YOUR FIRST LOOK AT THE *NEW* TOASTERPAINT 4.0, PAGE 20

VIDEO TOASTER USER

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THE PERSONAL VIDEO PRODUCTION MAGAZINE

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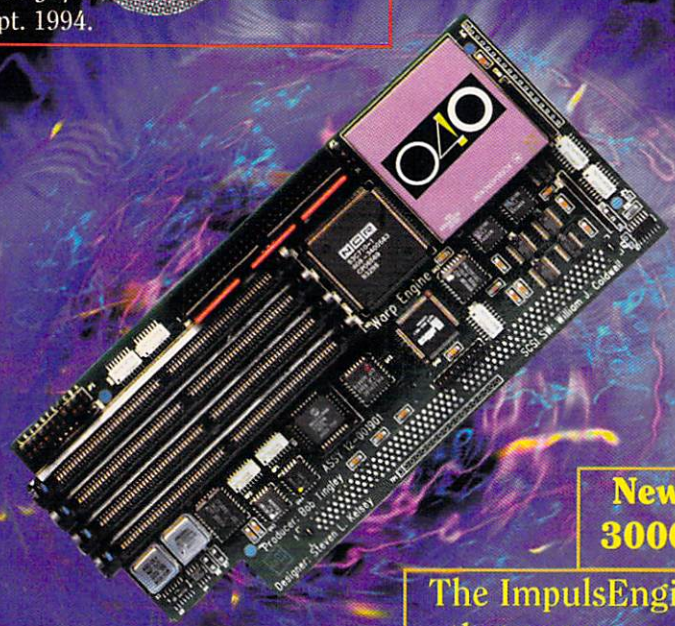

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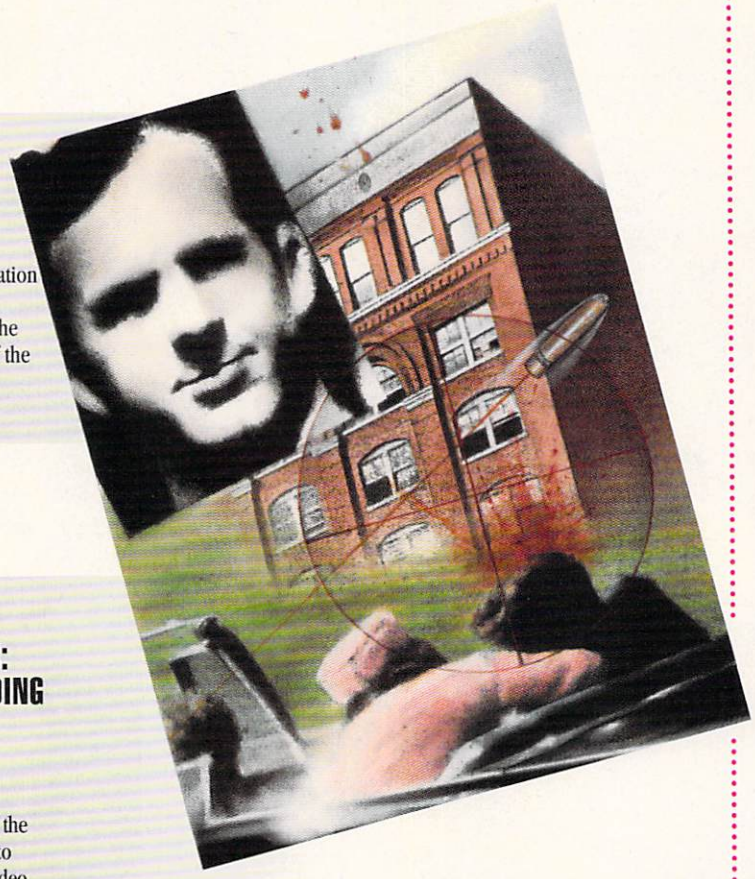
NOVEMBER 1994 VOLUME 4 NUMBER 11

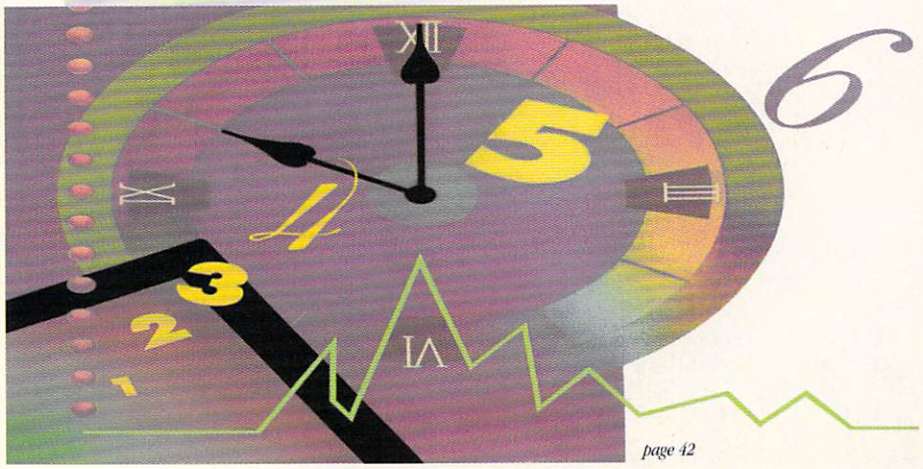
FEATURES

36 **JFK**
by Dale K. Myers
Secrets of a Homicide: A LightWave re-creation analyzes the assassination of the 36th president of the United States.

42 **BEHIND THE GREEN LINES: UNDERSTANDING THE COLOR SIGNAL**
by Cecil Smith
In the final part of the series, learn how to produce quality video by measuring and analyzing your video signal.



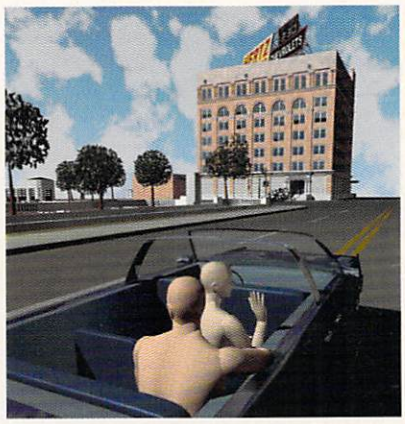
page 36



page 42

DEPARTMENTS

8 TOASTER TIMES
12 NEW PRODUCTS
66 ADVERTISERS INDEX
80 TOASTER GALLERY
92 USER GROUPS
93 DEALER SHOWCASE
98 CLASSIFIED
99 MARKETPLACE



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page 58

page 56

REVIEWS

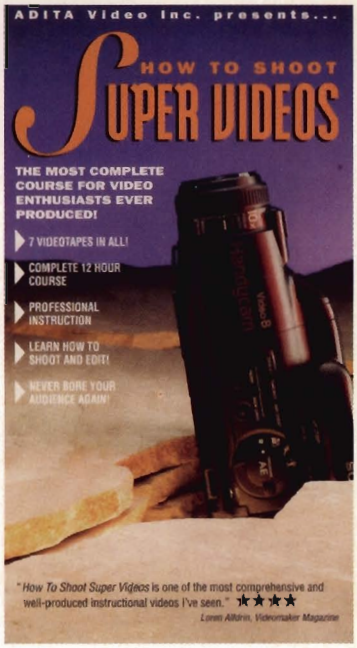
52 **SHOOT SUPER VIDEOS**
by Jim Plant
A review of the Adita Series of videotapes on how to shoot professional videos.

54 **SOUND SWITCH**
by Frank Kelly
A review of SunRize Industries' sound mixer for the Toaster.

56 **MAXDOS**
by Frank Kelly
A review of Media4 Productions' utility that makes transfers between platforms simple.

58 **NITRO-VLB**
by Erik Flom
A review of a new 100 MHz MIPS RISC processor from ShaBLAMM!

page 54



page 52

COLUMNS

6 **TOASTER TALK**
by Jim Plant

16 **DEAR JOHN**
by John Gross

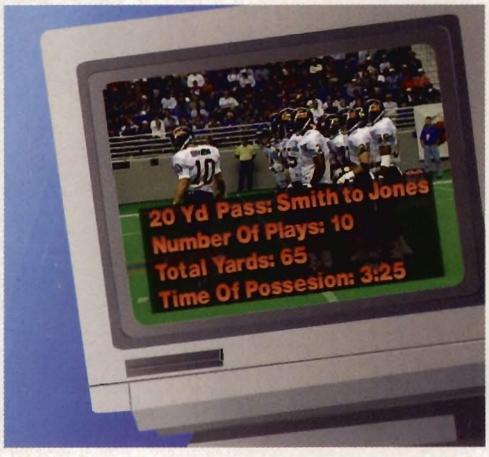
18 **CYBERSPACE**
by Geoffrey Williams

20 **SLICES**
by James Hebert

24 **SOUND REASONING**
by Cliff Roth

30 **TAMING THE WAVE**
by David Hopkins

100 **LAST WORD**
by Mojo

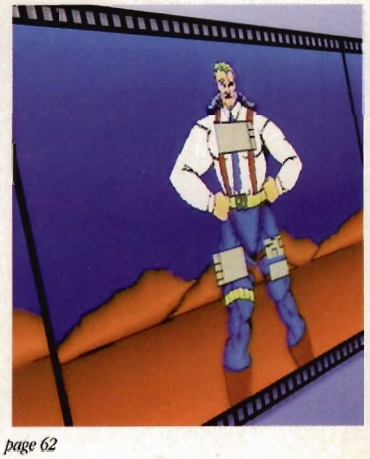


page 84

TUTORIALS

84 **USING THE TOASTER AS AN EXTERNAL CG**
by Clinton Rathmell
Learn how to use one of the most fundamental tools in television—the character generator.

62 **2D CEL ANIMATION**
by George Avgerakis
Using the past as a reference point, learn how the Toaster can be utilized for traditional cel-style animation.



page 62

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Direct your Toaster-specific questions to John Gross. All general video questions should be addressed to Rick Lehtinen. Send your tips to Brent Malnack.

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FOR INFORMATION CIRCLE 100

JVC. The three most important letters in S-VHS.

TOASTER TALK

Toaster System Upgrade

Significant Enhancements Added

by Jim Plant

It is not generally well understood that the software that ships with the new Video Flyer is actually a substantially upgraded Toaster System that will soon be available as a standalone upgrade for Toaster users who are not immediately adding a Flyer to their Toaster workstation. Toaster System 4.0 contains a number of important enhancements, including much-needed improvements to the long-in-the-tooth ToasterPaint module. (Unlike most of the other Toaster System modules, which have been incrementally improved with each successive system upgrade, ToasterPaint has been untouched since version 1.0. See James Hebert's "Slices" column on page 20 for a first look at TPaint's new features.)

The official logo of Video Toaster Expo '94 is shown at left. The Video Toaster Expo '94 will be held December 14-15 at the Universal City Hilton and Towers in North Hollywood, California.

The already rich feature-set of ToasterCG has also been enhanced with the ability to stretch, rotate and skew text. LightWave, of course, has been significantly enhanced, as previously reported, with the addition of inverse kinematics, surface samples, enhanced bone control, multi-level undo and redo in Modeler and, of course, open modularity to allow for plug-ins. Besides the ToasterPaint renovation, the most obvious physical change in the Toaster software is the Switcher interface. Its appearance has been dramatically changed to reflect its newfound emphasis as a non-linear editing environment. At press time, NewTek had not committed to shipping or price details, although our sources inside the company indicate that Toaster System 4.0 will ship on CD-ROM within a few weeks of the Flyer's release and will sell for approximately $500.

ScreamerNet Revisited

A few months ago I discussed the ramifications of NewTek's decision to cancel the Screamer project and focus on licensing just the software interface, called ScreamerNet, to third-party manufacturers. While NewTek took a lot of heat for this move, I am convinced that the company made exactly the right decision. My prediction in the September issue that "the initial promise of the Screamer will soon be met and even exceeded" is coming true even sooner than expected. As of this writing there are now two companies (DeskStation Technologies and ShaBLAMM!) actually shipping rendering speed solutions using ScreamerNet, and at least two others (Carrera Computers and Aspen Systems) are coming on-line by the end of the year. In this kind of competitive environment, the performances are increasing nearly as fast as the prices are dropping. Serious LightWave users now have a variety of offerings from different companies to dramatically increase their rendering speed. With versions of ScreamerNet available for Intel, MIPS and DEC processors, the market is free to do its thing and consumers end up with greater price/performance options. I seriously doubt this would have happened had NewTek developed the Screamer as originally planned.

LightWave on Multiple Platforms

When NewTek announced at SIGGRAPH in late July that LightWave would be ported to Windows and SGI computers and be shipping by the end of this year, many people expressed doubt that programmers Allen Hastings and Stuart Ferguson would be able to meet that deadline. Even yours truly, a strong believer in NewTek miracles, wondered how just two guys could not only port the software to two completely different processors, but also add significant improvements to all versions (including Amiga) in only six months! Well, based on a recent conversation with Hastings, it appears that they are going to be able to meet their deadlines, perhaps even with time to spare. Hastings confirmed that work on the ports and upgrades was ahead of schedule and that they were even planning to have LightWave and Modeler's new plug-in architecture well-documented for attendees of NewTek's developer's conference scheduled for mid-December. (Note: The developer's conference is scheduled for December 11, 12 and 13 in conjunction with Video Toaster Expo '94. Interested developers should call Ann Pulley at 408-774-6770 for more information.)

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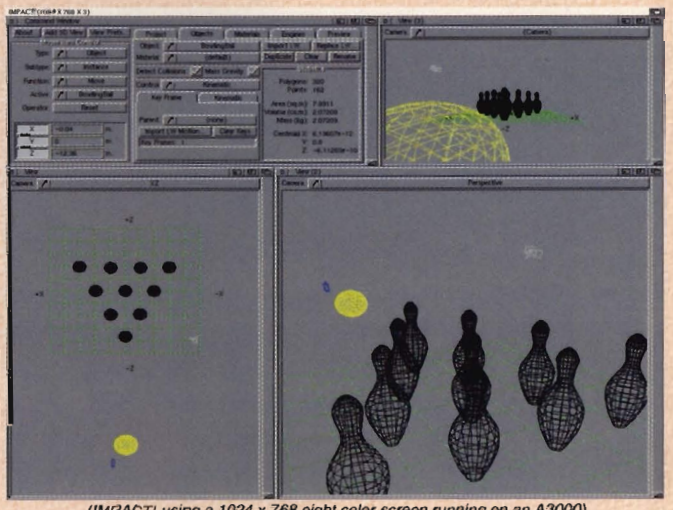

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TOASTER TIMES

Commodore Update

Jim Plant

After months of little or no progress, the pace in the Commodore liquidation proceedings appears to be quickening. As press time, speculation among knowledgeable insiders was that the liquidator handling the case would be formally selecting one of the remaining bidders (by October 15) to purchase the remains of Commodore. The management buy-out proposal, offered by the group headed by Commodore-UK President David Pleasance, appears to be the favorite to win the bid.

Unfortunately, this action would not constitute the final award, but only signal the beginning of a new phase in the proceedings. According to Dan Stets, a reporter for the *Philadelphia Enquirer* who has been following the story very closely, once the bidder is selected, the liquidator would present their name and plan to the Bahamian Supreme Court for approval. At that point, the Court could choose to distribute the details of the "winning" bid to the other bidders (namely, CEI and ESCOM, a German concern), and give them the opportunity to make new offers. Stets was unsure how long this part of the process might last.

Despite the potential for further delay, there is a sense that the purchase of Commodore is entering the final stage of the process. *Video Toaster User* will continue to follow this story closely. *VTU* plans to invite a representative from the company that eventually purchases Commodore to address the attendees of Video Toaster Expo '94, scheduled for December 14 and 15 at the Universal City Hilton in North Hollywood, Calif.

VTU

Toasterizing the Late-Night Competition

Corey Cohen

Few markets within an industry well-known for its competitive nature seem as truly "sink or swim" as that of late-night talk shows. Just ask Chevy Chase, Arsenio Hall and Dennis Miller. Amid the challenging, ever-necessary process of honing its product, *The Tonight Show* has emerged as a prototype for regular Toaster use in live-to-tape video production.

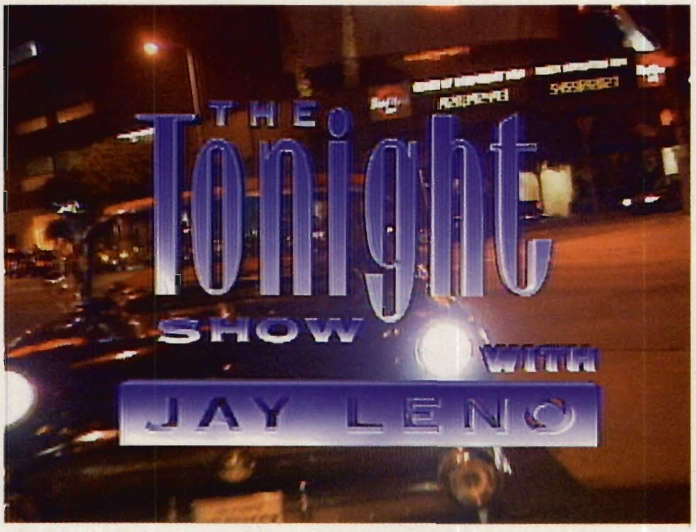
The program's foray into the realm of Toaster technology began a little more than one year ago. Mike Colasuonno, a writer on the show, had heard about the Toaster's capabilities and was eager to explore ways the equipment might be able to "jazz things up" at *The Tonight Show*.

"Before the Toaster, our graphics consisted of camera cards produced by the graphics department," said Mac McAlpin, a Toaster effects engineer for *The Tonight Show*. "But there's a limit to what camera cards can do."

A few months later, the staff purchased some Toasters. *The Tonight Show*'s Toaster setup currently consists of two Toaster 4000s networked with PARNET, one with two TBC3s and the other with a TBC4 and a Personal Animation Recorder. A Warp Engine 40Mhz 68040 accelerator and 32 RAM module in the latter round out the package.

The program's Toaster crew consists of McAlpin, who creates title animation and opening sequences for comedy sketches, and Carol Tellgren, who operates the Toaster Character Generator.

With deadlines that often land on the same day as the Toaster staff receives a project, production of special effects for *The Tonight Show* is a quick process. Though McAlpin said the turnaround time for most of his work is 24 hours, there are days when he'll get an assignment at 10:30 a.m. and have the animation ready by 1:30 p.m.



The Tonight Show recently introduced a new main opening, which was partly created using LightWave and ToasterCG.

The program's use of the Toaster is fairly diverse. A recent studio and set change has been accompanied by the use of LightWave and ToasterCG in the show's new main opening. LightWave and InnoVision's Montage are often used in the openings of comedy sketches—the latter to generate what McAlpin called "beautiful character generator pages."

One specific skit using the Toaster is "Iron Jay," in which the host plays a Hans & Franz-like muscleman with distorted features. LightWave is used to

create the title. Morphing Leno into "Evil Jay" when the full moon comes and grafting Bradford Marsalis' face onto the sphinx at the Luxor Hotel in Las Vegas are other examples of Toaster-generated visuals.

The Personal Animation Recorder and the TBC4 also allow the Toaster staff to "digitize video on-the-fly." The crew has used them to record bits of action during the show that are later played for promotional bumpers.

Satisfaction with the Toasters' effects runs high at *The Tonight Show*. According to McAlpin, the response from people on the show has been extremely positive: writers are pleased, engineers from NBC often stop in see what he's working on. Even Jay Leno and some of the show's guests are interested in the behind-the-scenes operation.

"Though I haven't heard anything from him directly, I recently overheard Jay explaining to a guest what the Toaster was," McAlpin said. "And Dick van Dyke is a Toaster fanatic. He has a Toaster 4000 animation recorder and VertiSketch, and we were recently talking backstage, comparing our work."

Said Colasuonno: "Right now it's almost as indispensable as the Chyron [a standard titling device]. It helps to have a nice beginning on a skit—it sets the flavor and allows you to make musical, costume and set changes."

Like many in the industry, McAlpin praised the cost-efficiency of the Toaster. "There's nothing on the market giving the power and the versatility of the Toaster for the same amount of money," he said. "Almost every day we come up with new uses for [our equipment]."

Though McAlpin said that he didn't know of anyone using the Toaster in live-to-video production in the same way as *The Tonight Show*, he predicted that that would change. "When you have a better mousetrap, people are going to want to duplicate it," he said.

VTU

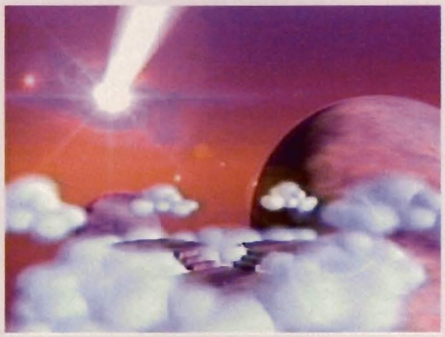
The Way I See It

More Rummaging through the Industry's Rumor Mill

Mike Danger

Thank you for turning to this column, which is guaranteed to generate more rumors than Michael Jackson and Lisa Marie. Although rumored, it is not true that I am the evil twin brother of the ever-animated Grant Boucher. So if you have the time to step into my non-seeing Toastercized world, grab ahold of your joystick and hold on for a truly informative ride.

The big question this month is whether or not we will be Amigaless in the forthcoming year. At press time, my sources tell me that Commodore-UK is buying the U.S. Commodore company and will be making the technology more useful. Hopefully, production will resume soon. Although many companies are dropping the Amiga and Toaster line from their inventory, quite frankly, they weren't major players in the video field. If I may say so, they were clueless in what was happening with the Commodore-Amiga platform. Meanwhile, such businesses as Anti-Gravity, B&H and Charles Hill of Intelligent Machines keep the unsteady flow of machines going. If you need the goods, give these guys a call. Hopefully, there will be a steady supply of Amigas arriving nationally in about five months. Keep your bones and splines crossed.



Beyond Computing's Framestore of the Month

The phones and mail have been packed with inquiries since last month's debut column. So in the hope of making everybody happy, here's some of your questions with what I hope are the right answers.

Question 1: Mike, after hooking up all my equipment, I find all my cables, wires and hook-ups resemble an aerial view of a Rand-McNally road map. What can I do to straighten this mess out?

Answer: Don't be afraid. Head out to your local auto parts superstore and pick up some plastic wiring harness tubing. This tubing, which comes in a variety of lengths, allows you to put all your loose wires and cables inside via a slit along the length of the tubing. This unit will now encase all your entanglement much like an audio or video snake. The best thing about this rig is that it is inexpensive and gives your edit suite a professional look.

Question 2: I constantly have problems with lightning storms interrupting my system during lengthy and difficult LightWave rendering. Is there anything to keep both my system and myself from blowing a fuse?

Answer: The first thing to do is contact your local power company to install a surge protector on your house. Standard protectors do not usually protect you from those pesky lightning storms. Certain individuals prefer to tie knots in all power cords, also known as the Buckwheat method (so-called because of the resemblance to the Little Rascals hairdo). I won't swear by it, but let me know if it works.

With new equipment becoming available by the minute, first to catch my attention are the JVC X-2 SVHS and the new KY-series dockable cameras. The X-2, which comes close to 700 resolution lines when coupled with the Toaster-Flyer combo, could become invincible in video warfare. Those of you with a few more pesos can opt for the dockable cameras and have either the S-VHS format or the ever-increasing Beta SP attachable decks. Both units weigh in the 13- to 15-pound

continued on page 10

The Way I See It continued from page 9

range and are more than reasonably priced, in my opinion, with such features as near-CD-quality audio recording including XLR inputs, stellar video, shooting ease with a cornucopia of features, and quality every time you turn this unit on. As you know, I am totally blind, and when I demoed one of these cameras I was amazingly surprised. The other two companies should look out: JVC is knocking at your doors.

Next thing on my bragging list is the new B&H product catalog. This catalog, which is thicker than most phone books, is more than a wish list providing hours of pleasurable bathroom reading. Distributed by those yarmuluke-fitted funsters from New York, this sourcebook provides valuable statistics on all your most treasured equipment. Now get this—the catalog is free. It makes a great gift, and after reading the whole thing you can amaze your friends with all your new-found knowledge.

This month's framestore comes from the great northern state of Washington. Located in Spokane, Casey Booey and his crew resemble those hard-working dwarfs from Snow White (minus Doc, Sneezy, Grumpy and Dopey). Dana, Monty, Johnny, Jeff, Chad and Casey have done quality work ranging from animations for corporations to instructional videos on the fine art of butchering and serving grizzly bear at your next outdoor barbecue. These merry men are experts at building Toaster systems for all applications. Their Toaster oven-encased creations have to be some of the most sought-after LightWave creations. Give the guys at Beyond Computing a call at (509) 325-0115.

Be looking for Toaster maniac Todd Rundgren on the road with all his interactive video gear. And I bet you can guess what is in his arsenal. Also in the near future look for a version of the kiddie classic "James and the Giant Peach" to be released by brothers Mark and Richard Kuaghn, possibly with the Disney folks.

For your comments, gripes or submissions, contact me at Rockasaurus Productions, 6706 N. 9th Ave., Suite B-5, Pensacola, FL 32504 (904-479-9305).

News & Notes

Comedy Short Wins Big

The Toaster-produced comedy short *Nick Dixon Private Eye* won two awards at the 1994 Hometown Video Festival in Honolulu. Producer and star Don Myers grabbed a plaque for Best Entertainment Show-Single Show Division (Pro)

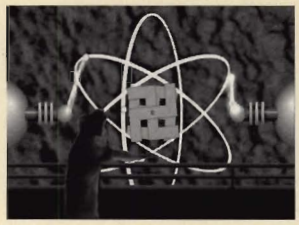


Figure 1

and a finalist certificate in the Computer Art-Single Show Division (Pro). The festival, a project of the Alliance for Community Media, received more than 1,800 entries from the U.S. and Canada.

Styled like a black-and-white 1940s movie trailer, the film (Figure 1) combines computer animation and live action with a bawdy tale of a detective's shocking secret. It also features more than 80 special effects created with the Amiga and the Toaster.

Myers is currently working on his next comedy short, which will make use of LightWave-rendered artwork.

Those interested in purchasing *Nick Dixon Private Eye* can write to Pink Pyramid, 36 W. Court St., Cincinnati, OH 45202, or call the store at (513) 621-7465.

Video and More Video

The Dallas Video Festival will return for its eighth year November 17-20 at the Dallas Museum of Art. An average of 5,000 people attend the event each year. It includes more than 250 screenings of videos from around the world, and all-day passes give attendees freedom to create individual viewing schedules.

Calling All Video Professionals

The International Television Association is now accepting entries for its 27th annual Video Festival. This event, which recognizes excellence in programs produced by professional video communicators, is one of the largest of its kind.

Tapes can submitted in 3/4-inch NTSC, U-matic format or 1/2-inch NTSC, VHS format with identical audio mixed on both channels. Entries and fees must be postmarked no later than Nov. 15, 1994. Entry kits are available through the association headquarters at 631 N. O'Connor Rd., Ste. 230, Irving, TX 75039 or call (214) 879-1112.

West Virginia Expo

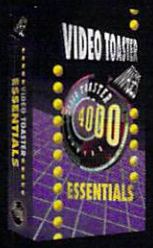
West Virginia Video Toaster User Group members (left to right) Joe Barta IV, John Wallace, Jim Cornette and Doug Morris outside the first Charleston Sternwheel Regatta Video Exhibition, which was co-sponsored by the group and drew nearly 150 attendees Sept. 2-3.

MAKE YOUR TOASTER SIZZLE

DESKTOP IMAGES INSTRUCTIONAL VIDEO TAPES

THE FAST AND EASY WAY TO LEARN THE VIDEO TOASTER

VIDEO TOASTER 4000 & 3.0



A step-by-step guide to the Video Toaster's digital video effects, set-up functions, ChromaFX and luminance keyer.

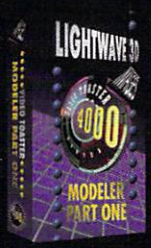
90 minutes

Complete instruction to ToasterCG's powerful text capabilities including font sizing, color brush loading, background & layering options.

100 minutes

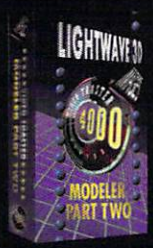
Discover the power of LightWave as basic 3D animation is explored. Learn scene creation, key framing, design and editing techniques for amazing animations.

120 minutes



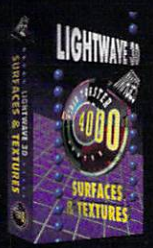
Create & modify basic shapes, making polygons with the freehand draw tool, using layers, creating text objects and assigning surfaces.

100 minutes



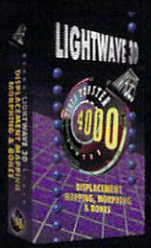
Change the shape and aspect of objects with modify tools, bending titles and logos, creating terrain using rail extrude, clone and lathe to create complex objects.

100 minutes



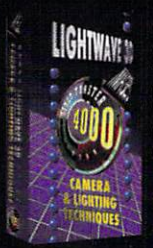
Professional surface and texture techniques, creating surfaces and increasing render speed by selecting the proper surfaces for your objects.

115 minutes



Twist, bend and deform objects in layout. Add incredible motion capabilities to your objects for realistic action effects.

100 minutes

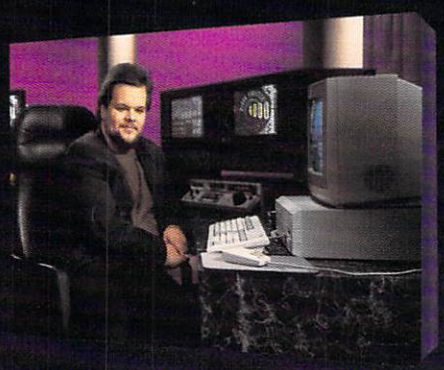


Give your animation depth and realism with camera placement & effects, lighting selection, envelopes and animation techniques.

120 minutes

FEATURING

LEE STRANAHAN



Lee has taught thousands through his national seminars and published articles. In this professional video tape series Lee offers the tips & tricks that provide invaluable Toaster Power.

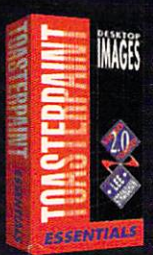
VIDEO TOASTER 2.0

A comprehensive guide to the Video Toaster's switcher and special effects, maximizing memory usage, ChromaFX transitions, and combining effects.

85 minutes

An easy step-by-step guide to the Video Toaster's character generator, font and palette controls, text file loading, and ToasterPaint CG backgrounds.

59 minutes



Discover the full potential of ToasterPaint's brush modes, warping & transparency controls, spare page feature, undo and redo functions and powerful keyboard equivalents.

62 minutes

Professional graphics techniques with multi-layered backgrounds, rub through and flood fill, textured ToasterCG titles, creating embossed borders and backgrounds.

59 minutes

Learn the basics of layout & renderer, loading objects, camera placement, motion envelopes, creating keyframes, quick rendering tips and animating to tape.

120 minutes

Create three dimensional objects using point manipulation, creating polygons, lathing & extruding, defining surfaces and creating complex objects.

90 minutes

Add texture and realism to objects by texture mapping applying images, using fractal noise, bump mapping, ray tracing, image capturing techniques & time saving tips.

90 minutes

Convert printed logos into 3D objects to create moving text graphics and flying logo animation, plus step-by-step instruction Pixel 3D Professional.

90 minutes

Each Tape is only **$49.95**

plus $4.95 shipping and handling

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RAVE VIDEO P.O. Box 10908, Burbank, CA 91505

Phone (818) 841-8277 FAX (818) 841-8023

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FOR INFORMATION CIRCLE 108

NEW PRODUCTS

Compiled by Joan Burke and Corey Cohen

Road Signs

Help for Artists, Animators

Products: Road Signs, Surface Pro, Transporter 2.0 update
Descriptions: Set of objects in LightWave format; surfaces for LightWave artists; animation control program for Amiga users
Prices: $59.95; $99.95; $199.95
Visual Inspirations
809 West Hollywood
Tampa, FL 33604
(813) 935-6410 Voice/Fax

Visual Inspirations has targeted LightWave artists with the release of *Road Signs*, *Surface Pro* and an updated *Transporter 2.0*. Road Signs contains more than 50 Modeler-crafted signs, and provides a construction kit and tutorials that allow artists to create an unlimited number of signs. The program allows accurate reconstruction of accidents and adds to any outdoor scene. Surface Pro offers LightWave artists a variety of low-memory, image-based surfaces, 12 new objects and a wide range of technical maps. The updated Transporter 2.0 software is designed for Amiga animators requiring more flexibility for single frame-to-tape configurations. Its features include providing a link between the Display Device and Single Frame Controller by creating scripts of pre-rendered frames, Frame Accurate Sequential Frame Grabbing, and simplifying of batch image processing.

FOR INFORMATION CIRCLE 1

3D Objects

Product: LIGHT-ROM
Description: Objects and scene files for LightWave artists
Price: $39.95
Amiga Library Services
610 N. Alma School Rd., Ste. 18
Chandler, AZ 85224-3687
(800) 804-0833
Fax (602) 491-0048

Amiga Library Services has released *LIGHT-ROM* exclusively for LightWave artists. LIGHT-ROM contains over 400MB of LightWave objects and scene files not available on any other CD, thumbnail renderings for easy previewing, a Showcase directory, and a selection of Imagine objects and text.

FOR INFORMATION CIRCLE 2

Color View Palmcorder

Product: PV-IQ244
Description: Palmcorder
Price: $899
Panasonic
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7182

Adding to its IQ series, Panasonic has introduced the *PV-IQ244* palmcorder. The compact PV-IQ244 can be used as soon as the battery is charged and produces tapes that can be played immediately in any VHS VCR. The PV-IQ244 features a built-in lens cover and a high-resolution color viewfinder. The 62mm-diameter head cylinder increases the picture stability. Other features include a 12:1 power zoom allowing for dramatic close-ups and wide angle views and a low light capability for shooting scenes that are not brightly lit.

FOR INFORMATION CIRCLE 3

Let's Hear It

Product: CS320
Description: Microphone amplifier
Price: $125
Carlson-Strand
152 Calle de Los Molinos
San Clemente, CA 92672
(714) 492-8978
Fax: (714) 492-9638

Carlson-Strand has released the *CS320*, a portable microphone ampifier designed to amplify microphone level inputs to audio line level outputs. With the CS320, a microphone can be added to any piece of audio equipment that has an audio input. The amplifier has both a 1/4-inch and 3.5mm input jack and expands the capabilities of VCRs, camcorders, audio mixers and public address systems. With the CS320's small size, it can be conveniently clipped to a belt or pocket.

FOR INFORMATION CIRCLE 4

Slip and Slide

Product: Rack Slide Kit
Description: Accommodation for Sony's UVW series of Betacam VTRs
Price: $235
Winsted Corporation
10901 Hampshire Ave. So.
Minneapolis, MN 55438
(612) 944-9050

Winsted has introduced the model F8806 *Rack Slide Kit* specifically for Sony's new UVW series of Betacam VTRs. The rack slide kit includes rack handles, slides and hardware needed to rack mount a VTR. The VTRs pull out easily on heavy duty ball bearing slides. Adjustable finger brackets provide rack mounting in slope or vertical racks. The rack slide kits are designed to hold VTRs securely and allow for easy maintenance of equipment.

FOR INFORMATION CIRCLE 5

Textures In Motion

Product: Moving Textures 100
Description: Image sequences for the Amiga
Price: $249
Precision Computer Graphics
634 N. Glenoaks Blvd., Suite 367
Burbank, CA 91502-1024
(818) 842-6542

Precision Computer Graphics is now publishing *Moving Textures 100*, a software package for the Amiga containing stock footage for computer animators. The package, which includes one CD-ROM and one videotape, consists of 22 image sequences—each with 300-900 ready-to-use IFF frames—that make it possible for computer animators to add natural phenomenon to their animations. Moving Textures

100 can be used with any software that can handle image sequences.

FOR INFORMATION CIRCLE 6

Watch and Learn

Products: Video Toaster Secrets; Pro Flying Techniques; Studio 16
Description: Instructional videos for Toaster, LightWave and Studio 16 users
Price: $49.95 each
Rave Video
P.O. Box 10908
Burbank, CA 91505
(818) 841-8980
Fax (818) 841-8023

Rave Video has released three instructional videos to help Toaster professionals improve their production power and profits. Video Toaster Secrets, hosted by Lee Stranahan, reveals little-known automatic functions inside ToasterPaint and LightWave 3D.

Stranahan shows Toaster users how to create TPaint graphic elements and effects automatically, how to customize TPaint and LightWave 3D preferences files, the power of ARexx, and basic Amiga Workbench functions.

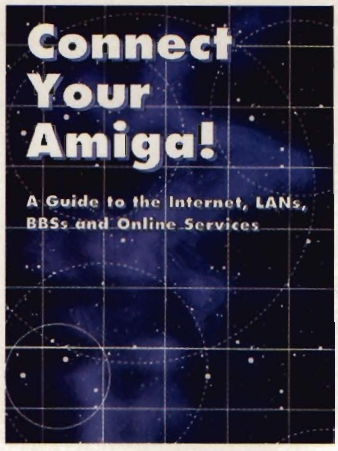
In Pro Flying Logo Techniques, LightWave artist Tony Stutterheim shares many of the methods he used in creating the logo effects in NewTek's Revolution video, including camera techniques, the "light speed" streak effect, the moving sheen effect, beveling techniques, modeling tips for crafting sharper logos and tips to reduce rendering time.

Studio 16 features SunRize Industry's Tony Shannon providing a complete step-by-step guide to Studio 16's Timeline Cue List, Digital Waveform Editor, Automated Mixer, Sample List, Meters and Recorder. In addition to Shannon's instruction on how to create professional soundtracks for video productions, Studio 16 contains broadcast tips from Emmy award-winning sound editor David Scharff.

FOR INFORMATION CIRCLE 7

Connect Yourself

Products: "Connect Your Amiga! A Guide to the Internet, LANs, BBSs and Online Services"
Description: Information for networking and going online
Price: $24.95
Intangible Assets Manufacturing
828 Osmond Ave.



Drexel Hill, PA 19026-2604
(610) 853-4406
Fax (610) 853-3733

Connect Your Amiga! 's 256 pages provide everything from background information for the novice to networking hints and tips for advanced users. A section on the Internet describes this service and how to access and maximize it's abilities. Telecommunication is also discussed, with information on selecting and using modems and terminal emulator software and how to choose computer bulletin board systems and on-line services. Also, a portion of the book is devoted to networking hardware and software, including the SANA-II standard, Ethernet, ARCNet, serial and parallel ports, SLIP, PPP and Envoy.

FOR INFORMATION CIRCLE 8

Zoom In

Product: S15X6.1EVM/ERD
Description: Handheld zoom lens
Price: $9,900
Fujinon Inc.
10 High Point Drive
Wayne, NJ 07470
(201) 633-5600
Fax (201) 533-5216

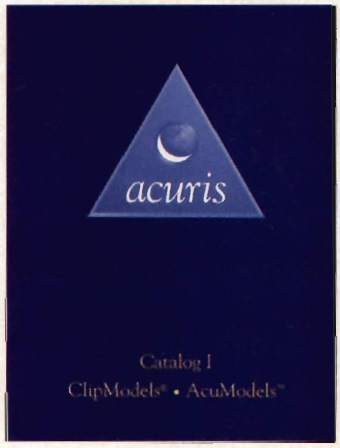
The *S15X6.1EVM/ERD*, the latest member of Fujinon's V-Grip series of premium handheld lenses, is a zoom lens that combines light weight, strong optical performance, Aspheric Technology, inner focus and a V-Grip. This 3.2 pound lens is available in a both a handheld ENG style and with servo control of zoom and focus for use in remote applications. The S15X6.1-EVM/ERD has a focal length of 6.1mm to 91.5mm, a zoom ratio of 15X, a minimum object distance of 0.75m, and a maximum aperture of F1.4 to 82mm and F1.6 at 91.5mm. It is compatible with most 1/2-inch-format three-chip cameras and with current Fujinon lens accessories.

FOR INFORMATION CIRCLE 9

3D on CD

Product: Clip Model Library CD-1
Description: Ready-to-render 3D models
Price: $495
Acuris, Inc.
931 Hamilton Ave.
Menlo Park, CA 94025
(415) 329-1920
Fax: (415) 329-1928

With the *ClipModel Library CD-1*, Acuris, Inc. offers the first unlocked, multi-platform, multi-format 3D Model CD. Consisting of six



NEW UPDATES

More Digitizing

Product: VertiSketch version 1.1
Description: 3D digitizing system upgrade
Price: Starting at $2,395
Blevins Enterprises
121 Sweet Ave.
Moscow, ID 83843
(208) 885-3805
Fax (208) 885-3803

Adding new features to its existing line of powerful digitizing tools, Blevins Enterprises has announced the release of *VertiSketch version 1.1*. VertiSketch allows users to sample 3D data from physical objects and create digital copies for use in computer animation. The lofting commands allow users to quickly create polygons between digitized contours without requiring splines and patches. The new point selection command allows existing points in Modeler to be selected directly with the digitizer's probe instead of the mouse.

FOR INFORMATION CIRCLE 12

Monitoring Video

Product: Hamlet 302 WVA
Description: Portable Waveform/Vectorscope
Price: $1,995
Feral Industries
9204 Bond Street
Overland Park, KS 66214
(913) 492-4666
Fax (913) 492-5666

The *Hamlet 302WVA*, an upgrade of the Hamlet MicroScope, adds several features: dual mono/stereo inputs for audio measurement, a new membrane control front panel, external reference with hands-free timing for matching video sources and a built-in black generator. Like the MicroScope, the 302WVA is palm-sized and battery-operated. In addition to offering a variety of display modes for precise measuring and problem detection, the Hamlet 302 WVA features storage memories for easy recall, RS232 serial port remote control, a 12-volt A/C adaptor for in-studio use, gain control and built-in calibration signals.

FOR INFORMATION CIRCLE 13

Speed Up

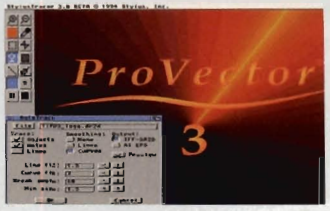
Products: PLI 15X QuickCD
Description: Product maximizing CD-ROM speed
Price: $1,295
Peripheral Land Incorporated
47421 Bayside Parkway
Fremont, CA 94538
(510) 657-2211
Fax (510) 683-9713

In an attempt to meet the high-speed demands of multimedia users, Peripheral Land Inc. has released the *15X QuickCD*, an updated version of its 10X QuickCD product. The 15X QuickCD enables a 1X, 2X, 3X or 4X CD-ROM drive to transfer data at a rate of up to fifteenfold, with a resulting access time comparable to that of a hard drive. In addition, the 15X Quick CD eliminates the waiting that accompanies data-intensive CD-ROM applications such as interactive games, clip art and photography databases, and image development applications, combining increased performance with maximum speed.

FOR INFORMATION CIRCLE 14

Stylish Graphics

Product: Stylus Pro-Pak
Description: Software bundle for graphic artists
Price: $299.95



Stylus, Inc.
P.O. Box 1671
Ft. Collins, CO 80522
(303) 484-7321

Stylus Inc. has announced the release of the *Stylus Pro-Pak*, a professional software bundle. Included with the package is ProVector 3, StylusTracer, PSImport and RexxRequest. ProVector 3 is an updated version of the Stylus structured-drawing program. New features include an improved interface, advanced Graphic Architecture support, new gradient fill options and object effects. The StylusTracer features a full suite of image processing and touch-up tools to prepare bitmaps for tracing. PSImport adds support for PostScript features including text objects, gradient fills and clipping paths. RexxRequest is an ARexx Command host utility which allows 2.X style requester to be added to ARexx macros.

FOR INFORMATION CIRCLE 15

libraries—Interiors & Multimedia, Geography, Human Forms Male, Female and Faces, and Exteriors and Trees—the ClipModel CD-1 features over 110 highly detailed, ready-to-render 3D models. The models offer support for 3D Studio, Topas, and two versions of DXF. Some of the libraries can be decompressed and loaded into LightWave.

FOR INFORMATION CIRCLE 10

Fun at Home

Product: Music Video 101—Home Camcorder Production
Description: Instruction booklet for home camcorder users
Price: $7.95
TIMTV
P.O. Box 2251
Douglasville, GA 30133
(404) 489-7371

Following up on its 1986 broadcast version of Music Video 101, TIMTV has published *Music Video 101-Home Camcorder Production*, a home camcorder guidebook for junior high school students and professional musicians alike. Published by Timothy Dwelle, Music Video 101-Home Camcorder Production is a 35-page paperback that features how to create simple non-broadcast music videos and covers everything from scriptwriting and rehearsal to practice tips and editing.

FOR INFORMATION CIRCLE 11

D2-quality Non-linear Editor

16 Bit CD-quality Audio

4 Input Switcher

35ns Character Generator

Video Paint System

3D Modeling & Animation System

(with real-time playback)

Luminance Keyer

Hundreds of Digital Video Effects

Real Time Color Processor

Hundreds of PostScript Fonts

Video Toaster® is out to amaze you. Again.

Introducing D2-quality, Non-linear editing for under $5,000.

What will we think of next?

The amazing Video Toaster just took another giant technological leap forward. Now, the world's first all-in-one, broadcast-quality, desktop video production studio can be turned into a sophisticated editing suite. Fact is, Video Toaster 4000 combined with Video Toaster Flyer delivers the same high-end editing capability you'd expect from a $50,000 digital deck—at a fraction of the cost. Check the list of features on the left side of this page, and start considering the possibilities.

To find out more, call now.

1-800-847-6111

Come see the **FLYER**, LightWave on multiple platforms & third-party Toaster/Flyer products at

VIDEO TOASTER EXPO '94

December 14 & 15
at Universal City Hilton & Towers

Call AVID Publications for more information **1-800-322-2843**

THE TAPELESS EDITOR

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NewTek, Inc.
1200 S.W. Executive Dr.
Topeka, Kansas 66615

NEWTEK INCORPORATED

FOR INFORMATION CIRCLE 138

DEAR JOHN

Solving a Logo Scene Dilemma

In Search of the Perfect Rotation

by John Gross

This month's column features plenty of variety, concluding with an invitation to answer two questions from fellow readers who managed to stump yours truly.

Q: I am interested in pursuing a career change to computer-based graphics and animation. I have been involved with computers, photography, video and film on and off since the late '60s.

I am planning on buying a Video Toaster in the near future. Is it a standalone system, or does it need a PC to interface with it? If so, what kind of PC—Windows or DOS-based? What kind of hardware/software does the Toaster require? Is there any one brand of PC that can run the Video Toaster (I see many ads for Video Toaster with Amiga computers), or can it run with any PC?

LIGHTWAVEPRO is neither hardware nor software. It is a monthly newsletter published by the same people who bring you *VTU*, AVID Publications.

On a related point, is LIGHTWAVEPRO a piece of hardware or a software package? If this is the case, what are the hardware/software requirements?

I realize that memory space and complexity of an animation will determine this, but how many seconds of animation can be done with a Toaster/LightWave setup? How does one store the finished sequence and how does one transfer that finished sequence to film or video?

Assuming that one is artistically inclined and becomes proficient in using the equipment, how does one go about obtaining work besides word of mouth, placing ads in various graphics/animation magazines, sending samples of one's work to magazines such as yours and placing ads in trade papers such as *Variety*?

I am also considering returning to school and obtaining a second degree, a B.S. in CAD/CAM-virtual reality from a local CAD/CAM school here in Phoenix. Do you think that virtual reality could be tied together with the Toaster and LightWave to create some interactive videos and games?

Tod Miles
Mesa, Ariz.

A: Currently, the Video Toaster is a combination of hardware and software that works only in an Amiga computer. The Toaster will fit in any A2000, A3000 or A4000 Amiga computer. In order for the Toaster to function properly, you should have Amiga OS 2.04 or greater, a hard drive (at least 100MB) and as much RAM as you can afford (at least 8MB is needed). Ideally, the Amiga should also have at least a 68030 or 68040 accelerator. Included Toaster software consists of the Switcher, ChromaF/X, Toaster CG, Toaster Paint and LightWave 3D.

LIGHTWAVEPRO is neither hardware nor software. It is a monthly newsletter published by the same people who bring you *VTU*, AVID Publications. LightWave 3D (or LightWave) is the software that will run in combination with the Toaster, and is also available as a standalone product that will function in any Amiga computer (except 1000) with 8MB of RAM, a hard drive and OS 2.04 or greater.

By the end of this year, we will also see LightWave released for Windows, Windows NT and the SGI platform.

As far as number of seconds per animation, it depends not only on RAM and configurations, but also on the final output. If your output is video or film, you can theoretically output a limitless supply of frames as they are recorded onto videotape.

For animations played back from the computer, it will depend on RAM. If you use the Toaster in an Amiga 4000 computer with 18MB of RAM, expect to play back (in real time) a 256,000-color playback of a LightWave animation for up to approximately five seconds.

Finished LightWave sequences can be stored as either individual frames or animations. The animations are played back on the computer, and individual frames are laid off to videotape using a frame accurate deck and a deck controller (hardware or software) that will instruct the deck to record frames after they are displayed. Individual frames can also be stored on removable media such as a Bernoulli drive or on Exabyte tape, where they can be restored to video at a later date.

You pretty much listed all the ways animators find work except for taking internships at graphics houses and circulating demo reels. All serious animators should have a demo reel of their best work that they can show to prospective clients.

Finally, do I think that the Toaster and LightWave can be used to create interactive videos and games? Yes.

Q: I recently encountered a little dilemma while setting up a logo scene that could possibly serve as the basis for a discussion on pivot points.

Basically, I had three objects that comprised the letter "i" (Figure 1). The problem arose when I went to spin the "top hat" 360 degrees in heading around the dot. The objects are keyframed into position at 30 degrees heading and -10 degrees pitch and are parented to a null object as part of the scene.

The problem is that the top hat doesn't keep the same pitch in relation to the rest of the objects during its rotation. That is, 180 degrees through the rotation, it is pitched +10 degrees to the front (Figure 2). Please explain.

Steve Bailey
Creative Concepts
East Aurora, N.Y.

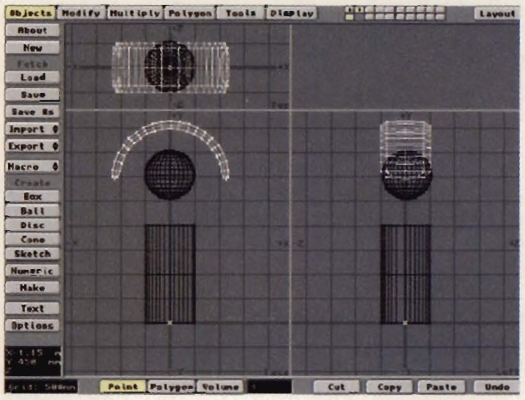


Figure 1: The top hat object in Modeler. The yellow dot represents its pivot point.

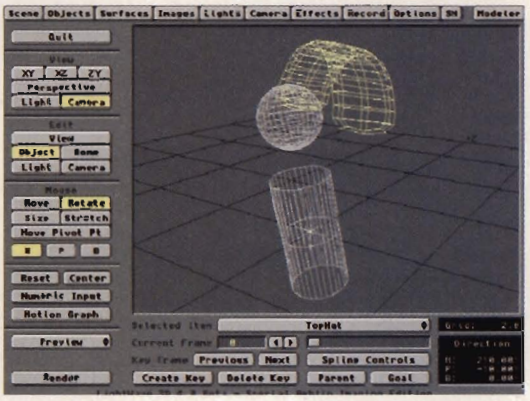


Figure 2: The top hat shown rotated incorrectly.

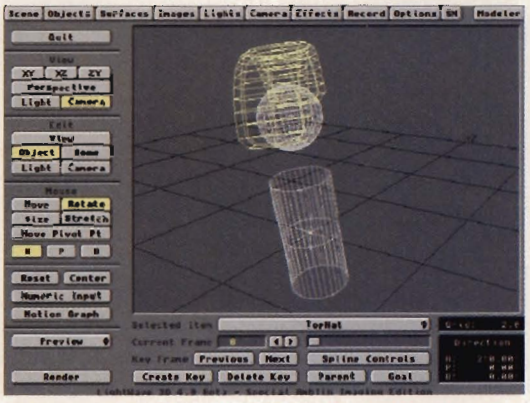


Figure 3: Parenting the top hat to the null and pitching the null as opposed to the top hat will produce the correct rotation around the dotted "i."

A: You've run into a common problem, and it sounds as if you had the right intention—if not the right use—for your null object.

Your problem stems from the fact that you parented each object individually to the null and then keyframed each object to the same rotation values. When you think of objects rotating, you should think of them as rotating on the world's axes. When an object is keyframed "tilted off-center," you will have the problems you experienced when rotating.

Whenever you want something to rotate around another object, you need to use a hierarchy, or parent-child relationship, to solve this problem.

There are two ways that you could have set up your scene that would have been easier and given you the correct rotation for the top hat. Since you had the objects parented to a null already, you could have simply left the objects in their default position/rotations at keyframe 0. You could then rotate the null to the required 30 degrees heading and -10 degrees pitch. Rotating the top hat at this point would allow for the top hat to rotate about the dot correctly (Figure 3).

Another way would be to parent the top hat to the "i" object or its dot and move just the parent object to the heading and pitch degrees you wish. Again, rotating the child top hat on heading at this point will pivot it about the dot correctly.

Either way, keep in mind that the top hat's pivot point, which is the intersection of the grid lines in Modeler, determines the point about which it will rotate. When you load and rotate it in Layout, it will rotate about the center of LightWave's world (the middle of the grid). If you parent it to another object, the new object becomes the "center of the world" for the child object. If you now tip the world (the parent), the child object still rotates the same way you would think it would relative to its world.

Open Forum

I've recently received a few letters asking for information that I do not have. I'd like to throw these questions out in the hope that one of you readers can come up with the solutions. If you know of any solutions, write or send e-mail.

Q: Are there any hacker-type Toaster users out there that know a way to make a keyboard shortcut to get to ToasterPaint from the Switcher control panel? To the best of my knowledge (limited as it may be), there isn't one.

Chris Fenwick
Redwood City, Calif.

Q: I'm wondering if there is a utility that, when enabled, will force users to save their files on a floppy disk.

In a school/classroom environment, it's getting to be a bit of trouble keeping the HD clean and preventing damage to other students' projects. Most of what they are doing on these machines is simple CG pages and small items.

I use a similar utility on the Macintosh platform that locks the desktop and requires saving on a floppy. No, it's not the AtEase junk—it's called FoolProof.

Any comments or suggestions?
Ron Rushing
Technology Coordinator
Stephen F. Austin University
Nacogdoches, Texas

VTU

John Gross is a supervising animator for Amblin Imaging and the editor of LIGHTWAVEPRO *newsletter. He is currently working on effects for* Star Trek: Voyager. *Questions can be sent care of* VTU *or electronically at jgross@netcom.com or 71740,2357.*

EDITORIAL EVALUATION

Circle number on Reader Service Card
I found this article:

Very Useful	Useful	Not Useful
Circle 021	Circle 022	Circle 023

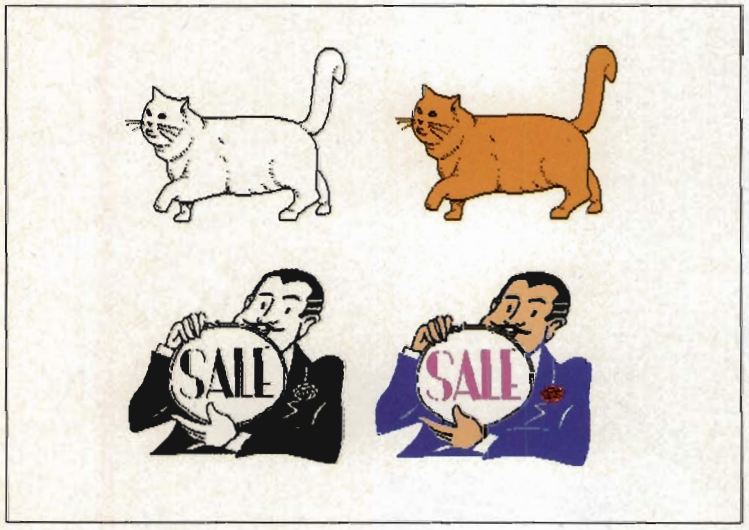
CYBERSPACE

Directory Assistance

Compiling and Organizing a Wealth of Clip Art

by Geoffrey Williams

Even those of us with an artistic bent rely on clip art. Previously, I've written about all of the CD-ROMs with clip art, and there is tons of information available through the Internet, commercial services, and local bulletin boards. You'll find everything from 24-bit textures to black-and-white line art, and most of what is available is of pretty good quality. There is such a wealth of clip art, in fact, that it can be almost overwhelming. You may acquire so much that you have no idea what you have. Consequently, you will wind up never using it.



Simple image processing makes black and white clip art ready for video.

One of the most important aspects of making clip art usable is to get it organized. If you have an abundance of random clip art floating around, it is useless unless you know what you have and where it is located. The simplest way to organize things is to make a bunch of drawers for the different types of clip art, separating it into the different types, such as line art, color drawings, cartoons, 24-bit scenics, textures, etc. The more categories you have, the better. For example, a drawer for scenics could have subdirectories for mountains, deserts, fields, forests, flowers and oceans. If you have several ocean pictures, you could have a subdirectory for waves, sunsets and beaches. The more categories you set up, the easier it is to find what you want and reduce searching time.

In each of these drawers, you could make pictures that consist of miniatures of all of the pictures in the drawer. It is much faster to look at the miniatures than to load each picture to see if it is what you want. For ADPro users, Dan McCoy's DoThumbNails ARexx script will ask for the directory you want to use, then generate a 640x400 24-bit screen with five rows and five columns for a total of 25 images per screen. The script can easily be changed to adjust the size of the picture and the number of images on it. The archive also includes a version of the script that prompts you for the pictures you want to include.

The next step beyond simple organization is to use a database. There are databases designed solely for organizing images. The only public domain database I know of is PicBase by Mike Berro. It works great, except for one flaw: it does not handle JPEG or 24-bit images. It will take other pictures and make a small 16-color grayscale image. You can view the images four at a time or in a special mode that shows 108 images at a time. The images can be sorted in several ways, and searched for based on keywords. The best way to get around the lack of 24-bit support is to use an image processor such as ImageFX (or the shareware Digital Illusions) to make 16-color grayscale versions of the 24-bit pictures you want to catalog. This should be pretty fast. Put those grayscale images into the directories you want to sort, make your database and then replace them with the actual 24-bit images.

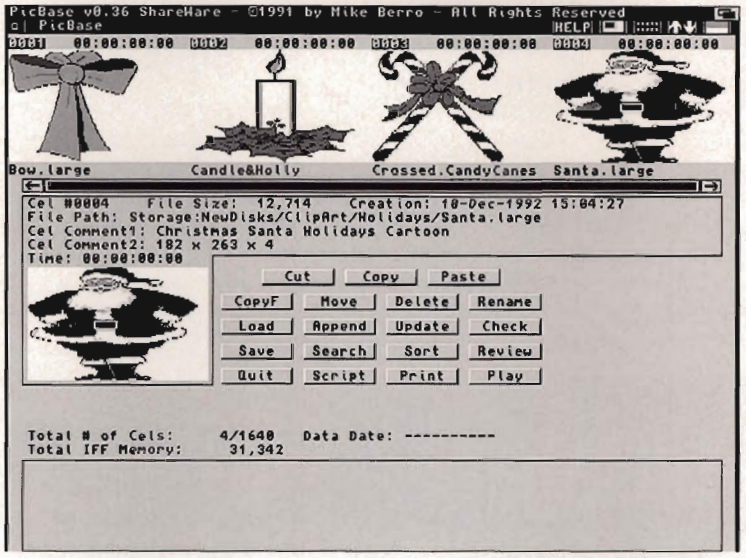
Browsing Through

There is a commercial cataloger that is full-featured. Graphic Recall lets you catalog IFF24, Anims, Framestores, JPEG and GIF format files, as well as IFF sound, MOD and MED audio files. It can also use the Toaster to do video grabs. You can create, browse and search multiple databases. It automatically uses ADPro to scale and manipulate images, and by the time you read this, they may have also added ImageFX and Image Master support. It will automatically make icons of the images you want to catalog, and let you easily browse through, sort and organize them to make finding the images you want a simple task. It is available as an introductory offer for only $50 directly from Focus GbR, 20 River Rd., Suite 9K, New York, NY 10044, (212) 826-1240. If you have a lot of images to deal with, I recommend this as a way to organize them.

One of the problems with images is that they take up so much space. I wrote previously about JPEG and its advantages for taming the size of 24-bit pictures, but JPEG does not do much for images such as CG Pages or Framestores. There is a commercial program that solves this problem, though. Heifner Communications'

Pegger, now in version 2.0, can easily JPEG those formats automatically, as well as Targa, DCTV, 24 Bit and all other Amiga modes, including AGA. It can also automatically decompress these files, so that they can be loaded directly into the Toaster. This is a great program, and I strongly recommend it, since it makes using JPEG compressed images with the Toaster automatic. There is a demo version available on the internets (everything works but it adds a copy of their logo to each picture). Once you try it, I think you'll be hooked by its incredible speed, ease of use, and the tremendous amount of storage space you will save.

There is a PD solution to the compression problem for standard non-HAM IFF pictures. It is a little program called PowerPacker, which has been around for quite a few years now. There is a commercial version that is much faster and supports more file types, but the PD version works just fine for compressing pictures. PowerPacker compresses both text and pictures, as well as actual programs.



PicBase by Mike Berro catalogs your clip art collection for easy access.

Compressing Programs

When you compress a program, a special decompression header is added so that it will decompress automatically and run normally. Pictures require a system patch, such as Michael Berg's PowerPacker Patcher (known as PP). Once installed, PowerPacked pictures are automatically decompressed when loaded into a paint program or into the Toaster. For simple black-and-white line art the compression can be as much as 70 percent. For other types of color clip art a good average is around 50 percent. Heavily dithered images, IFF 24 and HAM images do not compress well with this method. For a lot of clip art, though, you will see significant space savings. It also does a tremendous job on LightWave objects, many of which can be drastically reduced in size.

Another way to compress pictures that works especially well on line art is to simply load them all as frames in an Anim. To view the images, you can quickly load the Anim using an animation viewer and then page frame-by-frame through the pictures. If the Anims are organized by category, you can quickly go through the images you want to look at to find what you need, and with line art the file size shrinks down fairly small since they are mostly white space. For colored images, this can still work, but the space savings is much smaller.

There is a PD solution to the compression problem for standard non-HAM IFF pictures. It is a little program called PowerPacker, which has been around for quite a few years now.

Let's briefly review the types of clip art available, and what works best for video. The first type is black-and-white line art. The oldest Mac clip art, which is very low-resolution, is quite useless for video. High-resolution clip art can be used in video in a couple of ways. The problem, though, is that it is usually made up of single pixel width lines, which will jitter all over in video. Here is the solution: Load the art into a program such as DeluxePaint. Select a color that is roughly between the black and the background color you plan to use. Then press the "o" key, which will make an outline of that color around the drawing. This is an instant form of anti-aliasing, and you may be surprised at how easily it works. The line art still looks good, but will display on video without any jitter. You can also use a light gray as your outline color, which will work over a variety of backgrounds (though not all).

True Colors

You can also color in clip art. Look at the example picture of the cat. The first line art version is very jittery on video. I colored the cat orange using a fill, and colored the eyes green. I then picked up the cat as a brush and used outline to give it an outline in a lighter shade of orange. You now have a rock steady colored picture that looks great on video, and it only took a few seconds. In the Sale Man picture, the entire black-and-white image was picked up as a brush, outlined in gray, then colored using the fill tool.

If you have background patterns that are repeating, space can be saved by cutting out just the basic pattern as a brush. You can then load just the brush and use it as a screen fill, which will restore the pattern. The commercial product ProFills uses this technique to provide hundreds of backgrounds on a single disk with a tremendous amount of variety, and if you have seen the backgrounds it can generate, you'll understand just how much can be done simply by saving a small brush from a picture to create a repeating background.

A lot of the clip art and backgrounds found on BBSs were created

continued on page 27

ToasterPaint 4.0

Toaster Paint Module Receives First Major Upgrade

by James Hebert

One of the most frequent questions I have been asked at trade shows over the past year is, "Can we see the new ToasterPaint?" If you've been fortunate enough to have attended NAB, SIGGRAPH, an Image World show or any of a few others, you've been fortunate enough to get a glimpse at the new TPaint. Here's an opportunity for you to get a close-up look.

I will not attempt to provide a comparative review of TPaint's merits versus another paint package. There are good and bad paint programs available. There

A sample image showing two new TPaint tools: the airbrush (drew the large color swatches) and stencil (protected the lettering from being painted).

are also useful and useless features in each of them. But if you're like most Toaster users, it's likely you use TPaint because (a) it came with the Toaster, (b) any other high-quality paint package requires some form of display board with a much higher cost, or (c) you've grown familiar with its tools and found them to be of high quality.

Each of these arguments is valid, and I stand by my assessment of item (c). TPaint is a powerful video graphics tool. If you have taken the time to work with TPaint, you've found that you can achieve high-quality results. About the only complaint I acknowledge about TPaint is "Will it ever be updated?" Yes. And you're about to see just how much.

Many of the changes that have been implemented in the new TPaint are a direct result of adding another new feature. For example, adding alpha channel support necessitated a redesign of the color palette (with some features of its own) and a simpler way to go from one screen to another. As always, one thing leads to another.

On the Big Screen

The most noticeable difference between the old TPaint and the new TPaint is the screen display. On an Amiga 4000, a HAM 8 display fills the full screen. The quality of this display is so good, in fact, that you'll find yourself rendering the current image to the frame buffer to check it far less frequently. I only render after making a dozen or more changes, and usually only just before saving the image (the final check). The HAM 8 display shows more than 256,000 colors, and it's perfect.

(Note: If you're using an Amiga 2000 or 3000 with the Toaster, you should enjoy all of the new features in TPaint except this one. At press time, only the full-screen HAM 8 paint feature will be unavailable to you, since those Amigas cannot support the HAM 8 display. NewTek intends to make the remaining features discussed here functional on all systems.)

A New Look

TPaint's interface leaves behind the sharp-cornered beveled-button look and joins the rest of the Toaster's round-cornered smooth-highlight look. It's a leaner and cleaner appearance, allowing for better organization of TPaint's tools. Also, pull-down menus are a thing of the past. In an effort to remove such "hidden" things as disappearing menus or buttons, NewTek has rearranged all of the control panels in TPaint so that all functions

The tools panel with the tool palette beneath.

The color panel palette.

appear on one panel or another. No more hunting for that command you can't quite remember.

Following popular conventions of interface design, there is a row of main control buttons below every tool panel. This row of buttons is referred to as the toolbar and is available at all times below the current panel. It

contains buttons for each of the tool panels in TPaint, plus a small selection of useful tools, such as Magnify, Undo, Redo and more. The name of the current panel is highlighted. Jump to any other panel by selecting another tool panel button.

The most useful addition to the toolbar is screen control. Previously, when you wanted to use a spare screen as a compositing tool or a scratch pad, pressing the "j" key on the keyboard jumped you to the spare screen. The new screen control consists of three buttons: 1, 2 and A (for screen 1, screen 2 and the alpha channel screen). When these screens are present the corresponding button will be highlighted, showing you at a glance which screen is active. Click on any other button to go to its screen.

Alpha, Beta, Gamma

A newcomer here is the alpha channel screen. This screen allows you to draw a grayscale image that can be used as an alpha channel by LightWave 3D, or even by the Switcher. This enables you to create graphics in TPaint that can be keyed over other video, just as ToasterCG creates key pages.

Additionally, with an image on both screens 1 and 2, you can draw on the alpha channel screen using the RubThru drawing mode and see the results in real time on the Toaster's frame buffer output. This feature was recently added, and at press time its full capabilities were not yet known. No doubt you'll be reading more about it in future issues of *VTU*.

Of course, drawing a grayscale image requires a palette with a range of grays. TPaint's quick-access palette (which stretches across the screen above each tool panel) has been redesigned. There are now 24 color wells available to select a color directly in addition to 16 grayscale color wells. Both a current color box showing a large sample of the current drawing color and a wider range control that displays the current color range remain. You'll be able to insert colors into any of the color inkwells, and TPaint will remember those changes the next time you use it. In effect, you now have a user-definable palette.

A Whiter Shade of Pale

Since we're discussing color, you'll want to know about the new color selector in TPaint. The RGB sliders have been redesigned to be much simpler to use. There is now a greater range of steps with which to select a color.

Also, a Hue-Saturation-Value color wheel has been added for color selection. Drag the pointer around the wheel to select a hue (red, for example). Drag in and out from the center of the wheel to adjust the saturation (for example, very red, mild red, or pale red) or use a linear slider to adjust the value of the current color (bright red to dull brick red).

From the color palette you'll be able to select the range colors (any two colors between which a smooth blend will be created), flip the range colors, insert colors into the palette, or choose colors from the screen image itself.

Ghostly Visions

Transparency and Warping controls remain relatively the same, except for being simplified somewhat. You can still set the transparency amount for any drawing mode using the Center and Edge controls, only now those controls use numeric gadgets that show just how much of the effect you've set. This makes re-creating a "certain look" much easier, since you can set the numeric value to the one you used previously.

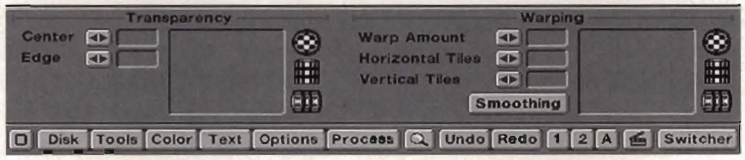
Four modes remain for Transparency: hotspot, horizontal, vertical and full. In hotspot mode, an indicator is adjusted that acts as a focal point for the transparency effect. If you want the upper right corner of the area you paint to be blended with the current image underneath, drag the indicator to the upper right corner of the transparency control. The horizontal and vertical transparency modes work in a similar fashion, except that the indicator is a bar rather than a small point.

When none of these three modes are active, you're in the full transparency mode. The Center and Edge controls are locked together to one value, which you can set. If you select 30 percent, for example, the entire area over which you draw will be applied with only 30 percent coverage equally.

A new panel named Disk contains all of the controls that relate to hard disk or floppy disk access. This includes commands related to Loading and Saving images or brushes, freezing video and importing it into TPaint.

Another new panel called Options contains many commands previously found on the pull-down menu system. Here you'll find screen-related commands such as Coordinates and Grid displays, as well as brush-related commands such as Swap and Rotate.

The new Process panel is designed primarily for Toaster owners who use the Video Toaster Flyer. For example, suppose you wish to have a recorded video clip processed so that it uses a sepia-toned color tint (something you might not want to use ChromaFX for, due to its horizontal shift). Select the clip and the Sepia Tone process, choose which frames from the clip should be processed and begin. TPaint will load each frame from the video clip, process it for sepia tone, then save it as part of a new clip.



The transparencey and warping panel (accessed from the tools panel shown above).

The disk access panel. This panel is designed for all disk access (loading and saving of files).

The options panel. This panel contains screen and brush options, as well as delete controls.

The new Process panel for processing flyer clips and still images.

The revamped text panel in ToasterPaint no longer supports bitmapped fonts, only PostScript.

(Due to the nature of clips, processing one requires the generation of a new clip. This is a bonus, since the old clip remains the same. It won't be overwritten.)

What processes are included, and where do they come from? NewTek plans to make a developer code available so that third parties can create their own plug-ins for TPaint. These scripts may be ARexx-based, or they may be codes of their own. Either way, look for major growth in the market for add-on packages to the Toaster, since LightWave 3D is already headed in the same direction.

From within the Process panel, you'll also be able to extract a single frame from a clip and process the current screen image. Non-Flyer owners will be able to use these processes on their loaded images, too.

PostScript Paint

The text panel has not been overlooked. The new TPaint supports PostScript, and it may support EPS artwork as well. After selecting the PostScript font desired, enter a short line of text. Screen controls enable you to set the height and width of the text, as well as the sheer amount and the rotation. Click on the Create Brush button and in a moment you'll have an antialiased text brush to place anywhere on screen. Using TPaint's powerful tools for drawing, you'll be able to create some terrific text effects.

Last but not Least

Keep in mind that this article was written just as final touches in TPaint were being applied. There may be newer features that appear in the shipping version, some features that may function other than the manner in which they were described here, and some that may have been removed because they could not be made 100 percent reliable. This is the nature of software design.

VTU

TPAINT: NEW FEATURES IN BRIEF

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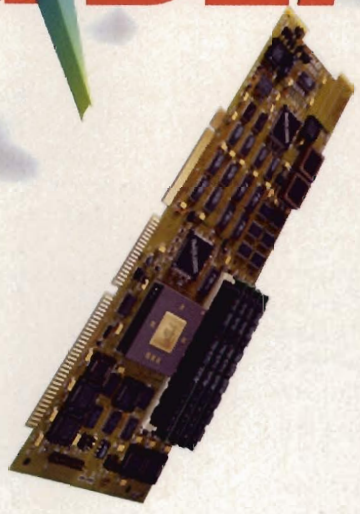

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SOUND REASONING

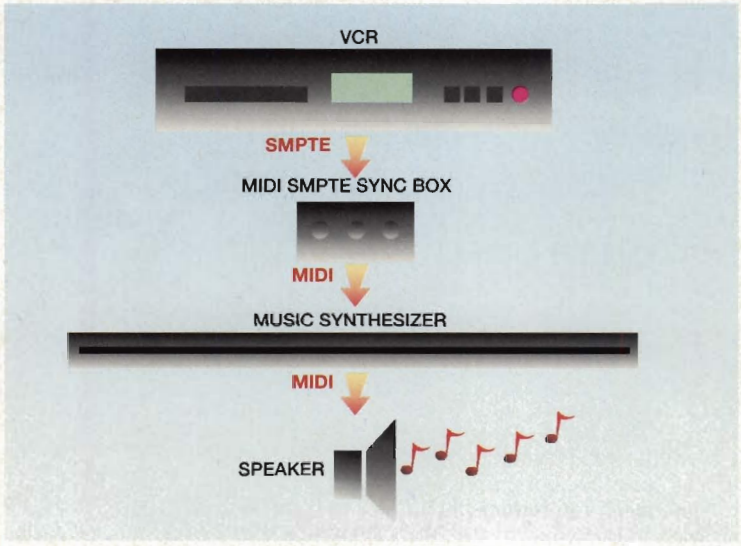
An Ear for Video

Speaking the Language of MIDI

by Cliff Roth

When video productions call for original music tracks and you start talking to musicians about creating original scores, it's almost a certainty that the language of Musical Instrument Digital Interface (MIDI) will be spoken. MIDI is like a breath of fresh air for anyone who has been around video for a while, because just about every single manufacturer of electronic musical equipment offers a MIDI interface. It's truly a universal standard.

Although MIDI has many valuable video applications that don't have anything to do with music—such as sound effects, machine synchronization, even controlling the coordination of multiple monitors or projectors in video art installations—the roots of MIDI are in electronic music.



MIDI Synthesis

The early music synthesizers in the '60s and '70s were based on voltage control—each key of the keyboard produced a different voltage level, along with a "trigger" signal that indicated when each key was pressed and a "sustain" signal that indicated how long it remained depressed.

By the early '80s, as digital technology became more commonplace, it became clear that a digital keyboard communication system could provide two distinct advantages over analog: There's no need to worry about tuning the keyboard, since each key is represented by a number rather than a voltage level. And the keyboard can communicate more sophisticated and subtle information about the way each key is being played, such as the velocity of each key depression. Hence MIDI was born.

Originally intended to allow one brand of keyboard to control another brand of synthesizer equipment, MIDI has become a general purpose interconnection highway for exchanging information between keyboards, drum machines, synthesizers, audio effects processors and computer sequencers.

Virtual Tracks

One of the most powerful capabilities of MIDI—especially for low-budget video producers who are always starved for an adequate number of audio tracks—is the ability to create "virtual track" recordings. For a computer, it's a rather simple task to record and regurgitate the MIDI commands that a keyboard sends to a synthesizer. But the real power of MIDI comes in the ability to layer these "tracks" one on top of another. You can use a half-dozen tracks for synthesized drums, for example—bass, snare, hi-hat and tomtoms—and then another dozen for synthesized piano, bass, organ, clarinet, etc. A single computer equipped with a MIDI interface can easily control all of these sounds simultaneously. The limiting factor that determines how many layers of sound can be run at the same time is the number of synthesizers being controlled (many synthesizers can produce a dozen or more different "voices" simultaneously).

Thus, you can have the equivalent of a 24-track-or-more recording studio. But with one major difference: The MIDI tracks are not actual sound recordings; rather, they are the command signals that instruct the synthesizer equipment to produce the desired sound at the desired time. If you want to record vocals or real acoustic instruments, you can use the MIDI "recordings" as base tracks that you play while singing or recording acoustic instruments.

MIDI Timing and Information

Essentially, MIDI represents timing information—this event happening at this particular moment of time. In the world of MIDI, all timing is relative to a tempo, such as 120 beats per minute.

In popular music, each beat is usually a quarter note duration. In MIDI, each quarter note is divided into 24 parts—thus, the finest increment of MIDI timing is typically about 1/48th of a second (a faster tempo can reduce this rate to 1/100th of a second or less).

Every MIDI hookup requires that one piece of equipment be designated as the "master" and all other units operate as "slaves." The master unit sets the tempo for all the others. Slave operation is commonly called "MIDI mode" or "sync mode."

The various MIDI devices are connected together in daisy-chain fashion. The MIDI connector itself is a standard 5-pin DIN plug. Typically, a master keyboard is inter-

connected with a sequencer using MIDI In and Out jacks, and is simultaneously connected to other devices, such as a slave synthesizer and drum machine, using MIDI In and "Thru" jacks.

Practically every multimedia computer sound card, such as the Sound Blaster for IBM-compatibles, also has MIDI capability. The cheapest ones usually only send out MIDI to another MIDI device. These cards also have simple built-in synthesizer, accessible via MIDI control.

MIDI-SMPTE Interface

Of course, anyone familiar with video is familiar with a much cruder timing system called time code. Regardless of whether you're talking about SMPTE audio (longitudinal time code), VITC (vertical interval time code), or 8mm RC time code, the information is essentially the same—a simple report of hour, minutes, seconds and frame number every 30th of a second (or every 25th for European TV, or every 24th for film synchronization).

High-quality multi-track audio tape decks are usually capable of synchronizing themselves to a SMPTE audio time code signal. For audio-for-video post-production, this is the key to getting beyond the limited track capabilities of the original video tape format. As the tape is played, a 24-track audio tape deck can run in perfect synchronization—providing plenty of room to record lush sound effects.

But 24-track audio recorders cost upward of $15,000, and renting studio time can cost more than $50 an hour. So many low-budget studios make do with more affordable 8-track recorders—which cost around $5,000, including SMPTE lock-up, or "chase sync"—and use MIDI virtual tracks to supplement the audio recordings.

Getting MIDI equipment synchronized to SMPTE signals doesn't happen automatically—you need a special adaptor, called a MIDI-SMPTE interface, or, more commonly, a "sync box." Fortunately, these are not particularly expensive devices. For example, the most popular model, the SyncMan, sells at music supply stores for about $200. Sync "boxes" are also available as plug-in boards for IBM-compatible computers—for example, the Micro Technology Unlimited SMPTE/MIDI board is priced at $250 list. Many of the more sophisticated direct-to-hard-disk computer audio boards, such as the SunRize Studio 16 (for Amiga) and Turtle Beach Systems 56K (for IBM-compatibles), include built-in SMPTE-MIDI synchronization capabilities. Note that for most of these devices, the SMPTE time code must be in the form of an audio signal (longitudinal time code). If you're working with VITC or RC time code, you'll also need a time code converter (they cost about $300 to $500).

The MIDI-SMPTE sync box can be a powerful component of the low-budget audio-for-video studio. With this interface, a MIDI sequence can be programmed to start at a designated point on a videotape, with the SMPTE time code functioning as the master synchronizing source. At 120 beats per minute, for example, a beat will occur at every 15th frame of video.

With MIDI-SMPTE synchronization, even a humble Hi8 or Super-VHS production can be accompanied by fully orchestrated scores, without the need for any additional audio recording capability.

Just sync up the synthesizer equipment to the time code, and you're in business.

A powerful feature of MIDI called the Song Position Pointer allows you to start playing the sync source (such as the edited videotape) in the middle, and automatically calculates what the corresponding music at that point in time should be. Combined with a sync box, it lets you start playing a videotape at any point, and hear the music tracks—just as if the MIDI tracks were actual audio recordings.

Of course, most video producers don't create their own music—they hire someone to create the score. The starting point usually occurs after the picture is "locked"—that is, after the fine editing is completed and no more changes will be made to the timing of the edited production. A copy of the edit master is delivered to the composer, with time code recorded on it. Depending on the budget, the composer may then record the music, mix it himself, and deliver it back on another videocassette with SMPTE time code, or may come to a recording studio, along with live musicians, to record a multi-track score combining synthesized and acoustic sounds.

With bigger budgets, the use of MIDI becomes transparent to the video producer, who simply gives the musician SMPTE at the start of the process and receives a SMPTE synchronized recording at the end. But for those working with lower budgets, setting up a video editing suite with MIDI equipment adds a lot of audio production value.

Besides music, MIDI gear can also be used for synchronizing sound effects, syncing digital audio recorded on hard disk, and even to control automated audio mixing consoles. The new GS3V mixing console from Allen & Heath, for example, is available in a 16-input fully automated (via MIDI) configuration for $6,495 list.

Compared with the expenses and chaotic compatibility problems associated with professional and semi-pro video equipment, the world of MIDI is surprisingly affordable and standardized. No video editing suite should be without it.

Companies mentioned:

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FOR INFORMATION CIRCLE 115

 continued from page 19

from 24-bit images that were reduced to HAM, 16, 32, or 256 colors. Twenty-four-bit displays used to be rare, so these lower color images were the best that was displayable. They were created by using dithering, a process that combines adjacent pixels of different colors to create additional apparent colors. While the images appear to have plenty of color, they also have a slightly grainy and sometimes a slightly pixelated look. Times have changed, and a higher standard of quality is expected these days.

There is a lot of clip art in this format, though, and it seems a shame that it is not usable. But there is a way to make this clip art appear to be of full color non-dithered quality. Dithering uses two adjacent pixels that merge together to fool the eye into seeing an additional color. It occurred to me that an image processor ought to be able to average those adjacent pixels to re-create the actual additional colors, just the opposite of the way the pictures were originally created. The new images, when displayed in HAM-8 or 24-bit, should look pretty close to the original 24-bit image. A little experimentation proved this supposition to be correct.

Imagery

Any 24-bit image processor or paint program that offers a smooth or blur option in which you can set the level and use on the entire image will work. I used Image FX, using the Blur option at between 13 and 15. The result was remarkable. The graininess was gone, and the image appeared to have much more color depth. It was hard to decipher that it was not a 24-bit image.

Some of the images that have been heavily dithered have an almost painted look to them, and smoothing the image will retain that painted look. If the image looks photographic, you will get a photorealistic 24-bit image that looks much better than you would imagine. If an area has too much color banding it will not look good, but I did not find this to be a problem very often, and the areas were easily cleaned up in a paint program.

There is a wealth of clip art available, and with a little organization and care it can be an important part of your work. Do keep in mind that not everything posted on a BBS is necessarily usable, though. Some posters don't respect copyrights and may have posted images that you should not use commercially. Use common sense to keep yourself out of trouble in this area.

As usual, if you would like a copy of the programs mentioned this month, including the Pegger demo along with a bunch of compressed clip art, send $5 to: Geoffrey Williams, VTU Clip Art Disk, 1833 Verdugo Vista Dr., Glendale, CA 91208. You can e-mail me at gwilliam@netcom.com.

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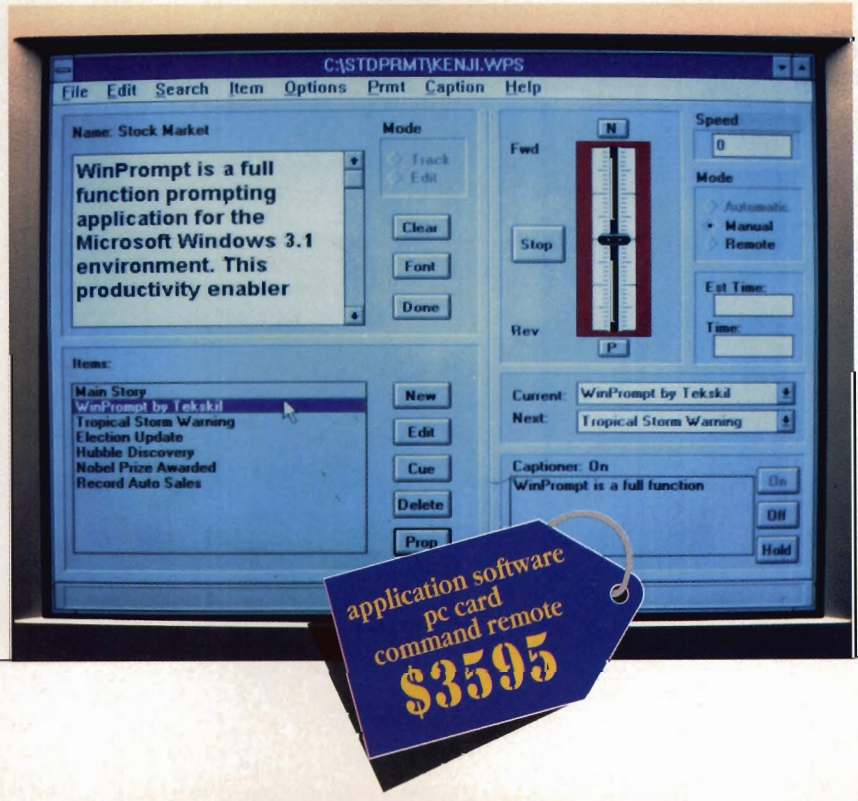

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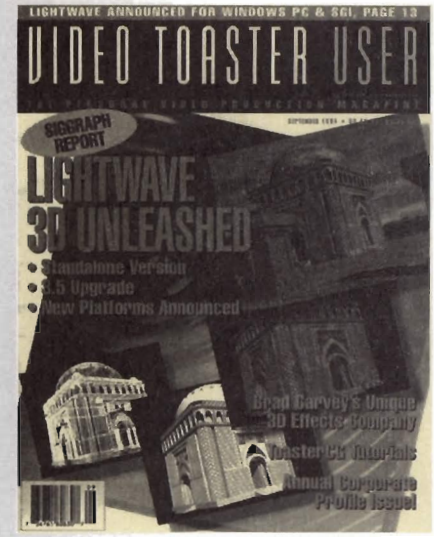

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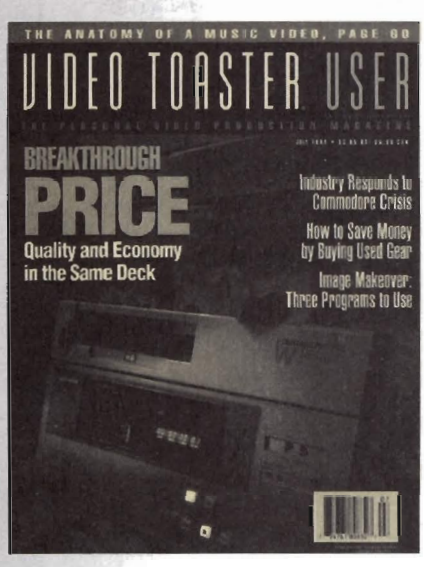

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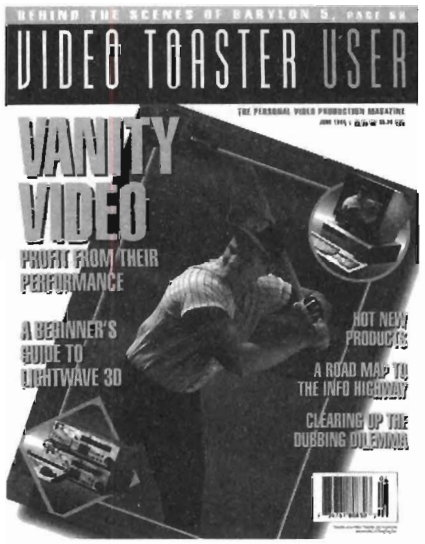

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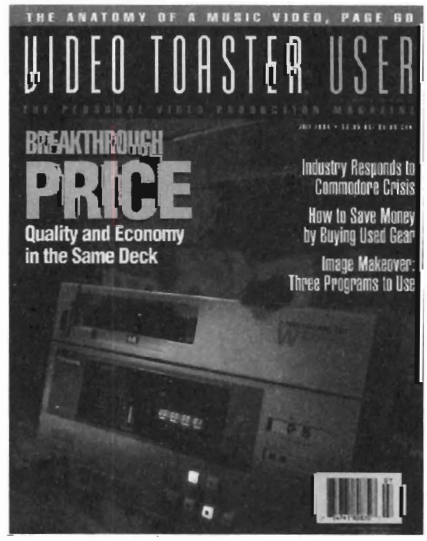

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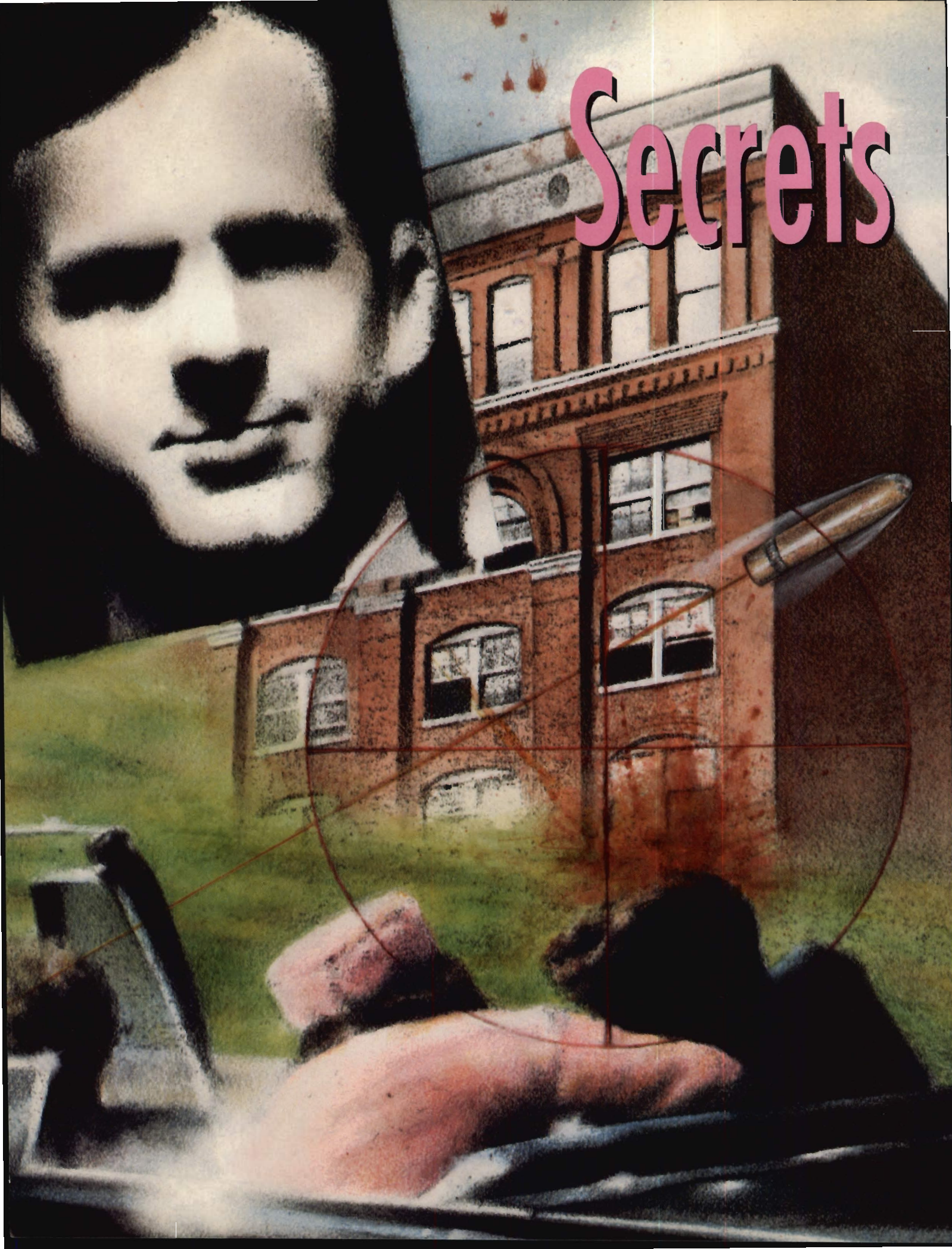
Secrets

# of a Homicide: Exploring the JFK Assassination

by Dale K. Myers

In the summer of 1975, radio announcer Dale Myers had an opportunity to see a bootleg copy of the Zapruder film, the famous 8mm home movie depicting the assassination of John F. Kennedy on Nov. 22, 1963. That moment changed his views on the murder of the 36th President of the United States. Over the next 20 years, Myers searched the indices of the National Archives in Washington, D.C.; prowled the corridors of the Texas State Archives in Austin, Texas; and visited Dealey Plaza, site of the assassination.

As a bonafide "expert" on the assassination, Myers was instrumental in the release of nearly 5,000 documents from the FBI and CIA under the Freedom of Information Act, produced a 1983 radio documentary that was honored by the Associated Press, wrote the Detroit News' *25th anniversary coverage of the assassination, and served as technical consultant both in front of and behind the cameras of the critically acclaimed 1993 BBC/Frontline television special* Who Was Lee Harvey Oswald? *Now an award-winning computer animator, Myers explores the JFK assassination in a new documentary.*

They say that if you were to study a single subject for one hour a day, in five years time you'd be a leading expert on that subject. If you were to spend 20 years time, you'd have a compelling urge to write a book. So far, I've been able to resist that temptation.

For me, the JFK assassination has always been a visual event. In fact, it is arguably the most photographed murder in history. Eyewitnesses I've spoken with over the years have repeatedly proven that there's truth in the old cliché "you had to be there." Yet, on November 22, 1963, events occurred so quickly that witnesses were unable to record the intricate details we now need to solve this three-decade-old mystery. If only we could somehow time travel to Dallas and preserve, for the official record, those details that have since eluded historians. Perhaps then, the assassination wouldn't be so mysterious.

In 1990, after embarking on a career in computer animation, I found the time machine I had wished for in the form of LightWave 3D.

ILLUSTRATION BY DAVID SMITH

Applying computer animation to the JFK assassination is not a new idea. PBS's NOVA program included a crude wireframe computer rendering of the assassination site in a 1988 TV special hosted by Walter Cronkite, while Failure Analysis Associates, Inc. produced an improved computer version of the plaza in 1992. Yet both renderings focused on a single issue, the trajectory of the shots fired at Kennedy's motorcade. I wanted to go beyond this focus.

Secrets of a Homicide

The result is *Secrets Of A Homicide*, a half-hour computer-generated exploration of the crime of the century. The concept was simple: rotoscope the Zapruder film into a 3D-animated model, then re-film the entire event from multiple viewpoints using high-resolution cameras. Through computer imaging, viewers would step back in time to become witnesses to the JFK assassination.

Secrets Of A Homicide is a crime scene re-creation on a monumental scale. I knew that if the final renderings were to have any evidential value, the crime scene setting demanded historical accuracy and mathematical precision.

Creating Dealey Plaza

To begin, I studied a survey map of Dealey Plaza that was prepared by Drommer and Associates for the 1978 House Select Committee on Assassinations.

Dealey Plaza is a triangular-shaped park area at the edge of Dallas' downtown business district. It is bordered on the east by Houston Street and the west by a railroad bridge known as the Triple Underpass. Cutting through the plaza are three roads—Elm, Main and Commerce—that sweep down a three-degree grade and slice under the Triple Underpass. To keep a reasonably low polygon count, I decided to model the north side of the plaza, do a mirror image, merge the two halves, and then trim the south end of unnecessary polygons.

The survey map provided precise elevations and locations of the plaza's main features—sidewalks, streets, lampposts, sewers, monuments, buildings and

trees. Since the survey was conducted 15 years after the assassination, it was important to use 1963 photographs of the plaza in placing objects that had since been relocated, such as streetlamps and highway signs.

Before beginning the process of modeling, all survey map measurements were translated into numbers that LightWave Modeler could use. Utilizing the southeast corner base of the Texas School Book Depository as the zero point (0,0,0), I converted all of the elevation points into X-Y-Z coordinates.

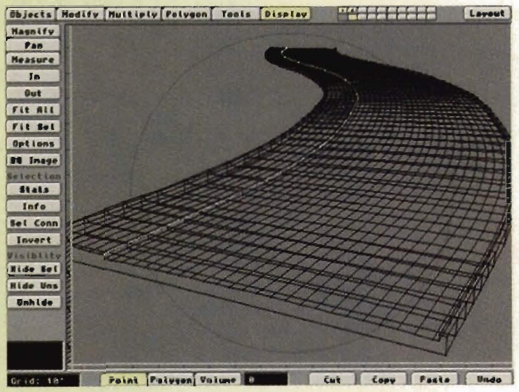

Figure 1

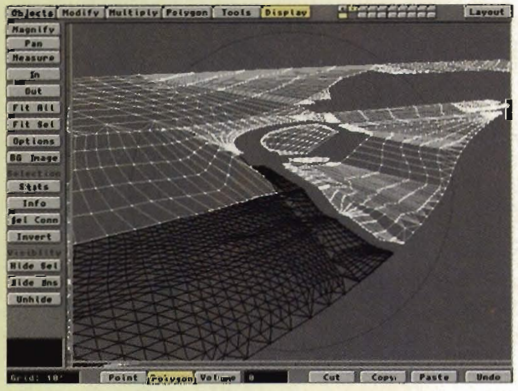

Figure 2

Modeling Elm Street

To create the sweeping grade of Elm Street, points were entered into Modeler that matched the survey elevation coordinates taken along the top of the north curb. These were linked together into a spline path. The survey map showed that the 40-foot-wide roadway rose approximately six inches between both gutters. Using survey points, a spline curve was created to match this hump in the road. The spline was frozen using Modeler's Freeze function and the point count was reduced to something more manageable. Using information from other official sources, a cross-section of the sidewalk, curbs and street was created and positioned at the head of the spline curve that represented the sweeping curve of Elm Street. This cross-section was then extruded along the spline path using Modeler's Path Extrude feature to produce a perfect replica of Elm Street (Figure 1).

Similiar techniques were employed to create the sidewalks, curbs and streets of Houston and Commerce. Finally, all of the modeled roadways were joined into a single object. Using the road as a template, I mimicked all of the street markings—crosswalks, centerline, road stripes—seen in 1963 photographs of the plaza. These polygons were burned into the road surfaces using Modeler's Template Drill/Stencil feature.

The monument walls, pergola, peristyle and reflecting pool that populate Dealey Plaza were modeled from personal photographs I had taken during various trips to Dallas between 1981-89, along with measurements provided by the JFK research community. Modeler's Boolean and Bevel functions proved invaluable for the creation of these objects, which were placed at elevations gleaned from the Drommer and Associates survey map.

Forming the Landscape

At this point, I essentially had the streets and monuments of Dealey Plaza floating in space. Next, I had to fill in the spaces with a contoured landscape. I plotted points matching the sloping ground at 30-foot intervals, producing a rough spline cage that represented the grounds of the plaza (Figure 2). The cage was meshed using Modeler's Patch function. Where more detail was needed, the polygon mesh was Tripled and Subdivided, then manipulated using the Magnet tool. Finally, the landscape was hand-stitched to the surrounding roadway and monuments.

The ornate lampposts that follow Elm, Main and Commerce streets were lathed from photo-based outlines. Highway and traffic signs were created by burning traffic symbols into basic sign shapes using Modeler's Template Drill/Stencil feature.

Growing Trees

The toughest aspect of modeling Dealey Plaza was the issue of trees. It's nearly impossible to create a realistic-looking tree in any modeling program without an incredible amount of polygons—something I really couldn't afford with this model. Although some realistic tree generation programs are available for the desktop, they generally produce files in the 16MB range per tree. I needed a minimum of 18 trees to populate the plaza, along with assorted bushes and hedges. Clearly, botanical, realistic trees were out of the question. What I needed was something that looked realistic, yet was functional on a polygon level.

After several days of experimentation, I settled on a solution that fit the parameters nicely. First, I created a six-sided flat polygon that would serve as a "leaf." Stepping to a second layer, I used the Point Distribution Macro to randomly generate 350 points. Falloff was set so that fewer points were created in the center of the point sphere. Switching back to the layer containing the "leaf," I brought up the point layer in the background, then activated the Point Clone Macro. This clones the "leaf" object and positions the new leaves to match the points in the background layer. To add additional randomness to the cloning process, Jon Tindall, author of the particle animation program "Sparks," modified the macro so that each leaf had a random rotation assigned to it as well as a random scaling that would place smaller leaves toward the top of the tree. I now had a bushy-looking batch of tree leaves. Without the mass of limbs and twigs seen in real-world trees, my tree leaves looked "thin" in the center. To add density to the tree leaves' center, a crude sphere was modeled and sized to fit within the batch of leaves. The sphere's surface was assigned a transparency based on a DPaint map of a similar leaf pattern. This helped provide the proper density while keeping the polygon count low. Adding a tapered tree trunk to the batch of leaves com-

pleted the illusion. This technique produces trees that look realistic at reasonable distances.

I decided to use a basic box-shape to represent buildings that lined Dealey Plaza's Houston Street. This would keep the polygon count to a minimum, while simultaneouly forcing the eye to key on the more detailed building—the Texas School Book Depository.

The Texas School Book Depository

This seven-story, salmon-colored brick warehouse was the building in which accused assassin Lee Harvey Oswald worked and from which shots were allegedly fired. I visited the sixth floor of the Texas School Book Depository in 1983. The Depository had been remodeled to accomodate a number of city offices as well as a new county courtroom. In the process of remodeling, much of the 1963 layout of the building had been destroyed, including the back stairwell that Oswald allegedly ran down after firing the shots. During my 1983 visit, the Dallas County Historical Society was in the process of creating The Sixth Floor, a museum exhibit that has since opened to the public. Although masterfully done, The Sixth Floor exhibit denies viewers the opportunity to look directly out the southeast corner sixth-floor window (it has been glassed in) or descend the back stairwell (it was torn out for the restoration). I was convinced LightWave could unravel some of the mysteries involving the building, so I set out to model a full-scale replica of the 1963 Texas School Book Depository.

Original blueprints for the Book Depository, built in 1901, do not exist. However, a detailed set of blueprints was created in 1978 by Burson, Hendricks and Walls, an architectual firm in Dallas, as a prerequisite to the planned Sixth Floor Exhibit. This set of prints showed the Depository's layout as it existed in 1963.

Floor-by-Floor Construction

Once again, it was necessary to translate the architectural figures into X-Y-Z coordinates. Beginning with the southeast corner base of the book building and working my way around to the west, I used the Enter Points macro to create points that outlined every nook and turn of the outer and inner wall. After connecting the points, the wall shell was turned into a single flat polygon (Figure 3). Using the Extrude function, the base wall was "pulled up" to the height designated by the architectual drawings (Figure 4).

This same procedure was followed to create each floor of the building. Modeler's Boolean function made creating windows simple. There are some minor variations in the size of the windows throughout the Depository, but for the most part I was able to create a single window "cutter," then clone it around the walls before doing one Boolean/Subtract cut per floor.

I found it handy to name the surface of the Boolean cutting object as "cutter." After the Boolean operation, these polygons could be quickly selected (R-Amiga/W) and cut or renamed. I also got in the habit of saving consecutive subversions of an object (Object_SubA, Object_SubB, etc.) as I progressively modified it, which helped facilitate experimentation without jeopardizing my previous work.

After punching out window sills in the building, each hole was fitted with a fully dimensioned window sash (Figure 5). Each variation of the Depository window sash was modeled directly from Dallas Police Crime Lab photographs obtained from the Texas State Archives. Modeler's Boolean and Beveling tools made this difficult task a breeze. Once created, the sash variants were cloned and positioned into the window sills.

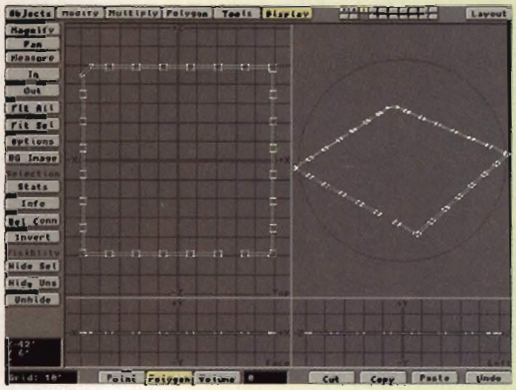

Figure 3

Additional details—window ledges, decorative bricks, corner columns and the rooftop Hertz sign—were modeled based on blueprints and vintage photographs of the building.

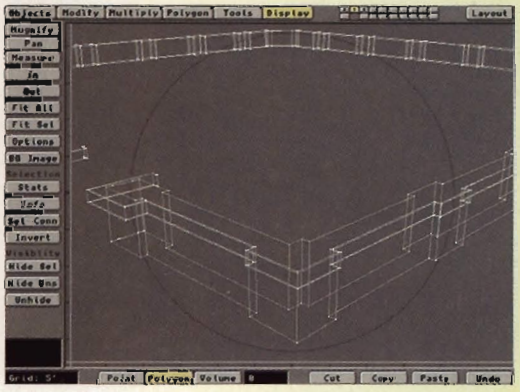

Figure 4

Turning to the Depository's interior, I used blueprints to model the northwest corner staircase as well as the floorplans for the first, second and sixth floors.

The Sixth Floor

A significant number of crime lab photos and film footage exist of the infamous sixth floor. I realized that enough photo evidence existed to re-create the arrangement of boxes for the entire floor. Working from photos collected from the National Archives, Texas State Archives and private collectors, I modeled several variations of the boxes seen throughout the sixth floor. The completed boxes were then arranged in large groups within Modeler. This allowed me to load hundreds of boxes into Scene Layout as a

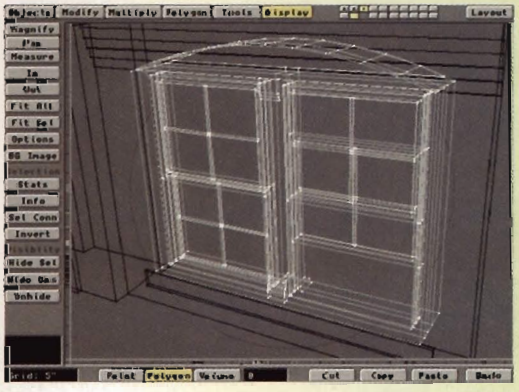

Figure 5

single object. In all, more than 5,000 sixth-floor boxes were arranged according to photographs (Figure 6).

The Sniper's Nest

Great care was taken to ensure the positional accuracy of the "sniper's nest"—a barricade of boxes around the southeast corner window of the sixth floor. The controversy about the position of these boxes centers around Dallas Police Crime Lab photos and news photos that show the boxes in various configurations.

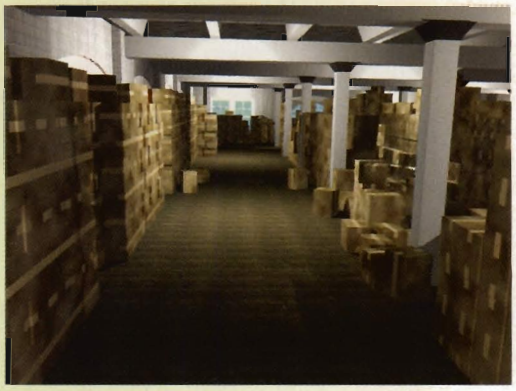

Figure 6

Past writers have charged that the sniper's nest was an invention of the police in an attempt to frame Oswald. They point to the various box arrangements seen in police photos as proof of the fraudulent evidence. Yet a careful comparison of photos and testimony reveals that the box photos depict a natural progression of the police investigation.

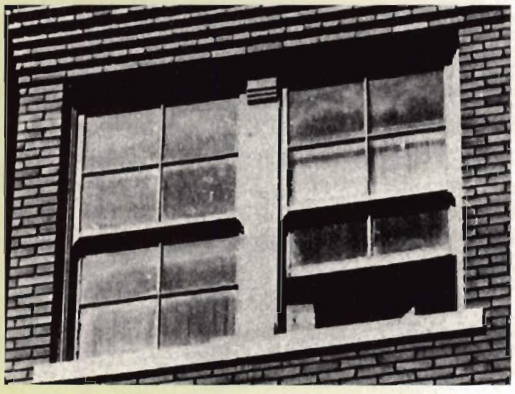

Figure 7

News footage shot by WFAA-TV cameraman Tom Alyea and two Dallas Crime Lab photos show the boxes in their original position. After these photos were exposed, the police photographer was called to the northwest corner of the sixth floor, where the rifle had been discovered. Homicide Captain Will Fritz wanted pictures of the rifle before it was moved.

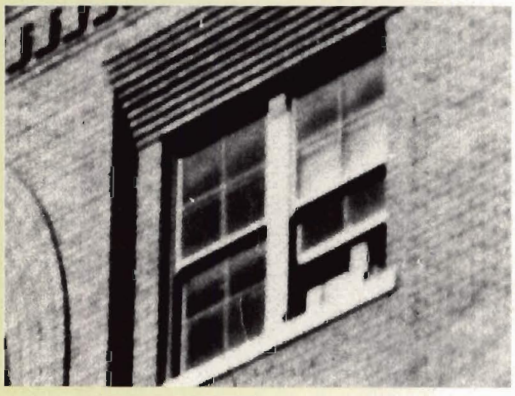

Figure 8

In the meantime, Crime Lab investigators had moved the sniper's nest boxes in order to dust them for fingerprints. The police photographer then returned to the sniper's corner and took additional photographs that show the new arrangement. It is clear which photos were taken after the dusting because you can see dusting powder on the boxes. Afterward, newsmen were allowed to photograph the view from the window for the morning papers, and further arrangements made it into the photographic record.

Matching the Box Photos

Once the photo sequence of the sniper's nest had been sorted out, I proceeded to reconstruct the box arrangement. In the official record I found that the Dallas Police had recorded the width of the floor boards seen in photos of the sniper's nest. Knowing the size of the window sash, I deduced the width of the bricks on the window sill. Using these two figures along with the known sizes of the sniper's nest boxes, I was able to arrange the sniper's nest boxes in Scene Layout with considerable accuracy—within a half-inch.

To confirm that the box arrangement I created was accurate, I decided to render two views of the window from street level that matched photos taken seconds after the last shot. Tom Dillard, a *Dallas Morning News* photographer riding in the eighth car behind the presidential limousine snapped one photo three seconds after the last shot (Figure 7). James Powell, an army intelligence officer, took a second photo approximately 30 seconds later (Figure 8). LightWave's camera was adjusted until a match was achieved between the re-creation and the original photographs.

A comparison of the two original photographs with their computer counterparts confirms that the arrangement of the sniper's nest boxes as seen in Alyea's film footage and the first two Crime Lab photos was the original arrangement. Equally revealing was something I had not anticipated.

Unraveling a Mystery

The 1978 House Select Committee on Assassinations Photographic Panel had compared Dillard and Powell's photographs and concluded that the boxes in the sniper's nest had been moved during the interval between the two photographs. The panel's finding could only mean that the gunman or an accomplice had lingered at the window after the shooting to rearrange the boxes. Oswald was encountered by Dallas police officer Marion Baker on the second floor less than 90 seconds after the shooting. In order for Oswald to have been the gunman, he would have to have left the sniper's nest immediately to get to the second floor in the allotted time. The House Select Committee's conclusion about the boxes being moved provided a photographic alibi for Oswald.

However, the computer re-creation of Dillard and Powell's view of the window shows that the arrangement of the boxes in the window is identical in both photos. I rendered an additional version of the Dillard and Powell perspectives, this time making the outer wall of the Depository semi-transparent and the sixth floor invisible. Comparing these two renderings (Figures 9 and 10) makes it quite clear that the apparent change in the arrangement of the boxes is due to the differing angles at which the photos were taken.

The Presidential Limousine

On November 22, 1963, President Kennedy was riding in a custom-built, 21-foot-long 1961 Lincoln Continental convertible. The actual dimensions of the limousine are readily available, having been part of the official assassination records of both the Warren Commission and the House Select Committee on Assassinations. Rather than build the automobile from scratch, I decided to purchase Viewpoint DataLab's 1963 Lincoln Continental computer model and alter it to match the dimensions of the original assassination vehicle. The model used in the project is therefore a hybrid—the 1963 version pulled, stretched and modified into the dimensions of the 1961 model. Additional cosmetic alterations were done to give the final model the "look" of the 1961 Lincoln.

Regarding the occupants of the limousine, I felt that it was important to avoid doing realistic, physical portrayals of Kennedy and Texas Gov. John B. Connally (JBC). Instead, the goal was to create a more generic-looking "human," which would underscore the project's scientific approach and avoid crossing the line of good taste. I ultimately settled on Crestline Software's Humanoid to provide stand-ins for JFK and JBC.

Preparing the Scene of the Crime

With the limousine and occupant models complete, I was ready to set up the assassination sequence. The most important part of developing something this complex is to create enough rotation controls to cover the circumstances you're going to encounter throughout the sequence. With LightWave, rotation controls are simple Null points (invisible point objects created in Modeler) that are parented to the object to be controlled, with each assigned a single rotational direction. In the case of the limousine, a Path-Null was used to propel the automobile down the roadway, a Y-Axis-Null allowed the car to follow Elm Street as it swept down and under the Triple Underpass, a B-Axis-Null provided roll control as the limo navigated the slight hump in the roadway, and finally, an H-Axis-Null gave me control over the heading of the car as it snaked through the plaza. The position of the occupants of the auto was controlled with two nulls: one that locked them to the limousine and a second that controlled their distance from each other.

The goal was to create an animated sequence that covered the presidential limousine's entire journey through Dealey Plaza, from the corner of Main and Houston to the Triple Underpass. The computer animation would be recorded at 30 frames-per-second (fps), as opposed to Zapruder's 8mm film speed of 18.3 fps. The conversion would require the computer to "expose" 1.639 frames for every frame in the original film. A chart was created listing the numbers of each of Zapruder's 486 frames along with their matching computer counterparts.

A copy of the Zapruder film was transferred to hard disk using the Personal Animation Recorder. The digital anim file was split into individual frames and each was renumbered to match its new "computer" number. This allowed me to go to any frame in Scene Layout and automatically bring up its matching Zapruder frame as a Background Image.

Rotoscoping the Z-Film

To bring the JFK shooting into a 3D environment, I used a twist on a technique known as rotoscoping. Traditional rotoscoping is the process in which individual frames from a moving sequence are traced, colored or altered in some fashion, then recompiled into a moving sequence. For *Secrets Of A Homicide*, I matched the motion of my 3D scale model to a 2D film of the actual event. This was accomplished by superimposing selected frames from the Zapruder film over a matching view of the 3D computer world. Key frames were then created of the matching positions of both automobile and occupants.

Figure 9

Figure 10

To begin, I matched the position and speed of the limousine model to the actual automobile seen in the Zapruder film. Lampposts and traffic signs located between Zapruder and the limo provided convenient markers with which to make spline adjustments until a perfect match was achieved. This process revealed that shortly after JFK and JBC emerged from behind the Stemmons Freeway sign, the limousine decelerated up until the headshot. Limousine driver William Greer, who can be seen looking toward the backseat during this sequence, apparently took his foot off the accelerator as the shots struck the president.

With the limousine moving down Elm Street at the proper speed, I began "keying" the motion of the JFK and JBC models to the film. Zapruder frame 139 (Z-139), the first clear frame showing both men, was used to establish their initial positions. Key frames were then periodically created for both men as the film progressed. Because of the computer's ability to interpolate motion between two fixed positions, it was not necessary to create a key at every Zapruder frame. However, to ensure that the motion seen in this 3D version was faithful to the original, key frames were established for every major change in the occupants' motion. In most cases, keys appear every 20

frames, though extreme motion areas required key frames at three- to five-frame intervals in order to keep the computer re-creation locked to the Zapruder film.

After completing the 3D rotoscoping process, frames located between key frames were randomly selected and compared to their corresponding Zapruder frames. This "spot check" confirmed that LightWave's interpolation routines were accurately re-creating the motion of the original sequence.

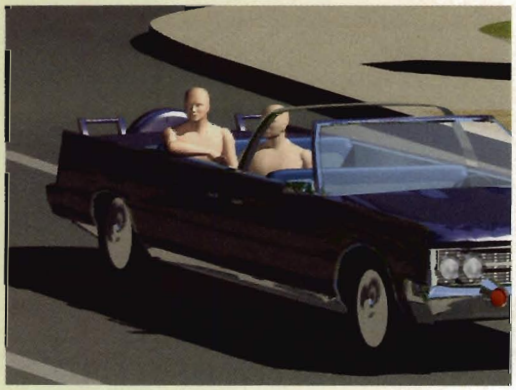

Figure 11

Figure 12

Establishing a Margin of Error

Like all science experiments involving human interaction, it was necessary to establish a margin of error. Due to the photographic quality of the original film (the image size of JFK and JBC on the original film is less than the head of a pin), I found that I could rotate the model's appendages up to five degrees without a significant visual clue.

This figure tends to decrease as the occupants draw closer to Zapruder's camera and the images increase in size and clarity. Although the rotoscoping process is by definition subjective, all key frames are within this 5 degree rotational margin of error. The 1978 House Select Committee on Assassinations used the same figure for similar reasons during its photographic analysis of the Z-Film.

To create the motion of the president and governor between the corner of Main and Houston streets and the start of Zapruder's film, I relied on all available films and stills exposed during this period. Very few gaps exist in the photographic record, so it was possible to gain a reasonable degree of accuracy to this portion of JFK and JBC's motion files. Because the rotoscope process was not used to create this earlier sequence, the motions seen are only representative of JFK and JBC's movements during this period. Still, the computer's ability to interpolate motion between fixed positions has created an eerie sequence leading up to the assassination.

Rendering the Assassination

The final Dealey Plaza model contains more than 250,000 polygons and took four months to complete. Rotoscoping the Zapruder and other films required an additional two months to create, check and re-check. The time had come to play the role of eyewitness.

The camera used by Zapruder was a handheld 8mm Bell & Howell Zoomatic windup model. FBI tests confirmed its running speed to be 18.3 fps. My intention was to re-photograph the shooting from Zapruder's position as if I had a 35mm motion picture camera running at a speed of 30 fps. LightWave's camera was positioned at Zapruder's location and the focal length adjusted to 285mm. This would provide the closeup view Zapruder was unable to record.

The resulting animation was nothing short of astounding. Nearly 35 years after the shooting, I was able to watch those tragic moments with unparalleled clarity. What the computer captured was very revealing.

The First Shot

As the limousine completes its turn onto Elm Street and begins the glide toward the Triple Underpass (Z-139), JFK and JBC are seen gently brushing their hair back. Both men turn toward the crowd on their left (Z-155 to 160). At that moment, something happens. Both men turn sharply to the right side of the car, JFK just before Connally. The governor's reaction is consistent with his testimony that he was looking left when he heard a gunshot and turned right to see what had happened. If a shot was fired at this point, it apparently missed both the limousine and its occupants.

Although JFK reacts with Connally, his turn appears related to a crowd gathered at the north curb of Elm Street between a lamppost and the R.L.Thornton Freeway sign (Figure 11). This fact was confirmed by locking the computer camera to JFK's facial plane and rendering the sequence. JFK is clearly tracking the area near the lamppost as the limousine passes (Figure 12). A photograph taken by Hugh Betzner Jr. shows a group of women standing at this location smiling as they wave handkerchiefs at the president.

From Zapruder's position, JFK is seen lifting his right forearm off the side of the car as he waves to the women at curbside. The House Select Committee on Assassinations interpreted the blurry images between Z-189 and Z-197 as an indication that JFK had been shot just before he passed behind the Stemmons Freeway sign. It appeared to the photo experts that JFK's right hand "froze" at this point. However, the computer re-creation reveals something else—a sharp, abrupt continuation of JFK's turn to his right. Viewing the sequence from JFK's position, it is clear that the president was tracking the women at curbside. Perhaps someone called out at the last moment. The president turned further right, but was too far past their position. He spun left (Z-195 to Z-204) and resumed his forward-facing posture.

Meanwhile, Gov. Connally was looking to his right, the blurry crowds flashing past just one lane away. From the moment Connally completed the sharp turn to his right (Z-170), he began slowly rotating back to his left until he was hit. This is not as evident in the original film, but does show up in the computer re-creation as a rotation of about 15 degrees. This motion is consistent with the governor's recollection that he was in the process of looking

over his left shoulder when he was shot. Nearing the Stemmons sign, Connally looks up toward the east end of the north pergola.

The Second Shot

The exact moment JFK and JBC were first hit has been the most venomous subject of debate since that day in Dallas. The 1964 Warren Commission picked the sequence Z-210 to Z-225 (while JFK and JBC were behind the sign) as the point of impact and claimed one bullet struck both, giving birth to the single-bullet theory. During the last 30 years, dozens of theories have been put forth by writers and amateur sleuths countering the Commission's claims. Just about every Zapruder frame from Z-190 to Z-240 has been used to bolster a theory about the first hit.

Part of the problem stems from Zapruder's shaky, hand-held camera work, which makes it difficult to focus attention on a specific area of the frame. Other problems arise when attempting to diagnose moving events from still enlargements. Frozen moments in time can be easily misinterpreted without the elements of time and space. By far the biggest problem with viewing the Zapruder film is the Stemmons Freeway sign, which comes between the presidential limousine and the viewer at the crucial moment.

Still frames clearly show the president grimacing as he emerges from behind the sign (Z-225). The question remaining is how much earlier was he hit and whether Connally shows a reaction to being hit at the same time. Watching the Z-Film in motion hoping to catch this subtle clue is an effort in frustration. It takes the human eye approximately five to 10 frames to recognize shapes in motion. By the time your eye locks on JFK and JBC, the film has already progressed to Z-230 to Z-235, where both are already reacting.

The 3D computer model of the JFK assassination effectively eliminated these technical limitations. Now, the computer camera followed the action with an ultra-smooth pan, image sampling was nearly doubled from Zapruder's original 18.3 fps to 30 fps, and the obtrusive Stemmons Freeway sign was assigned an 80 percent transparency value. The action behind the sign was interpolated by the computer based on the first and last frames in which JFK and JBC are visible. What happened behind the sign is no longer a mystery.

Mystery Behind the Sign

As Kennedy completes his left turn away from the women at curbside and Connally gazes up at the north pergola (Z-204), the limousine passes behind the freeway sign. JFK's right arm begins to resume a position he's kept throughout the motorcade—right arm on the side of the limousine, left hand up, holding his right fingers across his chest. The president's head tilts back slightly so that he's looking almost directly at Zapruder. Perhaps he glimpsed the Dallas dressmaker standing on the four-foot-high pedestal just as he slipped behind the sign.

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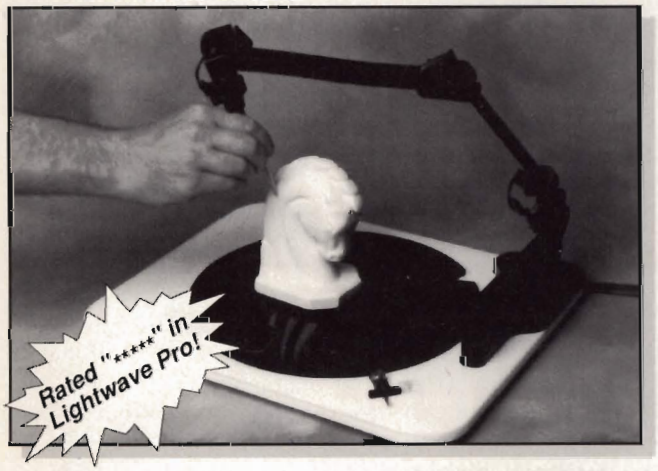

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FOR INFORMATION CIRCLE 103

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FOR INFORMATION CIRCLE 123

As Connally emerges from behind the sign (Z-223), the computer captures the moment of impact. From Z-223 to Z-227 (approximately one-quarter second), the governor's chest is driven downward nearly two inches, while pivoting violently to the left. At the same time, JBC's right arm flips upward, then down and out of sight as the governor spins to his right in pain. When JFK emerges from behind the sign (Z-224 to Z-225), his arms change from a smooth, gradual downward motion to a radically quick, jerking upward motion.

Figure 13

When watching this sequence in motion, it is clear that Connally is hit with a punching shot at Z-223. Without the sign to impede our vision, we see both men literally "jump" at the same time. In 1992, Failure Analysis Associates, Inc. revived a nearly 20-year-old observation that JBC's lapel flap bulges out for one-eighteenth second at Z-224, concluding that a bullet struck and passed through the governor's chest at Z-223 to Z-224. This fact, combined with the motions seen in the 3D computer re-creation, would seem to confirm a hit to the governor's chest at approximately Z-223.

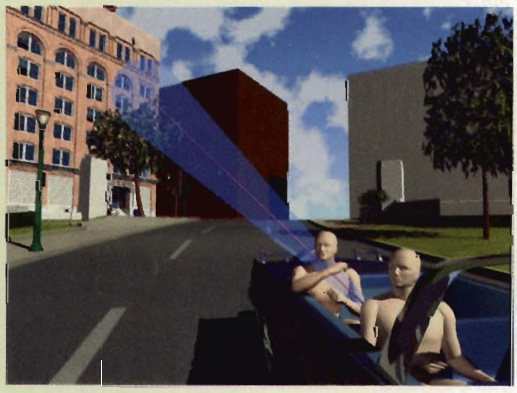

Figure 14

A Single Bullet?

The question haunting conspiracy-minded researchers is whether that same bullet hit JFK and from what source. For more than 30 years, scholars and researchers have argued over the location of JFK's back and neck wounds. Was it one bullet clean through or did two bullets strike—one from the front, the other from behind—and at what angle? The House Select Committee on Assassinations used the locations—still contested—of both men's wounds as presented by its expert medical panel. Connecting Connally's chest inshoot wound with JFK's throat outshoot wound, they created a line in space that was then extended back to the alleged source. Considering that JFK's wounds are still a subject of much debate, I decided to approach the answer through the location of the only wounds most researchers agree on—those in the chest of Gov. Connally.

Turning to LightWave Modeler, I set about to find the definitive answer. I loaded the "chest" object from the Humanoid models into the first layer. A point was created at the X-Y-Z zero point (0,0,0) in a second layer. This point and a clone were then moved to the positions that represented the inshoot and outshoot chest wounds of the governor as determined by the House Select Committee on Assassinations. The two points were then joined into a single-line polygon, and the line was extended rearward 200 yards. This line now represented the path of the bullet that passed through JBC's chest.

Returning to Scene Layout, the bullet track was loaded and parented to Connally's chest, retaining the relationship created in Modeler. Now, as the governor rotated in the jump seat, the bullet track would point to a source location. I rendered the computer frame that matched Z-223 and studied the resulting image (Figure 13).

Moving rearward from JBC's chest wounds, the bullet track encounters JFK's throat at precisely the point seen in the autopsy photos. Continuing rearward, the line intersects Kennedy's back near the shoulder line. Moving further rearward, the bullet track enters the southeast corner window of the sixth floor of the Texas School Book Depository.

This initial discovery was then subjected to the five-degree rotational margin of error inherent in this technical approach. This error can be represented by a cone that is spread to a radius of 22.5 feet as it meets the south face of the Depository. The trajectory of the shot that struck Connally must fall within the area defined by the cone.

Rendering Z-223 with the error cone in place provided the answer to the single-bullet question (Figure 14). If Connally was hit at Z-223, then it's almost a certainty that the same shot struck JFK first and came from the sniper's nest window of the Book Depository—the only open window unaccounted for within the cone.

The Head Shot

Both men react within four frames of being hit. JFK slumps to the left, elbows up, while Connally wheels to his right and into his wife's arms. At the moment of the head shot (Z-313), the president's head slams forward nearly two inches, then reverses into a recoil against the backseat (Z-319).

Determining the trajectory of the shot to JFK's skull proved to be more elusive. The House Select Committee had calculated a trajectory that intersected the south face of the Depository 15 feet above the sixth-floor window sill. This was based on a straight line drawn between the inshoot and outshoot wounds evident in X-rays and assumes the bullet did not change course as it passed through JFK's skull. This assumption is challenged by additional evidence that the bullet fragmented on impact, leaving two large chunks on the floor of the limousine as well as a trail of minute fragments in the president's brain. There was also damage to the limousine's windshield and a chrome strip above the sun visor.

To check the committee's work, I entered Modeler and created a bullet track trajectory matching the line it had used. The line was extended rearward 300 yards. Returning to Scene Layout, the bullet track was parented to the president's head and several viewpoints were rendered.

Based on the three-dimensional positioning of JFK's skull in frame 312, the House Select Committee's trajectory line was shown to intersect the south face of the Depository 60 feet above the sixth-floor window sill—not 15 feet as reported by the Committee. After including a 27.5-foot radial margin of error, it was clear that it would be impossible to fire a bullet along this line from the Depository or any other adjacent buildings. These results indicate that the House Select Committee's positioning of JFK's skull at Z-312 was incorrect. It also bolsters the notion that the bullet changed course before exiting the skull which, by definition, would eliminate the ability to calculate any true trajectory based on the inshoot and outshoot wounds to the president's skull.

Entertaining the hypothetical, I calculated a line from the sniper's nest window to the president's head at Z-312 and then extended that line forward. This line exits the top-right-rear of JFK's skull—within the area blown out upon impact. Although this should not be construed as a true headshot trajectory, it does demonstrate that the damage to JFK's skull is consistent with a shot from the Texas School Book Depository.

Shot From the Grassy Knoll

Preliminary work on a theoretical shot from the grassy knoll to JFK's head between Z-313 and Z-314 reveals a number of interesting facts. First, the president's body travels straight back toward the backseat cushion, not to the left, as a shot from the grassy knoll would dictate given its location nearly 90 degrees perpedicular to JFK's head. Second, a cone representing a shot entering any portion of the displaced skull and exiting the lower-right-rear area (as suggested by numerous researchers) virtually eliminates a shot at Z-313 from any location to the right of the midline of the limousine. Such a shot would have to come from the south plaza knoll, not the north plaza grassy knoll as has been suggested.

A Full Exploration

Computer imagery involving Oswald's encounter with Officer Baker on the second floor of the Texas School Book Depository and other key areas of the JFK assassination is currently being rendered for the final program, scheduled for completion in spring 1995. A national broadcast of this photorealistic computer documentary is anticipated.

Secrets of a Homicide is sure to add fuel to the assassination controversy as history confronts science in three dimensions. This time, you will be there.

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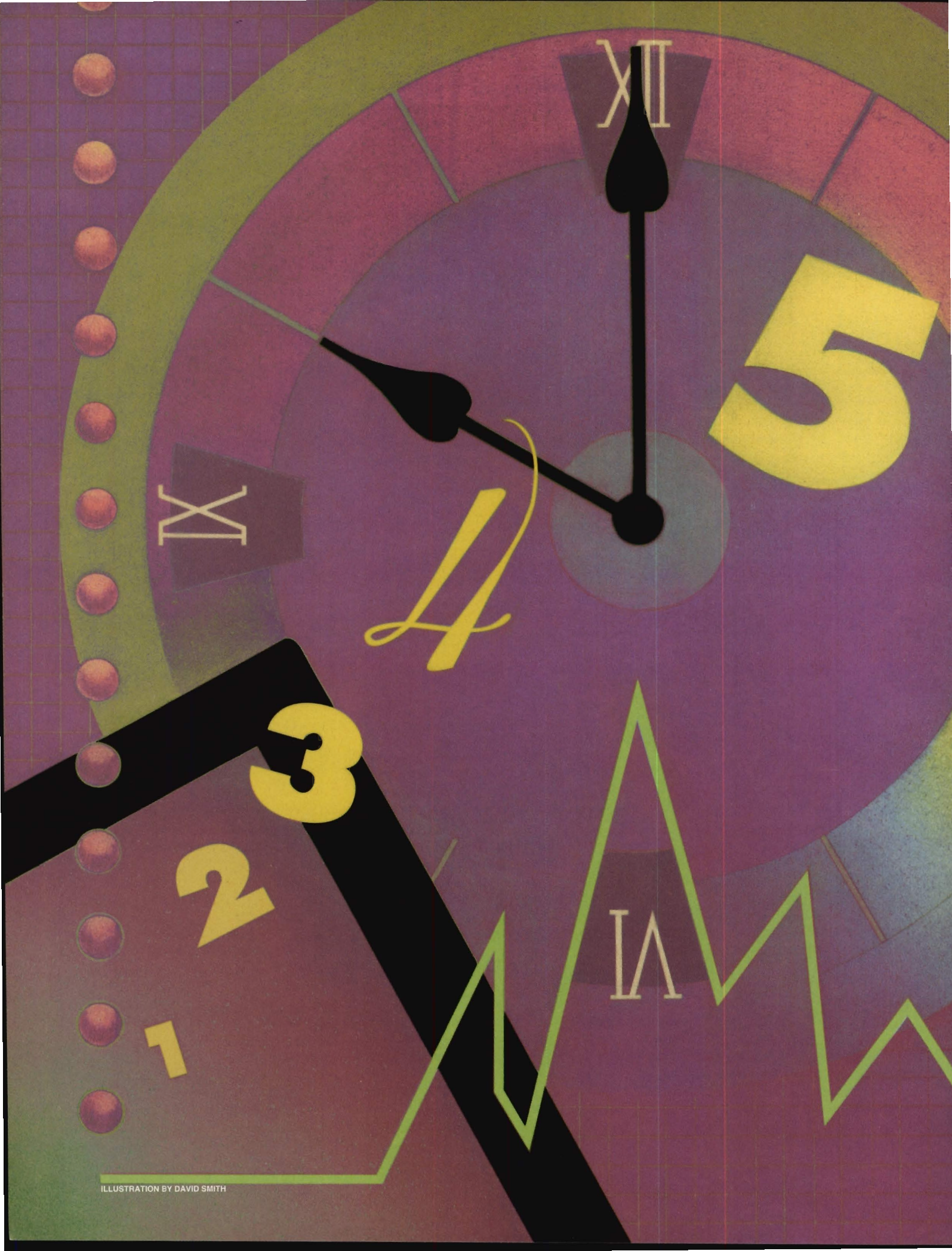

ILLUSTRATION BY DAVID SMITH

Behind the Green Lines:

6

Understanding the Color Signal

by Cecil Smith

The first article of this series reviewed how a black-and-white video signal can be measured with a waveform monitor. In this final installment of the series, we will look at the way that the color portion of the video signal can be interpreted with a waveform monitor and a vectorscope. Each type of test instrument has its use when measuring the quality of the color in the video signal.

Basic Parts of a Color Video Signal

As shown in Figure 1, a color signal consists of sync, a Y (luminance) component (the black-and-white signal that we looked at in the last installment) and a C chrominance signal (carrying all the color information); in encoded systems, they are all simply added together. In other systems, the Y (with sync) and C may be maintained as separate signals to be carried on separate cables. The chrominance signal conveys information about the hue and saturation of colors in the scene.

In the NTSC system (as standardized by the National Television Systems Committee of the Federal Communications Commission) used in North America, the color information is carried within a modulated subcarrier signal. The technique used is called Quadrature Amplitude Modulation; basically, a special form of amplitude modulation (AM) quite similar to the technique used in many radios. Within what appears to be one subcarrier signal, there are actually two subcarrier signals: One signal is in phase with the rest of the system (I) and the second is 90∞ (a quadrant of a 360∞ circle) out of phase with the rest of the system (Q). The two different subcarrier axes carry two different combinations of Red, Green and Blue (different, even, than the combination of Red, Green and Blue that is used to approximate the luminance).

The amplitude variations of the subcarrier represent the saturation of the color in the final picture. The instantaneous phase of the subcarrier (compared to a non-varying burst of subcarrier that appears at the beginning of each horizontal scan) determines the hue of the color in the final picture.

At this point, let's explore the effects of phase in a color video signal. Phase refers to minute timing differences between two signals of the same frequency of voltage variations. The two signals rapidly oscillate between a high peak voltage and a lower valley voltage: the time difference between a given peak (or valley) of one signal and the nearest peak (or valley) of the other signal is called phase. The 90∞ phase difference between the I and Q signals allows each unique combination of these signals to describe the amplitude and phase of a signal that can be "decoded" to display a particular hue and saturation.

Figure 2 shows the display of color bars on a typical vectorscope. Notice the two lines running diago-

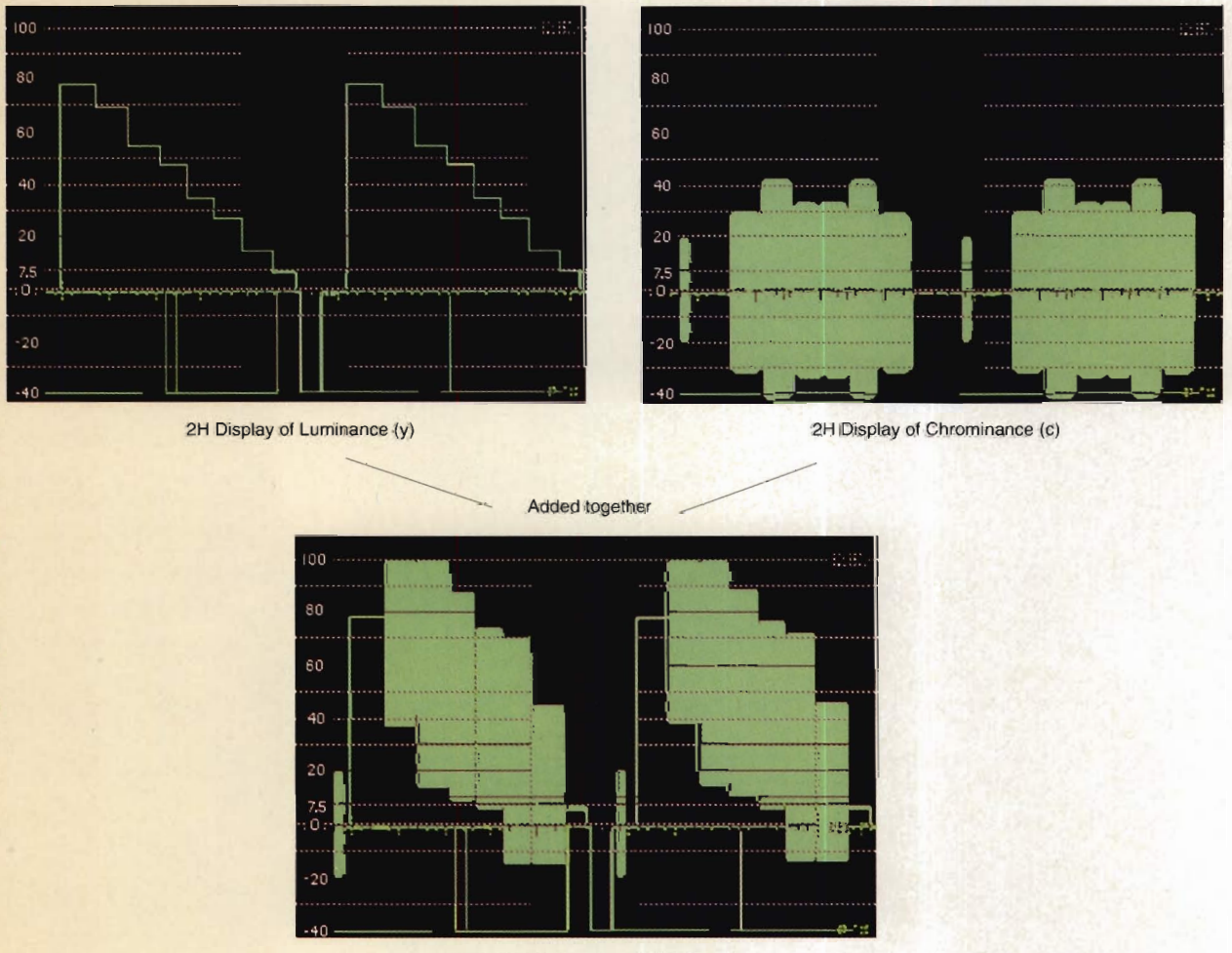

Figure 1: Luminance and Chrominance are added together to create an encoded NTSC signal.

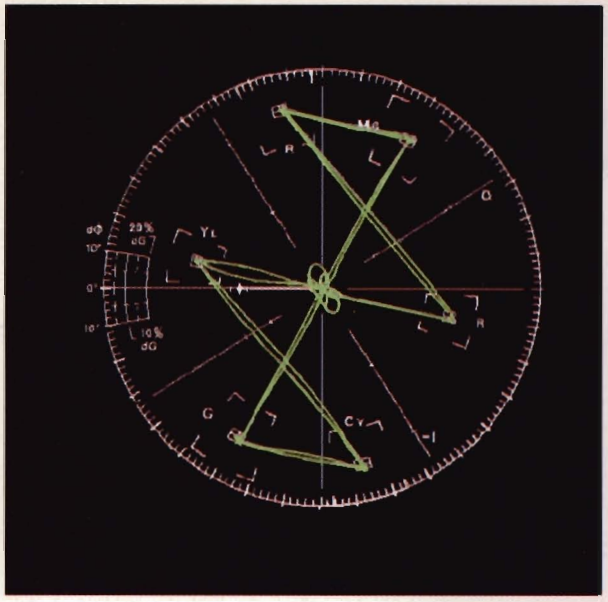

Figure 2: Vectorscope display of color bars

nally across the graticule that represent the I and Q axes of the video signal. These lines are used to make sure that the I and Q axes are separated by a phase of 90∞. (If they're not 90∞, various colors in a scene will not be accurately represented in the picture. This is an indication that a technician needs to adjust the quadrature phase of the encoder circuit.)

By now, you probably have a feeling that the axis around the circle (the polar) represents the phase in the chrominance signal (and hues in the picture). The distance from the center, in any direction, represents the amplitude of the chrominance signal (and the saturation of colors in the picture). Drawing correlation with the waveform monitor display and going around the circle in the counterclockwise direction is equivalent to going left-to-right across a small portion of the horizontal (time) axis of a waveform monitor. Distance from the center of the vectorscope display is equivalent to the maximum peak-to-minimum peak vertical signal voltage axis on the waveform monitor.

Examination of a real encoded signal shows that the subcarrier phase, the subcarrier amplitude and the luminance amplitude are constantly changing as each detail in a focused scene is detected and encoded. In the midst of all the radically changing electrical information, a constant phase reference must be provided to allow accuracy in the signal decoding processes. To provide this reference, the scene information from each horizontal scan is preceded by a "burst" of several cycles of subcarrier with a constant phase. (Actually, this burst is used to determine the phase of a regenerated subcarrier signal that is created in a decoder circuit. This regenerated subcarrier actually serves as the phase reference during decoding.)

Let's take a look at a vectorscope showing color bars. There are nine dots scattered about the screen: one for each of the color bars, plus the burst. You will probably not find separate dots for white or black because they are in the fuzz in the center of the circle. Following the lines connecting dots on the vector display, you can see the signal starting in the center with the Gray (or sometimes White) color bar, then go left and up a dot in the box marked Yl (yellow). You can now trace the signal from yellow to cyan to green to magenta to red to blue, and then back to the center, where black appears. The straighter the connecting lines, the less time is spent going between the colors, which is an indication of the color resolution of the encoder circuit. (Only a circuit designer has control over the straightness of the bars. There's nothing that a user can do.)

It may be confusing that black and white appear at the center of the graticule. A pure white creates no subcarrier, only a high luminance level. A pure black creates no subcarrier, only a low luminance level. As an experiment, look at what happens to a vectorscope and waveform monitor display when white balance is adjusted on a camera.

While we're on the subject of color balance, let's use the vectorscope graticule to examine the difference between color balance and phase (or tint) controls. Phase adjustments affect all of

Component Systems

Television systems that use component video tape formats use three separate signals to convey the information about one picture. The component signals are combinations of the luminance (Y), red (R) and blue (B) signals and abbreviated Y/R-Y/B-Y.

In practice, these three signals do not go through a distortion-producing encoding process. Instead, they are simply sent through a matrix that converts from R/G/B into Y/R-Y/B-Y without being imbedded in any special subcarrier signals. The bypassing of the encoding process is the primary reason why component systems can maintain a higher picture quality than systems using encoded or Y/C signals.

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the colors equally: If the red color bar is shifted clockwise by 15∞, all the other colors will be shifted by 15∞. The changes from a phase control affect the hue of all of the colors. Color balance, on the other hand, affects the relative amounts of red, green and blue in the chrominance signal. It affects the relative amount of saturation in various colors in the picture. If, for instance, the color balance adjustments in a camera are not properly matched to the light in a scene, the red channel might be adjusted too low. This would mean that any color containing red would lose some saturation: it would show up in the picture as a loss of saturation in the white, red and magenta portions of the scene, but would not affect colors that contain only blue or green.

Using a Vectorscope

The primary daily operational use of a vectorscope is to measure subcarrier phase and amplitude adjustments made to color television equipment for consistent color picture rendition. Such consistency reduces picture color shift problems when changing from one camera to another, or when editing video-taped scenes together that were recorded at different times or under different lighting or adjustment conditions.

Figure 2 shows that proper phasing of color bars using a vectorscope occurs when the burst is placed at 9 o'clock using the vectorscope's phase control and the subcarrier phase, chroma phase, or burst phase control on the color bar source adjusted until the dots describing the color bars fall within the boxes etched on the graticule. The small boxes on the graticule provide a centered aim point for the large boxes (which represent the color bar tolerances allowed by the FCC).

Caution should be exercised to ensure that the vectorscope is adjusted so that the displayed dot is in the exact center of the graticule when there is no color in the input signal. Without any signal applied, any vertical or horizontal centering controls should be adjusted so that the dot lands dead-center. Any time the dot shifts from the center when the signal is inputted, there is subcarrier frequency information within the signal. When subcarrier is detected in a signal where no subcarrier should be present, the signal is said to contain "residual subcarrier" and the condition should be corrected by a technician to assure accurate color rendition.

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Cecil Smith is a consulting engineer specializing in imaging and television systems, facilities and training. He is the author of "Mastering Toaster Technology: A Cure for the Common Video" *and* "Answers to Television Technology: An Encore."

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Encoding Standards

The NTSC standard established by the National Television Systems Committee of the Federal Communications Commission is used in countries where the U.S.A. exerted significant political influence immediately after World War II. All of the countries in North America have adopted NTSC as their television standard, as well as Japan, the Philippines, Guam, Puerto Rico and most other U.S. territories and possessions.

The PAL (Phase Alternation Line) standard was developed in the U.K. and Germany immediately after World War II. Needless to say, the countries that are now or formerly were in the British Commonwealth use the PAL color encoding standard.

In many pieces of literature, you may read that PAL uses 625 horizontal scan paths-per-field and 50 fields-per-second. This statement is not necessarily true. It is correct that the European countries use those rates, but other countries, particularly Brazil, use 525 horizontal scan paths-per-field and 60 fields-per-second. When making or transcoding a tape using the PAL encoding standard, double-check the scan rates.

In the '60s and '70s, the French and the U.S.S.R. were instrumental in developing the SECAM (a French acronym for Sequential with Memory) encoding standard. Again, the adoption of the technical standard was spearheaded by politics. The now-independent countries once part of the Soviet Union, the countries in the former Warsaw Pact, France and other places where the U.S.S.R or French exerted political influence adopted the SECAM standard.

There is no best standard. NTSC and PAL are easier to understand and use than SECAM. It is technically difficult to perform special effects when working with signals that adhere to the SECAM encoding standard—production is usually done in PAL, then transcoded to SECAM at the last possible moment. On the other hand, SECAM is a better transmission medium than NTSC or PAL.

Not all countries have adopted an official color television standard, and a few countries have not adopted an official television standard at all. It wasn't until the '80s that many emerging countries were able to afford the leap from black-and-white into color television.

The reasoning behind the political impact on color television standards is that the country that developed the standard can move into position to garner money associated with the rights to manufacture equipment that adheres to that standard. The same argument is also driving the U.S. adoption of HDTV transmission standards that are a technological leap ahead of any other transmission standard; hopefully, a leap that will meet our needs for another 40 years.

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Shoot Super Videos

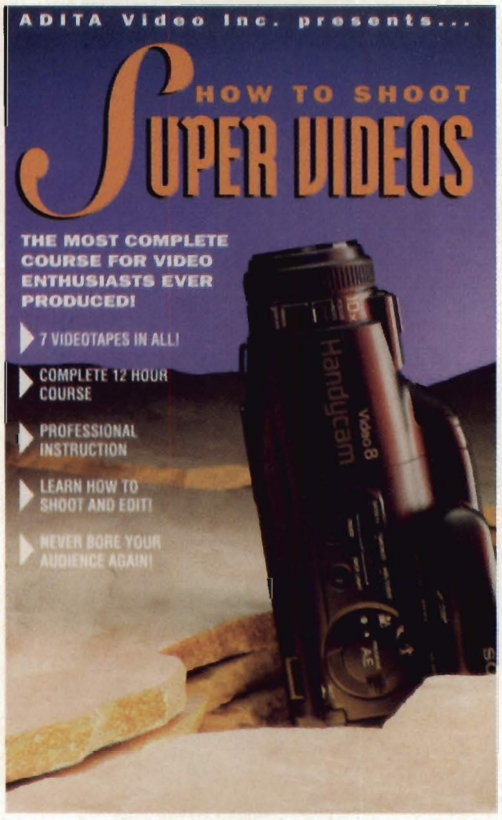
"How to" Video Series for Videographers

by Jim Plant

After seeing advertisements for this series of "how-to" videos in various video magazines (including *VTU*) for more than a year, my interest was captured. So when Myron Achtman, one of the producers of the *How To Shoot Super Videos* series, called to ask about the possibility of doing a review, I jumped at the chance to check them out. A few days later a box containing the entire set of tapes arrived at our editorial offices. After opening the box and seeing the seven shrink-wrapped, attractively packaged tapes, each one indicating a running time of 90 to 120 minutes, I suddenly realized that unless these tapes were really informative and incredibly interesting, there was no way I would be able to make it through the entire set. I'll spare the suspense by telling you that I was not disappointed. I watched every second of the series, and some parts I watched more than once!

Having been in and around the video business for almost seven years, I was tempted to skip the entry-level information and head directly for the advanced techniques. I'm glad I resisted this urge, as I found many valuable hints and tips even in the material directed toward beginners. While watching tape number one, for instance, I found myself watching the video with my camcorder in hand, saying, "Oh, that's what that button does!"

The information in this tape series is aimed squarely at the videographer using consumer, prosumer or low-end industrial equipment. In fact, the series was produced using relatively inexpensive industrial equipment and is a remarkable testimony to the high production values that can be achieved when you learn the techniques taught in this collection. What makes it even better for *VTU* readers is the fact that the Video Toaster and other third-party Amiga graphic programs are used extensively for graphic elements, backgrounds, and CG and transitional effects.



This tape series is aimed squarely at the videographer using consumer, prosumer or low-end industrial equipment.

The *How to Shoot Super Videos* series consists of seven professionally narrated tapes covering the following topics:

1. "Know Your Camcorder and Video Fundamentals" (90 minutes)—This tape covers the general features of most camcorders, with examples of how each feature affects your video and information on how to achieve the best results in a variety of environments.
2. "How to Shoot Video Like a Pro" (90 minutes)—Tape two looks at some of the creative aspects of shooting video, including image composition and the fundamentals of form, color, texture and line.
3. "Continuity and Combining Shots" (120 minutes)—Tape three focuses on the storytelling techniques used to effectively communicate with video. It includes an introduction to the "grammar" of video, or what messages are conveyed by camera movements like zoom, pan and tilt. Also covered is how to avoid some of the movements and actions that plague amateur videomakers.
4. "Lighting Techniques and Recording Sound" (90 minutes)—This is one of the most valuable tapes in the series. It offers instruction on the proper lighting and audio techniques needed to achieve professional-looking and professional-

sounding videos. It includes many real-world examples of shooting in a variety of light conditions: indoors, outside, in bright sunlight, in low light, etc. This tape also demonstrates several types of microphones with instructions on which ones to use for different conditions and how and where to place them for optimum results.

5. "Basic Editing with Consumer Gear" (90 minutes)—Tape five introduces the viewer to the subject of basic editing, including the fundamentals of how audio and video are recorded and how to manipulate that information with the equipment's built-in editing tools.
6. "Intermediate Editing with Prosumer Gear" (90 minutes)—Tape six increses the level of instruction to cover more advanced editing techniques using equipment from the upper end of the consumer video spectrum.
7. "Advanced Editing with Professional Gear" (120 minutes)—Tape seven was probably my favorite tape in the series. It demonstrates the use of the Video Toaster and other gear in an industrial-level A/B-roll editing environment. It also discusses time base correctors, time code, EDL and other advanced video subjects.

For those recently entering the video production business, I highly recommend purchasing the entire set. You will be able to compress years of hands-on experience into a couple of weeks of study and application. Even if you've been in the business for a while, you could definitely benefit from the *How to Shoot Super Videos* series. The tapes sell for approximately $40 each, or you can purchase the entire set for $175.

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FOR INFORMATION CIRCLE 104

SoundSwitch

Audio-Follow-Video Transitions Made Easy

by Frank Kelly

"Anyone using the Toaster for video production will understand the need to manipulate audio from one or more sources."

They say that good things come in small packages. That philosophy was certainly in mind when SunRize Industries (makers of the AD1012/516) designed the SoundSwitch sound mixer for the Video Toaster. Despite its small size and rather plain appearance, the SoundSwitch packs powerful features, such as audio-follow-video and control of its inputs and outputs via ARexx and MIDI.

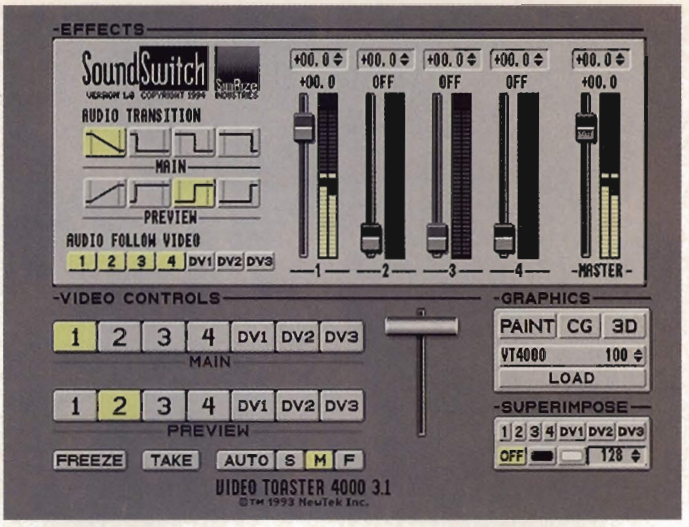
Anyone using the Toaster for video production will understand the need to manipulate audio from one or more sources. In most cases there are several ways audio is used in video editing. One of the most common methods is to take prerecorded audio (such as a narration with musical background) and record it onto the audio tracks of an edit VTR, then insert appropriate video segments according to specific cues in the audio. This method does not allow a great deal of flexibility when it comes to adding dialogue or natural background sound that would have been recorded on location. When editing multiple sources that contain their own audio, it can be awkward to manually create an audio transition while performing the edit, so that the audio "follows" the video precisely during the transition. This is one of the reasons the "audio-follow-video" feature is so desirable when selecting an audio mixer for video production.

Traditionally, these specialized audio mixers would either communicate with the edit controller via serial commands or be triggered via a General Purpose Interface (GPI) signal at the edit point. While more recent MIDI-controlled mixers have been supported with computer-based edit systems such as TAO's Editizer, these units often carry a high price tag and are laden with options that most video suites would never use. SunRize supports automated mix down with its AD516/1012 digital audio boards. But it requires a special software module, fancy ARexx scripting or Blue Ribbon SoundWorks' Bars n' Pipes Professional. While "audio-follow-video" transitions can be accomplished with this setup, it is somewhat complicated and not a cost-effective solution for those who only want to do a simple audio transition at the edit point without using specific time code references to manipulate audio levels or source selections. For owners of the AD516/1012, there is a specific software module that ships with the SoundSwitch for seamless integration with other software that supports Toaster edit control of soundboards such as Amilink. This module also provides special MIDI implementations and saving of file settings such as the "snapshot" feature. This allows separate volume-level presets for trim settings to be stored for different inputs to the mixer and restore them when the program first loads. Through ARexx scripting you can automate nearly every feature of the SoundSwitch. This should be invaluable for those working in multimedia applications such as kiosks or cablecast info-channels.

The SoundSwitch hardware installation is a snap. It uses a cable attached to the Amiga's external floppy port, and provides six stereo pair inputs along with one stereo pair output. Standard mono phono plugs are required for all audio connections, and SunRize provides RCA-to-phono plug adaptors for four stereo inputs and one stereo output.

Both balanced and unbalanced inputs can be used, as the SoundSwitch will auto-detect the levels and adjust accordingly. However, sound sources such as microphones and turntables require pre-amplification to bring them up to line level before they can be used.

SoundSwitch software is installed using CBM's installer and takes only a few minutes. Once installation is complete, simply launch your Toaster as usual and it automatically loads the SoundSwitch software. To control the SoundSwitch, click on a small speaker icon that appears just to the left of the effects bank selection buttons on your main switcher screen. The control software takes on the appearance of a conventional mixer, complete with sliding faders to control volume levels and trim adjustments. The trim adjustments are used to bring all levels up to zero dB for matching transitions during audio-follow-video edits. During transition edits where the SoundSwitch follows the video, levels for the selected video source are either completely muted or full volume until the transition takes place. You have the option of pre-selecting whether the transition occurs at the beginning, middle or end of the current Toaster effect. Crossfade between two channels is the default selection when the dissolve transition is selected. Duration of the audio transition is completely dependent on the pre-set time of your Toaster's transition.



SoundSwitch software is installed using CBM's installer and takes only a few minutes.

Although SoundSwitch (list price, $499) represents a boon to desktop producers because of its small size and impressive functions, some features usually associated with top-flight mixing consoles are absent here, such as stereo panning and equalization. However, SoundSwitch's audio performance is excellent, with no noticeable deterioration or distortion of the audio signals. Amid an ever-increasing demand for more of our desktop real estate, it's refreshing to have a product such as SoundSwitch that offers so much functional quality in such a small package.

VTU

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MaxDOS 2.0

The Macintosh/Amiga File Transfer Solution

by Frank Kelly

There's a crash edit project that just fell in your lap. It's an important job and you could use the money; the only problem is that the client has a ton of graphics in Macintosh format on a SyQuest cartridge and wants them made into framestores. "Money is no object, just get it done by tomorrow," the client says. The client doesn't necessarily know or care that you don't own a Macintosh—his only concern is meeting a deadline. This situation may not be an everyday occurrence, but as the lines blur between computer platforms and file formats, there will be times when files such as fonts, texture maps, graphics or documents will need to be shared by each other.

While Macintosh and Amiga computers share similar technologies such as Motorola 68XXX series processors and both can use the Small Computer Standard Interface (SCSI) for data storage, they have completely different operating systems and native file formats. Your mission (should you choose to accept it) is to get files from one platform to another.

Conversion Programs

Once transferred, you can use various Macintosh or Amiga conversion programs to translate these files into appropriate formats. For example, there's a utility included with the Toaster software called "LOADPICT" that allows ToasterPaint to read Macintosh files saved in PICT file format. There are other packages that support translation or direct loading and saving in other computer file formats such as Art Department Professional, ImageMasterRT, ImageFX and Photoshop. While these programs are excellent at what they do, they don't transfer the files from one computer's file system to another. Without a Mac emulator such as Amax or Emplant, this process can involve a tangle of cables, another computer, communications software and/or modem transfers.

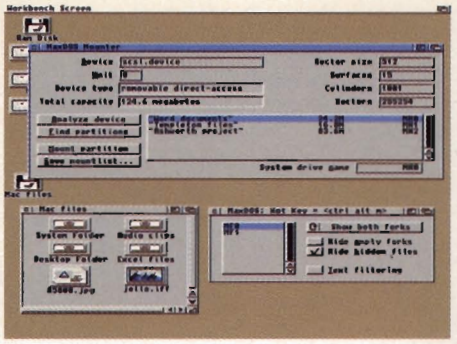
"Once installed on your SCSI-equipped Amiga, MaxDOS can be used to mount, and then directly read from and write to, native Macintosh-formatted hard drives and removables."

Foolproof Answer

Even with emulators, direct reading and saving of files to Macintosh-formatted removable drives (such as SyQuests) and large storage hard drives is not effortless or foolproof. In some cases it's not possible at all because of poor or non-existent support of various disk partitioning methods used on the Macintosh platform. Thankfully, there's a more complete, affordable and much easier solution: MaxDOS 2.0 from Media4 Productions.

Once installed on your SCSI-equipped Amiga, MaxDOS can be used to mount, and then directly read from and write to, native Macintosh-formatted hard drives and removables. CD-ROM drives are fully supported for read-only transfers. Those with high-density floppy drives will be able to access and write to Macintosh-formatted high-density floppy disks. The 800K Macintosh floppy disk format is not supported because of the variable speeds required during reads and writes.

MaxDOS's Mounter automatically recognizes Amax- or Emplant-



MaxDOS allows you to read and write to the Macintosh.

formatted partitions of AmigaDos volumes. The Mounter also allows you to select which SCSI device to access and whether to immediately mount it on the Workbench. You have the option of generating and saving the device to a mountlist so that the next time you start your Amiga the drive is already available to the AmigaDos file system. MaxDOS's Controller module allows you to select which types of Macintosh files are visible from AmigaDos.

All Macintosh files contain two components: the Data Fork and the Resource Fork. When displayed on the Macintosh, only one file is visible. Using MaxDOS, both are available as separate files to AmigaDos. The resource fork is roughly equivalent to the AmigaDos Info file. It contains icon, sound and other information specific to Macintosh's HFS file system for icon display and sound resources. The most important information during most Mac-to-AmigaDos transfers dealing with graphics files is contained in the Data Fork.

Immediate Results

The MaxDOS program falls into the category of "utilities." Many magazines do not review this category of software because it does not offer much complexity or glitz. However, if you think you may need a way to transfer files between Macs and Amigas, don't overlook MaxDOS because it's too simple or inexpensive. In my book, the mark of a good program (utility or otherwise) is how quickly it becomes invaluable to the user. In the case of MaxDOS, it meets that mark and goes a bit further by allowing you to both read and write to the Macintosh file system from Workbench or your favorite file utility (mine is Directory Opus). In my video production business I am frequently called upon to do transfers between file formats such as Mac, IBM and Amiga. For my Amiga/Mac needs I have used a combination of Amax, ASIM CDFS and some shareware to accomplish the tasks as needed. With MaxDOS, the process of transferring large amounts of file data between the Mac and Amiga is practically effortless, and it has become an indispensable tool for my Toaster system.

VTU

Frank Kelly owns and operates Spot Productions in San Jose, Calif.

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Nitro-VLB

Increased Render Speed with New MIPS-based Solution

by Erik Flom

When properly configured with ScreamerNet, the new Nitro-VLB card from ShaBLAMM! Computer Corporation is a exceptional choice for LightWave users in need of additional rendering power. It is a MIPS R4600 RISC processor with 32MB-15ns EDRAM on a single VESA Local Bus card that can also be easily employed as another "Screamer CPU" in any currently operating ScreamerNet. In preliminary tests, it renders an average of three times faster than a 40MHz '040—some tests showed improvements of up to four times (an average of 8-10 times faster than a stock Amiga 4000). It is also bundled with WindowsNT (necessary for ScreamerNet), so programs such as Elastic Reality and Real3D can easily be run at workstation speed. In the near future, when LightWave's Layout and Modeler become available for the MIPS processor, this computer will be ready to run it.

Since the Nitro-VLB is a single Local Bus board, it needs to be plugged into a 386/486 motherboard that has a VESA Local Bus (VLB) slot. VLB computer (386, 486, Pentium) owners can plug this board right into their computer. Once the software is installed, the ShaBLAMM! will peacefully co-exist with any of the software already installed on your machine, allowing you to continue using any DOS or Windows applications. (Amiga users who don't care about Windows or PCs needn't fear, just keep reading.)

Transferring control to the Nitro-VLB is as simple as typing "STARTNT" from the DOS prompt. (It's also easy to configure the ShaBLAMM! system so that it boots directly to WindowsNT, completely by-passing the DOS prompt.) When the MIPS R4600 processor is engaged, the x86 is disabled and the Local Bus is used to communicate directly with peripherals, such as SCSI, VGA and Ethernet cards.

By supporting the more common ISA and VESA Local Bus (VLB) standards, it's possible to choose from a wide array of low-cost peripherals available for the PC. In fact, the system I tested (using an AMD 486-40 and off-the-shelf components) could be assembled for under $5,000, including the ShaBLAMM! card. The test system for this review consisted of the 100MHz Nitro-VLB with 32MB RAM, a generic clone motherboard with an AMD 486DX-40 CPU, 4MB system RAM, BusLogic SCSI Controller, Toshiba 3401 CD-ROM, 1GB and .5GB SCSI HD, Intel Ether16 Ethernet card, 14-inch VGA monitor, mouse, keyboard, 3.5-inch floppy, 2Ser and 1Par. I/O, all running in a mini-tower case with little heat build-up.

The minimum system configuration is any x86 VLB computer, 4MB RAM, a 200MB HD (IDE or SCSI, but remember, you'll need a CD-ROM player to install WindowsNT from the included CD-ROM unless you can install it from your network), VGA display, mouse and keyboard. Complete systems suitable for use with the Nitro-VLB can be purchased for about $1,000. The major limitation is that all peripheral cards (e.g., Ethernet, SCSI, sound) must include support for WindowsNT on the MIPS processor. This, however, merely limits the range to choose from; it doesn't eliminate any necessary components. The WindowsNT CD-ROM includes drivers for a wide range of products, and a list of compatible hardware is also available from ShaBLAMM!

Configurations

The Nitro-VLB card itself, including a 100MHz R4600, 32MB-15ns TrueCache RAM and WindowsNT license, costs $3,045. This includes the board, WindowsNT on CD-ROM and a comprehensive, step-by-step manual. By the time this article is printed, ShaBLAMM! should be shipping the 133MHz version for $3,495. Other listed configurations running at 150 and 160 MHz have been reliably tested, but have been delayed due to lack of availability of CPUs.

When configuring a new system or generic configuration, installation is simply a process of following the instructions in

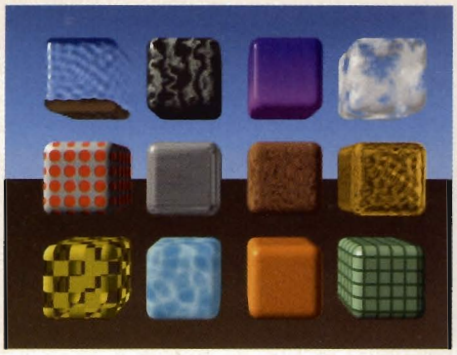

Fig. 1: Standard textures scene. Medium anti-aliasing, no tracing options.

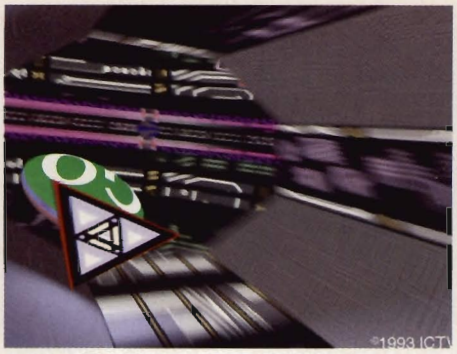

Fig. 2: Segue animation for Interactive Cable project. Uses motion blur, no tracing options.

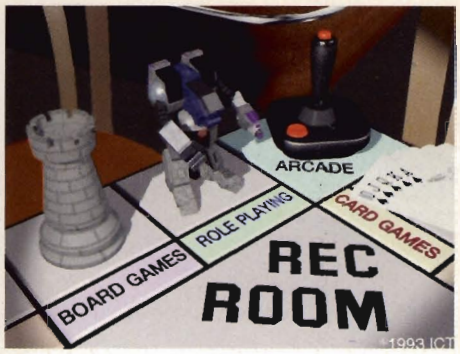

Fig.3: Top level of Interactive Cable project. Uses motion blur, no tracing options.

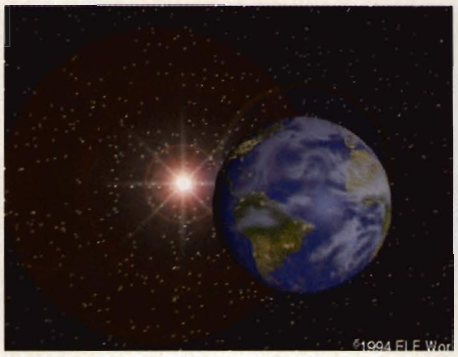

Fig.4: Field-rendered fly-in from space to Earth. Uses field rendering, no tracing options.

Fig.5: An homage to "The Renderman Companion," using motion blur, trace shadows and trace reflections.

Fig. 6: Featuring plenty of double-sided glassware, the image uses shadow mapping and trace refractions.

the 32-page manual and accepting the default options. Step-by-step instructions guide you through the various settings that must be checked. Like the Toaster in an A4000, the Nitro-VLB is a thick board, and will block an adjacent VLB slot. (Since it will work in any VLB slot, you can solve this problem by using the first one, closest to the x86 CPU, leaving any other slots free.) Since the board communicates with all peripherals through the Local Bus, no external or internal cables need to be attached. The onboard fans get power directly from the Bus. (Yes, there are two fans on the Nitro-VLB: one on the main CPU and another small one blowing on the RAM SIMMs.) A pre-configured system with a 100MHz Nitro-VLB already installed was used for the purposes of this article. However, after reading the manual, I would confidently say that anyone who feels comfortable upgrading their own computer hardware would have no trouble installing this card and setting up WindowsNT for MIPS.

It's likely that only the most complex system configurations will require any special user input. As an example, I had to install a network card in the test system to use ScreamerNet. Installation consisted of plugging the card into an empty slot, confirming the card's internal settings with the supplied diagnostic software, loading the appropriate driver in the window's "Network" control panel, and restarting the system.

And for those who would rather not even worry about trying to configure their own system, there's at least one mail-order house (Anti-Gravity Products) that is planning to offer a turnkey ScreamerNet-ready box. All you have to do is take it out of the shipping box, install an Ethernet card and ScreamerNet software in your Amiga, hook the machines together, and "voila!" an instant render-farm. Need more power? Add more boxes—up to eight with the current release of ScreamerNet. And, while untested, there's no reason the new box from Anti-Gravity (codename: Rendersaurus) shouldn't live happily alongside any currently installed Raptor or Screamer workstations on an existing network. (Rendersaurus and

SPEED TESTS

Scene Name	Amiga 4000 40MHz 040	Nitro-VLB 100MHz	Comments
Fig. 1: Texture Examples	8:42	3:12 (2.7x)	Med Res, MedAA (8), 9:24 on A4000
Fig. 2: Arcade	16:06	4:26 (3.65x)	Med Motion Blur
Fig. 3: Rec Room	12:08	3:08 (3.9x)	Lots of Shadow Maps
Fig. 4: Earth	9:06	3:12 (2.87x)	Field Rendering On
Fig. 5: Bowling Pins	3:03:09	49:00 (3.73x)	High Motion Blur, Trace Reflection, Trace Shadow, 43:00 On Original Raptor, 29:12 On Raptor+
Fig. 6: Test Tubes	1:15:19	22:202 (3.37x)	Trace Refraction, 1 Shadow Map

Raptor are just clients as far as ScreamerNet is concerned.)

Probably the hardest part of testing the whole system for this article was getting the TCP/IP network software configured on the Amiga. At press time, ScreamerNet was still sold as a Beta product (current customers will receive the final version when it's released), so installation instructions were sketchy. However, once I received the correct documentation, configuring the network was quite simple.

Network installation should be fully automatic by the time ScreamerNet is officially released. Until then, NewTek technical support can help with any configuration problems you might encounter. ShaBLAMM! technical support is also actively training in Amiga networking, so if problems arise with the Nitro-VLB, your questions should be answered quickly and efficiently.

Searching for Speed

Once the computers are networked, running ScreamerNet is a two-step process. First, you have to run LightWave for MIPS on the Nitro-VLB card. This is currently done by invoking the program from the windows equivalent of the command line. The command takes the format "LW <name> <ID>," where "name" is the word LW uses to log onto the network and "ID" is a number from 1 to 8 that designates which "Screamer CPU" it will appear as. There's no reason all this information couldn't be contained in a PIF file, allowing you to run it with a simple mouse click. I'm sure the release version of LightWave for Windows will include a standard "Setup" utility that will take care of most of the dirty work.

When "LightWave for MIPS" is run, a status window will open up on the WindowsNT screen, allowing you to watch as information is transferred and the scene is rendered. On the Amiga side of the network, the Nitro card will appear as a "Screamer CPU" in the slot designated by its ID on the ScreamerNet control panel. Documentation for using the ScreamerNet control panel is included with every copy of LightWave 3.5.

As mentioned at the beginning of the article, rendering speed is 3-4 times the fastest '040 rendering stations now available. The Nitro-VLB uses an exclusive TrueCache DRAM configuration that accelerates operation by giving all system RAM (up to 32MB) an apparent access speed of 15ns. ShaBLAMM! claims this is like turning all your system memory into cache memory, delivering "zero wait states to the RISC processor." Due to current availability, the board is limited to 32MB, using the 4-72 pin SIMM slots on the Nitro card, though larger configurations will be available in the future. However, since LightWave on the MIPS uses segmented rendering, most people will run out of RAM on their Amigas before they do on the MIPS machine. (One "bug" of ScreamerNet is that it allocates memory for the entire rendered image in Amiga RAM. The larger the image, the bigger the buffer required in RAM.)

Nitro-VLB uses an exclusive TrueCache DRAM configuration that accelerates operation by giving system RAM an access speed of 15ns.

In short, the Nitro-VLB is a strong foundation for the "next generation" workstations LightWave renderers and 3D artists will need. By placing the key components on a single board, much of the cost of the dedicated workstation is eliminated, providing for a truly configurable workstation with unparalleled price/performance. Taking advantage of WindowsNT's Hardware Abstraction Layer, ShaBLAMM!'s Nitro-VLB allows anyone with a VESA Local Bus computer to use their current hardware, saving hundreds to thousands of dollars. For those entrepreneurs making their initial foray into the world of the PC workstation, there is the benefit of being able to purchase hardware that is both affordable and far more resaleable than the more expensive SGI fare.

Through this configurable solution, those interested in pure rendering power can buy minimal systems, while artists who want to use the MIPS for applications such as Elastic Reality and Real3D can purchase full workstation power with a minimal investment. VTU

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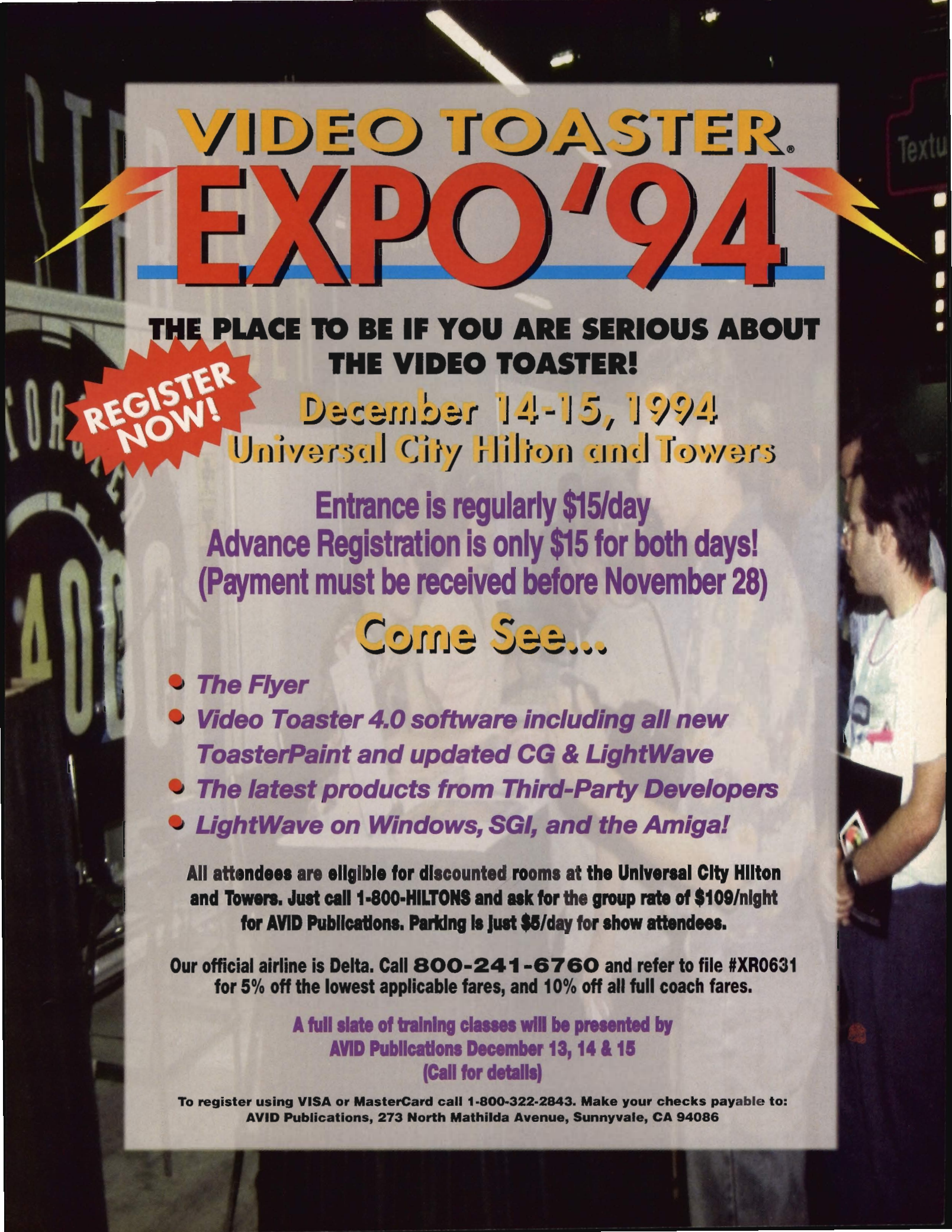
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Creating Cel Animation

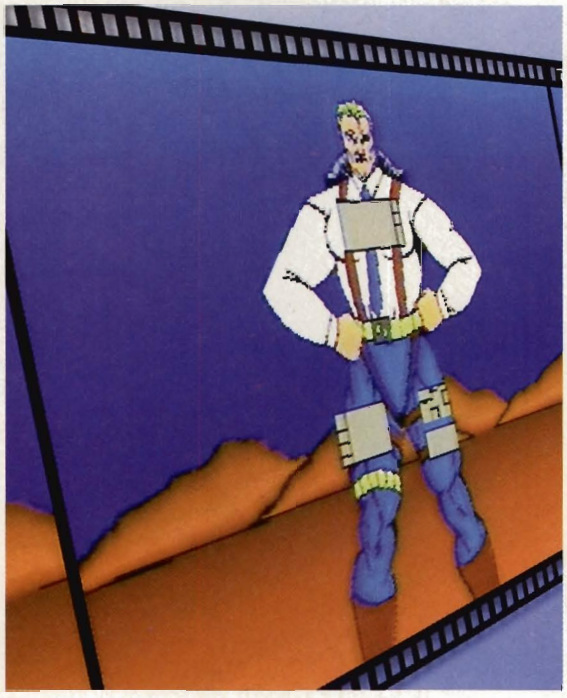
2D Toons Are Here to Stay

by George Avgerakis

Looking through the "Gallery" sections of the current graphics and video trade magazines, I noticed plenty of outstanding 3D renderings and reflected that it was only 12 years ago that I paid $45,000 for the first "industrial grade" 2D animation system (The Via Video One). It was limited to 16 colors on screen from a palette of 256. It ran on a file cabinet-sized Cromemco CPM computer (this is before DOS). My animators at the time, Drew Fishman, Rob Roesler and Allen Reid, stretched that system to the limit, culminating in the creation of a series of 2D animated children's tapes that sold more than 200,000 copies in Kmarts and Toys R Us stores nationwide. Back then, the ziggurat of our pyramid was Disney animation. Instead of ray tracing, we talked about "characterization." But eventually the hardware race began and we all went our separate ways.

Things we only dreamed about in 1981—low-cost 3D capability, millions of colors, ray tracing, bump mapping—have become commonplace desktop attributes. Today's animators aim for different peaks, but occasionally our shop gets called with a request for "that old-fashioned-type animation, you know, cartoons." The Disney name is still quoted, but often along with *X-Men* and series creators Marvel Comics Group.

I began wondering if the Toaster could be used for traditional cel-style animation about the same time veteran animator Allen Reid returned to show off several *X-Men*-styled drawings.



"Things we only dreamed about in 1981—low-cost 3D capability, millions of colors, ray tracing, bump mapping—have become commonplace desktop attributes."

Allen rekindled a dream we had of rendering his complex, muscle-bound characters to motion video. Coincidentally, a new client was asking for something exciting, so we pitched the idea of a "Saturday morning" cartoon and they commissioned us to begin. Our lessons are detailed here so that perhaps you, too, will take an interest in continuing this grand tradition.

The Cel Technique

If you've tried the Disney Animator program, you'll have some background in the technique that, since Walt Disney first created Mickey Mouse in 1928, has been known as cel animation. The name comes from "celluloid," which was employed as a transparent surface upon which different images were printed. Each frame of film in a cel animation might require several layers of cels, each representing a different moving part of the frame, all laid over an opaque-colored background.

For instance, if you had Mickey running across a wooded scene, the background might be the trees. Mickey's body would be painted on the first cel and laid over the background. Then separate cels might have Mickey's arms (pumping through a loop of arching motions), Mickey's legs (cycling through a loop of running frames), and finally, in the top cel, any foreground images, such as a tree passing between the camera and Mickey. A tradi-

tional cel animation like *Fantasia* or *Snow White* had millions of cels.

As computer animators, we can take a step backward technologically and employ the cel technique for creating characters, and then leap forward into the desktop video world to manipulate and combine these cels in the Toaster. We took the idea another step forward and experimented with loading the finished Toaster frames into D-Vision Pro, a non-linear editing system based on a PC platform.

Step One: Pencil and Paper

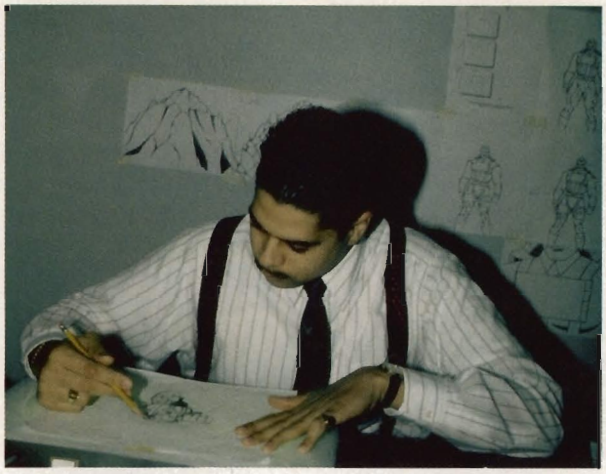
One reason motion pictures take so long to complete is the costs involved. You might dream of a spectacular story, but if you know that it will cost hundreds of millions to make, you tend to procrastinate. Cel animation begins with the cheapest, humblest materials: your ideas, a pencil and paper.

Begin with character and background sketches. A separate drawing (maybe several) should be designed for each character. In the margins, add notes that help you remember the attributes and personality traits.

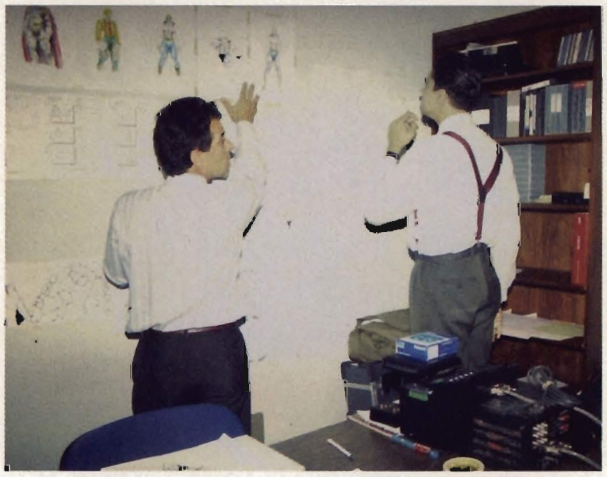
Once you've locked into the basic designs, convert the drawings to simple outlines. You'll find that simple line drawings that capture the essence of your character are easier to maintain over the hundreds of drawings you will need to create. The details can be re-incorporated later, using the automated routines of the computer.

At this point, you begin creating the cels, which are drawn on simple white paper using a soft black pencil. Drawing cels requires some basic tools and materials in addition to the paper itself. To assure that each drawing will match or register with previous and successive drawings, you must have a means of securing your current drawing over the last one you completed. A simple pin register made of metal or plastic can hold specially punched paper. Tape the pin register over a light box and the light allows you to work through two or three layers of paper at once. By using the previous drawing as a guideline, you can pencil the next drawing accurately.

An animation movement may be made smoothly by advancing the action just a bit from cel to cel. You can speed the action by advancing the action by a greater degree. Keep in mind that only the part of the drawing that changes need be drawn into the next frame. For instance, if a character moves past a stationary background, you only have to draw the background once. If a character's legs are moving to make him walk, but the rest of the body is not changing, you only have to draw the body once and create just enough leg positions to make one complete step cycle.



The first steps of cel animation use inexpensive materials: pencil, paper, light table and registration pins. Animator Allen Reid checks registration details of two paper cels of a foreground image of his "superhero" character.



Animator Allen Reid (right) discusses designs with author. These pictures are the preliminary storyboards and character sketches that were shown to the client prior to the cel stage.

Of course, to take advantage of the technique, you must carefully lay out your work and analyze the necessities of each finished frame. This is done on a sheet of graph paper called the "animation plan." Each horizontal line refers to a cel element (not a frame). A first frame composed of a background, a character and a pair of running legs will have three horizontal lines, thereby telling the animator to unite three elements into frame one. Frame two will have the same background and the same body but a different set of running legs, so it would have only one line on the animation plan. Always begin with the background drawing and work forward.

Once a significant amount of frames has been completed, you may wish to create a test of the movements. This "pencil test" may be accomplished simply with a non-linear editing system. We used D-Vision Pro (D-Vision Basic will suffice—NewTek's soon-to-be released Video Flyer can be substituted for any non-linear editing references in this article—of course, since you do not require time code or multiple audio tracks of D-Vision Pro) to capture each cel from a rostrum camera. You can use any camera secured firmly over a table and light source.

You could also create a pencil test by using a single-frame controller and recording the frames on a VCR. However, the non-linear system allows you to easily create loops of cel sequences. Instantly, you can "cut and copy" single frames to create elaborate sequences, thereby saving a lot of time and wear on your VCR.

The Fun Part

Once you have completed all your drawing, you are ready for the computer part of the job. Our in-house animation team consulted with some old time pros at this stage in the game. We received solid advice from computer animator Carmine DeFalco and cel animators Brian O'Connel, Sal Butta, Arnold Martino and Al Stahl (who created classics like the opening sequence to the television show *The Honeymooners*). Al was fascinated by the computer capabilities, but informed us that traditional animators would next proceed to the inking stage.

This process entails two steps. The first is to copy, either by hand or photocopier, each paper cel to real, transparent celluloid sheets. Next these sheets must be colored using special

cel inks. Inking is still done on many high-budget animations today, but it is a labor-intensive operation and a lot of the work goes to Asia, Russia and the Third World, where skilled artists work for pennies an hour. Al showed us some shortcuts using our photocopier and we showed him how we might try to ink on the Toaster. We timed each other for the fun of it and Al was mighty fast and mighty talented, but we already owned the Toaster, and Al, a seasoned master, would have blown our shoestring budget.

With the Amiga, you can accomplish three inking routines at once. You can convert your pencil drawings to high-contast RGB framestores, color the frames, combine them with the backgrounds and store them for later rendering to tape.

As you may know, if you've ever tried to use the "fill" command in a frozen Toaster image, there is no such thing as a captured solid color. Even dead black, when captured in TPaint, is composed of several colors. If you try to fill this area, you get pixilated garbage. Hopefully, a re-worked TPaint (due to be a part of the 4.0 release this month) will remedy this, but for now, there's a quick remedy that results in a black-and-white line drawing that has just two colors.

Enter Art Department Pro

Art Department Professional (ADPro) from Elastic Reality has a picture conversion utility that makes it easy to convert your multi-shaded pencil drawing into high-contrast black-and-white line art. The newest version (2.0) even allows you to directly import and export Toaster framestore files. Return to the switcher and multi-task over to ADPro. If your RAM is large enough (we had 8MB and it worked fine; if not, you'll have to shut down the Toaster first), you can convert all your drawings and multi-task back to the Toaster for inking.

Editor Anthony Gargano, (background, right) feeds Animator Allen Reid (foreground, left) finished animation framestores from the Video Toaster to the D-Vision Pro system. D-Vision Pro is shown here running on an IBM PS/2 system. The left monitor shows individual frames of the animation, while the right monitor shows an edit list management grid.

Converting the pencil drawings is simple. Take the register pins and place them under your rostrum camera. Adjust the camera's zoom and focus controls until the white paper just fills the frame (be sure to judge this in overscan). Enter the Toaster's switcher and freeze the frame. Enter ToasterPaint and under Prefs select the DVE buffer (which is checked as active) and bring the frozen frame into TPaint as a four-field capture. Now store the frame as a "framestore" file. Repeat this routine as many times as your project requires or as your memory will hold.

In ADPro, load a framestore and move to Palette Edit. The first color in the upper left corner represents the white area of the line drawing, so change it from black default to white. The second color represents the black lines. Adjust the second color to about a 16 blue, zero red, zero green. Do not make them black.

Exit the palette editor and lock the palette. Now convert the drawing to a two color framestore and resave it under the same name in your Toaster Framestore directory. Repeat this step for as many frames as you need.

Now return to TPaint. When you call up the line drawing, you'll find that you have a white background and a dark blue line drawing. First check that all the areas you want to fill with color are properly closed. If a gap in the line exists between areas between the interior of the character and the background, the fill will go out of control and color where you don't want it. If this happens, stop immediately. Hit the undo button and you'll be back where you started. Fix the hole and proceed.

If you are working on a background drawing, you can fill in the whole picture and save it. Allen Reid, our animator, prefers to save everything in RGB until it is ready for rendering to tape. Allen noticed that if you save in framestore, then call the picture up for later changes, the solid color areas come up spackled with random colors. This is because "framestore" saves the picture as a D-2 video frame, not as a bitplane data file. While framestore is the best way to display a frame for video, it is not preferred for repainting, since the Toaster must approximate the video information back into numerical bitplane information. The result is the same as if you'd captured the frame from a camera. Save to framestore format only when the frame is finished.

Once you've completed your background you are ready to color and assemble your foreground elements. Here, your animation plan comes back into play as you bring each line drawing associated with each line of plan onto the screen. Let's assume Frame No. 1 calls for a body with running legs over a jungle background. Line one of the plan requires the background, which we've done and saved. Line two calls for Body: Frame one without legs. Line three is frame one, legs only. It's easier to begin painting the foreground elements first, so call up the legs. Color the interior and then black out the background to 0,0,0 black. Next, go to the Brushes and select No Background. Now, click in the lower right hand box so that you see the X-Y coordinate display. This is important, since it will assist in keeping all your drawings registered to each other.

If you're guessing ahead of me, you'll

soon understand that we're going to put the legs on the body and then put the body on the background. Our main difficulty is going to be maintaining the same accuracy of element registration that we had in the analog world by pin-registering our drawings.

Unfortunately, Toaster 2.0 and (so far) Toaster 4000 do not have a means of automatically saving and restoring brushes to memory in the precise original position. For now, you must manually place all your picture elements together with pixel accuracy if you want your animations to look slick.

Now, click the Box icon, then the Filled Polygon icon, then the Scissors icon and press the "W" (for "whole screen"). This saves the entire screen as a brush. Allen tried saving smaller brushes but there was no reliable way of re-orienting the brushes to any pixel-perfect location on another frame. To avoid the guesswork, Allen saved all his brushes as full screens. Since the control point of the floating brush is the exact center, all full-screen images will be controlled from the center screen pixel (375x240).

Some systems with inadequate RAM will balk at storing an entire page brush with the "W" command. If you have this problem, use your mouse to define the page and use the coordinate box to make sure you begin at (0,0) and end at (750, 280). If this doesn't work, you have to struggle with smaller brushes and suffer a bit of registration inaccuracy.

Now you go to Brushes and Swap the brush. This puts the legs in a buffer memory. Next, call up the Frame 1 Body drawing, color this and black the background. Now restore the Legs Brush (Brushes menu, Restore Brush) and using the coordinates box, place the legs in their proper position and click the left mouse button.

To assist in placement, you can also use the Caps Lock feature (which freezes the screen) and diddle with the arrow keys. One valuable keystroke is Shift+Alt, which is the equivalent of the left mouse click.

Now you see why a 0,16,0 blue element was assigned to the "black" lines of the drawing. As you lift the brush with "no background," the blue (which is dark enough to look like black when rendered to video) gets carried along with the other colors and does not let the background show through. We thought it was transparent and called out to NewTek, but it turns out the apparent transparency of the 16-blue only displays on the Amiga screen. When you render the frame to video, you'll see opaque lines.

Now, save the body with legs as a full-screen brush, recall the background frame and paste the body with legs over the background. You've finished frame one. Proceed through your animation plan until all frames are complete.

Allen's *X-Men* animation required more than 200 finished full-color frames. We quickly ran out of hard drive space, but the problem was solved by installing a SCSI drive card in our Amiga and hooking up a SyQuest 88MB removable hard drive. The newest SyQuest allows you to use both 88MB and 44MB cartridges.

Once Allen had all the 2D cartoon frames finished, we decided to mix 2D animation with 3D. The client had the idea of having his superhero character flying over a 3D background of shopping malls, each with a sign that named one of his eight clients.

Both Toaster 2.0 and Toaster 4000 have a utility in 3D animation that allows you to incorporate background and foreground key graphics. Allen figured out that we could create a 2D cycled image of a flying superhero and key this frame-by-frame over a moving 3D background. He designed the character to fit in the upper left corner of the screen on a black background.

The 2D portion of the animation should be stored as a "sequence" of RGB files in the framestore subdirectory with a consecutive number of three-figure numbers. All the names of the framestores must be the same except for the numbers. Our sequence was called "Flyman," so the first frame was "FS.000.Flyman."

The 3D portion of the animation was designed simply except for the necessity of having the client names on each building. We started out in Toaster 2.0 by saving a full CG screen with each client name in the center. We ran into problems, however, when our 8MB of RAM gave out after only three buildings. Unili Graphics, the makers of many fine 3D fonts for Toaster 2.0, came to the rescue, sending us an early release of their "Wave Writer" software. Wave Writer lets you type 3D characters directly into LightWave. We scrapped the surface mapping technique and went with the Unili process, which worked fine.

Back to our flying man. In Toaster 2.0 there is a utility in Images that allows you to Load Sequence. If you prepared your frames properly as described above, you simply name the sequence and render. LightWave automatically selects each frame of

continued on page 69

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109	Anti-Gravity Products	73
110	Anti-Gravity Products	74
135	Anti-Gravity Products	75
143	Anti-Gravity Products	76
144	Anti-Gravity Products	77
150	Anti-Gravity Products	78
151	Anti-Gravity Products	79
125	Area 52	35
129	B & H Photo Video	87
130	B & H Photo Video	88
131	B & H Photo Video	89
132	B & H Photo Video	90
133	B & H Photo Video	91
103	Blevins Enterprises	43
	Castle Computer Systems	93
	Computer Video Associates	93
149	Corporate Video, Inc.	60
	Creative Support Services	99
	DC Productions	96
108	Desktop Images	11
	Desktop Video Systems	95
102	DevWareVideo	82
111	DevWare Video	83
	DC Productions	96
112	Digital Processing Systems (PAR)	C3
121	Dynamic Realities	7
	Electronic Connection	99
	Flex-Lease	99
	Graphic Impressions	99
	Hammond Photographic Services	99
	Hester & Associates	98
	Infotronics, Inc.	92
145	JVC Professional Products	5
128	MacroSystem Development	1
	Markertek Video Supply	99
	MediaQuest Studios	96
141	MegaHaus	35
104	MetroGrafx	53
	Microsearch	94
105	MicroSoftware Associates	57
	MicroTech Solutions, Inc.	94
	Mr. Hardware	98
	N. Y. Camera & Video	96
138	NewTek, Inc. Flyer	15
137	NewTek, Inc. LightWave 3D	C4
125	Nippon General	32
115	NoahJi's	26
134	Nova Design	C2
127	Nova Systems	35
123	Prime Software	43
147	Questar Productions	31
142	ShaBLAMM!	22, 23
	Strategic Video	99
140	SunRize Industries	45
124	Synergy International	4
	System Eyes	96
122	Tekskill	27
	T. S. Computers	93
	The Music Bakery	99
120	Token Video Associates	65
148	Videomedia	25
	Video Toaster Expo '94	28,29,61
	Visual Inspirations	99

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5	20	35	50	65	80	95	110	125	140	155	170	185	200
6	21	36	51	66	81	96	111	126	141	156	171	186	201
7	22	37	52	67	82	97	112	127	142	157	172	187	202
8	23	38	53	68	83	98	113	128	143	158	173	188	203
9	24	39	54	69	84	99	114	129	144	159	174	189	204
10	25	40	55	70	85	100	115	130	145	160	175	190	205
11	26	41	56	71	86	101	116	131	146	161	176	191	206
12	27	42	57	72	87	102	117	132	147	162	177	192	207
13	28	43	58	73	88	103	118	133	148	163	178	193	208
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7	22	37	52	67	82	97	112	127	142	157	172	187	202
8	23	38	53	68	83	98	113	128	143	158	173	188	203
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12	27	42	57	72	87	102	117	132	147	162	177	192	207
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Cell Animation continued from page 65

the sequence in numerical order and matches it to each successive frame of 3D animation. A "Loop" option allows you to apportion a sequence that has fewer frames than the 3D animation so the 2D cycles frames appropriately. The "Clip Level" for a color character on black should be set at 0,0,0 on the low side and about 15,15,15 on the high side. Experiment yourself for the best key effect. It basically works the same as the numerical slider in the Key Effects of the Switcher. In Toaster 4000 this feature is found under Effects.

Enter Non-linear Editing

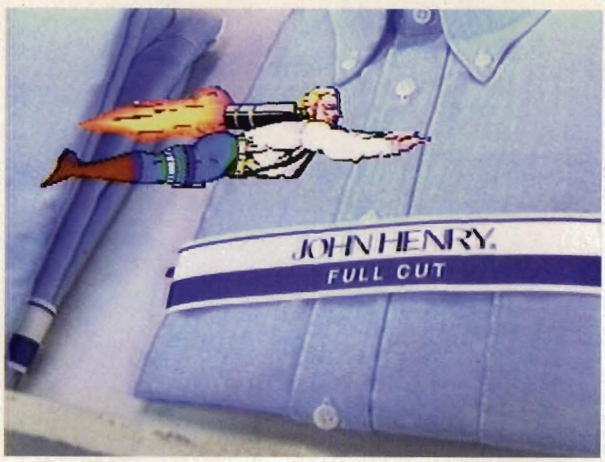
Now it's time to render all your frames to video. While you can laboriously single-frame edit by hand, it's better to use a single-frame controller. BCD makes a great single-frame controller that is quite reliable for taking the next step.

Non-linear editing is to video what word processing is to writing. If you single-frame control and want to create a repeating cycle of five frames 20 times, you'll have to do 100 distinct edits. In a non-linear system, you simply enter all the frames once. Then you can easily cut and splice on a computer screen "time line." Take the clip of five frames, for example. You highlight it, press the "lift" key, select "copy," place the cursor back on the time line and press the "lift" button again. You now have 10 frames. "Lift" the 10, copy, and you have 20. Two more click routines and you have 100 frames. Press play and watch your animation.

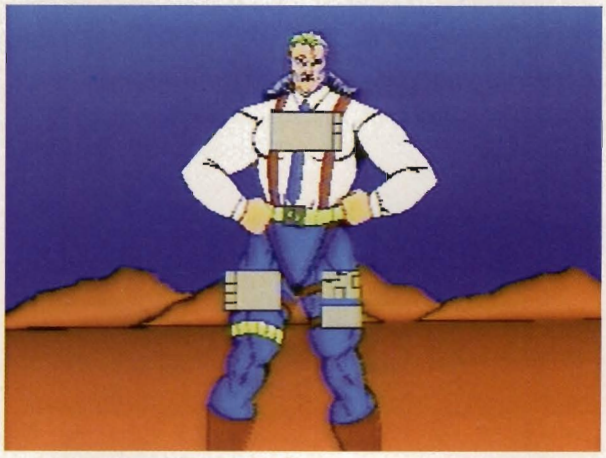
D-Vision Pro offers several resolution modes, the highest of which is about as good as the Toaster puts out. We'll be conservative and say 3/4-inch SP quality. If you're releasing in VHS or S-VHS, this is more quality than you'll ever need. If you want to go full broadcast quality, use D-Vision to create an on-line Edit Decision List (EDL) and then take a Betacam master tape with snips of each frame to an on-line suite and let them stay up all night.

D-Vision Pro also allows you to add up to six CD-quality digital tracks to the video and to mix any of them down repetitively to a stereo or mono output. This is great for lip-synching, sound effects and music, all of which are absolutely essential for high-quality cartoon style-animation.

Touch Vision also makes a stripped-down version of D-Vision Pro called D-Vision Basic. This may be adequate for animation purposes, since its limitations are not that crippling. You get only two audio tracks and you can't import SMPTE control code. If you plan to finish in the non-linear mode and output from the computer direct to tape, D-Vision Basic should work fine. At $495, the Basic is a bargain.



The 2D super hero is shown flying as an animation over the video of the client's product.



The 2D super hero standing proud.

The 2D super hero flying over 3D background.

Memory Hungry

All versions of non-linear editing systems require huge amounts of SCSI memory. D-Vision is designed to run on DOS machines, so you'll need a 386 or better. D-Vision works best with a 1.2GB Maxtor Panther drive (while they're discontinued, they are still the best). We tested our animation on a really stripped-down IBM PS/2 Model 56. While I would not recommend this machine for any non-linear editing, we still managed to store all our frames and a rather complex EDL on the 80MB hard drive. If you're experimenting with low-budget animation, have the computer available and want some intense play time, buy D-Vision Basic.

Incidentally, the new Toaster 4000, equipped with the maximum load of 16MB of RAM, will do a superb six seconds of animation internally. As I write this, we are only just figuring how to import all our frames from the 2.0 to give this a try, but I think it should work fine. We'll still have to link up six-second clips, however, so I think I prefer to stay with the non-linear alternative.

The proof is in the look, however. Our end results look so good, we are now considering taking the animation that one "revolutionary" step further. After our client is finished with the program we plan to strip the audio track and put a hypothetical Saturday morning kids show track on. Then it's off to pitching it to the networks.

VTU

George Avgerakis is founder of Avetka Productions, Inc., a motion picture production company in New York City. Some of his clients include CBS, ABC, PBS, Time Warner, IBM, Johnson & Johnson and American Express.

EDITORIAL EVALUATION
Circle number on Reader Service Card
I found this article:

Very Useful	Useful	Not Useful
Circle 039	Circle 040	Circle 041

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1994 Holiday Catalog

We at Anti-Gravity Products have the highest confidence in Amiga products, and the resurgence in the Amiga platform. The Amiga platform is too powerful to be ignored. Here at Anti-Gravity we stand ready to support and augment your Amiga systems with the latest in hardware, software and support for all your Amiga, Video Toaster and 3-D animation needs. When It Comes To Amiga Nobody Does It Like ANTI GRAVITY PRODUCTS!

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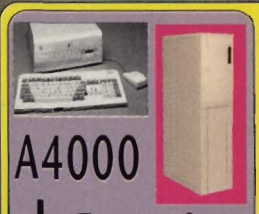
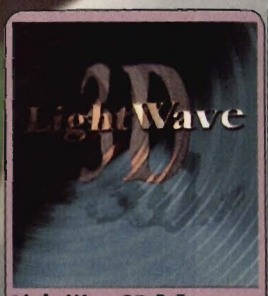
TapeWorm-FS $ Call
TapeWorm-FS allows any SCSI tape drive to act like an AmigaDOS volume.



A4000 + ToasterOven = 4000 TOWER!

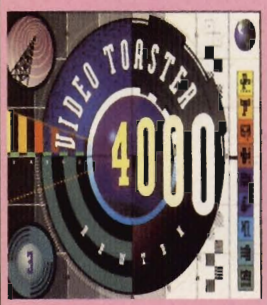
with: 40MHz 040, SCSI-2, 1GB SCSI-2 HD, 2MB ChipRam, 16MB 60ns FastRAM

AVAILABLE $ Call



LightWave3D 3.5
UpGrade $ 95
Stand-Alone $495

FLYER 4000 NON-LINEAR TAPELESS EDITOR TOWER WORK STATION:



TOASTER OVEN GT-4400, 40MHz-040, SCSI-2, 2GB HD, 2MB ChipRam, 32MB Ram, Video Toater 4000, Video Toaster Flyer, TBC, Flyer HD's Two 9GB Elite-9 (18GB) 20GB 2.5MB/sec Tape BackUp, QuadSpeed CD-ROM Drive, PICASSO II 2MB, SyncStrainer, 17" IDEK Monitor, ... *plus more.*

We have these systems available for sale $ Call for Pricing !

FLYer HARDDISKS

2GB	$2395
4GB	$3395
9GB	$4495

3.5" FAAAAST !!!
7200 RPM
500,000 MTBF
Fast SCSI-2 8ms

Barracuda-2	Barracuda-4
ST12550N	ST15150N
2.1 GB	4.3 GB
$ 1345	$ 3395

New Low Price!

Ambitious Technologies

ToasterOven GT

The Most Powerful DeskTop Video System In The World! JustGot More Powerful !!!

INSTANT REBATE $100***

The ToasterOven GT has been Completely Redesigned. Its bigger and has a new slotboard called the BigEthel Sisterboard that greatly exspands the versatility of the your system.

NEW

The new ToasterOven GT has:
- BigEthel Sisterboard
- More room for Full-Height drive bays.
- More System Cooling Power.
- SCSI-2 wiring harnessfor upto 6 internal drives and an external port.
- 3 External Flyer SCSI-2 Ports
- All Metal RF Enclosure
- L.E.D. Readout For Clock Speed Switches Monitor On/Off

* Optional Adapter allows you to plug your YC+ or Personal Component Adapter into our PC Card Slot.
** Other configurations available.
*** Instant Rebate good on all paid orders received before December, 31, 1994.

Big Ethel Sisterboard

11 slots positions:
- 2 video slots
- 7 Zorro slots (4 standard 3 power slots)
- 6 PC slots (5 Full Function 3 power slots)

ToasterOven GT-4300 $1295

BigEthel Sisterboard
300watt Switchable Power Supply
11 Bays (2- 3½; 5- 5¼; & 4 LPS Bays**)

ToasterOven GT-4400 $1495

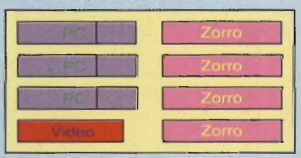
BigEthel Sisterboard
400watt Switchable Power Supply
19 Bays (2- 3½; 17- 5¼ Bays**)
Greater Cooling capacity

Why do you need a Toaster Oven for your Flyer system?

A big problem with the A4000 is its deficient expansion capability in adding cards or peripheral drives. Its power supply is equally weak.

Peripheral Cards

A4000 LIMITATIONS →Although you have a video slot, four Zorro and three PC slots, you can add only four cards: e.g., the Video Toaster (which is a double-width card) occupies two card positions (two Zorros and one PC), leaving two card positions available; adding the Flyer (a Zorro card) takes up another position, leaving one remaining card position (PC/Zorro); and since your Flyer system requires a TBC, *that* takes your last card position. You need more expansion than that for pro video production!



TOASTER OVEN ADVANTAGES →Other cards you'd most likely want to add to your system—display cards like the Picasso II or Retina, the SunRize 16 for better audio than the Flyer supplies, or an Ethernet card—can be added to the Toaster Oven. Because the Toaster Oven gives back three Zorro positions.

In the Toaster Oven the Video slot is separate from the Zorro slots, so when adding the Toaster card the Zorros are left free. This gives you back two of your Zorro slots. The Toaster Oven also has six power-only PC slots, one of which can take your TBC. This now frees up one more Zorro!

So your ultimate Flyer system now has: Toaster, Flyer, Sunrize AD516, Picasso II or Retina, Ethernet card, TBC, plus five more slot positions for power-only cards; five PC and two optional Zorro cards.

Peripheral Drives

A4000 LIMITATIONS →Another limitation of the A4000 is how few bays for hard disks, CD-ROMs, tape drives, removables, etc. are available. It has one 5.25 inch bay and one extra 3.5 inch bay, and a 3.5 inch internal mounting bracket. And definitely no room for full height drives.

TOASTER OVEN ADVANTAGES →The Toaster Oven has 11 drive bays. There is one 3.5 inch floppy bay, plus another suitable for a Syquest 270Mb removable. There are five 5.25 inch half-height bays to accommodate NEC triple-speed CD-ROM drives, Exabyte 8505 8mm tape drives and other storage devices, or two full-height 9Gb Elite drives for the Flyer with one bay remaining for another device. There are four internal 3.5 inch Low Profile (LPC) bays.

Power Supply

A4000 LIMITATIONS →Weak, barely adequate to power a minimum system.

TOASTER OVEN ADVANTAGES →300 Watts and a big fan. Powerful enough to accommodate any load. Say no more!

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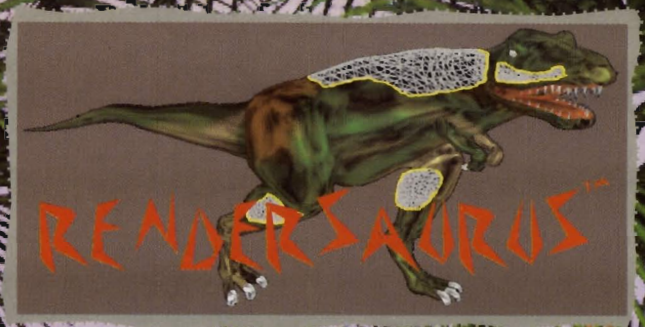
PRESENTS



Rip into the toughest task at an affordable price.

*10 TIMES?

*20 TIMES?

*30 TIMES?

FASTER?

Renders LightWave!

MIPS R4600 RISC CPU

Rendersaurus renders LightWave scene files through Screamer Net. Use up to 8 CPUs for a whole herd of Rendersauruses!

32MB of Highspeed 15 ns TrueCache DRAM delivers zero wait states to the RISC processor

One year warranty

Call us for complete specs, and test scenes you can test-render on your present system

Ask about options and pricing for upgrading the hatchling Rendersaur to a ferocious workstation!

RENDERSAUR-BC100M

100MHz R4600 RISC CPU / 32MB of Cache Memory
Includes keyboard, mouse, CD-ROM, Windows NT operating system

$5995

RENDERSAURUS™

Easy upgrade path to faster Rendersaurs by just popping in a new processor card.

Replica Technology

Homes: $95

Four complete, scaled homes for Lightwave. Exteriors, Interior rooms. Doors and windows ani- mated. Over 120 surfaces per home.

Interior Construction:$95

Create rooms and interiors with over 100 Objects: doors, windows, stairs, fixtures, mold ings, walls,

Interior Design 1: $45

Over 50 Real-World Scaled Furniture Objects: beds, tables, chairs, cabinets, and more. Doors and drawers can be animated!

Interior Design 2: $45

Over 50 Kitchen and Bathroom Objects: Lighting Objects, appliances, cabinetry, sinks, vanities, bathtubs, toilets and toiletry, and more. Doors and drawers can be animated!

Interior Design 3: $45

Over 50 Real-World Scaled Office Objects: chairs, desks, book cases, file cabinets, shelves, PC work- centers and more.

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DEDICATED DIGITAL IMAGERY

Create a 3D Virtual City with Citybuilder $120

CITYBUILDER object set for LightWave contains over 75 detailed 3D objects featuring high and low Resolution ver- sions of recognizable buildings from major U.S. cities.

OTHER OBJECT LIBRARIES

Medical/Anatomy (25 objects) $135
Space Essentials (50 objects) $ 95
Autos/Vehicles (65 objects) $ 95
Household Items (50 objects) $ 75

Objects such as street- lights and highways areincluded along with extra surfaces and modular building sec- tions for adding detail, diversity, and atmo- sphere to animations. Example scene files allow city scapes to be loaded into LightWave automatically.

Citybuilder is excellent for:

- Virtual Environments
- Architectural
- Visualization
- Forensic/Accident
- Reconstruction
- Special Effects

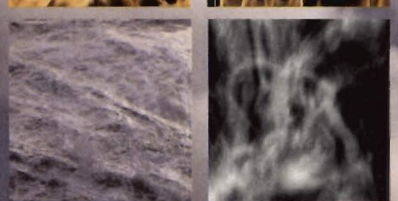
Objects are also available in Imagine, DXF, and Wavefront formats.

MOVING TEXTURES 100 $235

Royalty free Stock Footage for Computer ANIMATORS!

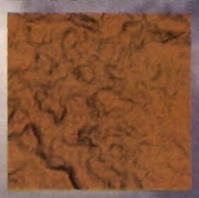
INCLUDES VIDEOTAPE

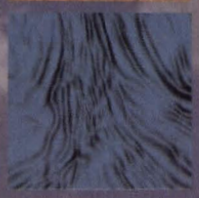
Moving Textures 100 contains 22 texture sequences for use in computer animations. Two types of image sequences are included on the CD ROM.



Tru Maps:

2 versions of a *Time Lapse* cloud animation, cackling fire , smooth burning flames, bubbling steam, ocean water, and slow moving smoke.

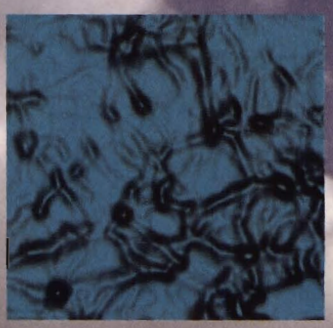




FX Maps:

Boiling, Burst, Calm, Disturb, Jiggle, Liquid, Pour, Rough, Spots, Swift, Tide, Water A, Water B, Waves A, & Waves B.

Each sequence contains 300 to 900 ready to use IFF frames. Tru Maps are stored as 24bit color, 8 bit color, or 8 bit greyscale images. All FX Maps are stored as 8 bit greyscale images.



Snap Maps: Fields & Foliage™

SNAP MAPS: Fields & Foliage / Building Materials & Fabrics

Whereas other texture libuaries help you enhance objects you created——————Snap Maps help you create objects!

SNAP MAPs is the first texture library to support the advanced mapping techniques today's renderers are capable of employing. SNAP MAPS TEXTURES give you an easy, powerful means to put useful, real-world surfaces and structures into your renderings. In addition to adding photo-realistic textures, Snap Maps can cut your 3D objects into new shapes, saving a great deal of time in modeling complex objects. Each Snap Maps directory includes many types of texture maps, pixel-aligned to work together, to create specific, detailed surfaces or structures. Also included are pre-textured tutorial scenes in LightWave, Imagine, and Real 3D format, and handy 24-bit preview pages for a graphics overview. Comes with complete instructions and tutorials, and texturing tips for better rendering.

Fields & Foliage	*$129.95*
Building Materials & Fabrics	*$129.95*
Super Bundle: F&F plus BM&F	*$240*

Snap Maps: Building Materials and Fabrics Library includes the textures you need to render a wide variety of manmade materials, for architectural rendering, realistic sets, building exteriors, and urban environments. The fabrics are great for carpeting, curtains, upholstered furniture, clothing, lamp shades, etc. Unique Snap Maps features add richness and depth to surfaces, and cut out complex structures like lace, wicker, fences and lattices that would otherwise be extremely complex to model.

Building Materials and Fabrics includes:
Brick, Burlap, Cement, Chainlink, Concrete, Crossweave, Fabric, Gravel, Lace, Lattice, Mesh, Net Plush, Ribknit, Slats, Stripecloth, Tile, Weave, Wicker, and Wood.

Snap Maps: Fields and Foliage Library includes all you need to render realistic forests, jungles, gardens, yards, and house plants. Unique Snap Maps features add richness and depth to surfaces, and complex cut-out structures like palm fronds, flowers, grasses, and ivy that would otherwise be extremely complex to model.

Fields and Foliage includes:
Bark, Branch, Fern, Flower, Foliage, FourLeaves, Grass, Ground, Hedge, Ivy, Lawn, Palm, Stalk, Stems, Stones, ThinFlower, ThreeLeaves, Twig, Vine, and WildGrass.

Snap Maps: Building Materials & Fabrics™

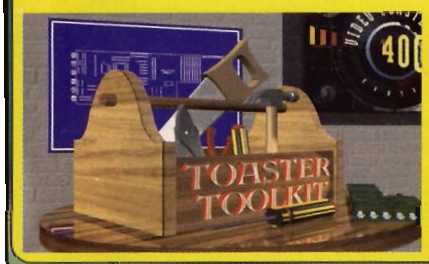
• ARexx Powerhouse $120 • Crouton Tools 4000

The Easy To Use Video Operating System integrates all your ARexx compatible programs

Now your Toaster productions can move ahead speedily and efficiently, with 1100 video functions. No more ARexx programming for you! Tie it all together with Crouton Tools 4000!

Toaster Toolkit 4000 • Now only $70 •

Creative Utilities to unleash the power of your Toaster, better than ever!



Toaster Sequence Editor
Toaster Project Editor
FrameStore Compressor
Anim to FX
FX to Anim
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HUMANOID human animation designer

Formats:

Lightwave/Amiga	$160
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3D Studio	$180
Imagine/Amiga	$160
Imagine/PC	$180

Hierchachical Models with Morphing Features

Each set includes a man, woman, child & strongman, walk & run motions, morphing facial expressions & hands, and extensive manual all for one affordable price.

Here Are Some Reviewers' Impressions:

"The objects rendered perfectly . . . an excellent source for accurate human form and motion . . . Crestline Software has produced a superior package . . ." *J. Parenteau, Amblin Imaging, FX producers for seaQuest, LIGHTWAVEPRO 4/94*

"This product is definitely the most mature and well-developed . . . excels in supporting motion . . . and it has the best hand and facial morph targets." *S. Elliott, author of Inside 3D Studio, CADENCE 8/94*

"If your project calls for people, the Humanoid objects are the best." *DV MAGAZINE 10/94*

"Use of joints and morphing are combined to get the best of both techniques into one human model paradigm . . . This is an incredible value." "It is all you need to begin designing human character animations." *3D ARTIST #14*

Announcing Humanoid: Lightwave format for Windows™

NUCLEUS ELECTRONICS, INC.

No Slot, No Bother, No Worry....

The Personal Editor™

Three Editors in One, Plus!

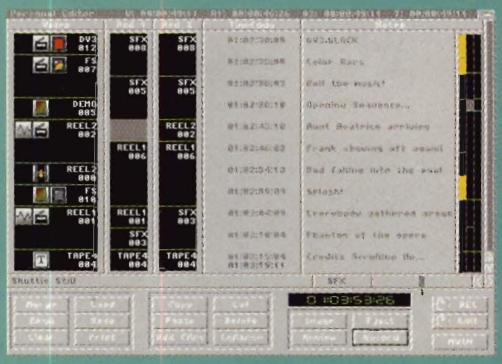
Video editing with the Personal Editor is fast, efficient, enjoyable, and inexpensive. Plus, you now have a choice of three editing modes from enhanced "Open-Ended" editing to full "B-Mode Auto Assembly". Starting with clip logging, and ending with EDL construction and final recording, the Personal Editor offers you an easy to use, intuitive interface where all the necessary tools are at your fingertips.

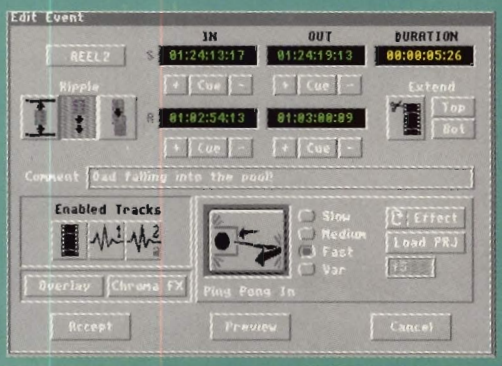
Many user definable options means easy creation of your own distinct editing environment shaped by your needs. Not only can you choose the best editing mode for the current job at hand, you can also customize your logging preferences to accomodate the nature or complexity of the source material.

There is more to the Personal Editor than just editing source video. Toaster owners can take advantage of a new frame grabbing technique which allows them to input three perfect full frames (or four frame fields) in a single tape pass. Rotoscoping just became a whole lot easier.

We're sure that you'll find the functionality of the Personal Editor to be exceptional.

It's Not Just Cuts Editing!





PERSONAL EDITOR FEATURES

- ✔ SMPTE time coded clip logging.
- ✔ A & B Mode Auto-Assembly plus Open-Ended editing.
- ✔ Pseudo A/B roll (A/X roll) w/ Video Toaster™.
- ✔ Toaster DVEs / CG page keying, scrolls, crawls, etc.
- ✔ Still images (FrameStore, IFF24, JPEG etc.) in EDL.
- ✔ CMX™ 3400 or 3600 list import and export.
- ✔ Split audio & match frame edits.
- ✔ 100% accurate single frame controller.

EXPANSION SYSTEMS

Add An External SCSI Port To Your A4000!

DATAFLYER 4000 SCSI PLUS gives you a standard 50-pin internal and SCSI DB-25 rear interface, all without using internal slots or interfering in any way with the IDE internal drives. So you can still have two internal IDE hard drives and seven SCSI devices hooked up.

The DataFlyer SCSI+ card attaches to the IDE header and converts it to also run SCSI.

A1200	$95
A4000	$115

DATAFLYER 105&270SQ
The ULTIMATE *Hard Drive*

Amiga4000 SyQuest Internal IDE Drive Kit

DATAFLYER 105	$375
DATAFLYER 270	$Call

Finally, a hard drive fast and economical enough to back up and transport large files, and to use as a primary drive. New SyQuest technology ensures data integrity. The 270SQ reads/writes 105 Mb cartridges. Special version of 3105/3270AT from SyQuest with our driver, compatible with the A4000. **FAST**—14ms avg. access **HUGE**—Unlimited storage **QUIET**—Shhh **SMALL**—3.5 x 1 in **RUGGED**—2 year Wnty. **EASY**—AutoChange **INTELLIGENT**—64K buffer. **COMPLETE**— Hardware & Software.

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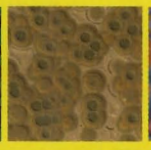
FEDERAL EXPRESS

Essence VOLUME I $95

An "algorithmic texture" is a surface that can be characterized with a mathematical algorithm as opposed to just "painting on" with a brushmap. Examples are checkerboards, grids, camouflage and wood. These textures are not brushmaps or pictures. They are algorithms used to color the surface of an object, and take very little RAM (about 1–15K each), and have no pixel artifacts. Essence I is sixty-six algorithmic textures compatible with the Forge texture design program, ranging from Hex, a simple tiling of hexagons, to a complex surface called Fractal Noise; turbulent, detail-rich for objects like clouds, fire, planets, landscapes, or even dirt.

Apex



FORGE

Examples:
Counter: a flat texture that applies the image of an LCD display to an obect. Fractal Noise: Fractal noise is a turbulent, detailed blend of colors ideal for realistic animated surfaces.

Essence VOLUME II $95

Over forty new textures. Some examples: Organic surfaces: Natural skins and colorings—turtle shells to crusty alien hides.

- Space textures: Hull plates, gas giants and planetary rings. Animated plasmas.
- Altitude textures: Burnished metal, crumpled paper, chipped ice, obsidian, cauliflower and fungus.
- Water effects: Light caustics, ripples, raindrops, expanding droplet waves. Including fully 3D flagstones, shingles and snake scales.
- Miscellaneous textures: Fibers, foam, and facets

Essence requires an Amiga with a FPU (such as a 68881 or a 68040 CPU). The textures require FORGE to preview and render, though they can be used in Imagine versions 1.0 through 3.0 directly.

FORGE Included with Essence
A new program revolutionizing Essence textures. A stand-alone program, Imagine is not necessary. Load/display any Essence texture or attributes, preview in real-time. Interactive edit and preview in color. Instead of editing a bank of mysterious numbers in Imagine, quick-rendering and displaying an image, then returning to the attribute editor, in Forge the design process is reduced to simply sliding a gadget and watching the change take place!
Forge is more: it is a texture Renderer. It can actually produce antialiased image maps of the textures it displays, saving as IFF24, JPEG, or TIFF, useable in Lightwave, Real 3D, Caligari, Alladin 4D, Playmation, 3D Studio or just about any 3D program.

- Preview up to 9 layers at once
- Load/save Imagine compatible attributes
- Slider control of texture parameters
- Image size not limited by memory
- Seamless repeating images, spherical maps
- View modes, full animation. and more.

MacroSystem Development

HARDWARE FEATURES

Very High Speed Local 040 Memory Bus with full 040 burst access.
- NCR 53C710 40MHz SCSI-2 Fast Controller connected directly to the 040.
- 32Bit SCSI host bus DMA interface supporting burst to and from the RAM
- Supports 10MB/s SCSI transfers.
- Full DMA allows the CPU to still have 90% Processing Power while doing Transfers.
- No Zorro III DMA Problems.
- Fully Autoconfigurable with optional Autoboot capability for SCSI.
- 32Bit Ram Expansion Up To 128MB.
- Uses Standard 72Pin SIMM Modules.
- Allows Mixing of Ram Module Sizes.
- Supports 4, 8, 16, 32 MB SIMM Modules.
- Uses the Memory that is installed on the Amiga 4000 MotherBoard.
- Supports DMA access from Zorro III Devices to onboard Memory.
- A3000 Version Supports up to 64MB of 32Bit Memory.
- A3000 Engine will clock 16MHz MotherBoards at 25MHz.

Compatibility
- Compatible with the Video Toaster, Retina Z-III and OpalVision.
- Works in all 3000, and 4000 series Amigas.
- Requires AmigaDos 2.1 or greater.
- Full Two Year warranty

The WARP ENGINE Is an 040 Accelerator with a High-Speed SCSI-2 controller & up to 128MB of ram expansion, All-In-One!

How Fast Is The Warp Engine?

Rendering Lw3D Texture Example
- A4000/040-25MHz: 160 sec.
- A4000 Warp 28MHz: 82 sec.- aprox. 2x faster
- A4000 Warp40MHz: 56 sec.- aprox. 3x faster

Warp SCSI-2 Speed:
- Using Diskspeed the 2.1 GB BarracudaDrive
- Read 9MB/sec with 94% of the CPU still availible.

40 MHz 68040 Accelerator for the VideoToaster/4000

The Warp Engine Series of Accelerators is a break-through in Amiga Expansion design. The Warp Engine comes in three versions for the Amiga/ Toaster 4000 and three for the Amiga 3000.

All Warp Engines are fully upgradable to 40MHz by just changing the CPU and the Clock Oscillator!

The Warp Engine uses standard 72 Pin SIMMs (NO CUSTOM SIMMS)and allows the use of up to four different sizes of SIMMs (4, 8, 16 and 32MB) at the same time.

Unlike other companare only available from them, and/or they only allow the same size SIMMs to be installed making it necessary to remove your old SIMMs before you can add larger SIMMs.

The NCR53C710-1 SCSI-II Fast 32Bit DMA Bus Master Processor makes it the Fastest available with its direct connection to the 040 chip—this provides up to 10MB/s Transfers and allows the 040 to retain 90% to 98% of its processing power! Zorro III Memory boards cannot even reach 70% of the speed of the Motherboard Memory while Warp Engines Local 040 Burst Memory is many times faster than the Motherboard Memory!

WARP ENGINE

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Composite Studio gets your projects done quickly, and with professional results!

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Composite Studio is a powerful user configurable image compositing program. By taking control of ToasterPaint™ or OpalPaint™, Composite Studio allows you to quickly and easily combine, resize, and arrange Framestores or RGBs. Composite Studio is perfect for the video, multimedia, or broadcast professional.

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For the beginner yet the powerful customizing features are sure to satisfy the professional.

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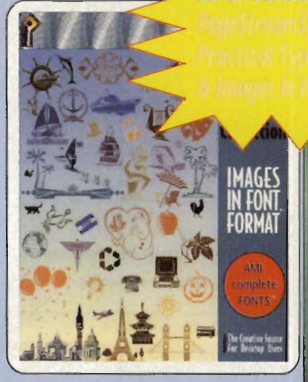

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A concise manual presenting basic concepts and techniques all desktop publishers need to know. To achieve professional control of typesetting and page composition you may need answers to questions about:
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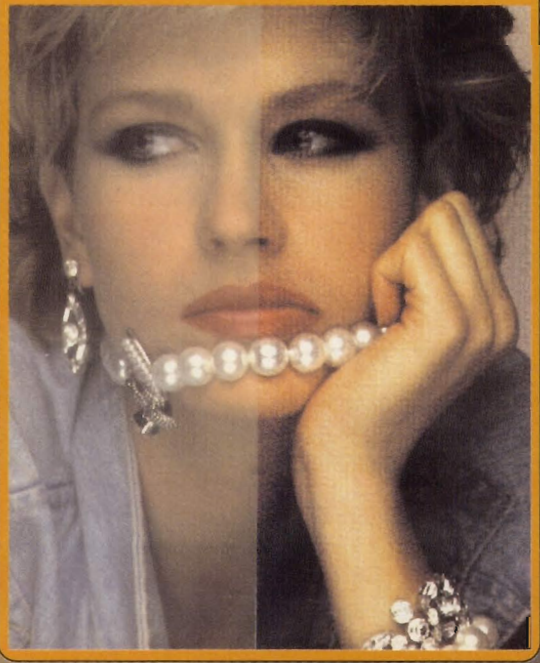

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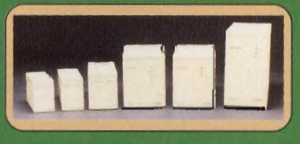

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Features:
Better 3D Look
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No more headaches trying to balance your account each month when you receive your bank statement. Reconciliation is now as simple as entering the statement ending balance and clicking on the print customizable reports to find out which transactions are still outstanding.

FEATURES:

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- Print customizable reports
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A New Level of Lightwave Mastery

Seventeen new and powerful macros for LightWave 3D and Modeler

IMPLEMENT NEW FEATURES AND STREAMLINE FUNCTIONS TO SAVE MODELING, SCENE CREATION, AND RENDERING TIME.

New features include automated scene creation of true 3D explosions (not flat polygons), swarming behavior through the use of Attractor/Repeller techniques and morphing objects along a path.

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With the Layout macros you can render unlimited scenes sequentially to any combination of destinations; transfer scene files with all elements; automate creation of focal distance envelopes; morph objects along a path using bones; create a constant velocity for existing motion paths.

Modeler macros will streamline cloning objects and surfaces; control the angle as well as position of mirrored objects; make it easy to join a polygon to the surface and angle of another; and load an entire scene into Modeler with all objects.

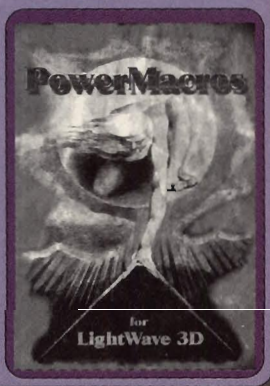
Create pie charts with Business macros; *Pie Chart 1 generates a single object, Pie* Chart 2 creates separate objects from the pie's pieces.

ENERGY:
- Shatter
- BlowUp
- Swarm

LAYOUT:
- Snake
- Render Batch
- Move Scene
- Smooth Velocity
- Focal Distance

MODELER:
- Attach to Polygon
- Clone Object & Surface
- Flip Around Polygon
- Load From Scene
- Mirror Using Polygon
- Save Pivot Point

BUSINESS:
- Chart1
- Chart2



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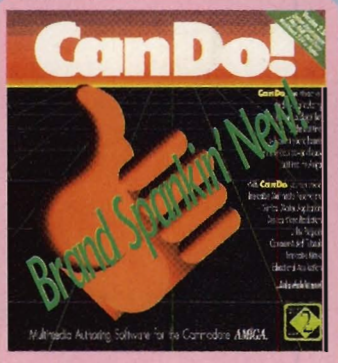

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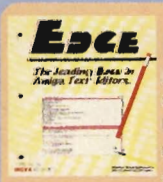

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EXABYTE® Great Digital Video Backup Device!

ExaByte 4mm DAT Drive:

The EXB-4200 provides 2GB of storage at 14MB/sec and the EXB-4200C compression* drive provides 4GB* of storage at a fast rate of 28MB/sec*. Both drives have a time to clean Light!

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EXB-4200C	3.5"	2-4GB	233K/sec	$ 925	$1015
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	Each	For Five
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AmiBack+tools		$ Call

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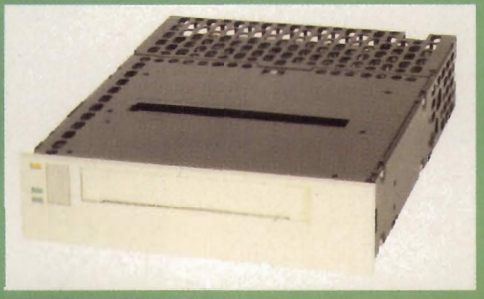

How do you use an Exabyte 8mm drive for data backups, and/or as a digital video transfer device?

Using the Exabyte drive as a tape backup device, you can store up to ten gigabytes of data with a back-up utility such as Amiback. Using an inexpensive 8mm tape you can quickly and reliably backup and retrieve files, directories or an entire hard disk.

With the Tapeworm software you can actually mount an Exabyte drive as a harddisk-like system volume, with half a megabyte per second access speed, and rapid tape rewind.

The Exabyte drive is used to transfer digital video or computer images to and from the Abekas digital disc recorder format. The Abekas system allows you to read and write D1 digital video in NTSC or PAL formats and to transfer data to other video formats—Betacam, D1, D2, SVHS, etc. The Exabyte drive is ideal for economical single frame recording.

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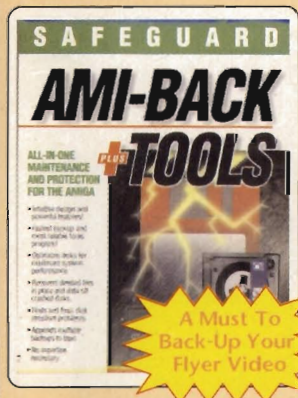

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Ami-Back Plus Tools: Super Deal $75

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TapeWorm-FS: $95

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3.5" SyQuest- 105MB & 270MB
Has an average seek time of 14.5ms; Comes in SCSI & IDE formats; And the 270MB drive reads & writes the 105MB cartridges.

5.25" SyQuest- 88MB & 200MB
Has an average seek time of 20ms; Comes only in SCSI format; And the 200MB drive reads & writes the 44MB & 88MB cartridges.

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IDE Bare Drive	$ N/A	$ 265	$ N/A	$ N/A
SCSI Bare Drive	$ 285	$ 265	$ 395	$ 395
External w/Cart.	$ 455	$ 425	$ 495	$ 495
Cartridges:	**88MB**	**105MB**	**200MB**	**270MB**
1 each for	$75	$ 65	$ 85	$80
5 each for	$70	$ 60	$ 80	$70

HILite Tape Drives Are The Next Generation In Tape Technology!

HILITE USA TAPE DRIVES

DDS-2 features: WangDat 90 & 120m data cartridge
SCSI-2 interface
4-8GB typical capacity
Transfer Rate 366-732 k/sec
Access Time 35sec

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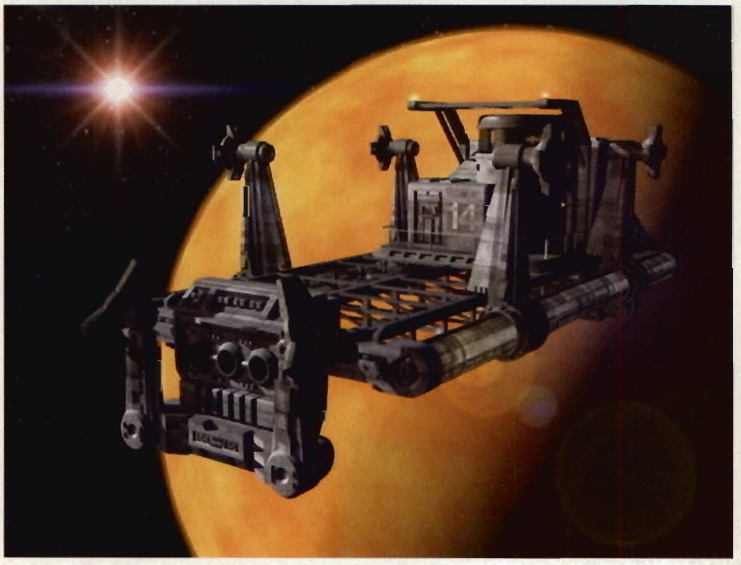
▲ *Living Room* by Arnie Boedecker

Living Room and *Fireplace* were rendered on an Amiga 4000/040 with 18MB of RAM using Toaster 3.1 software. *Living Room* contains 91 objects, which total 43,983 polygons, 226 surfaces and 33 images. The frame took just under four hours to render, with Trace Shadows, Trace Reflections and Trace Refraction active in Medium Resolution with Low Antialiasing and an Adaptive Sampling of eight.

▼ *Fireplace* by Arnie Boedecker

Fireplace contains 23 objects, which total 34,401 polygons and 95 surfaces. The frame took just under five hours to render with Trace Shadows and Trace Reflections active in Medium Resolution, Low Antialiasing and Adaptive Sampling of eight. Boedecker is owner of Imagi-Nation Enterprises, a computer graphics and animation company in McHenry, Ill. He can be reached at (815) 385-8198.



▲ *Freighter* by Daniel Dipierro

Created with an Amiga 2000 and an '040, *Freighter* is a realistic space-age cargo carrier made of 27,294 vertices and 16,910 polygons (not including the planet).

Dipierro is part-owner of Hollywood at Home Productions, which is developing a 3D graphic adventure game (TerrorBYTE) that incorporates real actors for the PC platform. He can be contacted at (908) 521-0769.

▼ *Cablevision* by James Vergara

Created in Modeler, *Cablevision* consists of the logo, a multi-colored television screen and a '50s style rocket. The metallic look of the logo was obtained with manipulations of a grey surface color's specularity and luminance with medium gloss.

Vergara is the video production director for San Joaquin Delta College in Stockton, Calif. He can be reached at (209) 474-5131.

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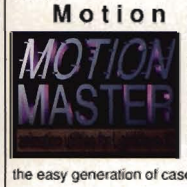

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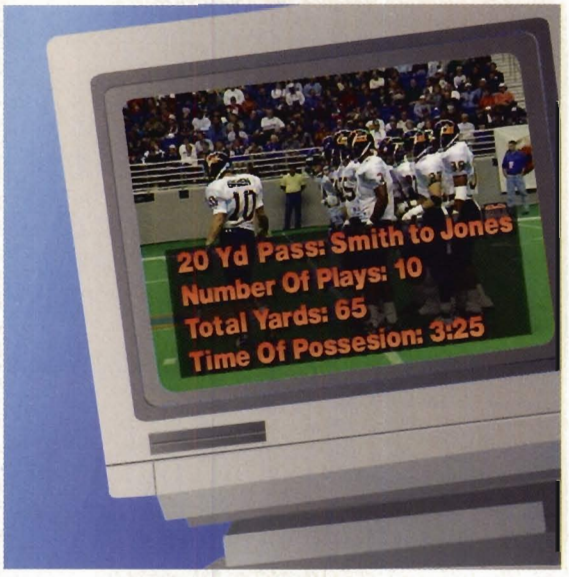
Using the Toaster as an External CG

by Clinton Rathmell

If you were to make a list of the most fundamental tools in television production work, the character generator (CG) would have to be near the top, right after cameras, microphones and tape machines. Try to remember the last program, commercial or newscast you saw that did not include graphics from a CG.



Traditional television titling has been done with dedicated CGs for just over 20 years. Today the market is crowded with dedicated standalone CGs as well as many systems based on the PC, Macintosh, Amiga and, of course, the Video Toaster. Prices for these systems range from a few thousand dollars to well over $100,000 for a high-end broadcast unit.

The most basic CG produces text on a black background that is superimposed over another video source with a keyer built into the CG itself or with an external switcher or effects generator. The latest generation of CGs provide an incredible amount of graphics power, including a large selection of fonts, colors, backgrounds or combinations of them all. Each has the ability to offer graphic element outlines, drop shadows and variable transparency level to any or all of these elements. The resulting look can be dazzling.

Since most television titling is done over a video source such as a camera or VCR and requires keying, let's take a look at the fundamentals of this powerful television tool. Keying consists of removing some element in one video source and letting another source show through. It is a layering effect with the background video—usually the main component of the screen—having another source keyed on top of it. There are a number of ways to achieve this, and what follows is a discussion of the most common.

1. Luminance Keying—The video to be removed is determined by its luminance level. A threshold control called the clip is adjusted to determine what luminance level is the cutoff point for the video to be removed (this is how the keyer section of the Toaster works). The major disadvantage of luminance keying is that if you have a graphic element that includes luminance values from 0 (black) to 100 (white), there is no cutoff point to select to let your background video show through. This includes the most basic of titles, white letters with a black drop shadow.

2. Chroma Keying—With this method, the video to be re-moved is determined by its color hue. For example, a video source with a particular shade of blue can have the blue area keyed out. Chroma keying is used extensively in newscasts and for special effects where the talent stands in front of a colored background and is keyed over another video source. Again, the major disadvantage is if the element you wish to key has any color matching the selected chroma key color.

3. Color Zero Keying—Used with computers and digital signals, color zero keying is a process in which a specific color or bitplane is selected and removed to allow the background video to show through. This method is disadvantageous if you need to use this same color in your graphic element.

4. External or High Gain Keying—This is the conventional keying method and has been in use for years. The CG develops two signals. The first is the regular graphic to be layered, called the "fill" signal. The second is the "key" signal. The key signal is never seen in the final video composition; its sole purpose is to act like a cookie cutter that is the exact shape and placement of the graphic fill element to be used. The key signal "cuts a hole" in the background video where the graphic element will be placed. The "hole" is replaced with the "fill" signal and the graphic is layered into the background video. Since the key signal cuts an area that is not dependant on luminance or chrominance values, the graphic element can be composed of anything and appear unaltered. External keying provides for an extremely clean key and offers greater flexibility when building graphics. For this application, the key signal is usually one volt peak-to-peak, but a gain of 10 or more is used occasionally to clean up imperfections in black to white areas. The disadvantage of external keying is that great care must be given to electrical timing of the two signals when fed

to an external device for the keying. If the signals are not exactly timed, the fill signal will be cropped or cut off on one side or the other, depending on the delay error.

5. Linear Keying—An improvement on external keying, linear keying allows for transparency in a key. The external key signal (Figure 1) can vary the "depth" of the cut, allowing for a blend of the fill signal (Figure 2) with the background video (Figure 3) and resulting in a transparent look. Figure 4 shows how the final product of the key, fill and background signals will appear. The linear key signal has a gain of one, so a full one-volt signal will cut completely to the fill signal and a level of zero will show only the background video. This is the most common type of keying currently in use and is also the type of keying done with the ToasterCG.

Special Features

After examining how the graphic signals are placed over video, it is time to examine the features and capabilities that give these graphics such a stunning look.

Many professional standalone character generators incorporate features offered by the CG section of the Toaster, such as scalable PostScript fonts, 24-bit graphic elements, transparency and gradient colors. Generally, these dedicated CGs are much more expensive than a complete Toaster system, and may even lack features such as paint and a four-input switcher, not to mention LightWave 3D. Their main advantage over the Toaster is probably speed, since they may create their pages in real time without having to render them.

If you can tolerate the speed of the ToasterCG, you will find that it is a superb value as a character generator. Keying internally, the Toaster is capable of producing a resolution of 35ns for exceptionally clean keys developed from the Toaster's internal alpha channel. The alpha channel is an 8-bit area of memory that is capable of creating 256 shades of gray that act as a mask or stencil. Depending on the luminance value of the alpha channel, the linear key is developed for varying levels of transparency and for extremely clean dithering at the edges of graphics, text and drop shadows.

The downside of keying within the Toaster is that the transitions available for bringing a CG key page over the inputs are cuts and dissolves. You can build a CG framestore page and use some of the transitions in conjunction with the Toaster luminance keyer, but with mixed results. Drop shadows are nearly impossible with this method, and transparency is out of the question.

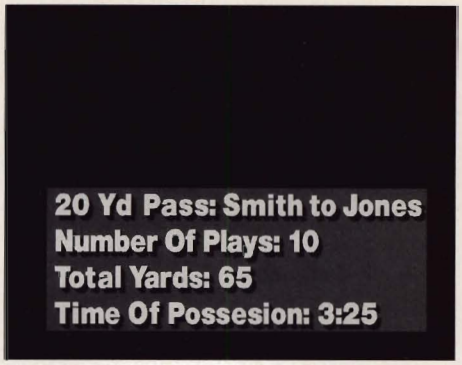


Figure 1

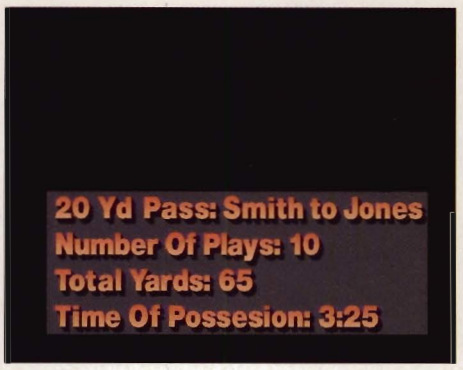


Figure 2

Figure 3

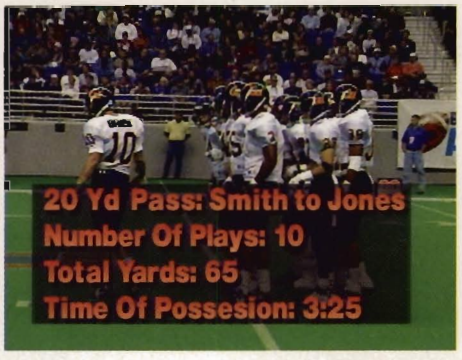


Figure 4

Despite the power of the Toaster, there are a number of good reasons to use its character generator with other external video equipment such as a digital video effects unit or switcher. An external digital video effect (DVE) offers more options for transitions of key pages on and off the screen and provides digital compression for a cleaner look. The four inputs of the Toaster switcher can also be limiting, and you might find the need to use the ToasterCG with a larger switcher with more inputs. If you are using component tape formats such as BetaSP or MII, you might be using a switcher or DVE that works in component mode throughout the system for minimal degradation of your signal during editing. While some of the dedicated units are quite capable, many have high learning curves and more complicated interfaces. Alternatively, the Toaster interface is straightforward and fairly easy to use.

Integrating the ToasterCG into professional production equipment wasn't really feasible until the introduction of a product called the Breadboard by PreVue Technologies ($398 list, 800-356-8863). The Breadboard makes use of the Toaster's internal alpha channel to create an external linear key signal, a fill signal and the regular program output signal. Occupying an expansion slot in the Amiga, the Breadboard also features additional program and preview outputs. The Breadboard is capable of working in two modes, providing key and fill signals or delay-adjustable outputs of the four Toaster input signals. Internal jumpers determine whether the outputs of the Breadboard are extensions of the inputs or if they are key and fill signals. The key, fill and program output signals are connected to the CG key input, CG fill input, and normal video input, respectively, on the external keying device. You will need the regular program video output as well as the fill signal to display CG framestore pages. A framestore page does not generate a key signal, so if your external device needs the key signal to display the fill signal, you will not be able to see framestore pages on your external keyer.

To utilize the transparency capabilities, the external device doing the keying must be equipped with a linear keyer. If the external device is only equipped with a high gain external keyer, make sure the transparency settings in the ToasterCG are always set to 255 for text, shadows and edges. The 255 setting provides for no transparency. The page type must be a key page for the alpha channel to be

present and develop the key signal at the Breadboard.

Timing, of course, is critical when integrating the Toaster into external equipment in a production environment. I recommend that black burst from the same reference source as the other equipment be used as the reference at input one on the Toaster. This signal will need to change by means of a delay line or other variable timing device so that the Toaster can be timed to the other sources in the system. The key, fill and output signals from the Toaster must be timed exactly the same at the inputs of the external device you are connecting to. This means that cable lengths from the Toaster to the device in question are critical. The Breadboard has the capability of adjusting the individual timing of each of these signals within a certain range, and most modern switchers and DVEs will result in some degree of timing adjustment. If you are careful with matching the cable lengths, you should have no problem keeping the timing in step.

The black background on input one will also be the source selected on the Toaster when creating and displaying CG pages. You will also be able to render and display from the CG section of the Toaster without exiting to the switcher to select a blank screen to key over. The reason for black as the background source in the Toaster is the transparency. For example, if you have a 50 percent transparent drop shadow keying over a color background or some video source in the Toaster, source bleeding will occur through the same drop shadow at the external device doing the keying. There is some potential for creating interesting effects in this manner, but for the most part you will need black as the background source when doing standard CG work.

InnoVision's Montage is a software alternative to the Toaster CG and works well with the Toaster. Other CG options are available for the Amiga using software such as Broadcast Titler and an external genlock/keyers. The SuperGen SX provides a high gain key out based on color zero selection in software and can be interfaced to external equipment with external high gain keyers.

A Toaster system provides a cost-effective alternative for the look and features it can provide. The ability to interface to professional equipment proves that the Toaster is a serious production tool useful in any production environment.

VTU

Clinton Rathmell is a video facilities manager for the San Antonio Spurs. He has worked in the television industry since 1972 and has written for a number of other publications.

Companies mentioned:

PreVue Technologies
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1933 Davis Street, Ste. 238
San Leandro, CA 94577
(510) 638-0800
Fax (510) 638-6453
FOR INFORMATION CIRCLE 51

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Circle 042	Circle 043	Circle 044

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Panasonic
Broadcast & Television Systems

AG-3
3-CCD S-VHS-C Camcorder

The AG-3 is an industrial 3-CCD camcorder. Don't be fooled by its size. It delivers extra precise color reproduction in addition to its excellent mobility making it ideal for almost any professional application. The AG-3 utilizes technology and engineering used in Panasonic broadcast cameras. A few examples: the capstan motor is coated with evaporated diamond-like carbon to provide the optimum smoothness/friction balance for positive traction and uniform tape tension. The AG-3 features high performance laminated amorphous pro heads which are far superior to those of conventional ferrite heads. The AG-3 uses a newly-developed 8-group/10-piece lens system that includes two double-sided aspherical lenses (4 sides). It is highly resistant to aberrations caused by flare, color fringing and other distortions that diminish contrast.

Features:
- Three 1/3" CCD image sensor system delivers over 530 lines of horizontal resolution
- New 10:1 2-speed zoom lens (see above) 6-60mm F1.6 with automatic and manual zoom. Also features 20:1 digital zoom.
- High resolution color viewfinder lets you preview and shoot scenes exactly as they are
- Built-in digital TBC (Time Base Corrector) eliminates jitter and skew and assures stable, distortion-free playback
- **Digital Mix** – for soft fade-over between memorized still and moving images
- **Digital Still** – lets you freeze a particular scene for as long as you like, without interrupting sound recording
- **Digital Gain-Up** – delivers clear, distinct images in low-light levels, even down to 1 lux!
- **Digital Strobe & Digital Wipe** – add professional effects to your shooting.

AG-455 2-Hour S-VHS Camcorder

- S-VHS system – records and plays back over 400 lines horizontal resolution
- Laminated amorphous heads assure exceptional picture quality, high resolution, superb color reproduction, and high signal-to-noise ratio
- 12:1 power zoom lens with continuously variable speed zoom
- Hi-fi stereo and linear track for recording. Also has "Audio Out" select switch for Hi-fi/Normal/Mix combinations
- High performance stereo zoom microphone features three different settings : Wide, Telephoto or automatic zoom.
- Built-in VITC (Vertical Interval Time Code) time code generator gives absolute address to each frame of video for frame accurate editing
- Audio/Video Fade-In and Fade-Out for smooth, professional scene transitions
- Automatic Iris plus manual control for fine adjustment
- Variable high-speed shutter from 1/50 to 1/8000 second.
- **Digital Mix** – for soft fade-over between memorized still and moving images
  Digital Tracer – to add an after-image effect to moving subjects
  Digital Still – lets you freeze a particular scene for as long as you like, without interrupting sound recording
  Digital Zoom – Thanks to digital processing, you can enjoy shots with ultra-high magnifications of up to 100:1
  Digital Gain-Up – delivers clear, distinct images in low-light levels, even down to 1 lux!
  Digital Strobe & Digital Wipe – add professional effects to your shooting.

AG-DP800 SUPERCAM
S-VHS FIT 3-CCD Digital Signal Processing Camcorder

- Three high-density 380,000 pixel CCDs with half-pitch pixel offset to achieve over 700 lines of horizontal resolution, a S/N ratio exceeding 60dB and remarkable sensitivity of f8 at 2000 lux result in simply extraordinary image quality. Additionally the Frame Interline Transfer (FIT) CCDs minimize vertical smear, so you maintain impressive picture quality even in very bright illumination.
- Uses advanced digital signal processing circuitry which provides four valuable benefits.
  1) Consistently reliable up-to-spec performance.
  2) Fine adjustment of a wide range of parameters.
  3) Memory storage and instant recall of specific settings.
  4) More flexible and higher quality image processing, as well as easier maintenance.
- Some of the DSP circuits and their functions:
  – CHROMA DETAIL - This function compensates for poor resolution in the high chroma areas of the picture.
  – DARK DETAIL - Determines optimum degree of contour enhancement in dark areas to deliver crisp, natural-looking images
  – HIGHLIGHT COMPRESSION - Expands the dynamic range of the highlighted areas and prevents halation. The highlight compression circuit allows a wide dynamic range producing detailed images even against bright backlight or daylight.
  – FLARE CORRECTION CIRCUIT - Compensates for unsteady black caused by light or by a subject's movements.
- Six Scene File modes. There are two user modes for custom digital parameter settings including Horizontal Detail, Vertical Detail, Chroma and Dark Detail, and Color Correction. The four preset modes are normal, fluorescent, special and sparkling.
- In addition to regular AGC (Automatic Gain Control), Supercam has a Super High Gain mode. At F1.4 this enables shooting under illumination as low as 2 lux while retaining detail and color balance.
- Synchro Scan function allows flicker-free shooting of computer monitors. Electronic shutter increments from 1/6 sec. to 1/100 sec.
- Built-in internal time code generator lets you record with SMPTE LTC/VITC (Longitudinal/Vertical Internal) time code
- 26-pin connector for direct signal output from camera section for easy backups using 2nd VCR.
- 2 hi-fi stereo audio channels with a dynamic range of 80 dB, and 2 linear audio channels with Dolby NR. Normal/Hi-Fi recording is selectable and levels of all 4 channels are controllable. Uses XLR connectors to further ensure high-quality sound.
- Phantom power can be supplied to optional microphone. Power can be switched off to prevent battery drain when not in use.

JVC GY-X2
3-CCD S-VHS CAMCORDER

- Three 1/2" CCD image sensor delivers 650 lines of horizontal resolution
- New micro-lens technology provides exceptional sensitivity of F7.0 at 2000 lux and new LO.LUX mode lets you shoot with almost no light! Now you can shoot superb footage with excellent color balanced at a mere 3 lux illumination
- Variable Scan View allows flicker-free shooting of a computer monitor.
- Quick Record Mode - when turned on the camera is set to the auto iris even if lens is set at manual. Also activated is (ALC) Automatic Level Control and EEI Extended Electronic Iris which provides both variable gain and variable shutter. Now you can shoot continuously from dark room to bright outdoors without having to adjust gain, iris or ND filter.
- Full Time Auto White circuit lets you move from incandescent to fluorescent to outdoor lighting without changing white balance or the filter wheel.
- Genlock input allow synchronization with other cameras.
- Dual output system allows camera output to be connected directly to an external recorder

Canon L2
Introducing the new Canon L2 Hi-8 Camcorder with VL Mount for interchangeable lenses, RC Time Code and digital effect for unlimited creative freedom.

- 1/2" CCD with 410,000 pixels delivers over 450 lines of horizontal resolution
  VL Mount System allows use of a full range of interchangeable lenses from extrawide angle to super telephoto plus, optional EOS-VL adapter allows mounting of over 65 Canon EOS 35mm Autofocus lenses.
- Records RC Time Code while shooting and can also "stripe" RC Time Code to tapes already recorded on other equipment. With RC Time Code the L2 can be connected to an edit controller with RC Time Code capability for frame accurate editing.
- Advanced encoding functions mean the L2 can record much more than audio and video. It will mark tapes for speedy identification, and even find recordings by their date.
- Includes wide range 15:1 zoom lens with special coating to cut flare and ghosts while providing high contrast and natural tonal gradation. The lens also has an 8-blade iris for precision exposure control.
- Provides stunning AFM stereo with the choice of auto or manual level control. To match the audio with video the L2 has a high performance stereo/zoom microphone which lets you select the stereo angle and recording sensitivity.
- High speed Piezo autofocus allows focusing through glass or water. Also provides focus lock and manual focusing.
- Provides two different grips with independent start/stop and zoom controls. Built-in sports finder lets you view the viewfinder from arm's length away.
- Built-in character generator lets you superimpose two lines of up to 16 characters on your recordings. There is also a choice of three date and time displays.
- Variable high-speed shutter from 1/100 to 1/10,000 of a sec.
- Includes a wireless controller which to make it a highly sophisticated edit deck. Includes a full-function shuttle dial allowing easy selection of a range of forward and reverse playback speeds for swift, precise scene location.
- Automatic exposure plus manual control lets you lock the aperture at any setting from fully stopped down to fully open.
- The L2 has a variety of special effects. Add an extra dimension to your video productions with digital image manipulation and striking scene transitions;

  Close-up – instantly doubles the magnification of the lens, giving you a 30:1 zoom
  Slow shutter – four slow shutter speeds allow recording in light levels as low as 0.5 lux or adds artistic after-images to selected scenes.
  Overlap – (dissolve)
  Wipe – this effect slides the picture off the screen while simultaneously replacing it with a new scene.
  Freeze – freezes the picture while sound recording continues uninterrupted.
  Art Freeze – records your scenes as colorful paint-like images.
  Strobe and Art playback modes – six-speed strobe playback can be combined with three levels of solarization effects.

SONY
EVW-300 3-CCD Hi-8 CAMCORDER

- Equipped with three high density 1/2" IT Hyper HAD image sensors. Has an excellent sensitivity of F8.0 at 2,000 lux, high S/N of 60 dB, and delivers over 700 lines of horizontal resolution.
- Provides high quality PCM digital stereo and single channel AFM Hi-Fi recording. Has XLR balanced audio connectors.
- Quick start 1.5" viewfinder with 550 lines of resolution plus Zebra pattern video level indicator and color bar generator
- Quick-start recording – takes only 0.5 seconds to go from REC PAUSE to REC MODE for immediate recording in the field
- Built-in 8mm Time Code generator records absolute addresses. (Either non-drop frame or drop frame mode may be selected.) Furthermore the EVW-300 incorporates a variety of time code features such as Time Code PRESET/RESET, REC RUN/FREE RUN and User Bits.
- A variety of automatic adjustment functions for different lighting conditions are incorporated into the EVW-300:
  ATW (Auto Trace White Balance) – when ATW is turned on optimum white balance is always ensured during recording, even for changes in color temperature. Conventional white balance adjustment is still provided with the Auto White Balance.
  AGC (Automatic Gain Control) – in addition to manual Gain Up AGC provides linear gain up in the range of 0 dB to 18 dB.
  Intelligent Auto Iris – for situations where the lighting between subject and background is different (subject is underexposed) the Intelligent Auto Iris automatically examines the scene and adjusts the lens iris for proper exposure.
- Selectable Gain-up from 1 dB to 18 dB in 1 dB steps for Mid & High positions.
- Clear Scan function – provides a variety of selection of shutter speeds ranging from 60-200 Hz allowing recording of almost any computer display without flicker.
- Compact, lightweight (12 lbs with NP-1B) ergonomic design provides well balanced and extremely comfortable operation.

TOSHIBA
TSC-200
3-CCD Hi-8 CAMCORDER

- 3 ¼" CCD chips mounted with spatial offset technology delivers resolution of 700 horizontal lines
- Low noise design provides extreme sensitivity of F8.0 at 2000 lux. Min. illumination 7.5 lux with excellent color reproduction
- New LNA (low noise amplifier) delivers a S/N (signal-to-noise) ratio of 62dB - the highest achieved for this type of camera
- 26-pin connector outputs Y/C or component video signal allowing hook up to a portable S-VHS, MII or Betacam recorder and simultaneously record with Hi-8.
- Quick-start 1.5" viewfinder needs no warm up time so you never miss a shot. Zebra pattern in the viewfinder alerts operator to excessive video levels.
- Genlock capability allows synchronization with other cameras. Also full calibration functions are built-in as well as color bar generator.
- Variable high speed shutter from 1/60 to 1/2000 second
- Built-in 8mm time code generator records an absolute address to every frame.
- High-performance back electret condenser mic records to all three audio tracks. Low cut filter eliminates wind noise.
- Very low power consumption. Draws only 16 watts per hour allowing 100 minutes of recording time with 1 NP-1B battery.
- Body made of magnesium alloy previously found only on broadcast cameras. Still only 13 lbs. in standard configuration.

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- Designed for working from the back of a van or the trunk of your car. The top loading case has a wide open fold back top that stays neatly out of the way. It's lighter and more compact than shipping cases, thus saving valuable storage space. With other equipment crowded around it the sturdy built-in frame provides added protection.
- Heavy duty shoulder strap & comfortable leather hand grip.
- Carry it in crowds – crush proof aluminum guard protects viewfinder.
- Fits into back seat and fastens securely with seat belt.
- Holds camera with on-board battery attached.
- Lid closes with Velcro for quick-opening or secure with full-length zippers.
- Two trim exterior pockets and clip board pocket.
- Dual purpose rear pouch is an expandable battery chamber or all-purpose pocket.

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SANYO GVR-S950
S-VHS Single Frame Recording VCR

- Single-Frame Animation Controller eliminates the need for separate or computer plug-in animation controllers. Industry-standard protocols, make it compatible with most popular graphic and animation software packages.
- SMPTE Time Code Generator and Reader with Built-in Drop and Non-Drop Frame Read/Write is fully programmable from an external computer and resettable from the front panel.
- Video and Audio Switcher with Two independent Video and Audio Channels. Each video channel contains both composite and S-Video inputs. Each audio channel contains two linear and two Hi-Fi inputs Switching can be performed either manually, or under RS232 or RS422 control. Video and audio channels are switched independently letting you perform break-away edits.
- Auto-Sensing Single RS422/RS232 Input eliminates the need for optional external interfaces. Interface requirements are automatically sensed and adjusted within the recorder.
- Input and Playback Video Processing allows adjustments to the video level of the incoming signal. Signal levels and hue can be adjusted during playback.

JVC

BR-S500U S-VHS Player
BR-S800U S-VHS Edit Recorder
RM-G800U Edit Controller

Fast, accurate and professional style videotape editing is now more affordable than ever. This new "S" editing system, costing thousands less than ever before, consists of the BR-S500U Player/Feeder, the RM-G800U Edit Controller and the BR-S800U Editing Recorder. Linked via JVC's proprietary control bus, these three units offer all of the editing features professionals have come to expect. The VCRs feature a fast, heavy-duty tape drive similar to that used in JVC's renowned "22 Series", and the built-in CTL (Control Track) time code provides unparalleled accuracy and flexibility, while maintaining the ease of use that JVC editing systems are famous for. There is also powerful picture-improvement technology to assure outstanding S-VHS picture quality. Best of all the VCRs feature an open architecture for easy system upgradeability. They have two plug-in extension slots that allow (with optional interface card) them to be configured into professional edit suites computer-based environments or into older JVC editing systems.

EXCLUSIVE JVC CONTROL BUS

Newly developed to provide a smooth upgrade path for video editing professionals at all levels, JVC's proprietary Control Bus is used to interface both units with the RM-G800U Editing Controller for more comprehensive editing capabilities.

OPEN ARCHITECTURE

There are two plug-in extension slots on the rear panels of both the BR-S800U and BR-S500U that accept a variety of optional JVC expansion boards. To build a PC-based editing system, add the SA-K27UA RS-232C interface board. To use with more sophisticated editing controllers, plug in the SA-K26U RS-422 board. Other boards include the SA-K28UA 45-pin board for connection to older JVC editing systems, the SA-N50U DNR board with time base stabilizer, and the SA-R50U VITC/LTC time code generator/reader.

CONTROL TRACK TIME CODE SYSTEM

Built-in time code reader (BR-S500U) and time code reader/generator (BR- S800U) utilize JVC's CTL (Control Track) Time Code System. This system records absolute tape address information (hours: minutes: seconds: frames) on the control track, and provides fast and accurate access to any frame on the video tape. This system is far superior to conventional control track counters that lose reference when the tape is removed from the machine. CTL Time Code can be added to the tape during the recording process or onto an existing recorded tape using the "post stripe" function. For professional VITC and LTC time code operation there is the optional SA-R50U VITC/LTC Time Code Reader/Generator card.

SUPERB VIDEO PERFORMANCE

Incorporates latest picture improvement technologies for razor sharp images, with over 400 lines of horizontal resolution. Digital Y/C separation, along with a chroma noise reducer, chroma aperture correction and a 3-line cross-talk cancellation all combine to offer outstanding image quality, even when dubbing down multiple generations.

32X VARIABLE-SPEED SEARCH

Front-panel search dials featured on both the BR-S800U and BR-S500U provide fast, accurate picture search at up to 32 times normal tape speed in either forward or reverse. This outstanding search capability is possible thanks to the incorporation of a heavy-duty direct-drive mechanism similar to that used in JVC's popular broadcast-standard 22 Series editing recorders.

FOUR-TRACK AUDIO

Each features two Hi-Fi stereo channels with a wide frequency response and a dynamic range of over 80 dB. In addition to the two Hi-Fi tracks, they each have two linear tracks. The linear tracks of the BR-S800U can be dubbed independent of each other and of the video. This is ideal for adding background music or sound effects to an existing audio track, or for more sophisticated editing. There are two audio level meters, switchable between the Hi-Fi and linear channels. Separate input and output (output only on BR-S500U) terminals are also provided for all 4 channels. On the BR-S800U there are four level controls permitting separate adjustment of each channel. Also the channel-2 audio meter doubles as a tracking meter during playback.

RM-G800U EDIT CONTROLLER

- Economical editing alternative for professional editors who require a controller that provides a comprehensive set of basic professional editing functions. Featuring JVC's exclusive Control Bus, the RM-G800U is the most powerful editing controller in its class.
- Has two GPIs allowing automatic triggering of special effects generators, switchers or audio mixers.
- Features automatic assemble and insert editing, audio insert editing, as well as preview/review for checking edits before and after editing, and goto for direct access to any edit point. A capstan bump function is provided to assure greater edit consistency.
- 8-digit LED counter indicates all edit data in either the TC or CTL mode. Switchable between player and recorder.
- The RM-G800U's Jog control is precise and responsive, making it easy to locate any frame on the tape. You can enter the Jog mode directly and switch between the player or recorder at the touch of a button. The Jog dial can also be used to enter and trim edit points and pulse timing from the GPI ports.

BR-S622U/BR-S822U
S-VHS Feeder Recorder/S-VHS Editing Recorder

The BR-S622U and BR-S822U meet the most sophisticated broadcast level requirements. They are equipped with flying pre-rec amp, digital DOC, digital Y/C separator, high precision CNR, improved chroma enhancer, and more. Their "Open-Ended System Architecture" lets you integrate them into advanced high-level edit suites without compromising their cost-effectiveness. You can choose from a variety of optional circuit boards and plug-in modules, including a time-code reader/generator, TBC with component out, and several remote control interfaces. They also have a full range of advanced editing functions, including direct player control, precision search/jog dials, RS-422 interface, high-speed search at up to 32x, and a tiltable control panel.

- Built-in digital Dropout Compensator (DOC) performs dropout compensation for the luminance signal on an all-digital basis. With chroma dropout compensation also being performed you get a stable, high-quality picture.
- An SC leak canceler detects and removes very low-level chroma signals on leaked carriers without interfering with overall signal quality. This helps eliminate much of the deterioration often noticed in repeated dubbing.
- Equipped with high-precision Chroma Noise Reducer (CNR). It conducts chroma noise detection on a pixel-by-pixel basis, allowing it to completely eliminate the color streaking normally caused by lags in CNR phase adjustment. This ensures a much-improved chroma signal-to-noise ratio in playback.
- Luminance Signal Enhancer allows you to select frequency responses of 0 dB, +2 dB, and +4 dB with the luminance signal at 2.5 MHz. High resolution is maintained even in multi-generational dubbing. An automatic equalizer is provided to prevent deterioration of the luminance signal frequency response when using overplayed tapes.
- A Capstan Bump Function operates during preroll. This function assures precise synchronization of the player and recorder during editing. Selectable via the On-Screen Menu, this function can be set to operate at either the player or recorder.
- Features a built-in black burst signal generator. Preparing a black master tape for insert editing is now a simple matter of inserting a blank tape and pressing a button. Simply set the video input switch to "BLACK" and start recording.
- Two Hi-Fi stereo audio channels with a wide frequency response and dynamic range of more than 90 dB. Two linear tracks with Dolby NR (Noise Reduction) are also provided. Audio output is selectable between Hi-Fi and the linear tracks while an audio monitor select switch allows independent monitoring of the Hi-Fi or the linear track. Separate or combined L/R channel monitoring is also possible. Two microphone connectors and a stereo headphone jack with level control are provided. Four recording level controls permit separate adjustment of all audio channels in recording.
- On-Screen Menu system with built-in memory which allows simple dial setting and switching of most basic functions while referring to the counter or on-screen display. Mode selection and initialization are all possible via the menu display, and even functions normally requiring DIP switch resetting can be switched directly, via the menu display. Over 70 items are selectable via the menu including frame servo, TBC mode, Dolby NR, Hi-Fi recording, audio limiter, and preroll times. On-screen warning indications are also provided.
- The BR-S822U has a comprehensive set of editing functions including automatic or manual insert and assemble editing. Editing features include Go-to, Pre-roll, Preview, and Review, providing high-performance cuts-only editing even without a controller.
- The BR-S822U features built-in machine-to-machine editing control capability. This permits control of any deck with RS-422 control directly from the BR-S822U. Player/Recorder select buttons are provided, and time code or CTL readings from the controlled player are displayed on the BR-S822U's counter display. You control all operations including search, FF, REW, edit point entry, and more.

SONY
PROFESSIONAL S-VHS SYSTEM

SVP-9000 Player

SVP-9600 Player/Recorder

The SVP-9000 S-VHS and SVO-9600 are designed as multi-purpose machines with the use of various optical interface boards. By selecting one or more of a particular board, they become dedicated machines for satellite recording, office viewing, video library, sports analysis and editing. At the same time, they adhere to Sonys professional VTR concept of reliable mechanism, rigid construction and easy operation, ensuring reliable and reliable operation in the industrial and professional environment.

They both feature:

- Using the S-VHS format, they deliver superb picture playback and recording. With newly developed Digital Y/C separator maintained picture quality even in composite.
- Newly developed video cross talk canceller eliminates color blur providing more accurate color and sharper images.
- Four channel audio system – Two Hi-fi with a dynamic range of 90dB and two linear channels with Dolby NR.
- Two direct-drive reel motors provide rapid response and smooth operations. Mode transitions such as STOP to REC, FAST FWD to PLAY, STOP to REWIND are instantaneous.
- Picture search from -10 to +10 times normal speed.
- SYNC IN for synchronizing with other video sources
- Automatic repeat and automatic rewind can be accomplished with programmed operation.
- There is a TIMER switch for either REC or PLAY (SVP-9000 PLAY only) when selected automatically executes the selected mode when the power is turned on. This is very useful for unattended operation such as satellite recording.
- Auto head cleaner – each time a cassette is loaded or ejected, a cleaning roller automatically passes over the video/FM audio heads removing tape residue and providing preventive care of the tape heads.
- The SVO-9600 features sensor recording. When video signals are input, it automatically starts recording.
- 19" EIA rack mountable plus adjustable front controls.

Panasonic

AG-1970 S-VHS Hi-Fi Editing VCR

- Uses Amorphous video heads which are superior to conventional ferrite heads and deliver rich, vibrant color reproduction and a high S/N ratio.
- Built-in Digital Time Base Corrector effectively eliminates jitter and distortion. Playback is high quality, stable and with natural colors.
- Built-in digital filter which helps the AG-1970 achieve even more accurate Y/C separation. Also a noise filter is included in the circuitry.
- Two Hi-Fi stereo tracks with a frequency response from 20Hz to 20,000 Hz and a 90 dB dynamic range. (Has one linear audio track.) Also has stereo recording level control, headphone monitor terminal and mic input terminal.
- Does assemble edit, video insert and audio dub. Flying erase head for smooth, clean, seamless edits. 5-pin edit terminal makes it easy to set up an editing system.
- Jog/shuttle Dial for varied playback from slow motion to high-speed search (shuttle) and frame-by-frame picture control in forward and reverse (Jog).
- Outputs the audio track during search operations for cuing and quick confirmation of audio recording.
- What makes the AG-1970 the perfect editing VCR? The advanced dual-loading mechanism features a quick response time, exceptional tape protection, remarkable tape control accuracy - all make for outstanding editing precision and ease.
- Automatic head cleaner removes dust and other particles from the heads to help maintain optimum performance.

AG-DS840/AG-DS850
S-VHS Slow-Motion Editing System

These state-of-the-art machines provide the quality required for professional video production and even broadcast systems. They offer features such as Digital 3-D Time Base Correctors, Digital Slow Motion, and Digital Noise Reduction. They also have built-in Time Code Generator/Readers, and component video output for connection to MII and Betacam machines.

- They provide clear, noise-free, high quality slow playback. Playback speed, including Digital Still is selectable in 10 steps (-¼, -⅓, -½, -⅔, -⅚, +⅓, +½, +¾, +¼).
- 3-dimensional digital TBC with a correction range of one field. With the VCRs continuously retaining one field in memory, the data is used for 3-D type processing thereby providing excellent dropout compensation.
- Digital Signal Processing for improved picture quality, and for maintaining uniform picture quality during editing. A Chrome Aperture Compensation (CAC) circuit eliminates color blurring and expands chroma bandwidth. Other digital processing circuits include:
  - Dig. Noise Reduct. (DNR): Processes Y & C signals separately to boost S/N Ratio by minimizing noise during playback.
  - Digital Comb Filter: Advanced 3-dimensional system for total Y/C separation providing reduced color & luminance blurring.
  - Switching Noise Mask Circuit: Effectively eliminates noise caused by head switching during slow motion playback.
- Employs amorphous video heads that have a higher magnetic coercivity than conventional ferrite heads. Expanded color signal frequency response from the amorphous heads enhances picture quality by minimizing color blurring.
- They have built-in LTC/VITC (Longitudinal/Vertical Interval) time code reader/generators for absolute frame accurate editing.
- Equipped with component outputs allowing easy connection to other component video equipment. This allows high quality transfer of S-VHS source material to Betacam or MII.
- IQ (Intelligent Quest) mechanism delivers precise, high-speed operation, plus the reliability needed. The dual-loading system achieves high-speed response while protecting tapes and heads from damage. The tape transport mechanism uses five direct drive motors, including two reel drive motors. Automatic head cleaning is also provided.
- Capstan Control System with large capstan spindle allows high-speed search at 32x normal speed (with color picture).
- 4 channel audio – 2 hi-fi stereo channels with dynamic range of 90dB as well as 2 linear channels with Dolby NR. Each audio channel has its own input (AG-DS850 only) and output with individual channel-level setting capability and uses XLR connectors.
- Provide 16:9 wide aspect compatibility, so they are fully equipped for the next generation of televisions.
- 3 rack units high, they are unbelievably compact for easy space saving installation. 19" rack-mountable with optional AG-M730.

MII "W-Series" AU-W32H/W33H/W35H

For years, Panasonic's MII VCRs have consistently brought professionals the superior broadcast quality of component recording. Now the "W-Series" brings the power of quality component recording to an ever wider range of users. They are equipped with 3-D type TBC for exceptional playback stability and excellent dropout compensation. All models have built-in SMPTE time code readers and generators (AU- W35H) and they each feature color framing — so essential for animation and editing.

- Uses true component recording technology, with separate tracks for the luminance (Y) and chrominance (C) signals. Delivers vivid colors and super sharp details— thanks to the full 4.5 MHz luminance bandwidth. Because the signals never mix during recording, the quality remains exceptionally high, even during repeated editing and dubbing.
- Each is equipped with a digital 3-dimensional type TBC boasting a correction range of one full field (262.5 H lines). The memory continuously retains an entire video field of information in memory, and is used for 3-D processing, providing excellent dropout compensation and horizontal and vertical jitter.
- All models have 4 high-quality audio channels — 2 Hi-Fi channels, with dynamic range of 85 dB & 2 linear channels with Dolby NR.
- "W-Series" models offer high precision time code editing, with ± 0 frame accuracy. Both players include a SMPTE time code reader, while the AU-W35H has a time code reader/generator. The AU-W35H records VITC and LTC separately, and MII VCRs automatically switch between them during playback, according to tape speed, for consistent, reliable time code identification. User bits are recorded in either LTC or VITC (or both), with the capability of making either one (or both) an internally generated time of day clock.
- AT (Auto Tracking) is a standard feature on the AU-W33H player. When used with an edit controller or the AG-A300 Slow Motion Controller, the AU-W33H provides noiseless still, slow-motion and quick-motion playback with a range of -1x to 2x normal speed. It also allows fine control over playback speed – highly effective for situations where "fit and fill" capability is required.
- They allow TBC adjustment on the VCRs itself. Conveniently located adjustment knobs for all TBC controls, including video level, chroma level, chroma phase, setup level sync and subcarrier phase. A 15-pin terminal allows external TBC remote control.

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B&H PHOTO-VIDEO

SONY VISCA

CVD-1000 Vdeck Hi-8 Computer VCR

Computer-controlled Hi-8 player/recorder. You connect the Vdeck to the serial port of your computer and then, using software that incorporates Sony's VISCA Protocol you will enter a new age of machine control. With the Vdeck and VISCA software you can seamlessly integrate audio, video, text, and graphics to create polished in-house video for training, product demonstrations, and corporate communications.

- Uses Hi-8 format which delivers over 400 lines of horizontal resolution in record and playback modes.
- Records Sony RC Time Code to any 8mm or Hi-8 tape plus it can dub RC Time Code to any existing tape.
- With RC Time Code you can search for specific frames of video. The Vdeck reads RC Time Code even in fast forward or reverse so you don't have to switch to playback mode to read the Time Code. This allows for even faster and more convenient search of scenes.
- Has AFM Hi-Fi stereo plus a PCM digital audio track. You can use the PCM track to dub digital audio background music or high fidelity narration.
- Has 3 video inputs (S-Video, 2-composite) and 2 stereo audio inputs. The Vdeck features a built-in switcher for transparent integration of multiple audio and video sources.
- Built-in microphone minijack allows connection of a mic to the Vdeck letting you add narration to your presentations.
- Microphone/Audio Mixer - the Vdeck lets you mix your audio and microphone sources onto the AFM and/or PCM tracks while recording.
- Built-in fader lets you fade audio, video or colors during playback to give your presentations a more professional look. You can also fade live video. Create special effects by fading color to black & white (or vice versa). Fades can be preserved by recording onto a second VCR.
- You can write or search for index markers, a feature found on most Sony 8mm camcorders and VCRs
- The Vdeck can read and write data code, allowing date and time information to be stored on the tape as data. Moreover it's the first video product that lets you search for a specific date and time on your tape.
- Includes RM-S1000 wireless remote commander designed for stand-alone presentation use, putting the control in your hands. Use cue and review modes to rapidly scan the contents of your tape.

EVO-9720

Hi8 Dual Desktop Editing Machine

BUILT-IN EDITING CAPABILITIES

- The EVO-9720 provides two ways for assemble editing when using the supplied RM-E 9720:
  - Quick-Edit - By simply pressing the EDIT button at the desired point on the source tape, pressing END at the out-point and repeating the process, a program is easily assembled, segment-by-segment on the master tape.
  - Program Edit - assemble video segments that are not adjacent to one another on the original source tape. The EVO-9720 can memorize up to 99 program events and realizes automatic sequential editing of pre-assigned scenes. To change a certain event in the program, simply recall the event and modify as desired. The editing list of the programmed time code data can be stored in the data area of the original source tape. The data can also be recalled, added, inserted or deleted as desired.
- Insert Editing - The EVO-9720 provides separate editing of the video and audio signals.
- Using the video insertion function, video and AFM audio segments can be edited into an existing PCM (Pulse Code Modulation) digital sound track. To verify the edit, a simulated edit can be monitored by pressing the PREVIEW button before the edit is actually done.
- The EVO-9720 allows audio dubbing on the PCM tracks. Background music or commentary can be added or inserted. During editing, audio from an external microphone can be mixed with the original audio from a player or from LINE IN and recorded on both the PCM and AFM audio tracks.
- Incorporates a digital field memory, allowing noiseless 1/5 normal speed slow motion pictures and a clear freeze picture to be played back during editing. This makes it possible to create a program with special effects.
- A built-in 8mm time code generator and reader. When using a tape without time code, you can stripe time code by simply pressing the Time Code Write button. (Post striping of 8mm time code will not affect any of the video and audio signals) Also reads RC (Re-writable Consumer) time code.

SUPERIOR PICTURE QUALITY

- The player portion of the EVO-9720 employs a digital noise reducer for luminance and chrominance signals, providing superior picture quality. Noise reduction levels are selectable from an on-screen display in accordance with picture conditions, CNR (Chrominance Noise Reduction) offers High, Middle, Low, and Off positions. YNR (Luminance Noise Reduction) offers High, Middle Low, Very Low and Off positions. Jitter and skew are eliminated at the same time to give clear, stable pictures.

A/B ROLL EXPANSION CAPABILITY

- When you've outgrown the cuts-only functionality of the machine, the EVO-9720 lends itself to A/B roll expansion capability. Both the player and recorder have RS-232 serial ports that allow for external control. They can be directly connected as Source A and B to an external computer and/or the Sony FXE-100 Video Editing System.
- To further allow configuration into an A/B roll system there are external sync input terminals for both the player and recorder. When the external sync mode is set to Auto, the EVO-9720 synchronizes itself with the incoming reference signal.

ADDITIONAL FEATURES

- To provide for smoother transitions from scene to scene, the EVO-9720 has a video fader. Black or white fading can be selected as well as a duration time of 0.5 or 2 seconds.
- There is a GPI (General Purpose Interface) output with timing adjustment for controlling external devices. External devices like the Video Toaster or Character Generators can be controlled. GPI timing of between 00 and 60 frames is selectable.
- The EVP-9720 incorporates both PCM stereo and AFM stereo recording for superb sound quality. PCM audio can be inserted or re-recorded for audio only edits in the Audio Insert mode.

COLOR MONITORS

PVM-1350

13˝ Presentation Monitor

- Employs a P-22 phosphor fine pitch CRT to deliver stunning horizontal resolution of 450 horizontal lines.
- Equipped with beam current feedback circuit which eliminates white balance drift for long term stability of color balance.
- Has analog RGB, S-video and two composite video (BNC) inputs as well as 4 audio inputs.
- Automatic Chroma/Phase setup mode facilitates the complex, delicate procedure of monitor adjustment. Using broadcast standard color bars as a reference, this function automatically calibrates chroma and phase.
- Chroma/Phase adjustments can also be easily performed with the monochrome Blue Only display. In Blue Only mode video noise can be precisely evaluated.
- Factory set to broadcast standard 6500K color temperature
- Provides an on-screen menu to facilitate adjustment/operation on the monitor. The on-screen menu display can be selected in English, French, German, Spanish or Italian.
- On power up, automatic degaussing is performed. There is also a manual degauss switch to demagnetize the screen.
- Sub control mode allows fine adjustments to be made on the knob control for contrast, brightness, chroma and phase. The desired level can be set to the click position at the center allowing for multiple monitors to all be controlled at the same reference level.

PVM-1351Q

13˝ Production Monitor

Has all the features of the PVM-1350 *PLUS* -

- Is also a multisystem monitor. It accepts NTSC, PAL and NTSC video signals. NTSC 4.43 can also be reproduced.
- Equipped with a SMPTE 259M Serial Digital Interface. By inserting the optional serial digital interface kit BKM-101C for video and the BKM-102 for audio the PVM-1351Q can accept SMPTE 259M component serial digital signals.
- Equipped with RS-422 serial interface. With optional BKM-103 serial remote control kit all of the monitor's functions can be remotely controlled with greater confidence and precision.
- Equipped with input terminals such as component (Y/R-Y/B-Y), analog RGB, S-video, 2 composite video (BNC) and 4 audio terminals for complete flexibility.
- Aspect ratio is switchable between 4:3 and 16:9 simply by pressing a button.
- Underscan and H/V delay capability. With underscan, entire active picture area is displayed. Allows you to view entire image and check the picture edges. H/V delay allows viewing of the blanking area and sync/burst timing by displaying the horizontal and vertical intervals in the center of the screen.
- Color temperature switchable between 6500K/9300K/User preset. 6500K is factory preset. 9300K is for a more pleasing picture. User preset is 3200K to 10,000K.

PVM-1354Q/PVM-1954Q

13˝ and 19˝ Production Monitors

All the features of the PVM-1351Q *PLUS:*

- SMPTE C standard phosphor CRT is incorporated in the PVM-1354Q/1954Q. SMPTE C phosphors permit the most critical evaluation of any color subject. Provides over 600 lines of horizontal resolution.
- The PVM-1354Q mounts into a 19-inch EIA standard rack with the optional MB-502B rack mount bracket and SLR-102 slide rail kit same as PVM-1351Q. The PVM-1954Q mounts into a 19-inch EIA rack with the optional SLR-103 slide rail kit.

SONY

EVO-9650

Hi-8 Single Frame Recording VCR

- Facilitates fast and accurate single frame recording which is indispensable for animation creation. With a short 3-second pre-roll the EVO-9650 is twice as fast as any other machine.
- Built-in RS-232 interface directly connects the EVO-9650 to an external computer, allowing all of the VCR operation commands to be directly communicated to the computer. The RS-232 baud rate can be selected from 9600/4800/2400/1200 bps.
- Records in Hi-8 format which delivers over 400 lines horizontal resolution, high S/N ratio and superior picture quality.
- There is separate DNR circuitry for both the Y (luminance) and C (chrominance) signals providing playback of superior images. There are three noise reduction levels for CNR and four levels for YNR. These levels are selectable according to picture quality.
- To ensure efficient operation, a variety of VCR modes can be easily customized within the PRESET MENU. The menu is superimposed on a video monitor screen allowing easy VCR mode setting. Fourteen menus are incorporated in the PRESET MENU offering options for digital CNR/YNR levels, time code display position, still timer, RS-232 baud rate, etc.
- Fully compatible with the Video Toaster 4000, no single frame controller required. Most animation programs work directly without a controller. They include Autodesk 3-D Studio, AT&T Topaz, BYTE-by-BYTE Sculpt 4-D, WaveFront Video Composer, and Personal Visualizer.
- Incorporates a memory device for frame/field storage to provide an accurate frame image in recording and playback. This memory can be used in either the BUFFER or the DNR mode.
  - **–DNR** (Digital Noise Reducer) A clear and stable picture is played back with no guard band noise and no picture movement. Field or frame can be selected. DNR mode is great for image analysis and medical applications.
  - **–BUFFER** for fast recording of sequential frames. Stores a frame in its buffer thus freeing up the computer to proceed immediately to the next frame. During this time the EVO-9650 performs its pre-roll and edit functions. This effectively cuts in half the time needed for single frame recording
- Built-in 8mm time code generator records an absolute address on every frame allowing absolute frame accuracy.
- Provides a variety of digital effects like 3x3 matrix display, 2x zoom and 1/30, 1/10, 1/5, 1/3 times normal speed in a noiseless slow motion playback
- Additional audio, such as music or commentary, can be dubbed to existing video by simply pressing the AUDIO DUBBING button. Additional audio is recorded on the PCM sound track.
- Optional EVBK-65 RGB encoder board allows the EVO-9650 to accept RGB signals, ensuring optimum picture quality recording. The EVBK-65 encodes 15.734KHz analog RGB signals to Y/C signals. This board also has sub-carrier lock capability.
- Optional EVBK-66 VISCA interface board allows communication with VISCA control signals. The EVBK-66 translates VISCA control signals into the Sony standard RS-232C protocol.
- Supplied RM-9650 Remote Control covers not only basic functions, but also provides digital special effects, assemble/ insert editing and jog/shuttle picture search up to 19x normal speeds.

EVO-9800A

Hi-8 Player/Recorder/ Edit Feeder

The EVO-9800A is a versatile and innovative Hi8 VCR for professional video production. Features include, Digital Chrominance Noise Reducer, AFM and PCM audio system, 8mm time code, RS-422 (9-pin) interface, XLR connectors and external sync input.

- The EVO-9800A incorporates a built-in Digital Chrominance Noise Reducer (Digital CNR) to provide higher quality pictures. When the CNR mode is set to ON, chrominance signal-to-noise ratio is improved. At the same time, the field store used in the noise reducing process removes jitter to give clear, stable pictures.
- The EVO-9800A provides two channels of high quality PCM digital audio and a single channel of AFM recording systems. The dynamic range for PCM is 80dB. The EVO-9800A also provides balanced audio inputs and outputs via XLR connectors to provide correct interfacing with professional audio equipment.
- Jog/Shuttle for picture search - The SHUTTLE mode provides high speed picture search of -17 to 19 times normal speed. Frame accurate picture search is available in the JOG mode to locate editing points. This greatly simplifies editing operations.
- Equipped with a built-in 8mm time code generator to record an absolute address on the video tape and to perform time code based editing. The 8mm time code is recorded between the video and the PCM audio tracks to identify each frame. The time code data is converted and transmitted via 9-pin (RS-422 serial) interface.
- If the tape was recorded with no time code, you can subsequently insert 8mm time code on the tape. Alternatively, existing time code can be overwritten with new time code. There is no need to lose a generation to record 8mm time code.
- Equipped with RS-422 (9-pin) serial interface. This allows it to be configured into editing systems with the same protocol. All editing functions are be controlled via this interface. Time code also is transmitted through the 9-pin interface.
- Dial Menu Operation employed for maximum ease of operation allowing an operator to use the search dial to easily set various VTR operational modes; time code preset, time code superimposition, self-diagnostics display, digital hour meter information, etc.
- The EVO-9800A is 3-unit high and can be installed into a 19-inch rack by using the optional RMM-980 Rack Mount Kit.
- The angle of the EVO-9800A control panel is adjustable to angles of a 30°, 60° and 90° angle for ease of operation.

EVO-9850 Hi8 Editing Recorder

- For enhanced picture quality, there is a built-in digital noise reducer for both the chrominance and luminance signals. In the CNR (Chrominance Noise Reducer) mode you can select low or high level of noise reduction according to picture conditions.
- Equipped with four channels of audio. Two AFM Hi-Fi stereo tracks plus two PCM digital stereo tracks. Each channel has balanced XLR inputs and outputs, plus there is individual level volumes for each track
- Assemble and insert editing modes. In the insert mode there is independent editing of video, PCM-1, PCM-2 and time code.
- Built-in TBC (Time Base Corrector). With TBC the EVO-9850 outputs highly stable video signals. A digital drop-out compensator is also built-in. TBC adjustments can also be remotely controlled with the optional BVR-55 TBC Remote Control Unit.
- Absolute frame accuracy for video editing and single frame recording. Accuracy of ±0 frames is achieved with advanced servo system, quick response mechanism and built-in 8mm time code reader/generator.
- The EVO-9850 is equipped with a built-in 8mm time code generator. Since the 8mm time code is recorded between the video and the PCM audio tracks in a separate and dedicated location, 8mm time code insertion or overwrite is possible without losing a generation. An RS-422 9-pin connector is utilized for communicating edit command and time code data. The 8mm time code is output as SMPTE time code through the RS-422 connection to the edit controller.
- With the optional EVBK-100 the EVO-9850 inputs and outputs SMPTE time code data via BNC connectors. Accordingly the EVO-9850 can feed time code to another VCR or can lock to an external time code.
- The Jog/Shuttle mode provides high speed picture search from -17 to 17 times normal speed.
- To minimize picture deterioration during the editing process, the EVO-9850 incorporates Dub In/Out (7-pin) connectors, enabling direct transmission of separate luminance and chrominance signals to another EVO-9850 or to Sony's U-matic editing recorders.
- With the optional RMM-980, the EVO-9850 can be installed into a 19-inch EIA standard rack.
- External sync input to lock onto external reference video signals. This provides for synchronization with other video equipment and easy configuration into A/B roll systems.
- For customized operation there is a Dial Menu. You can set VCR operation modes like time code preset, time code superimpose, self-diagnostics display, with the search dial.

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AZDEN

PRO SERIES VHF WIRELESS MICS

The **AZDEN PRO SERIES** brings you high performance VHF wireless at a price you can afford. Built around a two-channel design they allow selection of a frequency for the cleanest signal - delivering clean, reliable RF performance for up to 250 feet. The Pro Series includes handheld and lavalier mic systems as well as the WMS-PRO which includes a lavalier and handheld mic.

They All Feature:

- All have two switchable frequencies - 169.445 and 170.245 MHz and a range of 250 ft.
- High performance VHF transmitters and receivers incorporating SMD (small mounted device) technology
- Compact receivers which connect to the camera's external mic jack and attach to the camera with supplied shoe mount or velcro
- LED indicators for battery condition, transmit and receive operation

COMPLETE SYSTEMS

WMS-PRO

- Professional VHF wireless system with 250 ft. range
- Two switchable frequencies (169.445 and 170.245 MHz)
- Includes handheld and lavalier mic for extra flexibility
- Compact transmitter attaches to belt or fits in a pocket
- Includes earphone monitor and leatherette carrying pouch
- Battery-powered receiver comes with belt-clip, velcro and shoe mount for added versatility 149.95

WLX-PRO

- Sensitive lavalier mic with attached tie clip
- Lightweight belt-pack transmitter with two frequencies
- Includes wind screen, earphone monitor, shoe mount and velcro 139.95

WHX-PRO

- Handheld microphone with built-in transmitter
- No wires, no beltpack, no tangle-hassle free
- Operates on one AA battery for up to 8 hours
- Has a combination on/off-mute switch for quiet switching
- Includes shoe mount, velcro, earphone monitor 179.95

ECZ-990 SHOTGUN

- Short electret condenser supercardioid shotgun with two positions, wide and narrow 69.95

PRO SERIES COMPONENTS

WL/T-PRO

- Lavalier mic with belt-pack transmitter
- Same as WLX-PRO except without receiver
- Now owners of the WHX-PRO can combine the WL/T-PRO and have a complete system of one handheld and one lavalier mic with receiver 99.95

WM/T-PRO

Now owners of the WMS-PRO can get a completely wirefree VHF handheld microphone with transmitter built in.

- Combine it with the receiver from the WMS-PRO or WLX-PRO and you now have the ultimate quality microphone for interviews or pass around
- 3-position switch for on, off and "standby" for quiet switching
- Choose from either of the 2 switchable frequencies for the cleanest sound 119.95

WR2-PRO

- Unique new receiver which allows you to use any two Pro Series mics simultaneously.
- Each transmitter can be from 10 to more than 250 ft. from the receiver.
- Size of a cigarette pack the WR2-PRO mounts on a camera with supplied shoe mount or velcro
- Operates on a 9 volt battery and with optional adapters on 12 volt DC or 120 volt AC 179.95

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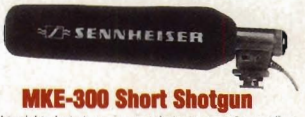

MKE-300 Short Shotgun

- Lightweight electret condenser mic to support the excellent video capabilities of most camcorders with the superior audio they deserve.
- Ideal for mounting on camcorders with an integrated shoe assembly and an extremely lightweight compact design.
- Tight, supercardioid polar pattern has the ability to pick up only those sounds that correspond to the scene being filmed and rejects any disturbing ambient noise.
- Integrated wind screen eliminates handling and wind noise.
- Operating time of over 200 hrs. using its own built-in battery so will not put added strain on your camcorders already limited power supply 189.95

NEW! K6 MODULAR ELECTRET MULTIMIKE SYSTEM

This rugged system has separate capsules and a powering module that can be combined to produce a wide variety of microphones. It converts quickly from one type of microphone to another by simply threading together various system components. All capsules use back-electret technology for uncompromised quality. Output of the powering modules is balanced, low impedance (200W) and terminates in a standard 3-pin XLR connector. The K6 series was designed to bring studio quality sound to the broadcast and field recording market. The K6 power supply can accept microphone capsules ranging in polar pattern from omnidirectional to highly directional shotgun, as well as special application lavalier microphones.

K6

Microphone handgrip and power supply capable of battery/phantom powering all microphone capsules in this series. One "AA" battery supplies power for approximately 150 hours or phantom power (12-48 volts). The K6 power supply has an integrated bass roll off switch and on/off switch with LED indicator for battery condition 194.95

ME 66

Short shotgun capsule. All sound coming from the rear and sides of the ME66 is greatly attenuated, thus allowing this microphone to pick out specific sounds in noisy environments. Great for interviews in crowded situations, as a camera microphone for electronic news gathering (ENG), for unobtrusive theater sound reinforcement and as a podium mic. Frequency response: 50-20KHz ± 2.5 dB 204.95
ME66 with K6 Powering Module 397.95

ME64

Cardioid capsule. Feedback resistant due to its well defined directional polar pattern. This feature, as well as its extended frequency response, make this microphone capsule ideal for use in sound reinforcement or recording in noisy environments. Frequency response: 50-20KHz ± 2.5 dB 144.95
ME64 with K6 Powering Module 334.95

ME62

Omnidirectional capsule. Very broad and smooth frequency response, without proximity effect. Its low handling noise and integrated pop screen make it ideal for interviews and live recording. Frequency response: 20-20KHz ± 2.5 dB 119.95
ME62 with K6 Powering Module 309.95

SHURE

FP32A PORTABLE STEREO MIXER

This small and rugged portable mixer is well equipped to handle the demands of EFP, ENG, live music recording or any other situation that requires a low noise high performance mixer.

- High quality-low noise electronics, perfect for digital recording and transmission
- Three balanced inputs, two balanced outputs plus tape out and monitor
- Supports all types of condenser mics with internal phantom supply
- Inputs can be switched between mic and line level
- Each channel has own pan pot
- Each channel has illuminated meter and peak indicator
- Two units can be cascaded to provide six input channels
- Internal 1KHz oscillator for record and send level calibration
- Internal (2x9V alkaline batteries) or external power
- Switchable low cut filters

$1379.95

MACKIE

MicroSeries 1202

Ultra-compact 12 channel audio mixer featuring the same specs and performance as the proven CR-1604. In less than 1 sq. ft. of work space it provides 4 low-noise/high headroom mic inputs with +48V phantom power, 4 bal./unbal. mono inputs, 4 stereo inputs, 2 AUX sends per channel, 2 stereo effects returns, 4 channel access inserts, tape in/out, 2 band EQ, headphone monitor w/level control, 12 LED peak meter display, sealed potntiometers, rugged steel construction and built-in power supply.

CR-1604

Sixteen-channel audio mixer designed to deliver exceptional performance in a wide range of situations, including studio recording, live recording, live music PA systems, broadcasting studios, and high quality installed systems. Exclusive mix amp technology delivers 2X more headroom than ordinary mixers, along with the lowest distortion and highest possible S/N ratio. Convertible design allows physical format to be changed between tabletop, jacks-to-top and rach mount with jack pod rotated 90° to back. Rack mount brackets included.

SAMSON

MR-1 Wireless System

- The MR-1 micro receiver is a professional VHF wireless receiver measuring less than 4" long and 2" wide.
- FCC licensed in 14 channels from 174 MHz to 213 MHz.
- Truly switchable balanced mic level (600 ohms) to unbalanced (-10 dBm) output.
- dbx noise reduction to simultaneously increase dynamic range and eliminate noise.
- Receiver squelch, level & headphone level output controls.
- Can be powered by a 9V battery for 10 hours.
- SH-2 hand-held transmitter can be used with mic elements like Shure SM 58 dynamic mic or Audio Technica Pro 4.
- ST-2 (L) body pack transmitter can be used with leading lavalier mics like Sony ECM-144 or Audio Technica 831.

Lavalier (clip mic) Systems

- ST-2(L)ECM-144 Transmitter with Sony mic & MR-1 Receiver 367.95
- ST-2(L) ECM-44 Transmitter with Sony mic & MR-1 Receiver 419.95
- ST-2(L) AT 831 Transmitter with Audio Technica unidirectional mic & MR-1 Receiver 419.95

Hand-Held Systems

- SH-2/PR4 Audio Technica Dynamic mic element & MR-1 Receiver 369.95
- SH-2/58 Shure SM58 Dynamic mic element & MR-1 Receiver 434.95
- SH-2/85 Shore SM-85 condenser mic element & MR-1 Receiver 592.95

SUPER TD SERIES TRANSMITTERS

For the serious professional who wants true step-up quality features. Lavalier (clip mic) systems each includes:

MR-1 Micro Receiver, TX-3 Body-Pack Transmitter, Lavalier Mic with Multi Pin Plug

Sony ECM-144 ..... 507.95 Sony ECM-44 ..... 544.95
Sony ECM-55 ..... 653.95 Sony ECM-77 ..... 724.95
Senheiser MKE-2 ..... 747.95

Fostex

RD-8 Multi-Track Recorder

This new digital multitrack recorder is designed specifically for the audio professional. With its built-in SMPTE / EBU reader/generator, the RD-8 can stripe, read and jam sync time code - even convert to MIDI time code. In a sync environment the RD-8 can be either Master or Slave. In a MIDI environment it will integrate seamlessly into the most complex project studio, allowing you complete transport control from within your MMC (MIDI Machine Control) compatible sequencer.

- Full transport control is available via the unit's industry-standard RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48KHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Slip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- All of this contributes to the superb sound quality of the RD-8. The audio itself is processed by 16-bit digital-to-analog (D/A's) converters at either 44.1 or 48KHz (user selectable) sampling rates, with 64X oversampling. Playback is accomplished with 18 bit analog-to-digital (A/D's) and 64X oversampling, thus delivering CD-quality audio.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. Eight tracks on S-VHS tape allow much wider track widths than is possible on other digital tape recording formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-fade time is fully controllable in machine to machine editing. Table of Contents data can be recorded on tape. When the next session begins, whether on your RD-8 or another, you just load the set up information from your tape and begin working. Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT controllers. Your tapes will also be playable on any other ADAT deck.
- In addition to familiar transport controls, there are a number of logical, user friendly features. This unit is the only one in its class with an on-board, back-lit variable contrast LCD display. It provides all of the information you'll need to keep track of offsets, punch points, generator functions and other pertinent data. Three function keys, combined with the HOME, NEXT and UP/DOWN buttons, enable you to navigate the edit menus effortlessly. If you need to have the front panel controls at your console, or elsewhere, the optional model 8312 remote control gives you remote command of the most common functions.

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B&H PHOTO-VIDEO

I.DEN IVT-7

DIGITAL TBC/FRAME SYNCHRONIZER

- Will time base correct & transcode inputs from Hi-8, S-VHS, VHS-DUB, 3/4", 3/4" VCR-DUB and composite video
- Use as a frame synchronizer, synchronizing outside satellite, microwave and camera feeds with studio signals
- 3-5 dB chrominance and luminance noise reduction
- Full Proc amp controls, drop out compensator
- Y/C delay adjustments, field and frame freeze
- Wide 5.5 MHz frequency response offers 450 lines of resolution. Full 8-bit professing and a 58 dB S/N ratio
- Built-in RS-170 sync generator with genlock input and black burst output **1795.00**

FutureVideo

V-STATION 3300 for Toaster

- V-Station 3300 for Toaster is an integrated software and hardware solution for precise A/B Roll editing on your Amiga/Toaster system. The advanced multi-tasking, multiple-event A/B Roll editing software provides you with direct communication and control over your Video Toaster. The three VTR controller unit provides the neccessary machine control and computer interface.
- The V-Station 3300 for Toaster system fully integrates the power of A/B roll multi-event edit control with the versatility of the Video Toaster's effects, framestores, and character generation. You'll appreciate the easy-to-read software screens and the comprehensive online help system.

HOTRONIC AP41

STAND ALONE TBC/ FRAME SYNCHRONIZER

- Compatible with S-VHS, Hi-8 and U-Matic SP equipment
- Frame synchronization with full frame memory synchronizes outside satellite, microwave and feeds with studio signals
- 4 times sub-carrier sampling, 8-bit resolution
- Adjustable horizontal and vertical blanking
- Proc-amp controls are presettable. Each control has a maximum useful dynamic range. Front panel buttons select different operational modes.
- Optional pixel by pixel DOC (Drop-out compensator)

AP41-SF

- Same as above plus S-Video output, freeze frame/field, Y/C adjustment and 16-speed strobe

AP41-SP

- Same as above plus wide-band comb filter (full bandwidth in all modes)

SUNRIZE INDUSTRIES AD 516 and Studio 16

The Complete Digital Audio Solution

The AD 516 is a professional quality 16-bit high fidelity sound board and hard disk recording system for the Amiga. It includes the feature packed Studio 16 software that allows you to perform all traditional audio post-production tasks. You can create sound effects, edit and replace dialog, and build multichannel soundtracks in the digital domain.

- Record, edit and playback directly off hard disk
- Play up to 8 simultaneous tracks off one or multiple hard disks in real time.
- Use a mouse to slice up and rearrange sound quickly
- Mix tracks with no generation loss
- Synchronize background music with your productions
- Fade, cross fade, or eliminate sections of audio
- Create unlimited variations of echoes, flanges, and choruses
- Optional Video Toaster Handler expansion module lets you play audio during many of the Toaster's digital video effects.

RGB COMPUTER

AMILINK

Amilink CIP

Amilink CIP is an Amiga-based A/B roll edit controller. It is a combination of hardware and software that provides flawless control of three VCRs. It is also the most complete personal video editor for the Video Toaster. It controls low-cost industrial VCRs like the Panasonic AG-1970 or with Control L protocol like Sony EVS-3000 and SLV-R1000. You can use three of the same or in any combination. Best of all, Amilink CIP is upgradeable for professional machine control. To upgrade, you buy an upgrade kit that includes new software and professional level control cards.

The system includes a new version of Amilink software designed especially for the Toaster 4000. With the new Amilink VT-4000 software, the Video Toaster is seamlessly integrated into your editing suite.

Machine Control

- Choice of joystick, mouse, keyboard and trackball, plus an optional jog/shuttle editing keyboard
- Industry standard keyboard layout (CMX/GVG)
- Auto calculated GPI, plus 48 additional GPI triggers per edit with optional hardware
- Controls industry standard audio mixers

Edit List Management

- Sophisticated search list by edit comment, content or number
- Import/Export CMX 3600 edit list on MS-DOS & Amiga-DOS
- Automatic edit list back-up
- Edit tail cleaning, list rippling, multi-field sorting
- Optimized edit list auto assembly with special integration

Editing Control

- Preview, Perform, Review and Auto review functions
- Multi-set, Multi-trim • Reverse play and auto review
- Pre-Roll, Post-Roll and Preview select

Edit Modes

- Provides for multiple audio/video splits per edit event
- Open ended immediate/delayed transition edits
- Performs all edit modes plus "Music Video Mode" for easily synchronizing edits to music.
- Integrate graphics, animation and character generation
- Scene-based editing with advanced park and perform features
- Cut and Paste EDL management

Amilink AL-3Ni Professional

Amilink AL-3Ni is the professional version of Amilink. It is designed exclusively for machines equipped with RS-422 9-pin serial interface. Amilink AL-3Ni is actually 2 edit systems in one, including both Windows and Amiga software.

Machine Control

- Controls up (Sync-roll) to 16 source VTRs and 4 record VTRs
- Choice of joystick, mouse, keyboard and trackball, plus an optional jog/shuttle editing keyboard
- Industry standard keyboard layout (CMX/GVG)
- Auto calculated GPI, plus 48 additional GPI triggers per edit with optional hardware
- Single frame animation module standard at no extra cost
- Dynamic motion control/auto tracking support
- Controls industry standard audio mixers
- Reads VITC and LTC time code, plus fully supports SMPTE Drop-Frame and non Drop-Frame, mixed and PAL/EBU

Edit List

- Sophisticated search list by edit comment, content or number
- Import/Export CMX 3600 edit list on MS-DOS & Amiga-DOS
- Automatic edit list back-up
- Edit tail cleaning, list rippling, multi-field sorting
- Optimized edit list auto assembly with special integration

Editing Control

- Preview, Perform, Review and Auto review functions
- Multi-set, Multi-trim • Reverse play and auto review
- Pre-Roll, Post-Roll and Preview select

Edit Modes

- Provides for multiple audio/video splits per edit event
- Open ended immediate/delayed transition edits
- Performs all edit modes plus "Music Video Mode" for easily synchronizing edits to music.
- Recorder only edits for recording graphics/audio
- Integrate graphics, animation and character generation
- Scene-based editing with advanced park and perform features
- Six forms of Match-Frame edits
- Cut and Paste EDL management
- Multiple time-code and edit clip-board registers

VT-4000 Software (Toaster Control)

- AmiLink/VT gives you total control over the Video Toaster as a fully integrated post-production switcher.
- AmiLink/VT remembers all of the Frame Stores, CG Titles, and DVEs used for your production in the AmiLink edit list. You never lose any of the information you need to recreate your production.
- All of the Video Toaster post-production functions are easily accessed from the AmiLink/VT interface screen. Toaster Digital Effects, Character Generator pages and the Digital Video Frame Stores, as well as standard wipes and dissolves, can all be called up automatically during edits, and are stored in the edit list for later auto-assembly.

NEWTEK VIDEO TOASTER 4000

Production Switcher

The Video Toaster Switcher is a broadcast quality production switcher which lets you perform cuts, fades, dissolves, advanced digital effects, key and color effects between any of 7 sources including 4 video inputs, two true-color high resolution frame buffers and a background matte generator. A separate overlay channel gives you the ability to key images or live video over the switcher during transitions.

Luminance Keyer

The Video Toaster's integrated luminance key technology gives you the ability to superimpose live video or still graphics. Luminance keying also works in conjunction with many Toaster Digital Effects to make text or logos fly in over another video source. Text created in ToasterCG uses built-in automatic keying to deliver titles crisply rendered over any video source, even with transparent drop shadows.

Frame Grabber/Frame Store

The Toaster can grab and save a full frame (in 16.8 million colors) and has sophisticated motion removal algorithms to provide a rock-solid freeze frame. These frames may then be loaded into "ToasterPaint" or "LightWave 3D" for further manipulation.

ChromaFX Color Processor

ChromaFX is a sophisticated real-time color processor that gives you complete control of all aspects of your video. It can alter video with color negatives, day for night, sepia tone, monochrome, solarization, posterization, color vignettes, and other totally unique effects.

Digital Video Effects

The Toaster has the processing power to manipulate live broadcast video in real time. There are effects for weddings, birthdays, sales, music videos, public affair messages, etc. There are even sound effects.

Character Generator

ToasterCG is the only desktop video system in the world that can create YIQ-encoded, 35ns (nanoseconds) high-resolution titles. Among the many powerful touls included are:

- Giant library of more than 250 PostScript fonts
- Can size fonts from 10 lines to 400 lines tall
- 24-bit smooth color gradations
- Variable-speed crawling and scrolling of text
- Easily adjust color, shadow type, outline style and font selection on a line-by-line, word-by-word, or even character-by-character basis

ToasterPaint

Everything you ever needed to create or alter true-color images. ToasterPaint makes importing and modifying files from the CG and frame grabber easy. It also gives you the capability to merge images captured in the Toaster's high quality digital still store or retouch them.

Dual Frame Buffers/Genlock

These are 24 bit (16.8 million colors) frame buffers meets the most stringent requirements for broadcast video. Toaster effects can be done between live video and either buffer, as well as between the buffers themselves. You can also overlay graphics on incoming video or over either frame buffer.

Lightwave 3D

The Ultimate 3D Rendering and Animation System for Broadcast Graphics

LightWave 3D offers all the high-end features you need to produce true network-quality graphics. Model, render, and animate videos in full broadcast resolution and 16.8 million colors. Everything from flying logos,and the most sophisticated effects are now on your desktop.

The KitchenSync

Dual Channel TBC

- Two complete infinite window time base correctors on one IBM AT/Amiga compatible card
- Plugs into any Amiga or PC compatible
- Use more than one Kitchen Sync linked together to synchronize even more channels.
- S-VHS and Hi-8 compatible. Has S-video input with option for S-video out
- Complete 100% accurate sync generator built-in. Totally regenerates all sync and blanking signals.
- Absolute 100% broadcast quality output
- Built-in Proc amp with Hue, Saturation, Contrast and Brightness adjustments
- Complete digital design – no pot adjustments necessary. The Kitchen Sync is completely microprocessor controlled
- Advanced sync output – useful with any VCR capable of taking an Advanced Sync in. **1279.00**

DIGITAL PROCESSING SYSTEMS

DPS VT-2600

Personal TBC IV

- Component digital transcoding provides s-video input and output. Digital 4:2:2 processing ensures the cleanest possible picture. Composite video signal is also enhanced by a newly developed chrominance comb filter.
- It interfaces virtually any camcorder, VCR or laser disk player to production switchers or computer video systems like the Video Toaster.
- Special features include Rock Solid Freeze (both field and frame), GPI Freeze, Variable Strobe, Forced Monochrome and Advanced Sync.
- Film Effect Strobe Mode - Simulates the 3-2 pull down conversion technique from a 24 frame per second film standard, to a 30 frame per second video standard.
- Can be installed in any Amiga or PC-compatible computers. Includes Amiga and MS-DOS software.
- Exclusive feature of the TBC IV is the 50-pin CVE (Component Video Exchange) port. When this port is connected to a DPS Personal Animation Recorder you can capture and record real-time video on the animator's dedicated hard drive. This combination is ideal for roto-scoping and other video capture processes.
- Fully compatible with TBC II, III and Personal V-Scope. The TBC IV is operated via software, or by using an optional DPS RC-2000 multi-channel desktop controller.

DC-2350

Personal Component Adapter

The DC-2350 Personal Component Adapter is a combination 3-Line Adaptive Digital Comb Filter Decoder and Y/C encoder designed for use with the Video Toaster.

- Has two S-Video outputs plus switchable Betacam/MII component output which allows the Video Toaster to be connected to Y/C monitors, S-VHS, Hi8, Betacam and MII recorders.
- Equipped with three S-Video inputs which are converted to Video Toaster input feeds. This allows devices such as TBCs and VCRs with S-Video output to be connected directly to the Video Toaster.
- Its 3-line Adaptive Digital Comb Filter provides superior diagonal luminance resolution compared to products using two-line comb filter designs.

DC-2350 ..... **$299.95**

DR-2150

Personal Animation Recorder

The DPS DR-2150 Personal Animation Recorder is designed to record computer animation sequences directly to a hard drive and then play them back in real time. The DR-2150 is a card that plugs directly into an Amiga expansion slot and replaces both the single frame record VCR and the single frame controller. Bad edits, missed frames, tape dropouts and other mechanical glitches common to traditional VCRs are a thing of the past.

- Combines custom ICs and a proprietary implementation of the LSI chip set enabling component 4:2:2 digital recording to a dedicated hard drive.
- The hardware adaptively samples each new video image to determine optimum quality. Although standard compression ratios don't apply you can expect four to five minutes of high quality playback from a dedicated 540 MB hard drive.
- Offers multiple outputs: Can output animation as composite, S-Video and component (Betacam or MII). Also includes a genlock input which enables it to be easily integrated with virtually any video production system.
- Variable speed playback lets you play back 24-bit (16.7 million colors) animation in real-time 30 frames per second, or you can choose a lower frame rate to play back animations in slow motion.
- Has composite, S-Video and component (Betacam/MII) outputs. Also has a genlock input enabling it to be easily integrated with virtually any video production system.
- Supports direct rendering of all common image formats including 24-bit IFF and Video Toaster frame store files and is fully compatible with all popular animation packages including Morph Plus, Lightwave 3-D, Fractle Pro, Imagine, Vista Pro, and Cinemorph.
- Real-time video capture for roto-scoping and other video capture applications is possible when used in combination with a DPS TBC IV card.

Minimum Shipping USA (Except AK & HI) $7.00, up to 3 lbs. Add 60¢ for each additional lb. For ins. add 40¢ per $100. © 1994 B&H Photo-Video. Not responsible for typographical errors.

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East

MAVTUG
Bill Sharer
6629 Paxton Rd.
Rockville, MD 20852-3659
Voice/Fax (301) 230-2847
BIX: bsharer
Compuserve: 76426,112

The Amiga Video Graphic Society
Roger L. Elowitz
32 Duncan Dr.
Morganville, NJ 07751-1649
(908) 536-4786
Meets on the second Friday of the month, 7:30 p.m.

Pittsburgh Commodore Group No. 346
Robert W. Peach
P.O. Box 16126
Pittsburgh, PA 15242
BBS: (412) 396-5483
Meets on the third Sunday of each month at Duquesne University's Mellon Hall (except July and August).

Amuse
151 First Ave., Ste. 182
New York, NY 10003
(212) 460-8067
Fax (212) 290-6747
BBS: (718) 539-3338
Meets on the first Tuesday of the month at:
NYU Main Building
32 Waverly Pl., 8 p.m.

Fine Art Productions User Group Society Network
Richie Suraci
Fine Art Production
67 Maple St.
Newburgh, NY 12550
Voice/Fax (914) 561-5866
Call for information.

MicroWave User Group
Art Baldwin
3670 Delaware Ave.
Buffalo, NY 14217
(716) 873-1856
BBS: (716) 873-9262
Meets on the first Wednesday of the month 7-9 p.m.

Suffolk Video Club
Attn: William Pinto
15 Columbus Ave.
Brentwood, NY 11717-2506
(516) 273-4876
Meets on the second and fourth Thursday of the month (except July and August).

Toasterholics Anonymous
Armato's Pro Video
Chris Heudrick
6716 Myrtle Ave.
Glendale, NY 11385
(718) 628-6800
Meets on the second Thursday of the month, 7 p.m.

LightWave User Group
System Eyes Computer Store
650 Amherst St.
Nashua, NH 03063
(603) 889-1234
Meets on the second Tuesday of the month, 7 p.m.

South

Vision VT Users Group
Vision Commuications Interactive
Sam Young
4000 Piedmont Pkwy.,
Ste. 131 High Point, NC 27265 (910) 841-6988
Meets every six to eight weeks for five hours on Saturday mornings.

VA Toaster Forum
Tidewater (Norfolk, Virginia Beach, Hampton)
George Triolet
902 Tabb Lakes Dr.
Yorktown, VA 23693
(804) 867-9056
Meets the first and third Wednesdays of the month 7 p.m.

WV Video Toaster Users Group
Destiny Images
Jamie Cope
P.O. Box 4631
Charleston, WV 25364
(304) 925-4741
Meets on the second Tuesday of the month at Computers Plus in S. Charleston, 7 p.m.

A-TUG Border States Amiga Group
Micro-Tronix
1614 Towson Ave.
Fort Smith, AR 72901
(501) 782-4048
Meets on the second Saturday of the month, 9 a.m.

West Tennessee Video Toaster Users Group
Brian Churchill
8886 Davies Plantation
Memphis, TN 38133
(901) 385-1711
Meets on the third Tuesday of the month at the Main Library at 1850 Peabody 7:00 -9:00 p.m.

Club Toaster
St.Petersburg/Clearwater Tampa
Jeff Asbury, Michael Price
9125 U.S. 19 North
Pinellas Park, FL 34666
(813) 576-5242
BBS: 813-398-0371
Meets on the last Thursday of the month, 7 p.m.

Toast 'n Jam
Debby Willis
Computers Plus
696-C S. Yonge St.
Ormond Beach, FL 32174
(904) 676-0650
Meets on the second Tuesday of the month, 7:30 p.m.

VLS Graphics Users
1533 Lakewood Rd.
Jacksonville, FL 32207
(904) 396-0746
9600 V.42.bis
6p-9a M-TH, 6p,F-9a,M
Meets on BBS: (904) 396-0318.

Southwest Florida Toaster Users Group
Jim Franke
944 Country Club Blvd.
Cape Coral, FL 33990
(813) 574- 8999
Fax (813) 574-2469
Call for information.

Midwest

Channel Z Toaster User Forum
Brian Plante
492 Sheridau Rd.
Evanston, IL 60202
(708) 332-1710

DMAAUG
Des Moines Amiga Group
Arthur Szczygielski
4046 Hubbell Ave., Ste. 155
Des Moines, IA 50317-4434
(515) 266-5098
Fax (515) 266-1012
Meets on the last Tuesday of every month at the Christ Church, Ashworth and 74th Street, 7:30 p.m.

Discover–Ring The Video Toaster
Ring Video Systems, Inc.
3250 S. Harlem Ave.
Riverside, IL 60546
(708) 442-0009
Fax (708) 442-5290

Chicagoland LightWave 3D User Group
AGA, Ahlan Graphics & Animation
680 Lake Shore Dr., Ste. 925
Chicago, IL 60611
(312) 771-1242

Digital Arts Toaster User Forum
122 W. 6th St.
Bloomington, IN 47404
(812) 330-0124
Meets the second Saturday of the month, 4 p.m.

Toast of Tulsa
Stewart Gus
Computer Consultants, Inc
P.O. Box 691810
Tulsa, OK 74169
(800) TOAST-OK
Meets the second Saturday of the month at 2:30 p.m. at Hardesty S. Regional Library, 6737 S. 85th E. Ave.

TUGSM
Toaster Users Group of Southeastern Michigan
Michael A. Greer
25109 Greenbrooke Park
Southfield, MI 48034
(313) 355-5916

Video and Graphics SIG
Charles Meier
P.O. Box 811
Bridgeton, MO 63044
(314) 739-5181
Meets last Wednesday of the month. Call for details.

Mid-West ToastMeisters
Brent Malnack
Positron Publishing
1915 North 121st St., D
Omaha, NE 68154
(800) 365-1002
(402) 493-6254

Rocky Mountain Amiga Users Toasters Sig
Don James
The Computer Room
9625 E. Arapahoe Rd.
Englewood, CO 80112
(303) 799-9733
Meets on the second Monday of each month at Virginia Village Public Library: 1500 Dahlia St., Denver, 7-9 p.m.

West

A.A.A.A.A.
Arizona Assn. of Amiga Artists and Animators
Richard Garrison
Dave Thompson
(602) 968-7922
Meeting times are flexible; call for information.

Inland Empire Toaster Users
Neil Abeynayake
1033 Pacific St.
San Bernardino, CA 92404
(909) 885-5259
Meets on the first Thursday of the month, 6:30-9:30 p.m.

LA Toaster User Group
Ken Wilder
1818 W. Victory Blvd.
Glendale, CA 91201
(818) 552-5024
Fax (818) 552-5025
Meets on the second Saturday of the month from noon to 5 p.m. at 10844 Acama St., No. Hollywood.

Orange County Toaster Users Group
Bruce Gleason
Thumbs Up Video
1206 W. Collins
Orange, CA 92667
(714) 633-3629
Meets on the third Thursday of the month, 6:30 p.m.

Sacramento Video Toaster Society
Glen Cornish
Applied Computer Systems
6108 Watt Ave.
North Highlands, CA 95660
(916) 692-0520
(916) 338-2000
BBS:(916) 338-2543
Meets on the third Wednesday of the month 6:30 p.m.

San Diego Video Toaster Users Group
Mike Amron
2334 Galahad Rd.
San Diego, CA 92123
(619) 277-5699

Silicon Valley VTU Group
HT Electronics
Andrew Timmons
2427 Hart Ave.
Santa Clara, CA 95050
(408) 243-9233
Meets on the last Thursday of the month at HT Electronics, 275 N. Mathilda Ave., 7 p.m.

Amiga LightWave User Group
MG Software & Video
Mark Miller
6660 Reservoir Ln.
San Diego, CA 92115
(619) 463-0545
Call for information.

N.A.G. Desktop Video SIG
Scott Wehba
Infinite Solutions
14780 SW Osprey Dr., Suite 240
Beaverton, OR 97007
(503) 579-5799
Meets on the fourth Thursday of the month 7 p.m.

Amiga Video Association, Inc.
Forrest McKinney
PO Box 550248
Dallas, TX 75355-0248
(214) 826-5113

Professional Video Toaster Forum
Omni International Trading
Monte Strohl
516 Westlake Ave. N.
Seattle, WA 98109
(206) 628-2923
Fax (206) 628-4324
Meets on the second Wednesday of the month 7 p.m.

T.U.G. 98XXX
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Bay Area Video Toaster Users Group
Don Smith
Richmond Public Library
Whittlesey Room
325 Civic Center Plaza
Richmond, CA 94805
(510) 620-6759
BBS (510) 228-0886
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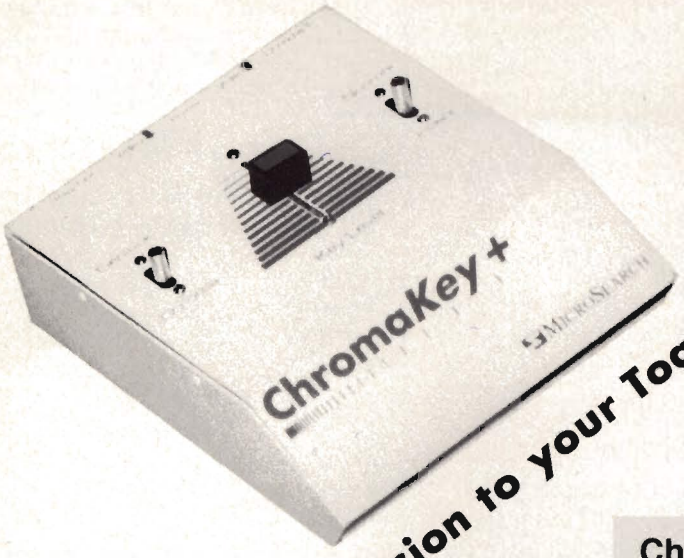

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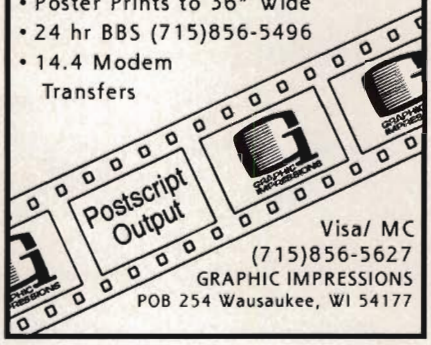

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LAST WORD

Striking Gold

Channeling Into the Power of Television

by Mojo

Have you ever talked to one of "those"?

You know the type. You're having a conversation with someone you've just met. The two of you talk about sports, politics, movies and O.J. Simpson. Everything is going just fine until you ask, "Hey, do you watch [insert your favorite TV show]? It's the best!" And they reply, "Oh, no I don't watch TV."

And they don't just say it, either. They wear it like a badge. What they mean is they're too good for TV. They have much better things to do than watch the boob tube. And now you've revealed to them what pond scum you are simply because you have a relationship with millions of phosphorescent pixels.

Immediately the cultural equivalent of the Berlin Wall goes up. On your side: jeans, McDonald's and *Star Trek*. On their side: ties, tofu and *Les Miserables*. To them, TV is nothing but a vacuous timesink and they harbor a misguided pride in their denial of the single most important invention ever. An invention of almost religious proportions that has guided and defined a generation—our generation.

Far more than any other single force in the universe, television has made me what I am. It has entertained me, educated me and inspired me, and now it clothes and feeds me. I spend more time in front of television screens than I do in front of human beings, and yet I am far from the brainless lowlife that "they" would label me.

Anyone reading this magazine is certainly a disciple of the church of the cathode-ray. You don't just watch the news and the occasional PBS special—you live for television. You drink of its dramas and eat of its sitcoms, and care so much for it that you want to ensure its survival and contribute. You crave the power of the electron message, and buried deep within you is the burning desire to pick up the camera and "write" your own "book." What do *these* people know? You have the answers to questions no one is even asking, and to be sure your voice is heard you have no choice but to end the spoon-feeding and become the meal.

That's why you have a Video Toaster (or want one). That's also why you read *VTU*. This isn't just a magazine you're holding, it's a bible, preaching the religion of video and teaching you how to use it to make your own TV shows—your very own personal sermons, designed to reach out one day (hopefully) to millions of viewers in the hope that they, too, will see the light. Maybe the light of fiction, maybe the light of fact, or even the light of hope. It's all there in that little box, just waiting for you to plug in.

A recent letter in a major national newsmagazine lamented the fact that television is everywhere—bars, restaurants, airports, schools, hospitals—and is inescapable. The woman who wrote the letter made a call for television-free zones so her kids and others could stay out of its reach.

Though these sentiments may sound a bit paranoid, I'm sure many readers agree with them to some extent. However, if the word "television" had been replaced with "book," I'm sure people would have considered this woman deplorably insane.

People who put down television don't understand it. Sure, there's a lot of garbage in the air. In fact, I'd say most of it is pure, highly concentrated trash on the same intellectual level as a bowl of oatmeal. Then again, next time you find yourself in a bookstore (the preferred stomping ground of "them"), take a good look around.

You'll see shelf after shelf of romance novels, rows of "how-to" books and stacks of glib, inflammatory celebrity biographies. Entire sections are devoted to cookbooks, comic books, picturebooks and computer books. All decent stuff to be sure, but not exactly the exhilarating antithesis to the evils of television.

I don't have anything against books, mind you. In fact, I still feel that a good book outweighs any other medium. However, page for page, the "good" books are greatly outnumbered by the trash. Sound familiar?

For every *Romeo and Juliet* there is a stack of Harlequin romances. And for every *All in the Family*, there are at least one hundred *Different Strokes*.

But you don't throw the baby out with the bathwater, and people who refuse to acknowledge television are guilty of this. Boobs watch the boob tube, but the smart ones know how to sift through the rubbish and find gold; gold every bit as valuable as gold found anywhere else, be it in a book, a record, a movie or another person.

But, like anybody, you want more gold. You can't find enough of it so you've resorted to alchemy and picked up a copy of *VTU*. You'll create a beast of camcorders, VCRs, TBCs and hard drives. With it you'll try to duplicate the circumstances under which gold is created and, if you're lucky, you may actually produce something of value.

However, unlike the folly of traditional alchemy, there is a blueprint of success for the modern video chemist. It's called a television. Just turn it on and study it. If you're anything like me, the practice alone will make you very rich indeed.

VTU

Mojo works on the syndicated series Babylon 5 *as an animator/technical director with Foundation Imaging.*

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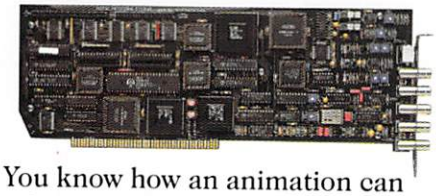

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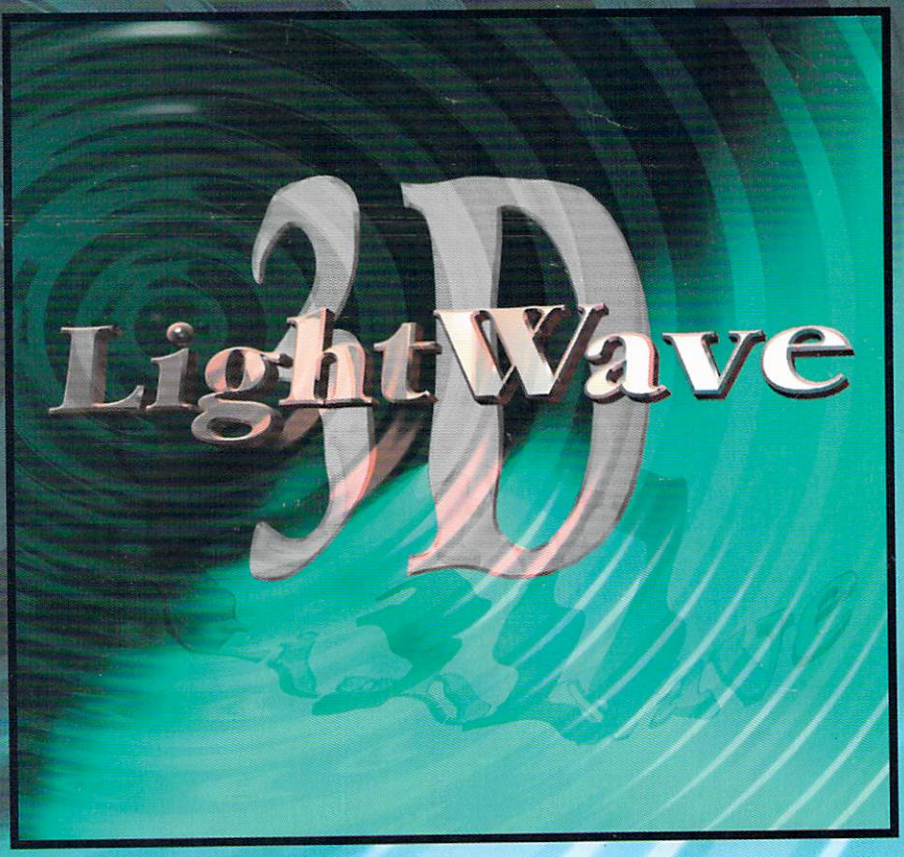

Yes, it's true. The 3D animation system used to create special visual effects on TV shows like *seaQuest DSV, Babylon 5, Robocop, Unsolved Mysteries, The X Files and Star Trek: The Next Generation,* can now be purchased separately from the Video Toaster™.

LightWave 3D™ shares most of the same features as animation systems costing tens of thousands of dollars. So you can create a host of 3D graphics—everything from flying logos to broadcast quality special effects—without paying broadcast-quality prices.

It's hard to know which news is bigger: the availability of unbundled LightWave 3D, or its low price. Whichever, demand is expected to be brisk. So see your dealer or call, now.

The sooner you do, the sooner you'll discover why LightWave 3D is the choice of professional 3D artists—and everyone else who wants professional results.

for more information call: 1-800-847-6111

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