opposed to the captured video, which is never actually used in the final movie, the edited audio can be used. You may decide to capture the audio at a high quality and export the edited audio as an Open Media Framework (OMF) file that can be imported at a Digital Audio Workstation (DAW) for finishing. Another approach is to capture the audio at a low quality and, when finished editing, export an audio EDL that can be used by an audio post-production facility, where the production audio can be captured and processed at a very high quality.

Stage 6: Processing the Video and Audio Clips

Depending on how you are using Cinema Tools, the captured clips can be linked to the Cinema Tools database. They can also be processed, using the Cinema Tools Reverse Telecine and Conform features, to ensure compatibility with the Final Cut Pro editing timebase. For example, the Cinema Tools Reverse Telecine feature allows you to remove the extra frames added when transferring film to NTSC video using the 3:2 pull-down process.

Stage 7: Editing the Video and Audio

You can now edit the project using Final Cut Pro. For the most part, you edit your film project the same as any video project. If you captured the audio separately from the video, you can synchronize the video and audio in Final Cut Pro.

Any effects you use, such as dissolves, wipes, speed changes, or titles, are not used directly by the film. These must be created on film at a facility specializing in film opticals.

It can be helpful for the negative cutter if you output a videotape of the final project edit. Although the cut list provides all the information required to match the film to the video edit, it helps to visually see the cuts.

Stage 8: Exporting the Film Lists

After you've finished editing, you export a film list that can contain a variety of film-related lists, including the cut list, which the negative cutter uses to match the original camera negative to the edited video. Additional lists can also be generated, such as a duplicate list, which indicates when any source material is used more than once.

Stage 9: Creating a Test Cut on a Workprint

Before the original camera negative is conformed, it is strongly suggested that you conform a workprint to the cut list to make sure the cut list is accurate (some negative cutters insist on having a conformed workprint to work from). There are a number of things that can cause inaccuracies in a cut list:

- Damaged or misread key numbers entered during the telecine transfer process
- Incorrect timecode values
- Timecode errors introduced during the capture process
- With NTSC video, 3:2 pull-down problems

In addition to verifying the cut list, other issues, such as the pacing of a scene, are often hard to get a feel for until you see the film projected on a large screen. This also gives you a chance to ensure that the selected shots do not have unexpected problems.

If your production process involves workprint screenings and modifications, you can also export a change list that describes what needs to be done to a workprint to make it match a new version of the sequence edited in Final Cut Pro.

Stage 10: Conforming the Negative

The negative cutter uses the cut list, the edited workprint, and the edited video (if available) as a guide to make edits to the original camera negative. Because there is only one negative, it is crucial that no mistakes are made at this point. As opposed to the cutting and splicing methods used when working with the workprint, the cutting and splicing methods used for conforming the negative destroy frames on each end of the edit. This makes extending an edit virtually impossible and is one of the reasons you must be absolutely sure of your edit points before beginning the conform process.

Stage 11: Finishing the Audio

You usually rough-cut the audio while editing the video (stage 7); the audio is typically finished while the film is being conformed. As mentioned in stage 5, you can use an exported OMF version of the Final Cut Pro edited audio or export an audio EDL and recapture the production audio (using the original sound rolls) at a DAW. Finishing the audio is where you perform the final sound mix, including cleaning up dialogue issues and adding sound effects, backgrounds, and music.

Stage 12: Creating the Answer and Release Prints

After the original camera negative has been conformed and the audio finalized, you can have an answer print created. This print is used for the final color timing, where the color balance and exposure for each shot are adjusted to ensure the shots all work well together. You may need to create several answer prints before you are happy with the results. Once you are satisfied with the answer print, the final release print is made.

How Cinema Tools Creates Film Lists

B

Cinema Tools can produce a film list only if it can match edits made in the editing system to records in the Cinema Tools database. The database record contains the film roll and key number information that Cinema Tools needs in order to describe the edit in the film list.

This appendix covers the following:

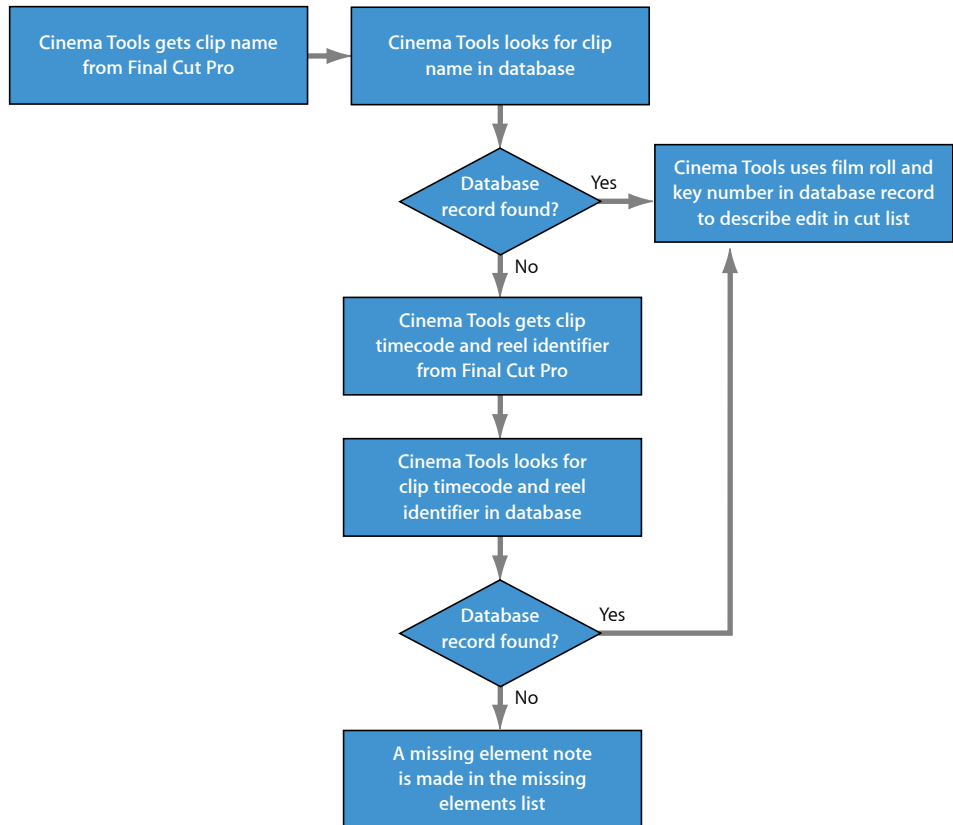
- [Film List Creation Overview](#) (p. 241)
- [About the Clip-Based Method](#) (p. 242)
- [About the Timecode-Based Method](#) (p. 243)

Film List Creation Overview

In creating a film list, there are two basic methods Cinema Tools uses to locate a database record associated with a particular edit:

- *Clip-based method:* Cinema Tools obtains the clip's filename from Final Cut Pro and then looks for the clip in the database. Cinema Tools first tries to locate the clip based on the clip pathname indicated in the editing system. If it fails to find the clip by looking for the pathname, it searches for the clip by its name and modification date. When Cinema Tools finds the clip in the database, it can also locate the associated record, because each clip must be linked to one record. See [About the Clip-Based Method](#) for more information.
- *Timecode-based method:* If Cinema Tools can't find the database record using the clip's filename, it finds the database record by looking for the video reel and timecode information associated with the edit in the sequence in Final Cut Pro. See [About the Timecode-Based Method](#) for more information.

Cinema Tools always uses the clip-based location method when it can. If it doesn't find a matching clip, it uses the timecode-based location method. If Cinema Tools cannot find a suitable database record with either method, an entry is logged in the missing elements list (if you chose to include a missing elements list in the film list). This process is outlined in the flow chart below.



About the Clip-Based Method

For Cinema Tools to locate a database record using the clip-based location method, it needs to know only the relationship between the source clip and the key numbers or ink numbers. In contrast, the timecode-based method requires that Cinema Tools know the relationship between the key numbers or ink numbers and the video reel and timecode. Because the clip-based method relies on fewer variables, it is more reliable, which is why Cinema Tools tries to use this method first.

About the Timecode-Based Method

There are some situations in which the timecode-based method is useful or even essential:

- *If you have not logged clips in the Cinema Tools database by connecting them to database records:* Only the timecode-based method can locate the database records. If the database contains the data that is needed to match the edge code and the timecode, and if the source clips were captured by Final Cut Pro using frame-accurate device control, Final Cut Pro should know the video reel and timecode information for each clip, and a film list can be produced from this information. (In such a case, you do not have to connect the source clips to the database records, saving you a fair amount of labor.)
- *If you are generating a film list from an external EDL:* The timecode-based method is used (assuming you have not connected the source clips to the database).
- *If the clip files are inaccessible (offline) when the film list is generated:* Only the timecode-based method can locate the database records.

There are a number of resources you can turn to for help when you have issues with Cinema Tools.

This appendix covers the following:

- Resources for Solving Problems (p. 245)
- Solutions to Common Problems (p. 245)
- Contacting AppleCare Support (p. 247)

Resources for Solving Problems

If you run into problems while working with Cinema Tools, there are several resources you can use to find a solution.

- *This appendix*: This appendix includes information about some of the most frequent issues users encounter.
- *AppleCare Knowledge Base*: AppleCare Support maintains a database of common support issues that is updated and expanded to include new issues as they arise. This is an excellent, free resource for Cinema Tools users. To access the AppleCare Knowledge Base, go to the AppleCare Support page at <http://www.apple.com/support>.
- *AppleCare Support*: There are a variety of support options available to Final Cut Studio customers. For more information, see the documentation about support options that was included with your Final Cut Studio package.

Solutions to Common Problems

Following is a list of common problems you might have while using Cinema Tools, with one or more solutions provided for each problem.

You see warnings about duplicate usages of source material

- When the number of frames reused is fewer than the number of frames you entered in the Cut Handles or Transition Handles settings in the film list export dialog, it's possible that a duplicate usage warning is a result of the cut handles or transition handles. To determine whether this is the case, try setting the Transition Handles option to zero frames and the Cut Handles option to one-half of a frame, then export the film list again.
- When your edited program contains duplicate usages of source material and you have only one original camera negative to cut, you have a couple of options. You can reedit your scene or scenes in order to avoid using the material more than once. Or, you can export a duplicate list and give it to a lab so the lab can create duplicate negatives of each shot that is used more than once. You then transfer the duplicate negatives to video, capture them into Final Cut Pro, log them in the Cinema Tools database, and use them to replace the duplicate sections in your edited project.

The key numbers in the cut list do not match the key numbers in the digital clips

- First, make sure that it is something to be concerned about. When editing at the NTSC video rate of 30 fps (actually 29.97 fps), key numbers might be off by +/- one frame. This is normal and to be expected if you edited at the NTSC video rate. (See [Frame Rate Basics](#) for more information.) Also, the key number may be off by more than one frame at the end of the cut if it was necessary to add or subtract a frame in order to maintain sync with the audio. However, under no circumstances should the key number be off by more than one frame at the *beginning* of the cut. And, if you are editing PAL video at 24 fps, the key number you see burned in to the frame should never be different from the key number you see in the cut list at the In and Out points.
- If the difference is more than one frame, the most likely cause is that the clip is not properly identified in the Cinema Tools database. To check that the clip is correctly identified, go to the corresponding database record, then click Open Clip to open the Clip window. Use the Identify feature to check the key numbers for more than one location in the clip to see if the frames are properly identified. If the key number was entered incorrectly, correct it in the Identify pane of the Clip window. See [Verifying and Correcting Edge Code and Timecode Numbers](#) for more information. Then, generate the cut list again and verify that the correct key numbers are now displayed.
- Make sure that the timecode is accurate in Final Cut Pro. If you used device control to capture your clips but find that Cinema Tools is reporting the wrong timecode, there is a good chance that the timecode is incorrect in Final Cut Pro. If the timecode is wrong in Final Cut Pro, you must recapture the source clips. If you used serial device control, the timecode mismatch may have happened because you did not set the appropriate timecode offset in Final Cut Pro for the specific deck you used. You need to make this setting once per deck, per computer. If the serial device control timecode offset was not set, set it, then recapture the source clips. For more information, see the section about calibrating the timecode signal in the Final Cut Pro documentation.

- Make sure that all the clips in your sequence have the same frame rate as the editing timebase for the sequence in Final Cut Pro. See the Final Cut Pro documentation for details about setting the editing timebase in the Sequence Preset Editor.
- There may be dropped frames or discontinuities in the key numbers of the video. Try recapturing the clips.

When you try to use the Reverse Telecine feature, you see an error about dropped frames

- Occasionally there are clips that contain frames that are longer than they should be. This situation can cause the Cinema Tools reverse telecine process to report one or more dropped frames, when in fact there aren't any. Try conforming the clip to 29.97 fps with the Conform feature, then start the reverse telecine process again.
- If frames were actually dropped during the capture process, it's best to recapture the source clips without dropped frames because dropped frames can interfere with the reverse telecine process. See [Avoiding Dropped Frames](#) for more information.

You see unexpected .tmp files

- Cinema Tools may create several temporary files in the process of creating the cut list. These files are normally deleted when the process is complete, so you don't see them. If a system failure occurs before the film list is generated, these files might not be deleted. If you find any Cinema Tools-generated files with a filename extension of .tmp, .tmp.dat, or .tmp.idx, you can delete them.

In the cut list, you see an error about a temporary file

- If a problem occurs while Cinema Tools is creating a temporary file, you might see error messages about these files in the cut list. The most likely reason for this problem is that there is not enough disk space available on the storage volume. Make sure the storage volume has disk space available.

Contacting AppleCare Support

Included in your Final Cut Studio package is documentation about the support options available from Apple. Several levels of support are available, depending on your needs.

Whatever your issue, it's a good idea to have the following information immediately available when you contact Apple for support. The more of this information you have ready to give to the support agents, the faster they will be able to address your issue.

- The Support ID number found on the back of the *Installing Your Software* booklet that came with Final Cut Studio.

Note: The 11-digit Support ID number is different from the product serial number used to install Final Cut Studio.

- The version of Mac OS X you have installed. To find the version of Mac OS X, choose Apple menu > About This Mac.

- The version of Cinema Tools you have installed, including updates if applicable. To find the version of Cinema Tools, choose Cinema Tools > About Cinema Tools.
- The model of computer you are using.
- The amount of RAM installed in your computer, and how much is available to Cinema Tools. To find out how much RAM is installed, choose Apple menu > About This Mac.
- What other third-party hardware is connected to or installed in the computer, and who the manufacturers are. Include hard disks, graphics cards, and so on.
- Any third-party plug-ins or other software installed along with Cinema Tools.

In certain support situations, AppleCare may require information about both your computer and how this particular application is configured. Choosing Help > Create Support Profile creates a file that contains the necessary information and can be emailed to AppleCare. You would not normally use this feature unless directed to by an AppleCare representative.

To access AppleCare Support for Cinema Tools, go to <http://www.apple.com/support/cinematools>.

2:3:2:3 pull-down A pull-down method that is the same as the 3:2 pull-down method, except that it is applied by a digital video camcorder (as opposed to any other type of equipment that could apply the same pattern of pull-down). This manual uses the term 2:3:2:3 when referring to the pull-down that comes from a 24p digital video camcorder; this type of pull-down can be removed using the automated form of reverse telecine. See also 3:2 pull-down .

2:3:3:2 pull-down A method of distributing film's 24 fps among NTSC video's 29.97 fps when film or 24p video is transferred to NTSC video. In the transfer, the recording alternates two fields of one frame and then three fields of the next two frames, followed by two fields of the next frame. In this way, the 24 frames in 1 second of film or 24p video fill up the 30 frames in 1 second of NTSC video. Although 3:2 is the conventionally supported pull-down pattern for NTSC devices, some digital cameras and editing systems are beginning to support 2:3:3:2 pull-down.

3:2 pull-down A method of distributing film's 24 fps among NTSC video's 29.97 fps when film or 24p video is transferred to NTSC video. In the transfer, the recording alternates two fields of one frame and then three fields of the next, so that the 24 frames in 1 second of film or 24p video fill up the 30 frames in 1 second of NTSC video. Also known as 2:3 *pull-down*.

3-perf 35mm A 35mm film format supported by Cinema Tools. Refers to having three perforations (sprocket holes) for each film frame. It is gaining popularity, especially with episodic television, because it contains 25 percent more frames per foot of film than the more common 4-perf 35mm format.

4-perf 35mm A common 35mm film format that is supported by Cinema Tools. Refers to having four perforations (sprocket holes) for each film frame.

24 & 1 A method of transferring film to PAL video, where two extra fields per second are added to the video so the 24 frames in 1 second of film are all contained within the 25 frames in 1 second of PAL video. This method maintains the original action speed. See also 24 @ 25, 24 @ 25 pull-down.

24 @ 25 The most common method of transferring film to PAL video, where the film is sped up during the telecine transfer to 25 fps. This creates a one-to-one film-to-video frame relationship, but speeds up the action by 4 percent. See also *24 & 1*, *24 @ 25 pull-down*.

24 @ 25 pull-down The Final Cut Pro term for the *24 & 1* method. See also *24 & 1*, *24 @ 25*.

24p A high definition video format using a 24 fps rate and progressively scanned video. It is finding wide use in film production because of its high quality and identical frame rate. It also converts easily to most 29.97 fps and 25 fps standard and high definition video formats.

Acmade number See *ink number*.

"A" frame The first frame in the repeating five-frame 3:2 pull-down sequence. In two-field 3:2 pull-down video, it is the only frame that fully contains both fields from a single film frame. B, C, and D frames have their fields split among two video frames. A frames normally occur on timecode numbers ending with "0" or "5" (when using non-drop frame timecode). See also *3:2 pull-down*, *field*.

ALE file Abbreviation for *Avid Log Exchange*. A file format that allows film databases to be shared between different systems. See also *telecine log*.

answer print The first film print that includes sound and picture, submitted by the laboratory for the customer's approval.

aspect ratio The ratio of an image's width to its height expressed either as two numbers (width:height) or as a value equal to the height divided by the width. Standard definition video uses 4:3 (0.75), and most high definition video uses 16:9 (0.56). Film aspect ratios depend on the format and lenses used.

change list A list you can export from Final Cut Pro using Cinema Tools, which assumes a workprint or negative has been cut to the specifications of a cut list (or prior change list) and specifies further changes to make based on new edits you have made to a Final Cut Pro sequence.

conform (film) To cut and arrange an original camera negative to match edits made in a digital editing system. Also, to assemble video or audio according to an Edit Decision List (EDL). See also *cut list*, *Edit Decision List (EDL)*.

conform (video) To change the frame rate of a video clip. For example, you can use the Cinema Tools Conform feature to change the frame rate of a PAL 25 fps video clip to film's 24 fps rate. You can also conform a clip to its current frame rate, ensuring there are no frame rate errors within it.

contact printing A film printing method in which the emulsion sides of the original camera negative and the print stock are in contact as the negative is projected onto the print stock. Creates an image that is reversed in color and light (for example, black becomes white and white becomes black).

cut list A text file that sequentially lists the edits that make up your program. The negative cutter uses the cut list to conform the original camera negative. The cut list is a type of film list you can export from Final Cut Pro using Cinema Tools. Also known as an *assemble list*.

device control Technology that allows Final Cut Pro to control an external hardware device, such as a video deck or camera.

DF See [drop frame timecode](#) .

digital intermediate (DI) A film workflow that does not rely on conforming the original camera negative for the final output. Generally, the film is scanned and processed at a high enough quality that the final output can be directly sent to a film printer or distributed as digital video. This term is also used even if the source for the video is a high-quality digital camera such as the RED ONE and no film is involved at all.

downconverted video Video created by converting high definition video (such as 24p) to standard definition video (NTSC or PAL).

DPX image sequence Digital Picture Exchange (DPX) image sequences are often referred to by their resolution. For example, DPX image sequences with 2048 horizontal pixels are referred to as 2K resolution, and DPX image sequences with 4096 horizontal pixels are referred to as 4K resolution. The video is actually a set of still images, one per frame, within a folder. The images are played back in sequence at their specified frame rate. DPX image sequences are often used as part of a DI workflow. Cinema Tools uses the folder name as the reel name and extracts the timecode from each image. See also [digital intermediate \(DI\)](#).

drop frame timecode NTSC timecode that skips ahead in time by two frame numbers each minute, except for minutes ending in "0," so that the end timecode total agrees with the actual elapsed clock time. (Timecode numbers are skipped, but actual video frames are not skipped.) This skipping corrects for NTSC's actual frame rate of 29.97 fps, which results in an inaccuracy of 3 seconds and 18 frames per hour in comparison to actual elapsed time when non-drop frame timecode is used. To avoid confusion, drop frame timecode should be avoided in film-based productions. See also [non-drop frame timecode](#) .

dropped frames Frames that are not captured. If computer performance is impeded or if the scratch disk is not fast enough, frames may be dropped during the capture process. When a frame is dropped during capture, the frame before it is repeated. Dropped frames can result in an incorrect cut list and interfere with the reverse telecine process.

dual system sound Sound for any production using separate devices to record the image and the sound. Dual system recording is always used in film productions and often used in 24p productions. Also known as *double system* production.

duplicate list A film list Cinema Tools users can export, indicating duplicate uses of the same film source material in an edited program. Also known as a *dupe list*.

edge code Refers to feet and frame count numbers found on the film edge. May be latent key numbers on the original camera negative, or ink numbers added to the edge of workprints. See also *ink number* , *key number* .

Edit Decision List (EDL) A text file that sequentially lists all of the edits and individual clips used in a sequence. EDLs are used to move a project from one editing application to another, or to coordinate the assembly of a program in a tape-based online editing facility.

Extensible Stylesheet Language Transformations (XSLT) The language used by the Cinema Tools style sheets. XSLT-based style sheets are commonly used to extract information from XML files. When you export a style sheet-based film list, Cinema Tools first exports an XML-format film list and then processes that XML output with the selected style sheet, resulting in exactly the output items and layout the style sheet specifies. See also *style sheet*.

field Half of an interlaced video frame consisting of the odd or the even scan lines. Alternating video fields are drawn every 1/60 of a second in NTSC video (1/50 of a second in PAL) to create the perceived 29.97 fps video (25 fps PAL). There are two fields for every frame, an upper field and a lower field. It is possible to capture only one field of each frame. See also *interlaced video* .

field dominance Refers to the field that occurs first in an interlaced video frame. If only one field is captured, field 1 dominance means that only field 1 is captured and field 2 dominance means that only field 2 is captured. See also *field* .

film list A text file you give to the negative cutter to use as a guide in conforming the original camera negative. The film list may contain one or more of the following: a cut list, a missing elements list, a duplicate list, an optical list, a pull list, and a scene list. A film list may also contain additional information for pulling the negative rolls, making duplicate negatives, making a workprint, or printing effects.

FLEX file A common telecine log file format. See also *telecine log* .

footage number Part of a key number; refers to the four-digit number indicating the position on a film roll. See also *frame number* , *key number* .

found set The set of database entries shown in the Cinema Tools List View window. This set is called the *found set* because you use the Find command to display it.

fps Abbreviation for *frames per second*.

frame A single still image. Film and video are made up of a series of these images. Although a film frame is a photographic image, a video frame contains one or more fields.

frame number The last part of the key number. The frame number consists of the footage number and the frame counter and indicates how many feet and frames into the film a particular frame occurs. See also *key number* .

HD video See *high definition video* .

high definition video Refers to any of a wide range of video formats, including the 24p format, providing a higher-quality image than standard definition video. Enhancements can include increased resolution, a wider aspect ratio, and progressive scanning. See also *progressive video* , *standard definition video* .

identifier In Cinema Tools, a combination of one or more letters, numbers, or both, that identify a shot, scene, take, video reel, sound roll, lab roll, or camera roll.

ink number A feet and frame count number added to the edge of workprints and magnetic film soundtracks. Also known as an *Acmade number*.

interlaced See *interlaced video* .

interlaced video A video frame format that divides the lines in a frame of video into two fields, each consisting of alternating odd and even lines, which are scanned at different times. Used in standard definition video. See also *field* , *field dominance* , *progressive video* .

interpositive (IP) A low-contrast positive film print made from an original camera negative. It is not projectable as a full-color image, because it has an orange mask on it like a negative. IPs are typically used as an intermediate step in creating opticals and duplicate negatives.

key number Latent feet and frame count numbers found on the film edge. Key numbers are often superimposed by the telecine onto the edge of the video frames (this is called *window burn*). Cinema Tools uses key numbers to help match digital edits back to the original camera negative. Key numbers consist of a key prefix, which is unchanging throughout an entire roll of film, and a frame number, which consists of a footage number and a frame count number. Telecine systems also often add a frame type identifier to the key number. For example, in the key number KJ 291010 5867+07, the key prefix is "KJ 291010" and the frame number is "5867+07." Also known as *edge code*.

latent key number A number added to the film edge during its manufacturing process. Also known as *latent edge code*. See also *key number* .

match back To match the edits of a video program that originated on film back to the original camera negative. All the edits to the video are listed in a cut list, which the negative cutter uses to cut the workprint and original camera negative.

NDF See *non-drop frame timecode* .

negative cutter A professional who conforms the original camera negative according to a cut list or a visual reference such as a workprint or a videotape generated by the digital editing system.

non-drop frame timecode Normal NTSC timecode, where frames are numbered sequentially and there are 30 frames per second, 60 seconds per minute, and 60 minutes per hour. Because NTSC's frame rate is actually 29.97 fps, non-drop frame timecode is off by 3 seconds and 18 frames per hour in comparison to actual elapsed time. See also *drop frame timecode* .

NTSC Abbreviation for *National Television Standards Committee*, the organization that defines North American broadcast standards. The term *NTSC video* refers to the video standard defined by the committee, which is 29.97 fps, 525 lines per frame, and interlaced.

offline edit The creative edit, where edit decisions are made. When the offline edit is finished, the material is often recaptured at high quality or an EDL is generated for re-creating the edit on another system. See also *Edit Decision List (EDL)* .

OMF Abbreviation for *Open Media Format*. A media interchange format, supported by many Digital Audio Workstations (DAWs), that allows all of the audio and edit points in an audio sequence to be exported as a self-contained file. OMF files are often given to an audio post-production facility, finished there, and then used as the final audio in a feature.

online edit The final editing process, where all the decisions made in the offline edit are applied to the original camera negative or full-resolution video reels.

optical list A film list Cinema Tools users can export for the optical house to use in printing effects for film. The optical list describes transition and motion effects that you created in your digital edit.

optical printer Rephotographs one or more film elements onto a new section of film. An optical printer can add or delete light from an image, create superimposed effects, or make scene transitions such as wipes, fades, and dissolves.

opticals Effects produced by an optical printer, including transitions and superimposed titles. See also *optical printer* .

original camera negative Also known as *OCN*. The negatives from the film shoot; the original source film. The original camera negative is what the negative cutter cuts after all the edits have been finalized in the digital editing system. There is only one original camera negative. (Duplicate negatives can be made, but they are expensive.)

PAL Acronym for *Phase Alternating Line*. A video format used by many European countries and other countries outside North America. The PAL video standard is 25 fps, 625 lines per frame, and interlaced.

progressive video A video frame format that progressively scans all lines in a frame. See also [interlaced video](#) .

pull list A film list Cinema Tools users can export, which list shots in the cut list in the order in which they can be found on the negative rolls. The lab refers to a pull list when going through your negative rolls to pull shots for a workprint or original camera negative cut.

release print A positive print of a finished movie; the final product for distribution.

reverse telecine The process that removes the extra frames from 3:2 pull-down video, returning it to its original 24 fps frame rate. Reverse telecine creates a one-to-one relationship between the video and film frames so that the cut lists are accurate. Reversing the 3:2 pull-down can be accomplished with hardware in real time during capture, but if you do not have the proper equipment, you can use the Cinema Tools Reverse Telecine feature. See also [3:2 pull-down](#) .

scene In filming, a time and place setting for one or more shots, typically tied together by a common story line or certain characters.

scene list A film list Cinema Tools users can export, which lists all the shots that are in the cut list with each shot listed only once. Scene lists are typically used to order prints of the shots in a program so that a workprint can be conformed prior to cutting the original camera negative.

SD video See [standard definition video](#) .

shot A continuous film recording that does not have any cuts. A shot is a subset of a scene.

slug Blank (fill leader) or substitute footage used to fill in spaces where footage is temporarily missing, in order to maintain sync between the picture and the soundtrack.

SMPTE Abbreviation for *Society of Motion Picture and Television Engineers*. The standard-setting organization that established the SMPTE timecode standard for video. SMPTE timecode is the most commonly used timecode format.

source clips The media files you start with when you begin editing. These are the files that are captured into your computer and linked to the Cinema Tools database before editing begins.

standard definition video Refers to the NTSC and PAL video standards. See also [high definition video](#) , [NTSC](#) , [PAL](#) .

style sheet Style sheets are Extensible Stylesheet Language Transformations (XSLT) files that Cinema Tools uses to provide customized output lists. This includes controlling the specific types of information to include and defining the output layout and format (plain text, HTML, and so on). Several are provided by Cinema Tools, and you can create custom style sheets as needed. See also [Extensible Stylesheet Language Transformations \(XSLT\)](#).

supers Short for *superimposed*. Overlays of images or text onto frames. For example, titles are superimposed onto frames.

sync Short for *synchronization*. When sound is in unison (synchronized) with the picture, they are said to be *in sync*.

synchronizer block A small mechanical bench device with sprocketed wheels mounted on a revolving shaft. Located between film reels mounted on shafted rewinds, it accepts one strip of film and perforated magnetic soundtrack per sprocketed wheel. Once the film and track are locked onto the wheels, they can be placed in exact mechanical sync and will maintain this sync while they are advanced forward through the synchronizer block. The synchronizer block also keeps track of elapsed footage via a mechanical feet and frame counter geared to the sprocket wheels. Also known as a *sync block*, *gang sync*, or *synchronizer*.

take A take is another version of a particular shot. In shooting a film, there may be multiple takes of each shot.

telecine A machine that copies the images on the original camera negative to a videotape format, often including a window burn of the film edge code. See also [window burn](#) .

telecine film speed The frame rate at which the film is run in telecine equipment during the transfer to video.

telecine log A file generated by the telecine technician during the telecine transfer. Records the key numbers of the original camera negative and the timecode of the video transfer, tracking the relationship between them. Sometimes called a *FLEX file*.

timecode A format for assigning each frame of video a unique, sequential unit of time. The format is *hours: minutes: seconds: frames*.

TK speed See [telecine film speed](#).

window burn Visual timecode and keycode information superimposed onto video frames. It usually appears on a strip at the bottom or top of the frame, providing code information to the editor without obscuring any of the picture.

workprint A positive copy of the original camera negative, cut to provide a record and prototype of the creative edit. In traditional filmmaking, the workprint is edited first and then used by the negative cutter as a guide for cutting the original camera negative. In digital filmmaking, a workprint is usually used to verify the cut list and to create a prototype of the film to view on a big screen before conforming the negative. Sometimes called a *work pix* or *cut pix*.

XML Abbreviation for *Extensible Markup Language*. A general-purpose markup language that combines human-readable text with additional, specialized information. Because of the large variety of tools available, XML files are widely used to exchange information between applications.

XSLT See *Extensible Stylesheet Language Transformations (XSLT)*.

