

# Angles of View: Digital Cinema - Take 1

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At first glance, it would appear that the development and progress of digital cinema have little direct connection to the world of pro AV. Because of its core concentration on entertainment media, the Home Theater industry has ample reason to monitor with interest this newest entertainment medium, but the systems end of the AV business? Kind of hard to imagine. Or is it? Let's take a closer look at this emerging technology and see if there aren't, in fact, some interesting correlations between commercial AV and Digital Cinema.

## Digital Cinema – Take 1

As this series has discussed previously, all information (of whatever kind) which can be captured, created, projected, or displayed exists only in an analog or digital format. True, any particular amalgam of information (an "image," for instance) can start out in one format and then once or many times be converted into the other as it is passed through and along the components of a display system.

Once upon a time, one could be confident that the initial collection point of that information resided firmly in the analog world. Certainly because our sense organs (eyes and ears, etc.) are exclusively analog receptors, information presented to us must always end up converted from D to A.

To use a simple example, when we set out to make a 35mm slide of, say, a friend riding her bicycle, we pointed our camera in her direction, snapped the shot, had it developed, and then, by shining a light through the resultant image, we could look at it projected and enlarged on a screen. The image we contemplated was an extremely convincing two-dimensional representation of the three-dimensional scene which we had lifted from the real world. Unless or until we blew it up to a size large enough to detect the grain of its emulsion, we could examine it as closely as we liked and still avoid noticing any of the artifacts out of which it was, nevertheless, actually made.

If this 35mm static image was inserted into a moving series of similar images each of which was only slightly altered from the ones preceding and following it, our belief in the fidelity of what we were looking at in space was enlarged to include convincing changes in time. These were, in their most literal sense, motion pictures — and the experience they came to exemplify for us was, of course, "the movies."

To belabor the point for one additional paragraph, when we aimed a movie camera at that same bicycle-riding friend, we took a series of photographs which accurately captured sequential changes in her position relative to ours. Note that our camera did not record every position she adopted during the time we were filming. Instead, it sampled just enough of them (24/sec) that when we subsequently ran them all through a movie projector, our brains were fooled into thinking that we were seeing fully as many positions of the moving bicyclist as we observed while watching the real thing. (The spokes in her wheels might appear to have been revolving backwards, but that is another discussion.)

It is this technique of using a finite number of temporal or spatial sampling elements to represent the infinite continuum of which reality is actually constituted which digital image making depends on. While its sampling scheme alone may not completely define digitized imagery, it is arguably its sine qua non.

The reason why none of this is very novel or startling to the pro-AV world is because, of course, we as an industry have been refining for years ways to improve the display of images whose origin was not the real world and was instead the insides of a computer.

By definition, the "data" of our data displays has always been computer generated. This hasn't been true because of anything intrinsically preferable about its format. (VGA never looked very impressive, did it?) But it was true because business people, our clients, had learned how to create with their computers gigabytes of information which was useful to them to organize and present. Since those computers were

universally digital, there seemed nothing whatsoever remarkable about projecting their graphical output in ways that were precisely divisible spatially.

We in pro AV have known for years what 640x480 signifies and we have been the first to celebrate the advances made in that sampling rate as it has extended through 1024x768 toward 1920x1080 and, doubtless, beyond. We understand (and take for granted) that the product of these numerical pairs tells us into precisely how many pieces our imagery has been diced.

We also appreciate that the image we project on a screen, whether it be a page of text, a PowerPoint® slide, or a spreadsheet, does not itself have any analog in the real world. It never, this projectable "object," had an existence whose resolution was infinite. In point of fact, the entire class of computer generated images don't have even a "native" resolution because that phrase describes machines and not the "objects" they create.

All of us are not only familiar but comfortable with our ability to take, for instance, a PowerPoint slide and entirely reconfigure its appearance in just a small number of mouse clicks. Foreground and background, fonts and graphics, color, pattern, and even movement are all not only profoundly variable but completely independent of objects in the real world. We are empowered with this flexibility because underwriting each and every attribute we alter is nothing more than a long sequence of very simple instructions which tell each and every pixel whether to be On or Off and, if On, what color it should be.

String all of those instruction sets together and then scan through them and you can have a succession of screens, images, or pictures which you can vary and reconstitute at an iterative rate easily fast enough to convince its viewers that it contains motion.

Which brings us back to the movies.

If we think about all of the movies we have seen in our lives, we can notice that a common denominator uniting them (except cartoons) is their inclusion of "live action." In going to them, we went to see real people (actors, of course) moving about and talking to one another within environments which themselves appeared convincingly authentic even when they were in fact artful and artificial sets. Were we privileged to witness the actual filming of such a movie, we would have seen arrayed in front of the camera real actors riding real horses or sitting in real chairs while their actions and dialogue were lineally transcribed onto film.

Even when "special effects" were employed, tangible objects, whether painted matte backdrops or miniature model spaceships, had to be photographed and recorded in ways and from perspectives which had persuasively to belie their actual natures and scale.

If the director of these efforts wasn't for whatever reason satisfied with the appearance of any one of these "scenes," his only option was to set it all up and shoot it over again. Then, at the end, he could assemble all the filmstrips containing all of the takes of all of the scenes and have them edited into whatever sequence he conceived would make up their most coherent whole.

These points have nothing to do with the aesthetic values of the finished product. We are instead only interested in drawing attention to the nature of the mechanical process by which all of the imagery making up a typical movie gets deposited onto the medium through which it will be eventually copied and projected.

From a pro-AV angle of view, the whole reason why the process of classical movie making has been so arduous could be explained by the phrase "Analog Cinema." As long as the source material of its imagery had to be found or created in the real world, cinema enjoyed none of the flexibility which digital imagery ensures.

With, however, the migration of digital imaging technology from our pro-AV world to the world of the Hollywood studio, all that is changing forever. While some may suppose that the most significant aspect

of Digital Cinema is the shift its arrival signals in how a movie may be distributed and shown, the really radical development is the transformation in technique of how a movie may be made.

To see this more clearly, watch what happens when traditional "live action" footage is digitized: "It loses its privileged indexical relationship to pro-filmic reality. The computer does not distinguish between an image obtained through the photographic lens, an image created in a paint program or an image synthesized in a 3-D graphics package, since they are made from the same material — pixels. And pixels, regardless of their origin, can be easily altered, substituted one for another, and so on. Live action footage is reduced to be just another graphic... ."<sup>1</sup>

This begins to sound like the sort of manipulations people preparing presentations in pro AV have long been used to, doesn't it? And so it is. Soon enough, the newly digital cinema will just be another version of what we're already calling multimedia. Movies won't be film anymore; they'll be software:

Lights, camera, action ... .

Cut. Paste.

<sup>1</sup>The author is indebted for these and other insightful observations to: Manovich, Len.

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