

## Debate brews over special 'K' standads

*Resolution queries raised as quick fix battles quality*

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By David Bloom



Of all the questions surrounding digital cinema - how much will it cost, who will pay for it, what will it do to the art and commerce of making movies - perhaps none is thornier than this: how good a picture is good enough to replace film?

The question often is reduced to a shorthand, 1K vs. 2K vs. 4K. Each "K" stands, roughly, for 1,000 pixels of horizontal resolution. A pristine film negative might be 6K in resolution, its descendant print screening in a suburban cineplex might be a fourth of that. The only commercially available systems now in theaters are based on Texas Instruments' DLP technology, with a resolution of 1.3K. Other systems are coming, from other companies, using other technologies to create resolutions up to 4K. But no one has yet decided which K is special enough to become the standard worldwide. As one digital systems specialist put it at a recent conference, "Today, we're not sure how many Ks are OK."

SMPTE's DC-28 panel has been hammering out d-cinema standards all sides can live with. More recently, the International Telecommunications Union in Switzerland has begun work internationally. The ITU has caused significant anxiety, however, because it normally oversees broadcasting, which has little to do with d-cinema. U.S. negotiators have pushed for an ITU standard that allows for technological advancements. But consumer electronics firms and others want to set a standard quickly, at resolutions as low as 1K. That would give buyers some assurance that their acquisitions won't become obsolete overnight, goosing the market and allowing electronics companies to spread development costs across both the small exhibition business and the much larger home-theater consumer market.

"One end of the spectrum says, 'Let's do it now. This is good enough.'" says Charles S. Swartz, exec director and CEO of USC's Entertainment Technology Center, which tests digital cinema systems. "At the other end, they're figuring out the theoretical best we can do and want to hold off. You reach a point of diminishing returns by waiting though. What that point is, we don't know yet."

A quick decision may be a boon for buyers and hardware companies, but worries creative types, who don't want a dumbed-down standard that reduces their options and doesn't differentiate movies from what consumers can see at home. One insider called the battles "a quagmire." Another says it's "a blood war". The real area of contention is what's good enough. No one disagrees that HD can be displayed, but people don't want it left there."

"It's very hard to legislate out good ideas," says John Manulis, CEO of Visionbox, which consults and produces digital films. It's possible, he says, to create different kinds of viewing experiences, and standards to guide them, for different kinds of content that will be possible in the coming digital distribution systems.

Thus, one level of quality might be acceptable for pre-show advertising, pay-per-view live events, corporate gatherings and the like, Manulis says. But Hollywood and most exhibitors won't risk their audiences' affections by accepting poorer quality on theatrical features.

To further cloud the dispute, some experts say a fight over resolution levels obscures much more complex issues, such as how subtly the technology can display differences in blacks, how many shades of colors can be stored, and more. How those factors are combined is a complex alchemy that professionals are only just now beginning to understand.

"I believe the issues having to do with picture quality are sufficiently complicated that many people have fallen on the count of horizontal pixels to represent something that's not represented by the count of horizontal pixels," says Loren Nielsen of Entertainment Technology Consultants, who works with several projector manufacturers. "It's a metaphor for how good the picture looks."

Nielsen advocates what she calls "2K squared," which is a 2K resolution, coupled with black-level ratios of 2,000 to 1, and "lots of (color) bit depth," though she jokes that she hasn't figured out a clever shorthand for that part of the equation yet. The TI systems recently have improved black levels to a ratio of about 1,350 to 1. And then there's the question of what, exactly, the human eye can actually see. "The human visual system has a lot of non-linearity in it," says Dave Monk, VP for Texas Instruments Europe.

Whereas humans have a difficult time detecting differences between white values of, say, 80% and 90%, evolution has created a finely tuned sense of differences in black values, discriminating between changes as small as a thousandth of a percent.

"Most people really like the (digital) pictures they see today," Nielsen says. "The pros will say the pictures will benefit with more resolution, more color information. I think we will see that in some of the new systems coming up. We're going to start seeing things that will satisfy more people in the creative community."