

**This is archive material from Jay Rose's popular Audio Solutions column in *DV Magazine*.** Most of this content is still valid and useful... but some of the specific information may have changed. You'll find newer, more comprehensive, better written tutorials in my books: [www.dplay.com/book](http://www.dplay.com/book)  
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*Oh, the things they do in the movies...*

## What I Learned Last Summer

Even though I'm writing this for January's DV, summer is still fresh in my mind. It probably always will be: I spent most of it as sound designer for a Hollywood feature. I'm a Bostonian who normally does audio for spots and documentaries, and this was a different world. It isn't just because theatrical features can have a more intense track, with more interesting sound—though I certainly appreciated that opportunity. It's mostly because, even though the technology is the same, the people doing audio post for movies in Los Angeles work differently than I'm used to. Some of their techniques can be helpful for us lesser mortals.

### **E Pluribus Unum**

In the DV world, it's not unusual for one person to handle almost every aspect of audio post—editing, sweetening, processing, and mixing. In Hollywood, sound evolved in a studio system with hierarchies and strict job descriptions. This made sense in the assembly-line atmosphere of a large studio. Most audio post engineers there are extreme specialists. One person might be a dialog editor, while someone else cuts music. Some people just record foley; others are known for their v/o recordings. King of this hill is the re-recording mixer, who's responsible for the ultimate balance and the final sound of the film. And even these mixers often concentrate on dialog, with assistants mixing music or effects.

In fact there may be a hundred or more people doing specific sound tasks on a big feature. With an army this big, predictability and order become important. The shortcuts you develop working by yourself might make perfect sense, save time, and result in a better track for less money. But they can be liabilities on a feature, if the next person down the line can't figure out (or undo) your work.

For example, I'm used to cutting and tweaking dialog linearly. If a phrase is garbled or badly read, I'll reach for an alternate take or build one from syllables. If something wants noise reduction, it gets it immediately. If two shots have to be equalized to match each other, I'll eq and it's done. When I reach the last scene, dialog is finished and I can move on to music and effects.

That’s not the Hollywood way. First, dialog editors get tracks from the picture editor, as edit lists to be conformed or as digital audio files. But even though these tracks have already been cut to picture in an NLE, there’s still a lot to do. Figure 1 shows some of the dialog editing, from a scant fifteen seconds of a movie; the colors were added for this explanation. The bottom track (light green) is how the track came from picture editorial; in this case it’s mostly a continuous clip from one take. The scene has three different characters with different timbres and volumes; to make them easier to mix, their lines are split among the top three tracks (pink clips). ADR (yellow) gets its own track. Note the fast fades, shown as thin blue lines at the ends of most clips: they smooth out the transition from one track to another. If two clips are next to each other on the same track, there’s a fast crossfade (narrow blue regions) to prevent clicks. One sound effect—a door slam (red)—was picked up from the production recording. It’s not dialog but might be useful in the mix, so it’s moved to a production effects track.

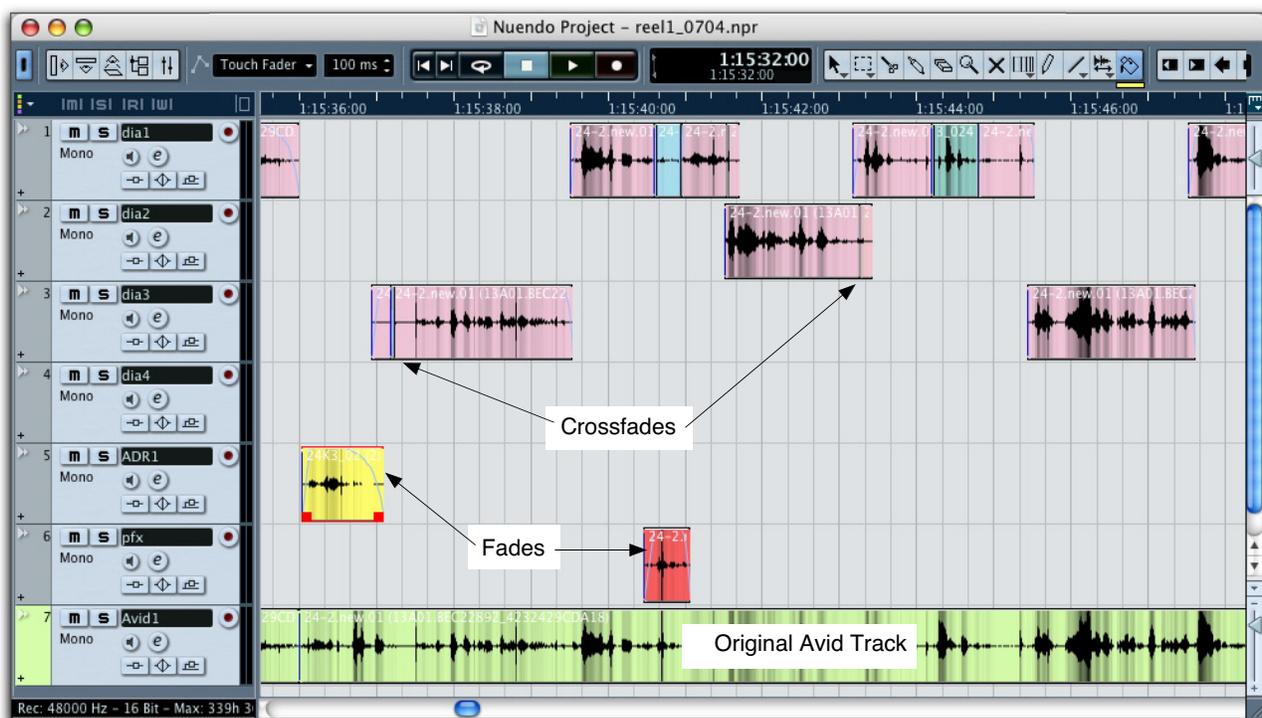


Figure 1: Splitsville! The original dialog track from the picture edit (green) gets broken up, often by character, to make it easier to mix. Very fast fades and crossfades smooth the transitions, even though actual levels won’t be determined until the mix. The various colored regions are explained in the text.

That door slam might be replaced with a different one from a library. So a little bit of room tone is copied from elsewhere in the take, and pasted where the slam used to be on the dialog track (blue). This way, the background can continue if a different slam is used. The blue-green chunk on the top track is a couple of syllables borrowed from an alternate take, to subtly change the performance, at the director’s request. Since its background ambience matched, it’s pasted directly over the original dialog.

Multiply this fifteen seconds by the length of a movie, and the dialog editor has a lot to do. Fortunately, that person never deals with equalization or noise reduction or overall levels. Since this means they're not making subjective adjustments to the sound quality, they don't need to spend money on high-quality monitors.

### **Listen Large!**

Ah, but mixing does need those monitors... as well as properly-tuned acoustics and a very large room. Something wonderful happens when a sound is spread across 5.1 channels in a big dark room, with theater-quality speakers: you hear *everything*, far more than in a typical video mix. This is partly because larger rooms support louder monitoring and better bass, and partly because a theater setting helps you concentrate on the track. Working on this scale even gives you options for centered, mono sounds. Dialog, in both film and video, is almost always mono unless there's a special effect. This is partly for aesthetics—it's disorienting to have voices bounce around the room each time the camera angle changes—and partly because everybody in the room should hear dialog clearly, no matter where they sit. Monaural sound effects usually go in the center as well. In stereo video mixes, mono sounds are sent equally to the left and right speakers and appear as a *phantom center* between them. In a film mix, they usually go to a dedicated center channel and play through a speaker behind the middle of the screen. But you can also mix them equally to the left and right channels, making them seem bigger in a large theater... even though in smaller environments, they'll merge to the phantom center.

These *mix stages* or *dub stages* are the room with a giant console and screen that you frequently see in "Making Of..." documentaries. They're where all the elements come together for the final mix. But they won't come together for a while. Before anything else happens, dialog is *premixed*: individual clips are equalized and their levels adjusted, and noise reduction or reverb is applied, to make each scene a seamless whole. This isn't trivial—a short scene might have taken most of a day to shoot, with mic position, acoustics, and background sounds changing for each camera angle. If the scene was shot and edited properly, we can ignore the picture cuts and accept it as one continuous action. But if the sound changes with each cut, we're drawn to the discontinuities and the illusion is destroyed. So premixing involves a lot of back-and-forth tweaking to make the clips flow smoothly. On a medium-sized film, the process can take a week. If the film has a lot of sound effects, the effects premix can take even longer, with separate passes for backgrounds, foley, and hard effects.

For most of Hollywood's history, premixing actually involved creating a new, mixed reel of optical or magnetic film. These days, it means storing the mix engineer's fader and equalizer moves for automated playback; these moves may be further modified during the

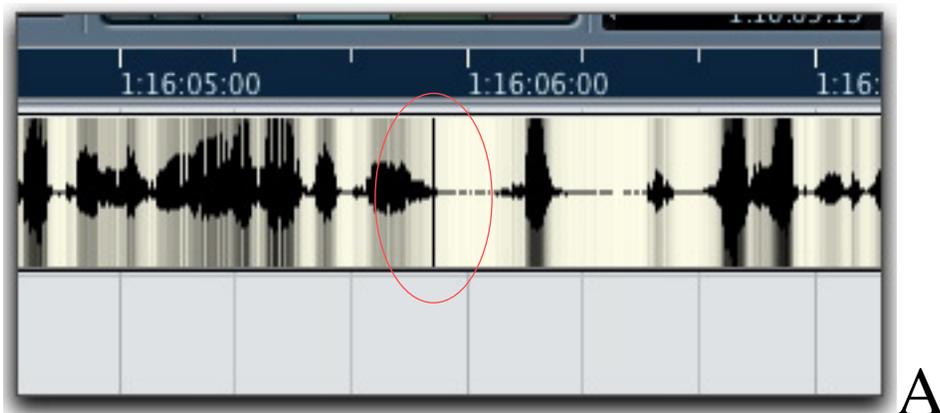
final mix. But some processes can't be automated—an external effect or plug-in might not support that function—and the result has to be recorded onto another track. And that was one of my biggest lessons:

**Always keep an unprocessed version of any processing, in sync, and on a nearby track.** When I'm working on a video by myself, I'm pretty sure how sounds will mix together. So I'll often replace an original clip with the processed version and not have to worry about multiple versions on the screen when I mix. But re-recording engineers demand the ability to treat sounds the way they think best, on their console, in their room. They'll accept processed elements, if a sequence was developed for a preliminary screening or there's a special effect, but insist on a *mirror track* of the same edited material with no processing. That way they can always reach for the unprocessed version, or mix just a little bit of it in to soften the processing. It makes so much sense that I now keep mirror tracks as well, in a folder just off the bottom of the screen.

There are about a dozen other specifics I learned while working with the Hollywood folks on this movie, more than can fit in a column, but you can read them at [dplay.com/dv](http://dplay.com/dv). One, however, is too nifty to make you wait.

### A Tick Trick

The big monitors on a mix stage let you hear any imperfections in the track, including momentary ticks or digital clicks that escaped notice earlier. Figure 2A shows one of these nasties, with a red circle around it. The time scale here is ten frames per division.



*Figure 2: Tick Talk A tiny tick (circled in A) might not make it through TV speakers, but you'll hear it in a theater. Fastest way to remove it?*



**B**

*Zoom down to the cycle level (B) and copy an adjacent cycle (green rectangle).*



**C**

*Then paste it right over the noise (C).*

To kill the tick, zoom in to where you can see individual cycles of the voice (2B, with a time scale of a half-frame per division). Then select the full cycle just before or after damaged one (green rectangle) and copy it to the clipboard. Paste it over the damaged cycle (blue region in 2C) and listen.

If you're lucky or your software automatically snaps to zero crossings, the repair will be seamless. Otherwise, just add quick crossfades around the pasted part. The whole operation is much faster than setting up a click-removal plug-in. Most software also lets you zoom down to the sample level and draw a new waveform over the tick, but that can take longer and requires a steady hand.

## **Summertime Blues**

I also learned something about semantics this summer. My column *Say It Ain't So*, which appeared in August and is online at DV.com, generated a lot of mail. Some readers were offended that I'd punctured their favorite audio myth, but a deeper explanation of the technical issues seemed to satisfy them. But a few took issue with my writing that real-time digital dubs might not be perfect copies, because of the error correction schemes used in digital audio players. This is thornier, because—as I wrote in the article—copies of an audio

file made within a computer *are* perfect, barring catastrophic failure. So are copies made of data on CD-ROM or 4mm DDS tapes, which use the same media as audio recordings. The problem is words: in this digital age, what exactly is a dub? One reader suggested we say “transfer” for re-recording an audio stream (which includes ripping an audio CD); I’ll add the term “clone” to describe a bit-for-bit file copy. And we’ll bag “dub”, except when talking about “dub stages”.

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Jay Rose, C.A.S., has been creating sound for the small screen (and occasional indie shorts) for a few decades, and has written a couple of books on sound that are standard texts at film schools. Ironic, huh? Reach him at [jay@dplay.com](mailto:jay@dplay.com).

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## *Coming Attraction*

The movie is *Two Weeks*, a comedy/drama starring two-time Academy Award winner Sally Field (*Mrs. Doubtfire*, *Steel Magnolias*), Ben Chaplin (*Murder by Numbers*, *The Truth About Cats and Dogs*), Clea DuVall (*The Grudge*, HBO’s *Carnivale*), Julianne Nicholson (*Little Black Book*, *Kinsey*), and Tom Cavanaugh (NBC’s *Ed*). Writer-director Steve Stockman is a transplanted Bostonian; we continued working together after he moved to L.A fifteen years ago. This was his first theatrical feature. Mine, too.

The picture was shot in Nashville as high-definition video for release on 35mm film. It was converted to letterboxed SD video for Stockman to edit in Los Angeles, then sent to me in Boston as BetaSP and OMF files. Our cross-country collaboration was mostly by telephone and QuickTime movies; as things got more interesting I’d overnight DVDs.

For those who keep track of these things: I did the editing and preliminary mixes with Steinberg Nuendo 3 software, MOTU audio and sync hardware, and a Doremi V1 video server; surround and special effects were processed through an Eventide H8000. The mix was done at The Dub Stage in Burbank by Marti Humphrey, C.A.S., using Digidesign ProTools HD hardware and software. We both used Mac G5s for almost everything.

*Update: The film was picked up and distributed theatrically by MGM.*

*Critical reaction was split good and meh, but the film didn’t do well at the box office.*

*You can sometimes catch it on premium cable, or through the streaming services*

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