

April 1995 \$5.00

Canada \$6.00

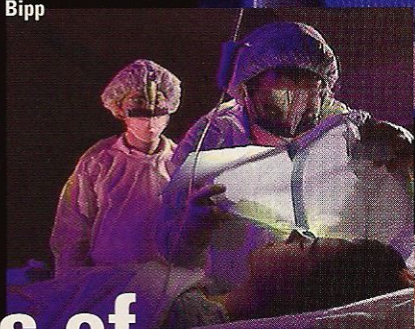
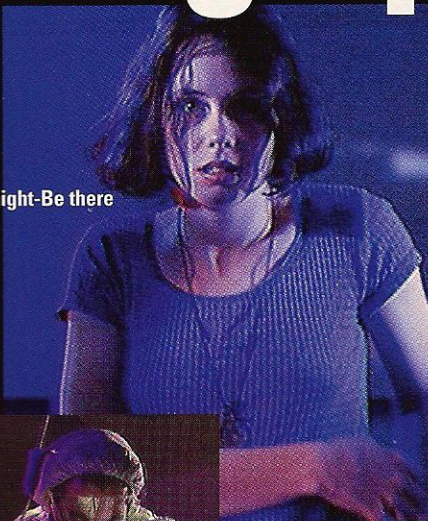
Digital Everything? A Glimpse of Tomorrow

American Cinematographer

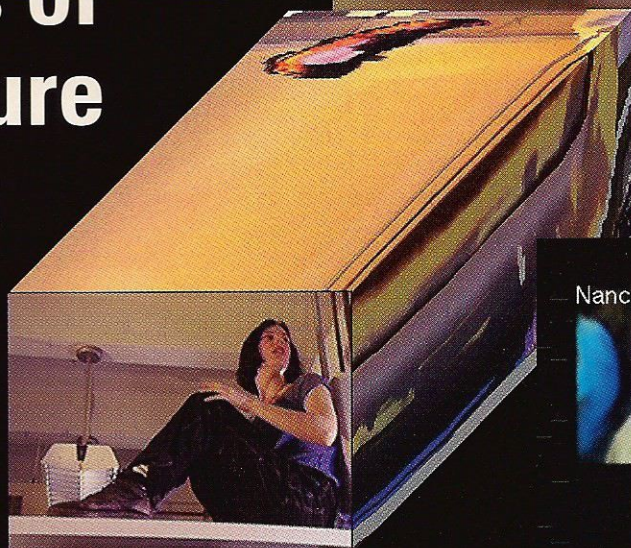
To: Shira@MIT.EDU
Cc: Lurkers@NET.ORG
Subject: Re: Meeting tonight-Be there
From: Bippy@MIT.EDU

Nick, we're getting
together tonight.
Same time and place
as last time.

- Bipp



MIT's Movies of the Future Project



Nancy Caruso



Protection



Artery as a Barrier

Plus Plenty of "Real" Filmmaking:
Tonino Delli Colli, Roman Polanski,
Tom Richmond, Jesse Lasky, Lee Garmes, ASC,
Curtis Clark, ASC



Features



56

- 26 Lending the Lottery an Epic Aura**
Otherworldly look enhances British commercial

- 36 Movies of the Future: Storytelling with Computers**
Exclusive report on MIT research project

- 50 Mail Bonding: Foray into Digital Filmmaking**
Filmmakers create short via high-end video

- 56 Death and the Maiden: Trial by Candlelight**
AC interviews Tonino Delli Colli and Roman Polanski

- 72 Personality Prevails in Killing Zoe**
Heist film offers stylish nihilism

- 78 ILM Creates New Universe of Effects for Star Trek: Generations**
Seventh installment employs latest digital techniques

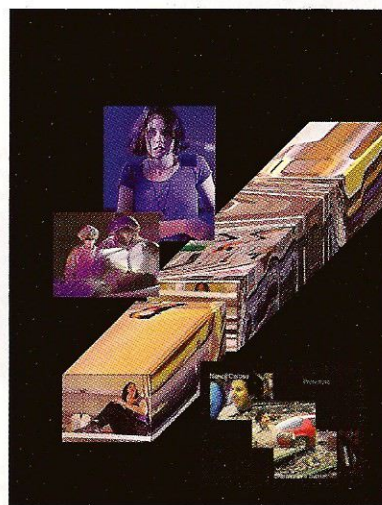
- 89 Zoo in Budapest: Lasky's Poetic Redemption**
Romantic tale fuels famed producer's comeback



50

Departments

- 10 Letters**
14 Production Slate
95 New Products
107 Points East
109 Books in Review
111 Classified Ads
117 Ad Index
118 In Memoriam
119 From the Clubhouse
120 Filmmakers' Forum



On Our Cover: A collage of images provided by the MIT Media Lab, where "Movies of the Future" are being explored and developed.

Contributing Authors:
Frank Beacham
Brooke Comer
Al Harrell
Debra Kaufman
Betty Lasky
Ron Magid
Chris Pizzello

Mail Bonding: Foray into Digital Filmmaking

High-end video project shoots for film benchmark.

by Debra Kaufman

The most technologically interesting movie at the 1995 Sundance Film Festival may have run on its smallest screen. At the Apple Computer exhibit at the Festival, on a Macintosh Quadra 630 running a CD-ROM, the first all-digital live-action movie gave filmmakers a 12-minute taste of digital filmmaking. The movie in question was *Mail Bonding*, a mostly black & white, silent short by director/producer Robert Miller.

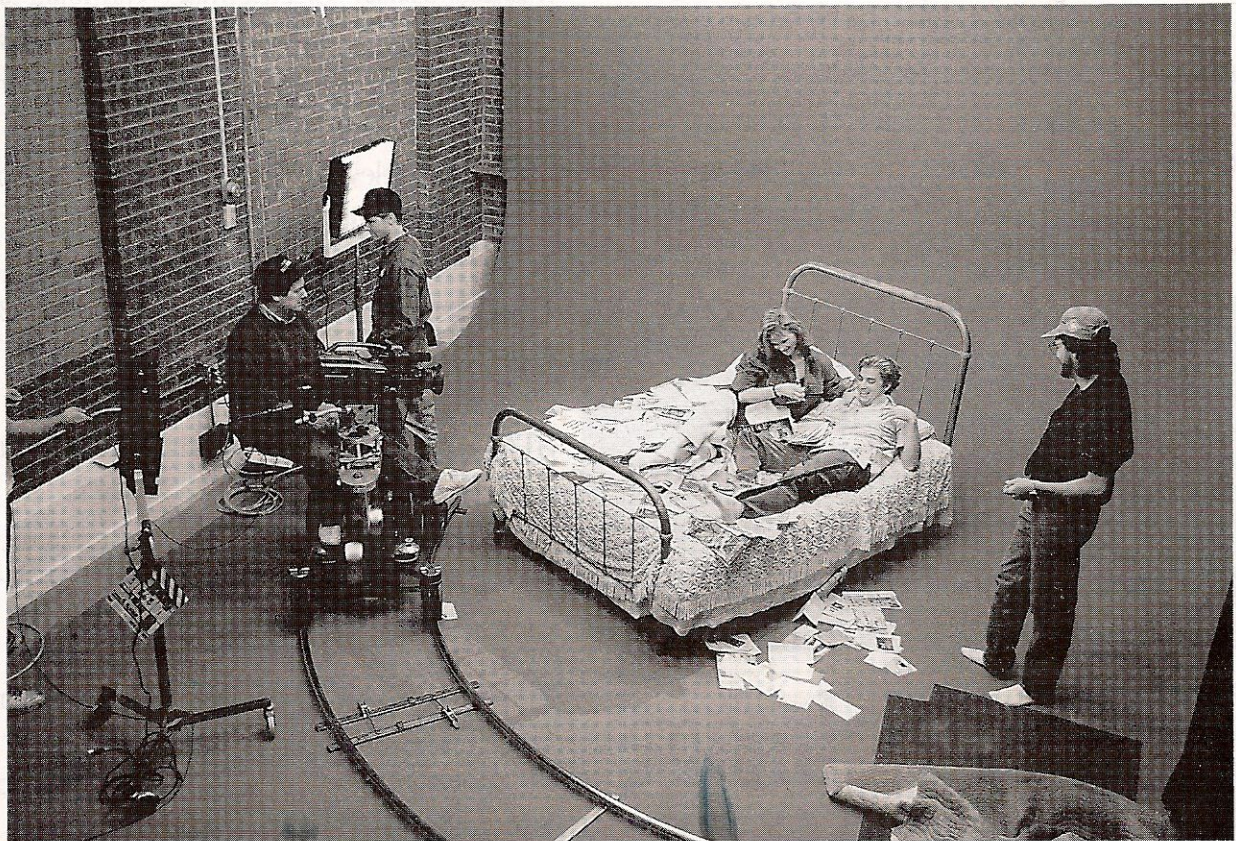
Mail Bonding relates the quirky adventures of a down-and-out beat poet holed up in his dark apartment who falls for a

winsome postal carrier and tries to win her affections. What he doesn't know is that her heart belongs to another postal carrier who was killed by a dog in front of his door. With color dream sequences, the whimsical tale of love, death, and the U.S. Post Office reveals a textured palette of darks and lights in both its images and emotional overtones. And, by the way, it was shot in digital component video.

The Berlin Wall between film and video may or may not be tumbling down. But if the recent all-digital production of *Mail Bonding* is any indication, there

may be some serious cracks in the separation between these two media. Computers have led the first incursion of digital technology in filmmaking with their ability to create dazzling visual effects in a resolution-independent environment and record those images out to film.

But until now, digital images have been created in a computer. After all, there is no digital camera, right? Wrong. Sony Electronics Inc. now manufactures a Digital Betacam camcorder, the DVW-700 series. According to Duane Dahlberg, Sony Electronics' market devel-



Shooting on the blue-screen stage at Pacific Video Resources.

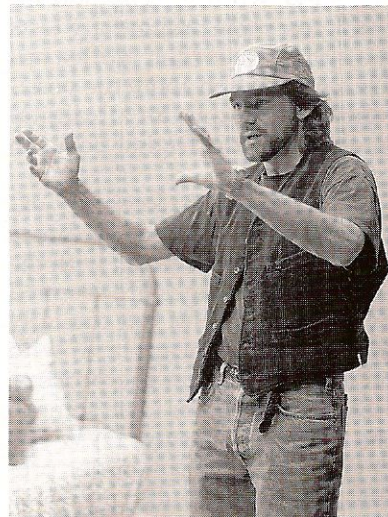
Photos by L. Sprague Anderson

opment specialist for broadcast cameras, Hyper-HAD 1000 Frame Interline transfer (FIT) CCD technology combined with advanced digital signal processing (DSP) microcircuits and Digital Betacam video recording technology has resulted in "a breakthrough in high-end portable video camcorders.

"Because of the performance of this product from the technical standpoint — colors reproduced, picture quality sharp-



Clockwise from top: Director of photography Steve Kotton; director Robert Miller; lead actors Beth Richmond and Craig Anton.



ness and resolution — we now for the first time have a product that can compete against 35mm film from a performance standpoint," says Dahlberg. "By no means are we saying we're going to replace 35mm or Super 16mm. We're not replacing film for theatrical releases. But when you're producing on film and it'll end up on television, the DVW-700 Digital Betacam camcorder gives film a good run for its money."

To many, that's a familiar refrain. *Mail Bonding* director/producer Robert Miller listened carefully. Over the last seven years, Miller has been writing screenplays and studying how the film industry works, while producing videos for Stanford University's national Instructional Television Network, where he was exposed to cutting-edge technology. These experiences led to an inescapable conclusion.

"I saw that making mov-

ies is not an inexpensive process, even if you're very judicious," notes Miller wryly. "You're shooting on precious metal and there's no way around it. With computer technology, you're shooting onto silicon, which is essentially dirt. It makes the costs involved very different: film is just more expensive than video. But video's drawback is that it doesn't look like film."

Intrigued with the challenge of finding a way to make digital images contain the "same visceral qualities of film," Miller searched for a more economically feasible substitute for film that was as close to film's look as possible. At the same time, Miller was working on an idea for a screenplay with his friend Alan Jacobs, who was in the process of shooting *Nina Takes a Lover*, in 35mm. Jacobs concocted the idea behind *Mail Bonding* and shared it with Miller. When *Nina* was

picked up by Columbia Pictures, Jacobs dropped out of *Mail Bonding* to close that deal (*Nina* is due to come out in March 1995) and gave Miller his blessings for going ahead alone with *Mail Bonding*.

He also gave Miller a piece of advice that would change how *Mail Bonding* would be made. He suggested that Miller check out the digital equipment at Pacific Video Resources (PVR), a production/postproduction facility that has pioneered analog component, digital component, and MPEG technology since its 1980 founding by partners Jim Farney, Steve Kotton, and John Zimmerman. Miller didn't know this when he played hooky from work to attend a PVR open house. Once inside PVR, Miller proclaimed its array of high-end digital technology "the promised land." And in the middle of that promised land

was Sony's Digital Betacam camera.

"When I saw that, it started a spark within me that it might be the chance to shoot an all-digital movie," recounts Miller.

That Digital Betacam camcorder was also Sony's sole wide-screen model (several other DVW-700 production models in existence feature the standard 4:3 aspect ratio). Demonstrating the digital camcorder was PVR partner Steve Kotton, who had already run some preliminary tests with the camcorder. Miller approached Kotton about the possibility of shooting an all-digital movie using the Digital Betacam camera.

"I tried to keep my excitement contained," admits Miller. Miller was taken with the fact that the images are scanned by the camera and put digitally onto Digital Betacam tape, with no analog steps in the process. Kotton filled Miller in on some of the specifics: that the DVW-700 Digital Betacam camcorder produces images in full bandwidth 4:2:2 digital component recording; that its 80 dB dynamic range translates to almost 11 f-stops of exposure latitude, and the dynamic range, combined with a 62 dB luminance signal-to-noise ratio, allows capture of image detail in low-light scenes or shadowed areas; that the VTR signal to-noise ratio of 62 dB matches that of its CCD imaging system, and the 10-bit component recording format captures the full dynamic range imaged by the CCDs; that the camcorder's high sensitivity (2000 lux, at f/8.0) translates to an equivalent film Exposure Index of 580 in studio tungsten light and 650 in daylight.

The Digital Betacam camcorder promised the possibility of shooting a video whose images would come closer to rivaling film images than any previous video format. The idea of making the first all-digital live-action movie became increasingly intriguing — both to Miller

and Kotton.

"I could have shot a video," says Miller. "But it would have just been another video and it wouldn't have been aesthetically to my liking. My aesthetic preference is filmic images." Pacific Video Resources' long history of tests and experiments also made the *Mail Bonding* project a natural. "Digital component recording in the field isn't new for us," explains Kotton. "We took two D-1 machines and did a technology test for Sony in 1988, with a generator truck trailing us with a 20-meter cable. We've done a few projects for Sony before, showing off digital compositing and using D-1 editing. *Mail Bonding* was just an extension of that."

Pacific Video Resources signed on as a participating party in all aspects of the movie, for the prestige inherent in making this first all-digital live-action movie. And Kotton, who is both a DGA member and experienced cinematographer, came on board as director of photography. Kotton's earlier field report on the Digital Betacam camcorder convinced him that it was ready for a real-life test.

Sony Electronics agreed. The long, fruitful relationship between PVR and Sony led to Sony's agreement to de-rail the Digital Betacam camcorder from its worldwide tour and loan it, free of charge, to the *Mail Bonding* project for a few days. From Sony's point of view, there was an obvious value in assisting the first "out-of-house" Digital Betacam production, especially one in the 16:9 aspect ratio.

Miller, who also produced the film, jumped into the task of finding locations, studio space, and appropriate talent. PVR's landlord, Greg Markoulis, gave Miller what the director/producer calls "a gracious deal" for three months' use of a 4,000-square-foot space. As production offices were being built in the rented space, Miller began collecting a professional film crew and additional sponsors. Apple

Computers — which donated use of large-screen color monitors, high-resolution printers and Quadra computer systems — and Avid Technology, which donated the use of an Avid Media Composer 800, joined the *Mail Bonding* project as sponsors.

Miller's familiarity with computers led to their use throughout the production process. "We had a complete Macintosh network on site," says Miller. "We used it for all office administration and organization, all printed materials, storyboarding, graphic design and layout, previsualization."

In the pre-visualization stage, Miller used the software program ArchiCAD to build a virtual set. That allowed him to try out shots using the computer's camera prior to building the actual set.

"We could see the angle we wanted and see where we needed an extension of the set or a wall," remembers Miller. "That's how we knew we had to construct ceiling panels, so we could put them into areas when we were shooting low angles. We hadn't anticipated this until we had the 3-D model. If we had had to stop production to construct those panels, it would have killed us."

The four-day shoot took place over Thanksgiving week, all of it shot on stage, with the exception of a half-day on location in San Francisco's Potrero Hill area and a half-day on PVR's blue-screen stage.

From the technical point of view, part of the rationale behind *Mail Bonding* was to show that the Digital Betacam camcorder could produce images sufficiently "filmic" to offer an alternative to film in some situations. For that reason, lighting director Mike Van Dine lit the stage set at around ASA 400 — "as if we were shooting film," says Kotton or, as Miller says, "the camera was rated as if it were at a film speed of 320, so we lit it for that."

Kotton also observes that the Digital Betacam camcorder is "malleable" with "hundreds of parameters you can tweak to your heart's content to get a specific look." From his point of view, what makes it better is that all those parameters are programmable, a feature which he says helped him to save on setup time. And, since digital technology doesn't drift, the settings remained rock solid, saving Kotton from constant tweak time associated with analog camcorders. From start to finish, say Kotton and Miller, the production went smoothly, without a moment of down-time.

Digital technology played another interesting role during the production. Miller digitized the images directly out of the camera into the Avid Media Composer, which allowed him to use the electronic nonlinear editor as a multi-purpose tool. The Media Composer came in handy, first of all, for continuity. Because the movie was shot completely out of sequence, the potential for problems was great.

"We'd shoot everything in one direction and then tear a wall down and shoot from another direction," describes Kotton. "With the Avid, it was quite easy to go back to the early scenes and see exactly what we were going for. It was a big help and cut out a lot of time."

Having the Avid Media Composer on set also allowed offline editor Jennifer Hudgins to do some rough cuts while the movie was being shot. Once again, Miller and Kotton caught problems during production instead of in post. For example, in one sequence, they shot a hand going down on the carpet from an overhead angle. When Hudgins edited the scene, Miller and Kotton clearly saw that the angle was wrong. Because they still had the correct lighting setup, they were able to re-shoot it easily.

"The Avid Media Composer is an immensely powerful

tool," comments Kotton. "The images were digitized instantly, so we could see the sequences right away. It blurred the line between production and post."

After the four-day shoot, Miller wiped out the footage on the Media Composer's 9-gigabyte storage. So that time code would be available for the editors, the reels were then re-digitized into the Avid, a process that took about 10 hours for 5-½ hours worth of material.

Mail Bonding will be shown at the San Francisco International Film Festival. Sony is helping out again by recording the Digital Betacam images — all 12 minutes — onto 35mm film. For Miller, whose undisclosed budget was minuscule and out-of-pocket, Sony's contribution allows him to get *Mail Bonding* out to the public. From Sony's point of view, *Mail Bonding* is a way to show professionally produced color images as an example of what can be done with the new Digital Betacam series.

Miller plans to market *Mail Bonding* with an all-digital trailer to be released to computer networks for the perusal of Internet surfers. He will also make *Mail Bonding* available to cable and "anyone interested in showing an all-digital production."

Like any director or producer, Miller sincerely hopes his work on *Mail Bonding* will lead to something else. A full-length feature is high on his wish list. Pacific Video Resources, Apple Computers, and Avid Technology all have the satisfaction (and prestige) of having played a role in a pioneering digital component production. And, for Sony Electronics Inc., the hope is, undoubtedly, that *Mail Bonding* will catch the eye of cinematographers as well as television producers hoping to trim the budget. Director of photography Kotton concluded that "the camera didn't miss a beat. Sony was very impressed with the images we got."