AN EXCLUSIVE WITH THE CREATORS OF LIGHTWAVE 3D, PAGE 54

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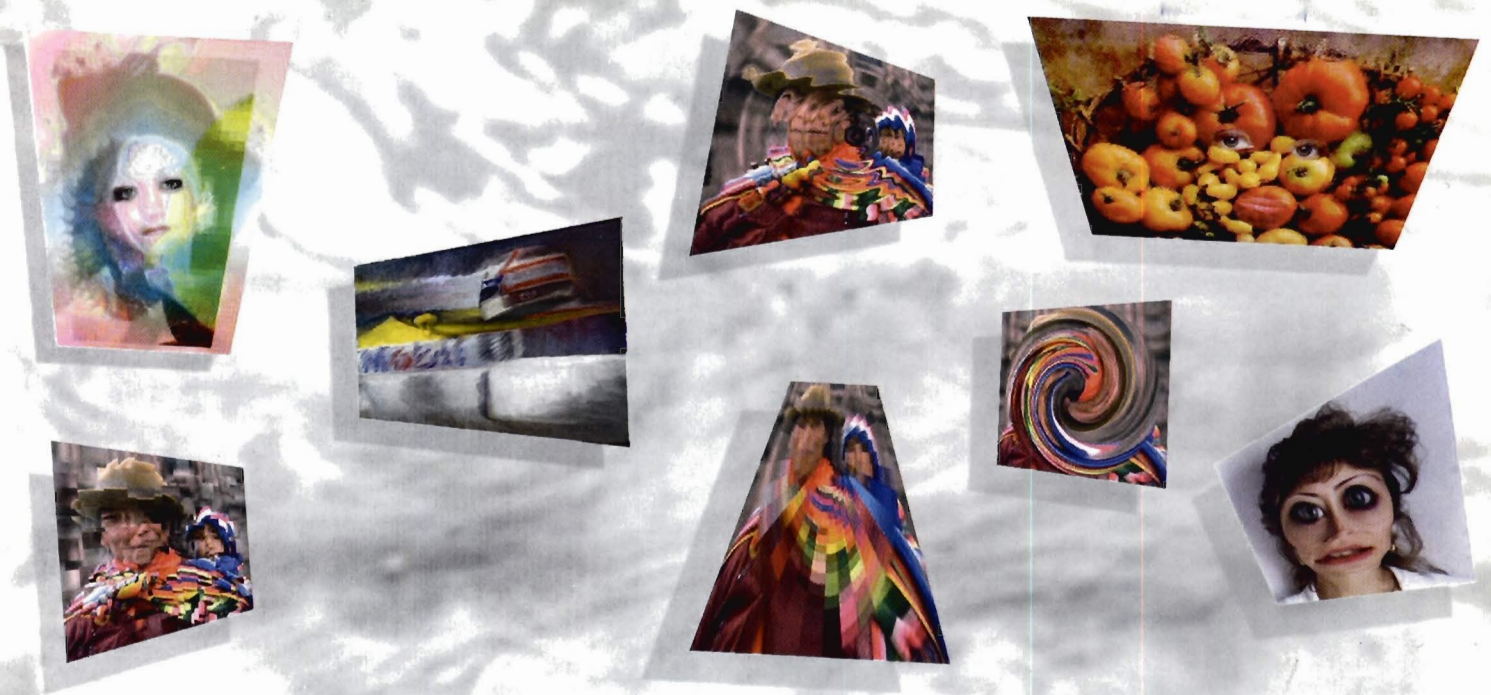

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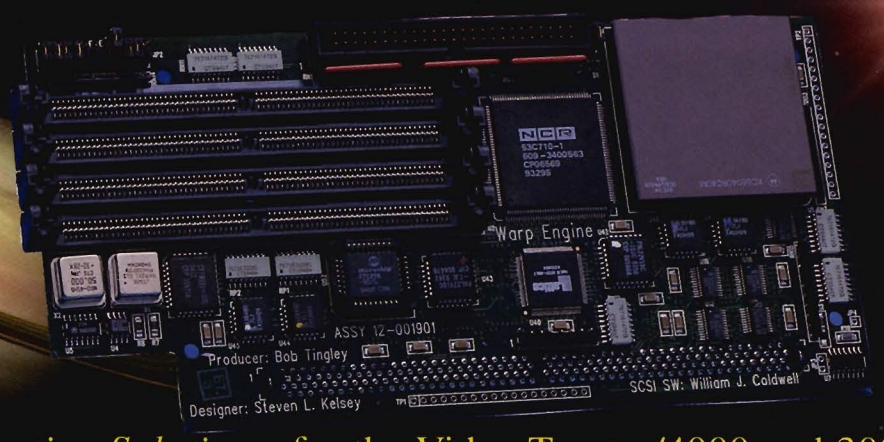
WARP ENGINE



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VIDEO TOASTER USER

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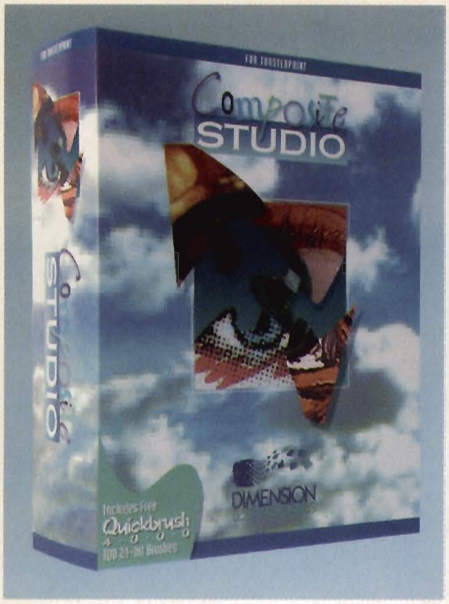

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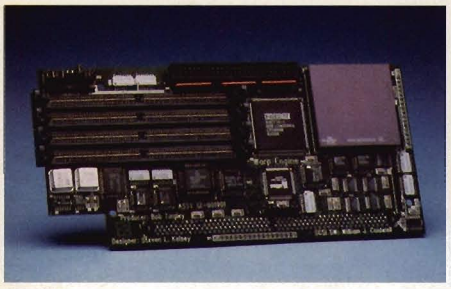

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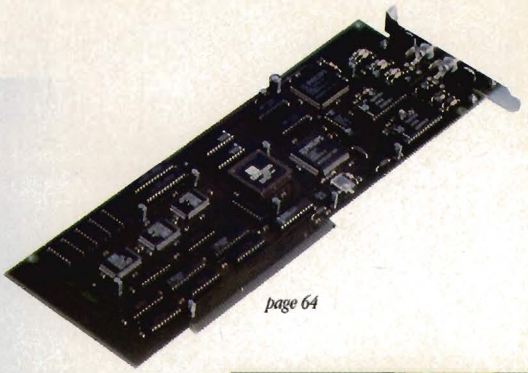

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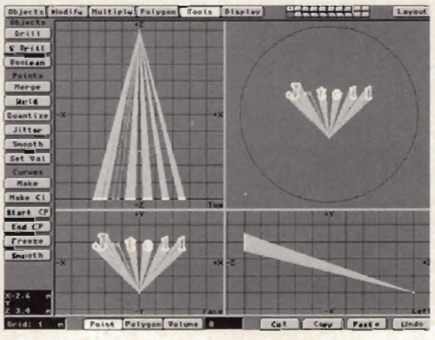

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TUTORIALS

VIDEO TOASTER USER

THE PERSONAL VIDEO PRODUCTION MAGAZINE

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Suggestions and comments should be sent by written correspondence to: VTU, Letters to the Editor. Be sure to include your name, address and telephone number.

QUESTIONS AND TIPS
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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Specific product information or press releases should be sent to the Editor-in-Chief by mail or fax (408-774-6783).

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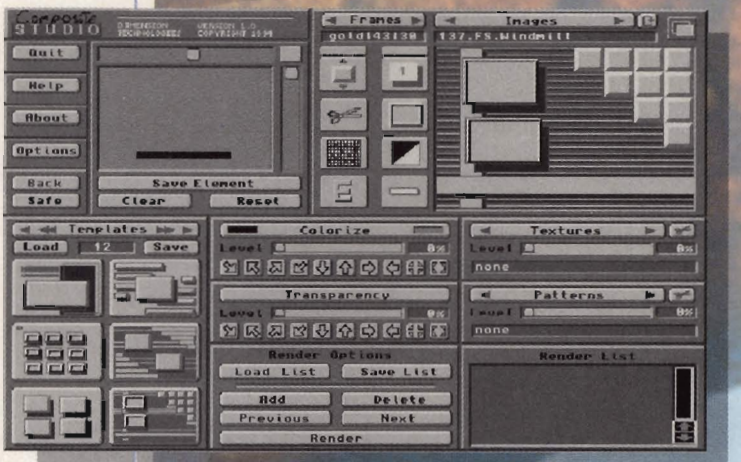

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FOR INFORMATION CIRCLE 114

TOASTER TALK

Collisions & Convergences

Expanding Leased Access Opportunities

by Jim Plant

Toaster users have front-row seats to a couple of the most interesting technology revolutions going on in the world today. The first, of course, is the rapidly narrowing convergence of video and computer technology. The second is the equally fast-moving development of cable and satellite distribution technology. With the former, we are seeing a continuous erosion of the economic and technical barriers to video program production. With the latter, we are witnessing a major expansion in video program distribution capacity. Combined, these two factors are creating business opportunities right before our very eyes. And if free market forces are not enough (and they usually are), our government has volunteered to jump on the backs of the cable system operators to ensure that some of their excess channel capacity is made available (via inexpensive leases) to people like you and me. As they say at Top Gun, this is a target-rich environment.

Recently, I spoke with Los Angeles-based cable network consultant Sheldon Altfeld, who currently has more than 70 clients who are attempting to exploit this new production and distribution environment. Altfeld said, "It's amazing how easy it is to start a network these days. You identify a niche market. Find some programming that addresses this market. Package it with some network logos and station IDs, and start leasing some time on cable, satellite or low-power TV systems. You can do all that for not much more than $5,000."

Altfeld, who has used the Video Toaster in one of his own network-startups (The Crime Channel), says, "Toaster owners have an edge here because they have access to a lot of the production and animation resources that most network startups have to go out and find." Altfeld teaches a monthly workshop on starting your own network through the Learning Annex (310-478-6677) and also consults privately through his company, Cable Maven Enterprises. He can be reached at 310-826-1531. Another excellent source of information on this subject is the *Leased Access Report*, a newsletter I highly recommend. You can get a sample copy of this publication by calling 1-800-284-3226.

Video Flyer Update

On September 15, NewTek President Tim Jenison and a number of other NewTek employees (including Lee Stranahan, Peter Tjeerdsma, Brad Peebler and Alcatraz programmers Steve Kell, David Holt and Arnie Cachelin) flew in to San Francisco from Topeka to demonstrate the soon-to-be-released Video Toaster Flyer. The crowd of 300-plus also saw a demonstration of the all-new ToasterPaint. Jenison spent a considerable amount of time discussing the following points with audience members.

1. Beta and dealer/developer Flyers will be shipped by the end of September, with production units shipping six weeks later.
2. The production Flyers will work in Amiga 2000, 3000 and 4000 computers (the beta units will only work in the Amiga 4000).
3. The Flyer will support SMPTE time code. If video is digitized into the Flyer, the time code will show up in the video control panel.
4. EDL capability will not be in the Flyer software, but NewTek will work closely with third-party developers to make this feature available.
5. The Flyer software will have a feature called "The Cutting Room" that will allow for large volume digitizing with fast, random-access editing functions.

(For additional information about the Video Flyer, see my article "Video Flyer Test Flight" in this issue.)

Video Toaster Expo '94 Set for December

We've been talking about and promoting Video Toaster Expo 1994 since early spring. Now, after long planning and negotiations, we've signed all the contracts and can provide all the pertinent details about the first-ever worldwide Toaster exhibit. Prior to the opening of the exhibition, NewTek will sponsor the premier Video Toaster Developer's Conference for third-party developers who are currently developing or new companies who are thinking about developing hardware and software that work with the Toaster system (including the Flyer and LightWave 3D). NewTek will also host a national dealer meeting prior to the show. The exhibition phase of the Expo will open on December 14 and 15 at the Universal City Hilton and Towers in North Hollywood, Calif.

In addition to the third-party developers showing their latest Toaster-related products and services, NewTek will display the new Flyer, Toaster System 4.0 (which includes updated ToasterCG and LightWave plus an all-new ToasterPaint), and the standalone versions of LightWave 4.0 running on Windows, SGI and the Amiga. A full slate of Toaster classes and seminars, taught by the smartest Toaster and LightWave experts, will also be offered. Show hours are from 10 a.m. to 5 p.m. on both days. Admission to the exhibits is $15 per day, but if you register by November 30, you can get a special two-day pass for the same $15. Send your check made payable to Avid Publications, 273 N. Mathilda Ave., Sunnyvale, CA 94086. You can also call our toll-free telephone line at 1-800-322-2843 to register using your VISA or Mastercard. Video Toaster Expo '94 will be the center of Toaster universe in mid-December. I hope to see you there!

VTU

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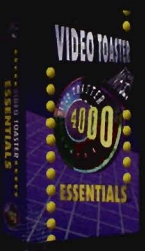


A step-by-step guide to the Video Toaster's digital video effects, set-up functions, ChromaFX and luminance keyer.

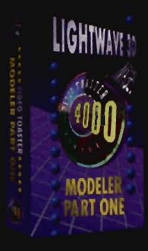
90 minutes

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

100 minutes

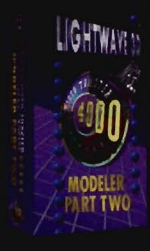
Discover the power of LightWave as basic 3D animation is explored. Learn scene creation, key framing, design and editing techniques for amazing animations.

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.

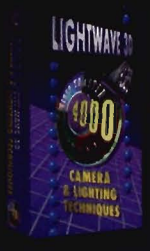
100 minutes

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.

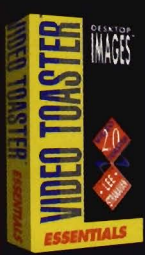
120 minutes

FEATURING

LEE STRANAHAN

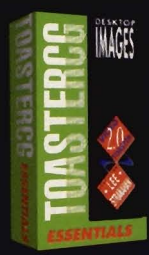
Lee has taught thousands through his national seminars and published articles. In this professional video tape series Lee offers the tips & tricks that provide invaluable Toaster Power.

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.

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FOR INFORMATION CIRCLE 108

TOASTER TIMES

Commodore Update

The struggle for the right to manufacture the Amiga continues to wend its way through the Bahamian Court system. At press time (mid-September), both David Pleasance of Commodore-UK and Alex Amor of Creative Equipment International (CEI) have confirmed that they have submitted strong bids to the liquidators handling the case. Each expressed confidence that his offer would ultimately be accepted. Pleasance has been very active in the press, granting interviews with a number of European and American publications. Through these interviews, Pleasance has outlined his plans for the Amiga pending bid acceptance. Some of the highlights of his plan include:

1. Forming a new company based in England, renamed Amiga International.
2. R&D operations established in the U.S., with a staff of 60-65 engineers.
3. Manufacturing to take place in the United Kingdom.
4. An initial focus on producing Amiga 4000s.
5. Halting AAA chipset and focusing on RISC technology for future development.

Amor conceded that CEI has not been as visible as C-UK in terms of speaking with the press, dealers and third-party developers, saying: "We decided that it was more important to put our energy into putting together the strongest possible bid. We have some wonderful plans for the Amiga, but first things first..."

While the process seems to be coming down the home stretch, the one potential fly-in-the-ointment is the creditor's continued efforts to have the legal proceedings moved from the Bahamas to the U.S. court system. Here, the creditors would have far more control over the disposition of Commodore's assets. If this happens before the liquidators make a decision, further delays can be expected.

VTU

Toasting to the Sound of Alternative Music

Joan Burke

Due to *Technical Difficulties*, we interrupt this Toaster Times article. Please stand by...

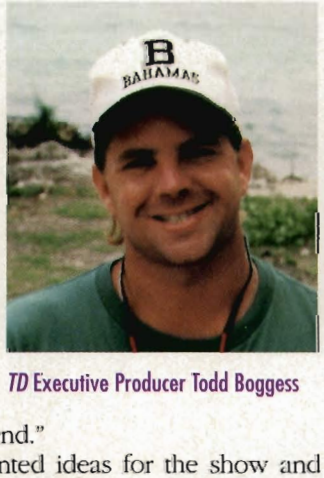
This type of broadcast interruption inspired executive producer Todd Boggess to give his alternative music video show the name of *Technical Difficulties* (*TD*). Half jokingly, Boggess admits, "If I make a mistake, I can blame it on the name of the show." More seriously he describes the program as having a pirate feel with many static bursts throughout.

The unique program not only offers music videos, interviews and performances for viewers, but it also provides an outlet for video producers to have their work highlighted.

The Toaster Connection

TD is a 60-minute broadcast television show that is created on a weekly basis entirely with the Video Toaster. According to 26-year old Boggess, everything including the music scores, animations and titles are all done on the Toaster using the M2 format.

"*Technical Difficulties* was set up on the premise, 'Everybody told me I couldn't do it' ," Boggess said, "I was told that quality had to be high-end."



TD Executive Producer Todd Boggess

When Boggess eagerly presented ideas for the show and explained that he would be using the Toaster, television stations were initially skeptical. Driven by the negative vibes from the TV stations, Boggess and *TD*'s 26-year-old associate producer, Tom Werner, completed a pilot of the show.

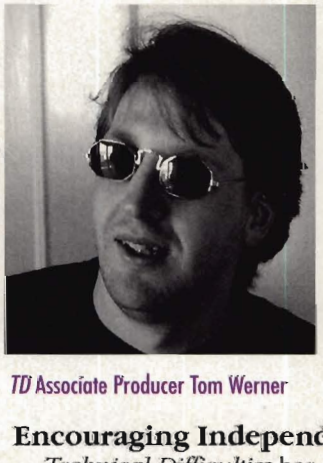
"I presented the pilot and they didn't believe me when I said I used the Toaster," Boggess said.

According to Werner, one of the main features that attracted them to the Toaster is its entry call.

"With a product like the Toaster, cost of entry into the business greatly decreases," Werner said.

"The Toaster allows us to do a wide variety of work at a reasonable cost and the Flyer (NewTek's soon-to-be released non-linear editor) will further the trend."

Currently, the Toaster-produced music show airs on WTAT-TV, Channel 24 in Charleston, S.C., and has met with great success since it first aired in December 1993.



TD Associate Producer Tom Werner

Record companies also provide *TD* enormous support.

"Major record labels are allowing independents to become the developing arm of record companies," Werner said. "What we do is try to identify the groups that are going to be up and coming and we air their videos. We've found that we've beaten MTV (by airing the videos first)."

Encouraging Independents

Technical Difficulties has also beaten MTV with the idea of helping other independent video producers.

"Cost excludes many people from doing video production, but the Video Toaster has eliminated that and we would like to set people up to insert their work," Werner said.

Taped in Charleston, S.C., the Toaster-produced music show *Technical Difficulties* made its debut last December.

Within *TD*'s 60-minute airtime, there are two local segments each ranging 8-10 minutes in length in which local producers can have their productions highlighted.

Boggess explained, "We're looking for animations, short films, short stories on fashion, art or music—anything that goes toward the age group we're targeting."

Both producers outlined the marketing approach of *TD* as "using radio stations to promote the show so that opportunity would go out to others who want to carry the show." The independent producers negotiate between a sponsoring radio station, nightclub and television station, basically giving a producer ownership of a programming franchise for their particular market.

Expanding Markets

Currently, *TD* is sponsored by two radio stations (96 Wave and Z 93 in Charleston), various nightclubs and Charleston's *Free Time* newspaper. By accepting video productions from independents from all over the country, *TD*'s producers hope that the market will expand and subsequently receive low-cost radio sponsorship. Ideally, their plan is to broadcast on a nationwide network.

"(Since) broadcast is four or five steps above cable access, our shows have the highest standards possible and we spend an enormous amount of time editing. But, when you sit down, turn on the TV and see something you've done, it's a wonderful feeling," Boggess said.

Backed with an ample amount of youthful enthusiasm, both producers are eager to help provide young video producers who are looking for an outline of success.

Werner explained, "Five years ago we couldn't do this, but because of the Toaster we have the opportunity."

Samples of animation work can be sent to:
The Video Company
52 Society Street
Charleston, SC 29401

VTU

The Way I See it

Cruising Down the Interstate of Information

Mike Danger

You're traveling along the information superhighway when suddenly you are forced to abruptly change directions because of one of those small furry rodents taking a stroll off its beaten path. But fear not. Consider this column as your wrecker truck back to Toaster salvation and myself as the road kill of information as we head down the highway. Remember one thing as you head back on this interstate of information. These opinions, stories and ideas don't necessarily reflect those of this magazine, but are "just the way I see it."

Before I go any further, let me introduce myself. My name is Mike Danger and I am a confirmed Toaster psychopath. A former pro-skateboarder and musician, I was forced to change my life's calling when a close encounter with an 18-wheeler caused me to lose my sight. Some 60 surgical procedures later I still haven't found my lost vision. So, I decided to get out of my hospital bed and find my place on this earth. The next thing I knew, I was slamming myself up the banks of professional wrestling.

Reader Thad Kanko's Framestore of the Month.

Whether you consider professional wrestling real or not, a broken back and injured shoulder later I chose a safer form of recreation. A year or so later I ended up in one of those state run classes directed towards making computers a cure-all for my obvious problems. Two weeks into the course I became totally bored and opted for more than typing meaningless files and commands. A wrestling buddy had informed me about a cool gadget called the Toaster. Sight unseen, and five months later I was a proud Toaster owner and my production company was born. Three years later, Rockasaurus Productions is still alive and thanks to this truly inspiring product. And if I get my way I'll be around a lot longer than that pricey Barney-sauraus character.

Enough about me. I know you are wondering about the fate of NewTek, the Amiga computer and other related subjects. First up on the menu is the state of the mother company which thrills us with this machinery and technology. As many of you know, the newly reorganized and leaner NewTek is right on top of their game and more focused than ever. Besides the much anticipated Flyer and unbundled LightWave (available by the time of this writing), prepare for more cool releases that would make even the crew of the Enterprise energize with envy.

The fate of the Amiga computer has frightened many owners to wonder if this is the end of it all or maybe a new beginning for the ill-

continued on page 10

continued from page 9

fated Commodore-owned technology. Fear not, 4000-based machines are making their way into our country from abroad as we speak. There are also many Amiga craving companies with the money to buy the technology and continue to improve the product. Although Commodore, in my opinion, did a lousy job with the Amiga, I feel this could be the best thing to happen in the long run for both the Amiga computer and the Toaster.

The last portion of this column deals with the truly cool Toaster users who take their equipment seriously. While you might have seen animations being used by Coca-Cola, *seaQuest* and even the new *Hercules* series, there is a breed that goes many frames further. For example, take Albert Freed of Prince Albert's Prints. This photographer is now Toastercizing photos of such sports greats as Dallas Cowboy Emmett Smith. And if that isn't enough, the host of the Howard Stern show on E! TV has expressed interest in Toasting.

As we reach the end of this column, I am proud to present Thad Kanko with the Framegrab of the Month award. This Southern California dude, who I understand was inspirational in utilizing the Toaster in conjunction with aging hard-core rocker Billy Idol, makes use of his Amiga 4000 on a daily basis. Thad describes himself as a power Toaster user and loves spending hours doing animations, filming live events, and crashing his Toyota four-wheel drive truck into non-moving objects. Good work, Thad, and I hope to see more of your work. (Matter of fact, I'd be glad to see anything at this point!)

In ending this rumor mill, I would like to invite you to either call or write with your news, views or framegrabs:

Mike Danger
6706 N. 9th Ave. Ste. B-5
Pensacola, FL 32504
(904) 479-9305

Until next time, happy toasting.

VTU

Mike Danger is a video producer and owner of Rockasaurus Productions in Pensacola, Fla.. Look for his column "The Way I See It" next month and each month thereafter in the Toaster Times section of VTU.

News & Notes

Play Around

Intent on redefining the desktop video market for PC-compatible computers, three pioneers in the field have merged to form Sacramento, Calif.-based Play Incorporated.

Founded by representatives of Digital Creations, Progressive Image Technology and a group of eight staff members who left Video Toaster-maker NewTek earlier this year, Play Incorporated planned to begin shipping the first of its PC video products by mid-November.

Play Incorporated is headed by chairman Mike Moore, chief executive officer John Botteri and president Paul Montgomery, who once served as NewTek's vice president.

Smashing Images

Bauer-Robinson Media, a 3D animation house located in Denver, Colo., recently completed nearly three minutes of animation for the popular band Smashing Pumpkins. The visual effects are being projected on a 35-foot screen behind the headlining act during this year's Lollapalooza tour. The logo explosion, which was created using LightWave 3D, was designed to complement the Smashing Pumpkin's hit, "Rocket." The 2 1/2-minute space warp animation was completed in less than three weeks on an Amiga 4000 and an Amiga 2500. Power Macros and a time-lapsed cloud background was used for the logo explosion (Figures 1-3), which was completed about 10 days into the band's tour.

Figure 1

Figure 2

Figure 3

Multimedia Group Forms

The National Multimedia Association of America (NMAA) recently formed in hopes of improving the knowledge and abilities of companies, professionals and consumers of multimedia products.

By creating two types of membership, the NMAA intends to address the needs of each market. The first classification of membership is tailored toward companies and professionals within the multimedia industry. This group includes producers, developers, publishers, artists and animators. For $89.95 ($350 for companies), industry members receive a monthly newsletter, access to the association's BBS, an on-line job bank and discounts on everything from office supplies to overnight deliveries.

The second classification of membership ($49.95) is designed for consumers of multimedia products. Membership includes the association newsletter, basic access to the BBS and discounts similar to those offered to industry members.

The NMAA also conducts a series of lectures and training seminars that will be held across the country. Topics are based on feedback from the membership and range from using PowerPoint to mastering a CD-ROM. For more information about the organization, call (800) 214-9531.

NewTek/Xaos Tools Alliance

NewTek, Inc. and Xaos Tools, Inc. have announced a cooperative technology agreement to explore synergistic technologies developed by the respective companies.

Both companies have established leadership positions by supplying a new generation of digital tools for media content producers. With both companies expanding into new platforms and markets, the decision was made to accelerate their longstanding strategic relationship.

Compiled by Douglas Carey

D2-quality Non-linear Editor

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4 Input Switcher

35ns Character Generator

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(with real-time playback)

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

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1-800-847-6111

Features, specifications, and prices subject to change without notice. Video Toaster is a registered trademark of NewTek, Inc. Toaster and Video Toaster Flyer are trademarks of NewTek, Inc. PostScript is a trademark of Adobe Systems, Inc. Video Toaster Flyer does not include hard drives. Complete Video Toaster 4000 Workstation with Video Toaster Flyer priced under $10,000. Video Toaster Flyer also sold separately for $4995. © NewTek, Inc. 1994

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

NEWTEK
INCORPORATED

FOR INFORMATION CIRCLE 138

NEW PRODUCTS

Compiled by Joan Burke

SoundSwitch

Automatic Switching

Product: SoundSwitch
Description: Audio mixer
Price: $499
SunRize Industries
2959 Winchester Blvd. 2nd Floor
Campbell, CA 95008
(408) 374-4962
Fax (408) 374-4963

SunRize Industries has released the *SoundSwitch*, an audio mixer that eliminates the hassle of manual sound switching. SoundSwitch allows the Toaster to control up to four stereo audio sources and automatically switches audio with video every time the Toaster performs a video effect. By clicking on a Crouton, SoundSwitch performs switches and cross-fades allowing music and voice-overs to be laid down at exact desired levels. This eight channel audio mixer is compatible with any edit controller such as AmiLink, Editizer or SunDance.

FOR INFORMATION CIRCLE 1

Just Like Pros

Product: Shoot Video Like A Pro
Description: CD-ROM
Price: $59.95
Zelos
535 Pacific Ave.
San Francisco, CA 94133
(415) 788-0566
Fax (415) 788-0562

Zelos has released *Shoot Video Like A Pro*, a new CD-ROM title that serves as an interactive guide for the camcorder enthusiast. The guide provides access to an experienced team of video consultants, directors, cameramen and lighting experts, who reveal secrets of how to create and compose professional looking video using any camcorder. Shoot Video Like A Pro teaches users how to manage camcorder controls, create new effects and make the best of available lighting.

FOR INFORMATION CIRCLE 2

Customized Control

Product: ST200
Description: Universal VTR controller
Price: $1,200
DNF Industries
1032 N. Sweetzer Ave.
Ste. 212
West Hollywood, CA 90069
(213) 650-5256
Fax (213) 650-6639

Adding to its VTR Controller product line, DNF Industries has released the *ST200* Universal VTR Controller.

The ST200 combines the features of the ST100 with a 2 Cue point memory, search to cue, preroll and standby on/off functions. The ST200 features a numeric 24 function keypad which allows easy entry to "search to" locations and eliminates the need to search through complicated menus by providing all the needed functions at the press of one button. A user can easily control D1, D2, D3 D5, DCT, Betacam and many other formats. It can be used through existing RS422 control router and patch-bay.

FOR INFORMATION CIRCLE 3

Saving Files

Product: MultiVol Mirror
Description: Back-up device
Price: $45
AugmenTek
3606 S. 180th St. C-22
SeaTac, WA 98188
(206) 246-6077

AugmenTek announced the release of *MultiVol Mirror*, a utility that backs up or "mirrors" a file to one or more devices every time the file is saved by the user or any program. Several versions of a file can be saved in case the user accidentally overwrites the file. MultiVol Mirror works with any device including the console to allow the user to record shell input and output, making a record of what was done for future reference.

FOR INFORMATION CIRCLE 4

Affordable A/B-Roll Editing

Product: V-Station for Toaster
Description: A/B-Roll videotaping editing system
Price: $1,295
FutureVideo
28 Argonaut, Ste. 150
Aliso Viejo, CA 92656
(714) 770-4416
Fax (714) 770-4667

FutureVideo's *V-Station for Toaster* is a combination of a user friendly software package and a compact external edit controller. The system is capable of supporting a wide variety of VTRs from different class levels and tape formats. The advanced multi-tasking, multiple event A/B-Roll editing software provides direct ARexx communication with the Video Toaster. Setting edit in/out points, edit mode and transition can be done simply with the click of a mouse. V-Station also features an easy to use tape log which enables tape to be logged before editing. Optional VTR Driver Kits provide

compatibility with professional VTRs.
FOR INFORMATION CIRCLE 5

No Hassle 3D Objects

Product: 3D Objects Collection for NewTek LightWave 3D
Description: A 12-disk collection
Price: $29.95
Kinetic Designs
1187 Dunbar Ct.
Orange Park, FL 32065
(904) 276-5383

Kinetics Designs announced the release of *LightWave 3D Objects*, a collection of disks that helps users create new worlds with LightWave3D without the hassles of building objects from scratch. The collection features more than 200 public domain and shareware objects in 20 categories including animals, aviation, household, sports and space. Also included are surfaces, textures, images and ready-to-use scene files. A bonus disk of LightWave utilities is also included.
FOR INFORMATION CIRCLE 6

Custom Made Monitors

Product: AD-1970
Description: 14-inch Color Multisync monitor
Price: $495.95
Creative Computers
2645 Maricopa St.
Torrance, CA 90503
(800) 872-8882
Fax (310) 222-5888
The *AD-1970* color monitor has been released by Creative Computers. The monitor was custom designed for the A4000 and is compatible with all Amigas. The AD-1970 is actually a CTX SVGA modified to work not only with the Amiga, but with the Toaster, Opalvision, Retina, Picasso II and Z3. All controls are accessed from the front of the monitor and full overscan can be achieved in all resolutions. The AD-1970 also features a Philips tube, .28 DPI and a wide frequency range.

FOR INFORMATION CIRCLE 7

Directing Hollywood Style

Product: *Hollywood Directors and Their Craft*
Description: 80-minute videocassette
Price: $49.95
First Light Video Publishing
8536 Venice Blvd.
Los Angeles, CA 90034
(800) 777-1576
Fax (310) 558-7891
First Light Video Publishing has announced the release of *Hollywood Directors and Their Craft*, a video featuring seven top Hollywood directors analyzing their working methods. The tape offers advice for young filmmakers and covers a variety of topics such as career preparation for directing, choosing a project, collaborating with the editor and the development of a sense of style. Directors such as Academy Award winner Clint Eastwood, Robert Wise, Michael Schultz and John Flynn share information about their films and how they were done.
FOR INFORMATION CIRCLE 8

Multi-Platform LightWave

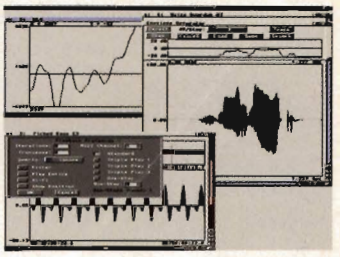
Product: LightWave 4.0
Description: LightWave 3D for the Amiga, SGI and Windows
Price: $995
NewTek
1200 SW Executive Dr.
Topeka, KS 66615
(800) 847-6111
NewTek has announced that LightWave 3D will be released as a standalone package for Windows, Windows NT, SGI, and Amiga systems. *LightWave 4.0* includes several new features including inverse kinematics for character animation. There will also be a new plug in filter system that will allow users to add features like advanced animation features and real world physics. LightWave will offer full cross compatibility which will allow users to bring objects, scenes and textures from one platform to another.
FOR INFORMATION CIRCLE 9

Music For All Occasions

Product: Token Music Production Library Vol.1
Description: Buy-out CD music library
Price: $19.95
Token Video Productions
10980 180th St. East
Hastings, MN 55033
(612) 437-1708
Fax (612) 437-5529
Token Video Productions has released the *Token Music Productions Library Volume 1*, a buy-out music library available on compact disc. Volume 1 contains 11 full-length tracks ranging from classical guitar to today's hottest dance music. Aimed specifically at the Video Toaster user, Volume 1 is perfect for a variety of uses including corporate productions, weddings and graduations.
FOR INFORMATION CIRCLE 10

Super Editing

Product: Sample Wrench 2.2
Description: Sound Sample Editor
Price: $299
dissidents
10325 Woods Road
Utica, NY 13502
(315) 797-0343
dissidents has announced the release of *Sample Wrench version 2.2* . The 16-bit sound sample editor offers a large array of DSP tools such as amplitude compression, extensive digital equalization, time compression/expansion, file format conversion and more. Sample Wrench 2.2 also provides support for a large number of MIDI sampling keyboards and modules. New features include Edit Smoothing and faster DPS



functions which uses less memory. The waveform drawing speed has also been increased. Sample Wrench supports many audio file formats, including AIFF, 8SVX and Sound Designer I.
FOR INFORMATION CIRCLE 11

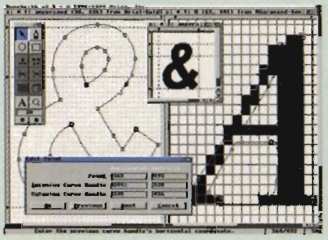
Organized Search

Product: graphicRECALL
Description: Amiga program
Price: $50
FOCUS GbR
20 River Road Ste. 9K

NEW UPDATES

Fantastic Fonts

Product: TypeSmith 2.5
Description: Updated version of TypeSmith, the font editor
Price: $199.95
Soft-Logik Publishing Corp.
11131 F South Towne Sq.
St. Louis, MO 63123
(800) 829-8608
Fax (314) 894-3280



TypeSmith 2.5 by Soft-Logik adds True Type font support, improved hints for PostScript fonts, more ARexx commands and improved printed font previews. One of the most important new features is True Type support which allows Amiga users to purchase True Type fonts and convert them to another format for use with Amiga software such as PageStream, Art Expression, LightWave and Toaster Character Generator. TypeSmith also features autotracing, drawing tools and bitmap font generation. Font conversion is also easier with the new upgrade.

FOR INFORMATION CIRCLE 15

Expanding Memory

Product: GigaMen 3.12
Description: An upgrade of GigaMen virtual memory system
Price: $15
INOVAtronics
8499 Greenville Ave.
Ste. 209B
Dallas, TX 75231
(214) 340-4991
Fax (214) 340-8514

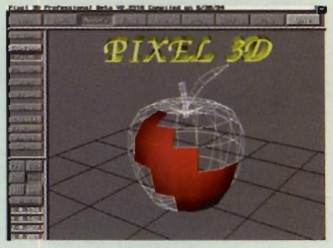
INOVAtronics has released *GigaMen 3.12*, a faster version of the previous GigaMen. The virtual memory enhancement system allows the Amiga to utilize its unused hard drive space as RAM with no additional hardware. It works on all Amiga 020/030/040 based platforms with MMUs operating under Kickstart version 2.04 or higher. GigaMen 3.12 features a fully multitasking environment, transparent operation, powerful customization tools and an additional 500MB added to give the GigaMen a new limit of 1.5GB. GigaMen 3.12 can utilize all available Amiga format partitions as contiguous memory and is written in 100 percent assembly language.

FOR INFORMATION CIRCLE 16

Powerful 3D Utility

Product: Pixel 3D Professional Version 2 (PixPro2)
Description: An upgrade to Pixel 3D Pro V1
Price: $299
Axiom Software
1668 East Cliff Road
Burnsville, MN 55337
(612) 894-0596
Fax (612) 894-1127

Axiom Software has completely rewritten *PixPro2* a program that offers many new features. PixPro2 provides full Amiga AGA support and full PostScript font and file support. Other features include artificial intelligent bitmap to 3D conversion, 3D polygon painting, auto conversion of 24-bit files through ADPro and multiple object loading. With PixPro2, bitmap smoothing has been simplified and format support has been increased to work with 17 3D file formats including LightWave scenes, Imagine hierarchies and 3D Studio binary.



FOR INFORMATION CIRCLE 17

New York, NY 10044
(212) 826-1240
Fax (212) 826-2589

FOCUS GbR has released *graphicRECALL*, a visual database which uses miniature images and text. Up to 16 miniatures can be displayed on-screen as the user scrolls through the database and the order can be changed using the mouse or keyboard. In addition to the cataloging of files, graphicRECALL creates databases which can be searched using multiple keywords and provides lists, labels and text print-outs using the data retrieved. Several file formats can be accessed including: Framestore, JPEG, PAR and TIFF.

FOR INFORMATION CIRCLE 12

Building GUI Extentions

Product: ZedREXX
Description: REXX language extention
Price: $35
Reality Check, Inc.
5543 Edmondson Pike, #134
Nashville, TN 37211
(615) 832-8888

ZedREXX, released by Reality Check, Inc., is a REXX language extension that adds Graphical User Interface (GUI) capabilities to the Amiga. ZedREXX syntax is structured so that it is simple and easy to read. All controls are accessible by keyboard shortcuts. Some extensions that ZedREXX provides includes; abstract textural definition of all user-interface elements, automatic snapshot of single-window or multiple-window interfaces and drag and drop support. ZedREXX provides on-line reference in AmigaGuide format and uses the Commodore Installer to make installation easier.

FOR INFORMATION CIRCLE 13

LightWave Furnishings

Product: Gothic Furniture
Description: 3D object set
Price: $69
Earthquake Productions & Publishing
13351 Foothill Blvd.
Fontana, CA 92335
(909) 899-1800

Adding to its 3D object design packages, Earthquake Productions & Publishing (EPP) has released *Gothic Furniture*. The high end 3D object set for use with LightWave 3D offers more than 40,000 polygons of authentic early American gothic furniture. The individual pieces contain multiple surfaces for quick texture mapping and are positioned for quick basic layout. Gothic Furniture has been designed to furnish EPP's Gothic mansion, which is also available for $69. Gothic Furniture requires at least 6.3MB of Toaster Directory space and 18MB or more of RAM for some scenes. Gothic mansion and Gothic furniture can be purchased together for $99.

FOR INFORMATION CIRCLE 14

U.S. CYBERNETICS PRESENTS THE WARP SYSTEM

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  - Can be linked with any other Warp Modules
  - Offers 4-6 times the speed of an '040 A4000* for $1395
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- **Warp Level 3 Module:**
  - Plugs into an external case
  - Can be linked with any other Warp Modules
  - Offers 6-9 times the speed of an '040 A4000* for $1995
  - Ram can be expanded up to 288 MegaBytes/Module

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- If fully loaded with Warp Level 3 Modules, the Warp Enclosure will offer anywhere from 60-90 times the speed of an '040 A4000*, and can hold up to 2.9 GigaBytes of RAM!

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Fax: (805) 730-7332 **In Canada call: (800) 668-WARP**

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FOR INFORMATION CIRCLE 144

DEAR JOHN

Just Like the Pros

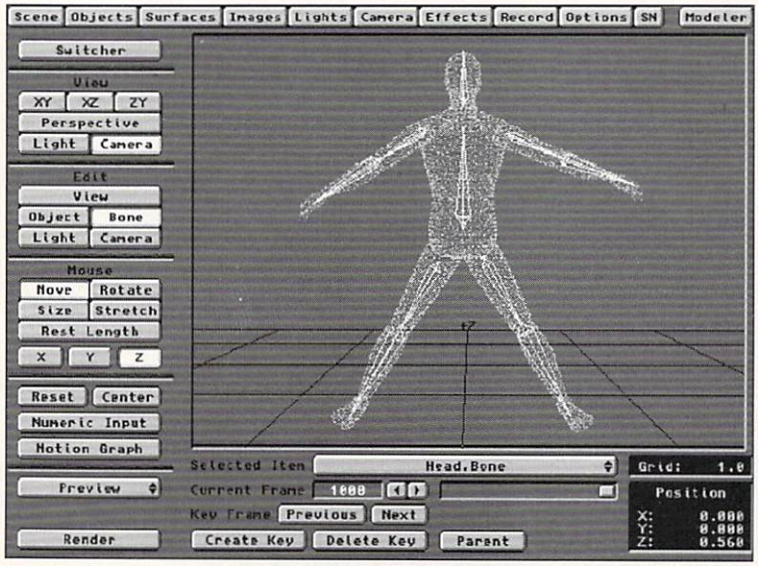
Merging LightWave Objects and Video Footage

by John Gross

This month's column answers Toaster-related questions from the overflowing *VTU* mailbag.

Q: I've been looking around for quite some time now for a quality animation program. I've checked the magazine ads, talked to various software dealers and have trekked virtually everywhere to find a program that meets my requirements.

It was just a few weeks ago that I stumbled upon a program named LightWave 3D, and from what I've read, it seems to be the forerunner in desktop animation.



Often, it helps to model a human figure spread eagle so when Bones are used, they'll have a minimal influence on neighboring limbs.

However, there are a few things still unclear to me and I'd like to clear them up before I purchase LightWave.

Here's what I want to know: Can you create smooth character-style animation in LightWave? Meaning, can you create and animate a character (the old traditional 'cartoon' character, but CG) in LightWave? If so, how would you go about doing it?

I had previously bought a modeling/animation program called Caligari. It performed great when it came to modeling, but failed miserably at animating a character. I have seen through magazine ads and photos that the 3D animation programs demonstrate the awesome rendering, modeling and animation power of their software, but always refer to inanimate objects.

Creating buildings and living rooms and having spaceships fly above hills and forests are great things to do, but what about telling an effective story that requires an animated object, a character, to perform in the animation?

Can it be done? Can LightWave do it? If not LightWave, then what else? And if it can be done, how would you animate different parts of the character (arms, hands, legs, feet, etc.) and then connect them to the body so that you don't see where the separate parts connect and still maintain a smooth fluid animation?

Jeff Marsella
Johnston, R.I.

A: Your answer is yes and no. Yes, you can create smooth, character style animation with LightWave, but you need to put a lot of work into it.

LightWave has tools that aid in character animation—spline controls, displacement maps, hierarchical animation and bones. LightWave's spline controls allow smooth control of motion paths with ease-in/out moves allowing for squash and stretch like movements if desired.

LightWave also allows for hierarchical animation in which objects can be 'parented' to other objects and follow their parent's movements. Displacement maps will deform an object to a picture or a procedural texture and bones allow for the bending and twisting of objects.

Bones work fine when you are animating objects that need to be given life such as dancing mouth wash bottles and gasoline pumps. However, bones are not the simplest thing to work with when animating a human form. To simplify bone use, you can build your humanoid form in separate, animatable parts, but then you end up with joint seams as you mentioned.

The other problem that often arises is that bones will affect parts of an object you do not wish them to, which makes animating in a realistic manner a chore. Part of the problem, also, is the Amiga's screen display. The system slows down when you have a lot of bones in a scene.

With the announced release of LightWave for Windows, NT and SGI platforms, we will see LightWave on more powerful and faster systems. This should be good news to animators of all types.

Also with this multi-platform release will come new features such as inverse kinematics. This allows for the ability to pull on a robot's finger and have his arm follow. Features like this and hopefully updated bones will give LightWave great character animation capabilities.

You've picked one of the things that is fairly hard to do on any type of computer system to date. It's why you do not see a lot of computer-generated animation of the type you describe. It won't be long though.

Getting LightWave right now wouldn't be a bad idea as you will be able to learn about the program, and then upgrade to the multi-platform release with its new tools.

Q: I want to be able to merge 2D and 3D animation together to produce the kind of professional quality the big boys do. Some examples being: Sugar Bear adverts, the ballroom sequence from "Beauty and the Beast" and Aladdin's magic carpet. In all of these, the 2D and 3D images interact with each other and are in perfect registration.

I've read the tutorial in the February issue touching on this subject, but it is too limited. There is no moving background in 3D. So is it possible in LightWave? If so...

1. How do you register the 2D and 3D together perfectly (i.e., 2D character opening a 3D door.) Do you render your wireframes first, then print them out and animate according to your printed wireframes or animate first and somehow match the 3D wireframe later?
2. Do I need to use the alpha channels?
3. Do I use the Foreground and Background images in LightWave to merge them together in final rendering or render first, then put them together using ADPro or ImageF/X?

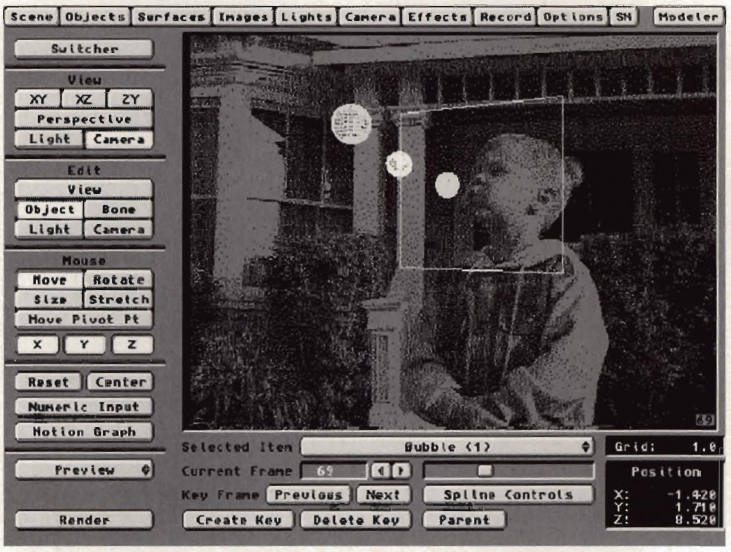
Ian (Rez-Man) Gregory
Brampton, Ontario

A: It is certainly possible to marry LightWave-generated objects with video footage. It is done all the time on *seaQuest*, *RoboCop* and *Babylon 5*. You can even shoot the video footage using motion control rigs that use programmed camera moves, and input the data into LightWave to be used by the LightWave camera (there is a little bit of creative programming involved) in order to match the shots exactly.

If you need to merge LightWave imagery with video footage, take all needed measurements such as camera distance to objects, camera lens, placement and rotation of camera and lights and items in the scene that you need to re-create with LightWave. It is also a good idea to place (and measure) items on the ground that you can align null objects with in order to get registration between the real world and LightWave's.

It sounds, however, as if you are talking more about classic cel-type animation being merged with LightWave. If that is the case, the answer to all of your questions seems to be yes or no depending on the situation.

Unfortunately, there are no physical cameras used in the traditional 2D animation world and you won't be able to match any motion files, so you'll have to wing it and animate by eye.



A video image sequence used as a layout background preview is shown above.

You may wish to render out a sequence of LightWave wireframes to aid you in your 2D animation or you may wish to bring the 2D animation into LightWave as a Background Preview (LightWave 3.5).

You may need to use the alpha channels depending on your situation, but it sounds like you will most likely use one set of images as the foreground and another as a background. You will probably want to check out the use of Front Projection mapping, however, as its use can be very beneficial in this type of work.

There may also be times when you need to use a third-party product to combine your images. Again, it totally depends on your situation.

Q: I would like to connect a Sony PVM-1341 monitor with the standard video out of an Amiga 2000. The Sony monitor has an RGB port and can display 640x200.

Can a cable be built for this connection? Will this setup support the Toaster requirement for sync? Can a Toaster workstation be set up without a monitor to reduce space requirements? What is the real deal on the need of a 1080 or 1084 monitor with the Toaster? Are there any other options other than a 1080 or 1084 monitor when using a 2000?

David G. Powell
San Carlos, Calif.

A: If your Sony monitor will scan down to 15.75 kHz, it should work with your Toaster. This isn't really my field, so I would recommend calling PreVue Technologies at (408) 372-6192. They specialize in making connections from anything to anything and should be able to assist you.

The real deal on a 1080 or 1084 is not that you need those monitors, but rather the Toaster must have something connected to its RGB out port to terminate that output. If you do not wish to hook up a monitor there (yes, you can use a Toaster without a monitor except for preview, but I wouldn't recommend it), you should at least terminate the output. PreVue or NewTek will be able to help you with a RGB port terminator.

If you are fortunate enough to find an ICD Flicker Free video adaptor, you can use it to connect a multisync monitor to your 2000 and get much better quality without the annoying flicker associated with the Amiga's NTSC compatible video displays.

VTU

SOUND REASONING

Digital Audio Basics

Don't Believe the Hype

by Cliff Roth

The audio tracks for low-budget video productions are increasingly being recorded on various types of digital sound recorders. From multi-track studio-in-your-computer systems such as the SunRize Studio 16, to the PCM audio dub tracks on Hi8 videocassettes, to the NewTek Flyer nonlinear editing system, digital audio seems to be just about everywhere the Video Toaster is.

But contrary to the hype, the mere fact that a signal is digital does not necessarily make it better. There's good digital quality and bad digital quality. Many computer-based digital audio systems allow control of the parameters that affect recording quality.

Raw Information

The physical phenomenon we hear as sound is rapidly changing air pressure, which our ear/brain system is sensitive to. When air compresses and decompresses between 20 and 20,000 times per second, it is said to be in the audio range and perceivable by the human ear.

ILLUSTRATION BY DAVID SMITH

A microphone is an electro-mechanical device that creates a correlation between air pressure level and electrical voltage level (much as a classic thermometer creates an analogy between temperature and length of a mercury column).

At the other end of the audio chain, the loudspeaker does the exact opposite process, converting changing voltage levels into changing air pressure levels (the louder the volume, the more extreme the changes in pressure).

Audio is therefore inherently analog—at least at the inputs and outputs. Digital recording changes what happens between the microphone and the speaker in the middle of the process.

Digital recording takes the voltage from the microphone at each moment, converts it to a numeric value, and records this number in digital memory. The quality of a digital recording is primarily dependent on how many such moments get recorded each second—called the sampling rate—and how precise each number is that gets recorded. That precision is measured by the resolution, which totals the number of bits recorded in each sample.

A standard audio CD has the following digital recording parameters: There are 44,100 samples taken each second, and each sample has 16-bit resolution. This is considered the current "gold standard" of digital audio.

Assessing Digital Audio Quality

Two digital audio rules of thumb can help translate these statistics into more commonly understood audio terminology: The highest frequency a digital recording system can handle is always a little less than half the sampling frequency. With audio CDs, that works out to a maximum reproducable frequency of about 20,000 Hz, which is the upper limit of human hearing.

The second rule relates to the amount of error that occurs from the act of digitizing a signal. The conversion process inevitably must round up or round down the value of each sample to the nearest increment. The more increments, the more accuracy and the less error. So a 16-bit recording system has less inherent error than a 12-bit or 8-bit system. (Just as a two-digit outdoor thermometer that rounds temperatures up or down to the nearest degree is inherently less accurate than a thermometer which reports temperature to the nearest tenth of a degree.)

The amount of error is described as a proportion of the maximum possible signal, and the overall measurement is called the "signal to error ratio." In practice, the S/E ratio is quite similar to the S/N ratio rating of analog audio equipment (which is also very similar to the dynamic range rating). The rule of thumb states that the S/E ratio is equal to the number of bits times 6dB. Thus, with 16-bit recording, CDs provide a 96dB S/E ratio.

The entire range of human hearing, from the faintest sound of a pin dropping to the threshold of physical pain (and eardrum damage) that occurs when ears are exposed to jet engines, jackhammers and other

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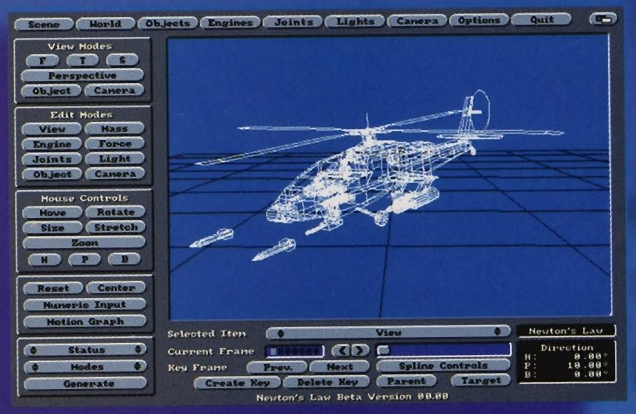

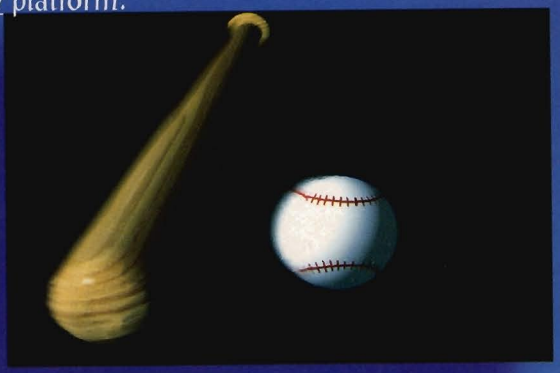

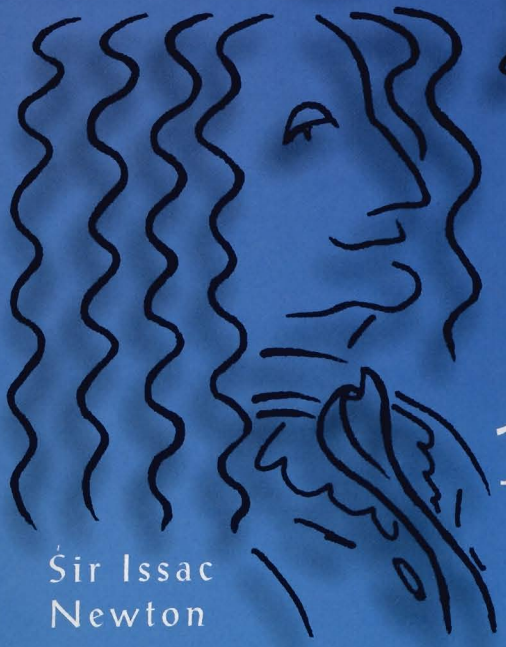

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FOR INFORMATION CIRCLE 146

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extremely loud sounds, is about 120dB. But ambient noise in most homes (and in movie theaters) makes it ludicrous to offer a recording range wider than about 90dB, because the faintest sounds will be lost in the background.

For the sake of comparison, the table below shows the specifications for some common audio devices.

The PCM tracks on 8mm and Hi8 tapes represent a good compromise in digital audio quality, though they're hardly top-notch hi-fi. Sampling frequency is 32 kHz, so the frequency response is limited to about 15,000 Hz. The number of bits per sample is only 8-bits, which would theoretically provide just 48dB of S/N ratio. However, a non-linear compression/expansion scheme (similar to the way Dolby works) is used to improve S/N ratio to about 75dB.

Bit Management

More sophisticated systems of data compression manage to squeeze better quality by using fewer bits, utilizing the same techniques that allow compression of video data and computer files looking for repetition and non-essential information in the data stream, and eliminating it. The MPEG-2 compression standard includes methods for reducing both video and audio data.

In the consumer electronics arena, both the Sony Mini-Disc recording system and the Philips DCC (digital compact cassette) use proprietary (non-standard) data compression algorithms to cut the data flow to about one-fourth or one-fifth of the "raw" stream.

But to those who desire the highest quality, use of such data compression schemes is considered taboo. The raw data is considered too precious to tinker with. In fact, among "tweaker" audiophiles who own top-notch home stereo systems, it is not uncommon to spend between $1,000 and $5,000 purchasing a separate D/A converter for a CD player. The quality of the A/D and D/A conversions is of paramount importance, once you get beyond the basic digital audio recording parameters.

The digital audio tape (DAT) format is currently the only digital audio format that provides the same raw quality as CDs. It can even go two notches better, offering sampling rates of 48 kHz and 56 kHz, for the absolute best frequency response.

These better-than-CD recording parameters are sometimes available on computer and hard disk-based digital recording systems; the SunRize Studio 16 can go up to 48 kHz, for example. But those concerned with getting absolute top quality should note that it's difficult to get a computer card to offer noise-free input and output (analog) circuitry, regardless of how many bits it uses in the recording/playback process. This is especially true when microphone-level mini-jacks are involved.

To its credit, Studio 16 uses gold-plated line-level phono-jack connectors. But the best digital audio recorders, such as those used in professional recording studios, have three-pin balanced-line XLR jacks for the inputs and outputs. Studio 16's overall dynamic range, according to the manufacturer, is an excellent 85dB.

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Specifications for Common Audio Devices

Device	Typical Frequency Response	Typical S/N Ratio
Telephone	100 - 5,000 Hz	30dB
VHS linear track	50 - 12,000 Hz (@ SP speed) 50 - 5,000 Hz (@ EP speed)	45dB 45dB
AM radio	100 - 5,000 Hz	50dB
FM radio	20 - 15,000 Hz	70dB
VHS Hifi track	20 - 20,000 Hz	80dB
CD player	20 - 20,000 Hz	96dB

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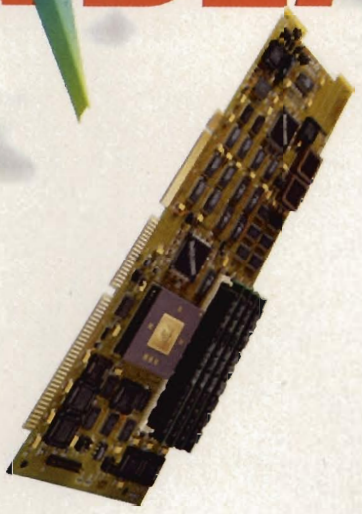

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CYBERSPACE

LightWave Utilities

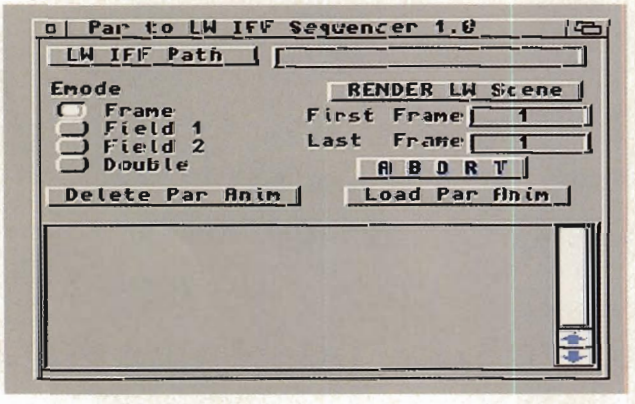
Additions for Your Animation Toolbox

by Geoffrey Williams

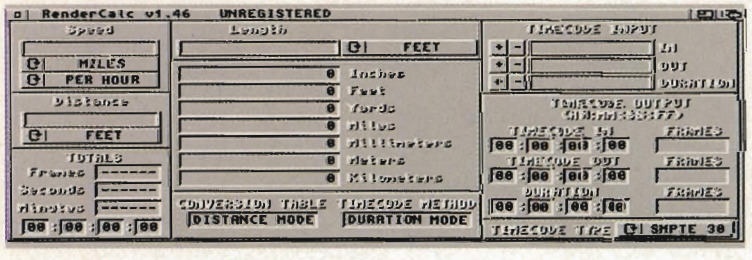
With the advent of a standalone LightWave and ports to platforms such as the SGI machines, our favorite 3D program looks to become the dominant force in the 3D world. With that in mind, this seems like a good time to take a second look at some of the resources and utilities available for LightWave.

A few columns back we reported on the LightWave Mailing List available through the Internet. Unfortunately, just before we went to press, the network that distributed the mailing list dropped the account of the person organizing the mailing list. For awhile its future was unclear, but it is now happily humming along, providing a healthy and regular dose of LightWave news, tips, commentary and debate. To subscribe to the mailing list (which means it regularly appears in your electronic mail box through your Internet access provider), send an e-mail message to listserv@netcom.com; the message should read "subscribe lightwave-l". If you do not have Internet access, you can find compilations of the LightWave mailing list on many BBSs that carry LightWave information.

The Orderly Scene Mover transfers scene files and assures that all of the required files and pictures also come along.



Richard G. L'Hommedieu's PAR to LW IFF Loader is a CanDo stack that features a simple user interface.



RenderCalc lets you enter the values for speed and distance and it tells you how many total frames, seconds, minutes and the length of time, in the specified time code format, that the motion will take.

Until the Video Flyer ships, the Personal Animation Recorder (PAR) from Digital Processing Systems (DPS) is the best way to get video into your Amiga and play it and LightWave renderings back in real time. Incidentally, the new PAR software (version 2.8) permits PAR animations to be loaded directly into LightWave as sequence image maps. All that needs to be done is set the export format to IFF. Use the preferences menu in the PAR software and turn on the emulate button. Then load the PAR animation into LightWave as an image sequence with a period appended to the end of the file name: "testanim" = "testanim." You can obtain current updates to most DPS products by calling their BBS at (416) 754-8368.

Richard G. L'Hommedieu's PAR to LW IFF Loader (PARLW) is a CanDo stack that offers a simple user interface to accomplish the same thing, and it even works without the upgraded software. While not as critical if you have the latest version of the PAR software, it is still a handy utility with a simple front end that simplifies the process.

While on the subject of PAR, suppose you have a LightWave PAR animation and want to do some image processing on each of the frames. This could be a bit tedious, but another CanDo stack called PAR Processor (PARPro) has come to the rescue. Written by Dostick, it will take a series of frames from a PAR animation, perform an ADPro operation on each frame, then dump it back out as a PAR animation. The AmigaGuide instructions are a bit difficult to decipher due to the broken English from the Latvian author, but you should be able to figure it out well enough to begin. Be sure to install the included fonts, or the interface is a bit difficult to read.

How would you like your computer to keep you verbally informed about the progress of your LightWave renderings? To do just that, Dan Murrell Jr. and Scott Ellis wrote SpamServer, based on an idea by

Chris "Spamgod" Short. (This explains the cryptic name, but not how Chris got his nickname.) SpamServer does not use the Amiga voice that was phased out with Workbench 2.1, but instead relies on digitized samples of a fairly attractive sounding female voice that are included with the package. Of course, you can create your own digitized samples, but included are the numbers 0 through 9, and the words "complete," "frame," and "rendering." What it does is watch for each frame as it is saved to the selected directory, and it announces the frame number using the number samples. When you get to the end, it announces "rendering complete." It works great with LightWave, but you could also use it in conjunction with Image FX or ADPro or any similar batch processing where a series of frames are rendered to a directory.

Most batch processing and animation compiling assumes that you are dealing with a sequentially numbered series of frames, but what if you rendered things out of order, or want to change things around a bit? Renaming a long series of frames is not an enjoyable task. Thanks to NMI Software's Renumber, you can quickly and easily renumber any sequence of files that use the standard Filename.001 numbering system. It even comes with a slick and simple-to-use interface that makes renumbering even vast quantities of frames a snap. Not only does it renumber the files, but you can also give them a new root name. For example, you might have a series of 150 frames named opening.001 through opening.150, and another series of frames called closing.001 through closing.050. With Renumber, they can all be easily renamed and renumbered to Anim.001 through Anim.200. This is quite helpful.

Another useful utility is Daniel S. Milling Jr.'s RenderCalc. It does a lot of the complex calculations that 3D animators might want to do. It lets you enter the values for speed and distance and it tells you how many total frames, seconds, minutes and the length of time, in the specified time code format, that the motion will take. Time Code In and Out points can be entered as well as duration, and it supports SMPTE non-drop frame, EBU and Film time code. Like a spreadsheet, you can change any number and all of the others are automatically updated. You can even change the TimeCode format on the fly and see all of the numbers updated. This makes it possible to play around with the numbers and try different things to see what results you get. It can also do conversion between inches, feet, yards, miles, millimeters, meters and kilometers. Overall, this is a great utility that will save you time and make it much easier to achieve accurate and realistic movements. With an excellent user interface that makes it easy to use, I think you will definitely want this one in your arsenal of useful tools.

The relationship between the height and width of an image is its aspect ratio. For example, the aspect ratio of a 786x480 image is .814. There are times when it is handy to know the

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aspect ratio of one image so that it can be properly scaled to match other images. This can be an issue when using images created on other computers with different aspect ratios because the pixels are square rather than elongated as they are with an NTSC or Amiga image. It makes it possible to calculate the nearest scaling that preserves as much as possible of the original aspect ratio while bringing the size to what you need. A handy calculator for doing this is Aspect by Kim Heise. It runs from the CLI and asks for the height and width, then tells you the aspect ratio.

Another handy tool is FranZoom by Sheldon Arnst, which calculates an object's movement on a frame-by-frame basis. If you have a start and stop position and know the number of frames that the movement of a specific object will take, as well as the number of frames to taper up (accelerate) and the number of frames to taper down (decelerate), then FranZoom can tell you the positions of each increment in the move. The same technique can be used for rotations, pans, zooms and any other moves that might require tapers. It will provide a list of the exact position of the object for every frame.

Have you ever tried to copy a scene file to a disk to transfer it to another machine, only to find that you were missing an important file? So did Scott Wheeler, and with the help of Joe Dox, they came up with OSM, the Orderly Scene Mover. It transfers scene files for you and assures that all of the required files and pictures also come along. It has a clean user interface and should save you a bit of frustration. It also comes with its own font, but it seems to work fine without installing it. If it doesn't, make sure you install the font in the fonts: directory.

Rename, by Gary Freedline, will rename up to 90 LightWave 3D saved files as recognizable framestore entries automatically. Although it is primarily a script, it easily runs from the Workbench just by double clicking on its icon. This is handy if you want to display the frames one at a time through the Toaster for recording to tape. It is certainly much easier than renaming them by hand or loading them through ToasterPaint.

Besides programs, there are countless textures, objects and scene files available through the various BBSs. We've written about LightWaved BBS before, but I bring them up again because their number has recently changed. Club Toaster at (813) 527-1722 seems to be disconnected and there is apparently no new number. Also gone is the BBS for the Arkansas Toaster User's Group at (501) 223-2516.

On the new listings front, the Sacramento Toaster Society has a BBS at (916) 338-2543 and (916) 338-7144. The Sysop is Jeff Hayer, and the board is supported by Applied Computer Systems (a Sacramento Amiga and Toaster dealer). The board is a general Amiga BBS and has a section for Toaster-related files. The LightWave area includes sections for surfaces, ARexx scripts, objects (55 of them), fonts, and framestores. They also have several CD-ROMs online, including Fred Fish, Aminet, MOD collection, Screenware GIFs and a CD of clip art, so there is plenty to peruse.

Mike's Video House of Glendale, Calif., has been a

reliable and active BBS for many years. Reachable at (818) 240-1593, they have a wealth of Amiga and Toaster related files. They carry many USENET message groups, including the Toaster, Amiga Video and Professional Video news groups. There is also a local Amiga Video message area. The message areas you are interested in can be compressed and downloaded as a message packet, and several offline readers are available, including Bluewave, which I wrote about a couple of months ago. Since this is a board local to me, I am on it quite a bit, and if you do not have Internet access, it is the best place to send me e-mail. There are more than 7,000 Amiga and Toaster-related files available for downloading, including nearly 300 object files and many textures and other items of interest to Toaster users. I'm certainly glad that it's a local call for me, but it's worth a look even if you have to pay the telephone tolls.

I've written about the following point before, but people still run into trouble and ask about it. If you use an Amiga 4000 or any 68040-based processor, not all public domain utilities will work with it at the beginning. They may crash horribly. The text reader that I use, which displays compressed text so I can fit a lot more on the disk, will fail. The solution is quite simple—you need to turn off copyback. To turn it off, open a CLI shell and type "CPU NOCOPYBACK." To turn it back on, type "CPU COPYBACK." It is quite simple to do and saves you a lot of frustration when you can't figure out why a freely distributable program is crashing. For the CLI-phobic, I made a couple of icons to turn it on and off, which I'll put on the disk mentioned below.

As usual, if you want all of the freely distributable utilities mentioned this month, send $5 to: Geoffrey Williams, LightWave Disk Offer, 1833 Verdugo Vista Dr., Glendale, CA 91208. You can reach him by e-mail at gwilliam@netcom.com.

SOUND REASONING

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That's better than any analog recorder, and good for just about any application, but it's a notch below the maximum theoretical capabilities of 16-bit digital recording.

The NewTek Video Flyer system features full-CD quality (16-bit stereo, 44.1 kHz sampling) digital audio recording, with no data compression (there's extensive compression of video, but fortunately, none on the audio side).

Disk Demands

Most computer-based digital audio recording systems allow you to choose the recording parameters—the number of bits per sample and the sampling rate. There are two trade-offs: First, the higher the quality you select, the more rapidly you'll use space on the computer's hard disk. Second, the higher the quality selected, the more demand there will be for the hard disk to quickly write and read data. Some hard disks may not be capable of handling the data flow required for top-quality recordings, which could result in skips or clicks during playback.

Suppose you want to record 16-bit stereo at the CD rate of 44,100 bits per second. That works out to about 1.4-million bits per second, or approximately 180,000 bytes (one byte = 8 bits) per second, which is the data rate of a single speed CD-ROM drive. Double-speed CD-ROMs can deliver about 360,000 bytes per second, and new quad-speed units rise over 700,000 bytes per second. This is called the sustained data rate. Another important measurement, called the seek time, states how quickly the drive can find any particular data location that's needed.

The raw data requires a lot of disk storage space, too. It takes about 5MB to record one minute with CD quality. Suppose you want to mix together a 30-minute video, with four CD-quality monaural tracks (dialogue, narration, music, sound effects). You'll need at least 750MB of disk space to hold it all—double that (1.5 GB) for stereo.

Digital Mixing

Practically everyone is familiar with old-fashioned analog audio mixing; a large (or not-so-large) console provides a series of fader controls representing each of the inputs. By raising and lowering the level of each signal, different mixes can be achieved.

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TAMING THE WAVE

Animation Explorations

Learning in LightWave

by David Hopkins

Hello again, and welcome back to Taming The Wave. This installment will provide a number of interesting ideas you may want to explore in your LightWave animations.

One problem that many LightWave animations suffer from is light tending to look too computer generated. One way to achieve a more realistic light when using Spotlights is to set the Soft Spot Edge Angle to be equal to the light's Cone Angle. This provides a beautiful soft light effect that can make all the difference in the world.

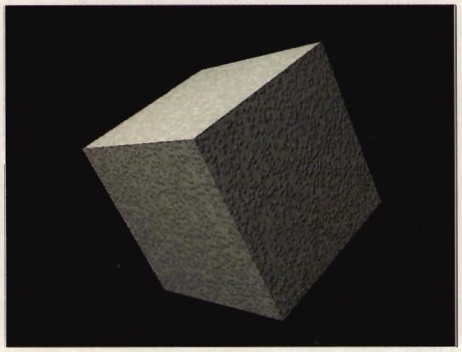

Figure 1

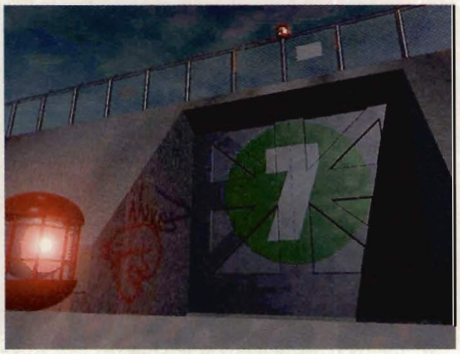

Figure 3

Figure 2

Figure 4

IMAGES COURTESY OF SCI FI PRODUCTIONS/GREEN COMMUNICATIONS/MACH UNIVERSAL

Do you have more than one machine that you use to work on your animations? For example, one at home and one at the office? The problem becomes how to have the scene set up to be mobile in the most painless way. A simple but effective solution is to build your entire scene on a floppy disk. Format a blank floppy disk and create directories on it for Scenes, Objects, and Images. Name the disk something distinctive such as "LaunchScene." As you model objects, save them in the Objects drawer of your floppy. If your images are small enough, save them in the floppy's Images drawer. If your images are too large, or you just have too many, put them on other floppies, but make sure that each floppy has a distinctive name. When you set up the scene, make sure to use the files from the floppies and save the scene on them when you are finished. Now, take this disk to that other machine, pop it in and you're all set. If you had to use more than one disk, LightWave will ask you to insert the appropriate disk as it is needed. And instantly the mobility problem is solved.

So, now that LightWave 3.5 offers programmable resolutions, what can you do with it? Well, if you intend to send your rendered images to film or slides, try using 1024x768 with the Pixel Aspect Ratio set to Square Pixels. If you have the rendering power, try 2048x1536 with Square Pixels. Each of these render sizes will produce a distorted final image on your Toaster display, but despite appearances the image is accurate. These sizes are used because they are common for service bureaus to deal with. Be aware that images rendered in 2048x1536 can take an extremely long time to render and usually produces images in the 4MB range. The 1024x768 render size also takes a long time, but produces images in the 1-2MB range.

On the subject of programmable resolution, you should be aware that LightWave doesn't let you "UpRes" an image. This means to render a 1024x768 image, you have to make sure the the normal resolution you choose is at least High, because High Resolution generates the picture at 1504x960 (1280x960 using Square Pixels). Obviously, to make that image fit into a 1024x768 area requires LightWave to shrink the image a bit. This is good because it also provides "oversampling," and actually improves your image quality. If, however, you try Medium Resolution (at 752x480 or 640x480 Square Pixels), LightWave must enlarge the image to make it fit. However, since LightWave doesn't enlarge, you'll usually end up with a blank frame. In short, remember to render the image at a higher resolution than the one programmed.

While working on visual effects for SciFi

Productions' "Digital Man" (coming soon from Republic Pictures), the question arose of how to get a 24-frame per second copy of our animations for use in the film's rough cut before the 30-frame per second (fps) files were transferred to film stock. If you have a Personal Animation Recorder (PAR), you can just press the "FILM" button and watch it at 24 fps, right? Well, not really. To view the film speed output from the PAR requires a component video monitor, something you are unlikely to have just laying around the house. In addition, you can't record this output to a standard video tape recorder because 24-frame video doesn't sync up on 30-frame recording equipment. The solution we came up with was stunningly simple, but solved the problem nicely. When using an Amiga 2000 (which I still find to be my favorite Amiga), simply take a feed from the Mono Video RCA port on the back of the machine into a standard video deck. Commodore, in its infinite (and, of course, fatal) wisdom, removed this port from the Amiga 4000, so you're out of luck if that's all you've got. In LightWave, generate a wire-frame preview, play it back using the 24 fps option, and you've got it on tape. Now, put it into your rough cut to verify timing.

Speaking of the PAR, there's an added feature in the last version or two that doesn't seem to have been documented. If you record a scene from a video source onto the PAR and want to use it in a LightWave animation, you have to Export the entire piece in IFF format, right? Wrong. If you take a look in the SetUp panel of the PAR, you'll find a button marked Emulate. (If you don't have this button, you don't have the required version. Contact Digital Processing Systems for version 2.8.) When clicked, this button allows LightWave to treat a PAR file as a standard image sequence. Of course, it also ties up your PAR for the entire time you are rendering.

Here's a good formula for making rough concrete with LightWave 3.5. In Modeler, make a one meter square box. If you are starting Modeler for the first time in this session, just click Box, press the "N"-key on your keyboard to bring up the numeric requester, and hit OK. The default values are exactly what we want. Export this object into LightWave and assign the following surface attributes to it:

Surface Color: 185, 185, 185
Diffuse Value: 85 percent
Diffuse Texture Type: Crust
Diffuse Texture Size: .03 .03 .03
Diffuse Texture Value: 75 percent
Diffuse Texture Coverage: .85
Diffuse Texture Ledge Level: .1
Diffuse Texture Ledge Width: .8
Diffuse Texture Bump Strength: .2

See Figure 1 for an example image. Also, I used a slightly yellow hue in my lights, the values: 255, 243, 209. Now it may not look like much in this shot, but take a look at Figures 2, 3, and 4, stills from "Digital Man" which make heavy use of it.

Do you have more than one machine running LightWave on an ENLAN-DFS network? If so, you should be aware of a new product I have developed called HardWire. Its purpose is to allow distributive rendering of multiple LightWave scenes, intelligently, across such a network of up to 14 machines. Since NewTek's ScreamerNet is supported and each machine can have up to eight Screamer CPUs, this brings control of up to 112 rendering engines online.

HardWire offers the ability to set all the important options for final rendering of each scene (including almost every option found on LightWave's Camera and Record panels), specify which machine (or machines) will render that scene, and even check for previously rendered frames before distributing. Better still, it runs just as well on a standalone machine as it does on the network.

There are other excellent features, but rather than turn the rest of this column into a sales pitch (oh no, too late), I'll tell you that you can find a "Test Drive" version of HardWire in the public domain (talk to your local users group) or you can order it direct from me for $5 (for details, see the end of this column). If you have ATalk communications software, a modem, and a pager, HardWire will even page you with progress reports. Imagine actually being able to leave your machines while they render dozens of scenes automagically.

Do you usually render and save RGB images, or Framestores? If you use RGBs, don't use Field Rendering. It looks like Field Rendering only really works properly with Framestores and since Framestores are of lower quality than RGBs, you probably don't want to do that. Try using a small amount of Motion Blur as an alternative. So, what's the secret with Adaptive Sampling Threshold? If you are like most LightWave users, you probably don't touch it. LightWave creator Allen Hastings explained that the best way to set it is to render your image and watch where the sampling occurs (that's what is going on with all of the white). If you find that it is sampling in areas that don't need it (such as the majority of image maps), reduce it. The goal is to let Adaptive Sampling work only on the edges of each shape. Taking a few minutes to determine the correct setting on each scene saves rendering time. Be warned, however, that setting the Threshold too high can result in the dreaded "crawling edges" problem.

One more lighting tip: if you leave LightWave's Ambient Light intensity at its default setting of 25 percent, you're missing the boat. This actually determines how much light LightWave should "presume" is hitting surfaces even when they are in complete shadow. Turn the intensity down quite a bit (try a setting of about five percent) and put in another light or two (if needed) to give your images a much more realistic feel.

As usual, if you have any cool tips or tricks of your own, send them in. We're all here to learn, and what you share might inspire others to share that one magic trick you've been looking for. Address all inquiries (and HardWire Test Drive orders) to:

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For HardWire Test Drives, make checks payable to Mach Universe. Mark the envelope "ATTN: HardWire Offer." VTU

SLICES

Graphics with ToasterCG

Creating Effective Video

by James Hebert

Not every Video Toaster user has the option of using LightWave animations in his or her work. If you haven't the luxury of operating an Amiga 4000 with its built-in LightWave playback, and the expense of a single-frame controller and editor has kept you immobile, then consider the following tips.

First, let's focus on something that many Toaster users forget; animation is the *appearance* of motion. We perceive motion when we see a series of still images, each with a slight difference from the one next to it, shown at a steady rate. Film is actually a large reel of still images shown at a speed of 24 frames per second (fps), while video is shown at 30 fps. A trait of our eyes—called persistence of vision—fools us into thinking that a series of images is in motion. Film, television and animation all use this trick of the human eye to fool us into seeing moving imagery. (If you get the chance, study a strip of film—either hand-drawn animation or a developed reel—and you'll see how each image differs slightly.)

The trick is, you don't need to be able to move several images at a time to create the sensation of motion. A simple wipe from one graphic to the next can be equally effective. And if you design your graphics appropriately, using related imagery, you'll save time over someone who has to use his 3D program to animate the same sequence.

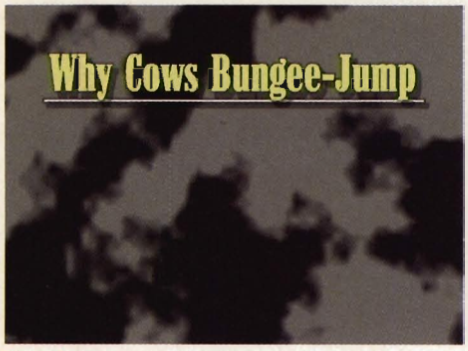

Figure 1

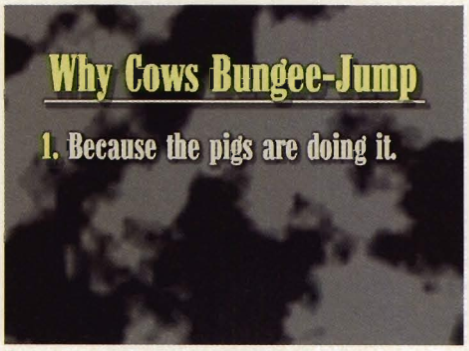

Figure 2

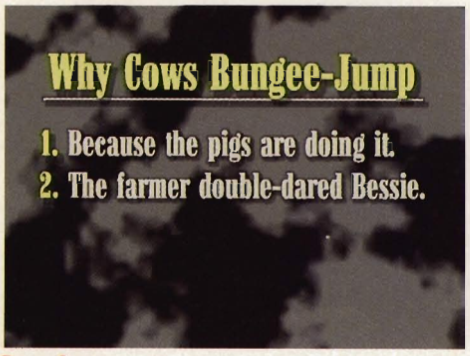

Figure 3

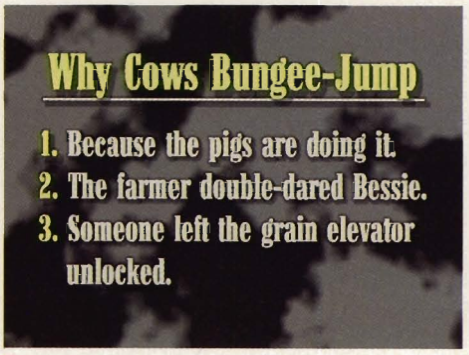

Figure 4

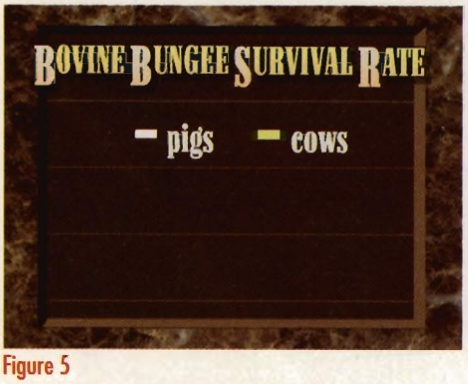

Figure 5

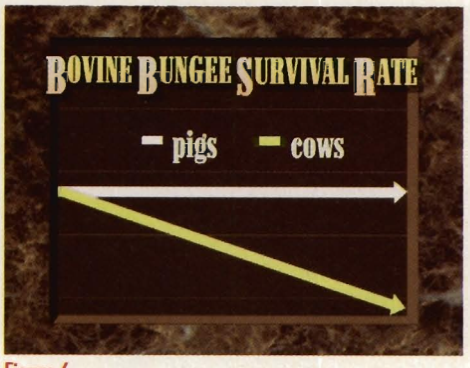

Figure 6

As an example, I recently attended a seminar where the speaker utilized a pair of slide projectors for his presentation. The only transition available in this situation was the dissolve, the slow fade from one shot to the next. From one unrelated slide to another the transition provided a feeling of completion, the slide was over and we were on to the next. However, when several slides created a related sequence, the effect was captivating. A simple three-slide sequence of a couple holding hands and walking away from the camera along a railroad track somehow took on greater meaning. In the first shot, they were near the camera. In the second, they were far from the camera. And the third slide contained only the empty railroad tracks stretching into the distant forest.

Tell me that's not animation. Tell me that's not effective storytelling.

Here's how you can use simple tricks to create effective video. The graphic image sequences accompanying this column were created in ToasterCG. They could just as easily have been created using ToasterPaint, LightWave or the Toaster framegrabber. (Incidentally, using a sequence of

still images in television can be highly effective. Typically, both videographers and viewers think of television as a medium of moving imagery, of scenes that contain motion. With this in mind, you can use a sequence of motionless images to capture the viewer's attention.)

Look at figures 1, 2, 3 and 4, which each display ToasterCG pages from a fictional documentary I just made up. (I can do this; I have a Fictional Columnist's License.) At this point in the show, there are three important points that need to be stressed to the viewer. This is a documentary, which means that in all likelihood it's being shown on public television. Furthermore, the viewers can read an entire screen full of text faster than the narrator can speak it. However, I want them to consider each of these points independently, so I will "build" the screen for them.

From the previous shot in the production I dissolve to Figure 1, the first graphic that sets up the situation. I then load Figure 2 into the alternate framebuffer, and dissolve to it at the correct moment in the narration. Since the two graphics are identical except for the presence of the first line of text, this line appears to dissolve in magically by itself. I load Figure 3 to the alternate framebuffer and dissolve to Figure 3, again just as the narrator reads this point. This line also seems to appear just as the narrator speaks the words. I repeat the process for Figure 4.

Using this simple method of building graphics on screen, you can draw the viewer's attention to the item you wish to stress. In this example, it serves to keep the viewer from reading all three points right away and having to wait while the narrator catches up.

If this graphic were a rendered image of a proposed architectural site, it might have been built with a series of images showing the stages of a building's construction, or even images consisting of different buildings entirely. Each of these methods of displaying a series of graphics creates a feeling of movement and animation to a production.

Take a look at Figures 5 and 6. This is another example of building a graphic. In this situation, you can use a different Toaster effect to create animation- a horizontal wipe (the hard-edged wipe that wipes from left to right across the screen).

I could use more figures in this sequence to show off each bar of the graph growing, but I think you'll get the idea. Figure 5 shows an empty graph, as yet with no information. Figure 6 shows the same chart with two jagged bars running across its length. If a horizontal wipe is used to wipe from Figure 5 to Figure 6, the two bars will look as though they are being drawn across the screen while you watch. If you had to animate five different bars across such a graph, it could be done with a series of six images (the blank graph, bar 1, bar 2, bar 3, bar 4 and bar 5), each bar in motion as it draws over the bars before it.

Another popular bar chart design uses vertical bars, with each bar drawn as a column so that the graph appears as a series of upright standings. With

continued on page 30

these, use a series of vertical wipes to demonstrate "growing bar charts."

What about the ever-popular pie graph? Pie graphs are a much-maligned form of presentation, probably because in themselves they are dull. Try using LightWave or ToasterPaint to illustrate pie charts with some pizzazz, then use the Switcher's wipes to display this information creatively. The Toaster Switcher has a clock wipe, that appears to wipe the Preview video source onto the screen in the manner that the minute hand sweeps across the face of the clock. This is an interesting and appropriate way to use a transition. Further, if you wish to build the pie chart on screen over a series of images (as mentioned earlier), use the clock wipe to move from one graphic to the next.

Think of these approaches to animated graphics as a form of "Now you see it, now you don't," except in this case you're revealing more information with each frame rather than taking it away. I find that looking at an otherwise unexciting corporate graphic in this frame of mind allows me greater freedom.

Flashing color is another method for drawing the reader's attention to a portion of the screen. Since Video Toaster version 1.0, there have been four video effects that permit loading and displaying two sequential framestores (one into DV1 and the other into DV2) with one load operation. By selecting one of these effects prior to loading the graphics, the Toaster was instructed to display each framebuffer at high speed.

If you designed two graphic pages with only slight differences, say one page has a line of text in red while the other page has the same line in white, the result would be a page of graphics with one line flashing between red and white. The only drawback is that you couldn't control the speed of the flash. However, if you load those same images into the two frame buffers, you can trigger the Take button and switch from image to image manually at the speed you want.

If the speed of the flash is to your liking, try this trick. Use ToasterPaint or LightWave to create two sequential frames containing marquee lights. On one frame, "flash" every odd light. On the other frame, flash the even lights. Select one of the Toaster's four-field effects, load these two images, and watch the marquee lights flash as though they were chase lights.

Take the time to run through the Toaster's collection of wipes and effects. Compare these transitions with the graphics you need for a given production. You should see corresponding relationships here and there, sure signs that a creative touch can be added without drawing attention to itself. Depending on the needs of the production, your creative understanding of the Toaster (and the approval of the client), you can create compelling video graphics without 3D animation.

VIU

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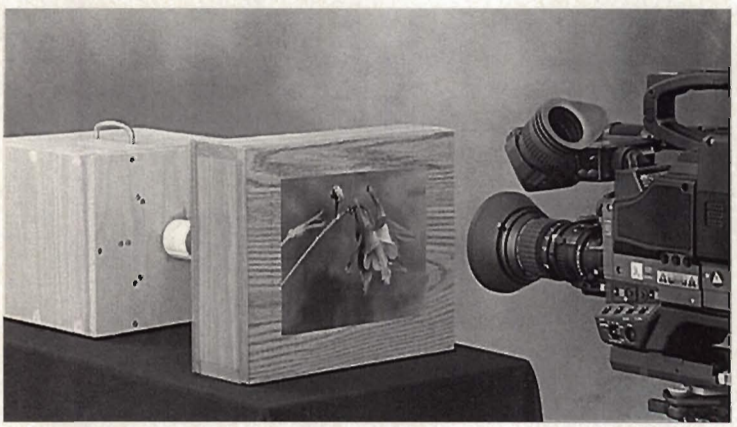
TIPS & TECHNIQUES

Interactive Journalism

Alert Readers Focus on Battery Problems

by Brent Malnack

Proving emphatically that many of you read this column, I received a record amount of mail in response to a tip that was printed in the July issue of the Tips & Techniques column. The tip revolved around memory problems with Panasonic camcorder batteries. Although I test most tips before printing them, I did not have the specific equipment to execute the tip. Sensing a problem, I bounced it off of a few video executives and received no major complaints. However, these are a few samples of comments I received regarding the tip:



Jim Block's Tip of the Month shows how to vertically mount a heavy video camera and shoot still images on a horizontal surface.

"In the hopes of saving many people from ruining their battery packs, I offer the following advice...Don't do it! The battery packs used in Panasonic AG-450s, 455s and 460s are not nicads. They are lead acid cells (gel cells) and should be recharged immediately." Ron Blachut.

"I am an electronics tech and have done a lot of work with nicads and the companies that make them. You can discharge a single nicad cell with no problem, but you should never, never, never completely discharge a nicad pack that is made of more than one cell. It can and will destroy the battery's life. Why? Because all cells in the pack are not equal. When the voltage drops in a cell to the 0 volt level there will still be other cells that are at a significant level, like around .2 to .5 volts. The result is that the 0-volt cell starts to charge from the live cells, but with a backwards (-) charge. This causes problems such as the pack never coming to a full charge again." Terry Morris.

"The batteries he refers to are not nicad batteries, but are lead acid batteries, so just the opposite is correct. That is, as soon as they are used, no matter how much, they should be charged immediately after using them. As far as I'm concerned, these are the best designed batteries on the market, and I've been in the video production market since 1986." Darrel Goheen.

In response to the sine-wave tip (also *VTU*, July '94), the author of the tip sent this comment:

"The initial black to white gradient should not be mapped onto the curved object on the Y-axis as descibed in the column, but on the X-axis (along the object's length). Then, when viewed from above, the object will then go from black on one end, to white in the middle (highest point) and on to black at the other end in a smooth fashion."

"The general idea is to do displacement mapping in reverse. Use an object with the desired curve to create an image that when displacement mapped onto a flat object, will re-create the original curve." James G. Jones.

While I'm at it, Dr. Nancy L. Kowall wrote to inform me that her image in the August column was erroneously credited to Chuck Wardin. The image of the meringue pie was actually created by Dr. Kowall to help describe her tip.

Keith Christopher contacted me via e-mail and described a $50 shareware program that is great at converting Amiga graphics to various PC formats. It can also load Window's AVI files, and even append them with Amiga graphics. The program is called Main Actor. I would suspect it could be found on the Internet and CompuServe.

Tip Of The Month

The following tip (Vacuum Box) was submitted by Jim Block of Champlin, Minn.

As a professional still photographer, I use the Video Toaster for creating video albums of still images. My tip concerns the digitizing of large numbers of images in a quick and easy manner.

The problem: Owning only one good video camera (a JVC KY-27), I cannot vertically mount such a heavy camera and then shoot the still images on a horizontal surface.

The solution: I built a vacuum box which allows me to quickly mount pictures vertically and place my camera horizontally onto a tripod. This method ensures the flatness of the pictures, while it also allows for easy mounting and removal of photographs.

The box (actually, two boxes) was created from scrap lumber. I built a box 14 x 12" x 5". In the front surface I drilled about 400 small holes. I drilled a 1

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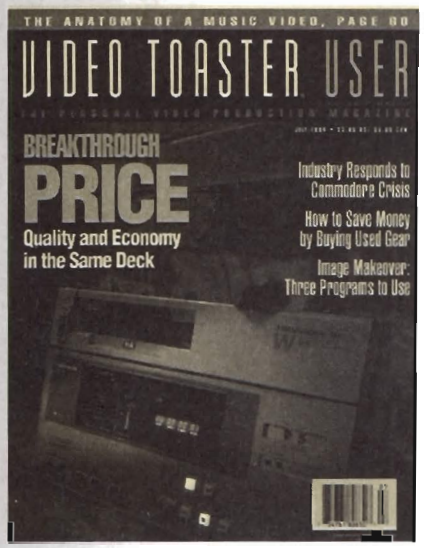

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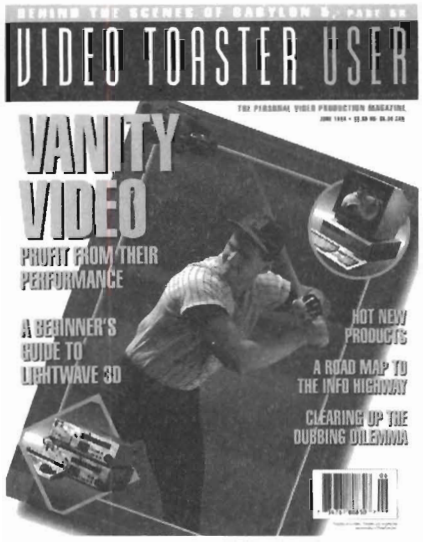

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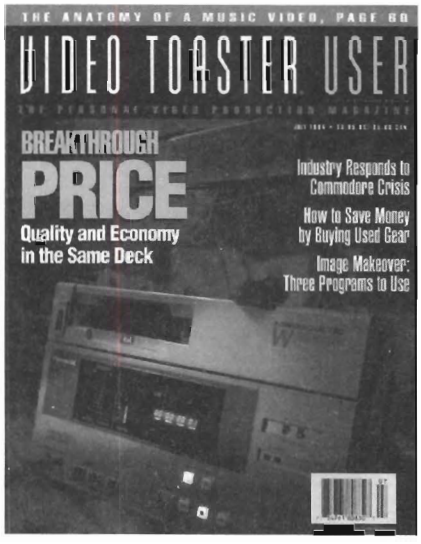

1/2-inch exit hole in the back. I then built a second box large enough to house a canister vacuum motor; I made one 1 1/2-inch hole in the front, and a number of exit holes in the back. To dampen the noise, I insulated the inside with foam. I then connected the two boxes with a 1 1/2-inch flexible hose. (The two box configuration prevents the vibrating motor from causing an unsteady vertical mounting surface). The vacuum motor then sucks the air through the 400 holes, holding the photo to the front surface.

With the improved digitizing speed of Toaster 3.1 and my vacuum box, copying still images is easier than ever. Note: I tried smaller motors (like computer fans, etc.), and they held the pictures in place for a short duration. However, the heat from the quartz copy lights caused the pictures to curl and then fall from the vertical surface.

Another great tip was received via the Internet. The author's address is P.Godley1@Genie.geis.com. The advice concerns using a front projection mask to "draw" letters.

Have you ever wanted to have letters in a phrase appear one at a time in a LightWave animation? You could model each letter of the phrase individually and create individual motion paths or transparency envelopes to make the letters appear, but there's a much easier way; a front projection mask.

In Modeler, create the phrase as a single object and save it as Phrase.lwob. Put the object in a background layer and create a single rectangular polygon that's slightly larger than the Phrase.lwob object. Re-position the rectangle so that the right edge is at X = 0. This puts the pivot point on the right edge. Give the rectangle a surface name of PhraseMask, and save the object as PhraseMask.lwob.

In Layout, create a scene using any objects, lights or backgrounds you need except for Phrase.lwob. Leave it out for now. Render a single frame in your final output resolution, giving it the name FrontProj (LightWave will render and save it as FrontProj001).

Now load Phrase.lwob and PhraseMask.lwob into your scene. Position Phrase.lwob, and then PhraseMask.lwob just barely in front of Phrase.lwob so that it covers it completely.

From the Images panel, load FrontProj001. From the Surfaces panel, select the PhraseMask surface and enter the Surface Color Texture Map panel. Select a Front Projection Image Map and select FrontProj001 as the Texture Image. Click on Automatic Sizing and then click on Use Texture. Set Luminosity to 100 percent and all other levels to 0 percent. From the Objects panel, turn off all shadow options for PhraseMask.lwob.

Now render the scene. It should look just like FrontProj001. PhraseMask.lwob covers Phrase.lwob and with its front projection map, it blends perfectly into the scene.

Now for the magic. In Layout, select the Phrase.Mask.lwob object and set a keyframe at zero. Then go to frame 30. Using the Stretch tool, set the X size to zero and set a keyframe. Because the pivot point is on the right edge of the object, the right edge stays in the same place, and the left edge shrinks toward it. Make a preview and play it. You should see the mask object shrinking over the 30 frames to reveal the Phrase.lwob beneath it. When you render and view the animation, the letters seem to appear out of nowhere.

If left alone, it's likely that the left edge of PhraseMask.lwob will reveal only part of a letter at some point. If necessary, you can set keyframes for the PhraseMask.lwob so that it always reveals an entire letter at a time.

Another useful option is to animate a lens flare that moves along with the left edge of PhraseMask.lwob. When animated, it looks like the letters are being written by the flash of light moving across the screen. The lens flare also helps hide the sharp edge of the mask.

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Video Flyer

Main Project Interface

This is a project sequence for a fictional (and very short!) vacation video. Our heroes, Lois and Clark, ventured to Mexico to spend a week in Mazatlan. While there, they encountered a storm and were whisked away from the planet earth in a spaceship. This is the video that would accompany such a groundbreaking *National Enquirer*-style piece.

If you "read" the storyboard, this is the play-by-play (or crouton-by-crouton):

1 Color bars for 30 seconds.
2 Black for 10 seconds.
3 Fade to:
4 Toaster Logo
5 Page Peel to:
6 Lois and Clark introduction
7 Background music starts
8 We see a wide shot of Mazatlan from the hotel window
9 A title graphic appears, saying "Mazatlan, 1994" over the window footage
10 Fade to:
11 A shot of the hotel where they stayed
12 Clouds effect transitions to:
13 Shot of stormy clouds rolling in
14 We hear the sound effect of thunder crashing
15 The alien spaceship breaks out of the clouds and lands
16 The ship spirits us from Earth
17 Cut to black

by Jim Plant

In 1986, having just completed the Digi-View digitizer, Tim Jenison began working on the concept of a video device that would combine all the major functions of a complete video production studio and put them into an inexpensive desktop computer system. This device, as we all know, was finally introduced to the world in late 1990 as the Video Toaster, and the desktop video revolution had begun.

The Video Toaster was an instant success, selling to thousands of eager customers within months of its release. Jenison should have been happy, but he wasn't. He and a few others who had worked on the original Video Toaster concept knew that they had shipped an incomplete product. The original design called for the ability to store and play back video from the computer's hard drive. Jenison believed that much of video production's complexity centered around the editing process and the inherent weaknesses of videotape. Because it is a somewhat fragile medium, videotape is subject to the vagaries of temperature and other external forces. It stretches, contracts, gets brittle, cracks and requires a lot of complex electronics and precise mechanisms to keep it under control. Jenison, fresh from his digitizing work with Digi-View, figured he'd simply avoid all those problems by digitizing the video signal and storing it on the hard drive. It was a great idea except for one little problem: existing hard drive technology was too slow and too expensive to make this practical. By early 1990, Jenison recognized that he would have to put that part of the Toaster design on the back burner and

Test Flight

The control panel for the color bars framestore
Its duration is set for 30 seconds, so the video starts with 30 seconds of bars. Notice the Clip Duration and the Program Duration indicators. Since this is the first clip in the program, both of these show 30 seconds. As more clips are added, the time of each individual clip will show on top and the total program time up to that clip will show below.

The control panel for the BKG crouton
Its duration is set for 10 seconds. There is no transition between it and the color bars, so after 30 seconds of bars there will be a cut to 10 seconds of black.

focus on getting a product to market.

It's 1994 now, and Jenison is a much happier man. Exactly four years after the ship date of the original Video Toaster, NewTek will release the Video Flyer, that critical part of the Toaster that was set aside so many years ago.

The Flyer brings non-linear editing to the Video Toaster system. Non-linear editing is a relatively new editing process that involves digitizing, storing and playing back video from a computer hardware, all under software control. It is really quite simple: first you acquire your video footage with your camcorder or video camera, then you feed it into the computer where it is transformed from an analog video signal into a digital one. This digitized video signal is then stored on the drive where it can be located quickly and further manipulated using the computer's digital processes. Once it has been digitized, the image is a collection numbers. Then, all editing, and other processing and manipulation is merely an exercise in number crunching. Unlike tape where the editing process requires you to fast forward or rewind in a linear fashion to locate various segments of video, the computer can jump to any location on the hard drive to instantly locate and play back any video segment in any order, hence the term non-linear editing.

Another important feature of a non-linear editing system is the use of visual icons rather than frame numbers to execute the edits. In a traditional tape-based editing suite, a segment of video is identified by a number made up of a combination of hours, minutes, seconds and frame numbers. For instance, a specific video segment might be identified in this manner:

IN 00:33:15:22
OUT 00:33:25:15

This identifies a video sequence that starts with a 10-second segment of video that begins on the tape at minute 33, second 15, frame 22 and ends at minute 33,

The control panel for the Fade effect with its speed controls.

The control panel for the framestore.

second 25, frame 15. A typical 30-minute television show would consist of a long list of these numbers, along with other descriptive terms to indicate different VTRs, transitions, audio effects, etc. This list is called an EDL, or edit decision list, and it is not much fun to work with. A non-linear editing environment, on the other hand, uses pictures or icons to represent the video segments, and other information, rather than mind-numbing lists of numbers. This graphic-oriented editing environment is much more intuitive and conducive to creative effort, and represents a giant improvement over traditional tape-based editing techniques.

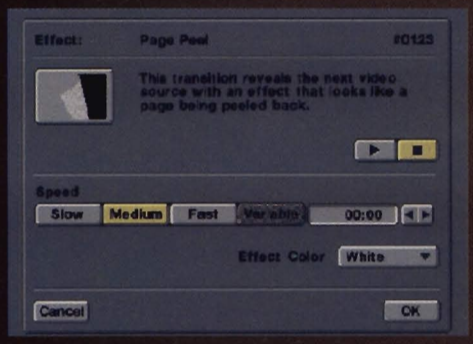
As a concept, non-linear editing is fairly simple. The way that it is implemented, however, makes all the difference in the world. Decisions have to be made and compromises considered in combining a number of important factors including, signal compression, video and audio quality, user interface and, of course, price. With the Video Toaster/Flyer combination, once again, NewTek has set a new video production standard in terms of price, performance and functionality.

What's so special about the Flyer? Well, let's start with its superb quality. NewTek decided early on that JPEG-based compression algorithms were not going to be able to attain the video quality necessary to make the Flyer system a true "on-line" system (on-line means the quality is high enough to be the finished product.) Instead they chose to develop a proprietary compression algorithm called VTASC (Video Toaster Adaptive Statistical Coding) that was optimized for the D2-quality signal (available to the Flyer directly from the Toaster's internal D2 video data port). Because the Flyer works directly with the D2 data, there is none of the quality loss associated with transcoding from composite to RGB and then back to composite again. There is no local frequency transform as in JPEG or MPEG, so there are no blocky artifacts, and there are no chroma-bandwidth limitations to smear the colors. There is also no inter-frame compression to cause temporal artifacts, such as jerkiness in different areas of the frame. The Flyer hardware is capable of totally loss-free D2 compression with high-performance hard drive configurations. The Flyer's only "artifact" is a decrease in S/N ratio and/or luminance bandwidth. At higher levels of compression this artifact manifests itself as video "snow."

The Flyer also handles the audio side of the video production process. Jenison says, "just think of the Flyer as two virtual D2 decks and two DAT machines, all operating simultaneously, with instantaneous Rewind, Fast-Forward and Pre-Roll."

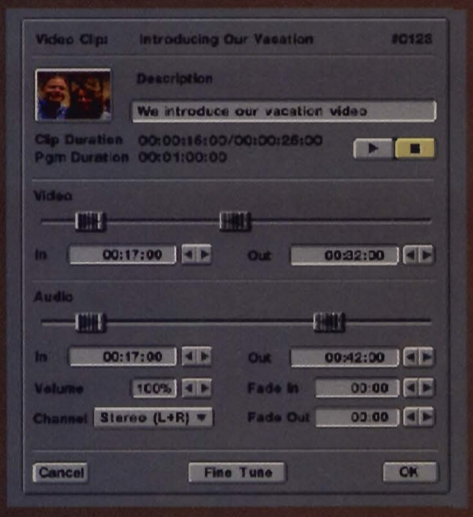
The Flyer has RCA connectors for stereo audio input and output. Video and audio can be recorded together, or audio can be recorded as separate audio clips.

Stereo audio can be played back from two video clips at once, "audio-follow-video" style, with independent volume level and fade-in/fade-out controls. There are also split-edit trimming sliders to set audio duration indepen-



The control panel for the Page Peel effect

Note that since you cannot use Variable speeds for this effect, that button is dimmed. Also, you have a pop-up menu to select the matte color that this effect uses.



Expanded view of the video clip control panel

Notice the addition of time code values for the video sliders. There are also additional audio controls for volume, playback channel, and fading the sound (with time code as well). Notice further that this is a split edit. The video segment lasts for 15 seconds while the audio continues for an additional 10 seconds. By default, audio and video use the same in and out points unless the user expands the display specifically to change them. In this sequence, this clip plays with video and audio for 15 seconds. Afterward, the video goes to the next crouton (the view out the window) while the audio continues playing for 10 more seconds.

dent of the video. Two separate stereo background clips can also be played simultaneously with both video tracks, also with independent volume level and fade-in/fade-out controls. These paired stereo tracks can be used for things such as background music, narration, foley, sound effects or ambient sound. The separate audio-only clips appear as icons that can be dragged into the storyboard, with control panels for trimming, duration, and synchronization to the video clips. A separate hard drive is required to use the background audio tracks. This can be an inexpensive normal SCSI drive, connected to the Flyer's third SCSI-2 bus.

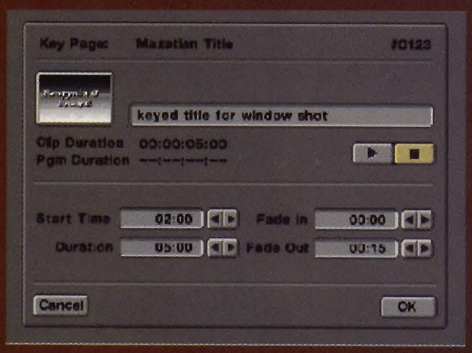
All four stereo pairs are mixed down to final stereo output in the Flyer's Audio DSP chip. The DSP chip can support more than this, and is capable of many other kinds of effects, which will be implemented in future versions of the software.

Because the Toaster and Flyer were designed to work as a complete system, all the great effect, graphic, CG and 3D

continued on page 41

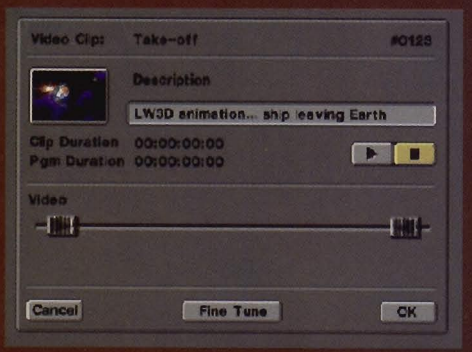
The expanded audio control panel

Here you can see that the clip lasts for 25 seconds, with a five-second fade-in and a five-second fade-out. Further, the maximum volume level is set for 33 percent so that the music plays at a level that is much lower than any other audio at the moment (the spoken audio from the previous clip will still be clear). The Start Time value determines when this clip will begin playing in reference to the clip before it. (In fact, any clip that has a Start Time slider indicates that it has an adjustable starting point in relation to a clip that has occurred before it in the sequence.) The clip's start time value is set to 00:00, which means that the background music track will begin playing at the same moment that the previous video event occurs. When our hosts first come on screen, soft background music will fade up as well.



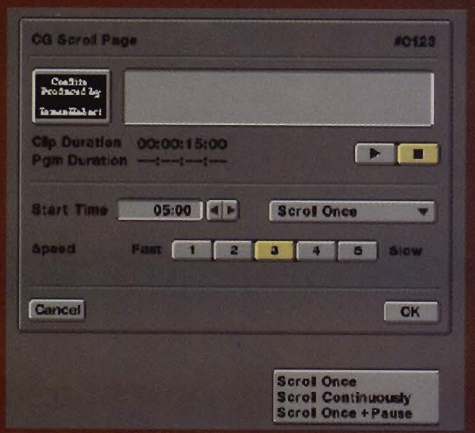
The control panel for the key page

Key pages made with ToasterCG (and Paint) contain their own display settings. Notice the Start Time slider, indicating that this page is relates to the previous video event (the video clip of the hotel). The Start Time value is two seconds, indicating that two seconds into the hotel clip, this key page will appear. The Duration shows that it will appear for five seconds. The Fade In value is set to 0 seconds, so the key will "take" on screen over the hotel shot (there is no time set for a fade, so the key pops on). The Fade Out value is set to 15 frames, so there will be a one-half-second fade as it goes off screen.



The control panel for the video clip

To the Flyer, all forms of video are just "video." This means that a still image, a CG key, an animation and a video clip are are simply forms of video images that can be displayed. Subsequently, a LightWave animation clip is just another video clip to be dragged into a sequence.
Of course, such a clip would not normally have an audio track (since audio must be recorded at the same time as video). So, the expanded view would not be useful here. However, if you had an audio track that you wanted to use, or sound effects, you would simply place them after this clip in the sequence and adjust their Start Time values accordingly.



The panel for a scroll page

At the current speed we've chosen, the page runs for 15 seconds. The Start Time tells it to begin scrolling five seconds after the previous video event (the matte black background color). This leaves 10 seconds of black afterward.

Video Flyer Test Flight continued from page 39

tools in the Toaster can be easily used in the non-linear editing process. Need a transition between two video scenes? No problem. Just pick from the hundreds of Toaster effects available and place the effect icon between the two video clip icons. An A/B-roll edit has just been completed. Need a lower-third CG title? No problem there, either. Create the title in ToasterCG and save it out as an icon that can be placed anywhere in the video edit sequence.

In fact, all of the Toaster's applications are fully integrated with the Flyer's editing environment. They can all create icons that can be easily dragged into an edited sequence. Framestores can be created by any of the Toaster's applications or captured directly from video, and saved to a system disk as usual, or stored on the Flyer for truly instant access. The CG can create Framestores, or keyed overlay stills which can be faded in and out. Or real-time scroll or crawl pages that can be keyed over a background video clip.

The new ToasterPaint can create normal Framestores or Alpha-Channel keyed overlay frames. You can now easily paint your alpha channel in real time, using an airbrush or any other paint tool to create a blend between your painted image and another graphic, or a background video clip. LightWave can render Framestores, of course, but it also uses the Flyer as a single-frame video recorder and player. This enables LightWave to input video clips as image sequences for backgrounds or texture-mapping. LightWave can also record the rendered sequence back out to a video clip. The result is a full D2-quality animation that can be inserted into an edited sequence just like any other video clip, graphic or sound.

The Flyer-Toaster combination provides an incredible amount of video editing and post-production power, but the real strength of the package is the storyboard-type user interface that makes this functionality accessible. During the course of the Flyer development, members of the Alcatraz interface development team spent time studying and analyzing television editing techniques. They observed that the most common edit was just a cut between two video scenes. The next most frequently used edit was a simple dissolve. They also learned that the most common audio was the dialogue and sounds associated with the video, using split edits between scenes. If these simple techniques were used in the majority of all productions, they asked, why not design an interface that makes those oft-used functions obvious and easy, and put the more complex editing features just below the surface?

They considered the timeline interface used in other non-linear editing systems. The timeline has the obvious advantage of being able to visually track several parallel events, but it's not always obvious how to manipulate those individual events. Eventually, they chose the storyboard interface, which they believed to be not only more visually intuitive, but also a more accurate representation of the natural "scene by scene" editing thought process that a videographer goes through when producing a video. The result is one of the most easy-to-use and seductive video editing interfaces ever created.

VTU

ILLUSTRATION BY DAVID SMITH

Behind the Green Lines

6

Understanding the Signal

by Cecil Smith

Achieving the highest quality video product is a constant tug-of-war between what looks good and what the technical systems are able to achieve. There are rigid limits to the amount and shape of the video signal that can reliably pass through a system: Exceed those limitations now and you may be asking for trouble later. In this multi-part series, understanding the signal and thinking like an electron for a few minutes is critical to creating reliable, professional pictures.

We've heard about the scanning system by which the focused image is dissected piece-by-piece. In North America, 525 horizontal scans are completed during two vertical scans (fields) for each complete picture (frame); 29.97 (about 30) frames are completed each second. This is called System-M by the International Radio Consultative Committee.

Elsewhere in the world, many countries complete 625 horizontal scans completed in two fields; 25 frames are completed in each second. CCIR Systems B, G, D, H, I, L, K and others use this scanning standard.

Notice that there has been no mention of color so far: Each color standard such as NTSC, PAL and SECAM can be used with any of the scanning standards where PAL-B (625/50) and PAL-M (525/60) are found. Much of the published literature, however, erroneously lists PAL as being only 625/50.

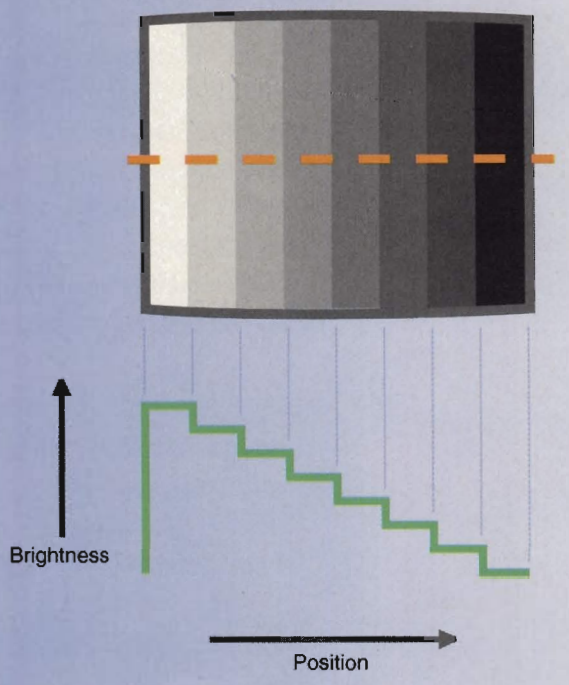


Figure 1: Brightness vs. Position Graph from a Stairstep Video Signal

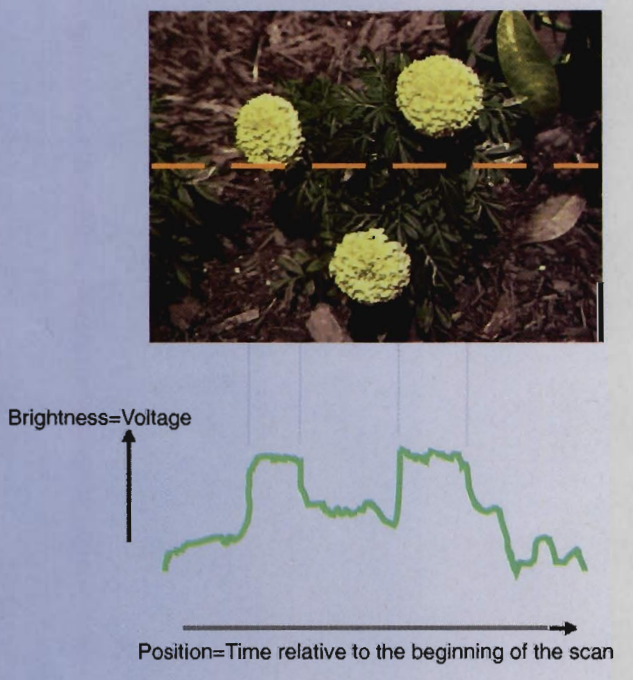


Figure 2: Voltage Graph from a Picture of Real Objects

The quest to understand begins by looking at a graph of the brightness in a picture. Figure 1 shows the picture and the brightness graph from one of the 525 or 625 horizontal scans: As brightness in the picture increases, the graph goes up. The graph from a real picture is shown in Figure 2.

In addition to brightness, the graphs actually show a second, independent piece of information: the position of the pieces of brightness in the picture. As the scan proceeds from left to right, so does the graph; the distance from the left side of the screen to the piece of brightness information is the same as the distance from the left side of the graph to the brightness information.

In actuality, the vertical axis of the graph represents the voltages in the video signal. The horizontal axis of the graph represents the time spent scanning across the image to reach the piece of brightness and beyond. The time allocated for each horizontal scan does not vary; it forms the time base upon which the video signal is formed.

There is a technical limit to signal voltage that can be processed in a circuit designed to carry a video signal. To make sure that the circuitry in one piece of equipment can talk to the circuitry in another, voltage standards have been utilized throughout the industry. Exceeding this voltage standard could cause the circuitry to be overloaded; a VTR may lose lock or a transmitter may splatter to adjacent channels if the circuitry is overloaded. To minimize the possibility of overload, many pieces of equipment have a white clip circuit that discards any video signal voltage greater than the designed voltage. It was decided during design that a picture with white picture details missing is preferred to no image at all. Figure 3 shows the signal and picture effects of a white clip circuit.

The graphs presented so far have shown only the active picture portion of the horizontal scan; there is additional time allocated for completing the scanning process. As shown in Figure 4, the active picture is always scanned from left-to-right, and top-to-bottom (as seen on a picture monitor). The retrace from right-to-left and bottom-to-top takes a finite amount of time.

If the picture were to be active during the retrace, a pattern of fixed, bright dots would appear on the screen where the trace and retrace paths intersect, as shown in Figure 5. To eliminate the pattern, the sensitivity of the camera is blanked for the time during which retrace occurs. The time during which blanking occurs is called the blanking interval. During the retrace along the horizontal axis of the picture, from right-to-left, a horizontal blanking interval is created. During the retrace along the vertical axis of the picture, from bottom-to-top, a vertical blanking interval is creat-

ed. The blanking intervals have specified durations, as will be discussed later in this series of articles.

The voltage to which the signal returns during retrace is called the blanking level. As we will see later in this article, the blanking level serves several critical roles in maintaining the technical integrity of the video signal.

Proper display of a television picture requires that the display of the picture be scanned at the same relative time as the sensing of the focused image. The time relationship between the start of a given scan and the elements of the active picture must be exactly the same. We've all seen a rolling picture; the time at which the monitor scans the displayed picture is not the same relative time at which the camera scanned the focused image.

To convey the timing of the scan, an electrical sync pulse is inserted into the signal at the end of each horizontal scan and each vertical scan. Figure 6 shows the graph from two successive horizontal scans with a horizontal sync pulse inserted. Figure 7 shows a graph from two successive fields with a vertical sync pulse inserted. When a sync pulse is sensed, retrace is started; the next trace is automatically completed by circuitry within the camera or monitor.

Horizontal and vertical sync pulses both have the same voltage amplitude, from the blanking level to the lowest sync tip. The only differences between the two types of sync pulses is the rate at which the pulses appear and the duration of the pulses themselves.

Let's digress for a minute as there is a large difference among signals labeled sync, drives and black burst. One definition of sync is the portion of a video signal that conveys the information necessary to scan the picture. A composite sync signal (at four volts peak-to-peak) contains only the vertical and horizontal sync pluses, plus equalizing pulses required to keep the horizontal scanning stabilized during the transition from an odd field (262Ω or 312Ω horizontal scans) to an even field (Ω262 or Ω312 horizontal scans). Figure 8 shows a close-up of a vertical sync pulse preceded by pre-equalizing pulses and succeeded by post-equalizing pulses.

Sync may be further divided into the vertical sync pulses (at four volts peak-to-peak and often called vertical drive) and the horizontal sync pulses (at four volts peak-to-peak and often called horizontal drive). A drive or composite sync signal contains absolutely no color information. A composite sync signal is connected in a sync lock system (the type of synchronization usually found in older equipment) to make equipment scan synchronously. Composite sync is normally connected to a SYNC input connector.

Black Burst is a signal composed of composite sync, black picture level during the

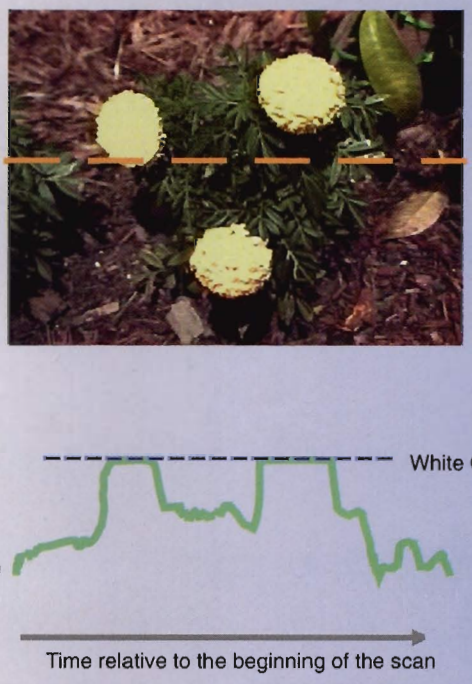


Figure 3: The Effect of White Clip Circuits on a Picture and Voltage Graph with Real Objects

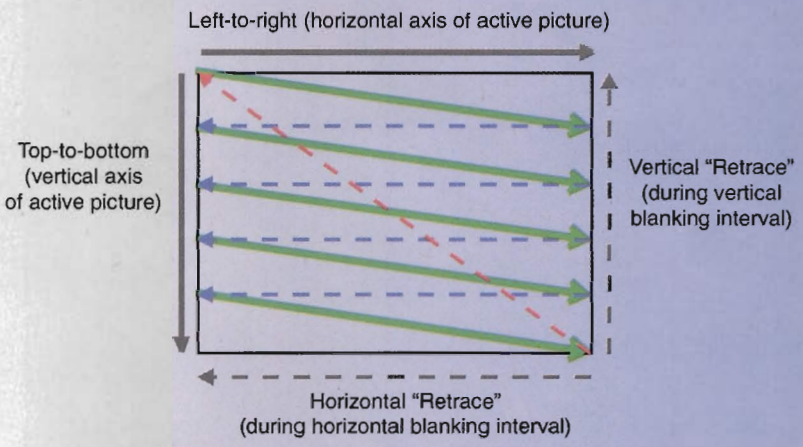


Figure 4: Television Scanning and Retrace

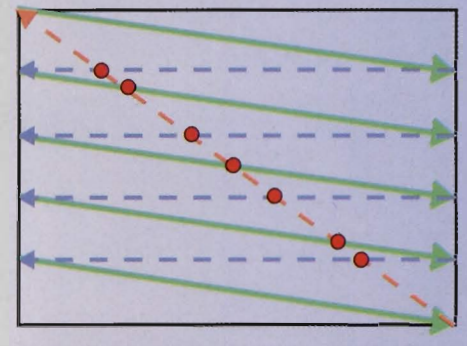


Figure 5: Pattern in television picture that would appear if blanking were not used.

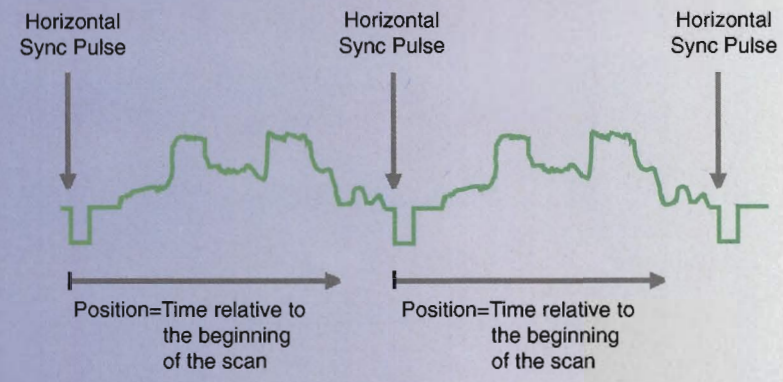


Figure 6: A "Horizontal Sync Pulse" is inserted at the end of each horizontal scan.

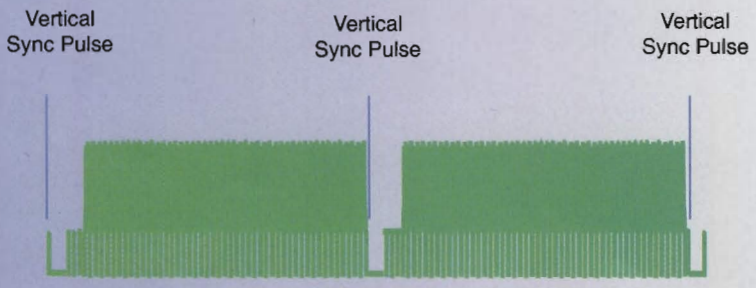


Figure 7: A Vertical Sync Pulse is placed at the end of each vertical scan.

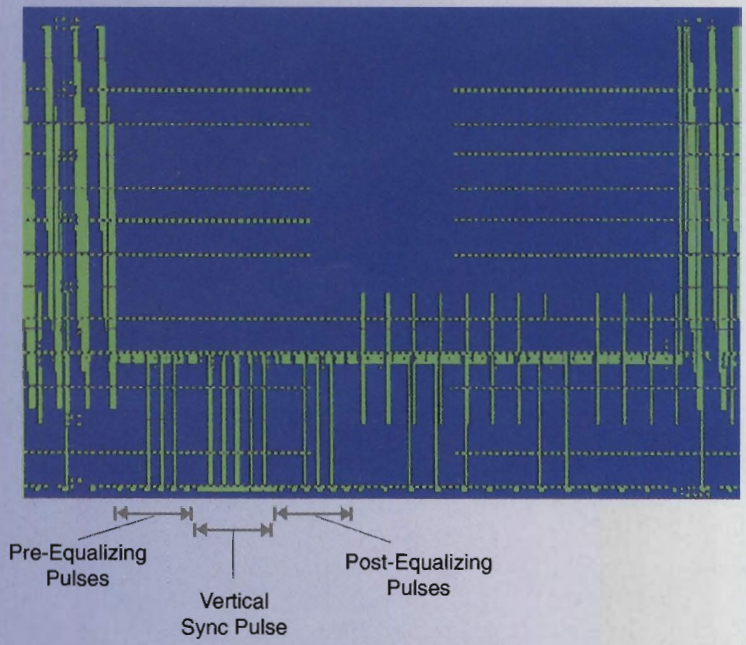


Figure 8: A close-up of the vertical blanking interval

active portion of each scan and a color burst reference signal, as shown in Figure 9. Black Burst contains all the information needed to genlock a system to make the scanning and the color generation properly work together. Black Burst is frequently connected to a genlock or a reference input connector. A genlock system operates by referencing any signal that contains synchronizing and color burst information. Black Burst and color bars fill that bill.

As indicated before, the blanking level fills several critical roles in the maintenance of a technically usable video signal. One role is the elimination of the pattern of dots across a screen. Another critical role is to serve as the delineation between active picture information and synchronizing information. Any video signal voltage that is greater than blanking is interpreted by equipment as being picture information; any signal voltage with a level lower than blanking is considered synchronizing information (Figure 10).

To ensure that there is no question about whether a particular voltage is picture or synchronization, a range of no-man's land is placed between sync and picture. This pedestal or setup was standardized when technology was based on vacuum tubes and is basically not needed with today's equipment. However, the requirement for a pedestal continues to be the specification today to assure compatibility between old and new signals.

If the voltage of picture information falls below the voltage of blanking, you stand a good chance of creating confusion about the times to retrace and start active scans. Confusion about scanning times may make the picture roll, tear or jitter. In a VTR, the confusion may be enough to destabilize the operation of servo circuits and eliminate the possibility of recording a usable signal.

The video signal described so far contains only the luminance (Y) portion of a color signal. The addition of chrominance (C) to make a color signal will be discussed in our next installment.

When you look at a real-time graph presented by a waveform monitor, you can get a good idea about the overall quality of the signal, particularly those critical signal parameters that only show up when it's too late. Let's look at what confirms that it is probably a good signal.

First, make sure that the blanking level is set to overlay a crosshatched line on an NTSC-M graticule, 0.3 volts on graticules for other systems. With the blanking level set, look at any portion of the video signal that exceeds the 100 IRE (NTSC-M) or 1.0 volt (all other standards) graticule line. Anything above that line stands a good chance of being clipped off somewhere in the process. If those over voltage portions of the signal are not important, don't worry if they are important and have the signal gain turned down.

Next, looking only at the luminance portion of the signal, make sure that no picture information falls below the specified level, 7.5 IRE in NTSC-M systems, 0.3 volts in other systems. Picture information below the blanking level causes picture jitter and roll.

That pretty much takes care of the adjustments to the picture information available to most operators. Now we move on to the synchronizing information. There are two basic characteristics of the sync signal that must be confirmed: level and pulse shape. The level of the sync pulses in NTSC-M systems must fall from the blanking level down to the -40 IRE level. In other systems, sync must fall from the 0.3 volt line down to the graticule line.

The shape of the sync pulses must be rectangular, with as little skewing from vertical as possible. The corners should be sharp, not rounded. If the shape of the sync pulses is not correct, the equipment will again be confused about the exact times to start the scans and cause jitter or roll in the picture.

Without white clip circuits, you may not receive any type of a usable signal.

VTU

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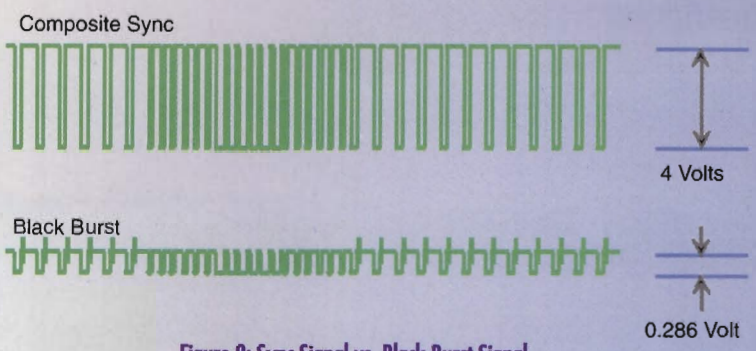

Figure 9: Sync Signal vs. Black Burst Signal

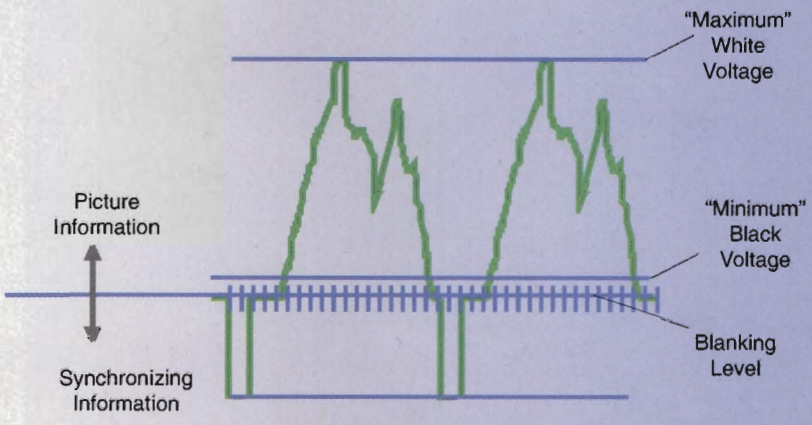

Figure 10: Blanking separates picture information from synchronizing information

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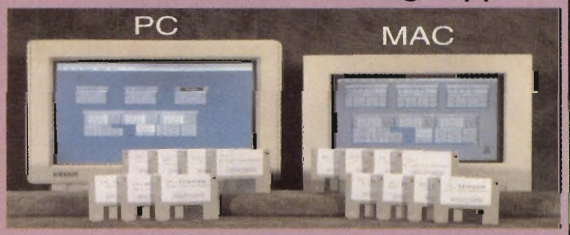

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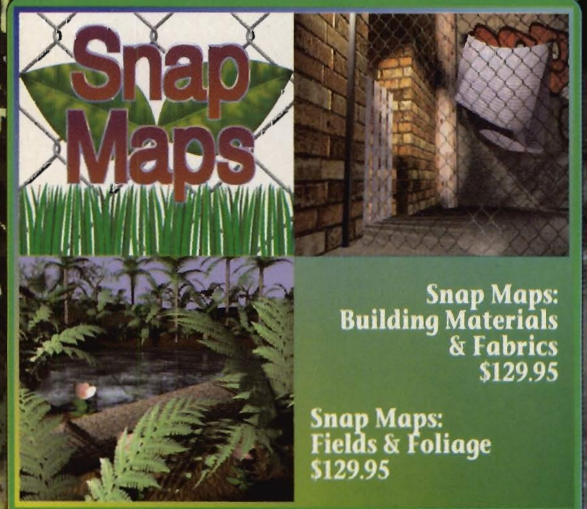

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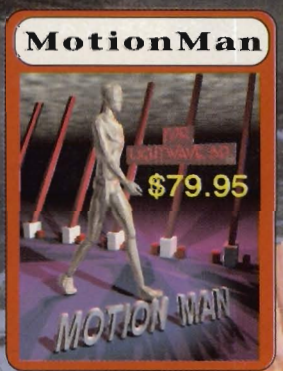

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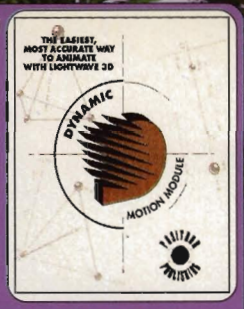

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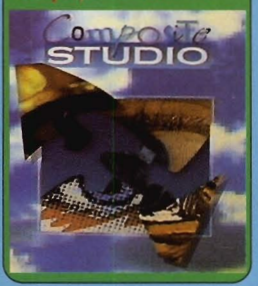

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Toccata's non-linear audio editing is a quantum leap in speed and compatibility: Toccata also includes "Samplitude", the powerful sampling software created by SIK'D of Dresden, Germany.

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.

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, quickrendering 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

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- 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.
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How Fast Is The Warp Engine?

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

Warp SCSI-2 Speed:
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40 MHz 68040 Accelerator for the VideoToaster/4000

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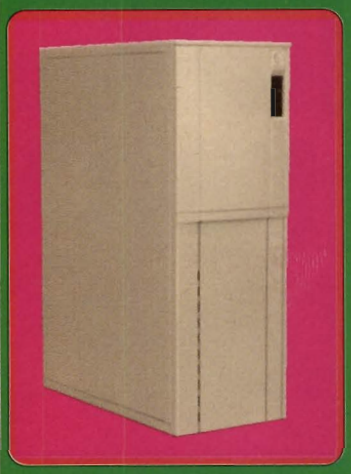

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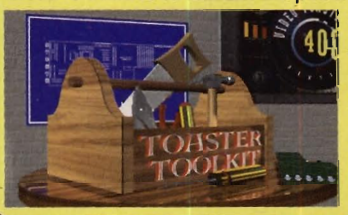

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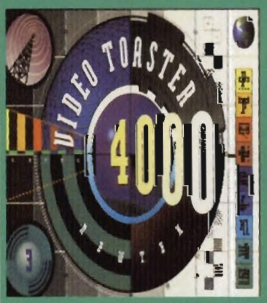

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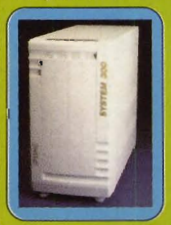

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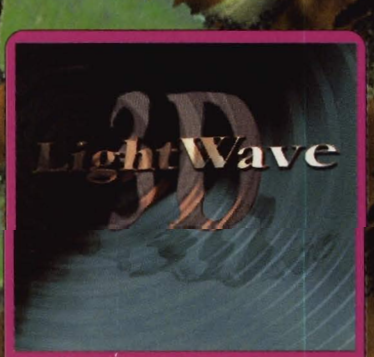

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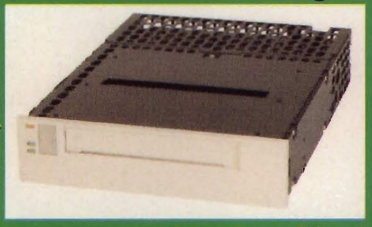

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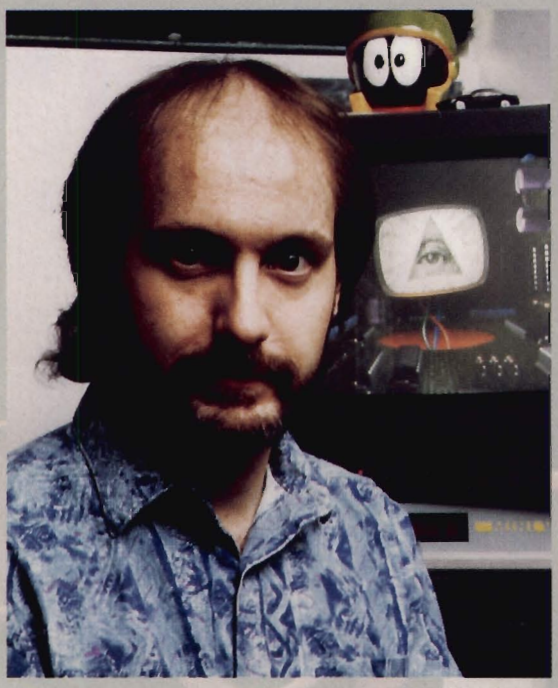


Allen Hastings

Stuart Ferguson

PHOTOS BY CURTIS FUKUDA

If you press the About button in LightWave or Modeler, you will see one of two names. Stuart Ferguson and Allen Hastings are the men behind the Emmy award-winning LightWave 3D, unarguably the most impressive piece of software included with the Video Toaster. *VTU* recently had the opportunity to speak to both of them and press their virtual About buttons.

Video Toaster User: Let's begin with a little background information about the two of you.

Allen Hastings: I was born and raised in the San Francisco Bay Area, and now live there with my wife Robin and our three Devon Rex kittens, a special breed recommended for people like me who are allergic to cats. I once read an opinion by a well-known game developer that programmers go downhill after age 25, but I hope that's not true as I'm now 31.

Stuart Ferguson: Pretty much the same for me. I was born and raised in the same area. I went to school at UC Berkeley and now live in the Bay Area with my wife Sandi. And I'm also 31.

VTU: Where did the two of you meet?

SF: We met in junior high school in 1976.

VTU: Is that where you got started in programming?

AH: Yes, while attending junior high, we took a class about programming in BASIC, but we really learned by hanging around after class to play with the school's terminals, which were ten-character-per-second teletypes connected to an HP 2000 minicomputer. We had fun developing games, crude "AI" programs, and eventually 3D graphics programs.

Inside LightWave

An exclusive interview with LightWave 3D creators Stuart Ferguson and Allen Hastings.

by John Gross

SF: We had this "Trench" program that was like a trench from "Star Wars" made from plus signs. It would print out a frame at a time on the teletype as you moved right or left. It was completely non-interactive and at 30 characters per second, it would take several seconds to print out a frame.

AH: You have to be patient to do graphics on teletypes! Within a couple years we both got Commodore PET home computers equipped with "high-res" boards capable of displaying one bitplane at 320x200, quite a luxury compared with what we were used to.

VTU: Why 3D?

AH: My focus on 3D graphics probably came from my interest in film making, which in turn was triggered by the release of "Star Wars" in 1977. That summer I began work on my own attempt at a science fiction epic using an 8mm movie camera. I was originally going to use animated paper cutouts of spaceships, planets, etc., but I soon switched to miniatures built primarily from cannibalized model kit parts. For interior shots, I started filming "claymation" aliens, and for things like computer targeting displays, I wrote a PET program to animate perspective views of wireframe objects, and then set up the camera to film the screen. I suppose that program could be considered a distant relative of LightWave.

VTU: What were you doing before working for NewTek?

AH: While attending the University of California at Santa Cruz, I worked part-time at Lockheed Missiles and Space Company, where I wrote software (mostly graphics related) in a kind of "think-tank" group. After graduating with a computer science degree in 1985, the job became full-time.

SF: I solved a math puzzle written by someone at Lockheed that Allen had brought back. The guy was interested in interviewing me and I soon got a job in the same department that Allen was in.

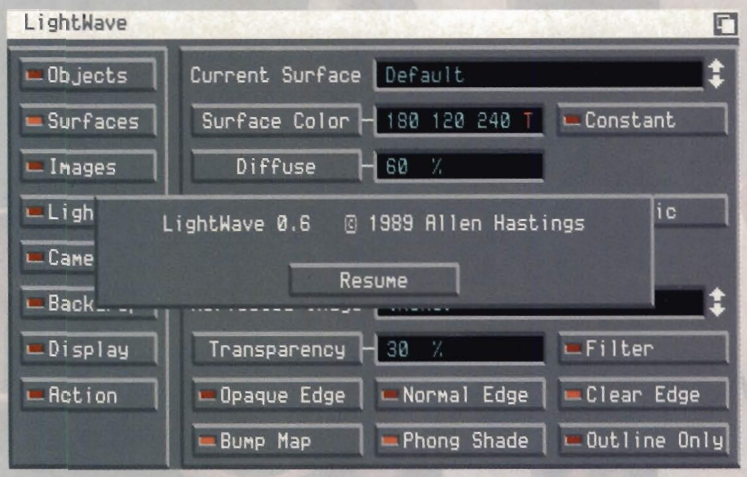
VTU: What exactly did you do at Lockheed?

SF: We worked in the Solar Physics lab and wrote software for displaying and analyzing data from solar tele-

scopes. It was kind of general purpose image display/image processing stuff.

VTU: Do you miss it?

SF: No. I do miss the tools that they had, however. The tools they had for doing this image processing stuff were wonderful. I have ImageF/X and ADPro on my Amiga and can't do simple things I was able to do with one line equations.



An early version of LightWave's Surfaces panel utitizing an LED style look.

VTU: What happened next?

AH: I wanted to get back into filmmaking, so I bought an Amiga 1000 and started working on a 3D animation program for my own use. The first film I made with it was called "Verx", which debuted at the September 1986 meeting of the First Amiga User's Group (FAUG). Along with a second film called "Infinite Loop," it attracted so much attention that I soon decided to sell the program, and it was released in 1987 as VideoScape 3D.

VTU: It was distributed by Aegis, right?

SF: Right. Allen was working on VideoScape for Aegis, and I started working on Modeler 3D more or less as an exercise. It turned out that it worked and they (Aegis) bought it.

VTU: How did you become involved with NewTek?

AH: Shortly after VideoScape was released, Paul Montgomery, who had been impressed with the films I showed at FAUG meetings and Tim Jenison invited me to consult with them on a planned NewTek game. That project didn't get very far, but in 1988 they asked me to write a new 3D program to be bundled with some hardware (not the Video Toaster) that NewTek was developing. I had already decided to move on from VideoScape, so I agreed. The new program was initially called Ultra 3D until I came up with the LightWave name.

Since Stuart had already written Modeler 3D to work with VideoScape, I convinced NewTek to bring him on to develop the Modeler portion of LightWave. Our software was first shipped in 1990 as part of the Video Toaster package, and near the end of that year I finally quit my day job and began working full-time for NewTek.

SF: I was just on contract with NewTek at that point, but eventually was brought in full-time.

VTU: Where do ideas and inspirations for the program come from?

SF: A lot of sources. I get a lot of ideas from user comments. I'm also a user myself, so I get a lot of ideas from what I am trying to do. Some ideas come from papers and technical writings. Metaform, for example, was inspired by one small point in someone's SIGGRAPH paper that struck me, perhaps more significantly, than anyone else.

VTU: I sometimes think that Metaform will be akin to Lens Flares in that other 3D programmers will see how useful it is and incorporate it into their programs.

SF: That would be kind of cool to see. I could then say "Look! I invented that!"

VTU: Allen, how about you?

AH: My main source now is the huge volume of requests and suggestions by LightWave users, and I also scan for useful new techniques in graphics journals. But because I originally started writing 3D software for use in my own films, my early ideas were inspired by things I needed for my stories. For example, my programs have always been able to render single-point polygons because my science fiction-oriented films needed several starfields. It's also common for people heavily involved in computer graphics to think about their work whenever they look around the real world and notice interesting shapes, textures, lighting effects, etc., but I'm trying to get over that affliction! Lately I've come up with several intriguing ideas for effects inspired by anime (Japanese cel animation) that will hopefully make it into LightWave 4.0.

VTU: If people have good ideas for the program, who should they contact?

AH: Suggestions and bug reports should be sent to Brad Peebler at NewTek. The preferred ways to send them are by fax (913-228-8001) or by uploading them to the NewTek BBS (913-271-9299). Also, LightWave demo tapes are always appreciated!

VTU: What about people who feel that they would be a good candidate for a beta tester?

AH: They can send their demo reel and an explanation of why they should become a beta tester to Brad Peebler at NewTek, since we don't handle those decisions ourselves. I should point out that the number of applicants has been enormous and they almost all have very good reasons to back them up, but there are very few openings.

VTU: What's a typical working day like?

AH: On a normal day I get up around noon, make the long commute down the hall from the bedroom to my office, and work until 6 p.m. when my wife gets home from her biotechnology job. We have dinner and spend the evening together, and then around midnight I get out of bed again and work until 5 a.m. So my workday is split into two parts, but this schedule has worked well for the last few years. Unfortunately, many days are not normal, especially around product shipping time, so I often have to work more or less continuously from noon to 5 a.m. or later. Weekends and holidays are usually workdays, too.

SF: I don't sleep as late as Allen does. I usually get up around 10 a.m. and head into my office next door and start working. I usually take a break to watch Monty Python and sometimes Mystery Science Theater. If I'm really busy, I don't take any breaks. Sandi usually comes home around 7 p.m. or so, and we eat dinner and I'll often work after that or we'll do something together.

I don't spend too much time on the phone like Allen does. He'll often spend time responding to "crises" from different areas.

VTU: What is the one most requested feature of your respective program?

SF: Probably the most requested feature that isn't in Modeler would be solid static preview. We plan to add it in the future.

AH: I can't think of a single feature that stands out as the most requested anymore. Prior to 3.5, two of the most common requests were for the ability to run LightWave without a Toaster and the ability to render at arbitrary resolutions, but those are now taken care of. Many users want to be able to animate the camera zoom factor and the cone angles of spotlights from the layout interface, so that will probably show up in 4.0.

VTU: What was the most ridiculous feature ever requested?

SF: The most ridiculous thing from the first release of Modeler, I thought, was the moving preview stuff. Tim Jenison wanted it as sort of a slick and sexy thing. I didn't think it was going to be very useful, but it turned out to be really neat.

AH: Some of Todd Rundgren's requests, like the Edge Transparency Threshold control, seemed goofy at first, but their usefulness was proven later. I guess the silliest feature prize should go to the guy who thought that LightWave should have a hidden video game built in!

VTU: What's your favorite feature?

AH: The feature that was the most fun to program was Lens Flare. In early 1992, Ron Thornton (who was working on the Babylon 5 pilot movie at the time) sent me some images of the kind of lens flares he wanted, and it was an enjoyable challenge to figure out how to match them. I'm not sure if it's my favorite feature overall though, since it's probably now the most overused!

Picking my favorite feature in Modeler is easy. Metaform has to be the coolest modeling tool I've ever used. I just wish I had more time to play around with it.

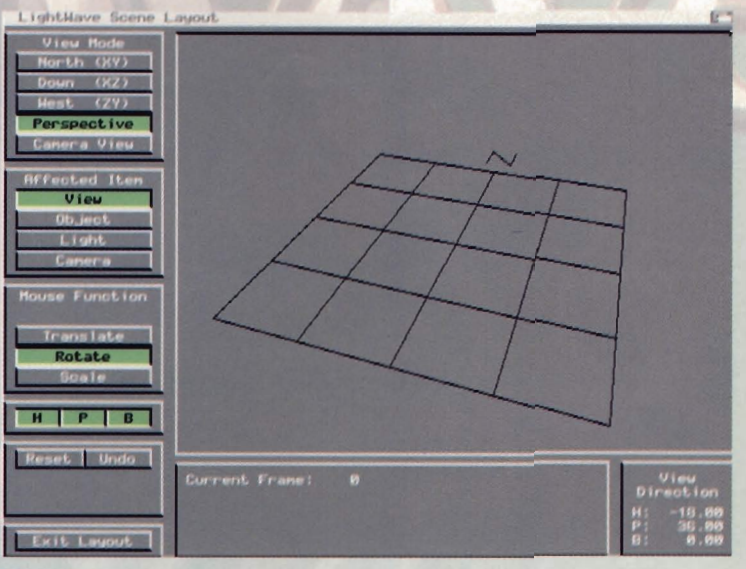
SF: These days, Metaform has to be my favorite feature. I'm really happy with it because it's quite simple from my point of view. It does quite a bit, and it's not like booleans, which are incredibly complex from my point of view and sometimes don't even work right. I'm universally pleased with how Metaform works.

VTU: What reference materials do you recommend people read if they want to know more about the way your programs work?

AH: If I had to recommend just one book to learn about computer graphics, it would definitely be "Computer Graphics Principles and Practice" (the second edition, by Foley, van Dam, Feiner, and Hughes), which discusses most of the basic algorithms used in LightWave. My favorite references for my own use, however, are the yearly SIGGRAPH Proceedings. I have the 1982 through 1994 issues, and they have been extremely valuable in the development of LightWave. For example, a detailed description of the motion splines I use can be found in the 1984 issue on pages 33-41. Other books I recommend include "An Introduction to Ray Tracing" (edited by Andrew Glassner), and "Advanced Animation and Rendering Techniques" (by Alan Watt and Mark Watt).

VTU: Is there a current feature that you would like to change?

AH: This isn't really a single feature, but what I'd most like to change in LightWave is to make it extensible in many areas. That means putting in support for plug-in modules, allowing NewTek, third party developers, and advanced users to add new features without having to upgrade the program itself. Some of the planned applications of plug-ins are procedural textures (such as those by Steve Worley), physically-based motion simulators, object and image format translators, and image processing effects (including some from XAOS Tools).



This is the layout screen from LightWave version 0.6 (circa 1989).

SF: Yes, plug-in support is very important. I would also like to make working with curves and patches easier. This is very technical and would require significant rewrites to parts of Modeler

VTU: What can we expect in the near future from you both?

AH: The big news, which we first announced at SIGGRAPH, is that LightWave will be available on multiple platforms. There will still be new Amiga versions, but in addition the software is being ported to run under Windows and Windows NT, allowing it to be used on MIPS and Alpha AXP-based PCs as well as the 486 and Pentium systems that dominate the market.

We've also announced a version for Silicon Graphics

workstations, and we may support still other platforms in the future. One principle we are trying to follow in these ports is to make them appear as consistent as possible, so that someone used to LightWave on one platform will feel right at home on another, and they should be able to use the same scenes, objects, and images.

SF: I definitely want to have different perspective working views, a shaded preview, faster redraw and rail extrusion improvements. Also, I want Modeler to be broken open for third-party development.

VTU: Like macros?

SF: Macros are definitely nice, but I'm thinking on a bigger scale.

VTU: How do pirated versions of your programs affect you personally?

Allt: Put simply, my income is based on a percentage of LightWave sales. The more people buy the program, the more I am encouraged to keep maintaining and enhancing it.

Fortunately, I believe most LightWave users are professionals who would not resort to piracy.

SF: I agree with that. My income comes directly from sales. When I get my check I see a value for sales and a corresponding amount to me. I guess that's pretty direct.

VTU: What do you think of the Amiga/Commodore situation?

SF: It's a sad thing, but there's not much to be done about it. I'm still very comfortable with my Amiga and do all my main programming on it.

Allt: As an early Amiga user (I bought my 1000 in November 1985), I find the situation saddening but not unexpected. So far, I'm still more comfortable using the Amiga than any other computer, but there are definitely some good points about moving to PCs that Amiga users should consider. One is the low cost of high-performance systems these days, and another is the availability of color notebook computers. Imagine being able to use LightWave on airplanes or even at the beach!

VTU: What parts of your old pre-Toaster programs are found in LightWave 3D today?

SF: Absolutely nothing! In Modeler 2.0, I introduced major revisions which destroyed the old way of doing things. This made it much easier to add new features.

Allt: I'm afraid there's really nothing left of them in LightWave, since I've learned better ways to do everything since then. For example, VideoScape 3D didn't even use matrices for transforming coordinates, and it used 2D polygon clipping instead of LightWave's more reliable 3D clipping. But I would like to play with those old programs again someday. I might even fire up my Commodore PET 3D program if I can find the cassette tape it's stored on—I never had a disk drive for that machine.

VTU: How do you feel about the success of LightWave with the Toaster?

SF: Great! It far exceeded my expectations. The fact that it is used on TV is wonderful. It's also very cool to look through the pages of VTU and see all of the new markets that have spawned because of LightWave.

Allt: I'm glad that it was a part of the Toaster package, since it has introduced 3D to a lot of people who may have initially just been interested in other aspects of the Toaster. But I'm also glad that LightWave is now available separately as well.

VTU: Can you tell us what you are working on right now?

Allt: As usual, I'm working on a lot of things in parallel. One is adding features for the 4.0 upgrade. For example, I've just put in a long overdue feature allowing items in the layout view to be selected by clicking on them. Another part of my job is supporting the needs of the special beta sites, such as Amblin Imaging, Foundation Imaging and the *Robocop* series team. And then there is the porting effort, which includes maintaining the ScreamerNet render modules for different platforms, and the bigger job of porting the user interface to work with Windows and SGI machines.

SF: I've been working on porting Modeler. I have three different machines that I have been working on, and I've been doing a lot of the work with the different systems understanding how they operate. When all the low level stuff is all laid out and understood, we'll switch and Allen will start porting and I will concentrate on adding new features.

VTU: How do you feel about the one-man approach (or two-man) to your program, versus the way other high-end software is developed?

Allt: Actually, I think it's an advantage for us. I've worked on some group programming projects in the past, and there are a lot of complications when two or more people work on the same source code. With Stuart and I each working only on our own programs, we are free to make whatever changes we want without having to coordinate with anyone else or wait for approval, and that lets us work faster. The down side is that the programs have grown quite large and complex, and sometimes the work can seem a bit overwhelming.

SF: I agree. It's definitely more complicated with larger groups. It's best when broken down into sections.

VTU: Where do you see LightWave 3D going in five years?

Allt: This may sound ambitious, but my hope is that it will be running on whatever platforms are popular at that time, and that it will be considered a standard for 3D software on those platforms.

VTU: What projects would you like to see LightWave used in that it isn't?

SF: I want to see it involved in film work. I think that it will definitely get more credibility that way.

Allt: Now that LightWave has been involved in winning Emmys, I think it's time we go for an Oscar! Seriously, I too would like to see LightWave used

more in motion pictures. The higher resolution (and thus rendering time) needed for film work has been an obstacle in the past, but our support for rendering on high-speed RISC machines is solving that problem.

Some other projects I'd like to see LightWave used in are my own films, but I'm afraid I won't be able to make any for a while. It's kind of ironic that the more successful LightWave has become, the less time I've had to use it myself.

VTU: Are there any projects that you are doing for yourselves right now?

AH: I've been wanting to remake "Verx", but have had very little time to devote to it. I've only been able to squeeze in a week or two, and since about 1992, have not had any time.

SF: I've been working on my own film, which of course is LightWave-generated. I had many ideas, but started working on this one since it was the most planned out and I thought it would take the least amount of time. What started out as a two month diversion is now, one year later, still in progress. It really makes me appreciate the type of work that you guys working for television do.

VTU: What do you see as the next biggest development in 3D Graphics?

SF: Currently, we're looking at painting on 3D objects—where you can turn the object and spray paint onto it and it will 'stick' to the object. It's technically not that difficult to do, but you need a good 3D and paint programmer—neither of which is trivial.

AH: I think the achievement that would impress me the most would be totally realistic human animation and rendering. What I mean is synthetic human characters that can act and that appear indistinguishable from real people, even in closeups. In spite of a lot of work by many talented researchers and artists, that still hasn't been done yet. I have no doubt that it will be done eventually, but I think the attempts to render realistic people so far have been kind of disturbing to look at.

VTU: How will LightWave work with the Flyer?

AH: Funny you should mention that, as I've been working on Flyer support. There are two major ways to use the Flyer with LightWave. Of course it will be possible to save LightWave animations as Flyer clips, but Flyer clips will also be usable as image sequences for texture mapping and compositing.

VTU: What is the configuration of the machines you currently use?

SF: My main machine is a 2500 with a Fusion Forty 33 MHz accelerator, a Picasso board, a PAR, three hard drives, an external drive and DAT. Basically, there's stuff sticking out all over. I also have an 8-bit Indy, a 486/66 PC and a 4000 hooked to an old DeskStation R4400 workstation. These last two act as my ScreamerNet rendering setup which is churning away on my film.

AH: I still primarily use the same Amiga 2000 that I used to begin LightWave development back in 1988. Of course it's changed a lot since then, and now has a 50 MHz 68030, 32MB of RAM, an Ethernet card, a Picasso II, a DPS PAR, a 500MB hard drive (and a one gig drive for the PAR), and a fan card to cool the whole mess! Peripherals attached to the 2000 include a Bernoulli 150 removable-media drive, a scanner, a laser printer, a modem, and a genlock. Perhaps my favorite external peripheral is a Panasonic AG-EP60, which produces beautiful color video prints.

Other computers that can be found in my office include an Amiga 4000, a 486DX2/66 PC, a DeskStation R4400 PC, a Silicon Graphics Indy, and an Alpha AXP-based machine. Also crammed in there are five monitors, four VCRs, a CD/laserdisc player, an 88-key Korg keyboard, and all my computer books, magazines, and tapes. Keep in mind that my office is only a 10x10 foot room!

VTU: What are some of your favorite programs that you use?

AH: On the Amiga, the programs I've enjoyed using lately include Forge by Steve Worley and JACOsub (a shareware program that I use for subtitling imported anime laserdiscs). On the PC, I like Comanche (a flight simulator with incredible voxel-based terrain rendering), and have just recently started getting into Photoshop and Fractal Design Painter.

SF: LightWave! Plus I think ImageF/X is pretty good software. I also use a lot of programs that I have written myself.

VTU: You guys aren't just programmers, but you are also artists yourselves. What kind of movies interest you?

SF: As most people interested in 3D, I'm a big Sci-Fi fan. I like old Sci-Fi movies, and the original "The Thing" is my favorite. Of course "Star Wars" was an influence. My own first movie attempts involved badly pieced together spaceships, and I've always wanted to redo them with LightWave as they would look much better.

AH: My favorite movie might be "2001: A Space Odyssey," which I made my dad take me to see when it first came out in 1968. In 1977, at the impressionable age of 14, I saw both "Star Wars "and "Close Encounters of the Third Kind" many times, and those really sparked my interest in film making (and thus computer animation). Other favorites include "Forbidden Planet "and Ridley Scott's "Alien" and "Blade Runner." Among animated movies, my vote for the best goes to "Wings of Honneamise", an outstanding Japanese production that was released in 1987, but unfortunately is not commercially available in subtitled form.

VTU: Any last thoughts?

SF: I'm constantly amazed at what users are doing with the tools we've provided. I guess I'd just like to say keep it up!

AH: Definitely. One of my favorite thrills is getting my socks knocked off while watching amazing new creations by LightWave users, so I'd like to encourage all of you who have ever considered making your own films to go for it!

VTU

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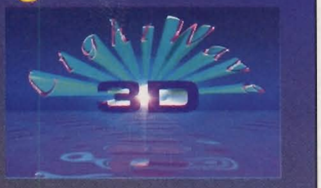

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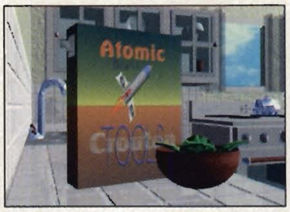

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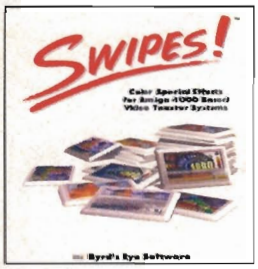

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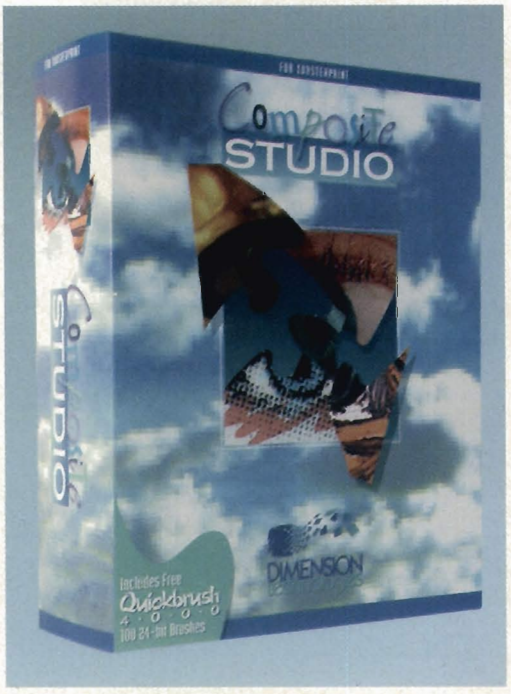
Composite Studio

Image Compositing for Toaster Users

by R. Shamms Mortier

What is image compositing? The simplest answer would be that it is the action of placing more than one image at a time in a picture area, making it comparable to doing a montage. But image compositing is much more then that, especially when computer graphics are taken into consideration. With computer graphic imaging, each of the elements of a composited picture can be altered in a number of ways. Each of the elements brought in can have varying transparency settings, and they might also have borders, shadows, and 3D extrusions. Some of the images might even be "brushes," standalone cutouts that seem to float on top of other images. The final result, then, might look more like a digital collage than a true montage.



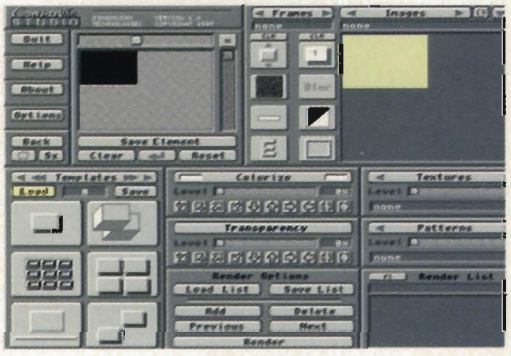


Figure 1: The Composite Studio interface is designed so you are invited to explore and manipulate composited images.

The first program that I ever used to composite diverse images on one screen was ASDG/Elastic Reality's Art Department Professional (ADPro). You can even toggle the settings in ADPro so that images loaded can be placed against each other in a compositing fashion. ADPro is quite capable of exacting compositing, as long as non-altered images are used. It's when you want to experiment further with the layout of your picture, to add drop shadows, 3D extrusions, frames, and other options, that ADPro alone will not do. You could add all of these options in a paint program like ToasterPaint (TPaint), but you would have to do it by hand which would require a lot of time. Besides, TPaint has a way of choking when you manipulate large images on its screen, even when you have 16MB of fast RAM and 2MB of chip RAM.

All of this could be done by writing ARexx scripts to do the work, but writing separate ARexx scripts for every possibility you might need is bothersome and tedious. What's a Toaster user to do if image compositing remains as a glaring need? There is a brand new answer.

Composite Studio

The answer is Dimension Technologies' Composite Studio, which comes in two types of packaging. One is for the OpalVision painting software, and the other is for TPaint. The TPaint version ($119.95), which was released first, is the one that I tested. Before you can render any screens from Composite Studio, TPaint must be running in the background. That's because screens are actually rendered in TPaint, with CStudio being its convenient front-end interface. There's not much to the CStudio manual because the interface is extremely intuitively designed around a sharp graphic interface.

What's Here

There are five main sections to the CStudio interface (Figure 1). The best news is that there is an interactive "Help" option that brings up a screen that lists all of the ways that CStudio works, and exactly what each of the tools does. This is always accessible simply by hitting the "Help" button in the upper left corner of the screen.

The graphic area on the left side is used to add and resize image areas. These areas appear in the graphic area on the upper right, and from there can be targeted for color, textures, images and brushes. The most important thing to remember is that manipulated elements need to be saved after they are finished. If not, they dis-

Figure 2: These four screens were composited in Composite Studio 1.0 and rendered in ToasterPaint.

appear from the compositing screen. The layers upon which your various elements are placed can be altered front and back, so that any one composition can be rendered in alternate ways. All images and brushes imported as elements can be set for 3D extruded boxes, framed (with a number of frame types in an included library), blurred, made grayscale, pixelated, negative imaged and embossed. You can use a special "Aspect Ratio" toggle that assures that images are resized with their ratios intact, or you can turn it off and accept the image stretching that may occur.

In the lower left is a multi-page arrangement of all the available templates that can be loaded in. If you design your own, they can be saved here for later recall as well. It's a simple point-and-click operation. Once loaded in, any of the elements involved can be re-targeted to other images and manipulated to an infinite degree. Colorization and transparency can be added from any of ten directions to all elements involved. Textures can be added too, and the manual lists ways that you can design your own for later reference. A library of separate patterns can also be selected. Lastly, there is the ability to store all of your completed screens in a Render List, where they can all be batch rendered at the same time.

What's Needed

TPaint will remain the poorest paint program around until NewTek redesigns it, which is slated to be included with the 4.0 release this fall. TPaint works with CStudio, however, better than its stodgy capabilities allow when you work with it alone. Low memory situations experienced during the compositing process may result in a crash of the system, and TPaint is terrible when it comes to memory management. CStudio should allow the loading of JPEG files into the process because few people I know store images in 24-bit anymore. Retargetability with PIP display would be a nice addition too. That would allow owners of other 24-bit graphics boards to see the results of a compositing operation right on the CStudio screen in an image area. The load requesters should also distinguish between drawers and other files (perhaps leaving "info" files off altogether, and being sure to save load paths as defaults each time), and the "FrameStore"/"RGB" selector should remain defaulted at the users selection. Most of all, there also needs to be a fast interactive "abort" in place for those "oops" moments. It would also help if there was a way to rotate selected elements in a picture.

Conclusions

Composited pictures are typically used as backgrounds for video titles and credits. Even though this is the first version of this package, I expect great things from it in the future. It's already paid for itself at our studio with just one job. Even in its present state, it is a necessary assistant in the image compositing process, especially for Toaster users. Dimension Technologies also offers the user availability and good-natured customer support on the phone, which has a value that cannot be underestimated in today's market.

VTU

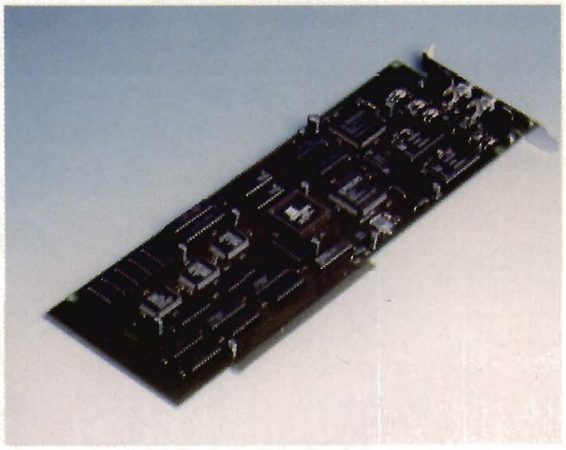
Company mentioned:
Dimension Technologies
2800 West 21st Street
Erie, PA 16506
(814) 838-2184
FOR INFORMATION CIRCLE 20

VLab Motion

Non-Linear Editing without a Toaster

by Matt Drabick

Many Video Toaster users know about NewTek's Flyer, but the VLab Motion is another non-linear video editing system for the Amiga. The VLab Motion promises to provide many of the Flyer's capabilities at a lower cost.



Developed by MacroSystem of Germany with U.S. distribution by NoahJi's, the VLab Motion is a Zorro-II card that works with the Amiga 2000, 3000 and 4000 and does not require a Toaster or a TBC. Both external composite and Y/C video inputs and outputs are provided with the system. An internal 50-pin input/output connector provides YUV/RGB signals for working with the Toaster's D2 signal or connecting directly to an RGB monitor for multimedia applications. No direct support is currently provided for working with the Toaster.

Required Tools

In order to use VLab Motion, Workbench 2.04 or higher, a large hard drive and at least 2MB of RAM are required. However, 8MB of RAM or more and a fast CPU (68030 or 68040) are highly recommended. Because both video and audio are being compressed and decompressed in real-time using a hard drive, having the right hard drive and controller is important. While an IDE hard drive can be used, a SCSI drive or SCSI-2 drive works even better. IDE hard drives are generally slower than SCSI drives, and are limited to two drives per IDE controller compared to seven drives per SCSI controller. This additional hard drive space is essential for large editing projects.

Since the Amiga 4000 has an IDE controller, users will have to add a SCSI controller to their computers. The Warp Engine 68040 accelerator by MacroSystem Development (no connection with MacroSystem of Germany), with its SCSI-2 controller and memory expansion, is an excellent choice. Newer versions of the Fastlane Z3 SCSI-2 controller will also work. However, due to a design limitation, GVP controllers aren't recommended. Although the GVP controllers work with the VLab Motion, the image quality will be quite low. Another alternative is the Amiga 3000, which has a built-in SCSI controller and also works well. When capturing video, a hard drive or hard drive partition must be dedicated to capturing and playing back compressed video samples. Regular AmigaDOS files can't be saved to that drive or partition. When using NoahJi's optional Toccata 16-bit sound card, 8-bit and 16-bit stereo sound files are saved as AmigaDOS files using a separate hard drive or partition. Unlike video samples, the VLab Motion's audio samples can co-exist with other Amiga files. While it's possible to split a hard drive into two parts and use one partition for capturing video and the second partition for capturing sound, for the best possible performance it's better to use one hard drive for video and a second hard drive for sound.

Animation Recorder in Disguise

In addition to capturing, editing and playing back digital video and audio files using the included MovieShop software, the VLab Motion can be used as an animation recorder. Until MacroSystem adds the planned file system, LightWave and other files must first be rendered and saved as 24-bit files using a separate AmigaDOS hard drive and then imported into the MovieShop software for conversion to JPEG files. After the files have been automatically converted and saved to the VLab Motion's dedicated video hard drive, animations can be played back in real-time without having to use a dedicated single-frame controller and frame-accurate VCR. JPEG files can also be exported and saved as IFF DEEP, IFF ILBM, PPM and Sunraster files.

MovieShop uses draggable windows that can be opened for selecting and adjusting the video source, capturing video and audio samples, placing video samples on the timeline, etc. Windows can be opened onto MovieShop's own public screen or the Amiga's Workbench screen using an RGB monitor. A separate composite or Y/C video monitor is required for previewing, recording and playing back video samples. When using an Amiga 4000, 256 colors or up to 256 shades of gray can be used with the screen. The 256-color display is useful when creating thumbnails of

video sequences for reference purposes. While it's possible to open a 640x960 or a 1024x768 display on an Amiga 4000, you still run the risk of cluttering the screen when opening too many windows, especially on an Amiga 2000. The optional Retina high-resolution RGB graphics card from NoahJi's can be used to display every MovieShop window at 1280x1024 pixels resolution and 256 colors. The VLab Motion alone has a list price of $1,750. Special pricing is available when bundled with the Toccata ($2,150) or both the Toccata and Retina ($2,650).

While still under development at press time (I worked with version 1.2 Beta), the MovieShop software is well-designed for capturing, editing and playing back video samples with sound. Once the video input has been selected, VCR-style controls are used to record, pause and playback samples. Samples can be automatically recorded using a user-defined length, but it's easier to simply start recording and manually stop the process. Controls are included for adjusting the brightness, contrast and chrominance values, plus the subcarrier of the incoming video signal. The amount of JPEG compression can be adjusted between one and 100 percent. Using higher compression results in better image quality but also requires a fast hard drive and controller, a 68030 or 68040 CPU and plenty of hard drive space.

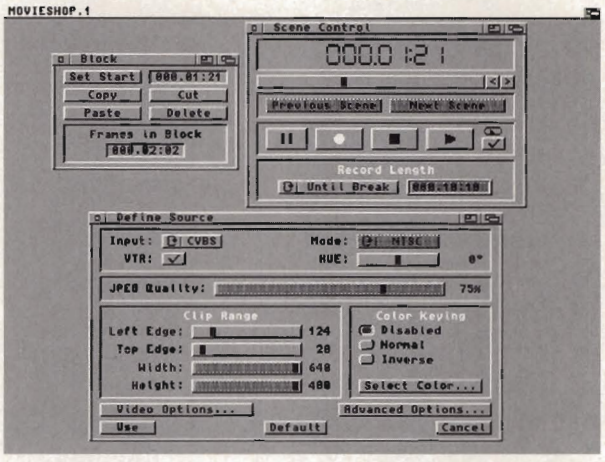
Manipulating Samples

With the Toccata sound card installed, audio samples are captured in sync with the video using either 8-bit or 16-bit quality. Audio samples are saved separately using the same file name as the video sample with an ".snd" extension. It's possible to pair different audio samples with different video samples during playback by reassigning the names of the audio samples and effectively adding music, narration or natural sound to the video. Audio samples can be extensively edited (cut, copy, paste, fade in or out) using the Samplitude software included with the Toccata.

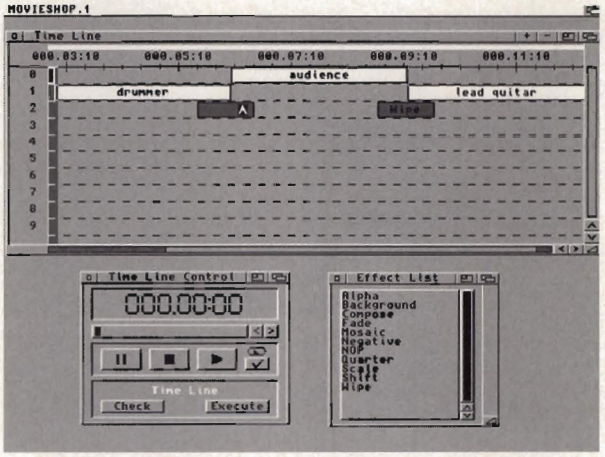
Once captured, video samples can be cut, copied and pasted to remove or add extra frames. A timeline is used to sequentially place video samples in horizontal rows as they occur over time. Zooming in on the timeline adjusts the position of the sample on a frame-by-frame basis and then zooming back out allows every sample in the timeline to be seen. The timeline window can be reduced or enlarged and moved around the screen by using the mouse.

Special effects or transitions can be added to the beginning or end of a video sample or between a pair of samples. Effects include fade, mosaic, negative, scale, color background, wipe and shift. They must always be rendered, much like creating a 3D animation. Currently effects can't be previewed. Once rendered, video samples, effects and sound can be played back in real-time. Due to the modular nature of the program, new special effects can be easily added to MovieShop.

Audio samples are added to the timeline with their assigned video samples. It's possible to "turn off" the sound associated with each video sample during playback. According to MacroSystem, future versions of MovieShop will allow audio samples to be independently added to the timeline to simulate insert editing.



Once captured, video samples can be cut, copied and pasted to remove or add extra frames.



A timeline is used to sequentially place video samples in horizontal rows as they occur over time.

Future Enhancements

MacroSystem has a number of developments underway that support the VLab Motion. An enhanced version of the MovieShop software, appropriately named MovieShop Pro, will provide improved audio capture and editing capability, time-code support, archiving video and audio samples. Finished productions will also be improved by using a DAT recorder, creating EDLs using CMX and Grass Valley protocols and a GPI trigger plus additional transitions.

MacroSystem of Germany is also developing a Zorro-III version of the VLab Motion with true 32-bit performance. While the current Zorro-II version of the VLab Motion is capable of moving up to 2.5MB of data per second using up to 90 percent compression, the Zorro-III will approach 6MB per second and easily achieve 100 percent compression for improved performance.

Third-party software support for the VLab Motion is reportedly planned by Scala and MediaPoint, while loaders and savers are being developed for Art Department Professional (ADPro). MultiLayer, by Prime Software, which automatically composites multiple digital layers using ADPro and ImageFX, will also support the VLab Motion.

As a more affordable non-linear editing system for the Amiga and Toaster, the VLab Motion is an attractive product. Although the Flyer will certainly take advantage of the Toaster's real-time special effects and offer other advantages, the VLab Motion doesn't require a TBC or even the Toaster to work. Once MacroSystem includes time-code and EDL support and improved audio capability, the VLab Motion should provide some real competition for the Flyer.

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3	18	33	48	63	78	93	108	123	138	153	168	183	198
4	19	34	49	64	79	94	109	124	139	154	169	184	199
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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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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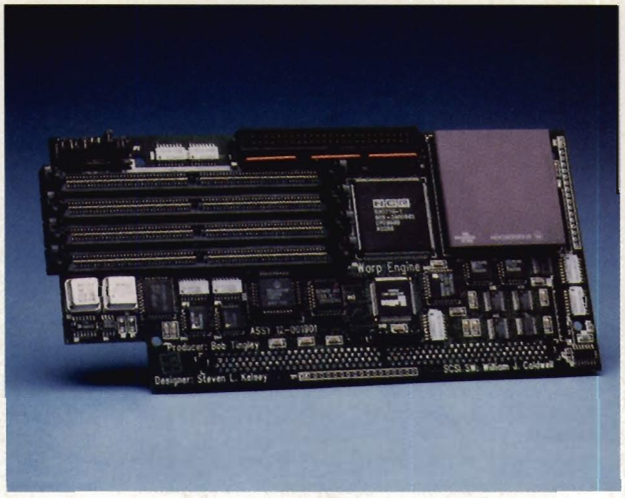
The Warp Engine

Speeding Toward High Performance

by Tim Doherty

When Commodore introduced the Amiga 4000, they presented users with mixed blessings. On the plus side, the new operating system, AmigaDOS 3.0, was efficient and polished. The much-anticipated AGA chipset and its expanded palette—from 4,096 on screen colors to 256,000—once again thrust the computer to the forefront as an affordable graphics machine. In addition, the modular design of the 4000, with the CPU placed on a card rather than the motherboard, allowed for easy upgrading.



However, other aspects of the 4000 were dissatisfying, particularly to current Amiga owners who were familiar with the Amiga's technology and were interested in upgrading to a 4000 or Toaster 4000 system. There were only four internal expansion slots, including the video slot. Though it did have an IDE controller built in, a SCSI controller was noticeably absent. The motherboard was expandable to just 18MB. And most disappointing to LightWave 3D users, the 4000 was sluggish when it came to rendering. My 25MHz Amiga 4000 ran roughly twice as slow as my similarly equipped Amiga 2000.

MacroSystem Development's Warp Engine provides an inexpensive way of correcting the 4000's shortcomings. The Warp Engine delivers high speed local '040 burst memory access. It accepts up to 128MB on board. In addition, it has a blazing fast DMA SCSI-2 controller. To top it off, the Warp Engine doesn't eat any of the 4000's precious expansion slots; it is a single card which replaces the Amiga's CPU card.

No Dilithium Crystals Required

The slow speed of the Amiga 4000 results from the interface between the Commodore CPU card and the motherboard where the RAM is located. By placing the '040 burst memory on the same board as the CPU, MacroSystem Development eliminated this bottleneck. This results in significant speed improvements over a stock 4000, even with their slowest accelerator.

The Warp Engine comes in a variety of configurations and speeds for the Amiga 4000: 28MHz, 33MHz (both of which are upgradable) or 40MHz. The 28MHz version does not include an '040 chip. Users simply remove the '040 from their Amiga CPU card and install the chip in the Warp Engine's socket. The FastRam already on the 4000's motherboard can be moved to the Warp Engine as well. 33MHz and 40MHz versions of the Warp Engine include '040 processors which require 70 and 60ns RAM, respectively, though slower RAM can be used by adding wait states via a jumper on the board. Wait states translate to reduced performance, however. The Warp Engine accepts standard 4, 8, 16, or 32MB 72-pin simms, and can hold up to four different size simms at the same time.

I tested a 32MB, 40MHz version. The card itself was a beautifully engineered, eight-layer circuit board with double-sided surface mount technology. I was guided through installation by the manual, which was concise, clear and logical. The process took approximately 45 minutes. I basically had to disassemble my entire Amiga in order to remove the Commodore CPU card and install my Warp Engine. While the Amiga 4000 is intelligently designed for easy service and I did not have any great difficulty taking it apart, users who are more comfortable staying on the other side of a computer case will probably want to let their dealer install the board for them. I attached a Seagate ST12550N Barracuda drive to the Warp Engine's SCSI-2 controller before reassembling my system. My 4000 booted without a problem. I loaded SCSI Tools from the Warp Engine installation disk to format the Barracuda drive. Also, I followed the instructions for remapping my Amiga's kickstart ROM into RAM by adding the included utility WarpROM to my c: directory and startup-sequence.

Warp Speed Results

The Warp Engine produced noticeable speed improvements, from general system response to LightWave rendering to disk access. I used the public domain utility AIBB (version 55) for comparisons of standard benchmark tests such as dhrystone and sieve. The results are summarized in Table 1. Next, I loaded four different LightWave scenes to evaluate relative rendering speeds. The first scene contained

Table 1: Standard Benchmark Comparison

Test Stock	4000 (25MHz)	Warp 4000 (40MHz)	Increase
Dhrystone	19.07	31.01	1.6x
Sieve	10.63	26.17	2.5x
MemTest	27.83	11.54	2.4x
Beachball	53.99	33.64	1.6x

Table 2: LightWave Render Comparisons

Test Stock	4000 (25MHz)	Warp 4000 (40MHz)	Increase
Simple	3m	1s1m	7s2.7x
Complex Textures	29m	40s11m	0s2.7x
Complex Geometry	15m	36s5m	13s3.0x
Ray Traced	21m	6s7m	39s2.7x

simple geometry and textures. The second scene had complex, full screen texturing and bump maps along with shadow maps. Scene three consisted of a single, complex geometric object containing more than 28,000 points and 18,000 polygons. The last scene utilized ray traced reflections and shadows. The results are listed in Table 2. Though the AIBB benchmarks produced respectable results, the real-world tests were much more formidable. In all cases, the Warp Engine performed an impressive 2.7 to 3 times faster than the standard Amiga 4000.

My overall productivity with Layout and Modeler also benefited from the Warp Engine. Layout screen redraws were faster. For example, the complex model used in the render test redrew about 33 percent faster. The time required to generate a layout preview decreased by a factor of 1.3 to 2.5, depending on the scene, with simpler scenes gaining the greatest increase. Modeler posted similar gains. Importing the complex object from Layout to Modeler took only 18 seconds on the accelerated system, but required 42 seconds on the base 4000. Modeler redraws were approximately 50 percent faster with the Warp Engine.

MacroSystem Development boasts that the Warp Engine's SCSI-2 is the fastest available for the Amiga, and I found their claim to be justified. The 32-bit DMA bus was able to achieve bursts of 9MB per second with my Barracuda drive, and sustained rates of 6MB per second. Other companies which advertise hard drive transfer rates of up to 10MB per second are probably just citing the maximum possible rate for SCSI-2. The Warp Engine is the first board I've seen which actually achieves such rates. The CPU retains ample processing power during SCSI transfers—well over 90 percent. This is also a big advantage to LightWave users. Images are saved quickly, and LightWave has plenty of processing power left to quickly resume rendering.

Something for Everyone

Anyone who owns a 4000 will benefit from a Warp Engine (Amiga 3000 versions of the Warp Engine have also been released). Desktop publishers who move large documents to and from their hard drives will appreciate the speed of the SCSI-2 transfers. LightWave users will certainly enjoy improved rendering times. Even Raptor owners will benefit from the faster response of both the LightWave's modeler and layout screens. In my opinion, the Warp Engine allows the Amiga 4000 to meet its full potential. Serious 4000 users, particularly LightWave modelers and animators, should make the Warp Engine an immediate addition to their system.

VTU

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Novi, MI 48374
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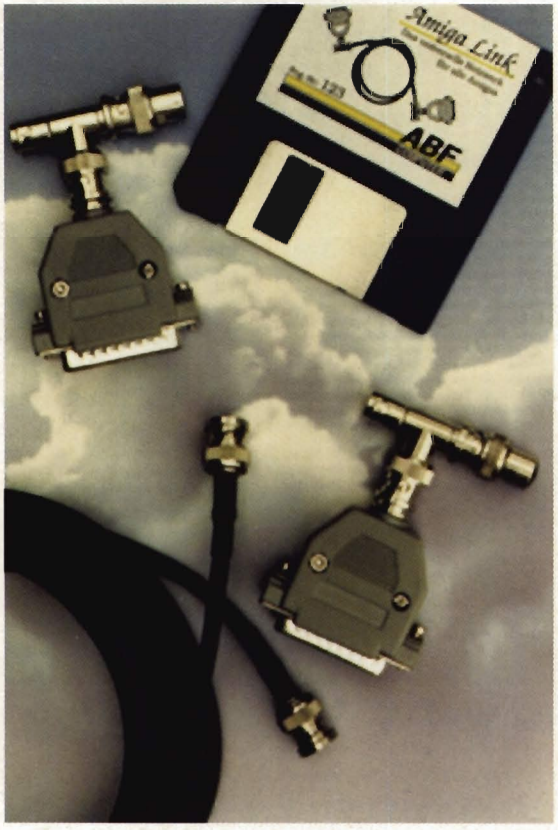
FOR INFORMATION CIRCLE 55

AmigaLink: Affordable Networking

by Douglas J. Nakakihara

True multi-user Amiga networking has traditionally required expensive Ethernet cards and networking software. Spectronics International U.S.A. has released a low-cost solution which relies on the Amiga's built-in floppy disk port. An added benefit is that slotless models such as the A500, A1200, and CDTV can be part of a network. A4000 Toaster owners will appreciate the fact that AmigaLink doesn't use an expansion slot.



AmigaLink works with pass-through connectors and yet up to three floppy drives can be on each Amiga.

Par-Not

Of course, Amiga owners have long relied on the freely distributable ParNet software to network Amigas. However, ParNet's usefulness is limited by its two-computer maximum and monopolization of the parallel port. The latter limitation precludes the concurrent use of printers, scanners and audio digitizers.

AmigaLink is a peer-to-peer network, which means all of the nodes (i.e., networked computers) are capable of accessing another's storage devices. A maximum of 20 nodes and 330 feet of 50 ohm RG-58 coaxial cabling is recommended, although you may be able to exceed these maximums depending on the amount of interference at the network's location.

AmigaLink works with pass-through connectors and yet up to three floppy drives can be on each Amiga. Since many external floppy drives do not have a pass-through, Spectronics will be releasing an inexpensive pass-through add-on. An adapter for CD32 has also been mentioned.

Video Toaster Farm

Spectronics' RenderLink software will do simultaneous LightWave rendering on multiple Amiga/Toaster systems. This is an excellent application for AmigaLink and will put "rendering farms" similar to the big boys (i.e., Amblin Imaging [*seaQuestDSV*] and Foundation Imaging [*Babylon 5*]) within the reach of smaller 3D studios.

Installation

Hardware installation is simple and doesn't even require the opening of a computer case. This entails merely plugging the AmigaLink adapter into each nodes' floppy disk port and then daisy-chaining them together using the provided cables. Red-capped terminating plugs are then placed on the first and last nodes. Incidentally, cabling can be disconnected or reconnected without powering down. However, you should never add or remove an AmigaLink adapter while the computer is running.

Software installation involves connecting the device driver and file system on each node using two separate installation scripts. For floppy disk installation, a handy list of deletable files is provided for Workbench 1.3 and 3.0 disks. Between the two, you can come up with a list for a 2.x Workbench disk. (Note: a real keyboard or a keyboard-emulating utility is a must for CDTV.)

When installing the file system, you will be asked for a unique "host" name for each node. I recommend you keep names meaningful, but short, like "DJN4K," or "CDTV1."

Proving the point that AmigaLink is a real network, the device driver is SANA-II (Standard Amiga Network

Architecture) compatible. Thus, ENVOY or other SANA-II compatible networking software can be used instead of the AmigaLink file system software.

Configuring Nodes

Once the device driver and file system are installed on all Amigas, each node must be configured. The configuration programs can be run from the AmigaLink floppy disk; however, I found it more convenient to copy them to my hard drives for possible future configuration changes.

Running the Export program first lets you select which devices will be available to other nodes, and therefore certain devices can be private with no remote access allowed. All storage devices can be exported, including RAM: and removable media, such as floppy drives. Export settings can be saved as the default or using a user-specified name, or just used for the current session. Settings are stored in the ENVARC: directory under Networks, a standardized storage area for configuration information.

After the export devices have been identified for all nodes, the Import program can be run to select which devices should be mounted on a node. Devices are grouped by host in the program's window. The host's name is automatically appended to the front of the device and volume names. For example, the device and volume names "HD1" and "Work" on host "A3000" become "A3000-HD1" and "A3000-Work," respectively.

This avoids naming conflicts with the local machine. However, names can be changed manually.

Instead of saving its settings in the ENVARC: directory, Import saves them in the WBStartup drawer. This may lead to a series of irritating requestors upon bootup, if all of the nodes for the imported devices are not turned on. Moving the settings file to a different directory only solves the problem until you save the settings again. My solution is to add some lines to the Startup-Sequence that checks for the settings files in the WBStartup drawer and then moves them to another drawer. This works because the Startup-Sequence is executed before WBStartup programs are run.

Utilities

Diagnostic utility programs are also supplied. One is a self-testing program which identifies hardware problems. Two other programs test the receiving and sending abilities of computers on the network. The Statistics program monitors and displays network performance information.

Spooled Network Printing

Any node with a printer can act as a print-server, allowing other nodes to print to its printer, using AmigaLink's Spooler program. The program monitors a user-specified directory for "print-files" and sends them to the printer. Remote nodes use the AmigaDOS CMD command, usually found in the Tools or Utilities drawer, to redirect printer output over the network to the monitored Spooler directory. Multiple print-servers are possible. Note: don't run CMD on the print-server, because it will cause an endless loop.

OS1.3 Supported

AmigaLink was designed to work on OS1.3 Amigas, including the Amiga 1000. However, sometimes installation and running the software will require using CLI commands. Fortunately, the Startup-Sequence can be modified to automate the process. Remember to include the StartServer command, as the installation process does not do it for you.

My Network

My test network consisted of an Amiga 3000, 4000, and CDTV. The network ran invisibly, as imported devices operated from the Workbench and CLI just like local ones. Even (OS2.0+) "left out" icons appeared.

I noticed that rebooting a node caused a little problem for remote nodes. I had to unmount and then remount any devices imported from the rebooted node, even though the Import program indicated the devices were mounted. You can click the "mounted" button twice or do it from the CLI. When there are a lot of devices, a script file works great for unmounting devices.

There was also a conflict between my Goldengate 486 board, but only if I tried to access a network device while emulating a PC.

Performance

Although the data transfer rate is suppose to be about 55 kilobytes-per-second (kbps), I could only get about 40kbps, while ParNet achieved approximately 61kbps. However, I also found that ParNet required huge amounts of CPU time, while AmigaLink barely required any. This could be an issue when multitasking. All in all, AmigaLink's speed was tolerable.

At $259.95 for two nodes ($299.95 with RenderLink) and $124.95 for each additional, this product may seem expensive, but a functionally equivalent Ethernet-based network would cost much more, though speed would be increased. However, top speed is not always a requirement and AmigaLink is fantastic for sharing peripherals. Even for a single user, it's advantages over ParNet more than justify its price. Long overdue, this is a landmark product for the Amiga.

VTU

Douglas J. Nakakihara is a freelance writer for several high-tech publications.

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Champaign, IL 61820
(217) 352-0061

FOR INFORMATION CIRCLE 56

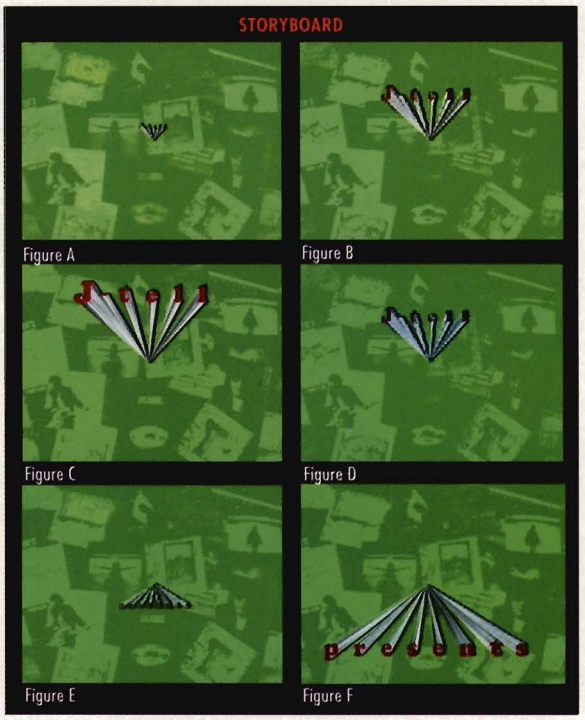
Integrated LightWave with the Keyer & Switcher

by Dave Hibsher

This tutorial will show you how to do something I call "The Crush Effect," which Lee Stranahan and I have been showing at recent training seminars.

When run from the Switcher, a word keyed over live video will appear to expand toward the top of the screen from a point infinitely far away on the horizon. When it's run again, this word will "crush" back to where it originated and a second word will expand toward the bottom of the screen from the same spot. Figures A though F show various points of this transition in order.

I like this effect because it combines several elements of the Toaster—Modeler, Layout, Framegrabber, the Luminance Keyer and a Digital Video Effect—to create an impressive CG effect.



Figures A though F show various points of this transition in order.

I have not assumed much knowledge of LightWave, so even if you're normally shy of this powerful, though seemingly complex video tool, don't worry.

I have assumed you're using system 3.0 or later. However, you can still do the Crush Effect with system 2.0, but it's more work. For instance, you don't have a Text button, so you'll have to load your text from a bank of letter objects and line them up one at a time. The basic steps are the same, though, so if you're a little familiar with LightWave, you should be able to keep pace. The Switcher and Framegrabbing parts are identical.

Modeler

Make the Word

Begin by entering LightWave's Modeler. Click on the Text button and a requester will appear, allowing you to load a font (click Load). These are the same fonts you have access to when loading fonts in the character generator. Pick a font you like—I'm using Coolsville. Type in the word you want at the top of the effect and hit Return. Modeler will now make the word you typed.

You may want to press the "a" key at this point to make the text visible in all three windows. Feel free to hit this key frequently during the modeling process to keep everything in view. Also, if you grab the "t" where the three windows meet, you can drag to resize them and often get a better look at the object you're modeling.

Depending on the font and words chosen, you may have to do a little clean-up at this point. For instance, I had to make my own hyphen by drawing out a two-dimensional box. Also, this effect will look better if you put more space between letters than usual. You can do this by selecting the hyphen and all the letters except the "J" and moving them to the right a few millimeters. Then de-select the hyphen, move the "tell" to the right, de-select the "t," move the "ell" to the right, etc. Of course, an easier way to add the extra space is by typing one between the letters when making the text in the Generate Text requester.

If you do need to move the letters around, you can select all but the "J" using the right mouse button lasso to draw around the letters. To de-select, just drag over the points with the mouse or draw another lasso around them. If you've just used a modeling tool, such as Move, you may have to click on the Point button at the bottom left of the screen to get the selection cursor back (it looks like a cross when in select mode). It's a good idea to de-select everything when you're done by using the slash key (/).

The Move button is on the Modify menu. I find using the numeric input is easier here than the mouse because I can never keep the text vertically aligned with the mouse. The numeric input allows you to enter exact values for the selected tool (in this case the Move tool) rather than having to have the steady hands of a surgeon with the mouse.

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Integrated LightWave continued from page 78

To get to the numeric input, click the Numeric button (near the bottom of most menus) after selecting the particular tool. Try an offset of 100 to 200 mm in the "x" direction and zero in "y" and "z" for kerning text.

Finally, center the word using the Center macro. Modeler normally comes configured with this macro on the F1 key; just hit F1 and the text will center.

Extrude the Word

When you've got your text aligned, you're ready to give it depth. Go to the Multiply menu and click extrude. Now, when you click on one of the three windows, an "arm" will appear in the other two. You can grab this handle and drag the extrude tool to the depth you want the text to be. Click first in the window in which you can read the text (should be the lower left one). Again, it may be easier to use the numeric input to extrude to the right depth rather than dragging with the mouse. Try entering an extent of 10 meters or so, and be sure to leave the number of segments at one. After entering the numbers and closing the requester box, hit Return and this will give the text depth.

Name the Polygons

Now we need to give the front and side polygons separate surface names. This is necessary so we can put different colors and other surface attributes on the front and sides of the text.

Go to the Polygon menu, select the Surface button and type a name—like "sides"—for the sides of the letters in the requester that appears. Click Apply. Because nothing was selected, this will name all the polygons of the text with the name you chose for the sides; don't worry, it's easy at this point to rename the front polygons. Change the mouse selection mode (at the lower left of the interface) to Polygon, then lasso around the front polygons. This will be easiest in the top or side views. The front of the text is the bottom end in the upper window, and the left end in the lower right window.

When the fronts are selected, you will see little dotted lines, with surface normals pointing away from them. Make sure only the front polygons are selected. If there are extra ones, you can de-select them by clicking and dragging across them with the mouse. Select Surface again, type in a different name—like "front"—for the front polygons, and click Apply. You should de-select the fronts after you've named them.

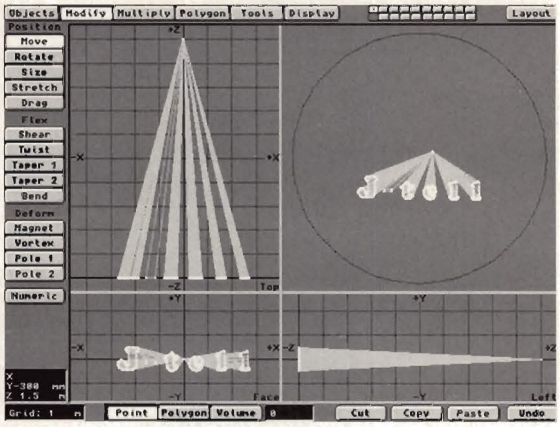

Figure 1

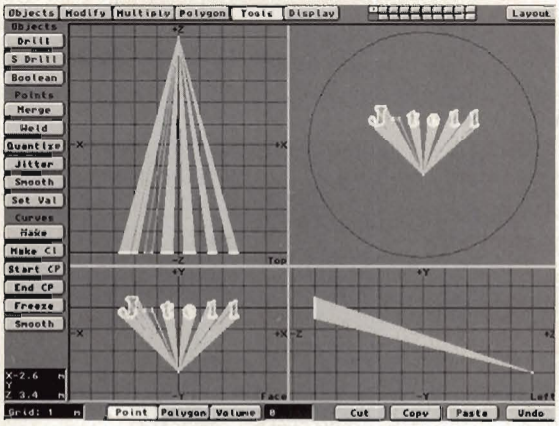

Figure 2

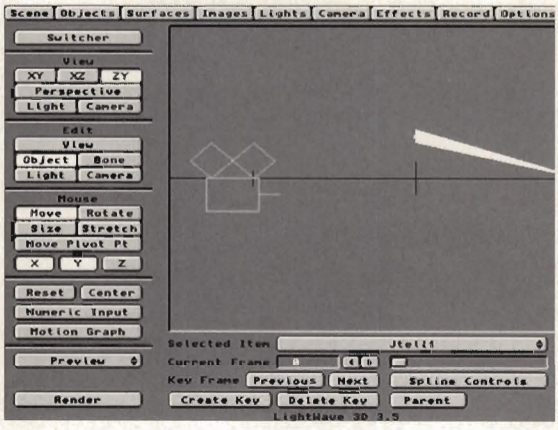

Figure 3

Taper the Text

Now we're ready to taper the extruded text so it appears to trail off to infinity.

First, select all the points at the back of the object. As with selecting polygons, the lasso in the top or lower right window works well. Now, go to the Modify menu and select the Size tool. Click in the top window directly on the line of highlighted points at the darker grid line which indicates the center of that window. If you're using a 4000, this will be a double line. Drag the mouse to the left. This should collapse the back end of the text to a single point.

I recommend using the numeric requester at this point. Click Numeric and enter .001 in the Factor requester. This number controls what percent of the original size the new size will be. Don't enter zero or the side polygons won't render correctly (trust me). Leave the other numbers as they are. You should have something similar to Figure 1.

Shear the Back

The last step in making the text object is dragging the back end of the text down so it can be seen in the front view.

In the Modify menu, select Move and drag the points down. They should still be selected from when you re-sized them, but if not, make sure you only select the back points or you'll be moving the whole object down. Grab them in the lower right window and drag straight down. I moved the J-tell points down about three meters. You should now have something that looks like Figure 2.

We're done with the first text object, so save this one and make another using the word you want to zoom out from the bottom of the screen. This time drag the pointy end above, rather than below the text. Don't forget to center the text before you extrude it and name the front and side polygons.

Layout

Line Up the Text

Now we're ready to make these objects into Framestores that can be keyed over video.

Go to Layout, open the Objects panel (the button on the row at the top of the screen) and click the Load Object button. Select and load the word to go at the top of the screen.

continued on page 82

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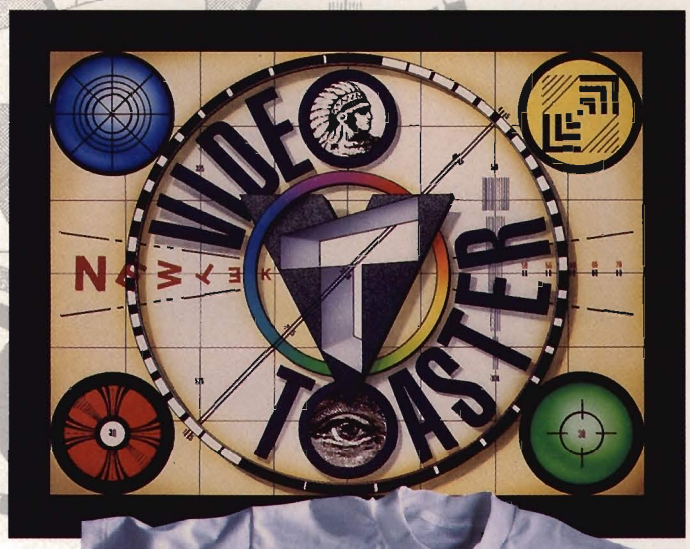

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Integrated LightWave continued from page 80

The Continue button closes the Objects panel.

Now, in the Layout screen itself, select side (zy) as the View and Object as the Edit item and make sure Move is the mouse function. Notice how you can see your text from the side. You may need to zoom in or out with the comma and period keys to get a good view. Move the text straight up until the point at the back is just touching the horizontal black line (Figure 3). This places the infinity point of the text on the horizon when viewed from the camera.

Make a keyframe for the text. To do this, hit the Create Key button at the bottom of the interface and click OK. If this isn't done after moving objects, lights, and the camera around, they will magically fly off to undesired places when you render.

Line Up the Camera

Now change the View to Camera and select Camera as the Edit item. Hit the Numeric Input button and enter zero for the camera's "y" value. Leave "z" as is. As soon as you press OK, make a keyframe for the camera.

At this point, the camera may be either too close to or too far away from the text. We want to move the camera forward or backwards without moving it left or right or up and down. To limit the motion of the camera (or anything else), LightWave has a useful feature called the axis constraints. These are the buttons labeled "x," "y," and "z" under the area with the mouse function buttons. For the present camera move, click on "x" and "y" to deselect them. This prevents the camera from moving any direction but forward or backward. Now drag the camera so that the text object is just below the top of the screen. Compare Figures 4 and 5; 4 is a poor example. Make a keyframe.

Try rendering a frame here to check the positioning of the camera. Use the F9 button to render the current frame. You can see the full overscan area in the Layout screen, so check your output monitor to be sure you can see the tops of the letters. If not, the camera is too close to the text so move it back and render another test frame. Don't forget to make a keyframe as soon as something is moved.

Surface the Text

When the text is aligned properly, you are ready to apply surfaces. Here's where your artistic taste comes in. I personally like a metallic surface on the sides of text and a solid or gradient color on the front faces. For the sides of my J-tell, I am using the silver surface that comes with LightWave; for the faces I'll use a purplish red.

To change the look of the sides or faces of the text, first make that surface the current one on the Surfaces panel. To change which is current, click on the Current Surface at the top of the panel and drag to the desired one. Next, click Load Surface and select the desired surface.

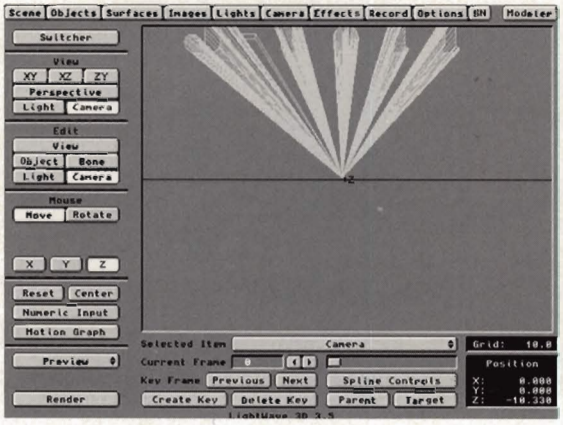

Figure 4

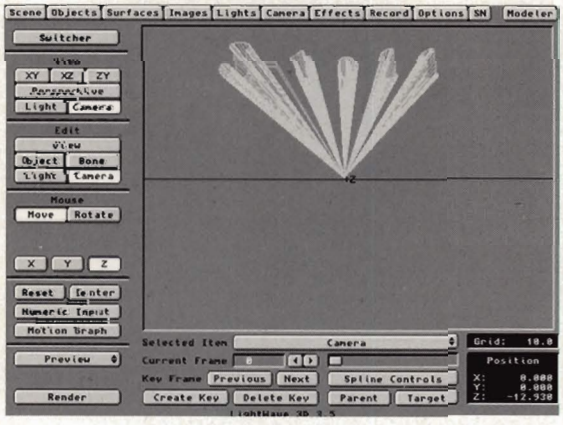

Figure 5

Make sure the surfaces given to the sides and front are bright enough. If the shadowy areas are too dark, the Framestores you create won't key well. You may have to rotate the light on heading or pitch to make the text shadow better. The included silver and gold surfaces look good enough on their own, so if you don't want to tweak the light, use one of them. To change the face color, make "front" the current surface, click the Surface Color button and drag the sliders to get a color you prefer. Render frequently to check the progress of your surface.

If your sides and faces look the same, you probably didn't give them different names in Modeler. Clear the object, go back to Modeler, select and rename the polygons, and resave the object. Then go back out to Layout and try again.

Make the Framestores

When you have a position and surface you're satisfied with for your text, you're ready to save it as a Framestore. Give the frame one final rendering, but go to the Camera panel first and turn Antialiasing to low. This adds a bit to the render time, but it makes a better looking frame.

Switcher

Framegrab

When the frame is done rendering, exit to the Switcher. Check which Framebuffer contains your rendered text (should be DV1) and select that buffer on both main and preview. Go to the Setup screen and save the buffer as a Framestore. It might be a good idea to save it in a place where you can save two or three consecutively.

Do It Again

Now it's time to return to LightWave. On the Objects panel, click Replace Object and select the other word you made—the one with the point above the faces. Move it down until the point is just touching the horizontal line in the side view, load or apply the surfaces you want, and render and save another Framestore as you did with the first one.

You don't have to stop at two, but at least two Framestores are necessary to get the full effect. For now, let's assume you are stopping at two.

Lumakey

To create the crush effect, set the Switcher up this way: put a video source on input and one on the Main bus, load your first Framestore in DV1 and the second in DV2. Turn on the Luminance Keyer to black and select DV1 on the Superimpose bus and DV2 on the Preview bus. Set the clip

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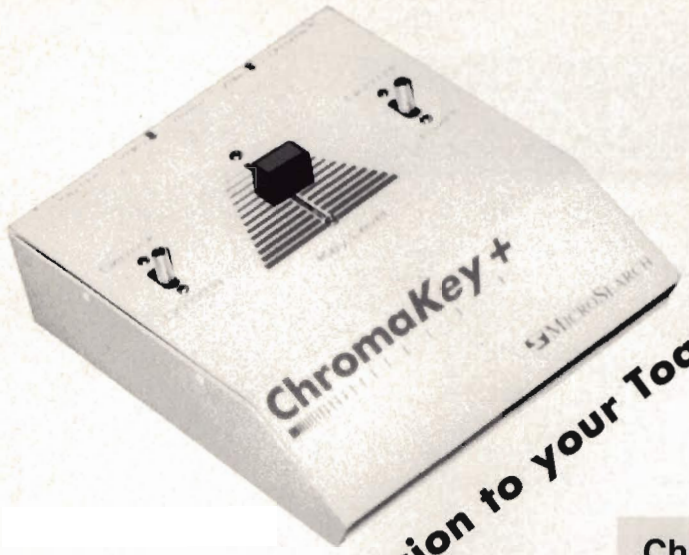

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SOUND REASONING continued from page 25

In multi-track music recording, for example, anywhere from eight to 64 separate tracks are typically recorded (representing such individual sound elements as kick drum, snare drum, bass guitar, lead vocals and backup vocals). The final step of the studio recording process is the "mixdown" of these isolated tracks into the final stereo "master."

With video and film production, the multiple tracks typically consist of multiple layers of dialogue, music, sound effects, and background ambience. Traditional film and video mixing combines these tracks together simultaneously through a big mixing console.

But with some computer-based digital audio recording systems, sometimes you can't simultaneously listen to all the different tracks that have been recorded because the hard disk can't simultaneously read all the different files. Mixing such digital audio recordings thus becomes more cumbersome since you must essentially do what studio engineers call "bouncing tracks," which means taking a few of the tracks, combining them before re-recording with other tracks, then mixing it with other mixed tracks until the final version is achieved. The disadvantage of this "premixing" technique is that if you're near the final mix and decide to change a level from one of the earlier mixes, you may have a difficult time going back and changing it (it may be completely impossible if the earlier source tracks were erased). The process is certainly more complex than simply adjusting a fader, as with traditional analog mixing consoles. But compared to analog track-bouncing, you're much better off in the digital audio realm, because at least quality is not lost (generation loss) with each pre-mix.

One distinct advantage of the Studio 16 system over simpler audio cards (such as the standard multimedia audio boards found in Windows multimedia computers) is the ability to play up to eight tracks simultaneously, and the inclusion of an 8-track mixing system. To get around the disk access problem, Studio 16 uses RAM as a buffer to temporarily hold the information needed for the multiple tracks.Ultimately, there's no question that digital audio will replace analog at all audio levels: recording, mixing and playback. But for the time being, especially for mixing on a low budget, there are still some advantages to analog gear, such as having easy-to-use equalization knobs, solo buttons, sends, and monitor mix outputs. Since these features already exist in the digital domain on top-quality professional recording studio mixing consoles costing nearly one quarter-million dollars, there's no doubt they'll eventually trickle down to more affordable equipment. The only question is: how soon?

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FOR INFORMATION CIRCLE 18

LAST WORD

Help Yourself

The Key to Getting an Animation Job

by Mojo

I would like to thank everyone who took the time to write about my How To Get A Job As An Animator article (*VTU*, April '94). It seems to have made an impact and actually fulfilled its purpose of helping people. A big You're Welcome to all of you.

I also received a few letters from people who wanted more advice—people with specific circumstances who were looking to me for guidance. Some wanted to know if they were better off starting their own company; if they were too old to change careers; if I could look at their demo reels; what schools they should go to and many more.

All of these are valid questions and deserve to be answered, yet I feel compelled not to respond. The article I wrote was designed to give people a head start and clue them in on what the 'real world' is looking for. It was not Mojo's Start-To-Finish Guide To Success. Much of it was common sense and certainly gave enough of a nudge in the right direction for those who have the desire to work professionally. Once nudged, I think people need to sink or swim on their own.

I really can't answer any more questions because all I'll do is give the same, basic answers I've already given—become better animators and send out demo reels. It doesn't matter who you are or how old. Pound the pavement. Be persistent. What else is there to know?

One person figured as soon as that issue of *VTU* came out, Foundation Imaging would be flooded with great demo reels and the odds of getting a job there would go down. That's what I thought, too, but it hasn't happened. I wonder why?

It's all about common sense. Many people ask me for advice on how they can break into the 3D animation business. Ninety percent of the time the advice I give is "Buy a computer, (preferably one that runs LightWave), learn how to do 3D animation, then send out examples of your work to the people you want to work for." And they actually "thank me" for that! The problem is, that's not advice. Am I supposed to believe that people are unable to come to these conclusions on their own? And if that is the case, what possible chance do they have of making it in the big time? Don't laugh. Many *VTU* readers are guilty of the same kind of thinking. It defies common sense, yet Foundation continues to get demo reels that are prime candidates for landfill. People should know better than to send in poor animation but they still do. Why do people need to be told this repeatedly? Something is at work here. Something far more complex than mere stupidity.

Take the Plunge

I have a friend named Peter who has wanted to write scripts for Hollywood ever since I met him nearly seven years ago. Last year he finally took the plunge and moved from New York to Los Angeles, looking for success.

He wanted to know if I had any advice for him. "Well, write some scripts, maybe even some magazine articles, and send them out to people. Pound the pavement and, if you're good, sooner or later someone will hire you."

Sound familiar? Unfortunately, after more than a year, he has made absolutely no progress. Not because it's a dog-eat-dog world out there (which it is), but because he hasn't been trying very hard. He works at a bookstore (a job that took him six months to find), he lives on a couch at a friend's house and hasn't tried to sell one word to anybody. Yet if you ask him what he does, he'll say he's a writer. Incidentally, he still hasn't made and sent out his 'demo reel.'

I don't mean to be so hard on him, but let's face it—Peter needs to wake up from this daydream of his and get busy. As far as I'm concerned, he'll never be a writer until he can stare reality in the face and see that he's just not trying. Once again, why not? I have slim hopes now for Peter. Several of people have given him help and opportunities but he has yet to help himself.

Personally, I think he's afraid to try. He's one of many people afraid of failure. It's very common. Most of the laziness and excuses are a result of the underlying fear of failure. Of course, it doesn't take a genius to tell you that unless you try, failure is a certainty.

There are many people out there competing for animation jobs, video jobs, editing jobs and acting jobs and every other job a reader of this magazine probably wants. The last thing anyone needs to do is to stop themselves from making it.

If you want to reach the big time, it is entirely up to you. It doesn't matter how much advice or help anyone gives you. The people who will make it are the people who have their goals in plain sight and are willing to do whatever it takes to reach them. These are people who know what they need to do and will let nothing, not even their fear, stand in their way.

These are people who help themselves. Do yourself a favor and be one of them.

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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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