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Is 2006 the Year of the Indie Digital Intermediate? A Look at Software-Based DI Systems

By Ed Heede

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With NAB 2006, the DI movement has come into its own — and a seminal DI culture promises to transform indie filmmaking across the board.

The term digital intermediate is generally understood to describe the process of color-grading scanned film frames within a computer workstation. But, understood correctly, DI is actually much more. The digital intermediate is becoming the final online — an entire pipeline process to handle digital camera data or film from the scanning stage through real-time grading at up to 2K or 4K and back out to film or digital projection. There are almost no real industrial standards in digital intermediate, so companies are vying to create them in color calibration schemes from Kodak, Filmlight, ARRI, Rising Sun Research (CineSpace) and Imagica. How DI is done, who does it now and who and what kind of pipeline will do DI in the future are looming questions. Who will be the DI artists of the near future? And can it be long before robust compositing and editorial become part of the DI toolset? With the arrival of 4K digital cameras, the answers may change filmmaking in more drastic ways than any technology has since the advent of film itself.

Changing culture will be a factor. Traditional colorists from high-end broadcast post suites did not come from a software-driven game. The commonly used proprietary-hardware rigs — film versions of broadcast coloring systems — are first-rate but come at price tags that are a deal-breaker for independent filmmakers. New software-based systems are run by similar panels (from Tangent, Pogle, Valhall and J.L. Cooper) or via Wacom tablets, which means they can be operated by anyone who has a refined sense for color, look and grading — high-end visual effects artists may be as qualified as anyone to sit at new DI stations. If that isn't enough to blur the culture line, industrious editors have been doing color-correction for some time now. The only reality not in question is that DI will continue to be the ultimate film-finishing tool.

If you're shopping for a software-DI system, remember that all film DI solutions need large and fast storage. Usually that means RAID arrays of at least 6 TB or more to do real-time color correction of a feature film at 2K, and more at 4K. Big throughput headroom and higher sustained speeds are what make DI smooth and transparent. Among the key technology providers that make indie DI possible are Nvidia, RSR and Globalstor Data. Nvidia's FX4500 provides necessary hardware acceleration and throughput for desktop DI a reality; at NAB, Rising Sun Research will launch version 2.5 of cineSpace, its open, indie-friendly color-management tool; and Globalstor Data offers high-speed, cost-effective storage integration.

Virtually all the DI software makers support existing color-management tools. Here's a big-picture view of the current generation of software-based DI that's driving innovation in digital workflows for independent film.

Assimilate Scratch (\$35,000 for software; \$55,000 complete)

Although Scratch is one of the newest players in DI, it is a powerful contender with a fast and able system that does real-time color correction at 2K (using NVIDIA'S PCI Express technology) with real-time primaries at 32-bit float accuracy. "We started with the focus and vision being on the move to data — the need to work with it, manage it and play back in real time at 2K," explains CEO Jeff Edson. "The real key is that [Scratch] is an open platform that provides a means for facilities to integrate and create workflows and maximize their investment in existing tools." Scratch can access files in practically any format from any location in a facility, and outputs finished work in a variety of pro formats for recording back to film or to master at HD. The recently added Assimilate Performance Lab (APL) is a published resource showing benchmark performance for virtually all DI hardware. Scratch version 2.5 will be shown at NAB with emphasis on fresh gains throughout Assimilate's data-centric workflow — and Assimilate has a DI surprise in store.

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Discreet Lustre (\$61,500 for an assistant station; up to \$400,000 for a master station depending on options and hardware)

Lustre is often considered the most mature of all DI solutions. Most Lustre operations are real-time 32-bit floating-point and at 2K, including primaries. Discreet's color-correction tools are built for speed, with a UI based on projects and film reels. Shape on-board secondaries offer deep control over masks, tracking, and logical operations, and keys isolate for color-correction with vertex-point level control. The change-cut feature in the editing browser allows artists to edit the cut list under the grading list so that already-applied grades and look decisions can be kept in the new edit. "There are three key elements to successfully doing DI," says Product Manager Maurice Patel: "Establishing a neutral controlled DI environment; establishing an accurate display environment, temporally and spatially; and using intention look-up tables." Those three steps make sure scanned film matches what was originally captured on celluloid, prevent color drift over time or on different monitors, and allow colorists to visualize how the image on their monitors will look when it's filmed out and projected. Autodesk Incinerator for Discreet Lustre hardware debuted recently, using latest generation Intel Xeon processors to boost the performance of complex primaries, secondaries and most plug-in effects to real time at 2K and accelerated 4K.

Iridas SpeedGrade DI (\$49,500 for software; up to \$100,000 or more with added hardware)

The Iridas FrameCycler pro flipbook has been used by VFX houses worldwide for about four years, but the company made its DI debut more recently. The Iridas UI caters to editorial-style flexibility with timeline functionality based around a workflow that brings originally scanned footage into editable layer stacks. In terms of asset and media management, Iridas aims to remain wide-open and agnostic. For example, Iridas intends to port SpeedGrade DI to Linux and OS X. "The Iridas products can be thought of as playback and image processing engines that are easily driven by custom scripts," says Steve Crouch, director of Iridas USA. "Iridas was creating DI technologies before the term existed. The first FrameCycler, in 2001, and the first SpeedGrade, in 2003, provided real-time playback and color grading to digital frame-based file formats." Iridas most recently enhanced SpeedGrade OnSet with a pro edition, making it a portable software tool that provides the same shaders and color capability — and some of the editorial functions — found in SpeedGrade DI for cinematographers and others to save, wedge and reuse. New at NAB: a multi-platform FrameCycler DI real-time playback utility (pictured at the top of this article) for conform and remote collaboration and SpeedGrade HD (Mac OS X, Windows XP) with support for Final Cut Pro workflows, standard EDL formats and more.

Nucoda Film Master (\$100,000 to \$175,000 depending on hardware options)

Film Master works in real time at 32-bit float 2K and up to 4K for primaries. Even more unusual is the editorial-friendly UI. Various grades can be accessed right on the timeline so alternatives can be assessed at quick-fire speed for client work. "Media management is crucial to a DI production, especially as many productions will also have 100+ effects shots," says CEO Simon Cuff. "This means there are many versions of the same media living in different locations in the facility. Nucoda systems have been used to solve this problem by integrating with the facilities database and/or naming scheme. Some users have gone so far as to make the Nucoda the front end of the data base so you can browse all the media across the network wherever it is in a facility." When it comes to conforming, Nucoda FM reflects new EDL or film-cut changes in its timeline without affecting existing grades. Being open and flexible is key to Nucoda workflows that allows its system to be hooked up to SAN or NAS storage anywhere and do grading work. All available color management systems are supported for calibration. Version 3 added real-time effects in secondaries and real-time global primary film graining effects. Also new is grain reduction from Digital Vision (which recently acquired Nucoda) and more. Nucoda has also added its Digital Vision Valhall ergonomic colorist panel and partnered with Huge Systems for an approved disk array that will do real-time 4K on down to 2K and HD utilizing standard PC-based hardware. New and shipping at NAB: nine-processor Nucoda workstations for 10-fold speed increases and Nucoda Film Master version 3 with easier UI for colorist migration. Also shipping are Nucoda Data Conform, a new resolution-independent conform-and-review system, and Nucoda Film Cutter, an assist workstation to Nucoda Film Master for primary color correction.

Silicon Color Final Touch (\$995-\$24,995 for software; up to \$100,000 and more with hardware options)

Final Touch is an OS X-based DI system that offers real-time 32-bit floating point 2K film coloring without proxies. Each cut in the timeline can have 4 "hot grades" — any mix of live primaries and secondaries. Final Touch works well with Apple's Final Cut Pro HD and therefore the entire Apple pantheon of tools. For example, users can bring in Final Cut Pro XML files for direct import and real-time color correction via Final Touch HD (\$4,995). Final Touch 2K and HD originally focused their efforts on designing their tool for the existing colorist culture with a UI that is somewhat segmented and spread out into 8 so-called "rooms" for various key functions. Is it possible that Silicon Color's approach is changing the very culture of DI? According to VP Roland Wood, 80 percent of Silicon Color users were not previously colorists by trade. "We have grown a new culture of colorists," he says. "We have an almost 100 percent attach rate in people that use Final Cut Pro as an indie editing

package". Final Touch has added renderfarm and background rendering capabilities as well as Sony IMX support. Look for tight integration with new accelerated Apple G5 and Xserve RAID hardware to keep Mac users happy into the future. MTI has recently licensed Silicon Color's Control Dailies 2K color corrector for restoration. New for NAB is FinalRender 2K and Final Render HD, to accelerate rendering via a distributed render network.

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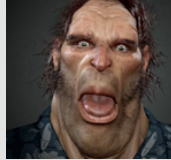
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