



## Performance Media Industries, Ltd.

**Get in Sync!**  
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by A. Grimani

Have you ever noticed that lip sync seems a little funky on today's plasma and fixed-pixel projection display systems? You are right; lip sync keeps getting worse. All the time I run into systems with increasingly long picture-to-sound delays, and it drives me crazy! I was walking through one manufacturer's booth, and a concert video they were playing from a DVD was so far out of sync that the snare drum's sound was consistently at the top of the drumstick's upswing – pretty darned syncopated!

It is known from film production that typical humanoids can detect lip sync errors of one full frame of delay. At 24 frames per second in film, that translates to 42 ms. It is also known that film sound editors, who synchronize soundtracks for a living, can detect an error after half a frame (only 21 ms). I would say that those of us with high-end home theater systems should target less than 30 ms of sound-to-picture sync error.

How can you tell if the sound is off? If it's way off the error is really obvious – like the drummer in the above example. But if the sync error is only slight, I can usually tell because the dialog sounds soft... What?! Well, your eyes are always looking at lips and your brain is unconsciously reading them. If the sync is out, there's a mental disconnect, and dialog clarity plummets. For this reason, you will often find that foreign-language-dubbed versions of Hollywood flicks usually have much louder dialog-to-effects balances than the original English release. Just take a listen to what Ah-nuld sounds like in French; it's hilarious!

The reason for the sync error is simply video processing delay time in the display and/or scan converter. The incoming video needs to be converted to the digital domain, then stored in a buffer for one, two, or three frames' worth of time (at video's 30 frames per second that's up to 99 ms), so that the signal can be analyzed, upconverted, noise-reduced, and rescanned to the display system's native resolution. Then the signal may need to be converted back to the analog domain or further processed for additional enhancements. Altogether, you can end up with 100 ms or more of video delay. Can you notice this? You bet; any common home theater owner can!

So what do you do? Your only solution is to delay the audio signals in all the channels by the same amount as the video. A few products, such as Lexicon A/V controllers and Denon receivers, provide this feature. If you're not using one of these units, you can add an external digital delay unit between the surround controller and the amplifiers. Decent units are available from several pro audio manufacturers such as Lexicon and Rane. You then need to make sure to delay all the audio channels equally. Signals that test A/V sync are available on the *Digital Video Essentials* DVD, so go hunt them down.

Better yet, you can add a digital equalizer in the chain and, for a little more money, get to correct the room's inherent frequency response errors. Such a deal!

Now: a big caveat. (Never easy, is it?) Since picture-sound sync is set by the mastering engineer during the film-to-video transfer process, you will find variations in sound sync from disc to disc. To make things worse, I heard that one Hollywood facility was using plasma sets for monitoring until they realized that their resulting work was way off...but it would have looked fine at your house with the same plasma set! So, unfortunately, you can't really just set a fixed compensation delay these days. You will need to set up the automation system controls to start at the ideal delay amount to compensate for the video chain's errors and then offer a plus/minus delay setting that will alter all the delay units at the same time. Darn; this can actually get to be really complex programming! It gets better. Some audio signal processing units don't offer on-the-fly updates for delay through their RS232 ports. So, more legwork for you. Think of it as one more reason why you have the best home theater on the street!

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