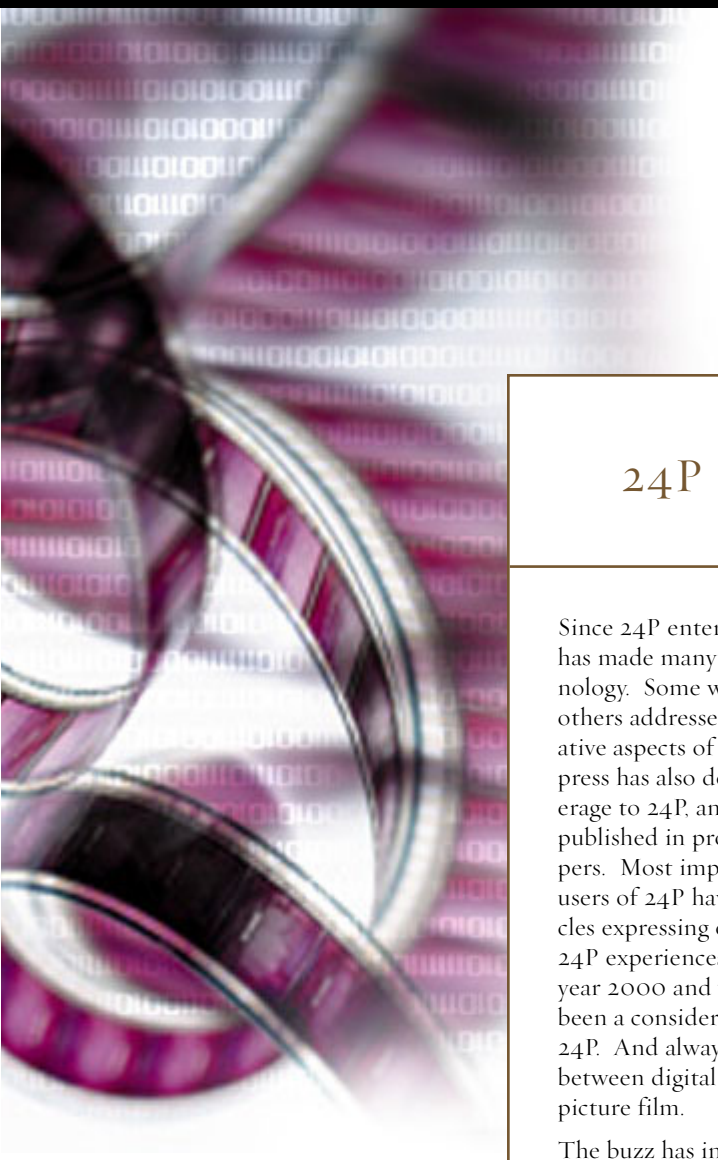
SONY

24P

and the

CINEMATOGRAPHER

CINEALTA



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Since 24P entered the marketplace, Sony has made many presentations on this technology. Some were of a technical nature; others addressed the production and creative aspects of this new system. The trade press has also devoted a great deal of coverage to 24P, and major stories have been published in prominent national newspapers. Most important, many of the early users of 24P have written their own articles expressing opinions on their respective 24P experiences. All in all, throughout the year 2000 and well into 2001, there has been a considerable "buzz" on the topic of 24P. And always, comparisons are drawn between digital 24P and 35mm motion picture film.

The buzz has increased with the larger discussions now taking place under the umbrella of "Digital Cinema." Encompassing everything from consumer DV digital shooting, to professional DV variants, to digital 24P, these debates are further complicated by separate discussions on digital distribution and digital projection of movies.

24P - FRIEND OR FOE?

As a consequence of these complex discussions, it was perhaps inevitable that some mixed messages would circulate throughout the industry. Controversy often surrounds new ideas and techniques. Enthusiasm sometimes overshadows realities.

Stories have circulated suggesting that the advent of digital 24P shooting can magically dispense with the need for lighting and film crews — and that anyone capable of handling a DV consumer camcorder is instantly empowered by 24P into becoming a skilled DP. To say that all of this has caused something of a reaction from the community of professional DPs might be an understatement. Hot debates have whirled through cyberspace as angry cinematographers and directors furiously dissected the perceived merits and shortcomings of 24P. Current opinions range from outright rejection of any digital encroachment into the domain of motion picture film origination, to skepticism regarding all of the hype about 24P — accompanied by a guarded curiosity about its potential.

Invariably, some of the more contentious messages surrounding 24P have been attributed to Sony, the manufacturer most prominently associated with the development and promotion of 24P technology. A number of editorials in magazines catering to Directors of Photography even spoke of "false marketing" on Sony's part. Some of these perceived "falsehoods" were specifically attributed to the individual at Sony who became most visible as a consequence of his many presentations on the topic of 24P. Protesting innocence has been of little avail; feelings were running high, and in some instances, still remain that way.

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SONY AND 24P

That Sony has definite views on the topic of 24P and its relationship with motion picture film goes without saying. As early as 1994, Sony published a paper on the "The Electronic Pursuit of Film Imaging" [1].

In light of current sentiments in some quarters, we would like to clarify our views on 24P especially in its relationship to motion picture film. This paper outlines the 24P views put forward by Sony with careful consistency over the past four years.

CREATING THE FILMED IMAGE

Figure 1 is a slide first presented by Sony at the Sundance Film Festival in January, 1998, when we gave a seminar on digital cinematography. It was intended to diagram all of the elements of a "shoot and capture" process that contribute to the final quality of imagery recorded on a given film stock.

FILM IMAGING

- set
- lighting

CHOICE OF IMAGE FORMAT:
- 35mm
- Super 16mm
- 16mm

- lens
- filtration
- matte box

CAMERA CHARACTERISTICS
- fps
- shuttering

CRAFTSMANSHIP OF THE CINEMATOGRAPHER

RECORDER CHARACTERISTICS
- film stock
- film speed

Figure 1. A DIAGRAMMATIC representation of all factors contributing to a final IMAGERY captured on MOTION PICTURE FILM

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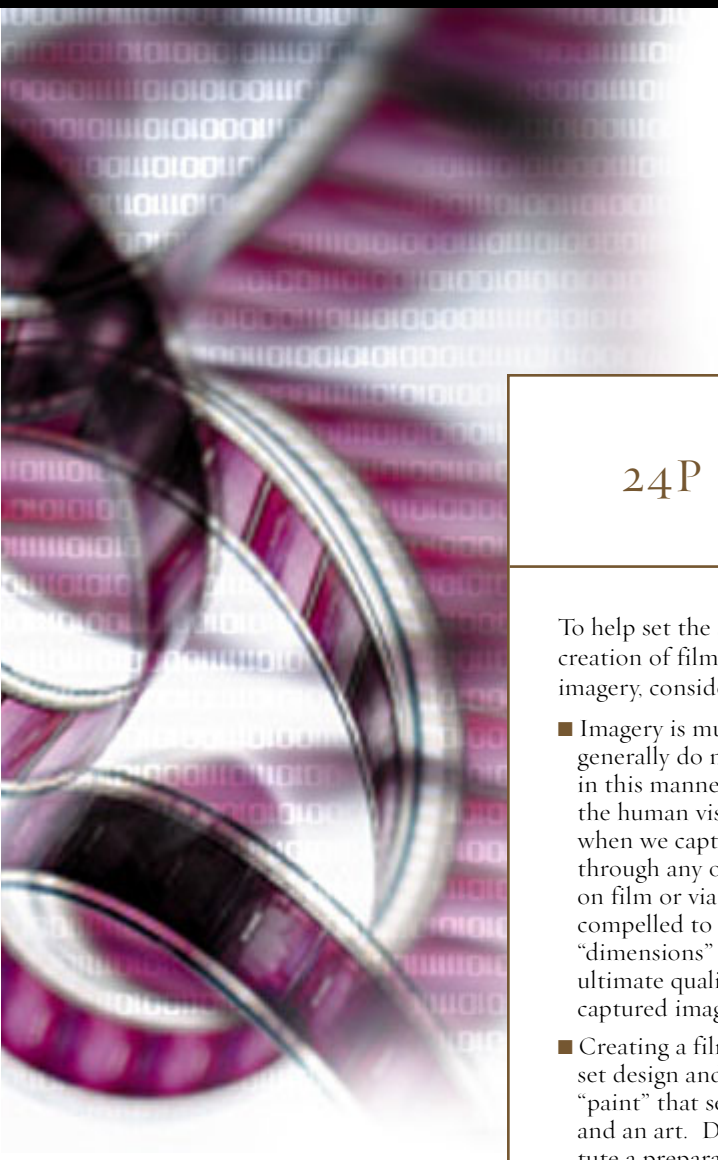

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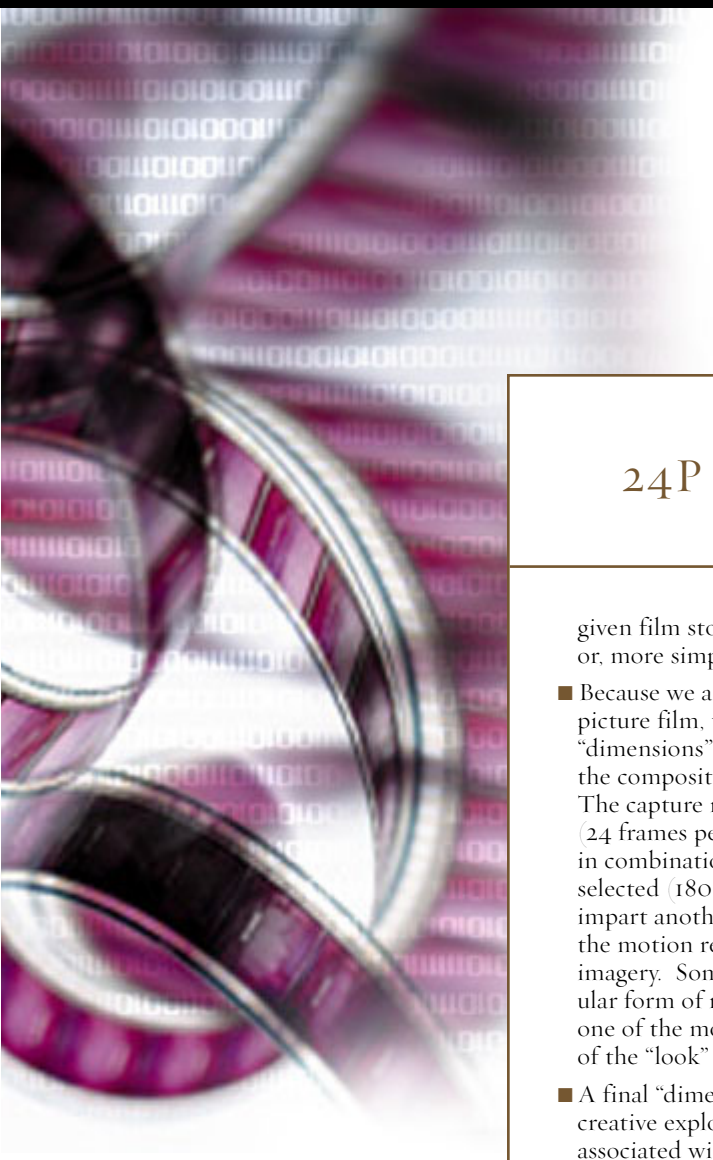
To help set the stage for comparing the creation of film imagery to digital 24P imagery, consider the following sequence:

- Imagery is multidimensional. We generally do not think of the real world in this manner, because we see reality via the human visual system. However, when we capture an image of reality through any other medium in painting, on film or via digital photography we are compelled to pay attention to the many "dimensions" that contribute to the ultimate qualities and aesthetics of the captured image.
- Creating a film image begins with the set design and the lighting employed to "paint" that set. This is both a science and an art. Design and lighting constitute a preparation of the optical image that will be collected by the camera lens and ultimately focused onto the film emulsion.
- The camera lens, along with various separate accessories associated with that lens (such as matte boxes, optical filters, etc.), will add other "dimensions" to the optical image applied to the film emulsion.
- There is a crucial human dynamic associated with both of the above processes. Technical acumen is certainly required — but above all, there is artistry involved. Together, set design and lighting are the creative domain of the DP. The vital point here is that a considerable aesthetic intervention affects the image that will subsequently be recorded by the camera.
- When exposed by the camera operator, the film makes a separate recording on each of its three emulsions. At this stage, a profound transformation takes place as the optical is converted to the photo chemical — and the "footprint" of the film medium itself makes a considerable modification to the imagery.
- Impressed upon the film emulsion will be several separate core "dimensions" of the image: tonal reproduction, color reproduction, exposure latitude, and picture sharpness. Each of these dimensions will be different for different film stocks. At this point the next level of DP expertise comes into play. The accumulated knowledge of years working with film stocks endows the DP with an innate creative sense of the imagery he can anticipate on any specific film recording.
- One important attribute of a given film stock is its exposure index. This refers to the sensitivity of the film stock, or, as it is termed in the industry, its operational "speed". Exposure Index refers to the ability of a specific film stock to "capture" a satisfactory level of imagery under a specific level of scene illumination. Because scene illumination can cover a vast range, film stocks have been progressively developed over many years to handle all possible extremes. A slow-speed film (perhaps 50 ASA) can record satisfactorily under high illumination levels, while high-speed stocks (500 ASA and even higher) are designed to produce the best imagery under much more limited levels of illumination.
- Attendant with the Exposure Index of a



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given film stock is its r.m.s. granularity – or, more simply, its film "grain."

- Because we are dealing with motion picture film, there are several more "dimensions" that can be impressed upon the composite imagery being recorded. The capture rate selected in the camera (24 frames per second, or other rates), in combination with the shutter angle selected (180 degrees or otherwise), will impart another indelible "footprint" to the motion reproduced in the recorded imagery. Some have claimed this particular form of motion reproduction to be one of the more significant dimensions of the "look" of film.
- A final "dimension" of the image is the creative exploitation of a phenomenon associated with lens optics: depth of field. And this is a dimension of imagery that is wholly artistic – one that has no direct equivalent in the human visual system.
- The camera lens facilitates another artistic intervention: selecting what portion of a scene is in optical focus and what portion is deliberately defocused. Because what is seen on screen is ultimately a two-dimensional portrayal, focus can be used to create a compelling psychophysical illusion of three-dimensional depth. The complex interaction between scene illumination, image format size, framing, and lens aperture all empower the DP to be very creative in setting up the apparent "depth" of a specific scene. DPs can exercise powerful control over what they wish to be portrayed as the dominant element within a scene. That power is enriched by the ability to alter the depth of field in real time during the shooting of a given scene, adding yet another creative level to the "story-telling".

CREATION OF THE DIGITAL 24P IMAGE

The equivalent diagram of the 24P shooting process is shown in Figure 2. It will be immediately obvious that there is a close similarity to the film shooting process represented in Figure 1. Indeed, this similarity demonstrates a very important point: there is no short-circuiting of the necessary processes involved in capturing high quality imagery.

DIGITAL 24P HD IMAGING

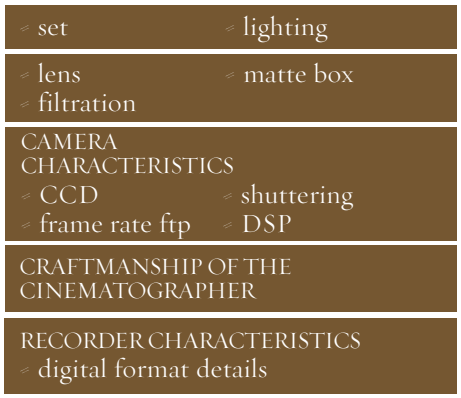

Figure 2.
A Diagrammatic representation of the Digital Image Capture process

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A film/camera combination "shoots" and "captures" an image. Likewise, a digital camcorder also "shoots" and "captures," although the physical mechanism involved is radically different. Both film cameras and video camcorders capture the optical image that the DP has artistically pre-structured. Thus, nothing is lost in terms of the craftsmanship of the DP when making the creative transition from shooting with a motion picture film camera to shooting with a digital 24P camcorder.

FURTHER EMPOWERMENT OF THE DP

The practices employed in shooting with motion picture film and with digital 24P can be the same. They can also be different. The differences can be a creative choice, or simply a choice of style. In other words, the shoot can be set up to anticipate the final imagery, just as in the case of traditional film shooting or it can be structured to confirm the final imagery while still on set.

The choice is that of the producer, director, and the director of photography. Any difference is primarily associated with the decision of the DP to make use of additional empowerment techniques offered by the digital 24P camera. Over and above the application of craftsmanship in lighting, lensing, framing, filtration, a cinematographer can, if he chooses, also make adjustments to the digital processing of the RGB video in the camera. RGB values can be adjusted in real-time during the shoot itself. They may also be pre-adjusted prior to the shoot. Crucial to making these adjustments is the employment of a high quality HD monitor connected to the camera. A technological advantage of 24P is that all adjustments simple or more complex can be instantaneously stored in a miniature Memory card that plugs into the side of the 24P camera. That card remains a permanent record of decisions the DP has made; it can be used at any future time to instantaneously set any 24P camcorder of the same vintage to produce precisely the same picture "look."

Available controls in the digital camera allow artistic manipulation of the primary imaging "dimensions" of the picture to be recorded. These include tonal reproduction (by altering the digital transfer characteristic), color reproduction (by adjusting the digital color matrixing), exposure latitude (by adjusting the digital "knee" characteristic), and picture sharpness (by adjusting the digital image enhancement controls or the skin tone detail).

Years of careful work, in concert with filmmakers, have refined the controls provided in the 24P camcorder so that DPs can achieve a close approximation to the "look" of a given film stock in terms of the image "dimensions" listed. Experimentation is, however, required on the part of the DP to achieve the desired results.

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CONCLUSION

The world is going digital and the transition is happening rapidly. Digital distribution is fast becoming ubiquitous — and whether through digital satellite or digital cable, digital terrestrial broadcasting or web streaming, digital pipelines are relentlessly snaking into homes throughout the U.S. The success of DVD has inaugurated an era in which digital packaged media represents another fast-growing delivery system to the home.

While 24P digital HD is here to stay, happily, program production can be decoupled from issues of distribution. The decades ahead will see a protracted coexistence of both motion picture film and digital acquisition formats. The cinematographer of this new century will invariably be using both media to satisfy the requirements of different creative projects.

Film DPs come to digital acquisition from a position of strength: nothing in all their accumulated skills is lost. Digital 24P imagery will be richer by virtue of those skills. As the DP acquires mastery over the powers latent in the digital 24P camera, that imagery will be further enhanced. A cinematographer can apply these skills to honing 24P imagery to the cherished aesthetic levels of a favored film stock, or depart from that norm to seek new aesthetic experiences offered by the digital palette. In either case, what is certain is that the creative cinematographer will continue to be heard.

REFERENCES:

1. L.J. Thorpe: "The Electronic Pursuit of Film Imaging - The Arrival of the High Definition CCD Camera." Proceedings of the IS&T's 47th Annual Conference, Volume 2, pages 668-671; May, 1994.

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