

Larry's Final Cut Pro HD Newsletter

*Editor: Larry Jordan
Issue #14 -- March, 2005*

Welcome to the latest issue of my Final Cut Pro newsletter!

The goal of this newsletter is to provide information helpful to the professional user of Final Cut Pro. This newsletter publishes around the middle of each month. Past issues are not archived, however, key articles are posted to my website for your reference. Unless otherwise noted, all references are to Final Cut Pro HD, and may not work under other versions.

Also, please invite your friends to visit my web site -- www.larryjordan.biz. We are working to make it a great Final Cut resource!

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Report from Uganda

I think this story is a great place to start. Sometimes, we get so caught up in the details of running our editing systems, we lose sight of a bigger picture.

Last October, **Matt Warren**, of [Radar Multimedia](#), called me to configure a Final Cut system they were installing for a church in Uganda. I hadn't heard from him since he was getting ready to leave, so I sent him a note asking how the install went.

I was deeply touched by his reply and want to share it with you.

Matt writes:

Welp, where do I start? Let's just say these 6 guys have the best editing system in all of Uganda and you had a lot to do with it. I don't know about you, but that sounds like a great "latest news" on your website. But seriously, the trip went really well. I was a little surprised how quickly they picked everything up. They all seemed to grasp FCP and LiveType really well as well as Photoshop Elements and

DVD Studio Pro. They email me all the time and continue to thank us for the system.

Most of the content they're producing is for a TV station that reaches about 300,000 people all over Southern Uganda so their work is definitely being seen by people.

Timothy, one of the guys I hit it off with, sent me a DVD of some of the work they've done since November but I haven't had a chance to watch it yet. A group of people from Simi Valley were there in February and said they watched a few shows on TV that the guys had produced.

So.... All of that to say, it's working beautifully. So far, so good. I'm hoping to go back out there in 06 and do some more training for shooting & basic editing techniques, build up more systems, etc.

As a side note: I think it's important you understand what the system will be used for. A lot of times, community leaders and some of the local pastors go out into the bush, villages that are literally in the middle of nowhere, and using portable DVD players, they can play training videos on how to bandage wounds, steps to follow in order to prevent malaria, how to build a hut, protecting themselves from rebels in the North, etc... Everything you can think of. It's pretty amazing.

So when you think about the system, remember that. It's not just an editing system for some kids, it's a tool for these people and this country, a tool they can use to reach hundreds of thousands of people and you helped put it together.

This was a great and unique project for us. I miss those guys and I miss them smiling all day while I was there, going through everything with them and just seeing them so blessed and truly grateful for what we were doing. It was such a no-brainer and such a simple gesture for us, but for them it meant the world.

Thanks again for everything.

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Countdown to NAB

NAB is less than a month away (April 17) and I'm getting excited.

Because of NAB, next month's issue will be out *after* NAB so I can include any NAB announcements that seem relevant to Final Cut users. (OK, perhaps not *ALL* the announcements, I can't write that much -- just those that strike me as interesting.)

In my opinion, last year set the stage. This year should be amazing -- I'm expecting major announcements from a variety of vendors. Like I said, I'll have more details after the show.

Just a reminder -- there is a new operating system and software coming in the next few months. I'm really looking forward to seeing what Tiger, among others, looks like.

However, I'm only initially loading it on my test system. My main production editing system will stay firmly rooted in the past until I make sure I can upgrade smoothly and safely. Save yourself anguish. Don't upgrade the instant the new

toys are announced. A little initial restraint can save hours of unnecessary downtime.

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Larry Releases Training DVD on DVD Studio Pro 3

If you want to work faster, and smarter, with DVD Studio Pro 3, I just recently completed a training DVD for Lynda.com filled with tips and techniques you can use immediately.



Learning Apple's DVD Studio Pro 3 is a QuickTime movie-based tutorial intended for the beginning or intermediate DVD Studio Pro user. The DVD includes over 6 hours of tutorial movies and complete exercise files covering Compressor, A.Pack, DVD SP templates, creating menus, markers, stories, subtitles and scripts.

I am well into your [DVD Studio Pro 3] tutorial on Lynda.com. I have [watched] several tutorials on [Lynda's] fine system but have found yours to be easily the best so far. I use DVSP3 as a producer of industrial and promo DVD work in Adelaide, Australia. BTW, I love the humor and your droplet ideas are great. Thanks! (J.B. 1/13/05)

This DVD is available now for \$99, plus shipping and handling. [Click here to buy it.](#)

New Poll - HDV

We have a new poll posted that I'd like your opinion about -- HDV is a very hot buzz word right now. So, I'm interested in learning how soon do you expect to start editing HDV?

Click the link above to take the poll. You'll see the results right after you vote. Thanks!

Adam Wilt's comments on HDV

And speaking of HDV, after last month's discussion of working with the HDV format, I received the following comments from **Mike Horton**, chief cutter for the [L.A. Final Cut Pro User Group](#), with further clarification from Adam Wilt, on using HDV.

Mike writes:

Great stuff, again, Larry!

FWIW and in response to the HDV via iMovie to FCP thang everyone is struggling with, we have all basically come to the conclusion it just doesn't work. Below is Adam Wilt's reasoning which I [wanted to share with you.]

Adam Wilt writes:

This discussion started from an email, where the question was asked whether using iMovie as part of an HDV workflow in Final Cut is viable.

[In my opinion,] I tried it and it's not viable for real work.

HDV 1080i clips captured in iMovie 5 using the Apple Intermediate Codec report themselves as being 1920x1080 in the Finder's Preview Pane and in FCP's clip properties, but if examined in QT Player Pro, Video Track Format is shown as 1440x1080 (which is not the native size of a 1080i HDV frame).

Hmmm... Therein lies the rub.

I tried cutting in FCP using a sequence setting of 1920x1080 with the AIC, and it failed to render ("codec not found").

If instead I set the sequence to 1440x1080 (following some hints from Mike Curtis), I *can* render and even do lots of stuff in real-time--but AIC clips dropped into the timeline display in the leftmost 1440 pixels of the image, with the right edge of the clip (about 3 pixel's worth?) then repeated across the rest of the canvas--until I render, at which point the image fills the entire width properly. However the horizontal scaling is utter crap (technical term) with aliasing and moiré, and completely unusable. It appears as if every 3rd pixel is replicated with no other processing.

This may be what Frederic referred to as being "buggy". I refer to it as " nice tech demo, but not usable."

Within iMovie, it appears that multigenerational rendering (one does multigen testing to amplify defects one might not see in one generation) back to HVD via AIC is not as good as Canopus Edius 3 (HDV native or via Canopus HQ) but better than Vegas 5 / MainConcept (HDV native or via Cineform CFHD).

Apple's renderings are unity-gain; luma and chroma stay dead on to where they should be. MPEG defects are admirably minimized, although there is a visible softening of fine detail over five generations.

However, the killer is that each generation (including the first) shows what, were this Hi8, I would instantly tag as excessive digital dropout compensation: frequent bursts of repeated or downwardly displaced lines of data, so that the picture "twitches" as it plays (the "DOC bursts" run anywhere from around 16 pixels to a full screen's width). VERY odd indeed!

It really does look like trashed Hi8 in an EVO-9850 with the DDOC turned up to 11. (Except of course this is high-def Hi8. Who says there ain't no progress?)

Rendered effects, like fades and cross-dissolves, show further, excessive degradation of all sorts. This may be an iMovie rendering issue (it appears as if all transitions are rendered at quarter-resolution) but I can't say for certain; I'm not an iMovie expert.

Based on what I've seen in my simple tests, Apple may have workable intermediate and final MPEG codecs here, IF they can get rid of the DDOC defect and perhaps bias it slightly more towards holding onto high-frequency detail. But today, even within iMovie, we're not there yet.

LumièreHD and HDVxDV are still the way to go, IMNSHO.

Larry, again: In a follow-up email discussion, Adam sent the following comments:

There was a posting on FCP-L today about some FX1 filmout tests that seems to indicate that Final Cut Express HD may format its AIC captures differently from iMovie5: in the case quoted, iMovie 5 AIC clips imported into After Effects needed horizontal scaling whereas those from FCE did not.

So the workflow discussed below MAY be somewhat more workable with FCE as the capture/playback tool instead of iMovie 5. As I don't have a copy of FCE I can neither confirm nor deny that.

Also, I also just received an email from Marcus Van Bavel at DVFilm. He's got a new version of Maker that, among other things, undoes the pseudo-1920 sizing from iMovie HDV AIC files, so they can be cut properly in a 1440x1080 sequence. I'll be looking into it this weekend, but you might want to hit him up for more details.

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HDV in *Videography*

Finally, to wrap this discussion of HDV, the March issue of *Videography* has an article I wrote on the current state of editing HDV for both PCs and Macs.

For more information, visit the *Videography* website: <http://www.videography.com>

Technique: Working with Firewire Hard Drives

This technique grew out of a message sent by **Christopher Warren**, who asked:

I don't know whether you have ever talked about using Firewire hard drives for MiniDV with Final Cut Pro:

- Whether to partition or not
- I have problems with them starting up from sleep mode
- How many drive can you daisy chain together
- Should you group different sizes or brand names together or keep them separate
- Whether to turn off journalling for a speed bump

- Cooling issues
- And any other issues that would effect performance

Larry replies: Based on my conversations with a variety of hard drive and RAID vendors, here are my suggestions.

A FireWire Preamble

First, Firewire is a perfectly fine technology to use for capturing DV video. However, there are some things you need to be aware of in order to maximize your success.

When you capture DV, you are simultaneously capturing both video and audio at the rate of 3.75 megabytes per second. An hour of DV material (audio and video) takes 13.5 gigabytes to store.

While 4 megabytes a second may not sound like much -- yes, I rounded the number up -- it's actually pretty demanding on a hard drive, because the drive needs to deliver 4 MB/s second after second, minute after minute. For this reason, you need to get a FireWire drive that meets the following three criteria:

1. It needs to spin at 7,200 RPM, or faster
2. It needs an 8 MB cache
3. It needs an Oxford 911 chip for FireWire 400, or,
4. An Oxford 922 chip for FireWire 800.

If your drive meets those three criteria, it is reasonably likely to work well with Final Cut.

But wait, there's more.

In an ideal environment, FireWire 400 transfers data at 50 megabytes per second. However, while that's the maximum data transfer rate of Firewire 400, the hard drive inside the case is nowhere near that fast.

Generally, a single external FireWire hard disk moves data at between 20 and 25 MB/second. SATA drives will be somewhat faster. Writing data, by the way, is always faster than reading. You can increase this transfer speed by using a RAID, but for this discussion we will limit our comments to single drives.

Every stream of video on your timeline requires roughly 4 MB of data each second. So, doing a dissolve means that during the dissolve, the hard drive needs to send 4 MB/s for the outgoing shot and 4 MB/s for the incoming shot. If you have three images on screen at once, that's 4 MB/s times three.

Complicating this process is that FireWire is a very "chatty" protocol; the drives spend a lot of time talking to each other, and the computer, reminding each other they are still connected and making sure everything is functioning OK.

For this reason, I allow 25% of total data throughput for the computer and drives to exchange FireWire protocol information, separate from any audio or video material.

On G-4's, I reserve less, on G-5's I reserve more.

Wrapping up this preamble before answering your questions is that the fuller a hard disk gets, the slower it plays. And, in fact, you can so fill up a hard drive that it neither reads, nor writes, data.

While Phil Hodgetts and I have agreed to disagree on how full, exactly, is too full, I recommend you keep your hard disks no more than 90% full. The world will not

end if they get fuller, but they will start to slow down.

Getting Down to the Questions

So, with that as an introduction, here are my answers to your questions:

1) Should you partition a drive? No. In the past, partitioning was necessary in order for applications to work properly. With today's operating systems and applications, there is no performance advantage to partitioning. As the engineers at Huge Systems told me, partitioning is neither good nor bad. In the future, though, partitioning will decrease system performance.

The only time I recommend partitioning is when you want to create a backup to your boot disk. However, **never** store media on one side of a partitioned drive with the operating system and applications on the other. That is a recipe for dropped frames.

2) Sleep mode, by definition, tells your hard drives not to spin. If they are not spinning, they are not sending or receiving data from your system. In other words, sleep is bad. Go to **System Preferences > Energy Saver** and set sleep to "Never," and **UN**check the two check boxes. Unlike people, your hard drives will not die for lack of sleep.

3) How many FireWire drives should you daisy chain together? The FireWire spec says 63. Sigh... I don't recommend that number. I have a few clients with 6-12 FireWire drives talking to a G-4. However, G-5s seem to have a problem when they talk to more than 4 FireWire drives. In my opinion, if you need that much storage, you are much better off with a RAID than a collection of FireWire drives. I would not recommend more than a dozen or so drives to be attached to any system.

On the G-5 in my studio, I have two internal drives and three external FireWire drives and they all seem happy.

4) Should you group drives by size or brand? First, there's no way to "group" drives. FireWire is just a bus -- all the devices "see" and "talk" to everyone else. There is no sectioning, or grouping. Keep in mind that you want to keep your FireWire cables as short as possible. When the *total* length of FireWire cable between all drives exceeds 15 feet, data errors can start to result. If you need to move drives a long way from the computer, be sure to use amplified FireWire cables.

Second, a FireWire device has no preference for a specific size or brand. So you won't need to worry about that.

5) You should turn journaling **ON** for your boot disk, the one with the operating system on it. You should turn journaling **OFF** for any hard disks that you plan to use for capturing media. If you don't know how to turn journaling on or off, here's an article that explains it.

http://www.larryjordan.biz/articles/lj_journaling.html

6) Cooling issues. As long as there is air flow around the drive, you won't need to worry about cooling. If you are putting all your drives in a box to keep the noise down, you'll need to make sure the box stays cool. (Smoke curling up from the back of your drive is simply nature's way of telling you that your data is now toast...)

However, if the temperature in the room is comfortable enough for

you to work in your shirt sleeves, your drives will do just fine.

Hope these answers help.

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Client Report: RAID problems and OS upgrades

I had an interesting conversation this morning with ATTO tech support (www.attotech.com) regarding problems a variety of clients, all of whom are using RAIDs, are experiencing.

Their basic problem is that the RAID no longer works properly -- icons disappear from the desktop, data rates drop, more drop frame errors -- after an operating system upgrade.

What I learned is that back in OS 10.3.5, Apple changed the way it communicates with SCSI devices in order to properly support multi-pathing. This is a technology that allows the operating system to more reliably recognize and communicate with the different hardware controllers in a SCSI device.

The problem is that many RAID manufacturers needed to update their firmware in order to support this change.

Normally, this would not be a big deal. These sorts of modifications occur all the time. So, I'd recommend the client drop back to an OS version that works; such as OS 10.3.4. What makes this tricky is that OS 10.3.5 is the minimum OS required to use Motion. So, many clients unsuspectingly update their OS so they can work with the Motion demo, only to have their entire edit system stop working.

If you are experiencing problems AND you are using a RAID, I suggest you contact your RAID vendor about an upgrade. If you are only using FireWire drives, this problem does not apply to you.

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Tip: What Do All the Different Outputs on a Tape Deck Mean?

While we are on the subject of hardware, another reader, I must confess I lost his name, asked me if there was a difference between all the different outputs on his tape deck.

Which set me to thinking. I've worked with decks for so long that I just take their various outputs for granted. So, if you're new to this whole tape deck thing, here's a quick primer.

Video Connectors

Let's start with the connectors. There are four principal types of video connectors:



Jerrold, or F-connector



RCA



S-video



BNC

The **F-connector** screws, or slides, onto a post on the back of your deck or TV set. This connector is used for connecting RF (radio frequency) signals. While very useful in connecting a VCR to a TV set, it has very, very limited use in professional (or even semi-professional) video. It's principally used for RF signals.

The **RCA connector** is the one that's used on most consumer gear. Normally used for audio signals, it can also be used for video when inexpensive connectors are required.

The **S-video connector**, unlike the other three, has four wires to carry video signals. (The others all use two.)

The **BNC connector** is a twist-lock silver plug used in most professional installations. The twist-lock means it won't come off by accident. Due to the way it is constructed, and the quality of the wire attached to it, BNC connectors provide higher quality than RCA connectors. Given the option, I always prefer gear that uses BNC connectors for video.

Video Outputs

Now, back to our discussion of outputs. Depending upon format, and how much you spend, a tape deck can have up to five input/output options. Here's a quick description of each, from lowest quality to highest (and cheapest to most expensive):

- **Composite.** This uses a single connector, either RCA or BNC, that is the lowest common denominator for all video sources. It is the traditional connection on VHS decks. It provides an acceptable level of quality, but nothing you'd write home about.
- **S-Video.** This uses a higher quality signal, with greater resolution and less color "fuzziness." This is an excellent option for connecting decks for dubbing.
- **Component.** This uses a three wire connector, where each wire carries part of the color components of a signal; as well, the green wire also carries the black-and-white signal information. This is the best choice to provide the highest quality for analog signals. It is the preferred connection for Betacam SP and other analog tape formats. As well, it is commonly used for DVD output to a monitor.
- **Firewire.** This is a 4-wire digital signal (the other two connectors on a six-wire FireWire connector carry power to the external device). As FireWire is digital, the quality of the image is determined by the source format, rather than the transmission. Generally, FireWire provides the highest quality for DV signals.
- **SDI** (Serial Digital Interface). This uses a single wire BNC connector to carry digital signals. This is the standard digital interface in a broadcast/high-end post production environment because of its ability to travel longer distances than FireWire. It is the preferred connection for DigiBetacam decks.

While there are a few technical benefits to capturing DV-recorded output using an SDI connection on a very high-end deck -- specifically for converting color sampling, or integrating Betacam and DV footage -- in general, a FireWire connection is the best method for transferring DV footage into your computer.

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Graeme Nattress: Color Sampling

One of our on-going discussions is the issue of color sampling; which we describe using terms like 4:1:1, 4:2:2, 4:4:4 and, with DVD and HDV, 4:2:0.

And, I thought I pretty well understood what these meant. I should have known better, because someone who DOES know better wrote a nice article illustrating the difference.

Allow me to present Graeme Nattress (<http://www.nattress.com>) with a short and highly lucid description of what all the numbers mean. (For those of you who worry about such things, "colour" is the Canadian spelling...)

Color Terminology

Component digital video is often referred to as YUV, but this is not an accurate description of component digital video, but instead refers to a set of intermediate qualities used in the formation of analogue composite video. The correct terminology for the components of digital video is Y' Cb Cr.

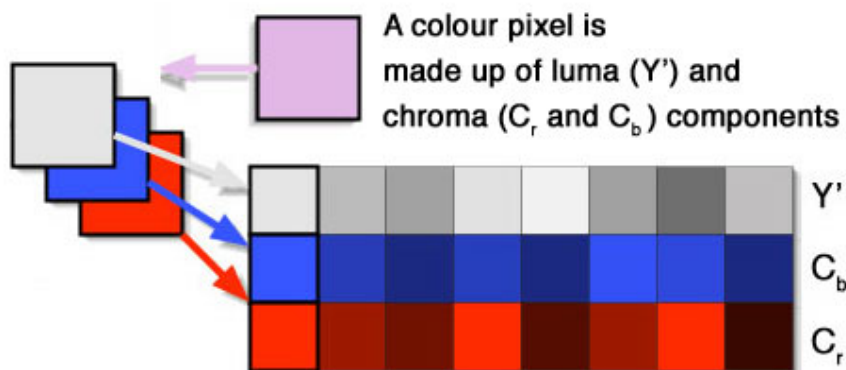
The Y' represents luma, the ' is important, reminding us that it is non-linear (gamma corrected). The C_b and C_r are chroma components that are often wrongly referred to as U and V. The C_b is calculated as $B' - Y'$, and C_r is $R' - Y'$. If you are interested in more details, check out Charles Poynton's excellent articles at <http://www.poynton.com>.

Chroma Sampling

The CCDs that capture our image inside our video camera, capture colour by the use of Red, Green, and Blue filters. The phosphors in our CRT monitor, and filters in our LCD monitor and DLP projector also use Red, Green and Blue filters.

Why is it then, that digital video is stored and manipulated as separate luma and chroma components? Separate luma and chroma are used so that the resolution of the chroma can be reduced with respect to the resolution of the luma so that large savings can be made in the amount of data that needs to be transmitted -- it is a form of compression. This reduction in the resolution of the chroma components works perceptually as our human vision systems are not as able to see fine details in colour as we are in lightness.

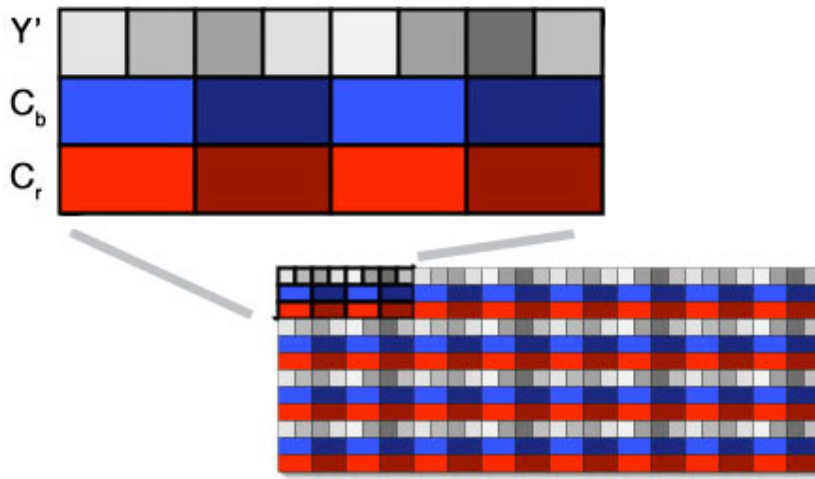
There are a number of methods of chroma sampling, and they each have terminology that refers to the chroma resolution (the second and third numbers) as compared to the luma resolution (first number).



4:4:4 Chroma Sampling

4:4:4

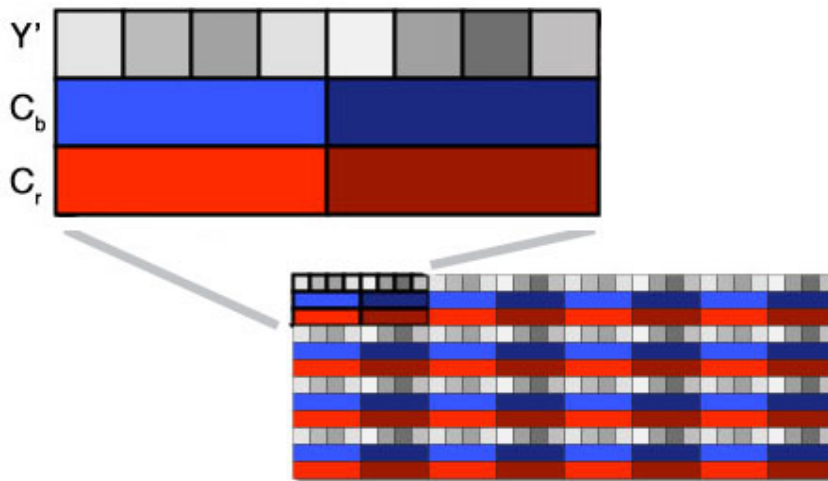
Full resolution luma is represented by the number 4, and as the chroma components C_b and C_r are also 4, there is no reduction in resolution. 4:4:4 sampling is mostly used for RGB images, although it can be used for $Y'CbCr$, although no camera records 4:4:4 $Y'CbCr$.



4:2:2 Chroma Sampling

4:2:2

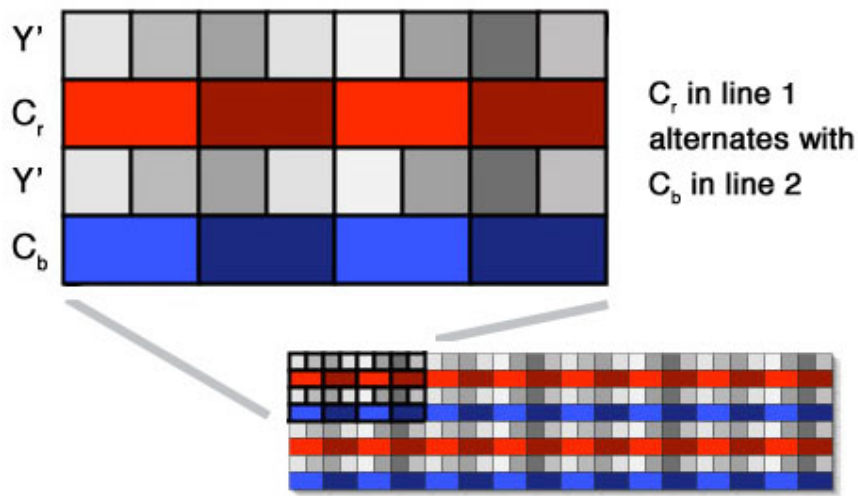
Full resolution luma, and half ($2/4 = 0.5$) resolution horizontally on the chroma components. This is the traditional broadcast standard for chroma sampling and is used by DigiBeta, DVCpro50 etc.



4:1:1 Chroma Sampling

4:1:1

Full resolution luma and quarter ($1/4 = 0.25$) resolution chroma components. This is the system used by NTSC DV and PAL DVCPro.



4:2:0 Chroma Sampling

4:2:0

Full resolution luma, and half resolution in the horizontal direction and vertical direction for the chroma components. 4:2:0 is a very complex chroma sampling with many variants depending on whether the video is progressive or interlaced, or if it is being used by PAL DV or MPEG2.

4:2:0 compresses the resolution of the colour to 1/4, just like 4:1:1 compresses the resolution of the colour, but whereas the compression in 4:1:1 is horizontal only, the compression in 4:2:0 is horizontal and vertical.

This picture, above, illustrates PAL DV 4:2:0 chroma sampling.

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Hand's on Training for Final Cut Pro gets rave reviews.

Thank you to everyone who has written in about my book. I'm grateful for your support. If you haven't ordered your copy yet, now's the time. Here are two quick reviews to twist your arm.

Larry, I'm a self-taught FCP devotee with a considerable investment in various after market Final Cut Pro books but yours is the best I've ever read. Though I'm familiar with much of the material you've presented, you revealed many valuable tips and "secrets" and, more importantly, clarified a number of points with real-world examples and logic. (D.S. 3/14/05)

I am faithfully studying your book and DVD every day. I am now going into chapter 5. It is absolutely THE book for me. Everything you teach is exactly what I need to know, and phrased so well, I can actually understand it! I don't know what I'd do without it! (J.G. 3/8/05)

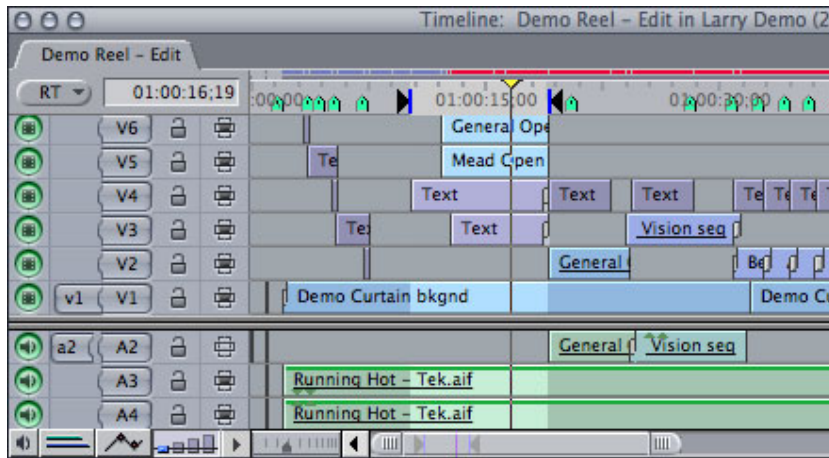
You can buy the book at Amazon.com, at most major bookstores, or from me. And, if you buy from me, you can also order your own personal inscription - FREE! [Click here to order a copy.](#)

Thanks!

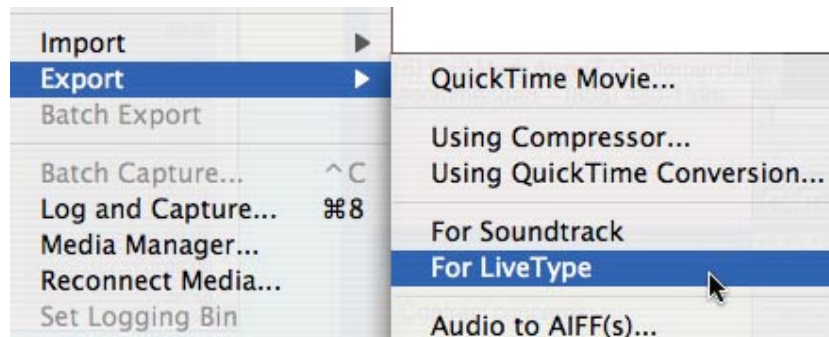
Michael Murray wrote in with a question about how to export a Final Cut sequence for use in LiveType; which led me to think about one of the truly time-saving features of FCP HD -- round-tripping.

Allow me to explain.

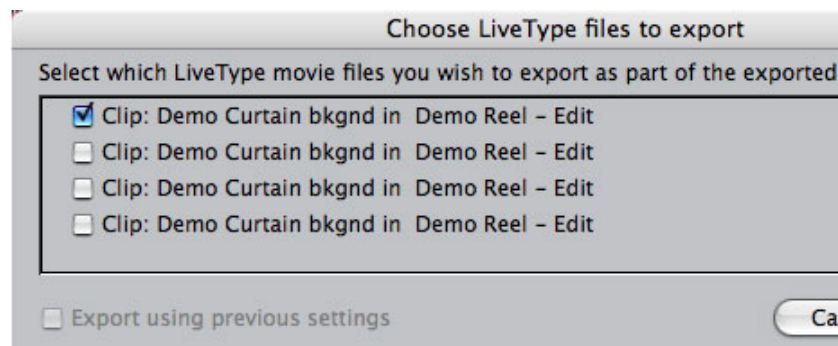
Exporting a Sequence from FCP for LiveType



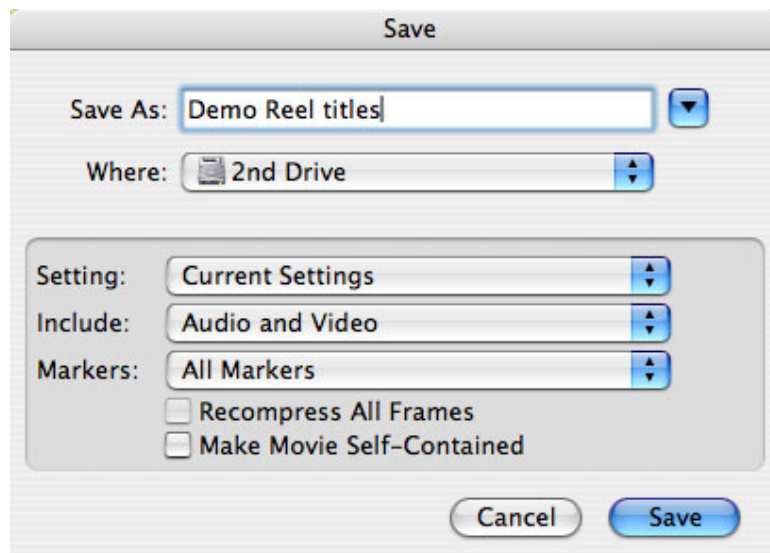
1. Since you only need to work on a small section of your sequence for titles, set an In and Out so only the portion of your sequence that you need to work on in LiveType gets exported.



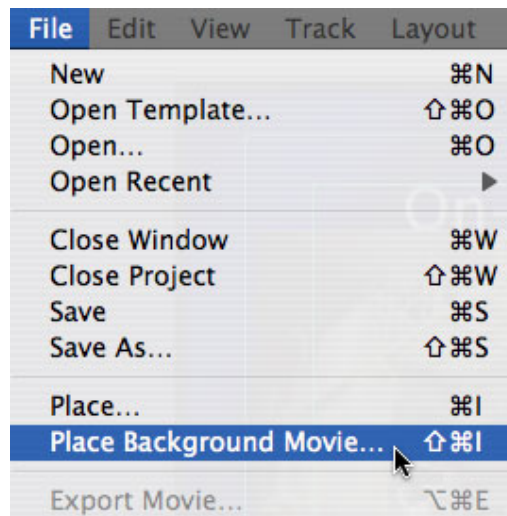
2. Select **File -> Export -> For Livetype**



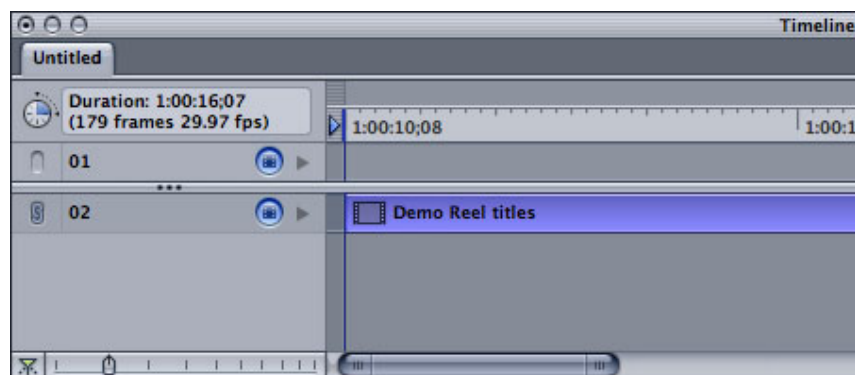
3. If you are exporting LiveType files as part of your sequence, as I am here, select which you need exported. In this case, these are LiveType textures which I want to see as I am adding text, so I am exporting all of them.



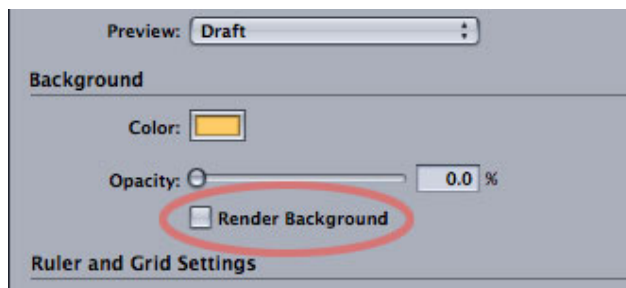
4. Select where you want to store the movie. Don't check "Make Movie Self-Contained." As this is only a temporary file, you'll trash it after the LiveType work is done; so there's no need to waste time and space making it self-contained.



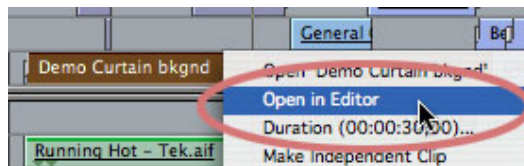
5. Open LiveType and import your movie using **File -> Place background movie**. Notice that only that part of your sequence between the In and the Out is imported.



6. Don't worry about the video quality of your imported media. This is only for reference, so it's quality isn't important. Also, notice that the video appears **BELOW** the heavy gray line in the timeline. This means it has been placed as a background element.
7. Create your text animation keeping all elements **ABOVE** the heavy gray line. When you are finished, save your LiveType project file.

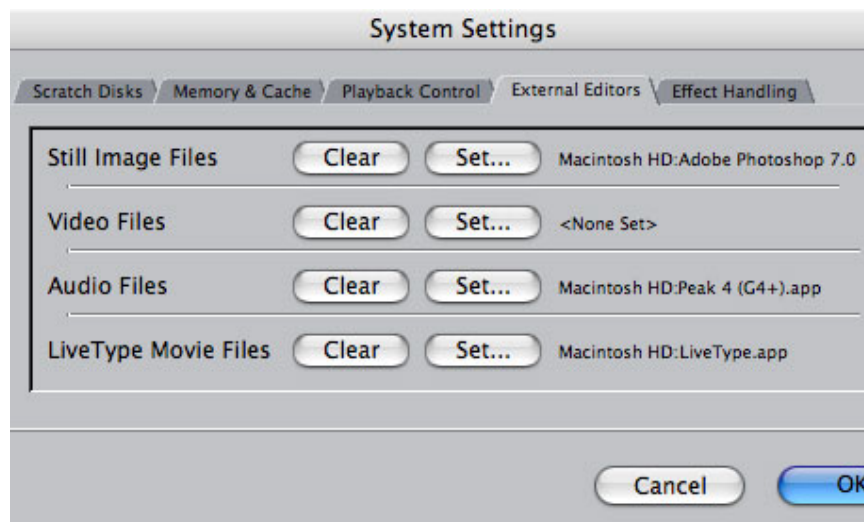


8. Before moving it back to Final Cut, you need to set a LiveType preference. So, go to **Edit -> Project Properties** and make sure "Render Background" is NOT checked. This will exclude your imported footage from the LiveType project you are about to bring into Final Cut.
9. Save your LiveType project. You do **not** need to render the movie -- just save the project file.
10. Switch back to Final Cut and import the LiveType project (**File -> Import -> Files**). It will appear in your Browser.
11. Edit it into your Timeline the same as you would edit any clip. All the transparency information you created in LiveType has been retained, so it will easily key over your sequence.



12. Now, let's say you realize you have a typo in your text. Here's where the magic starts. Control-click on the LiveType clip in your Timeline and select "Open in Editor."
13. Final Cut will automatically open LiveType and load that project file so you can make changes.
14. When you are done making changes, simply **SAVE** your file and switch back to Final Cut. Your newly altered and saved file is automatically updated into Final Cut!

This ability to quickly switch between Final Cut and another application to update a file is called "round-tripping" and it has saved me hours of production time. You can round-trip between Final Cut Pro HD (and only the HD version) and LiveType, Motion, and your favorite still image, video and audio editing programs.



You set which applications Final Cut should use for round-tripping in Final **Cut Pro HD -> System Settings -> External editors** tab. This illustrates how I have my system configured.

This is a great technique and well worth the few minutes it takes to learn in hours of time saved.

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Reader Mail

This is my favorite part -- reading and answering your comments. We've got a great collection this month, so let's get started.

Color Sampling

Graeme Nattress writes:

In reading your article on [when and why to select the DV format](#) for your project, I'm getting confused.

As part of the article, **Phil Hodgetts** commented:

"To clarify: the numbers 4:4:4 are the ratio of [the] sample of the YUV color channels within the datastream. Graeme is correct that there is no tape format that records 4 U and 4 V samples for every Y sample recorded.

"What I [Philip] think you [Larry] meant to convey in that last sentence is that "...DV contains half the color resolution of professional standard definition formats". DV has only 1/4 the color resolution of the luminance resolution of any SD format. In 4:2:2 Y = 720 x 480 (or 486); U & V are 360 x 240 each; in 4:1:1 Y is still 720 x 480 but U & V are only 180 x 120 each but offset so that they "fill in" a bit for each other.

"Not a big thing, and the general principle is right, it's just me being picky."

Graeme continues:

In 4:2:2 Philip is saying that the Y is 720x480 and that the Cb and Cr are 360 x 40. (It's not YUV, it's Y'CbCr and we should all really start calling it what it really is, not YUV which, although easier to say, is actually nonsense. I know I've said YUV in the past, but I've learned that I was wrong) They're not, they're 360x480. It's only horizontal resolution that gets squashed. In 4:1:1, the luma (not luminance - luminance is not the same as luma) is still 720x480, but the chroma components Cb and Cr are 180x480 not 180x120!!! They are also not offset in any way.

I think Philip is getting confused with PAL DV, which is 4:2:0 where the luma is 720x576 and the chroma components Cb and Cr are 360x288 and they are offset.

[I'm [sending you an article](#) that] I'm working on about this very subject, which you're welcome to read. I'm still not finished the article, but it should explain things better than I can in an email as it has some funky pictures I made up.

One of the key points is that Beta SP is quite an ugly duckling compared to Digital Betacam, in that both it's chroma and luma are reduced in resolution from Digital Betacam, and that although DV is 4:1:1, Beta SP would rate about 3:1.5:1.5 on the same scale, so it's a

real toss-up over which is better or worse. Given that luma is mostly made up of green, and that chroma-keyers work in RGB not Y'CbCr space, a properly smoothed DV chroma should be no better or worse than a Beta SP chroma to key with. The issue is that converting Beta SP to DV to get it into your computer is combining the worst of two worlds - DV artifacts + Beta SP artifacts, and you end up with 3:1:1 on your resolution, which is atrocious!

<http://www.poynton.com> gives a lot of good info on luma vs. luminance and YUV vs. Y'CbCr.

Hope that helps.

Larry replies: Yes, that helps a lot; though I will confess I had to read it through a few times to understand it. I've presented your article in abbreviated form earlier in this newsletter.

You can go back and [read it here](#).

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NTSC Setup

OK, time to get another discussion going. Feel free to warm up your flame-throwers....

First, though, a definition. Traditionally, the black level of a video signal is called "setup." In NTSC video, but not PAL, nor NTSC-Japan, the setup level is set to 7.5 IRE units (7.5% on FCP scopes and 16 when measured on an 8-bit digital scale).

DV video, on the other hand, sets black at 0 IRE / 0% / 0 digital units. This is a darker black than broadcast allows, so, it needs to be raised, using a device called a processing amplifier (proc amp). This proc amp is generally built into the capture card, or video deck or broadcast operation, so it's generally not an issue.

Except...

Mark Spencer writes:

Man, you really put in some time on these articles! Very thorough. Nice job.

One thing that has been bugging me for a long time that I think your newsletter could shed some light on - setup. It seems that most decks don't add setup out to your NTSC monitor so you aren't getting an accurate view of your black levels. This happens in the typical dv setup with FCP through firewire to a deck, and then out to the monitor. The solution is to install a TBC in-between the deck and monitor to add the setup, but I'm wondering if there is any other less expensive solution? I'm convinced that just about every DV-only editor has this issue.

By the way, here's a great article (or rather, series of articles) describing the issue:

<http://www.signvideo.com/dv-black-levels-dvd-authoring-mpeg-2-part-1.htm>

I'd love to know your thoughts.

Larry replies: I haven't read the entire link, yet, but the short answer is that setup is NOT an issue for DV. All DV decks put video at 0 IRE, which is where it belongs.

Mark: Ah, but when your program goes to broadcast, setup is added in the D/A conversion (either in the dub to an analog deck, or in the D/A converter in a DVD player), so when it airs, the black level is HIGHER than when you monitored it on your NTSC monitor - don't you think that is an issue?

Larry: No, because setup is also added on output from your DV deck to the monitor so you are seeing it correctly.

Mark: Actually, it's not, that's my whole point! Most DV decks do not add setup to the monitor, that is my understanding, and the article I referenced reinforces this.

Larry replies: It seems we have two issues: first, do we need to add setup (i.e. increase the black level) when dubbing to tape, and the second is do we need to add setup when monitoring our DV signals. My understanding in talking with video engineers is that we do not need to change the black level when recording to tape. If a MiniDV tape is dubbed to Betacam or prepped for broadcast, the black level will be changed at that time.

However, much more intriguing is the issue of whether we should monitor our DV signals through a proc amp so that we are seeing it with setup at 7.5 IRE, rather than 0. (Again, PAL and NTSC-J editors don't need to worry about this.)

That is an excellent question that I am less sure about. Anyone care to chime in? I'd love to learn the answer.

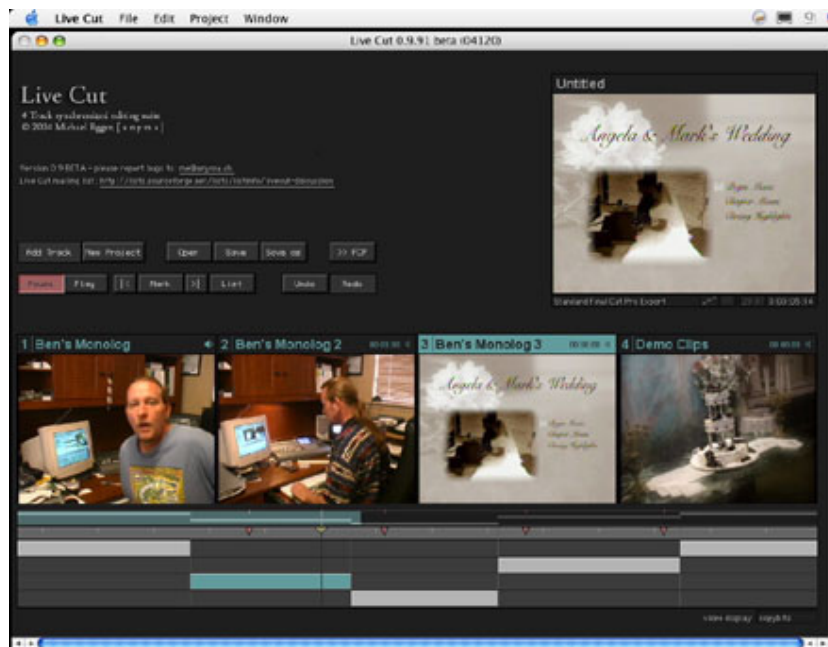
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Live Cut Comments

Ben Balsler:

Just wanted to drop you a note. I just finished a few more articles for a magazine, Flip4Mac review, Studio 1 DV Jib Arm review. But what I am really excited about is Live Cut. I hope you'll check this out and share it with your readers.

There are currently two products for FCP that will do multi-cam edits for you. One does up to 3 cameras at a time and costs \$295 (www.digital-heaven.co.uk) called Multicam Lite. Very nice software with lots of functions.



But the other option is my favorite. I'm so totally in love with this little gem. Not to mention it does up to 4 cameras at a time and is FREE. Yes, I said free. It's called Live Cut. I highly recommend any FCP editor who has to do multi-camera edits such as weddings and events get this. And I also strongly recommend they print out the page on the site that has the user instructions. Read the **WHOLE** page! There's a few features that aren't immediately obvious. Live Cut can be found at:

<http://livecut.sourceforge.net>

This little gem has literally cut my wedding ceremony editing time in half (the part of the edit I hate doing). I can not tell you how much I love this application.

Keep up the great newsletter. I look forward to each one.

Larry replies: My opinions were drawn from a comparison Phil Hodgetts did recently at the LA Final Cut Pro User Group. I listened to his reasoning and agreed that Multicam Light sounded like the better program.

On the other hand, it is hard to argue with free. So, if you need to edit multiple cameras, now you've got a testimonial and a choice.

PhotoShop and Final Cut

This comment is from last month's issue where opening Mac-based PhotoShop files retains the layer information, while opening PC-based PhotoShop files does not.

Nick Toth:

I read with interest Jim Tapley's observations on Photoshop PC files in your latest newsletter and have some info to add.

I was recently working with someone who had made some Photoshop files on a PC. It's true that they import into FCPHD as a flattened file. However, if you right-click (control-click) on the file and choose open in editor (with Photoshop chosen as your still image files editor in FCP

setup), you will be greeted by Photoshop opening the file as a layered file with all of the layers intact!

I could not replicate this in any way on the Mac. If I re-saved the PC-created file under another name on the Mac, the new file would revert to normal operation i.e.: importing as a sequence. Only the file originally created on a PC exhibited this behavior.

It gets more interesting. If you add layer effects (drop shadow, emboss, etc.) and re-save, FCP will recognize the layer effects without any of the merge into layers nonsense we typically go through!

There is some really cool potential there that I haven't had time to investigate further. FCP appears to like something the PC is doing with Photoshop files.

Thanks for all the great info!

It still seems to me if there's a way to get FCP to recognize Photoshop layer effects, it would help streamline the production process by eliminating the "merge to an empty layer" step. In many cases this need to merge layers can eat up a significant amount of time and is only a work-around for how it 'should' work (in my opinion.)

Michael Lynch adds:

I can vouch for the fact that Photoshop files created on the PC will not open in FCP (they open, but are one layer). This drove me nuts for a month before I finally installed Photoshop on my MAC and tried it from there. I posted to Creative Cow, etc... but nobody caught the connection (then again I don't think I specified PC vs. MAC). Note: you can create a document on the PC, but it must be opened and saved on the MAC version for FCP to open it correctly, even if you've made no changes to the file!

Your newsletter is great - keep up the good work!

Continuing the discussion, **Ann Farrell** chimes in:

Photoshop CS has, in addition to a way to set the pixel aspect ratio for display in an image, a number of new presets that address digital video considerations. In PS CS, if you go to File -> New and then look at the presets pop-up there is a list of preset image sizes customized for digital video. These include the proper pixel aspect ratio setting. This is what moved me to upgrade!

Nick Newman adds:

I read this article and here is my solution. I have both PC & Mac and utilize Photoshop 7 on both systems. I have never encountered a transfer problem of either a flattened JPEG or a layered file (other than font exchanges). I use a USB memory card (256 MB) to transfer the files. On occasion I will also burn to a disc if more space is required.

[So, when I'm ready I]import to Photoshop – manipulate – save to my Glyph 120 and import to FCP 4.1.1 One problem I did encounter 3 years back was that I need to make sure I keep the DPI low (but quality at high – 12) and make sure that I keep the save and usable file on RGB not CMYK. After that – no worries. PS works great for using those same files in After effects as well.

Hope this helps someone.

Larry replies: Several key points here:

1. Avoid using JPEG images for video, TIFF is much better
2. As video is a fixed resolution, I've found it best to do all my video graphics at 72 dpi.
3. Never bring CMYK images into Final Cut, they won't work
4. FCP 4.5 handles graphics differently from 4.1.1. As usual, test your graphics to make sure everything works as you expect before spending hours creating files that don't import properly.
5. Remember that single-layer graphics need to be created at 720 x 540 x 72 in PhotoShop in order to look geometrically correct in Final Cut.

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Backups and Upgrades

This comment came from last month's article about how handle working with two different operating system - one for testing and the other for general production.

Jan Biddal:

A solution to that particular problem could be buying two cheap external firewire hard-drives. [Use] Carbon Copy Cloner [to copy] a perfectly working operating system to this hard-drive and check if everything works then boot from the [second] hard-drive.

I can see two advantages with this setup

1) When Apple releases another update you have the opportunity to test the update on the firewire hard-disk and see if it breaks anything. When everything runs as it should with the new operating system upgrade the internal hard-drive and the other firewire hard-drive.

2) If your main hard-drive crashes you will be able to carbon copy clone your system back to a new hard-drive from the firewire hard-drive.

You can find the software here:

<http://www.bombich.com/software/ccc.html>

If people like it (it saved from a lot of time and inconvenience when I had to upgrade the hard-drive in my powerbook), they might consider making a small donation to Mike Bombich.

Larry replies: You could consider even making a *large* donation...

I use Carbon Copy Cloner, and a similar hard disk setup, on my system. It seems to work fine -- better than other utilities I've tested (and I've tested a lot). On the other hand, I haven't had a crash since I started using it, so I can't attest to how well it restores systems after the crash. On the third hand, I will be completely happy if I don't have a crash to test this on.

Calling All Track Gaps

Damion B. writes:

My question: Am I wrong in thinking it would be pretty easy to have a single command that closed ALL track gaps? Have I just not found it yet?

Larry replies: "Easy" is such a slippery word. First, though, you are correct, there is no way currently in Final Cut, to automatically close all track gaps.

And, I would argue, this would probably not be a good idea. There are too many issues of how to handle sync to worry about. Closing a track gap (a gap in the video where there is no corresponding gap in the audio) means the video changes position, but not the audio, How would the software know how to handle music cues spotted into lower audio tracks? Or, adjust text titles on V2, when there's a gap on V1.

This strikes me as much easier to say than to write -- or, much worse, force us to use the Auto-Select buttons far more.

Sigh. I don't like track gaps, but I like automated tools that close all gaps much less.

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Connecting a Monitor to a PowerBook

This refers to an [article describing how to connect a video](#) monitor to your computer without using a capture card.

Brian Seegmiller writes:

Larry, in your last newsletter there was an email asking about previewing video like a client would see on a TV. I have discovered something not covered in your answer. I connected my PowerBook to a monitor from the S-video out on the laptop.

At first you will see an extension of your desktop. Open up FCP and select view/video playback and you will have options like digital cinema preview main or something like that.

Anyway, selecting one of these will give you a preview of the program. And like you mentioned before selecting "best for video" and "overscan" in the monitor system preferences will make it look better.

Larry I did not know if you covered this trick.

Larry replies: Brian, thanks for pointing this out. Actually, connecting a video monitor to a PowerBook is as easy as Brian indicates, because the S-video port is built right in.

Capturing 24P from a DVX-100

This is a follow-up to the Noah Kadner's article on [capturing from a DVX-100](#).

Joe Chipmin writes:

Per your referenced article, does the capturing of 24P Advanced

footage at 29.97 also apply for 24P footage? If not, what is the "best" capture rate or setting should one use?

Noah Kadner:

For 24p standard you still capture at 29.97. Then if you wish to conform the captured footage to true 24p you do this in CinemaTools according to the manual. That's why 24pA was designed, because it can be conformed automatically by FCP. 24p standard requires more work.

Joe:

OK, then, a follow-up question. Using the Panasonic DVX100 in 24p/24pA, am I able to keep the 24p look (or even some aspect of it) when I output it through FCPHD to regular VHS and NTSC DVD formats? Are there any applications for shooting in 24p and outputting it in the NTSC world? I would need to interlace it for NTSC, correct?

When a "film" is set up for NTSC broadcast or DVD, its 24 fps is "converted" to be shown in the NTSC format, yet it retains most of its original 23 fps look.

Larry replies: Final Cut automatically adds pull-down frames in real-time for any 24 fps footage it is editing. So, if you have a 24 fps timeline, Final Cut will add all necessary frames so your video can be displayed on a standard video monitor. And interlacing is also added automatically, regardless of frame rate.

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Final Cut, ProTools and OMFs

Thom Monahan writes:

Thanks for posting the article on [exporting audio out of Final Cut into OMF](#) for use in ProTools.

I use Pro Tools LE all the time to mix projects that have been delivered to me as OMF exports from FCP. What are the advantages of using DV Toolkit?

I just use the freeware "OMF Tool 2.08" that Digi has on their site. I've been using it forever, it runs well in Classic in OSX. Sometimes it can be a little strange, but I've never run into any major problems. The one thing to make sure is that cross-fades are not included in the FCP OMF export.

Since FCP doesn't export volume change information, why spend \$1000 on DV Toolkit if the majority of your work comes from FCP? It seems like you might just as well skip it.

Larry: I use ProTools almost exclusively for mixing video, not music, tracks.

The big problem with using the OMF Tool is that it only runs in OS 9. I am not comfortable switching between Classic and OS X -- for that reason, I didn't mention OMF Tool 2.08. Further, as it is not supported by either Apple or DigiDesign, I didn't want to steer new users in that direction.

The disadvantage to the DV Toolkit is the price -- \$1,000. The advantage is that it is OS X native and fully supported by DigiDesign. And, of the four software

packages in the bundle, I use three of them a lot:

- OMF Import (called DigiTranslator)
- DINR -- a KILLER noise reduction program
- The ability to spot audio to the timeline using timecode, as opposed to minutes and seconds
- As I don't do ADR work, the ADR program didn't interest me.

For these reasons, I felt it was a good value for the money.

Thom replies:

I know what you mean about switching between OSX and OS9. In my normal work flow, I use three macs, a laptop that's OSX, another that's dual boot, and a tower that's OS9. I encounter some oddness now and then, swapping firewire drives around, but it's a necessary evil.

The only time that Classic is ever opened on the powerbook that's running OSX, is when I have to use OMF Tool. There are definitely a few buggy things about it but I have a protocol that I follow strictly.

1. Start Classic
2. Launch OMF Tool
3. Use the drop down menus too navigate to a file to open with OMF Tool.
4. Convert the file to a ProTools session
5. The Important One: QUIT.

This seems to be the real stickler. OMF Tool in my experience will only process one file correctly each time that it is launched. You must quit and relaunch it again if you have another file to process. You don't have to restart Classic, but you do have to quit, relaunch, process, quit, relaunch process, etc...

I have much better results with OMF Tool this way.

Also: I have had no luck at all trying to convert cross-fades from FCP sessions with OMF Tool. I always have to ask the editors to make sure to uncheck the "include cross-fade" option. What I've found, if the cross-fades are included in the OMF and OMF Tool is used to convert to a PT session, there is a cumulative drift that is unique to each track in the session. It seems like each cross-fade is included as extra time in each track, pushing tracks out of sync. I'm not sure if this is the case, but that's how an editor and I diagnosed the sync issues that we were having.

In a OMF export that included cross-fades we found that the tracks with no cross-fades remained in sync, but the more cross-fades that were present in a track, the greater the drift.

Since then, no exports with cross-fades.

I've been doing this since before OSX and since the bulk of my work is music and composition based, I never wanted to pony up 1K for DV Toolkit.

For me, I've had better results with the Waves denoiser than with DINR. Just my opinion, haven't used a version of it since I started using Waves.

Judy Korin adds:

Thanks for your helpful article about exporting Final Cut Pro OMFs for use in ProTools sessions.

One little detail that we've discovered that you might want to add:

Your FCP sequence name, project name and OMF file name need to be short (i.e., under 10 characters and with no funky characters) or else ProTools will not be able to open/read the file!

Just one of those little things that can really trip you up...

Larry replies: Judy, and Thom, thanks for your comments!

Here's the commercial that supports this newsletter.

I provide system design, consulting, editing, training and support for Final Cut Pro, DVD Studio Pro and Motion.

You can review my [support and training services here](#).

If you need training, help or advice with Final Cut Pro, DVD Studio Pro, or Motion, I'd appreciate it if you would give me a call, (818) 879-5105, or send me an email -- larry@larryjordan.biz -- worldwide.

My [client list](#) speaks for itself.

Your support of my services keeps this newsletter free.

Thanks.

Oh, and please [buy my book](#) - and [DVD!](#) Thanks.

Wrap-up

Remember, next month's issue won't be out until after NAB, so please be patient. And take a minute to vote in the poll -- I enjoy learning more about your interests.

Well, that's it for this edition of the newsletter. Let me know what you think, and tell your friends to subscribe. I love reading your comments and sharing them with others.

Or, send in some ideas of what you'd like us to talk about.

Even better, send in some tips of your own. I'm happy to publish everyone's ideas. That way, we all learn!

Thanks -- and have fun editing!

Larry

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