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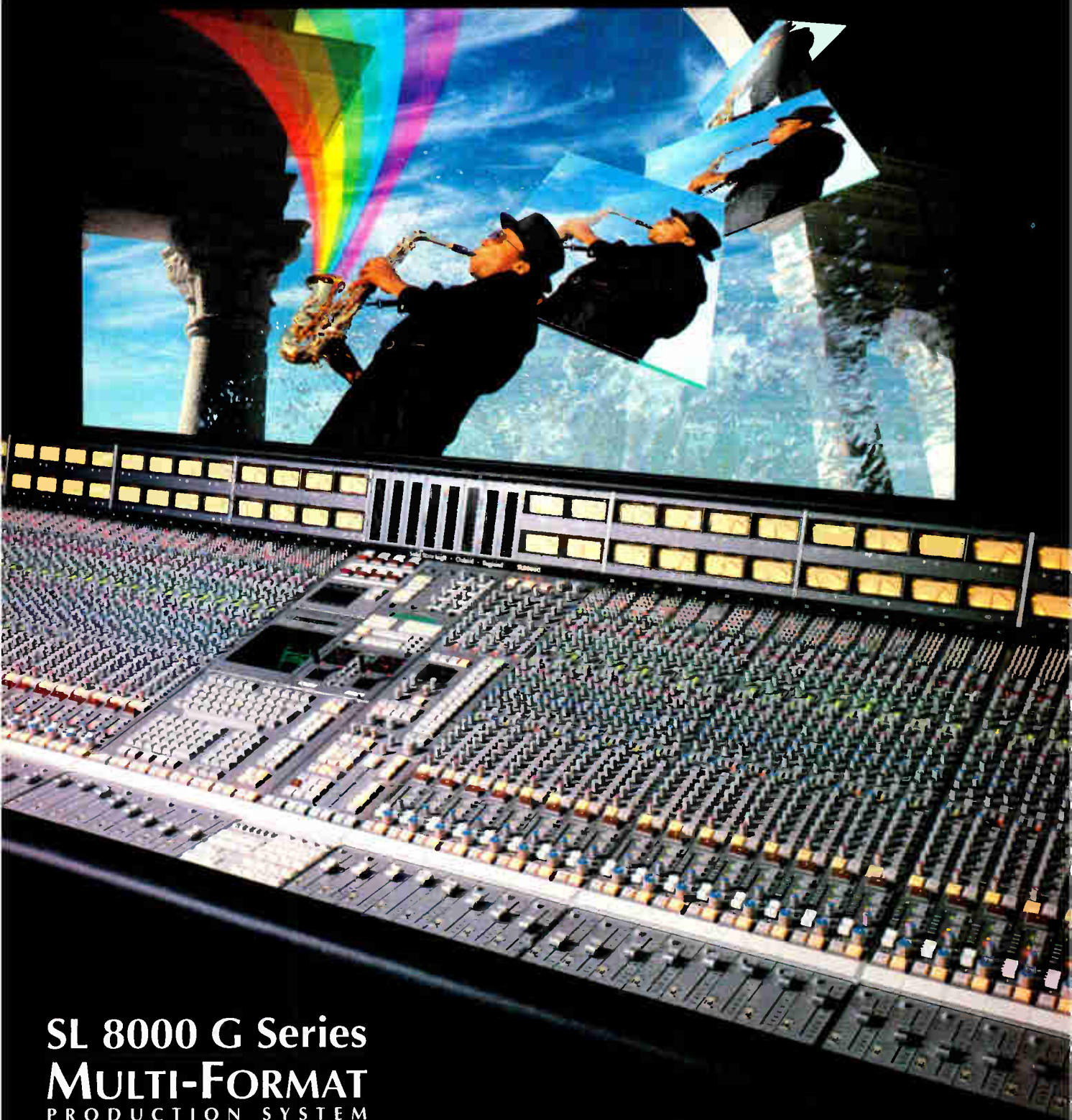
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MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

APRIL 1993, VOLUME 17, NUMBER 4

AUDIO

- 20 **Insider Audio:** The Doors of Perception
by Ken Pohlmann
- 26 **The Fast Lane:**
ISO/ANSI Standard C-032848.044 B"
by Stephen St. Croix
- 76 **NAMM Special Report**
*by George Petersen, Paul Potyten
and David (Rudy) Trubitt*
- 87 **The Byte Beat:** Digital Video Production, Part 1
by Paul Potyten
- 90 **Production Music Libraries:**
A Sound Investment *by George Petersen*



PAGE 90

SPECIAL TIME CODE SUPPLEMENT

- 34 **Using Time Code in the Reel World**
by Jim Tanenbaum, C.A.S.
- 46 **It's DAT Time:**
Time Code DAT On Location and In the Studio
by Mike Riner and Lee Lusted
- 56 **Is SMPTE Time Code Obsolete?**
by Scott Billups
- 60 **Studio View:** Time Code in the Project Studio
by Dan Daley

POST-PRODUCTION

- 65 **New Audio Post-Production
Products/Post Notes**
- 68 **Digital Audio Meets Digital Video:**
A Look at Three Fully Integrated
Post-Production Facilities *by Mel Lambert*
- 149 **The Operator:** Finding New Markets in the
Post-Production Jungle *by Chris Stone*

PRODUCTS

- 94 **Auditions:** Fostex DCM100 Mixing System;
Sound Ideas "The General" Sound Effects Library;
Peavey Delta VU Meter *by George Petersen*
- 100 **Preview/Hot Off the Shelf**
- 104 **Field Test:** Studer Dyaxis II *by Steve Rowland*



PAGE 33

LIVE SOUND

- 112 **SoundCheck/News Flashes**
by David (Rudy) Trubitt
- 113 **Computer Control Concepts, Part 2**
by Bob Moses
- 118 **New Sound Reinforcement Products**
- 120 **Wireless Gurus** *by David (Rudy) Trubitt*

TAPE & DISC

- 136 **Multimedia Universalis:**
Can 3DO End the Format Wars?
by Philip De Lancie
- 142 **Tape & Disc News/Splices** *by Philip De Lancie*

MUSIC

- 128 **Recording Notes:** Allmans' Guitar Ace Warren Haynes Goes Solo; Hendrix in the Studio; Mingus' "Weird Nightmare"; Diane Warren's Home Studio *by Blair Jackson, Bruce Pilato and Adam Dobrin*
- 144 **Lunching with Bonzai:** Branford Marsalis
by Mr. Bonzai

DEPARTMENTS

- 8 **From the Editor**
- 12 **Current**
- 16 **Industry Notes**
- 152 **Coast to Coast** (Including Sessions/Studio News, NY Metro Report, L.A. Grapevine, Nashville Skyline)
- 176 **Ad Index & Reader Service Card**
- 177 **Classifieds**

DIRECTORY

- 159 **Video Production and Post-Production Facilities**

Cover: There may be no greater convergence of audio and visual technology than in the modern post-production studio. Fueled by the innovations in workstation equipment and associated technologies, the illusionistic relationship between what is seen and heard in video/film projects is pushed to new realms of fantasy and reality. Our cover presents a photomontage of this new technological environment.
Art Director: Tim Gleason.
Photo: Paul Morrell.



-12
-15
-18
-22
-27
-32
-38
-44
-51
-60

8 Tracks

RECORD
INPUT

1 2 3 4 5 6 7 8



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Here's some specs. Bandwidth 20Hz to 20kHz ± 0.5 dB. Total Harmonic Distortion plus Noise 0.009%. Wow and flutter unmeasurable. ADAT uses the professional standard 48kHz sample rate and delivers better than 92dB dynamic range.

Here's some features. ADAT uses the familiar tape recorder controls that you already know how to use so

recording is fast, intuitive, effortless. Connections are provided for balanced +4dBu levels on a single 56 pin ELCO** connector and unbalanced -10dBV signals on 1/4" jacks. And ADAT uses S-VHS tape because it's a proven, robust recording medium with wide 1/2" tape to solidly support ADAT's 8 recording tracks while delivering 40 minutes of recording time.

The best part. ADAT's Proprietary Synchronization Interface (Patent Pending) locks multiple ADATs, independent of the audio tracks, to single sample accuracy $\pm 5\%$ of 1/48,000th of a second! In other sciences this is referred to as 'air tight'. So multiple ADATs function in perfect mechanical and electronic unison: up to 16 ADATs without an external controller. That's 128 tracks!

More best part. ADAT's Proprietary MultiChannel Optical Digital Interface (Patent Pending) simultaneously sends all 8 tracks of recorded information out the Digital I/O for perfect safety tapes and perfect track bounces.

Even more best part. The optional BRC Master Remote Control opens a whole other door to the ADAT miracle. With it you can control up to 16 ADATs (128 simultaneous tracks) with full transport functions, track offsets, machine offsets,

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In time we'll all start taking these little miracles for granted. Before that inevitable event, unpack your first ADAT and track a minute of single notes and chords on your favorite instrument. Play loud, play soft. Play it back and listen really close. It's always a good feeling to have your mind completely blown.

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FROM THE EDITOR

“Why don't we have a definitive primer on time code for the NAB issue?” suggested associate editor Tom Kenny at our weekly editorial status meeting a couple of months back. “Film and video people talk in different numbers, and now time code DAT machines are in the field and in the studio. There's so much confusion out there.” With not an editor dissenting, Tom was put in charge of coordinating our 1993 “salute to time code” supplement in the issue before you.

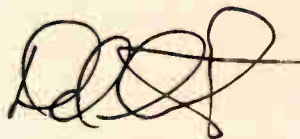
Beginning with veteran production sound mixer Jim Tanenbaum's introduction to time code, we get an easy-to-understand history of the development and applications of the several time code formats—systems devised to build a common denominator for the audio, video and film components of a viewable program.

Updating this information for important recent developments, production sound specialist Mike Riner answers the most common questions of how time code is handled by portable DAT recorders. Independent engineer Lee Lusted follows by asking Sync Sound's Ken Hahn and Bill Marino about time code DATs in the post-production environment. Then, our leading project studio evangelist, Dan Daley, brings the issue into the project studios to explore the impact and controversy time code has generated for the do-it-yourselfers.

We wrap up this special supplement on a slightly futuristic note with desktop production guru Scott Billups' view of life after time code. A serious Macintosh artist who grew up slugging it out in more traditional environments, Scott is surfing the cutting edge of current capabilities of desktop computing that allows complete, high-quality, multimedia production to be performed directly to disc—then directly to broadcast—without the limitations of the tape medium. While his world may be on the esoteric fringe for many real-world assignments, he demonstrates present alternatives as well as what many of us will be dealing with in the near future.

While we have run numerous articles on time code in the past, we feel that this is the most lucid, compact and well-balanced view of the subject we have yet presented. We hope you find something of interest here, and, if you still have questions, let us know. It's not too early to start planning for our next NAB issue.

Keep reading,



David Schwartz
Editor-in-Chief

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Founded in 1977 by
David Schwartz and Penny Riker Jacob



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INDUSTRY NOTES

Euphonix (N. Hollywood, CA) recently hired Rick Plushner, formerly general manager of Siemens Audio Inc. (Neve and AMS products), Western region, as vice president of sales for the Americas...TOA (South San Francisco, CA) restructured its sales and marketing divisions: The new sales force is directed by Richard Krochmal and consists of six regional sales managers and four technical experts, each of whom is responsible for the sales of all TOA product groups. General manager Jeff Pallin heads the new marketing group...In an effort to define more clearly product management and marketing communications issues, AKG Acoustics (San Leandro, CA) recently restructured its marketing department. Amy Herndon was appointed to a newly created position as the company's first marketing communications manager. The product development group now reports to David Angress...E-mu Systems of Scotts Valley, CA, hired David Bristow as European marketing consultant. Bristow will drive market support functions for Europe including product presentations, press relations, product voicing and product support...Crown (Elkhart, IN) named Pacific Star Enterprises as their sales rep in Hawaii...Ron Sauro joined the management team of Renkus-Heinz (Irvine, CA) in the newly created position of engineered systems manager...Techron (Elkhart, IN) appointed Blair McNair as regional sales manager for TEF products. In this newly created position McNair will be responsible for managing and training the national TEF representative team...Two promotions at Koss (Milwaukee, WI): Jill McCurdy to director of marketing and product development and Lenore Lillie to director of sales planning and vendor relations...San Francisco-

based Charles M. Salter Associates Inc. (consultants in acoustics and audio/visual system design) opened a Seattle office headed by Timothy M. Der. The Seattle office is located at 2520 25th Ave. East, Seattle, WA 98112. The telephone number is (206) 860-5013...Randall Whitney was appointed product manager for VOX (Westbury, NY). Whitney has worked for Korg, distributor of VOX, for ten years...Research Technology International (Lincolnwood, IL) hired Michael T. Chaffee as professional products sales manager...Michael Briggs joined International Sound & Lights as the vice president of marketing...Ramtek Inc., Livonia, MI-based maker of SCSI-based RAM disks and subsystems, expanded its operation to serve the digital recording and sampling market. The firm hired the development and technical staff of the now-defunct Eltekon Inc. to produce SCSI-based, rack-mounted storage subsystems. The new Ramtek systems incorporate many of the features of the Eltekon product line, and Ramtek indicated that owners of Eltekon products can look to Ramtek for repairs and upgrades...The tenth edition of the semiannual "Australasian Music Industry Directory" is now available. The 224-page directory covers many aspects of the industry in Australia, Japan, New Zealand and various Asian countries. Call (61) 2 212-6677 for more information...The third edition of "The Tapeless Directory" was recently published by technical and marketing consultants Sypha (London, UK). The directory covers tapeless (random-access, nonlinear or disk-based) audio recording and editing systems and is available from Sypha at (44) 81 761-1042 or from the Mix Bookshelf, 6400 Hollis St. #12, Emeryville, CA 94608, (510) 653-3307. ■

—FROM PAGE 12, CURRENT

research, and we can now offer this major benefit to our members. We are also confident that this new program may be an incentive for even more audio professionals to consider joining SPARS."

For information about this new program or about joining SPARS, contact Shirley Kaye, Executive Director, (800) 771-7727.

1993 TEC AWARDS SCHEDULED

The ninth annual Technical Excellence & Creativity Awards, sponsored by the Mix Foundation for Excellence in Audio, will be held Friday, October 8, at the luxurious Marriott Marquis in New York City. The Marriott Marquis is well-known for its awards shows and special events, playing host to the Heisman Trophy awards ceremony and the daytime Emmys. Located in midtown, the Marriott Marquis is readily accessible to both the Jacob Javitz Convention Center, site of the AES show, and the convention hotels. For more information about the event, call Karen Dunn at (510) 939-6149.

GROUP ONE TO DISTRIBUTE FOCUSRITE IN THE U.S.

Group One Ltd. of Farmingdale, N.Y., was appointed as the official United States distributor for British console and signal processing equipment manufacturer Focusrite. Group One will initially distribute three products from Focusrite's new Red Range line, including mic preamps and EQs. It will also focus its activities on further developing a dealer network by providing a U.S.-based inventory, sales and service facility. Group One will also implement a marketing program in the U.S. for Focusrite products and for the company.

CORRECTIONS

Some corrections to the February issue's Recording Schools and Programs directory: Studio Technique's correct address is P.O. Box 714, Lanham, MD 20703. The director of the New School for Social Research is Fred Winston. ■

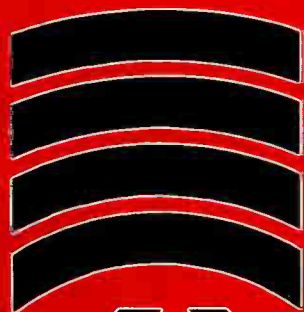
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Rather than let this success go to our heads, we let it go to our brains. And ears. And hands.

You see, we've been thinking. And listening. And working hard. All to build something even better. Now, it's ready, and it's called Pro Tools 2.0.

Two Point Oh Wow. Pro Tools 2.0 is a new, software-based advanced user interface. Without any modifications or additional hardware, 2.0 runs with all past and present Pro Tools hardware. If you're already familiar with Pro Tools, the first advancement

More Than Speed and Efficiency. The benefits of Pro Tools 2.0 go far beyond the obvious. For instance, we improved Pro Tools' already acclaimed audio quality: Our new digital EQs are as effective and musical as they are clean. We've added a host of intuitive automation, autolocation and transport features. Pro Tools now has a no-wait waveform overview mode. There's complete time-stamping. Enhanced grouping. Better scrubbing. More session management options. Bigger, brighter, faster, and



Thanks to our new Apogee-clock-equipped SMPTE Slave Driver* Pro Tools 2.0 delivers ultra-high-fidelity, ultra-low-jitter, ultra-easy digital synchronization in playback and record, complete with varispeed.

more accurate VU metering. Improved MIDI sequencing and control. Extensive undo commands. In fact, Pro Tools 2.0 has dozens of new features, and scores of enhancements, for audio post, music, and broadcast production applications.

YOU MIGHT CALL THAT IMPRESSIVE.

you'll notice is that 2.0 combines full-featured recording, mixing, signal processing, automation, along with advanced waveform and event editing — all in one, easy-to-use, integrated program.

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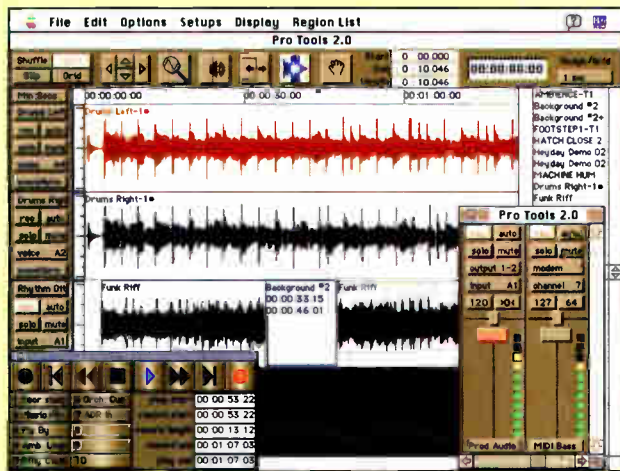
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by Ken C. Pohlmann

THE DOORS OF PERCEPTION

C

onsumer digital audio is moving rapidly toward perceptual coding methods, also known as bit-rate reduction methods. The MiniDisc and Digital Compact Cassette (and any future digital audio radio system) employ perceptual coding to constrain the volume of data required to convey a digital audio signal. Rates of 256 Kbps are common for a stereo channel. Meanwhile, for a variety of reasons, professional formats will continue to use fixed, linear PCM recording and processing, throughputting 1.5 Mbps. Will linear professional formats be able to supply the level of audio quality demanded by the consumer's perceptual coders?

That question is meant to be provocative, at least temporarily. For now, fixed linear systems set the standard against which perceptual coders must be tested. It is common and correct, for example, to perform A/B listening tests between CD and MD, or DCC. The 16-bit signal stored on a CD, when properly dithered at the recording stage and reproduced through a D/A converter with low nonlinearity, should exceed the consumer PASC and ATRAC data-reduction systems. However, as more and more startled listeners are discovering, the differences are quite small and, in some cases, completely inaudible (try a careful CD/DCC comparison for yourself).

Perceptual coding algorithms such as the ISO/MPEG Layer II have been judged indistinguishable from 16-bit dithered coding after very rigorous international testing by a variety of organizations. The next round of tests will not compare CD and ISO/MPEG, but 20-bit PCM master and ISO/MPEG. It is impressive that

first-generation, consumer-quality perceptual coders can already challenge even the best professional linear PCM systems, indicating that a battle for fidelity supremacy is



quickly shaping up—a classic case of the old vs. the new.

To many people, the idea that a data-reduced signal could ever sound as good as a linearly coded signal seems like madness. It seems intuitive that some sonic sacrifice must occur. In fact, that question echoes from the very introduction of digital audio, when many critics wondered how a sampled signal could ever sound as good as the original waveform. It has taken decades for many recording engineers to understand that the information “between the samples”

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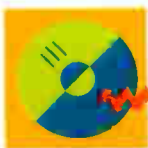
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World Radio History

is indeed reconstructed by the $\sin(x)/x$ response. Similarly, perceptual coding will take some adjustments in thinking, starting with the simple fact that perceptual coding can rival linear coding because perceptual coding is a much more efficient way to code audio (and video) signals. Simply put, it doesn't need as many bits to sound as good, and it has the opportunity to sound better.

Analog recording seeks to preserve an analog of the original pressure function, mimicking it throughout the signal chain to the best of its ability. The "warmth" of analog sought by many recording engineers is, of course, the distortion introduced by the process. Similarly, a linear digital representation seeks to preserve an analog of the original pressure function, using sampled amplitude values instead of continuous values. In both cases, the goal is to reconstruct a waveform that is as physically similar to the original as possible (the Gibbs phenomenon of a band-limited system only technically complicates this).

However, a perceptual coder abandons literal representation in favor of a more sophisticated method. Using a human model of the minimum threshold of hearing, amplitude and temporal masking, joint channel redundancy, and other devices, the coder calculates where losses can be tolerated. Based on this dynamic model, audible data is coded, usually with a floating-point format, to provide data compression benefits. Through data reduction and data compression, overall data throughput is decreased.

In comparison, linear PCM is a brute force approach. Think of it this way. Imagine that for a week you make every little purchase with a \$100 bill and do not ask for change—this is the none-too-clever PCM approach. With perceptual coding, not only do you argue the asking price, but you also count your change.

One important advantage of perceptual coding is that the perceptual model is located in the encoder. The decoder does not need a complementary model because it merely reconstructs available data. Thus, as perceptual models improve (the rate

of improvement has been rapid), the sonic quality of perceptually recorded music will improve, and the improvements will be conveyed through existing decoders.

Another important advantage is that data is assigned according to the audibility of the signal. In the PASC algorithm, for example, the data word's mantissa may vary from 2 to 15 bits (the exponent is fixed at 6 bits). In this way, highly audible signals can be coded with a precision that is unavailable to many linear systems. The consumer PASC algorithm currently provides maximum resolution equal to 19 bits of linear coding.

Finally, because perceptual coders tailor the coded signal to the human ear's acuity, they similarly tailor the required response of the playback system itself. Live music (at least historically) does not pass through amplifiers and loudspeakers; it goes directly to the ear. But recorded music must pass through the playback signal chain. Much of the original signal present in the live recording merely serves to degrade the playback system's ability to reproduce the audible signal. Because

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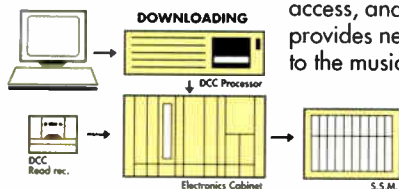


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a perceptual coder removes the inaudible signal content, the performance of the playback system to convey audible music logically should improve.

But how can perceptual coders objectively measure their performance? Linear measurements may reveal gross errors, but they cannot penetrate the question of the algorithm's perceptual accuracy. Objective measurements are being developed, but the best objective test for a perceptual coder, an artificial ear, will always remain paradoxical.

In other words, to measure perceived accuracy, the testing device must contain a model that precisely emulates the human hearing response. The measuring model could tell us how good the coder is. However, as soon as a superior model is developed, it would be ported to encoders and used for coding. In this way, an artificial ear measuring system would never be better than the systems it seeks to measure, or at least not for long.

Clearly, the best way to evaluate a perceptual coder is to listen to it. However, this prospect is distressing to many developers because aural

subjectivity in the recording industry is often accompanied by ad-lib, pseudo-scientific explanations and opinions based on improper listening tests. Still, listening is the best way to approach perceptual coders, and perhaps this necessity to actually listen, instead of merely repeating an opinion based on misunderstanding, will promote more careful listening tests. Given some healthy critical listening competition, it will be interesting to see who can identify sounds that stress perceptual coders, and, of course, it will be interesting to see who can actually hear the difference and who cannot. A hint: Cranking up the volume won't help expose differences; the masking curves increasingly work against you. Listen at soft levels. Another hint: Avoid full-bandwidth music; stick with complex tones, rich in information around the ear's most sensitive region, 1 to 5 kHz. Finally, have your ears cleaned.

So, the question is posed. Will linear professional systems be able to compete with the consumer's perceptual coders? Can today's 20-bit linear converters exceed the 19-bit precision of the first PASC coders? When perceptual coders get better (and much, much room for optimization is clearly in sight), how many linear bits will professionals require to compete? Or will professionals have to abandon linear methods and develop encoding and processing methods based on perceptual coding? For both fixed and perceptual coders, how much precision is actually required? A dynamic range of 120 dB? 130 dB? Which method will reach complete transparency first, perceptual or linear?

Twenty years after its advent, digital audio is now challenging the threshold of human acuity. Digital recorders can capture virtually everything that an acoustic pressure function can convey. In comparison, the best analog recorders are merely signal processors that add charming sonic characteristics to the signal. With the proliferation of perceptual coding in digital audio, we will close the door on the first age of digital audio—and open the next. ■

Ken Pohlmann is a professor of music at the University of Miami in Coral Gables, Fla.



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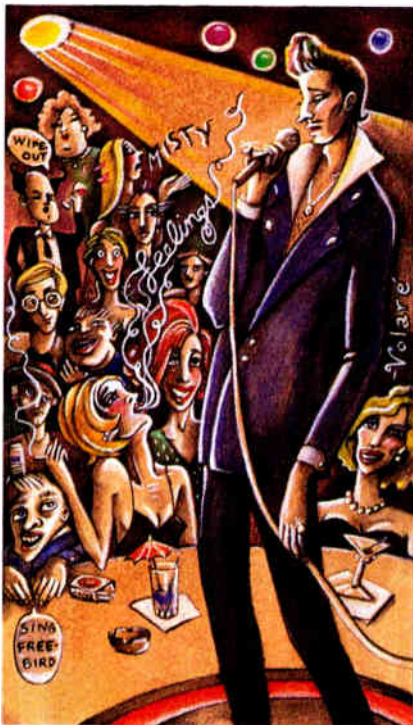
by Stephen St. Croix

ISO/ANSI STANDARD C-032848.044 B"

Standards: good or bad? No, wait! Don't turn the page. Come on—it's *me*, your friend. It won't be *that* bad.

If ever there were a perfect example of the old saying that along with good comes some bad (and vice versa), this is it.

So let's take a look at the definition



itself. Just what exactly is the basic concept of standardization? Well, as it applies to technology, it is pretty scary. Horrifying in its cruel, calculated simplicity, the idea is to advance the technology in question for a couple of months, then to completely *freeze* it, publish a description of the frozen state, and then put all available resources into halting any further ad-

vancement of any kind, for as long as possible.

"What," you might say, "does he mean? Is he serious, or has he just copped a 'tude because his Harley leaked black oil all over his white cat again?"

Well, let's see. Computer guys have SCSI, music guys have MIDI, recording engineers and producers have the wonderfully horrible SMPTE to deal with. We have 60, they have 50. We have 120, they have 240. We have NTSC, they have PAL, or SECAM, or...well, you get the idea. Let's see now. There's +4, -10, XLRs, Pin 3 hot, ASCII, 44.1, 16-bit, Ethernet, group 3, 300, 1200, 2400, 9600 baud, and, of course, the ever popular 9mm (most useful in dealing with problems with any of these other standards).

We certainly do live in a world of standards. We pretty much just accept them, because you don't get much done if you don't.

OUR FIRST WARNING: MIDI HECK

Many of you might remember when MIDI first came along. We were all thrilled that the synthesizer guys had actually hammered together a standard protocol for their machines. I remember how anxious I was to try linking my first two MIDI drum machines so they could talk to each other. We were all quite tired of gates and control voltages, frustrated by trimming offsets, adjusting ranges, inverting gates, stripping gate-trigger pairs and *still* having the top two octaves going out of tune. Remember?

Then, as the weeks passed, we found out that MIDI wasn't necessarily data from Heaven after all. We

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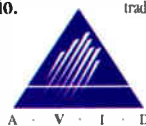
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could hear small timing errors. The timing resolution was not always enough; big chords and bends didn't go together at all; we discovered MIDI choking. There were a lot of mistakes and limitations in this protocol, but it *was* our new standard, and synths were pouring out of the doors of all the major manufacturers with these strange 30-year-old DIN connectors on the back. (I had a wonderful Grundig tape recorder 28 years ago that had those same connectors for line-in *and* for speaker outputs.

I wish I had kept its green, magic-eye level indicator.)

Obviously there were many similar stories that predate MIDI of standards whose woefully inadequate specs emerged shortly after implementation, but I picked MIDI because it is recent enough for everybody to have gone through and still carry the fresh emotional scars as a result. Recent surveys show that fully 18% of all professionals in our industry who see shrinks are still working on recovering from this trauma. I think that the actual numbers may be *much* higher. For example, 100% of all gui-

tar players who have tried to interface to synths with MIDI guitar controllers are in long-term intensive therapy.

WHY DO WE ALLOW THIS?

An interesting sort of Catch-22 becomes apparent when you examine the cause-and-effect conditions that force the existence of standards.

You can't have advancement without economic incentive; you can't have economic incentive without a reasonably large market; you can't have a reasonably large market without assuring that the competition's stuff will be compatible with your stuff; and you can't have the competition's stuff be compatible with your stuff unless all the warring countries—oops, sorry—unless all the competitors can call a truce and design a standard that they all adhere to for the life of the products. Okay. So that's *why* there are standards.

AND WE GET?

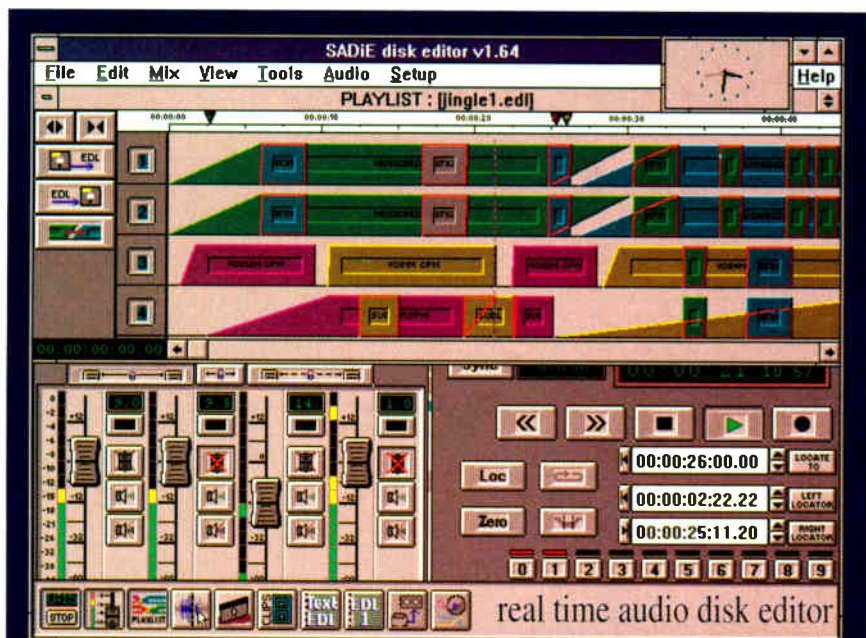
Now, what do they *get* us? Short term, we get a wonderful burst of technological advancement. All the little problems that have been keeping a pretty good concept from really operating well, problems that one company (say the one that originally thought up the pseudo-standard to begin with) just couldn't get a final handle on suddenly get solved when ten companies get together and contribute to the cause.

Further, while this problem-solving process is going on, significant improvements often pop up spontaneously. This is not too much of a surprise, as we now have 150 minds on the case instead of seven or eight. And there's more. Because these design teams know that they are designing for a standard that will be frozen, they do their best to push research to solve any theoretical problems that might arise in the immediate future.

So we get a non-linear boost in R&D; we get a little push into the future.

AND WE PAY?

What does it *cost* us? Well, that's pretty simple: total cessation of any further advancement. Complete termination of any further technical evolution, at the time when it is actually needed the most. Any standardized technology, whether it is a tape or disk format, a communications pro-



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Algorithms include reverb as only TC Electronic could do it, pitch/harmony effects, and unmatched chorus/flange/delay effects. Other algorithms are already under development by TC Electronic and third party programmers. Since the M5000 is software based, updating or adding new algorithms is as simple as loading in a RAM card or floppy disk.

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toloc, or broadcast standard, is handed to us finished and frozen, and well, let's face it...untried in the real world.

So it is frozen *before* it is tested. Mmmm. What is the first thing that happens when a new product appears that uses a new standard? Techno-freaks buy it, right now. Real citizens wait and see if all the hype that preceded the initial release was enough to generate sufficient momentum to make the standard stick. Remember Beta and 8-track? Well, go ahead and forget 8-track, but remember Beta; it died years ago, though superior in every way to its survivor VHS, due to the way the standards game plays into marketing.

Anyway, a standard comes out, and *then* it is field tested. Problems arise, but they are very difficult to address, if they can be at all, because any repairs have to be made *without disturbing the very standard that caused them*. An interesting challenge at best. What a system!

Finally, of course, the standard begins to age ungracefully. In light of the general technological atmos-

phere (which has been advancing linearly the whole time, free of the constraint of artificial stagnation), that frozen-in-time standard eventually becomes intolerably frustrating. Even the most unsophisticated dolts eventually become aware that the standard is actually holding them back. Sometimes the clue is that it just seems a bit clunky, sometimes it is because it is simply slower, bigger, heavier, lower resolution, noisier or even just uglier than the other new toys. Sometimes it is the specs of the soon-to-come new replacement standard that the tech-toy magazines leak out three years too soon, so that the standards-designing guys can find out if you will respond positively enough to give up the old, dead standard and do the whole thing over again.

Some of these jumps are so small that they feel like minor improvements, but they are still new, if merely evolutionary, standards. VHS to Super VHS. SCSI to SCSI2. Harley's New Evolution Engine.

Some are reasonable and impressive jumps. TV to HDTV. A to SR. '020 to '030 to '040, or 286 to 386 to 486. All those additional cellular phone

channels.

Some are huge and shocking. Tube to transistor. Transistor to I.C. Wax to vinyl. Vinyl to Compact Disc. Volts to bits. Electrons in copper wire to light in glass.

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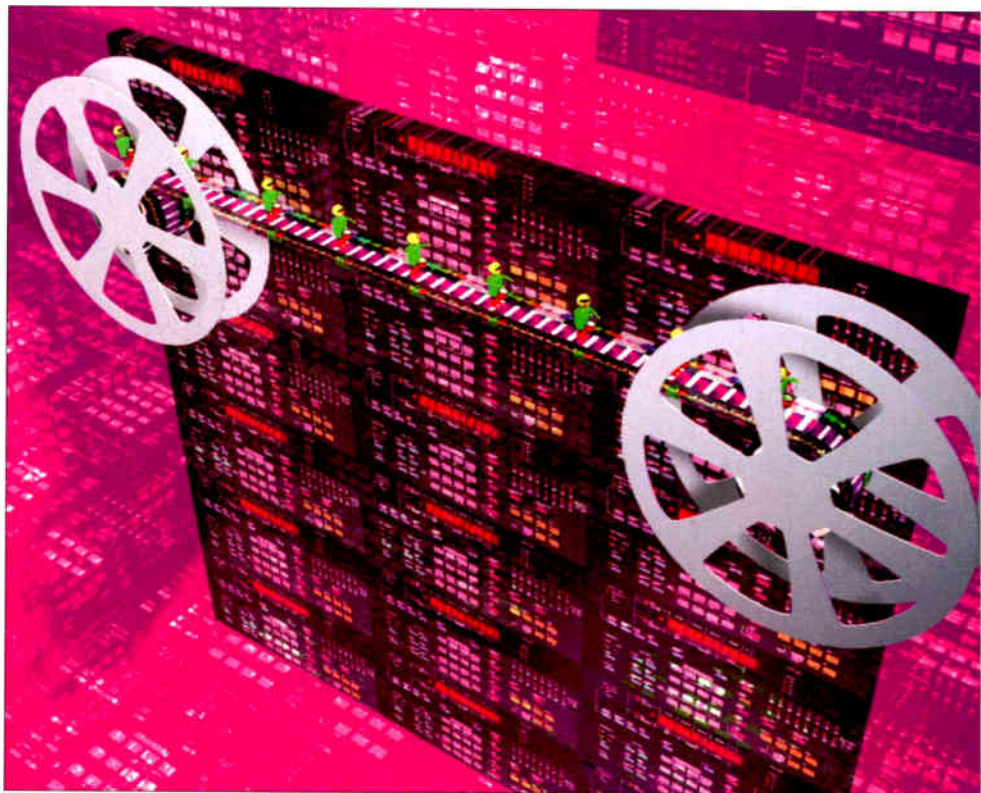
IME CODE! Do those two little words strike fear and/or loathing in your heart? Have you been unable to sync up the playback in a music video? What's the I.Q. difference between a smart slate and a dumb slate? Who is SMPTE, and why can't he just pick up a frame if he drops it?

The following is an introductory time code overview—without getting *too* technical—for those just starting off in sound for picture, or those who are a bit confused. A glossary is included for terms you may not be familiar with, and numbers are rounded off; for example, 59.94005234 Hz becomes 59.94 Hz.

WHAT THE HELL IS TIME CODE, ANYWAY?

SMPTE/EBU time code was developed originally to label each frame

TIME CODE ILLUSTRATIONS: These illustrative metaphors for the function of time code in audio-visual projects were created by Zach Rymland/CADP, Inc. President Clinton photo: Peter Turnley/Blackstar



of a videotape program for editing and broadcast control. Later, time code was adapted for film use, but unfortunately, many people who use time code don't understand it, and many people who think they understand it, don't.

In film production, time code is used to make the process of synching sound and picture easier—especially for transfers to video—and to synchronize music playback during filming. In post-production, time code can be used in picture editing and to synchronize the various elements of picture, sound effects and music.

Time code is simply information that can be displayed or represented in a number of different formats. Inside equipment, it is an electronic signal in the audio frequency range that represents a binary

**Many
people who
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don't understand it,
and many people
who think they
understand it,
don't.**

BY JIM TANENBAUM, C.A.S.

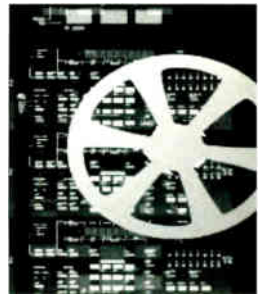
U S I N G

Time Code

and error detecting, application variables, time, and user-provided data. The first is entirely internal and does not concern the user. The second is almost the same, and if it should be of concern, it will appear on a read-out. The third type, time, is in the HOUR:MINUTE:SECOND:FRAME format, using the 24-hour mode (e.g., 3 p.m. = 15:00:00). The frame count starts at 00 for the first frame and ends with one less than the number of frames per second involved (e.g., 23 for 24 fps, 24 for 25 fps, or 29 for 30 fps). Finally, the user information, called "user bits," appears as eight digits and can contain a date in the DAY:MONTH:YEAR format and/or any other data that meets certain requirements.

There are five different SMPTE time code standards: 24 fps, 29.97

**IN THE
REEL
WORLD**



number. It can be encoded within a video picture signal or carried as a separate audio-like signal. For humans, the time code information can appear on a readout as conventional decimal numbers. On film, it can

be a bar code or another pattern (or actual numbers) exposed between the sprocket holes and the edge of the film, outside of the image area.

There are four kinds of information contained in a time code: sync

fps non-drop frame, 29.97 fps drop frame, 30 fps non-drop frame, and 30 fps drop frame. In contrast, there is only one EBU standard: 25 fps. Of the six standards, three are fairly straightforward: 24 fps time code is

GLOSSARY

EBU—European Broadcast Union. A standards organization similar to SMPTE.

Field—one-half of a video frame. Each video image is composed of hundreds of horizontal scan lines. All the odd-numbered lines are scanned first, and then all the even-numbered ones. The odd and even fields interlace to produce one video frame. The field rate is twice the frame rate. (e.g., 30 frames per second = 60 fields per second.)

fps—frames per second. The rate at which individual film or video images occur. Also used to identify different time codes.

Frame—one complete image on film or videotape.

FSK—Frequency Shift Keying. An older format for tape recording digital information by switching between two carrier frequencies. Not used for SMPTE/EBU time code recording.

Hz—Hertz. A measure of frequency. Formerly cycles per second.

LTC—Longitudinal Time Code. Time code recorded on a linear track and readable at higher tape speed than VITC. Not readable at a very low speed or when the tape is stopped.

Manchester bi-phase—a format used for tape recording digital information in which the timing of the transition between the —*CONTINUED ON PAGE 36*

used only occasionally at present, mostly for special film applications. 25 fps time code is used primarily in Europe, for film and video applications. 30 fps time code is used for most film applications. The other three time code standards require some introductory explanation.

A number of television/video systems are in use worldwide (NTSC, PAL, SECAM), but the salient factor is whether they operate at 25 fps or "30" fps. The 25 fps systems actually run at 25 frames per second and use 25 fps time code without (too many) complications. This is also true for film cameras operating at 25 fps. The world-

class problems occur with the other systems, the so-called 30 fps ones.

Originally, black-and-white TV receivers (in the U.S.) used the 60Hz electric power on which they operated as a reference to generate the 60 field/sec vertical sync pulse that was used with their 30 fps picture. With the advent of the NTSC color system, a more accurate crystal frequency reference was needed.

For technical reasons, 60 Hz could not be used, and a value of 59.94 Hz was chosen. The color video frame rate thus became 29.97 fps. This slightly lower rate was no problem for black-and-white re-

—FROM PAGE 35, GLOSSARY

positive and negative portions of the signal represents either a "1" or a "0."

NTSC—National Television Standards Committee. Color television system used in the U.S., Japan and some other countries.

PAL—Phase Alternating Line. Color television system used in most of the former Western Europe and some other countries.

Regenerator—a device that can correct data and timing errors in time code signals, as well as reshape them.

Reshaper—a device that can correct the distortions in the shape of a time code signal caused by the recording process, so that it can be recorded again or used for other purposes. Does not correct other errors.

Resolver—a device that can control the speed of a tape playback deck so that it will synchronize with some internal or external reference.

Restorer—same as Reshaper.

SECAM—color television system used in France, most of the former Eastern Europe and some other countries.

SMPTE—Society of Motion Picture and Television Engineers. An organization in the U.S. that develops and establishes technical standards in the fields of motion picture and television.

VITC—Vertical Interval Time Code. Time code encoded within a video signal and readable whenever the picture can be displayed. ■

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ceivers, and when old black-and-white programs are transmitted now, they are run at 29.97 fps, which does not cause any trouble unless the show's timing is critical.

Timing is often critical in applications involving time code, prompting the development of 29.97 fps time code. Its structure is identical to 30 fps time code, in that each one of its seconds is divided into 30 whole frames; there are no partial frames, in spite of the 29.97 designation. The difference is that the master clock generating the 29.97 fps time code is constructed to run 0.1% slower than real time, so that one of its "seconds" is actually 1.001 seconds long. The clock still counts out 30 full frames before increasing its seconds count, but because it is running 0.1% slow, only 29.97 frames occur in one second of real time, and it falls behind the true time. However, it then aligns exactly with the video frames—one frame of time code for each frame of video image.

DROP FRAME? PICK IT UP

29.97 fps drop-frame time code serves to reconcile the slow 29.97 fps clock with real time. The problem arose when video editors attempted to measure the length of a program by the elapsed time code. If the program started at a time code of 00:00:00:00 and ended at 01:00:00:00, it was not in fact 60 real minutes long, but rather 60 minutes and 3.6 seconds. To television broadcasters, 3.6 seconds every hour added up to a lot of lost commercial time slots, so it was necessary to fix this problem, while preserving the utility of time code for program timing.

Drop-frame time code provided the solution by "fudging the books." While the video frames continue to occur at the rate of 29.97 frames every *real* second, the time code circuit that created the frame numbers skips a couple of numbers every so often, so that the time indicated by the time code catches up with the time in the real world, instead of falling further and further behind. It is very important to note that drop-frame time code is dropping frame *numbers*, not actual *frames* of picture or sound!

In the example of the "60-minute" program above using 29.97 fps drop frame time code, the end code would now be 01:00:03:18, and the editor would instantly see that it would



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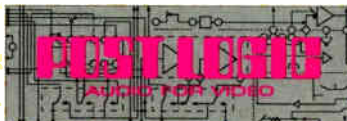
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World Radio History

have to be cut by three seconds and 18 frames if it is to be exactly one hour long. Incidentally, many of the television people, especially old-timers from the black-and-white days, call everything "30-frame," even color, but it really is 29.97 fps. Beware of someone telling you that a tape has 30 time code; try to find out if it is really 30 fps or 29.97, because it can make a *big* difference.

The method of implementing drop-frame time code consists of skipping the first two frame *numbers* of every minute, except for the tenth minutes (those whose right-hand digit is 0). In other words, except for minutes 00, 10, 20, 30, 40 and 50, the time code clock goes directly from HH:MM:59:29 to HH:MM:00:02. Time codes like 12:23:00:00 or 12:34:00:01 don't exist. However, the time code 12:39:59:29 would advance to 12:40:00:00 and to 12:40:00:01, because 40 is a tenth minute.

While 29.97 fps drop-frame time code keeps up with real time *on the average*, at any given point it can be almost a tenth of a second fast or slow, depending on when the last two frame numbers were dropped. This does not cause a loss of sync, however, as all the equipment that is operating in the system will be exactly the same amount fast or slow.

30 fps drop frame is similar to 29.97 fps drop frame, and it is used in applications where the tape will be transferred or played back to 0.1% slower than it was recorded, converting it to 29.97 fps drop frame.

The most common applications for these three time codes are the following: 29.97 fps is used in television/video and in original music recording. 29.97 fps drop frame is used in video intended for direct television broadcast (e.g., news), or where the video will go to a drop-frame edit bay. 30 fps drop frame is used in film that will be transferred to video where drop frame is required, such as the direct television broadcast or editing in a drop frame bay as mentioned for 29.97 fps drop-frame, above.

THE FILM TO VIDEO TRANSFER (TELECINE)

In Europe, film for television/video is often shot at 25 fps so that it can be transferred frame-to-frame to 25 fps video. Even film shot at 24 fps

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That's why TASCAM chose the newer 8mm tape format for digital multitrack recording. It's simply better than anything else. Why? The 8mm transport is the most compact and is designed to take the beatings of the start-stop-start-stop operations that characterize studio and post production environments. And we should know, because TEAC makes

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We could go on. But the point is that with over 20 years experience, TASCAM has quite an investment in multitrack recording. An investment that has paid off for

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can be transferred that way, speeding up 4%, but still acceptable in terms of action and audio pitch.

Where 29.97 fps television/video is involved, things are not so simple. A frame-for-frame transfer would speed up the film by 24%, which is not acceptable, so a process is used that "makes up" the extra frames and results in an effective film speed of 23.98 fps, which is only 0.1% slow—an unnoticeable amount while watching a program, but enough to cause a sync drift when compared to the 24 fps original. (It increases by 1.5 frames every minute.)

Film for 29.97 fps video is sometimes shot at 30 fps so that it can be transferred frame-for-frame, but it still undergoes a 0.1% slowdown when transferred, just like 24 fps film. The only exception to this slowdown occurs when film is shot in a camera that has been adjusted to run at exactly 29.97 fps.

SO WHAT?

If you're filming a music video (as opposed to videotaping it), lip-synching to playback from a scratch copy of a master tape, and planning to lay in a new mix from the original multitrack master, how can time code help (or hurt) you? It can help you by saving time (and money) if you have the right equipment to take advantage of it. It can hurt you by making things impossible to sync up if you or your crew don't know what you're doing.

In this example, there should be 29.97 fps time code on one track of the multitrack studio master tape, and this time code should also be transferred to the playback tape. During shooting, a time code tape playback deck, a time code audio recorder and a time code camera (or a conventional camera and a time code slate) will be used so that time code can be used to speed up synching picture and sound during the film-to-video transfer. Note that the time code used for the production recording may not be the same as the one that is on the playback tape, and which type of time code it will be is determined by the camera's speed. See table below:

CAMERA SPEED	TIME CODE
24 fps	30 fps
29.97 fps	29.97 fps
30 fps	30 fps

WHAT GOES UP MUST COME DOWN

Why use 30 fps time code when the playback tape has 29.97 fps? This occurs when the camera is running at either 24 or 30 fps, and the resulting film will undergo a 0.1% slowdown during the transfer to video. By using 30 fps time code during filming, the playback tape will be resolved 0.1% fast, and the performers will lip-sync to that rate. The reference sound recorded on the set will also have 30 fps time code. When this sound is transferred to video with the film, they will both slow down 0.1%, staying in sync and re-

turning to the rate of the original multitrack audio master. In Europe, things are much simpler: everything will use 25 fps time code.

The "time code" film camera mentioned earlier has its own time code generator, which can be synchronized with that in the audio recorder ("jammed") to expose the images of the digits and bar code of the running time code along the edge of the film. If a time code camera is not used, a regular camera and time code slate will substitute. In addition to the usual clapsticks, the time code slate has a large numeric readout that displays the production time code at

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the head (or tail) of the shot.

There are two kinds of time code slates: "Smart" slates have their own time code generator and, once jammed to the recorder, operate independently; "Dumb" slates lack a generator and must be continuously fed time code from the audio recorder or other source, either by a cable or a radio link.

The production time code is used by the telecine operator to sync the reference sound and picture during the film-to-video transfer. The editor may or may not have any further use for it. If the reference audio is

recorded on one track of a 2-track machine, it is possible to record the playback time code on the other audio track, and this will be of some use to the editor.

Speaking of tracks, time code can be recorded on videotape in one of three ways: combined with the picture signal (VITC), on a dedicated linear track (LTC), or on an audio track (LTC). VITC goes with the video signal and can be read at a very slow speed or freeze-frame. LTC can be read from about quarter-speed to very high speed.

On 1/4-inch analog audio tape,

time code is most commonly recorded in a dedicated center track, in a format that has become relatively standardized among the various manufacturers. However, some music studios cannot record time code in this format, putting it on one of the two audio tracks instead. If you have to use such a tape for playback, be advised that the standard Nagra IV-S time code machine cannot resolve this format without a special adapter cable between the Nagra and the resolver.

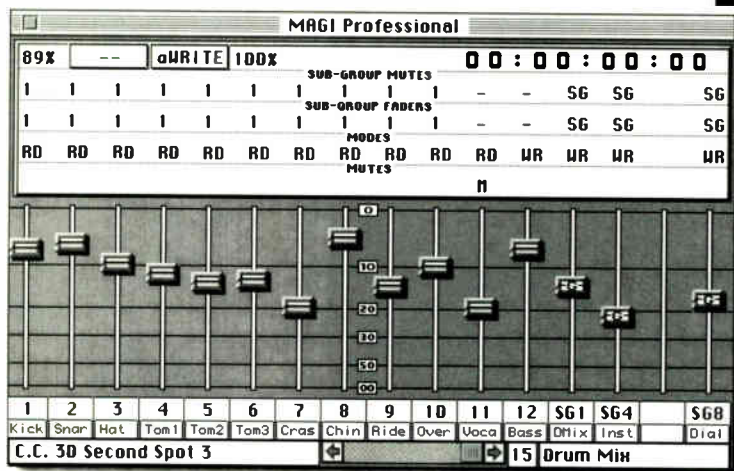
In DAT recording, time code is encoded in the DAT subcode. In the first machines, the format varied between some of the different brands, and they were not all able to recover time code recorded on a different machine. New units are standardized, and most old ones have been updated, so this is not usually a problem now. (If only one of the two audio channels is needed for program, time code could be recorded on the other, but then it cannot be used by the DAT machine to locate specific sections of the recording.)

When treated like an audio signal, time code is not polarity- or phase-sensitive, but tends to crosstalk readily because of the high-frequency components of its square waveform. To overcome this, use time code signal levels 15 to 20 dB lower than your normal audio levels. This will reduce the signal-to-noise ratio, but since time code is digital, it can be read reliably even at the very low S/N ratios. Unlike an audio signal, however, time code cannot be reproduced and then simply re-recorded, because its square waves are distorted by the recording process. It must be cleaned up by a restorer/reshaper, and if any data errors have occurred, a more powerful device called a regenerator must be used.

Television/video time code is a "mature technology"; film time code is still evolving. Some mistakes are therefore inevitable, but most are avoidable to a knowledgeable artist or technician. The fewer problems that occur when using time code, the more eagerly producers will use it. ■

Jim Tanenbaum, C.A.S., is a 25-year veteran of production sound mixing, specializing in non-mainstream directors. Between features, he teaches at UCLA and designs and builds custom recording equipment.

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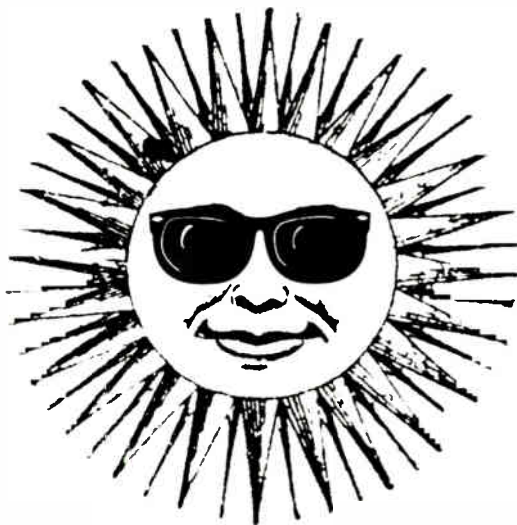
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DAT

TIME

Digital audio tape has quickly become accepted as the replacement digital format for analog 1/2-inch tape. Already standard for most aspects of film or video post-production, the addition of a standard time code system is now making DAT the successor to the time code Nagra in the field. Currently, Fostex and Stellavox manufacture time code location DAT recorders. In this article we'll answer some commonly asked questions about the use of time code DAT, especially as it pertains to field recording.

What is this new time code format?

The time code standard for DAT is referred to as the IEC (Internation-

Electrotechnical Commission) standard. Followed by all manufacturers, this new standard assures compatibility between equipment.

What differences are there between IEC DAT code and 1/2-inch center-track time code systems?

Basically none. If anything, IEC code gives you more flexibility because of its "gear box" ability to change frame rates in playback mode. Because DAT frames occur at 33.33 fps, and consequently have no relationship to the six standard time code frame rates, IEC time code DAT machines extract the time code information and put it on tape without

it being contained in the frame rate. While doing this, the machine notes on tape the frame rate at which this information came. When playing back, you can either set the playback machine's output to whatever frame rate you want, or if a playback machine is equipped with an Auto-Detect mode, it will automatically output the recorded time information at the same frame rate that the code came in. Obviously, the "Auto-Detect" feature is very popular, but some studio machines don't have this mode. This is a common quandary for operators of those

BY MIKE RINER

machines—they don't realize they have to set the output frame rate during playback.

Can the DAT format be pulled down to compensate for the film-to-tape transfer process? Yes! In fact, there are four ways to accomplish this. First, the time-honored method of "cross-resolving" time code frame rates can still be used, but not on any of the location DAT machines to date. Second, the sampling frequencies can be used to speed up or slow down material recorded on DAT. Third, a 29.97 video reference can be used to slow down a 30-frame-rate tape in telecine. Fourth, you can program a simple 0.1% varispeed slow-down.

How can sampling frequencies be used to pull a tape up or down? In addition to the standard 44.1 and 48kHz frequencies, many of the time code DAT machines are equipped with 44.056kHz or 47.952kHz settings (0.1% slower). These can be used as a record or playback rate to accomplish the necessary speed change in the field or in the studio. This is done by intentionally playing back DAT tapes at a different sampling frequency than what was originally recorded.

I understand that when you overload with digital recorders you get massive distortion. Are the Fostex PD-2 or Stelladat prone to this type of distortion?

**On location
or in post-production,
time code DAT recorders hold
the promise for improved audio
quality and increased efficiency.**

**But understanding the
technology is a vital
step in attaining
this goal.**

**Here are answers to some
common time code questions.**

Not at all. Both manufacturers have designed field recorders that just don't overload. It's amazing to hear the recordings these machines make. They are the best-sounding recorders we've heard or tested.

What is the standard level for reference tones on the PD-2 or Stelladat? A -18dB reference level has become standard for zero on DAT machines. Both the Fostex and the Stelladat give you the opportunity to change or optimize this level, ranging from -10 to -18 dB. You could probably set your reference higher because these machines don't seem to overload, but the de facto standard is -18 dB.

Does the PD-2 or Stelladat give you the

—CONTINUED ON PAGE 51

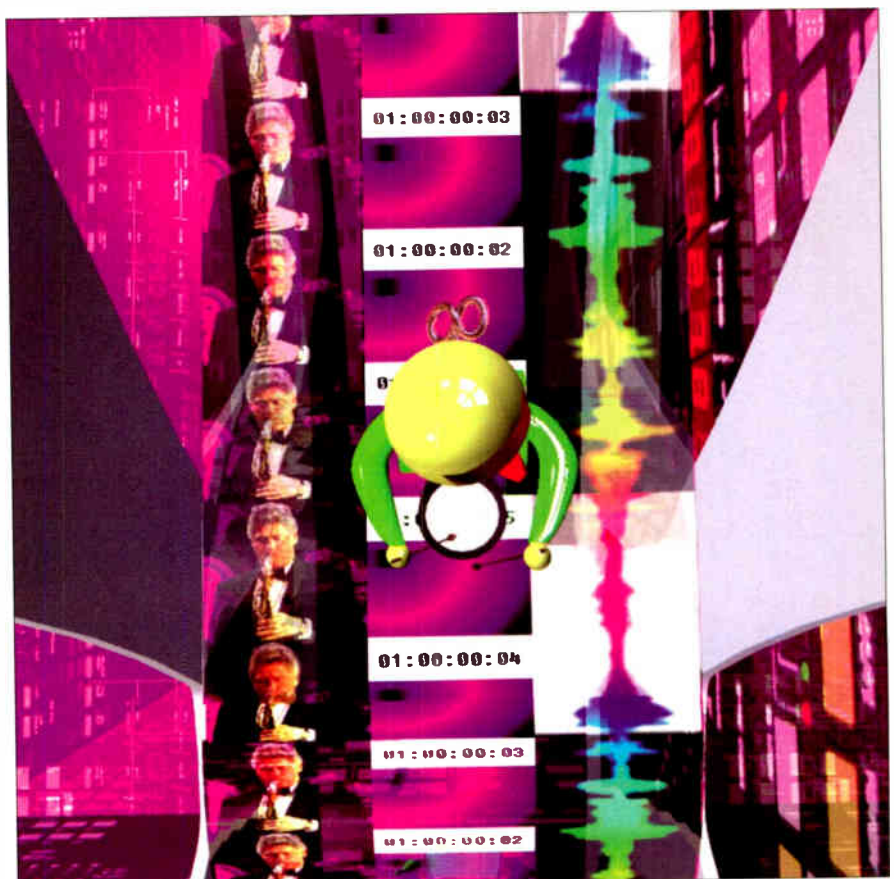


ILLUSTRATION: ZACH RYMLAND/CADP, INC.

Time Code DAT in Post-Production

by Lee Lusted

With the implementation of time code into the DAT format now a functional reality, we are seeing its use in both audio and video post-production facilities on the rise. Ken Hahn and Bill Marino, co-owners of Sync Sound in New York, answer some questions and relate some of their extensive experiences.

Could you give some examples of how time code DAT is being used at Sync Sound?

Hahn: We have both the Fostex and Sony 7030 and use them for everything from post time coding tapes that we've received from the outside—such as playback tapes for music video shoots—to recording voice-over work on DAT that we time code. We also get a fair amount of music in here that has been recorded both with and without time code. These contain composed music to be used in television shows—in other words, stereo DATs. If they are not time coded, we time code them, and if they have time code, we use them in the machine as we would any other machine in an online situation.

Could you define post-stripping?

Marino: Post-stripping is inserting subcode data onto the DAT. One of the problems that could occur, that I guess is worth mentioning is that you can erase other subcode data in the process of recording time code. What we generally do is make a dub. We don't post-stripe time code—I'd rather not insert into other people's tapes for a number of reasons. First, if there is anything wrong with the tape, I don't want the responsibility or to have anyone suspect that we might have hurt their tape in some way. Also, if you insert subcode by time code post-stripping, it is possible to in fact erase, for instance, Start IDs from the takes, because it's part of the same data. Likewise, if you have a time code tape, someone should not start putting Start IDs on a time code tape with a different type of DAT machine, especially a non-time code DAT machine, because they can put holes in the time code.

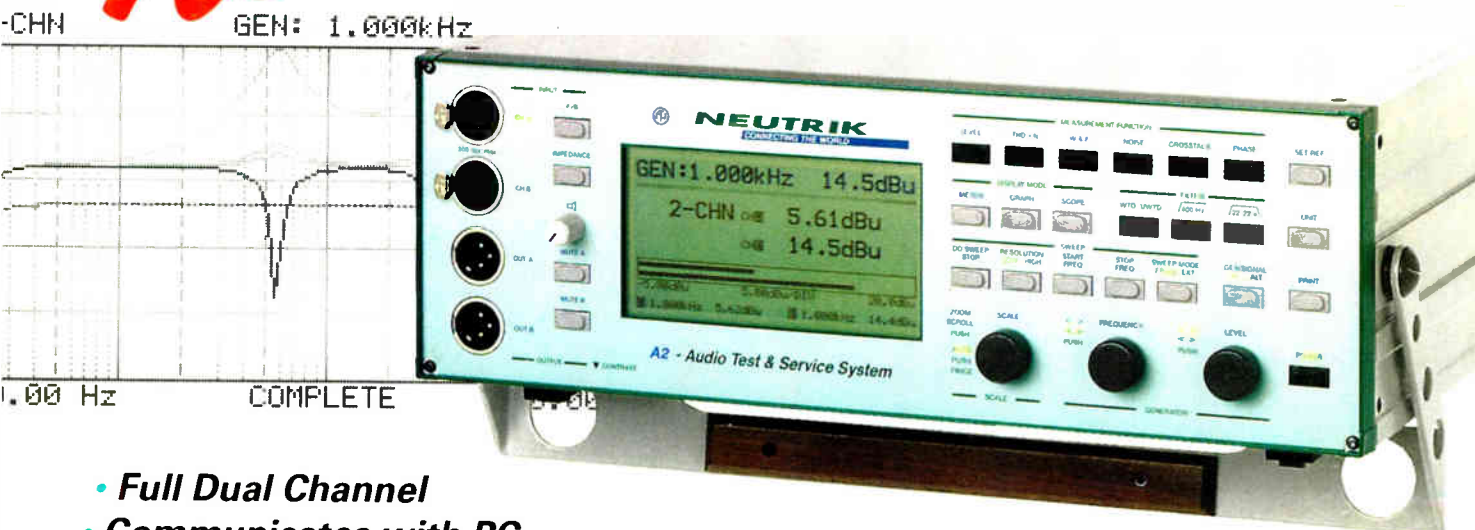
What do you mean by "synchronous" and "non-synchronous"?

Marino: Basically, what [syn- —CONTINUED ON PAGE 52

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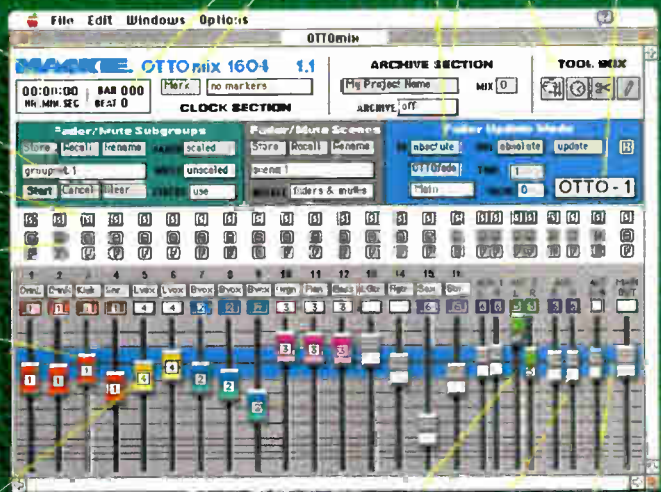
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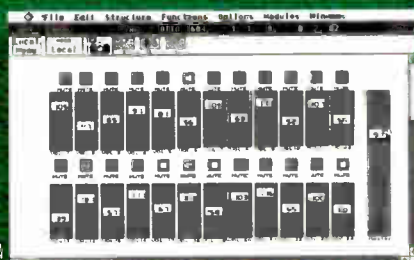
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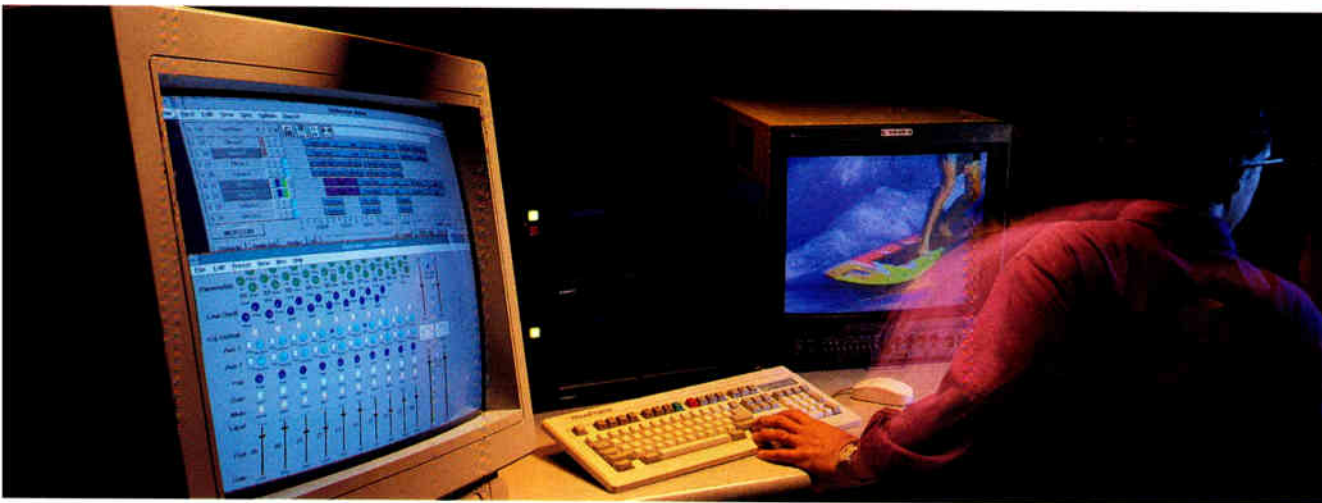


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—FROM PAGE 47, DAT TIME

ability to monitor tape while recording?

Yes. Both machines are equipped with four heads, which give them the ability to monitor tape. The Tape/Direct difference is approximately 200 ms, which is very close to a Nagra at 15 ips.

Can absolute time be used instead of IEC time code?

If your application is for film recording where a time code slate is used for visual synching the answer is "no." Absolute time can be converted to SMPTE time code on many of the post-production/studio time code DAT machines. However, without a reference to a slate on the film, you will lose the ability to auto-locate at the telecine stage. This usually means increased telecine time, which means increased costs.

Is any more pre-roll time required for DAT vs. 1/2-inch?

From my experience, there is no more pre-roll time necessary with DAT than with 1/2-inch. In fact, pre-roll can be eliminated completely if you

use a Fostex PD-2 in the Record-Run mode. The PD-2 will *absolutely* assure continuous time code on the tape even though it is started and stopped. However, if you choose to operate in this mode, you will have to feed your slate code from the recorder at all times via a cable or a wireless.

Can time code DAT recorders interface with time code camera systems?

Yes. The Stelladat recorder offers both standard XLR time code input and output, in addition to the industry standard 5-pin Lemo. The Fostex offers XLR input and output connectors but no 5-pin Lemo. When interfacing to the Aaton Origin C+ time code master clock, a 5-pin is necessary. On the Fostex, this can easily be done through the use of an XLR to 5-pin adapter cable.

Can I use a smart slate?

All currently used slates and generators can be used with either the Fostex or the Stelladat. They are simple time code accessories, and these are time code recorders.

Are telecine facilities set up for DAT?

Several telecine facilities in the Los Angeles area are set up to deal with DAT production tracks—Encore Video, Action Video and CFI, to name a few. The price of most post-production DAT machines is around \$8,000 to \$10,000, making them more affordable than the analog Nagra T-Audio, which when fully loaded runs about \$38,000.

What overall advantages does the DAT format have?

One of the most important reasons for using DAT over analog 1/2-inch is the quality of the audio. There is a minimum of a 20db improvement in signal-to-noise ratio between DAT and 1/2-inch.

Second, maximum recording time on the DAT is two hours. Two hours on one tape greatly minimizes the number of tapes necessary for a typical production. (Instead of a hand truck full of tapes, a small box of tapes is all that's necessary for DAT.)

Third, DAT has the ability to locate points for playback. The ability of the Fostex PD-2 to locate to A-time num-

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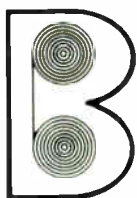
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chine to machine if that will occur, but in practice it is certainly good enough to do the kind of things we have to do. We generally use them for songs and pieces of material five minutes or less. We don't master shows to DAT without an external reference, and I don't recommend it, but when it's been done it hasn't caused problems.

What is the tolerance on how hot the time code signal is recorded? What do you consider the optimum?
Marino: The time code is recorded at a fixed level by the machine, regardless of what level you input, because

it's not being recorded as a separate time code signal. I recommend that you don't use any gain-adjusting devices that come right out of the time code generator or right out of the output of some time code device directly at full operating level, usually +4dBu, into the time code input of the machine. And it does vary from machine to machine—what the optimum level is—but it's not terribly critical at that point because it is being totally regenerated.

What other situations have you encountered?

Hahn: We've also done a few eso-

teric things with this format. We had a dance program that was delivered to Danish television, I believe. They had made a 25-frame D2. We laid our mix onto DAT at 25 frames and took a Sony 7030 to a nearby video facility and did a synchronized layback there. We've also used it for some Sony projects for high-definition television. We transfer our material to DAT, take a DAT machine over to an HDTV facility and do a layback there. It's nice to have a fairly portable machine.

Are you seeing much field recording on time code DAT?

Hahn: We haven't seen a lot of field recording yet. We have a project coming up where they are planning on doing the dailies that way. They are going to shoot with a mono Nagra, and as they sync their dailies they'll make a copy to time code DAT that will match the picture. But I don't believe we've gotten any films or television shows where the production sound is recorded strictly to DAT. Maybe next year we will see more of this, but people are still a little leery at the moment. We've had a few incidences of music programs where they record audio on videotape with a DAT backup, and that has been very useful. In this case the DAT is better quality than any video format except D2, but it's unlikely you will be shooting with D2 in the field. There's a lot of Beta-cam shooting with DAT backup.

I equate it to what we went through with 1/4-inch reel-to-reel, and then time code was added to it to make center-track time code 2-track. The same thing has happened with time code DAT. I think one of its greatest features is the ability to do post-coding. A project studio can do a score for a commercial, for example, and they can deliver to us a non-time code DAT. The speed stability is excellent, and by resolving it to the correct sampling rate, we can post-code the DAT then sync it up properly. There has always been a bit of a problem between the project studio and the professional post facility. With time code DAT, as opposed to wild 1/2-inch or wild 4-track, for example, this is like having the missing audio link. ■

Lee Lusted is a San Francisco Bay Area-based independent audio/video engineer.

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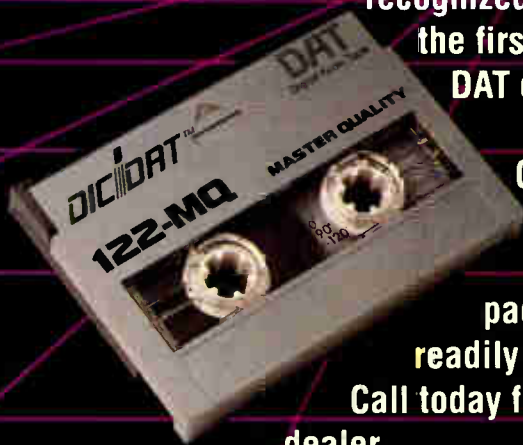
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same workload out of my home using a few computers. How long before your boss gets the same idea? How long before you are replaced by some state-of-the-art silicon? What can you do to prepare yourself for the inevitable? If your digital virtuosity leaves something to be desired, unless you can survive being one of the "technologically disenfranchised," I'd suggest hoppin' your booty into a class or two.

The American Film Institute's Computer Lab was founded by an act of Congress during L.B.J.'s rather ducal reign. As federal institutions go, it is a unique showcase of forward-thinking innovativeness. It affords an invaluable opportunity for people in the film, video and music industries to "retool" their approaches to production. The Kodak Center for Creative Imaging in Camden, Maine, serves a similar function on the East Coast.

Now, as simplistic as this may sound, it bears consideration: Try to get some sort of "application-specific" training before you run out and buy a truckload of technology that will be outdated by the time you figure out how to use it. No matter how easy a salesman makes something look on the trade show floor, it will always take you much longer to become proficient in the privacy of your own environment.

As we transition into the digital age, we must be prepared to slough off many of the remnants of the mechanical age. For communicators this means a radical restructuring of conventional production mechanisms as they evolve into more functional and user-friendly tools. Top of the list is SMPTE time code, which must adapt or die along with its supporters; close behind will no doubt be a re-design of color bars to address the rapidly changing parameters of the digital environment.

I'm continually amazed at the number of people who assemble state-of-the-art communication systems only to find that they have nothing of value to say. The priority becomes not whether you can make the machines "work" but rather can you make them "sing." ■

Scott Billups is an independent producer/director who is a pioneer and innovator in high-end applications for the Macintosh, merging computer, video, film and print technologies.



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crosstalk while still getting consistent start and lockup. Also note, he adds, that smaller decks will have a built-in noise reduction scheme, such as dbx, which is anathema to time code of any sort. Make sure the channel that time code will reside on can defeat the NR individually.

And finally, says Mann, jam syncing—regenerating time code via a black box—is something to be provided for. He uses the Opcode Studio 5, although several boxes are made specifically for this purpose.

Another musician who began with MIDI and made the transition to SMPTE is Pete Scaturro, who owns Ball and Chain in San Francisco, where he scores for NBC's *Eye-witness Video* and other television programs. Scaturro used a Roland 80 converter box before getting a Synclavier 3200, which reads and generates SMPTE. "That drastically improved my synchronization capabilities," he says.

Even with a Lynx synchronizer for his 24-track deck, Scaturro has experienced chase-and-lock problems, which he resolved for the most part by using his multitrack as the master deck. He's also found that program length has a lot to do with how well synchronization fares in the long run: the shorter the program, the fewer the problems. "If I use the video deck as the master, that's where I have the most problems in lockup," he explains. "I'll be off a frame or two more often than not. That's fine if the program is short, but if it runs long, that's where the problems come in."

The secret to time code, says Scaturro, is striking a balance between using it correctly and creatively. Time code works within some very tight parameters and isn't fond of having its envelope pushed. On the other hand, says Scaturro, "You can't always totally rely on the manual. It depends, to a large degree, on the decks and other equipment you're using. It's all somewhat idiosyncratic. And that's the way it's going to be for a while to come." ■

Dan Daley is the Mix East Coast editor. Watch for his upcoming PBS home-repair-and-time-code show, The Kitchen Sync.

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Fairlight does things differently from other manufacturers. That's because we design from the perspective of the user, not the most commonly available technology. For example, you won't find a 'personal computer' in MFX2 because professional digital audio has different needs from word processors and spreadsheets.

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Architecture

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POST PRODUCT SPOTLIGHT

AVID TECHNOLOGY AUDIOVISION

Avid Technology (Tewksbury, MA), manufacturer of Media Composer, has unveiled its first stand-alone digital audio unit. AudioVision is a fully digital, disk-based track layout/editing station for audio *and* video, integrating 24-track digital audio editing with sync-locked digital motion picture playback. This eliminates the time delays caused by the transport and shuttle time requirements of analog VTRs.

Available in 4- and 8-output versions, AudioVision features electronic workreels that have the same look and feel as Media Composer's electronic clip bins. Audio clips can be accessed instantly, organized easily and annotated by a variety of criteria, including sound effects, music, dialog, sequence or scene.

Audio elements can be "nudged" into the proper

place by moving the audio clip forward or backward relative to the video.

AudioVision also sets up instant visual loops for ADR, Foley and language translation work. The best dialog takes are looped into an audition stack, and the system can cycle through the "takestack" easily and quickly.

Direct timeline editing speeds up track layout and editing, and audio clip names appear on-screen, allowing the editor to view tracks in relation to each other. Level settings can be adjusted for each clip or audio component, and any eight tracks (four on the Model 4) can be played back simultaneously.

Material edited on Media Composer can be loaded directly into the station via optional removable storage devices.

For non-Media Composer input, AudioVision can auto-conform

sound and picture from an edit decision list and "batch digitize" the required audio material from the original audio and videotape sources.

Audio is 16-bit linear at

age allows MIDI events to be placed on the track sheet and played in sync with video; these events can then trigger sounds from a sampler installed in the system.

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DENON DN-1200F CD CHANGER

Designed for studio and production applications, the new DN-1200F CD



44.1/48 kHz, with AES/EBU and S/PDIF digital I/O ports standard. All 24 tracks can be output to tape, and AudioVision provides 9-pin serial control for external devices.

Circle #190 on Reader Service Card

DOREMI LABS DAWN II

The successor to the DAWN workstation from Doremi Labs (Covina, CA) includes Version 3.6 of the DAWN software. Production video can be recorded to the hard disk or MO cartridge, then played or manipulated directly from the control panel in sync with audio. Audio and video can play at the same time, with the video source—either a VTR or nonlinear video from a hard disk. A new sound effects/MIDI pack-

changer (previously designated DNM-200) uses a new storage and transport system to store 200 CDs in a relatively small space. Two 100-CD cartridges flank the transport, resulting in a maximum time lapse of only 15 seconds between tracks on any two CDs. Control is via computer (the serial port is configurable for RS-422 or RS-232C formats) or through an optional dedicated controller. Denon (Parsippany, NJ) is working with software developers including Gefen Systems, which offers software packages for various control, indexing and programming for large-capacity CD changers. Signal processing is accessible through an



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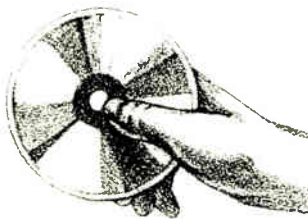
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ROLAND LOCKING RESOLVER

The Roland Pro Audio/Video Group (Los Angeles) has introduced the DM-80-L, a 1U rack-mount device that converts longitudinal SMPTE time code to video sync. The DM-80-L (\$995) allows users to lock the DM-80 hard disk recorder's sample clock directly to the frame edge of incoming SMPTE time code, which enables the DM-80 to lock to variable-speed or non-synchronous sources of SMPTE code for accurate synchronization. Four SMPTE outputs and four "video sync" outputs can lock up simultaneously to four DM-80 recorders.

Circle #193 on Reader Service Card

OTARI CONCEPT I CONSOLE

The Concept I Music & Production Audio Console from Otari (Foster City, CA) offers 64 inputs for under \$60,000. Features include symmetrical dual-path architecture with 24-track buses, ten auxiliary buses and the Diskmix dual-path VCA automation system. Both audio paths in each module have their own 4-band equalizers and 100mm long-throw faders, and individual paths offer full automation of faders and mutes. Thus, 64, 80 or 96 simultaneous automated channels are possible in the available 32-, 40- or 48-module configurations. All audio routing is digitally controlled, allowing instant recall of console setups and snapshot automation of module routing functions.

Circle #194 on Reader Service Card

COOPER SOUND D-1 MIXER MODULE

The D-1 Aux Module from Cooper Sound Systems (San Juan Capistrano, CA) is designed to interface Cooper's CS-106+1 mixer with the Nagra-D recorder. It provides two extra isolated outputs (+4 dBu, balanced), which can be used to mix to four tracks or serve as two extra auxiliary buses for film and video loca-

tion recording. Installed in the seventh channel slot, the module provides monitoring of outputs (with phones and meters), as well as internal oscillator and slate functions. Inputs are selected and panned to the I and II outputs and may be assigned to the I and II outs, or L and R, or both. Master gain controls are provided for both outputs.

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POST NOTES

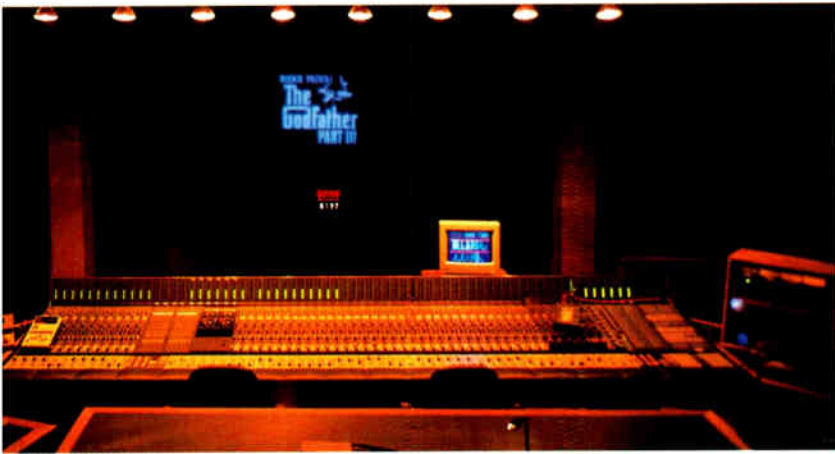
Hollywood East? Sonalysts Inc. opened two new film and video studios at the end of March in Waterford, Conn. The multimillion-dollar complex includes 7,000-square-foot and 5,000-square-foot soundstages, two audio suites, two multiformat online suites, an extensive animation suite, production offices, "star" dressing rooms, wardrobe rooms, set construction, and on and on. Sonalysts consulted with Universal Studios for construction guidance to make sure the studios would equal Hollywood standards. Jack Purcell of Purcell and Noppe, L.A., handled the acoustic engineering of the stages, bringing in a sound rating of NC 15. The audio suites, run by composer/engineers Curt Ramm and Jake Kahn, contain a Soundcraft 6000 production mixer, a Sony JH-24 multitrack, 8-channel Sound Tools, Beta SP, 3/4-inch and 1-inch VTRs, and an exten-

—CONTINUED ON PAGE 174

Noted West Coast film and television composer Gary Remal-Malkin at the Neve VR in Westlake Studios, L.A., putting the finishing touches on some television spots for an Infiniti car campaign. Remal-Malkin served as producer/composer.



PHOTO: JEFFREY MAYER



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DIGITAL AUDIO

Meets

DIGITAL VIDEO

.....

A Look at Three Fully Integrated Post-Production Facilities

by Mel Lambert

Most cutting-edge commercials, soaps, series and major network features are now being shot and posted on component and/or composite digital video. The additional quality gained through the use of digital VTRs, allied to the increased number of serial generations and layers that can be achieved through D1, D2, D3 and other formats, has revolutionized the broadcast and video/film production industries.

And with the final links in the all-digital video/film production chain now available—including fully compatible digital switchers, digital video editors and video disc recorders coupled with integrated audio workstations—the full potential of the all-digital post-production facility can be realized.

former RCA Studios complex. Modern Sound includes a dedicated mix-to-picture room with a 72-input, highly



To find out more about the design criteria and equipment alternatives available to the all-digital audio/video facility, I spoke with the engineering directors/owners of three leading California post houses: Modern Videofilm, based in Burbank; Pacific Ocean Post in Santa Monica; and Hollywood Digital, which recently opened a new 30,000-square-foot complex on Sunset Boulevard right in the center of the media, broadcast and advertising district.

MODERN VIDEOFILM

Starting with a single location in Hollywood in the early 1980s, Modern Videofilm quickly earned an enviable reputation for innovation and investment in the latest audio and video technologies. In the mid-'80s the company set up a dedicated post-production and sound-editing facility, Modern Sound, in the former RCA Studios complex. Modern Sound includes a dedicated mix-to-picture room with a 72-input, highly customized Solid State Logic SL-6000 console, plus a Foley/ADR stage. On an upper floor various music-editing, prelay, sound effects and dialog-editing rooms house a mixture of analog and digital technologies, including several NED Synclavier workstations.

In September 1992, the video editing and post division moved from its Hollywood location to a new facility within Gateway Plaza, directly opposite the Warner Bros. film complex in Burbank. According to Modern Videofilm VP of engineering Al

On the Scenaria workstation, at Hollywood Digital's audio room one, is Andre Perreault.



Hart, the firm had outgrown its old facility, and "this new 40,000-square-foot area was built to our own specifications. We had the opportunity to get in on the ground floor; the shell had been built, but we specified all AC and power systems."

The three-story complex houses six composite digital edit bays, one component edit bay, six Rank digital telecine areas, plus companion graphics and paint rooms. A central machine room houses both digital and analog video decks (mainly Sony D1 and D2 VTRs) plus several Panasonic D3s. The total cost of the project was close to \$9 million. All systems design and acoustics were handled in-house, with George Augspurger serving as acoustic consultant for the new dub stage and telecine rooms.

The complex currently provides editing and post services for more than 15 cable, independent and network productions ranging from *The Untouchables* (mixed at Modern Sound) and *The Edge* through *Renegade* and *Raven* to *Beakman's World* and *America's Funniest People*. Modern Sound also handles audio post and/or sweetening for *I'll Fly Away*, *Star Trek: The Next Generation*, *Deep Space Nine* and *Bay Watch*.

To accommodate the various interconnecting requirements of a digital audio/video facility, Modern Videofilm

specified a sophisticated routing system that's controlled via a series of terminals located within

each technical area. Audio,

video, time code and machine control sources and destinations can be assigned via a series of touch-sensitive screens. The controlling software was developed in-house.

A Vistek 128x128 router-switching matrix handles composite serial digital video, while an NVision NV-4000 352x256 switcher/DA accommodates 48kHz AES/EBU-format digitized audio. Component 4:2:2 digital video is also routed through a Vistek 96x96 switcher, which, like the composite video section, auto-senses the presence of 525-line NTSC-format or 625-line PAL-format signals and switches during the appropriate interval. Assignable machine control is available via RS-422 serial interfaces linked to remote panels in each edit bay.

"At the old facility," Hart recalls, "our worst failures were in the [audio and video] patch bays. A decision was made to reduce the high labor and capital costs of conventional patch bays by installing a computer-based routing system. We also specified sync generators that output both NTSC and PAL references, linked to an NVision Digital Audio Reference that locks the whole complex to a Rubidium standard.

"The system is so stable that we can route 48kHz audio directly from an NTSC-based D2 machine to a PAL-referenced D2," he says. "For that to be click- and glitch-free, you need a very stable synchronization scheme."

Little analog audio is routed around the new facility. Instead, several NVision A-to-D and D-to-A converters are used for patching analog VTRs and ATRs into the digital switching matrix. "We felt that, because machines were changing so rapidly to all-digital formats," Hart offers, "we'd

be better off making a commitment today to an all-digital switcher, and

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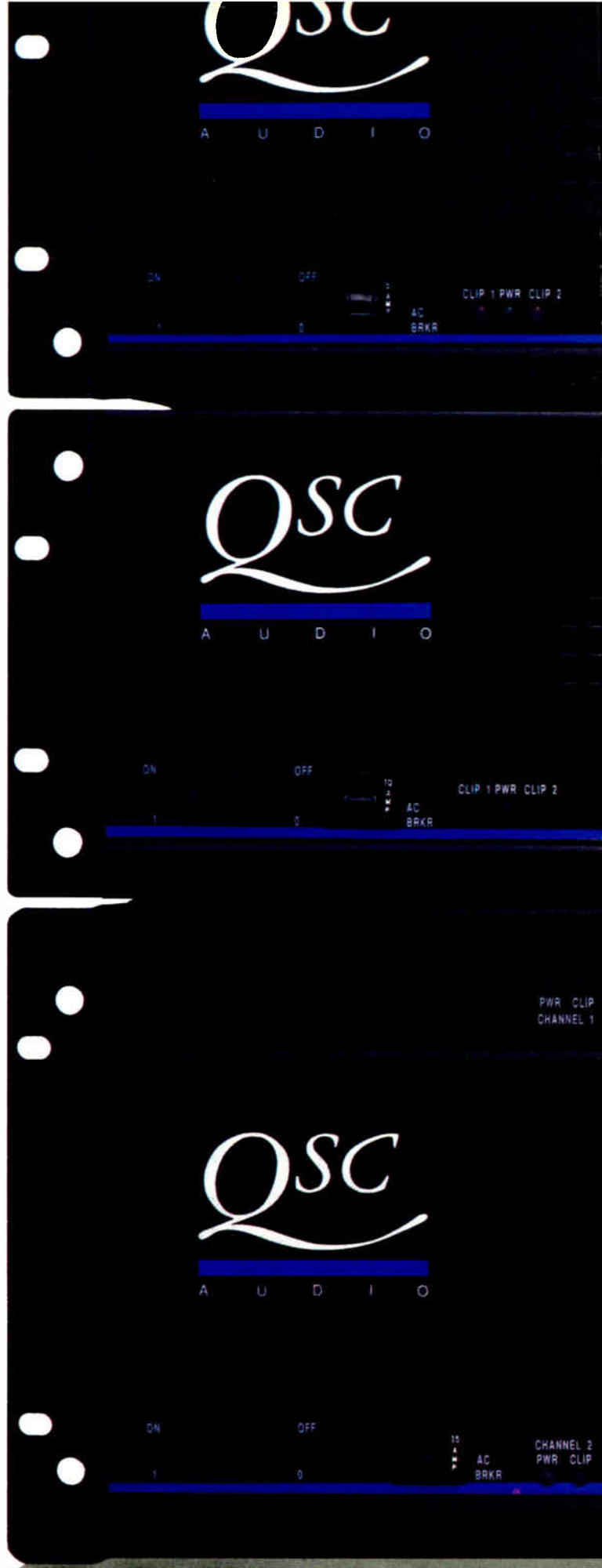
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just remove the codes as new digital machines become available.”

Studio A, a dedicated mix-to-picture room, houses a 48-input Solid State Logic SL-6000 console with G Series automation from the old complex. The board has been modified to provide four stereo output buses, A,B,C and D, which are normally assigned to music, effects, dialog and laugh-track submixes. Up to three Sony ATR-124 analog multitracks, 4-tracks and other time code-based transports can be synchronized to picture. Mixdown is done to an analog 24-track or, more commonly, a Sony PCM-3324/3324S DASH-format 24-track that holds premix stems as well as the final stereo/surround format mixes. Layback of final mixes to the edited master videotape is handled in another room within the facility.

Regarding future developments, Hart figures that the post industry faces some difficult decisions. “For \$20 thousand,” he concedes, “you can get 98 percent of the way to where you are going; the next two percent might cost you \$80 thousand. You have to decide, ‘Do I really want to spend that much money?’ More sound is cut on [Digidesign] Sound Tools and Pro Tools systems than anything else; anybody can use it. The Sonic Solutions unit looks very good. Currently we don’t cut any sound at the new facility using workstations, although we are looking at one or two systems.

“We are obviously moving more and more toward digital audio,” he concludes. “One great advantage of digital multitrack is that the signal plays back exactly as it was recorded; you have no azimuth or line-up problems; you can get rid of analog Band-Aids. In terms of convenience, [mastering to a digital multitrack] was probably one of the best decisions we made here.”

HOLLYWOOD DIGITAL

According to Hollywood Digital CEO Bill Burnsed, “We couldn’t have built this facility a year ago. Our overall *raison d’être* was to improve the quality of both audio and video by implementing one of the first truly all-digital throughputs for video post-production. But we have only recently seen the introduction of the last pieces of hardware that allowed us to construct an all-digital facility—a fully functional digital video routing switcher; second-generation D2

machines; and fully integrated, disk-based editing/mixing workstations.

“For us, audio is equally important as video,” Burnsed continues. “Although HDTV is the next important step for broadcast television, unless we can come up with an acceptable compression scheme [the data] won’t fit into our current transmission systems. But, using one of the current digital audio data-reduction systems (Dolby AC-2, for example), high-quality audio can be delivered to home audiences. Also, surround sound is becoming more common on productions. We feel that audio will be a focus of improvement in television for the next five to ten years. Responding to those needs, we have created a facility that we feel elevates post-production to a new plateau.”

Ground breaking for the new complex on Sunset Boulevard began in August 1992; within six months the facility was open for business. “Hollywood is still the center of the entertainment industry,” Burnsed offers. “We believe that a West Side [location] is a mistake, as is Burbank; they have both reached saturation in the business they can attract.”

Space for ten online edit bays, two telecine rooms, two mix-to-picture suites, two sound-editing rooms and a central master control/machine room is provided on the ground floor. General offices are located on a second floor. All primary systems design was handled by B&B Systems, Valencia, Calif., with acoustic consultation from audio division directors Andre Perreault and Ken Fause. Nathan Simmons served as project engineer for B&B Systems, working with Dave Jennings. The total budget for the 33,000-square-foot project was \$11 million.

“Our philosophy,” Burnsed explains, “was to work very closely with the top two or three manufacturers in the world and make a showcase for them—and, in turn, get their support at what we consider to be an unprecedented level of cooperation. The Grass Valley Group was our main supplier, with BTS/Sony providing the majority of digital audio and video tape machines. We chose an all-digital distribution system, using a GVG serial digital video router for composite and component plus a GVG digital audio router—serial number 000! Total audio routing will be 284-in by

384-out, four channels of AES/EBU throughout the plant.” An NVision master digital clock system provides subsample-accurate audio/video synchronization at all NTSC and PAL frame rates. NVision [NV4448] sample rate converters are available for up/down sampling.

Four composite digital edit bays currently house Grass Valley Sabre editors and Model 3000 switchers linked to Accom digital disc recorders; a single-component digital edit bay features similar hardware but with a Grass Valley Model 4000 switcher. Two digital telecine bays offer Rank Ursa units with Renaissance Da Vinci color correction and a GVG Model 1000 component switcher. All main rooms, including the telecine bays, also feature Zaxcom DMVI000 digital edit suite mixers, which allow all audio level transitions to be controlled from the room’s video switcher.

“The component digital edit room,” Burnsed says, “will specialize in the highest-level commercials, music videos and special productions. The majority of editing will be done through the D2/D3 composite digital bays. We expect 50 percent of our business will be for broadcast episodic TV and drama series. Thirty percent will be commercials, music video and promos, and the remainder will be informational and high-end corporate productions.”

Within the audio-for-video area, two identical mix-to-picture rooms feature Solid State Logic Scenaria post-production mixing systems equipped with 38 inputs, dynamic automation and 24-track, random-access hard disk recording capabilities. Each Scenaria can handle 24 individual analog and 24 individual digital AES/EBU-format I/Os. Sound editing takes place in two editorial/prelay rooms equipped with SSL ScreenSounds. Dolby surround-sound encode/decode matrix units are provided in each room, along with dedicated surround speakers. To maintain sonic consistency, all monitor speakers are by KRK Systems.

A comprehensive SoundNet system links the various control surfaces in the four SSL-equipped rooms to the corresponding hard drives and DSP racks in a dedicated section of the central machine room. The total record/replay time available for all of the four networked systems is 45 track-hours. Backup is

done to 8mm Exabyte drives running at five times real time, as well as to removable magneto-optical drives holding 60 track-minutes of digitized audio.

Also housed in the machine room are three BTS Model 300 and two Model 500 D1-format digital VTRs (containing Sony-built transport and electronics), nine BTS/Sony DVR-20 and four DR-28 D2-format VTRs, six Panasonic ½-inch D3 composite VTRs, four Sony D-75 and 12 D-265 Beta-D VTRs (analog recording coupled with serial-digital video I/O), and five Sony BVU-3000 analog C-Format VTRs with serial-digital video I/O.

"Our decision to go with the Scenaria was easy," Burnsed says. "In addition to digital record/replay quality, we can improve the speed and efficiency of mix sessions by a factor of ten. The combination of Scenaria's random-access replay/editing, digital mixing and extremely fast access to video stored on hard disk [SSL's VisionTrak] will dramatically improve our work throughput."

Close attention was also paid to audio isolation and sound diffusion throughout the facility. "All floors in

each of the audio *and* video rooms have been floated," Burnsed notes, "even the telecine bays. We used sound diffusors on the side walls, ceiling and rear walls, plus bass traps on the side walls. The overall result is well-controlled acoustics, with a very low noise floor of around NC 15, which allows our mixers to fully appreciate the enhanced image detail and lack of noise build-up with digital recording/replay."

PACIFIC OCEAN POST

Established in 1985 by video editor/director Alan Kozlowski, producer Sandra Hay (Kozlowski's wife), and Jerry Kramer, Pacific Ocean Post prides itself on actively responding to the day-to-day technical and creative requirements of the video post-production industry. POP currently houses 17 editing and post rooms that include a PAL/NTSC online component D1 bay (Sony Model 9100 editor with Model 8000 switcher), two online composite D2/D3 bays (Grass Valley Model 151 editor with Model 200 switcher), an inter-format bay (Grass Valley Model 141

editor, Model 100 switcher), three NTSC/PAL nonlinear bays (Avid Model 2300 Media Composer with Apple Quadra 950s), two digital telecine areas (Rank Ursa with Renaissance Da Vinci digital color corrector), two compositing environments (two Quantel Flash Harrys and Quantel Hal), and an integrated editing and compositing suite (Quantel Henry).

Late last year, Bruce Botnick, whose work as a music producer, scoring engineer and "digital guru" should need no introduction to *Mix* readers, moved his Digital Magnetics production facility into Pacific Ocean Post. Botnick is now a partner in the POP audio-video complex and heads a remarkable new state-of-the-art digital audio facility located in an adjacent 17,000-square-foot building. The new rooms were designed by Bret Thoeny of BOTO Design, Venice, Calif., who also designed the new Radford Scoring Stage for Todd-AO and Prince's Paisley Park complex. Engineering design was handled in-house, under the watchful eye of Tim McCollm, POP's audio technical director, and Ron Lagerlof,

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former VP of technical operations at Lucasfilm's Skywalker Sound.

"The new building offers five dedicated audio rooms," Botnick explains, "each equipped for multi-channel L-C-R monitoring, plus split surrounds. Two of the rooms—Mix Room A and Mix Room B—feature Neve Capricorn digital consoles." The larger 30x23-foot Mix A is laid out for re-recording to film and/or video. Mix A's Capricorn console features 64 analog inputs, a 48-channel MADI digital I/O for Sony PCM-3348 and 3324 multitracks, plus various analog and AES/EBU-format insertion points. Two Assignable Facilities Units (AFU) will allow system functions to be controlled from two independent operator positions.

Mix Room B's Capricorn is intended primarily for mix/sweetening to video and music mixing. It can accommodate half as many analog sources as Mix Room A's board, although, if the situation arises, DSP racks from one system can be removed and replugged into the other. The pair of Capricorns will feature eight monitor buses, plus L-C-R-S panning and Dolby DS-4 surround-

sound switching. Both Mix A and Mix B feature Lucasfilm THX monitoring systems.

Mix Room C is designed for mix-to-picture, commercials, comedy shows and so on. It houses an AMS Logic 1 console—the first in the U.S. to offer four layers of assignable functions rather than two. In this way, the system's 12 channel strips can be assigned to a total of 48 signal paths, routing to two groups, a main stereo and four mono/stereo auxiliary outputs. All inputs pan between left and right outputs; L-C-R panning is planned for the near future.

Integral to the Logic 1 is an AMS Audiofile Spectra random-access editor, equipped with two magneto-optical drives and a conventional hard drive. Eight channels of digitized audio can be replayed from the MO drives, plus 16 from hard disk. The system accommodates 48 digital inputs, routing to 28 digital outputs; digital inputs can be selected from 12 2-channel AES/EBU-format sources, 24 analog sources or 24 internal outputs from the AudioFile. Like the Capricorn's, all of the Logic 1's channel settings are dynamically

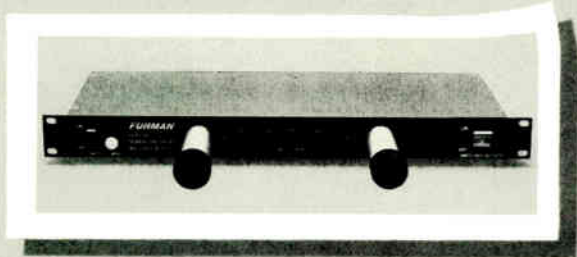
automated. In addition, because the console and random-access editing systems are interlinked, in the very near future all of the dynamic automation data will be able to be coupled to sound cues (in an event list, for example). If the cue is later moved in the AudioFile from one time code-based location to another, all of the mix level and processing information moves with it.

POP's fourth room, PreLay D, contains a New England Digital Synclavier/PostPro hard disk editing and prelay system; the final room houses the hardware Botnick brought with him from Digital Magnetics that will handle remixing for foreign-language versions, CD mastering and other video-related sweetening projects.

"We purposely designed each of the two Capricorn rooms to handle different functions," Botnick explains. "They are also of different sizes, to suit the requirements of medium- and large-scale mix-to-picture sessions. I like the idea of having two Capricorns, because clients will now have the option of preducing in the mid-sized room and then moving the project into the bigger



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mix-to-picture suite. Of course, all we have to do in the central machine room is cross-switch the media and automation disk, and off we go! The use of MO and removable drives for disk-based editors means that we can move projects on and off these systems very quickly."

The central machine room houses the main processing racks for the Neve and AMS digital consoles, two Sony PCM-3324s, a Sony PCM-3348 and several PCM-7030 time code DATs. Sendor mag transports and analog machines are also available, including 4-track, 1/2-inch with time code and 1/2-inch with time code. In addition to the facility's PCM-3324 and 3348 digital multitracks, the AudioFile and PostPro are directly accessible from each of the five rooms. All digital routing is handled by a large-format AES/EBU-compatible NVision system operating at 48 kHz; a master synchronization system accurately locks NTSC/PAL house sync to the digital audio word-clock reference for both AES-format signals and SDF-2 digital I/Os.

A vocal booth is located between Mix Rooms A and B, and between Mix Room C and Prelay D. An ADR and Foley area is also planned.

Addressing the reasons for embarking upon such an ambitious project, Botnick asserts that Pacific Ocean Post is responding directly to the broadcast and video industries' growing need for fully integrated digital audio-for-video. "But," he is quick to point out, "anybody can buy equipment; we place equal emphasis on the caliber of engineering and technical staff that will be servicing our clients' needs."



"What will be unique about the facility," adds Marc Robertson, general manager of POP's sound department, "is that we'll be able to accommodate a broad client base—from feature films through commercials, trailers and television shows. The design of the rooms, the equipment and the caliber of our talent allow us to provide the best post-production sound quality for our clients' specific needs in one facility. True to the nature of POP's growth and commitment to a diverse post-production client base, the audio department will model this successful approach."

Mel Lambert is a Mix senior editor.

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NAMM

SPECIAL REPORT

TECHNOLOGY SHINES AT WINTER NAMM

Even the record 18 days of heavy rain slamming the drought-parched California landscape couldn't dampen the spirits of the 30,000 attendees who packed themselves into the Anaheim Convention Center on January 15-18 for the Winter Market of the National Association of Music Merchants. Inside, more than 800,000 square feet of exhibit space was devoted to the newest and coolest in music and sound gear. Although the skies were gray outside, the shining technology on the exhibit floor brought smiles all around. We sent our intrepid editors onto the NAMM show floor in search of interesting developments. We'll be presenting more news in our regular product columns in the months to come, but here's a taste of what they found...



JBL's 4000A Series updates its enormously successful 4400 line with three new studio monitors.



Mackie's 8-bus console offers in-line monitoring and optional meter bridge.

BY GEORGE PETERSEN

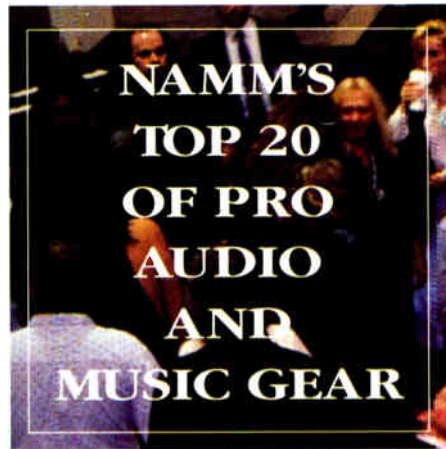
Digital was everywhere, as at least a dozen companies (Anatek, ART, Akai, Digidesign, Digital Audio Labs, Digital F/X, Roland, SADiE, Singular Solutions, Spectral Synthesis, Tascam, Turtle Beach and Yamaha) showed disk-based recording/editing systems, most of which were aimed at the burgeoning home studio market. [See Paul Potyén's section of this article for more details—Eds.]

On the DAT front, both Sony and Panasonic debuted under-\$1,000 decks for the home market. The Sony DTC-A7 rack-mount DAT records at either 44.1 or 48kHz sampling rates, using 1-bit A/D and advanced HDLC D/A converters; a wireless remote control is included. Panasonic's SV-3200 features 44.1/48kHz recording, forward/reverse shuttle wheel, wireless remote and IEC 958 (consumer-type) digital I/O; A/D converters are 1-bit, with 64-times oversampling; D/A con-

verters use a high-resolution, single-chip, 4-DAC LSI.

The modular digital multitrack market is heating up fast, as the continuing barrages in the ADAT vs. Tascam format wars were tossed around the convention floor like incoming mortar rounds. The Tascam booth featured a working DA-88, so attendees could listen to and check out this 8mm-based deck firsthand; initial deliveries are expected to begin this month. And with a one-year head start, Alesis focused on the announcement of strategic third-party alliances.

JL Cooper, MIDIman and TimeLine all announced ADAT-friendly synchronization products. Steinberg/Jones will offer a computer interface for direct MIDI machine control of ADATs via software-based sequencers, and Digidesign will provide both the ADAT 8-channel optical



Dynatek's RAID system offers disk storage ranging from 600 MB to 16 GB.

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Digidesign's Session 8 system puts eight channels of recording and editing in the PC platform.

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Roland's JD 990

and sync/control protocols for integration into its Pro Tools and new DOS-based Session 8 products. Since the machine was slated for debut at last month's Musik-Messe in Frankfurt anyway, I snuck a quick back-room peak at the ADAT-compatible recorder from Fostex (Norwalk, Calif.) and was impressed by the fact that the deck has provisions for onboard SMPTE, with word and video sync ports. There are more than a few reasons users might elect to use a Fostex deck as a master transport with a couple of Alesis ADATs as slave recorders, but we'll know for sure when the Fostex machines come out later this year.

Consoles, particularly in price-conscious configurations, seemed to be everywhere. At under nine pounds and priced from under \$500, the Spirit Folio from Soundcraft (Northridge, Calif.) is available in two versions: a 10x2 with six mono and two stereo inputs, and a 12x2 with eight mono and two stereo inputs. Each mono channel has a phantom-powered mic input, 3-band EQ with swept mids, two aux sends and a 2-track return that can be used as a separate stereo input.

Soundtech (Vernon Hills, Ill.) debuted a new line of dual-purpose sound reinforcement/recording mixers, created by former Trident design engineer John Oram, with 11 consoles in 4-, 8- and 24-bus versions (16 to 40 input channels). According to Soundtech, Oram's design emphasis stresses musical EQ and sonic integrity. The boards are priced from just under \$2,000 to \$12,999.

Peavey's (Meridian, Miss.) Production Series 2482 is a compact in-line console with a discrete transistor low-noise mic preamp in each channel. The 4-band EQ has two sweepable mid-bands, and the LF/HF shelving section can be split to form a unique monitor/alternate input path. Other features are 48V

phantom power, eight aux sends, eight stereo aux returns (with EQ and assignment capability) and two mute groups.

Mackie Designs (Woodinville, Wash.) will finally begin shipping its 8-bus consoles, available in 16- (\$3,195), 24- (\$3,995) and 32-channel (\$4,795) versions. The series features in-line monitoring (thus doubling the number of inputs on mixdown) with switchable -10/+4 balanced

tape returns, 4-band EQ with true parametric high/mid-band, sweepable low/ mid-band and shelving low/high-bands, mic inputs on all channels, and six stereo assignable effects returns. A full-width meter bridge is optional. Mackie also previewed its LM-3204 line mixer with 16 stereo input channels and four stereo returns for a total of 40 inputs in a four-rackspace chassis.

JBL Professional (Northridge, Calif.) debuted all-new versions of the highly successful 4400 Series of studio monitors, which now carry an "A" suffix. The two-way, 8-inch

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The portable single channel **DB-1A Active Direct Box** is based on the same design philosophy as its big brother. Its three-way independent power scheme* facilitates a unique design that simply blows every other DI away! In addition to features like line level output and no insertion loss, the DB-1A has rechargeable battery capability and automatic system power check.

*Simon Systems PS-1 Power Supply is recommended.

And for the ultimate in headphone distribution systems there is the **CB-4 Headphone Cue Box**. The CB-4 features four headphone outputs independently controlled by conductive plastic stereo power controls. The XLR input/output connectors allow numerous boxes and headphones to be connected to the same amplifier with headroom, clarity, and flexibility that cannot be achieved with active headphone cue amplifiers. A three-position switch selects left mono, right mono, or stereo mix, allowing for additional cue mixes. It's no wonder why the CB-4 has become a standard in the industry.



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Akai S3000

4408A system is designed for small studios or broadcast control rooms. For mid-field listening, the 10-inch 4410A is a three-way system in a vertical line array, with a response of 45-20k Hz. Enhanced low-frequency output is available with the 12-inch, three-way 4412A, (frequency response 45-20k Hz); the top end uses titanium dome drivers, with tweeters oriented to create mirror-imaged pairs.

Yamaha's (Buena Park, Calif.) SPX990 multi-effects processor features 20-bit A/D and D/A conversion, with 50 preset effects, 100 user memories and optional RAM

cards. Delay time programming is tempo-based, with time entry via a footswitch or MIDI clock data. Pitch change is improved over the SPX900 with a new dynamic wave form analysis and intelligent pitch algorithms.

On the keyboard side of things, E-mu

(Scotts Valley, Calif.) drew crowds with its Vintage Keys, a \$995 MIDI module loaded with the hip keyboard sounds of the '60s, '70s and '80s. Imagine hundreds of B-3, ARP, Moog, Rhodes, Wurlitzer, Oberheim and even Farfisa sounds with 32-voice polyphony, 32 "analog-sounding" filters and a disk drive for loading new variations—you get the idea.

Akai of Fort Worth, Texas, launched five new samplers, priced from \$2,995 to \$6,395, all with 32-voice architecture, 16-bit resolution, 64 times oversampled A/D converters and 20-bit DACs. The top-of-

the-line S3200 features eight separate analog outputs (plus main stereo outs), digital I/O, onboard stereo effects processing, SMPTE read/write (with integrated cue list programming) and direct-to-disk record functions. Also in the line is the CD3000, the first sample playback module to include a built-in CD-ROM drive; the unit retails at \$3,995 and includes *five* CD-ROMs (about 3,000 MB!) with sounds from developers such as East-West Communications, Invision and The Hollywood Edge.

Top honors in the synth department go to the Roland JD-990 (\$2,095), which packs the power of the company's flagship JD-800 synth into a two-rackspace module. This 24-voice beast has 6 MB of ROM waveform data (including drums) as standard and can read ROM card patches from the JD-800 or JV-80, thus expanding ROM waveform memory to a hefty 16 MB. Also standard are four pairs of stereo outputs. Awesome!

But by far, the coolest product at the NAMM show was the reissue of the AC30 guitar amp from Vox

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(Westbury, N.Y.), an exact reproduction of the 1963 model. Yeah, yeah, yeah!

SOUND REINFORCEMENT HAPPENINGS

by David (Rudy) Trubitt

NAMM's organizers recognized the growing importance of sound and light manufacturers by providing a dedicated hall at last January's show. This made for almost one-stop shopping for SR-specific attendees, although not all SR manufacturers displayed in the sound and light hall. For specific products, check out our "Sound Reinforcement New Products" section over the next couple months.

Computer control of sound systems proved to be one of the most significant sound reinforcement developments at NAMM this year (for an introduction to the subject, see the multipart "Computer Control Concepts," which began in last month's issue). An industrywide method for controlling sound equipment from different manufacturers would have a far-reaching effect on the SR industry. However, the path has not been easy.

In addition to the technical hurdles of creating such a standard, the competitive agendas of the participants has added an extra dimension to an already difficult task. The only non-proprietary systems available have been MIDI and PA-422, both of which have significant limitations. Proprietary networks such as the well-established Crown IQ System (see this month's "SoundCheck"), Intelix's MindNet, Crest's NexSys, Lone Wolf's MediaLink, etc., have had varying degrees of success, but none can yet lay claim to universal acceptance.

However, Lone Wolf's approach could be reaching critical mass with the formation of a MediaLink users' group, an independent association created to facilitate the exchange of information and ideas pertaining to the MediaLink local area network protocol. Initial membership includes more than a dozen companies. Participating manufacturers include Altec Lansing, Fender, JI, Cooper, Mackie Designs, Opcode, Peavey, Symetrix and Yamaha Corp. of America. Participants in

the group are not required to be currently working on MediaLink-compatible gear. However, four additional participating manufacturers—Carver, QSC, Rane and TOA—have already licensed the technology. I found it very significant to see two direct competitors (QSC and Carver) making a commitment to the same networking system. Although multimanufacturer support exists for other proprietary systems it seems unlikely that, for example, a power amp manufacturer will license a direct competitor's proprietary network control system.

Despite the growing support, MediaLink still has a long way to go. The first generation of MediaLink-compatible products will contain a small MediaLink circuit board. This version, referred to as "Level 1 support," has enough speed to provide control and monitoring. However, the release of Lone Wolf's MediaLink chip is said to offer sufficient speed to carry multichannel digital audio also.

Lone Wolf has announced that the long-awaited chip will incorporate VLSI technology, and sample quantities will be available in early

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summer. Assuming that date is met, manufacturers could be readying product by year's end. With this in mind, anyone spec'ing a computer-controlled system today should investigate systems that are currently shipping. However, the long-term interests of the entire industry are best served by a common networking system that offers ample room for growth. MediaLink clearly shows promise in this regard.

Speaking of computer control, several sound reinforcement console manufacturers are close (but not quite ready at press time) to making formal announcements on automated live sound boards. One unexpected source for such a product is Fender Electronics, which showed a range of small to mid-sized boards that will include VCA automation controllable via MIDI and, interestingly, SCSI. For those unfamiliar with the term, the Small Computer Systems Interface is a high-speed computer interface that easily solves MIDI's lack-of-speed problems, although SCSI has its own limitations.

THE AGE OF MULTITRACK DIGITAL AUDIO—ON DISK

by Paul Potyén

It was "Workstations R Us" at the January NAMM show, with random-access digital audio solutions being demoed at dozens of manufacturer booths.

Particularly large crowds packed the Digidesign (Menlo Park, Calif.) booth, where the big news was multitrack recording systems for IBM/Windows 3.1. Session 8, described as a complete digital studio in a box, includes a 10x2 software-programmable analog mixer and was expected to be ready for shipping by the end of February with a \$3,995 price tag. A second product, Session 8 XL, is targeted to project studios that require pro-level audio interfaces. To accomplish this, Session 8 XL uses two Pro Tools Audio Interfaces—instead of the Session 8 Audio Interface—along with the audio cards and software used in Session 8. The XL system is priced at \$5,995.

Also in the works is a Digide-

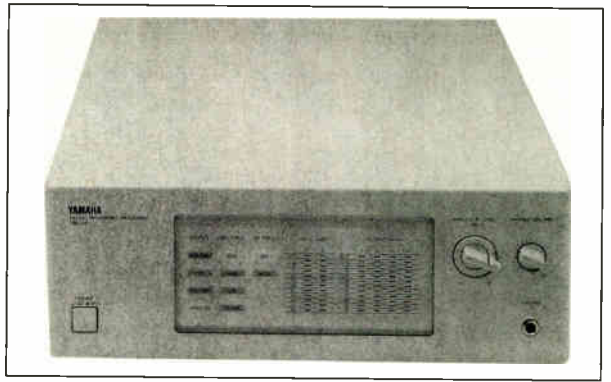
sign-to-ADAT interface for Session 8 and Pro Tools. The interface would allow direct, real-time, synchronized transfer of multichannel audio between the two companies' products.

Yamaha (Buena Park, Calif.) rolled out its newest entry, the CBX-D5 Hard Disk Recording System. The 12x15x4-inch box allows 2-channel simultaneous recording and 4-track playback of CD-quality audio, and it contains an internal SPX1000 digital effects processor. Yamaha's unique approach allows the unit to operate via SCSI and MIDI, with either a Macintosh, Atari or Windows 3.1 computer. With an Atari or Windows computer, you would use a Steinberg Cubase Audio sequencer to control the CBX-D5. In the case of the Macintosh, you would control the Yamaha device from Mark of the Unicorn's Digital Performer. The CBX-D5 was expected to ship later this spring at a price of \$2,995.

Three other companies—Anatek, Akai Digital and ART—were showing multitrack digital packages. Anatek (North Vancouver, B.C.), which introduced RADAR at the AES show last fall, had implemented many more features in its prototype 24-track disk-based recorder. The 4U, rack-mount, stand-alone unit can be configured with a minimum of eight tracks, with a slide-in card and hard drive for each additional eight tracks, up to the 24-track maximum. It incorporates pro-level features, such as AES/EBU I/O, LTC, NTSC and PAL video, and RS-422 connections. With this box, Anatek appears to be moving deeper into the pro audio marketplace.

Akai Digital's (Fort Worth, Texas) new DR4d is a 4-track hard disk recorder designed to work with any external SCSI hard drive. Its expandable architecture allows additional units to be added for as many as 16 tracks of digital audio. At a suggested retail price of \$1,995, the DR4d promises to be a popular device for first-time digital audio buyers.

ART's (Rochester, N.Y.) DR 8000 is an 8-track random-access recording/editing system, with a mini-



Yamaha CBX-D5 hard disk recorder

imum of 20 minutes of full-bandwidth recording time per channel—more than two hours and 40 minutes of track time. The unit looks and operates much like a digital 8-track, with familiar-looking "transport" controls, meters and track select buttons. An expansion unit (for upgrading the system to 16 or 24 tracks) was unveiled, and by adding a VGA monitor, AT-keyboard and mouse, the user gains access to the DR 8000's visual functions, which include onscreen waveform editing and SMPTE-based punch-in/out.

Over in the Atari (Sunnyvale, Calif.) room, the new Falcon030 computer was being put through its paces by a number of third parties. Designed for audio and video production, the new Atari machine has been selling well in Europe and was expected to be available in the U.S. soon. Priced at \$799 (!), the Falcon is capable of recording and playing back stereo 16-bit audio without additional hardware, and record/playback/editing software from D2D systems is bundled with each machine. Pro users who wish to use AES/EBU digital I/O and/or balanced/unbalanced line/mic inputs with the Falcon should check out the A/D 64x Audio Interface from Singular Solutions (Pasadena, Calif.). The unit sells for \$1,295.

Steinberg (Northridge, Calif.) has been shipping its Cubase Audio MIDI sequencer/hard disk recording software for the Macintosh for several months now, and the company used NAMM to announce Cubase Audio for Windows and Atari. Each version will be used in connection with the Yamaha CBX-D5 box (see above). Also expected to be shipping by February was TimeBandit, a time-, pitch- and har-

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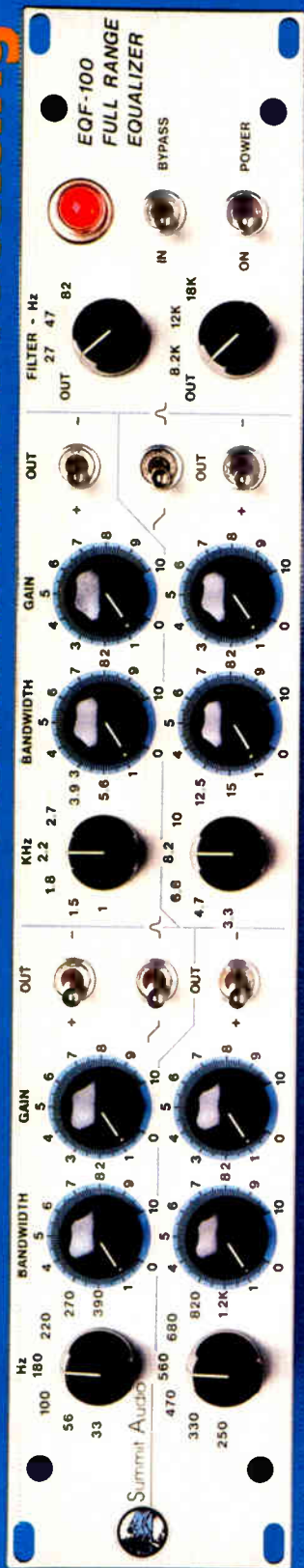
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monization-editing software package for the Macintosh that reads and writes in Sound Designer or AIFF formats.

Opcode Systems (Menlo Park, Calif.) was showing the next version of StudioVision for the Mac. The new software lets you incorporate four tracks of digital audio with MIDI sequences when used with Digidesign's Sound Tools I, II and AudioMedia cards. Another demonstrated feature of the program, expected to be available in the spring, was software control of an external tape deck via MIDI Machine Control.

Digital F/X (Mountain View, Calif.) was on hand with its array of digital audio and video products, including the 8-track WaveFrame 401 Windows-based DAW, and the 4-channel, 16-track Digital Master EX. The latter consists of three 19-inch rack modules designed for use with Atari computers. The two systems, the first products from Digital F/X's new audio division, are the result of that company's recent acquisitions of WaveFrame and Hybrid Arts.

Spectral Synthesis (Woodinville, Wash.) announced a 24-track version of its PC-based hard disk system and Version 2.0 of its StudioTracks recording, editing and mixing software. But the big news from Spectral was AudioPrism. AudioPrism plays, records and mixes 12 simultaneous digital audio segments on 64 virtual audio tracks with onboard DSP (two 32-bit chips running at 40 MHz), for real-time digital EQ and software-controlled signal routing/patching, including sends and returns to onboard digital processing. Its Prismatic software offers either destructive or non-destructive editing functions, along with MTC, SMPTE, VITC or black-burst sync. Priced under \$4,000, this Windows-based system requires only one computer slot and has full interchange capability with AudioEngine files. AudioPrism was slated for an official debut at last month's MusikMesse in Frankfurt; third-party developer's kits are being distributed now.

A.R.A.S. (Ann Arbor, Mich.), U.S. rep for British manufacturer Studio Audio and Video Ltd., was on hand to demonstrate the newest enhancements of its SADiE disk-based

editing system. And Micro Technology Unlimited (Raleigh, N.C.) was demonstrating its Windows 3.1-based Studio Workstation, which offers internal mixing and playback of up to 38 segments of audio via stereo digital or analog stereo I/O.

Historically, one limiting factor of random-access audio systems has been the cost and reliability of audio data storage media. One company that specializes in storage media for the audio and music industry is Dynatek (Toronto, Ontario), manufacturer of the Redundant Array of the Inexpensive Disks systems, which were demonstrated at the company's NAMM booth. The RAID concept allows several smaller "off-the-shelf" drives to be configured in an array as a single, high-capacity, logical unit. Data is striped across multiple drives in an array along with error-correction code. In the event of drive mechanism failure, the data can be re-created from the error-correction code on the other drives. RAID systems are currently available with capacities ranging from 600 MB to 16 GB for all common computer platforms.

Like an oil slick from the Exxon Valdez, multimedia is making its way into all kinds of places, and the NAMM show was no exception. Passport Designs showed its Producer software package, which lets users integrate all the common digital media forms into a single presentation. It's a well-designed, easy-to-use, powerful package that is becoming popular among Macintosh multimedia authors.

Sound Impression from DigiVox (Palo Alto, Calif.) lets you record audio in a Windows 3.1 environment via any third-party audio card. You can also edit and mix audio and MIDI files with CD-Audio via a CD-ROM drive.

Here is a very attractive alternative for those PC people who have been thinking about buying an audio card: Roland's TAP-10/AT Audio Producer System is a PC-compatible sound card with 16-bit stereo direct-to-disk recording and a Sound Canvas General MIDI synth. Some well-designed, complete digital audio/MIDI software editing is included, with built-in effects: \$599 list. An optional MIDI Connection Box lists at \$150. ■



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World Radio History

by Paul Potyen

DIGITAL VIDEO PRODUCTION

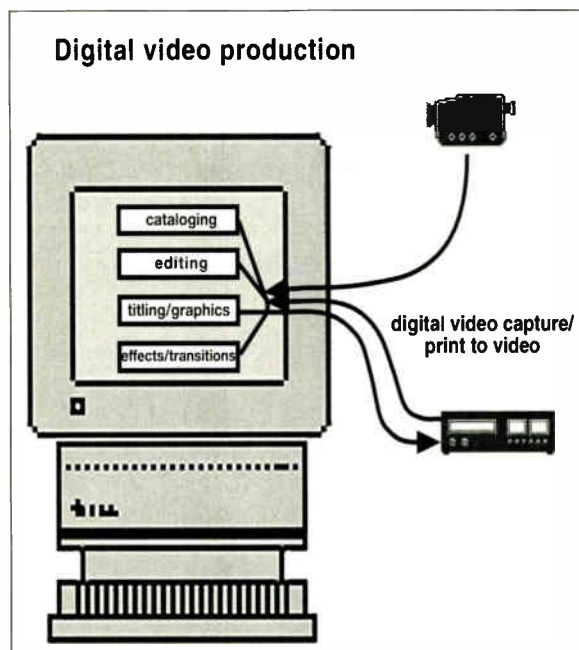
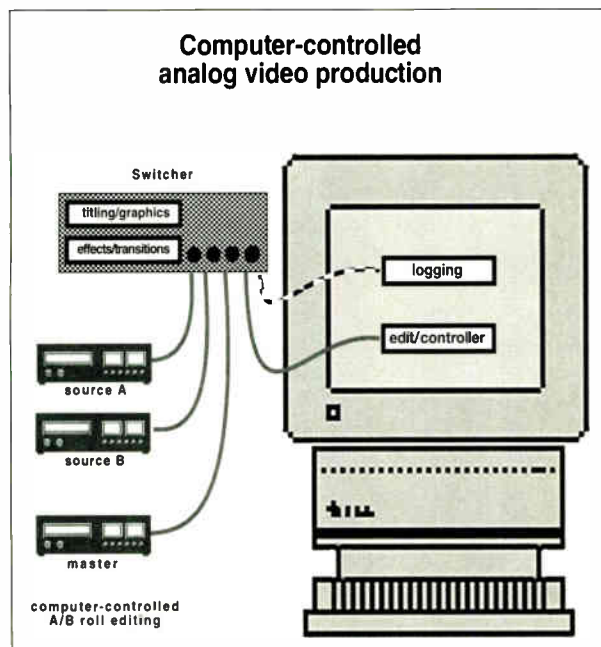
PART 1, AN OVERVIEW

Just as random-access digital audio is revolutionizing the pro audio recording industry, we are on the verge of another revolution: desktop video production. Already it has changed the way many professionals work with video, and—as with audio—it's providing people outside the video industry with an affordable way to break into video production.

In this, the first part of a series,

advent of QuickTime for the Macintosh (see "The Byte Beat," October '92) and now QuickTime for Windows, all but the most well-informed might easily feel overwhelmed by the flood of new video-related products.

At the center of this new video technology is the personal computer. Such tasks as cataloging source material, controlling external video decks, recording (digitizing) video



I'd like to provide an overview of digital video production. If you've been around for the changes in audio, some of this will be familiar territory. But fashionable terms like desktop video and digital video are being bandied about by various and sundry marketing types who don't always agree on what these terms mean, leaving much room for confusion on the part of the uninitiated. With the

into the computer, editing picture and sound (either analog or digital), creating graphics and titles, and creating transitions and effects are all possible under computer control. Let's take these tasks one at a time.

LOGGING VIDEO MATERIAL

Software that allows a video editor to identify video clips by title and time code address have been around

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BYTE BEAT

awhile. Typically, the editor simply uses the computer to identify usable segments by logging start and end times via time code numbers on a window dub of the source tape. This task is really the first step in the editing process, and even if your goal is merely to have an organized, legible printout of an edit decision list to take to your online session, it beats scribbling down time code numbers and rearranging your cues on a piece of paper. While some programs allow you to type in information based on what you're looking at on a video monitor, more sophisticated ones allow you to view the video in a window on your computer screen, and perhaps even automatically grab SMPTE start and end points by clicking a mouse or striking a key as you watch and listen to your material.

Many programs allow users to save EDLs in one or more formats (such as CMX, Grass Valley, etc.) that can be used directly by proprietary high-end video editing equipment at the online suite, and there are software programs that deal with tape-based video (that is, video on an external tape deck) as well as digital video (data stored on a computer's hard drive).

VIDEO DIGITIZING TECHNOLOGIES

One analogy between the audio and video worlds has to do with the concept of what "digital" means. There are tape-based digital audio (Alesis ADAT), tape-based digital video (DI and D2 formats), random-access digital audio, (Digidesign Pro Tools, Roland DM-80) and random-access digital video (Avid Media Composer, Digital F/X Composium with DDR option). It is in this last category that we are seeing significant developments, made possible in part by improved methods for compressing digital video information.

When digitizing video, it is possible to record the differences between successive frames rather than the whole image, thereby using less hard disk space. The other benefit of video compression is a higher throughput, which allows the user to digitize larger window sizes at higher frame rates. A number of video digitizing hardware products are available for the Mac and PC platforms from companies like SuperMac, Ras-

terOps and Radius. In addition, more sophisticated turnkey video editing systems make use of their own hardware to digitize video and audio.

EDITING PROGRAMS

Before launching into the subject of video editing, it's probably a good idea to touch on the differences between offline and online editing. Traditional broadcast-quality video editing systems are very expensive to purchase, staff and maintain. Hence, these systems, generally referred to as online suites, command premium rates. It's a good idea for video producers to do their homework before going online, and that's the purpose of the offline system.

With any tape-based system, editing a program of video down to a desired length is a complex process. It is by necessity linear, so if you edit together a 30-minute program and later decide to change something five minutes into that program you have to redo everything from that point on. Those decisions are best made in the offline part of the editing process, where you are working with less-expensive video decks and few, if any, special effects. When you have finished editing your material in an offline environment, it's time to take advantage of the special effects, titling and high quality of the online suite to produce a finished version of your program.

It has long been a video industry dream to develop a random-access method of editing, where you can fix that edit five minutes into the program without having to redo all your subsequent edits. And today there *are* editing environments for random-access digital video, as well as for traditional offline video. But with the emergence of random-access video, the distinction between online and offline is becoming blurred. Several different approaches have emerged: one is to digitize video at low resolution and do your edits using a random-access approach, then save the edit decision list and "auto-assemble" using external tape decks under computer control. This is the approach used by Digital F/X's Video F/X system. Another tactic is to digitize at high resolution, perform "online" edits of the digital material, and print the result to an external master tape, as is typical with an Avid system.

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So PC-based editing systems can be classified as follows: those that do linear editing of analog video and audio by controlling external tape decks (A/B roll, online or offline); those that do random-access editing of digital video and audio and subsequently auto-assemble the analog equivalent of the digital material in a linear way by controlling external tape decks; and those that do random-access of digital video and audio and subsequently output the program directly to a master tape.

GRAPHICS & TITLING

NewTek's Video Toaster for the Amiga was one of the first desktop-based solutions for digitally creating titles and graphics (and much more) and incorporating them into broadcast-quality videos. Today there is the Toaster for the Macintosh, as well as hardware and software solutions from Digital F/X, Avid, Fast, Matrox and others. Some are designed for overlaying onto analog tape in A/B roll systems, while others operate entirely on digitized video material.

SPECIAL EFFECTS & TRANSITIONS

It is not uncommon for products with graphics and titling capabilities to offer sophisticated transitions and effects as well. Until recently, such options were the sole domain of very high-end (and very expensive) video post houses. Today these post houses offer more bells and whistles than their PC-based counterparts, but the technological and economic differences diminish with each coming month.

SORTING IT ALL OUT

The range of things the creative video producer can do today with a computer and a few tools is indeed bewildering. And no less bewildering is the flood of new products, with the accompanying marketing technogabble that seems to ride its crest. For every product that can be clearly identified as falling into only one of the above-named categories, there seem to be several others that satisfy several, if not all five categories. Next month I'll identify, compare and contrast some of the most innovative products in this rapidly emerging technology. ■

Associate editor Paul Potyen knows a few magic tricks that will amaze and disgust the most critical audience.

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PRODUCTION MUSIC LIBRARIES

BY GEORGE PETERSEN

A SOUND INVESTMENT

Every year, the typical recording studio spends thousands of dollars on the latest in electronic gimmickry with one purpose in mind: luring customers into the facility. There's nothing wrong with a well-thought-out schedule for upgrading and replacing older equipment; this should be part of every studio's general business plan. But a fundamental part of any purchasing decision should include the answer to the following question: Will this acquisition result in new business? If so, then you're on the right track. If not, then you may just be falling into the very expensive (and quite common) studio pitfall of keeping up with the Joneses.

The investment in a production music library is not often as high on a studio owner's wish list as that spiffy new all-digital console, but in many cases, a collection of production music can provide a return on investment that far exceeds its initial cost. Additionally, a quality production music library can open up new business, including jingle and spot production (for radio and TV), video/film scoring (particularly in the industrial and educational markets), long-run cassette forms such as books on tape and instructional programs, and computer-based multimedia.

Even in the best-equipped MIDI scoring/composition room, production music can be a useful adjunct, allowing the producer to focus the budget and cre-

ative energies on creating the main themes and scores for a given project, while relying on production music beds for backgrounds and underscores. If a jazz composer is creating a film score, for example, and one of the incidental bits requires a five-second drive-by scene of a car blaring out '50s-type rock music, then it makes little sense for that composer to create and produce such a short bit. Of course, you could negotiate a synchronization license for some existing '50s tune, but the time and expense may not be justified for five seconds of audio. Production music could be the cost-effective solution.

Today, production music is available in just about any style, including rock, pop, jazz, country, blues, new age, industrial, electronic, classical, comedy, historical, rap, religious and so on. The variety of forms is equally impressive, from full-length symphonic pieces to 15/30/60-second jingle beds and quick bumpers and tags for the broadcast market.

Virtually all production music today is available on CD, with the exception of some older collections of vintage material on LPs and a few small libraries still on tape. However, the introduction of the CD to the pro-

A PRODUCTION MUSIC

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YOUR STUDIO'S BUSINESS THAN

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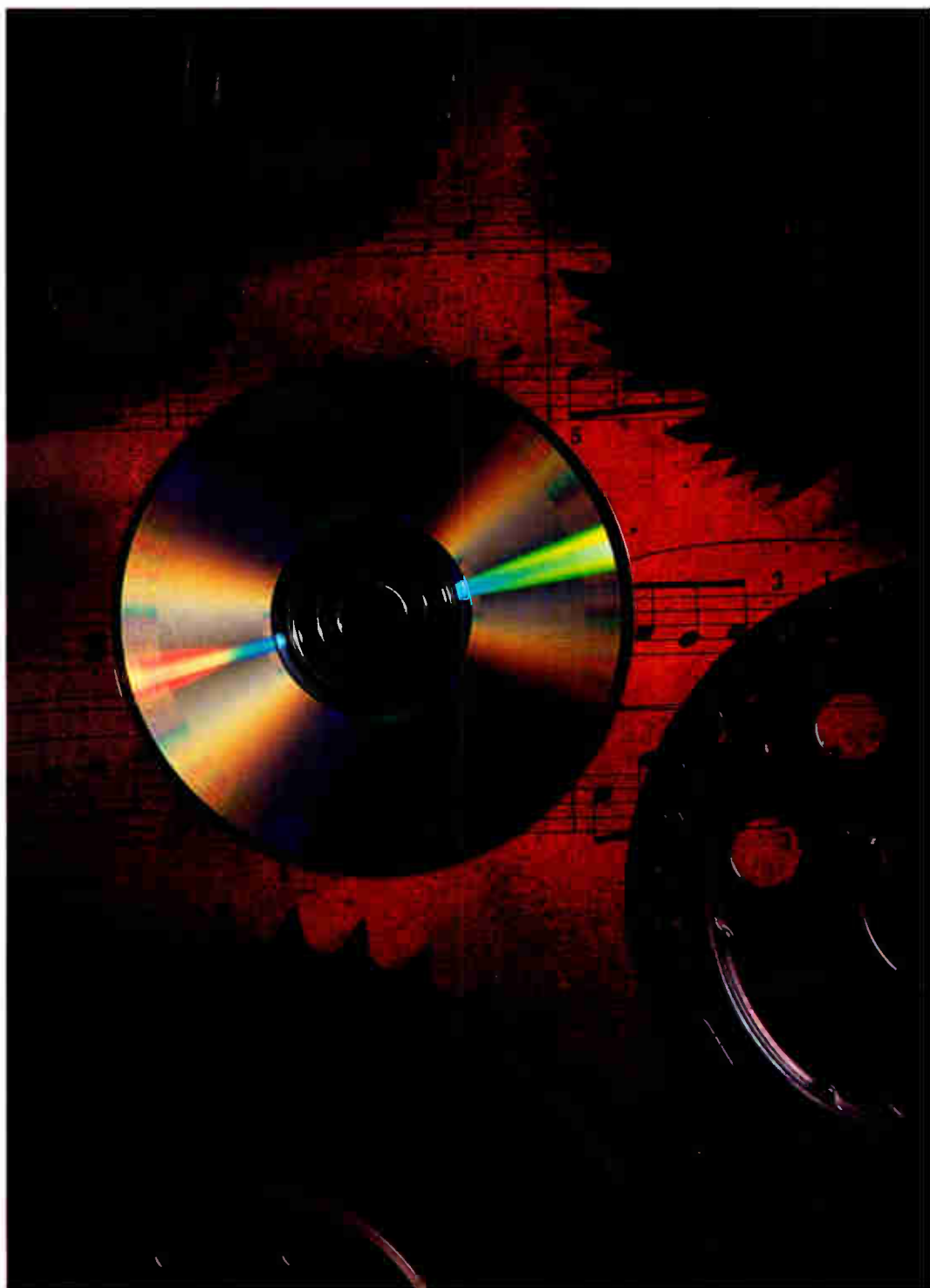
PHOTO BY RON MILLER

duction music industry provided enormous advantages, especially in the fast-paced production environment. The 60 to 70 minutes of storage on a single CD lets production music producers offer more versions, often with music beds pre-edited into commercial-length spots, as well as the typical two- to four-minute themes.

Many libraries also provide alternate mixes with different solo instruments or rhythm-section-only versions, the latter allowing the producer to overdub any desired lead instrument. Another advantage of having a rhythm-section-only mix is the possibility of editing part of that selection into the main theme, as a simple means of extending the music. Even with a full-length four-minute piece, you always seem to need another ten or 15 seconds, and the additional editing flexibility of an alternate mix on the production music CD is a definite plus.

The availability of affordable digital workstation systems has made a significant impact on music editing of all types. Add a CD player with a digital output to the system, and production music elements can be copied, edited and recalled with extraordinary ease. If your editing system also includes time compression/expansion functions, you'll be way ahead of the pack, particularly when you need to add or subtract a couple of seconds on a music cue.

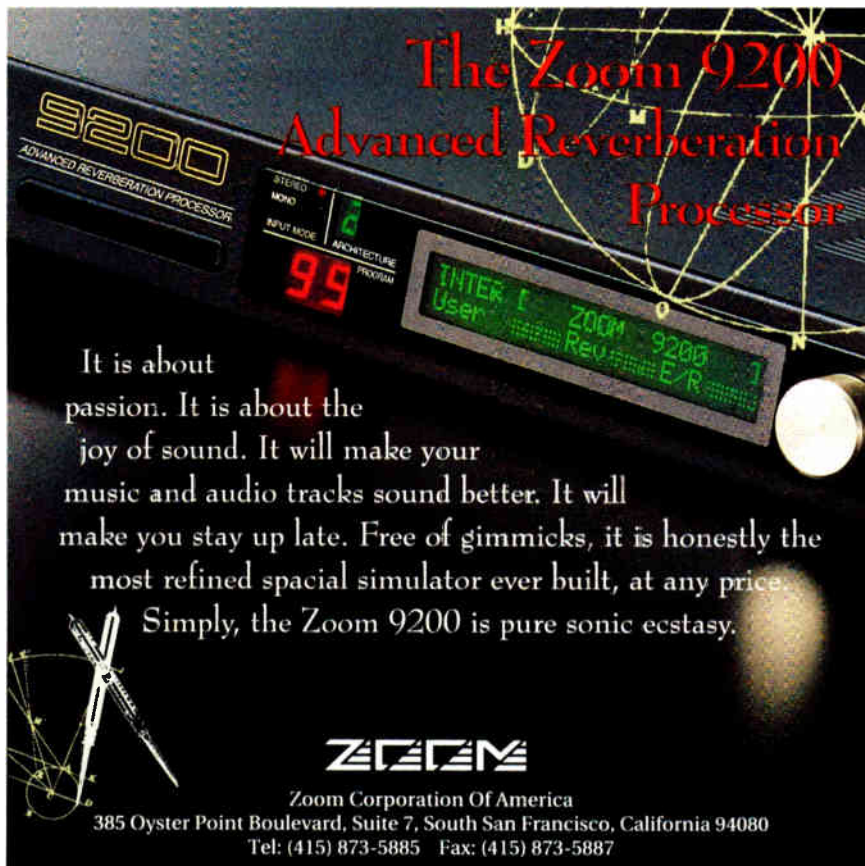
Speaking of computers, an increasing number of companies are now offering production music selections on CD-ROM in a variety of file formats, ranging from CD-Audio (standard CD playback), 8- and 16-bit AIFF (Mac format), and the 8-bit Microsoft MPC (IBM PC-compatible) WAV format. Of course, there are no *technical* reasons why these should be restricted to multimedia use (although licensing requirements and fees may vary), as CD-ROM-based production music may be suitable for use in film, video and other applications. On a related note, a number of production music companies are now offering music selections at reduced rates for use in multimedia presentations.



Another growth area is the distribution of production music as Standard MIDI Files, which can be loaded into any MIDI sequencer and played back through a full-fledged MIDI system, a multitimbral synthesizer/sample playback unit or through one of many MIDI modules (or plug-in computer boards) specifically designed for General MIDI applications.

A recent extension to the MIDI specification, General MIDI establishes a common set of program number assignments for common synth sounds, enabling playback on a wide variety of GM devices with predictable results. For example, percussion elements—such as kick and

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snare—are mapped to specific note numbers and assigned to MIDI channel 10. The use of MIDI-based production music allows for an extremely wide amount of control in determining the type and instrumentation available, as well as desired tempo. As a bonus, once loaded into a sequencer, files can be edited, trimmed or extended with a high degree of precision and ease.

Traditionally, CD music libraries exist in two basic types, either operating on a "buyout" basis or on a "signatory" contract, which involves per-use/or unlimited-use blanket licensing arrangements. Buyout agreements typically allow for unlimited use for a one-time charge, although occasional restrictions may apply. For example, some buyout music collections include limits on broadcast use, and all specifically forbid the repackaging of the music for sale as production music.

Signatory agreements can take a variety of forms. "Needle-drop" refers to the use of a partial or entire music selection in a single segment of a production. So if the same theme is used in two different parts of a film, then two needle-drop charges would apply. A "per-production" rate allows the unlimited use of a particular library or selection in a single production for a set fee, depending on the audience/market size or type, release medium, and total length of the project. Often used in jingles, television ads and radio spots, "theme rates" apply to the use of a particular selection on several projects. "Annual blanket" rates are based on the unlimited use of a library for a set period, either on a calendar year or 12-month basis.

Libraries with music available on a signatory (licensed) agreement typically provide CDs of music to users for a nominal charge, normally in the \$10 to \$15 per disc range—*not* including usage fees. Rates for such usage can vary considerably. A needle-drop charge for music used for a local television spot—say, a 60-second ad for a used car lot—could be as little as \$25. However, when that same music bed is used as a title theme for a network TV program, the fee would be significantly higher. Some libraries provide a complete set of CDs at no charge when the music is licensed on a long-term contract, and others may distribute discs on an "approval" basis, so a

—CONTINUED ON PAGE 158

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by George Petersen

PRODUCT

CRITIQUES AND COMMENTS

F OSTEK DCM100 MIXING SYSTEM

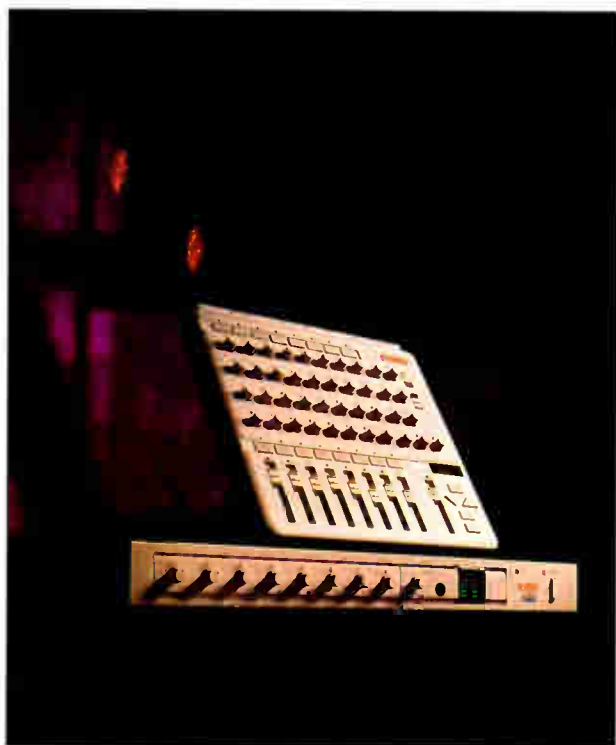
The widespread use of digital circuits to control analog mixer electronics is a fairly recent development, but one that makes a good deal of sense. Until now, however, this market has been limited to higher-end designs—such as the successful Euphonix Crescendo and CSII consoles—or more affordable systems using rack-mount, level control modules under MIDI control, such as the CM Automation MX-816 or Niche ACM. With the introduction of the DCM100/MIXTAB system, Fostex has taken a quantum leap ahead of the pack.

In its most complete form, the system offers up to 48 inputs (24 stereo pairs), plus six *stereo* effects returns—a total of 60 input channels—with dynamic automation and 100-scene snapshot control of all pa-

rameters (level, pan, mute, EQ, aux send/return) for \$2,946. As the system is based on add-on modules, a user could start off with a simple configuration and expand the system as needs—or finances—grow.

The DCM100 mixer module is controlled entirely via external MIDI commands and is housed in a one-rack-space box. Its spartan front panel contains only input trims, a headphone output control, two five-segment LED output meters and two LED indicators—one for AC power, the second to indicate when MIDI data is received. The rear panel has MIDI in/out/thru ports, unbalanced 1/4-inch jacks for the eight input channels (mono or stereo), two stereo aux sends, two stereo aux returns, main stereo outputs and stereo bus inputs—for summing the DCM100's output with that of a second DCM100 module, conventional mixer or other stereo source. The power supply is internal.

The mixer module can be manipulated from any MIDI controller, whether it be a hardware box such as a J.L. Cooper FaderMaster or sequencing program (Steinberg Cubase, C-Lab Notator, etc.), and the MIXTAB controller is slick and easy to use. Requiring less than one square foot of studio space, MIXTAB resembles a tiny mixing board, with conventional-looking controls that send MIDI data to the DCM100 and/or MIDI sequencer. Sixty-six multicolored LEDs adorn the top surface, to indicate status of nearly every MIXTAB function. Two-band shelving EQ (± 15 dB at 100 and 10k Hz) is provided on all inputs and aux returns. Up to 100 automation snapshots can be stored in MIXTAB for immediate recall and a bright numeric LED display showing the number of the current (or next selected) snapshot.





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One limitation of the mixer system is that each input can only access *one* of the two aux sends; a switch above each channel lets the user decide whether to use aux 1 or 2 for that input. This may prove problematic to the typical studio junkie who is addicted to large numbers of sends, but there are always other methods of getting more signal processing into the mix, such as routing a snare input through a reverb before connecting it to the mixer and controlling ambience using the processor's wet/dry controls. Additionally, many current synths have onboard effects, so in electronic music production the number of available aux sends may be less of a problem. Incidentally, the two aux sends are configured post-fader, which is less desirable for cue or monitor functions but fine for mixing, particularly in a MIDI studio.

Operation of the system is straightforward. Connect your audio lines to the rack module, use a couple MIDI cables to connect the MIXTAB and DCM100 and sequencer—if desired—and away you go.

A single MIXTAB can control up to three DCM100 modules, so a "select" switch decides which of the three is currently being controlled by MIXTAB. A second control sets MIXTAB into one of three operational modes: Direct, Preview or Enable. In Direct mode, MIXTAB operates the DCM100 in a similar manner to a conventional mixer. In Preview mode, MIXTAB will not transmit any MIDI data, although the tricolor LEDs above individual controls may begin flashing either red or green to indicate whether any discrepancies exist between the physical settings of the controls and the audio values of these parameters. A flashing green LED means that the control is set lower than the DCM100 value (red indicates the control is higher); and the faster the LED blinks, the closer the control is to matching the actual level. Once the two are precisely matched, the LED goes out. The Enable mode is like a combination of the Direct and Preview modes, but it begins transmitting MIDI data (indicated by an orange LED color) *after* the the actual control setting is matched. This may

seem complicated, but most folks could have this system figured out in less time than it took to read (or write) this paragraph.

Changes made in the Enable mode can be made quickly but with less precision than switching between Direct and Preview. As most users will be more interested in tweaking mixes than saving a few seconds, the main use of the Enable would be in live music or theatrical applications. While any hardware- or software-based MIDI sequencer is capable of storing the system's automation data, there are many cases where a sequencer is not required, with one or more DCM100s controlled directly by MIXTAB's controls or snapshot memories.

Speaking of other applications, Fostex has recently published an informative booklet that details a number of tasks (other than MIDI production) suited to this system, such as studio multitrack mixing, theatrical automation (with or without MIDI-controlled lighting), SMPTE-controlled audio post-production, signal processor programming, etc. I'm sure that dozens of other possibilities exist—an automated cue mix monitoring system for large studios is one example that comes to mind.

Overall, I was pleased with the DCM100's audio quality, which was free of any of the grit or zipper noise effects that I might have expected from an automated mixer at such a low price. The 78dB signal-to-noise spec is respectable—if unglamorous—and certainly won't put a crimp in the market for Massenburg line mixers. The system responded quickly and smoothly to MIDI commands, either from MIXTAB or sequenced data. (In fact, MIXTAB even includes a "smoothing" control that allows a user to tailor the response of the controls to suit a particular style.)

With a basic MIXTAB and DCM100 priced at \$549 and \$799, this Fostex system has a lot to offer, particularly for the price-conscious consumer who's tired of the idea of losing trade-in value of an old console each time a few more inputs

are needed. True, the DCM100 doesn't include any mic preamps (priced at \$299, the Symetrix SX-202 stereo mic preamp would be an excellent add-on to this system), but for anyone seeking a flexible, powerful—and expandable—automated console at a down-to-earth price, the DCM100/MIXTAB combo would be hard to beat.

Fostex Corp. of America, 15431 Blackburn Ave., Norwalk, CA 90650; (310) 921-1112.

SOUND IDEAS "THE GENERAL" SOUND EFFECTS LIBRARY

Nearly a decade ago, Sound Ideas released its first CD sound effects library, and the audio industry hasn't been the same since. Over the years, Sound Ideas offered a number of smaller, more specialized effects collections (such as the Ambience, Wheels, Hollywood and Lucasfilm Series) to expand upon that original library; now the company has released *The General*, a 40-disc set of digitally recorded sound effects.

As its name implies, *The General* is a general (though not generic) all-purpose sound effects library. It is



an all-encompassing collection that covers just about every sound effect need. The General CD collection includes: Aviation 1-2, Helicopter, Automotive 1-4, Road Surfaces, Construction 1-2, Crowd, Fire, Foley Footsteps 1-2, Household 1-4, Motorcycles, Military, Industry/Jungle, Restaurant/Stores, Outdoor, Office, Music/Percussion, Sports, Transport, Miscellaneous 1-4, Weather, Water, Traffic and Sound Designer discs featuring the work of Alan Howarth, Mike McDonough and Frank Serafine.

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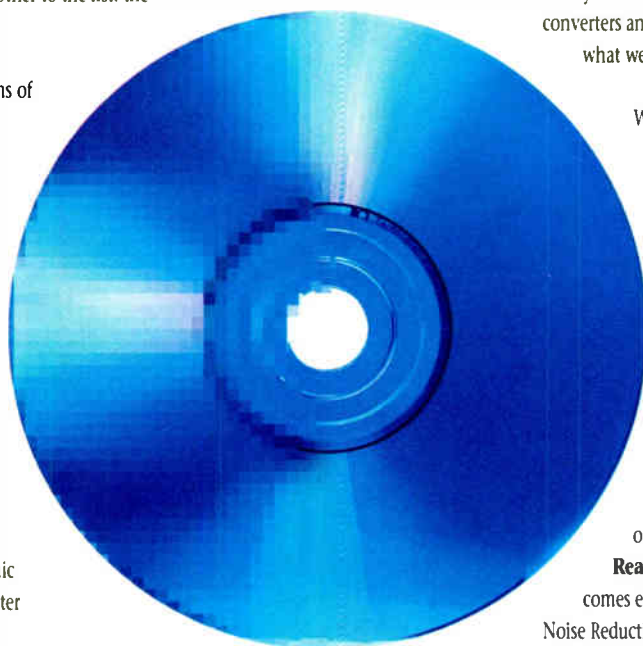
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If you'd like to receive a FREE VIDEO describing the Digidesign ProMaster 20, DINR, and other professional developments — plus a technical paper which objectively shows the advantages of 20-bit audio — please call us at (800) 333-2137, ext. 108 (US & Canada), or internationally at +1-415-688-0600. We'll also be happy to arrange a no-obligations demonstration of the ProMaster 20, DINR, or any other Digidesign product.

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AUDITIONS

Comprehensive is the key word here. The General has more than 7,500 effects, so you're bound to find what you need, and Sound Ideas cut no corners in producing the CDs. Each disc is packed with more than 70 minutes of sounds, ranging from short bits to extra-long ambience tracks. And the variety within types is impressive: Just drop in disc 7 and you'll find 39 car crashes, ranging from sideswipes and fender benders to major head-on catastrophies. Entire discs are devoted to four different autos: Ford Escort, Olds Cutlass, Lincoln Town Car and Honda Accord. I imagine that though few people may need sounds of those specific cars, they represent a range of automotive types, from subcompacts to full-size. So you should have no problem substituting the "Honda Accord gas flap open and close" (Disk 8, Track 51, Index 01-02) for a similar effect if you're doing a Subaru spot.

A catalog accompanying the set lists the tracks on each disc, but no cross-referencing is provided. The back card on each CD only states the title of that particular disc—some kind of CD booklet or flap to list the track numbers of individual effects would have been helpful. Perhaps Sound Ideas could consider adding these in future versions.

The General is a superb collection, providing top-notch digital recordings of almost every effect imaginable, with enough variety within effects types to please the production palate of even the most critical audio connoisseur. At \$1,295, this 40-CD set is an ideal choice for the facility needing a first sound effects library or as an add-on to expand an existing library. I'd give this general five stars.

Sound Ideas, 105 West Beaver Creek Road, Suite 14, Richmond Hill, Ontario, Canada L4B 1C6; (416) 886-5000.

PEAVEY DELTA VU METER

Here's an example of a product that doesn't create headlines in the press or waiting lists at audio dealers, but nonetheless is an extremely useful accessory in the studio or post facility. The Delta VU, from Peavey's Audio Media Research division, is

—CONTINUED ON PAGE 184

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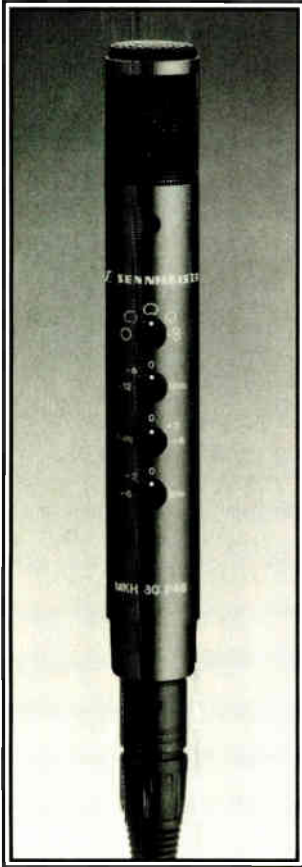
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NEW PRODUCTS



SENNHEISER MKH80 CONDENSER MIC

The MKH80 joins the transformerless Sennheiser (Old Lyme, CT) family of MKH mics for digital recording. The capsule is part of a tuned circuit in a radio frequency system, resulting in low noise (10 dBA, 20 dB CCIR), while the symmetrical push-pull capsule design with optimum resistive loading minimizes intermodulation distortion. A dual-membrane converter provides bass response similar to large-diaphragm mics, and the MKH80 offers omnidirectional, wide cardioid, cardioid, supercardioid and figure-8 patterns, as well as attenuation, treble boost, bass cut switches and an LED that facilitates proper mic orientation.

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DAR SOUNDSTATION DELTA

The 4-channel version of the SoundStation digital audio production system from Digital Audio Research (Chessington, England) offers the same quality and speed as the SoundStation II and Sigma systems, at a lower price and with an upgrade path. Editing is carried out on a single page, using touchscreen operations, rotary controls and keys. The user also has instant access to the audio material in Delta's configurable directory. Four-channel operation is standard, with four track-hours of storage, four analog and AES/EBU inputs and outputs, two channels of SPDIF I/O, chase-sync and backup to DAT; optical disk storage, time compression, machine control and WordFit dialog synchronization are optional.

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STEWART PA-SERIES AMPLIFIERS

The newest additions to Stewart's (Rancho Cordova, CA) series of 2-channel power amplifiers are the PA-200 (\$429), PA-1000 (\$1,099) and PA-1400 (\$1,399). The half-rack PA-200 delivers over 50 watts per channel at 8 ohms, 90 watts at 4 ohms and 100 watts at 2 ohms. The PA-1000 delivers 200 W/ch at 8 ohms, 350 at 4 ohms and 500 at 2 ohms, in a single rack-space; inputs are XLR and 1/2-inch TRS, while outputs are binding post and 1/4-inch. Specs for the 2U PA-1400 are 300 W/ch at 8 ohms, 550 watts at 4 ohms and 700 at 2 ohms. XLR, 1/2-inch TRS and barrier-strip inputs are included, while output connections are banana plugs and binding posts. The PA-1400 unit features true dual-monaural design topology.

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PEAVEY AMR 2482 CONSOLE

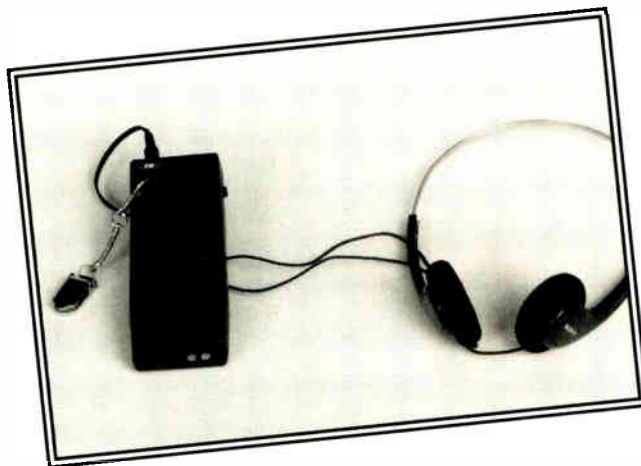
Peavey's Audio Media Research division (Meridian, MS) introduces the Production Series 2482, a compact in-line console with a discrete transistor low-noise mic preamp in each channel. Equalization consists of fixed high and low bands, with sweepable high and low mid-bands, and the shelving section can be split to form a unique monitor/alternate input path. Other features are 48V phantom power, eight aux sends, eight stereo aux returns with EQ and assignment capability, two mute groups, a PFL/solo switch, two cue sections for independent headphone mixes, and -10dBV and +4dBu tape inputs.

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RE AMERICA D940 HEADPHONE INTERFACE

Easy monitoring of digital audio data is available with the d940, a headphone interface small enough to clip onto the user's belt. RE America (Westlake, OH) designed the unit to monitor both AES/EBU and SPDIF audio sources through 16-bit D/A conversion, at sample frequencies of 32/44.1/48 kHz. Also included are an LED indicating signal validity and a signal confidence switch, and a mute setting automatically activates upon loss of input signal.

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ART DRX-2100 SE

The Studio Edition of the DRX-2100 processor by ART (Rochester, NY) offers hundreds of new presets and independent mixing of the dry, equalized and wet signals. Also included are a programmable compressor, limiter, exciter, noise gate, expander, acoustic environment simulator and a tone/pitch generator for testing P.A.s and room setups. The DRX-2100 SE allows 11 simultaneous audio functions and is fully MIDI-controllable.

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AUSTRALIAN MONITOR PROPHILE

New from the manufacturer of high-power MOS-FET amplifiers is proPHILE, an amp designed for studio and other critical listening applications. Distributed in the U.S. by Australian Monitor U.S.A. (Malvern, PA), proPHILE provides 400 watts of power into 4 ohms and 255 watts into 8 ohms.

Circle #231 on Reader Service Card



YAMAHA SPX990

The SPX990 is a multi-effects processor with 20-bit A/D and D/A conversion, featuring 50 preset effects programs and 100 user memory locations. A slot accepts optional RAM cards, while balanced XLR and TRS phone connectors provide input and output. Delay time programming is tempo-based, and the time can be entered via a footswitch or MIDI clock data. The unit offers more precise pitch change than the SPX900, with a new dynamic waveform analysis technique and intelligent pitch change algorithms.

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JBL 4400A SERIES STUDIO MONITORS

Designed to provide extended listening without ear fatigue, three new models join the 4400 Series from JBL (Northridge, CA). The two-way, 8-inch 4408A system is designed for smaller studios or broadcast control rooms, offering 100 watts at 8 ohms and a frequency response of 50-20k Hz. The 10-inch 4410A is a three-way system in a vertical line

array, providing 125 watts at 8 ohms and a response of 45-20k Hz. Enhanced low-frequency output is available with the 12-inch, three-way 4412A, providing 150 watts at 8 ohms with a response of 45-20k Hz. Titanium domes minimize distortion levels, with tweeters oriented to create mirror-imaged pairs.

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DBX PROJECT 1 SERIES

dbx of San Leandro, CA, has introduced a new series of low-priced signal processors for a wide range of applications. The 266 is a compressor/gate that retails at \$299. Two independent channels can be master/slave-coupled for stereo operation, while new attack and release circuitry provide control ranging from slow leveling to aggressive peak limiting. A new expander/gate, the 274, offers four independent channels, configurable as four mono, two mono and one stereo or dual stereo channels of processing. Priced at \$449, the unit has a three-LED threshold status indicator on each channel and includes VCA and RMS detection circuitry. At \$349, the 296 Spectral Enhancer is a dual-channel processor that features high-frequency enhancement, hiss reduction to clean up audio material and low-frequency detail enhancement, which adds bottom-end punch while reducing mid-bass muddiness.

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AMEK SUPERMOVE SYSTEM

Amek's (North Hollywood, CA) new moving fader system is available on Mozart consoles or retrofittable to other models. Supermove combines motorized fader and VCA elements: The signal path is automated without the VCAs, but inclusion of a VCA allows Virtual Dynamics to be fitted; hybrid VCA/servo control modes are also possible. Supermove is controlled by a 16-bit/10MHz processor; 12-bit converters provide 4,096-step resolution over the fader range. Amek plans to develop Supermove options for the Hendrix, Classic and G2520 consoles in the future.

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SOUNDCRAFT SPIRIT FOLIO

Weighing under nine pounds and costing a mere \$495, the Spirit Folio mixing console is designed to offer professional-quality sound in a portable, compact unit. Soundcraft (Northridge, CA) offers two versions: a 10x2 format with six mono and two stereo inputs, and a 12x2 format (also available in a rack-mount version) with eight mono and two stereo inputs. Each mono channel has a phantom-powered mic input, 3-band EQ with sweepable mids and a highpass filter. Two aux sends are included (one switchable prefader from the master section), as are dedicated monitor out, an oscillator and a 2-track return that can be used as a separate stereo input.

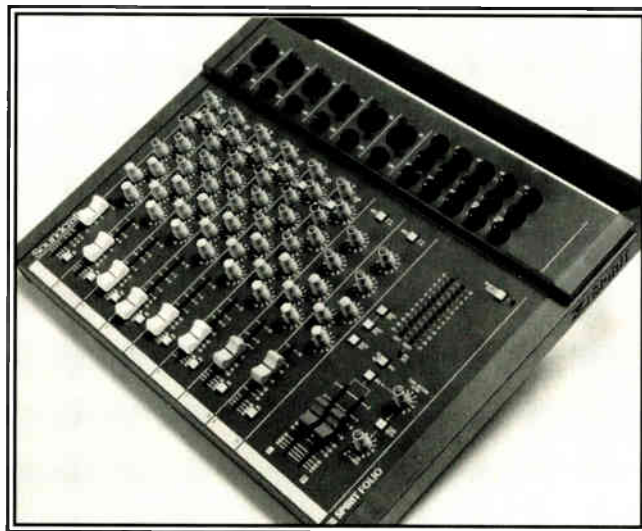
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DRAGONWORKS MS MATRIX

For music and film/broadcast production, the MS Matrix System from Dragonworks (Woodland Hills, CA) simplifies the manipulation of tracks recorded using MS (mid-side) microphone techniques. The unit has all-discrete circuitry, relay muting and gold XLR inputs/outputs. Frequency response is 10-80k Hz, ± 0.1 dB. A compact remote provides divergence control, mute and phase reverse switching; retail is \$2,000.

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DAP ENTERPRISES HEARING PROTECTORS

Offering a Noise Reduction Rating (NRR) of 30 dB, these soft, reusable foam earplugs from DAP (Studio City, CA) expand to fill the ear canal and have foam "handles" for easy insertion and removal. Hearos are priced at \$2.99 for two pairs, and SuperHearos provide a key ring carrying case with four pairs of plugs for \$4.99.

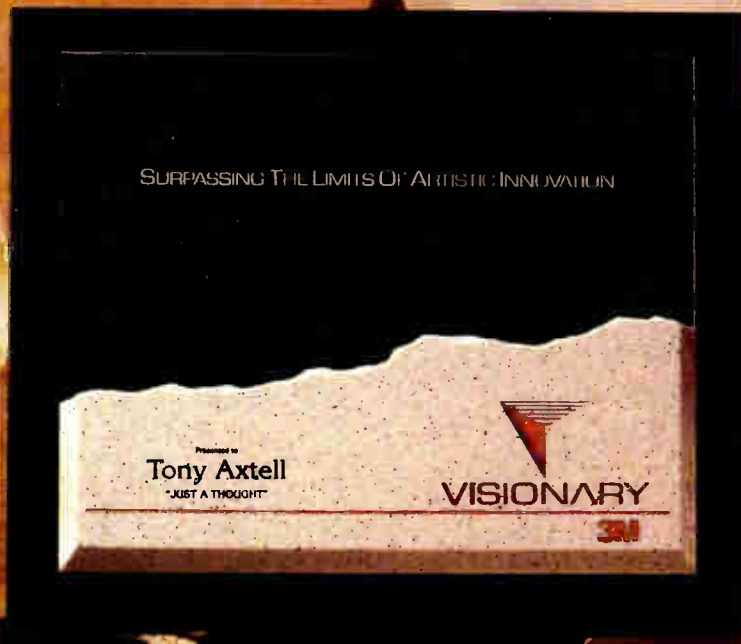
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HOT OFF THE SHELF

Promusic's **The Match Production Music Library** is a series of CDs containing music ranging from classical to the latest styles, with a complete catalog and software for easy selection. The series is slated to include 50 CDs in the near future; call (305) 776-2070 for a free demo...Jiri Donovsky of Hollywood is offering an upgrade of eight channels of AES/DAT/CD-format digital input for Yamaha DMP7 digital mixers. Also available is a 2-channel or multichannel interface box providing AES/EBU and SPDIF inputs at 44.1 and 48 kHz for most Yamaha digital audio products. Call (818) 240-7668...The "All Drums" CD (\$99) offers more than 70 minutes of jingle tracks, acoustic drum rolls and loops, marches, comedy drum fills, solos, and grooves, ranging from samba to techno to blues. Call (407) 260-0079...A half-rack device, Rane's **FBB 44 Balance Buddy** uses nickel-core transformers to convert one stereo pair of -10dBV RCA inputs into +4dBu XLR outputs, while

performing the reverse operation on a pair of XLR inputs. Call (206) 355-6000...Benchmark's **The Jr. Audio Director** (\$390) is a small audio mode controller that offers Left Only, Right Only, Mono, Stereo and Stereo Reverse; it features polarity inversion correction and independent gain adjustment for both left and right inputs. Call (315) 437-6300...A price reduction has been announced for the **Drawmer DS201 gate**, bringing the list down to \$749. Call QMI at (508) 650-9444 for more info...The **Crystal Semiconductor CS4303 D/A converter chip** uses 8-times interpolation and 64-times oversampled delta-sigma modulation, said to exhibit flat response to 21.8 kHz with interchannel isolation of 115 dB. A flexible serial interface accepts two channels of 16/18-bit data. Call (512) 445-7222...Specs for the **Analog Devices OP-213 dual op amplifier** is said to offer the lowest voltage noise and drift specifications of any single-supply amplifier. Call (617) 329-4700...The **Manhattan Production Music New Visions CD** has 13 pieces (65 cuts)

of contemporary jazz fusion with guitar and sax solos, while **In the House** is a blend of techno/hip hop with dance mixes in ten themes and 62 cuts. Call (800) 227-1954 or (212) 333-5766...Version 2.0 of **Yamaha's DMC1000** allows aux sends to be routed from input channels and monitor channels simultaneously. Other new features include storage of user-defined parameter groups, tolerance of faulty time code and MIDI transmission/downloading of automation data during playback. For the free update, call (714) 522-9011...Contemporary and futuristic music are available on **Signature Music's "Techno-Rock and Cyber-Funk" CD**, targeted especially for action-oriented or youth audiences. A free sample disc of Signature's entire library is also available; call (800) 888-7151...**Outboard Gear Sheets** are custom-designed for your studio's equipment and special features, providing an easy way to write down important settings and patch points for future reference. Call (415) 626-9777. ■



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World Radio History

by Steve Rowland

STUDER EDITECH DYAXIS II

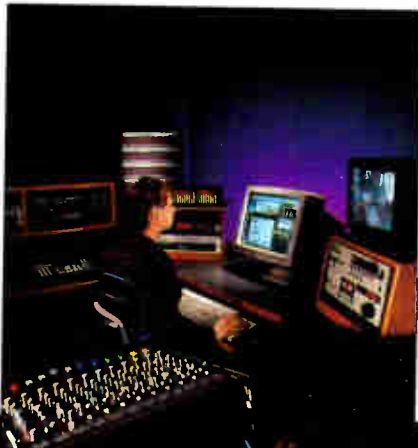


The age of the functional, affordable multitrack digital audio workstation has arrived, and Studer Editech's new release, the Dyaxis II, is certain to rise quickly to the top of most users' lists. With the Dyaxis II, Studer has challenged others to meet it in performance, ease of use, flexibility, processing power and upgradability—all working in one comprehensive software application.

Clearly, there is a demand for a real-time multitrack workstation that can serve the needs of a wide variety of users. Over the past year alone, a number of competitors have entered this market. Each manufacturer has faced the challenging dilemma of releasing product faster to get a jump on the market, or waiting for a more complete product. Some of those who released early ran the risk of undetected software problems, or worse, locked themselves into hardware setups that will limit future growth. The

manufacturers who waited risked losing market share, but have the advantage of releasing systems that are much more thorough.

Studer waited patiently to release the Dyaxis II. The third-generation hardware is entirely different from the earlier Dyaxis I, and the software, while based on the superb editing environment of its predecessor, has leapt—both literally and figuratively—from a black-and-white,



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two-dimensional model into a magnificent full-color, three-dimensional world.

In the contest for the best visual display, the screen of the Dyaxis II is stunning. Everything you need is laid out clearly in color, and much of the screen mimics familiar analog tools like tape recorder transports and a mixing console.

Studer has geared the initial release of the Dyaxis II to the film and video post-production market. With the release of the hardware controller and its integrated mixer, the system will also be a suitable choice for music production.

While it may look better than its competitors, the important thing is that the design is functional. The display provides the user with a comprehensive overview of the entire project at a glance: Meters, EQ, EDL, all mixer positions, waveforms and the graphic track display all appear simultaneously and, of course, are updated continually. Its handsome appearance, however, does have several advantages in and of itself. It provides a pleasant environment for an operator who works many hours at a time.

The hardware offers the superb sound quality Studer is known for, easy hardware upgrades (a 20-bit A/D-D/A converter is already planned, and optical drive Plug & Play technology should be available by the time you read this) and a software environment that is unmatched in its integration, intuitive design and ease of use.

Studer has geared the initial release of the Dyaxis II to the film and video post-production market (see sidebar). Because the system is so

well-integrated, it works beautifully for radio production, dialog editing, sound effects and other environments. With the release of the hardware controller and its integrated mixer, the system will also be a suitable choice for music production.

HARDWARE OVERVIEW

The hardware platform is very important in determining the sound quality, overall integrity, endurance and the future viability (expansion and upgrade possibilities) of any system.

The Dyaxis II requires a Macintosh II or Quadra series computer with 8 MB of RAM, a 19-inch color screen and an 8-bit video card. Rather than handling the DSP and number crunching, the Mac is used primarily for sending commands from the mouse or keyboard and for drawing the screen. The faster the Mac, the faster the screen draws. I have used the system with both a Quadra 900 and a Mac IIfx. Though I preferred the 900, I was more than satisfied with the IIfx.

The basic Dyaxis II system comes in a single three-rackspace unit. Each unit, or processor, provides four analog in and out channels, with eight tracks of real-time playback and unlimited virtual tracks, which can be mixed offline. Up to six processors can be linked together to provide a 24-channel, 48-track environment. It is important to understand that each processor is a complete workstation on its own and can be used independently or in-line. Therefore, a studio with more than one processor can use them separately for some projects and then combine them for others.

Track time, as with most systems, is dependent on the size of the storage drives. The system ships with a 1-gigabyte drive, which provides 189 minutes of track time. Each processor supports up to six drives. At this time, the limit is six processors, each supporting six drives (36 total), which would provide a 24-channel, 48-track system with over 110 hours of track time. Disk time is only taken up where sound is actually placed. For example, in a 30-minute mix, if track 12 has only five minutes of material, only five minutes of track time are used for that track.

The processor houses both the circuit boards and the disk drives.

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The back panel's array of digital connection options include AES, SPDIF, SDIF-2, Yamaha multitrack and cascade. Dyaxis II will translate between all digital formats.

The circuit boards are arranged in what Studer describes as "Card Cage Architecture." Each major function of the system (the CPU, DSP, time code, etc.) is on a slide-out card. This provides two very important advantages. The first is easy maintenance. If anything should ever fail, a replacement card can be installed by the user in about 60 seconds: You don't even have to take the processor out of your rack. In the event of any hardware failure, Studer promises to get users worldwide back online within 48 hours. The second advantage of this design is easy upgradability, with new cards planned for future firmware and hardware updates.

Studer's initial hardware upgrade (slated for release last month) is the Plug & Play™ optical drive, an industry first. Because access times to optical drives are much slower than to magnetic hard drives, until now they have only been of value as backup media. But by making use of Dolby Labs' new transparent AC-2 data compression (20-20k Hz), the Dyaxis will compress the data (4:1) and allow the drive to work in real time. This arrangement actually allows the optical drive to be the primary disk used for recording, editing, playback and storage. It eliminates the need for a backup.

The architecture of the Dyaxis II guarantees that the compressed audio will remain in its first-generation state. The value is that disks can be switched instantly, without the download or upload times found in current back up systems. Busy studios could change projects instantly or swap work from one location to another—either down the hall or cross-country. Editors would be able to work on different parts of a project and then combine their efforts at the mix stage. In addition, because the storage is optical, saved data should be much more stable than magnetic options, such as DAT or cartridge.

THE SOFTWARE

The software program that runs the

Dyaxis is called Multi-Mix. One of the most powerful aspects of its design is that everything takes place in one program, and everything is visually displayed simultaneously. Most of the other systems, including Sonic Solutions and Pro Tools, require completely different programs to be run for various parts of the job. You must switch back and forth between them.

Multi-Mix displays the following:



Figure 1: Multi-Mix screen display

1. Digital Mixer—with full control over faders, pan, mutes, solo and track assignment. The mixer offers source and disk operation so that the operator can adjust both gain and EQ on input. The board incorporates a 5-band parametric equalizer with sweepable "Q," bandpass, and high/low shelving filters.

2. Digital Meters—offering very impressive ballistics for an onscreen metering system, the display is switchable from input to repro/peak hold or three-second hold. Metering can be done in a variety of locations along the signal path. A superb hardware meter bridge is also available.

3. Time Code Window—a visual display of the time code reader/generator, supporting VITC, LTC and film tach pulses. Provides time code editing functions with subframe accuracy.

4. Session Planner—allows track assignment selections as you begin to load in your project. The planner enables users to efficiently handle track assignments to multiple hard disks.

5. Session Browser—the place where the listings for all sessions, sound files and sound windows are kept.

6. Edit Desk—this is where the real action takes place. The edit desk itself has three regions. "The View Pane" displays waveforms, where the editing is done. "The Graphic Edit Decision List" has the bar graph display of each track, laid like pieces of tape in time, from left to right. Each channel is equipped with Ready/Safety/Input/Reproduce buttons, which appear as colored "lights" onscreen. Time code refer-

ences appear here as well as in the TC window, and importantly, the view can be adjusted with zoom buttons or keyboard commands to represent any length of time.

"The Event Editor" allows full snapshot automation of all mixer positions. An unlimited number of events can

be recorded and then played back to time code.

The depth of the system does not make it hard to use. For anyone familiar with multitrack recorders and consoles, most of the system is easy. The waveform editing is probably the newest conceptual area, and this is very intuitive.

As mentioned earlier, the editing procedures are based on those used in "Mac Mix"—the program used to run the Dyaxis I and Dyaxis Lite. I have used the Dyaxis I for more than three years and rely heavily on its editing features. I originally purchased the system because the editing features were faster, easier and smarter than anyone else's. And I think they still are, as evidenced in part by other companies trying to incorporate the Studer approach: The operator can zoom in on any duration of a sound file with ease; reference marks are easily placed and moved; unwanted sounds within a segment are easily surrounded with the cursors and then deleted with a keystroke; and rough edit spots are beautifully fixed with a simple cross-fade.

Like the Dyaxis I, the Dyaxis II supports virtual track mixing. You must imagine a three-dimensional

setup on a mixer—that underneath each track on the console can be an *unlimited* number of “virtual tracks,” which can be mixed “of-line” and then integrated into the final mix. This allows the creation of very complex mixes involving many elements.

Another powerful feature that is

settings appear at each level change. When working on a stereo file, one keystroke duplicates the envelope drawn on the left channel to the right. I'll get back to these in a moment.

IN SESSION WITH DYAXIS II

I work in radio and used the Dyaxis II system to mix my most recent program, a two-hour documentary about the life and work of guitar legend Carlos Santana. Here are the steps:

To load in sounds, set up track assignments in the Session Planner (music on tracks 1 and 2/narrator on track 3/mono actualities on

Track 4/stereo actualities on 3 and 4). Choose digital or analog source. If digital, choose the correct parameters: sample rate, digital format, emphasis, stereo or mono, etc.

If you desire, you can boost or lower gain and adjust the EQ on input. Record in, and name the pieces. The default naming system will number your takes, and retyping names isn't always necessary. For big projects, though, I'd certainly recommend it.

Open up a new edit desk. As you call up your sound files, the first stop is the “View Pane,” for waveform editing. Here you can trim the head and tail of each piece and make internal edits. The display instantly gives you the duration of your piece, so if you need to you can adjust it to time. With one keystroke, the file is sent into your mix to its default tracks (or others if you choose to change it). You can choose to paste to either the left or right cursor in your Graphic EDL, to the end of the last piece on that track, or, of course, directly to time code.

You can choose to work at any level of detail. You can rough out the piece, and then go back and fine-tune it, or you can work on perfecting each edit and each mix as you go along. Of course, coming

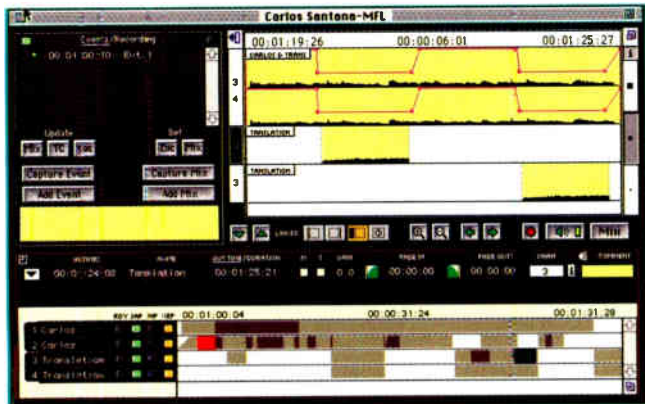


Figure 2: Edit Desk screen display

used in conjunction with the waveform editing is the “envelopes.” The envelopes are ramps—or gain changes—that are manually drawn with the mouse over a file. The dB

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THE COMPLETE ACOUSTICAL PALETTE

back to a spot in your program later and either inserting or deleting material is no problem.

The Dyaxis II offers many methods of adjusting gain on an element. This can be done with the fader when inputting sound files into the system. Also, envelopes can be drawn on the waveform display. Then you can choose to boost or reduce gain on any one ingredient just by typing in the desired gain change (in dB). Additionally, you can draw a fade in or fade out to any element in the Graphic EDL. Finally, of course, the gain can be adjusted by the onscreen fader.

This level of detail allows you to create very precise work. One example from the Santana documentary is a tape we had of Carlos' triumphant homecoming concert at the "Bullring by the Sea" in Tijuana, Mexico, recorded in March 1992. Carlos likes to talk to his audiences, and this crowd was especially eager to listen to his words, because Carlos hadn't played in his hometown since he was 15. As the concert opened, Carlos addressed the crowd. His message, a beautiful one of international brotherhood, referred to the breaking down of borders around the world. It was concise and powerful, but spoken in Spanish. The normal radio convention for translation is to hear the opening and closing sentences of the original, and then to paste in the translation over the body of the text.

In this case that approach wouldn't suffice, because the energy of Carlos' voice and the passionate reaction of the crowd would be lost. I was tempted to leave it alone, but too many listeners would lose the meaning of that moment. I recorded an English translation but wasn't sure how it would work until I got it into the Dyaxis II.

I started by laying in the live recording that was placed first into the Graphic EDL. Then I put in the whole English translation. This I placed in the View Pane for waveform editing. I listened to each phrase in Spanish. Then I surrounded the corresponding sentence from the View Pane and pasted it just after the original. I listened for the space between Carlos' sentences where the crowd responded. If the

translation fit, fine. If it was long, I could easily measure the time I had and cut the translation down to fit in better.

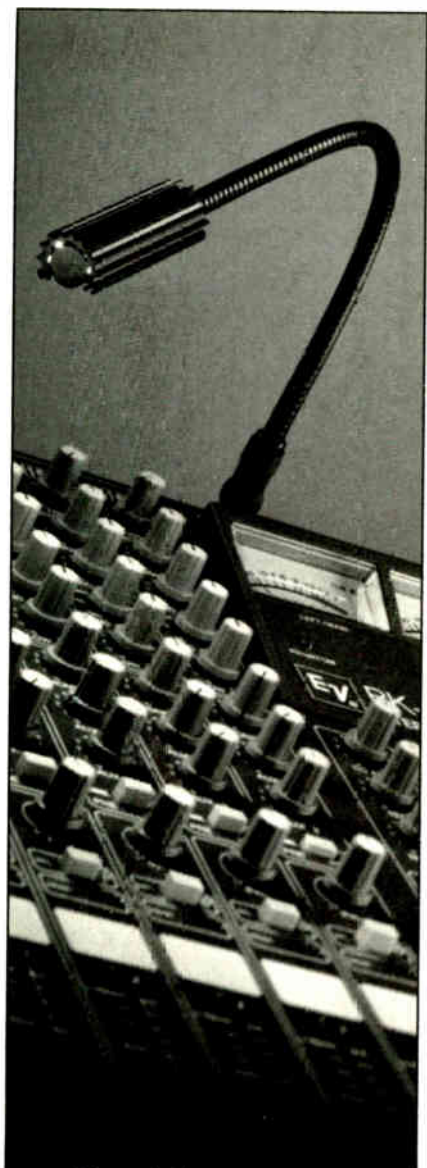
If I needed more precision, I could use the time code function for backtiming. Just press the Capture button to grab the TC of the place you want to paste to. Then find the place in your second file that you want to paste, and press Set TC. Then hit the Paste to Time Code button. Elegant and fast. Soon I had the pieces laid in, like tiles, just how I wanted them in time.

Then they had to be mixed, and the mix was tricky. The transition time between the two tracks needed to be very short, so using the fader would be difficult. I could have used the Event Editor to command the fader to instantly shift to a new position at any given time code, but that was a rather involved process for such a seemingly simple task. The easiest, and best, method was to use the "envelopes" on the waveforms (see Fig. 2). By pasting both tracks into the View Pane, I could see each waveform in relation to each other. It was a simple process to duck the track with Santana and the crowd as the translation came in. I was able to set the envelopes by first using the visual cues, and then, playing back in real time, I got the right settings in a matter of minutes.

Although the result goes by in less than 45 seconds, it was an important moment and one that keeps the energy of the show moving forward. I wouldn't have been able to pull it off in an analog studio, and I doubt if it would have been so easy on another workstation.

Anyway, once all of your pieces are laid in where and when you want them, it is time to begin your mix. Unfortunately, the Dyaxis II programmers have not yet been able to turn their attention to dynamic fader automation. This is slated to arrive by the fall of 1993. Fortunately, there are many other places to set levels. A lot can be done with the ingredient-based DSP, the envelopes and the fades in and out. The Event Editor can be used effectively to switch the mixer to any setting at any time code spot. Settings for EQ can be stored and named ("Narrator EQ," for instance), then recalled and applied over and over again. It is

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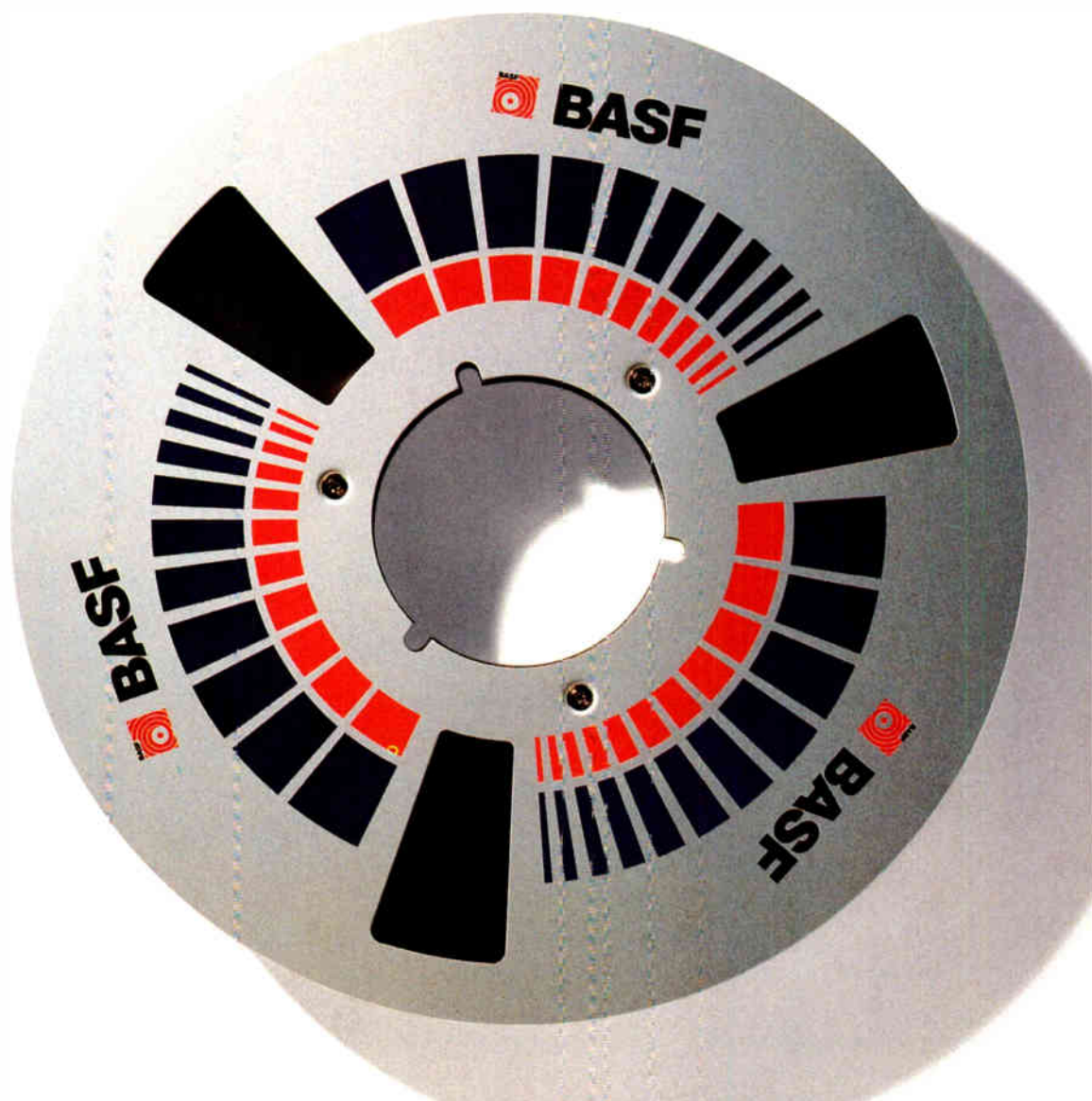


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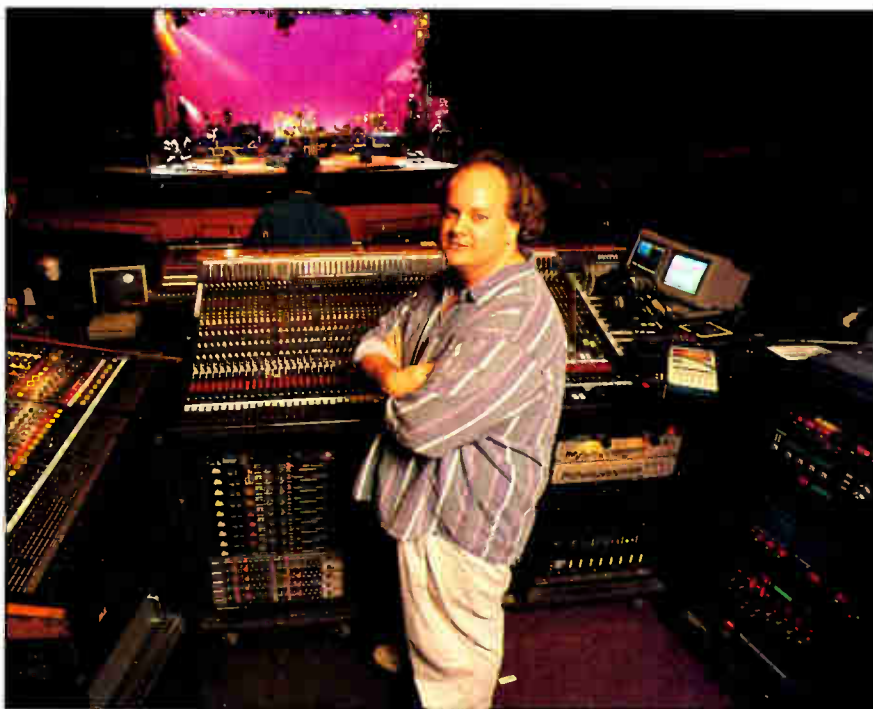


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by David (Rudy) Trubitt

SOUND CHECK



J.D. Brill of Schubert Systems Group and Oingo Boingo's Danny Elfman

SCHUBERT SYSTEMS HANDLES OINGO BOINGO'S MUSICAL MENAGERIE

Schubert Systems Group (North Hollywood, Calif.) provided sound for longtime client Oingo Boingo's recent California dates, including three shows at San Francisco's Warfield Theatre and five at L.A.'s Universal Amphitheatre. J.D. Brill (pictured above) has mixed the band for the last four years. During that time, the band switched over from a heavily sequenced show to their current, primarily live format. This increased the number of musicians to 14. Handling these inputs at the FOH is a Gamble EX and Gamble 24-input console, with a Ramsa WRS-840 covering monitors. Schubert Systems uses its own proprietary drive racks and JBL-loaded enclosures, driven by Crest 8001 amps.

Oingo Boingo's Danny Elfman

has specific ideas about sound. "What he wants onstage," explains Brill, "is a control room environment, but when he comes out in the house, he wants it to be big and pounding. He doesn't want to feel low end onstage but wants tons of it out front." One way these very different goals are met is by staggering subwoofer placement off from the geometric center of the stage so that they null, rather than sum, at Elfman's stage position.

Brill runs an extensive effects complement. Two TC Electronic 2290s are constantly adjusted to create rhythmic delays—a half-note delay on Elfman's vocal and quarter-note delay on the horns. Other processing used on horns



and vocals includes an Eventide H3000 Harmonizer and de-essers, which Brill finds especially effective for keeping the horns from becoming overly harsh when they play loud. Other effects include three Lexicon PCM70s, a 480 split left and right between vocal and snare, and a Yamaha SPX900.

PHOTOS: STEVE JEFFERSONS

SYN-AUD-CON WORKSHOP HELD

Although not associated with the National Association of Music Merchants show itself, the fourth SYN-AUD-CON/PSN Live Sound Reinforcement Workshop was held during the three days prior to NAMM's opening. This year's workshop covered a broad range of topics and was attended by more than 100 students. The program covered business and technical issues of interest to touring sound companies, as well as a special focus on theme park and house-of-worship audio.

At the core of the workshop are its instructors, all veterans of the sound reinforcement scene. Returning instructors from last year included Will Parry (Signal Perfection Ltd.), Albert Lecesce (Audio Analysts), M.L. Proise (Showco), Mick Whelan (Electrotec) and David Scheirman (Concert Sound Consultants). Joining the lineup this year were independent monitor mixer Randy Weitzel of Weitzel Audio (last out with Michael Jackson) and Randy Seigmeister (Maryland Sound Industries). Over the coming months, I'll encapsulate individual topics covered at the event, providing some practical information you can use and whetting your appetite for the next workshop.

REGIONAL COMPANY EXTENDS REACH

Rock Systems Audio of Edgewood, N.Y., is now offering service out of the United Kingdom. RSA shipped a complete system to the facilities of Tour Tech, Northampton, England. (RSA and Tour Tech have been working cooperatively since 1990.) The system was out recently with the Scottish group Del Amitri, with

—CONTINUED ON PAGE 115

COMPUTER CONTROL CONCEPTS

by Bob Moses

PART 2: WHO'S WHO IN COMPUTER CONTROL?

Last month I threw out some ideas of what a computer-controlled P.A. system might be like in the future. This month, I'll look at the state of computer control today and how we got here. As you'll see, there is quite a difference between my visions of the future and what we have today.

As with most significant historical events, there are several versions of what really happened. If you want to see power amplifiers fly through the air, just recite camp A's version of who invented computer control to camp B. So, please accept the disclaimer that this is my version of history and is by no means a comprehensive study. This article covers "off-the-shelf" computer-controlled audio systems primarily marketed in North America.

IED is largely recognized for pioneering off-the-shelf computer-controlled audio systems. In 1981, IED set up the Columbus International Airport with a system for digitally recording and playing back announcements. Since then, IED has filled out its system with a full line of computer-controlled signal routing, mixing, processing and diagnostic equipment. The IED system is used primarily in large installations such as arenas, schools and airports.

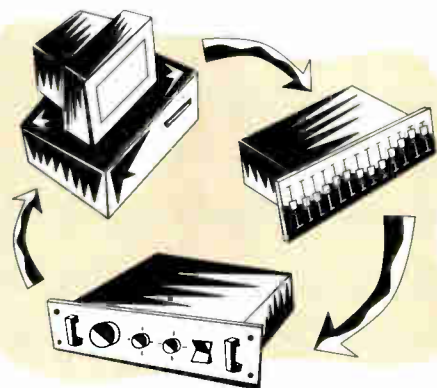
About the same time IED was introducing its system, MIDI was making its grand entrance. Although MIDI was originally intended to interconnect musical instruments, today it controls lights, explodes bombs, hurls jeeps through the air and probably even makes a good latte in somebody's studio. MIDI does have limitations in large systems, though. It has only 16 one-way channels of communication (per cable), and the standard specification does not provide any generic way to adjust equipment controls—each manufacturer does it differently.

So, in 1988 IED decided its digital control technology had broader applications and decided to share it with the industry. With the aid of Bob Rodgers at Altec Lansing, the IED system was overhauled with a new protocol, documented, and pushed through the AES standardization process. The result was PA-422 (or, as the AES calls it, "AES15"). PA-422 excited the professional audio industry in the beginning, but as people started to apply it to large systems, its limitations began to erode its popularity. The AES standards group (now called "Subcommittee 10" or "SC-10") responsible for PA-422 is still hard at work, writing new standards that will hopefully fulfill everyone's wildest desires for a large, flexible, real-time multimedia system.

In 1986, Richmond Sound Design began shipping its COMMAND/CUE programmable theater sound control system to theaters and theme parks. COMMAND/CUE quickly became an industry standard for automating theatrical performances. Charlie Richmond, inventor of COMMAND/CUE, used his experience to lead the development of MIDI's Show Control specification, which was finally ratified in 1991.

In 1987, Crown unleashed its own IQ computer control system. Although most people think of IQ as a "network," Crown stresses that IQ is a "distributed intelligence" system that works on top of a network. Actually, IQ is designed to provide control and

—CONTINUED ON PAGE 117



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World Radio History

—FROM PAGE 97. SOUND CHECK

whom RSA worked on a recent U.S. tour. RSA has been out with the Spin Doctors since September '92, starting with the European leg of their tour. Personnel for that tour includes Michelle Sabolchick (FOH), Sean Giblin (monitor) and Tom Giannoni (system tech). Before leaving the U.S., the Spin Doctors played three nights at NYC's Beacon Theater. Other recent RSA clients include a year-long run with They Might Be Giants, as well as various NYC-region one-offs with acts including Robert Cray and Big Audio Dynamite.

CROWN IQ INSTALLS CONTINUE

Crown's IQ 2000 computer control system continues to find homes in a variety of installations, including Denver's Boettcher Concert Hall and the ice arena at the University of Michigan. The Boettcher Concert Hall is part of the Denver Performing Arts Complex and was originally intended for symphonic music performances. However, a desire to make the hall suitable as a multipurpose venue prompted the installation of a new sound system. Design work was done by Ed Logsdon of David L. Adams Associates Inc. The 2,634-seat hall was equipped with 15 Crown Com-Tech amps controlled by a Mac-based IQ system. EAW KF600i and KF691i speakers are used. IQ allows control over 15 individual amps (which are remotely located) from the house mix position.

The University of Michigan Ice Arena uses computer control for push-button reconfiguration of its system. Eight presets allow the audio system to be used for events ranging from hockey games to commencement exercises. Installation and design of the system was performed by Max Krueger of Mavri Inc. (Jenison, Mich.) in conjunction with Larry Walburg of Media Design Consultants.

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LIVE SOUND

BERNHARD BROWN TOURS WITH PANTERA

Bernhard Brown (Dallas) supplied full sound, lighting and trucking to Pantera's recent U.S. tour. Sound equipment fielded on the 60-plus dates included BBI's Crest-powered Turbosound TMS3s and TSW24 subs, Midas XL3 console, Yamaha PM2800 monitor board and signal processing gear including Aphex, Yamaha, Klark-Teknik and Drawmer. Longtime Pantera house mixer Aaron Barnes chose the TMS3/TSW24 combination because "this is one of the few systems that can really deliver the low-end power demanded by the band." He also notes the ease with which the rig can be re-configured for a variety of venues. Other personnel on the tour included band monitor engineer Kevin Gill and Bernhard Brown's system engineer Jeff Palmer.

UPCOMING RIGGING SAFETY WORKSHOPS

The Masters Class in stage rigging (Level 1) has announced its 1993 schedule. In Louisville, Ky., from June 13-20, contact Richard Nix, Musson Theatrical, at (502) 367-1900. In Denver from July 11-17, contact Bob Bauer, Theatrix Inc., at (303) 922-0505. Areas covered include rigging components and inspection; structural considerations; rope and wire rope selection, use and disposal; flying performers; and liability and risk management. Instructors include Rocky Paulson of Stage Rigging, Randy Longerich of New England Ropes, Peter Foy, Dr. Randy Davidson, Wally Blount of CM (chain motor manufacturers), Bob Beebe of the Crosby Group, John Gray of Bowman Distribution, and Jay Glerum, author of *Stage Rigging Handbook*. For general information on the workshops, contact Dr. Randy "Doom" Davidson at (909) 625-5961. ■

—FROM PAGE 113, COMPUTER CONTROL monitoring of Crown's amplifiers, signal routers and mixers, and has been installed worldwide in many high-profile systems. Crown is now offering IQ to other manufacturers. To date, White, TC Electronic and Rane have licensed the right to build IQ-compatible equipment.

In 1989, Lone Wolf introduced a network called MediaLink. MediaLink is a "carrier" system that encapsulates other protocols into a single multimedia (there's that blasted buzz word again) environment. Early MediaLink systems carried MIDI and RS-232 data and were used in a number of recording studios and large touring systems. In 1991 Lone Wolf began to work with Rane and QSC to develop MediaLink-based signal processors and amplifiers. Today, 12 manufacturers are developing MediaLink-compatible equipment, and nearly 50 more are in negotiations with Lone Wolf.

In 1990, Crest introduced the NexSys system for controlling and monitoring its amplifiers. The first NexSys system went into the Kremlin, followed by a number of other installations. [See last month's "Disneyland's FANTASMIC!" profile—*eds.*] Crest designers gave NexSys a direct interface to MIDI, allowing it to communicate with the vast world of existing MIDI equipment. Crest is planning to license NexSys to other manufacturers in the future.

Also in 1990, a company named Intelix introduced a system called MindControl. MindControl consists of modular building blocks for controlling audio, lighting and other media. Intelix sold all the MindControl hardware to Mark IV in 1991 but retained rights to the network protocol (known as MindNet), which is available for licensing to other manufacturers. Intelix will soon introduce a graphical user interface environment called MindView, which gives consultants and end-users a toolbox for designing their own control environment to a number of underlying networks.

As you see, this will be the decade of computer control and networking. This article has only exposed the surface: I haven't told you about all the systems in Europe, the consumer systems for your home or the many custom and proprietary systems out there.

So where does all this leave us? Will the industry settle on one system, accommodate several, or will something new and better come along? One thing is for sure: This is not the time to

be a passive observer. This is the time for all of us, from manufacturers to end-users, to discuss our visions for future systems and take part in their creation.

Next Month: Why are we complicating things with all this computer control stuff anyway? ■

Bob Moses is a senior digital audio engineer for Rane Corp. and a longtime participant in the AES computer control standards process.

Small

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PIONEER LASER ENTERTAINMENT S-V7000

PLE (Long Beach, CA), the karaoke-based subsidiary of Pioneer, makes its first foray in the pro sound arena, introducing an 800-watt speaker system that is said to provide a max SPL of 126 dB. The system combines four 6½-inch woofers with six 3¼-inch tweeters, which are angled for wide dispersion. High-impact cabinets, built-in handles and the small size of the system enhance its utility for both karaoke and pro uses. A matching subwoofer, Model S-V5500W, is also available for full-range, high-power applications.

Circle #213 on Reader Service Card

AKG TRI-POWER MICS

AKG has introduced its new Tri-Power Series of condenser mics, designed specifically for live performance. The hand-held C5900 (\$449) features the TPC-I condenser system for smooth off-axis frequency response, hypercardioid pattern, and triangulated body design for comfort and control. The C5600 (\$579) uses the large-diaphragm TPC-II condenser system and has a built-in stand adapter. Both models use AKG's InterSpider suspension system to provide shock protection and minimize handling noise; three selectable bass contour curves adjust for proximity effect and instrument characteristics.

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YAMAHA PM4000M MONITOR MIXER

The stage monitor version of the PM4000 console, this unit is available in 44- or 52-input configurations. The PM4000M features eight VCA groups and eight mute groups, and can perform 22 discrete mixes (18 primary, 2 stereo). The mainframes are the same as the 40- and 48-channel versions of the PM4000. The PM4000M also shares the 4-band, fully parametric input EQ of the PM4000 FOH console. Yamaha (Buena Park, CA) will begin distribution of the PM4000M in mid-1993.

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ELITE STAGE MONITOR

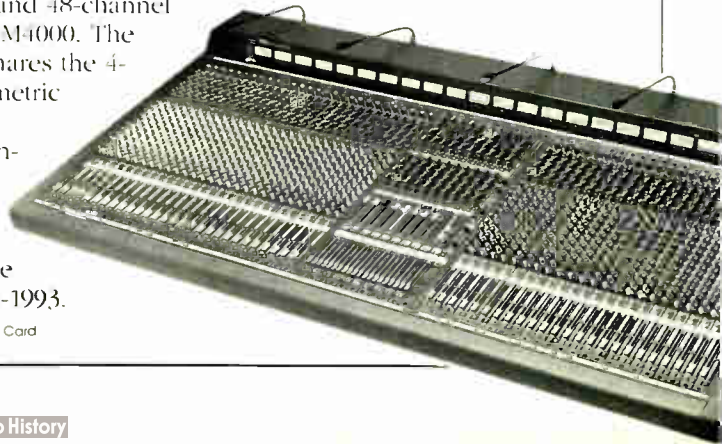
The new EX-350M stage monitor from Elite (U.S. distribution by Yorkville of Niagara Falls, NY) has an angled horn for better onstage throw, while its low profile improves sight lines for audience members. Listed at \$799, the 350-watt EX-350M provides 102dB sensitivity from a 12-inch speaker with horn enclosure. The angled design allows tight multiple-unit arrays, while a built-in stand mount enables the EX-350M to be used in other P.A. applications. A P-350 processor is available for full-range sound or as a crossover with subwoofers.

Circle #215 on Reader Service Card

RANE CM 86

From Rane Corporation (Mukilteo, WA) comes the CM 86 Commercial Mixer, an 8-in, 6-out rack-mount unit designed for use in live sound installations. Each input channel has switchable mic/line inputs, phantom power, insert loop, EQ, two assignable aux sends and assignable master sends; transformer coupling is optional. The master section features two sets of concentric stereo outputs, plus separate tape/CD inputs with individual sends to aux A/aux B/master for controlling background music levels in different zones. Other features include two aux returns, Flex Bus in/out jacks, assignable headphone amp and master loop, as well as XLR, terminal strip and ¼-inch TRS connections.

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Working With

Wireless

In any wireless situation, you're dealing with a whole mess of variables," says Gene Iacono of Gient Communications (Walnut, Calif.), whose company does wireless work for everything from broadcast to theme parks to churches. "First and foremost, you have to know the parameters of your equipment. [If it is] of a certain caliber and quality, that variable is at least minimized. The second is to try to get a handle on the environment. When I say environment, I mean the presence of other radio communication devices, VHF and UHF television stations, on-site paging or closed-circuit television—try to learn what the fixed sources of hostile interference are."

One of the most vexing problems of wireless, according to Iacono, is that "everybody and nobody owns the airwaves. You're subject to all sorts of legal and illegal interference. When I say minimize the variables, that's the best you can ever hope to do—it'll never be 100 percent. [One day] you'll get people that have really high-power illegal amplifiers causing crazy things to happen, and then you won't see them for a month."

Gient's first step is a site survey starting with questioning venue staff about known sources of potential interference. "Let's take a hotel convention cen-

by David (Rudy) Truhitt

A blue-tinted photograph of a vintage-style microphone, possibly a Shure SM57, positioned vertically. The microphone is dark and stands out against a light blue background filled with several overlapping, thin, circular lines that create a sense of depth and movement. The text is centered on the left side of the page.

*Two veterans share
their thoughts on dealing
with the world outside.*

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PATRICK WEBER ENGINEERING

ter," Iacono says. "You have satellite antennas on the roof, all the pay-per-view channels, plus the hotel's in-house [informational] channels. Basically, you have every VHF and UHF channel being used for something." All this closed-circuit TV is wired throughout the building and, if properly shielded, can operate as its name implies—as a closed system. However, this isn't always the case.

A multipurpose ballroom could be wired for in-house video and "those jacks," warns Iacono, "are not always properly terminated. They could be spewing out broadband interference on every channel. Some poor, naive sound guy comes in and doesn't realize he is five feet away from an RF spigot that is blasting him. That's part of what you try to find *before* you crash and burn."

House mixing engineer Dave Morgan, whose last U.S. gig was Paul Simon's recent epic "Born at the Right Time" tour, echoes the importance of a site survey before the gig. "The most important thing is to have a good rapport with your production manager," he explains, "so when they advance the building, [they can] find out what transmission facilities are nearby, and what type: TV, FM, etc. You have to expand your awareness beyond the bus and backstage. Break that bubble and find out what's going on outside."


Although his outing with Simon did not use any wireless vocal gear ("Nothing replaces a good mic on a good cable going into a good pre-amp"), Morgan's last tour represented an intense exercise of wireless technology—32 simultaneous wireless vocal channels. Two weeks before its opening, Morgan was called in to design the audio for an Australian revival of *Jesus Christ Superstar*. The show tour did unprecedented business in five Australian cities and was seen by 20% of the population of Melbourne and a remarkable 5% of *all* Australians. "It was an absolute all-star show," Morgan says. "John Farnham was Jesus. He's the top entertainer in Australia, one of the best tenor voices you've ever heard, and the other cast members were of similar popularity."

"At the first night in Perth," he recalls, "when we opened the second act, we had 12 mics on the chorus with Jesus and Judas singing 'Look at all my trials and tribulations.' This turned out to be surprisingly appro-

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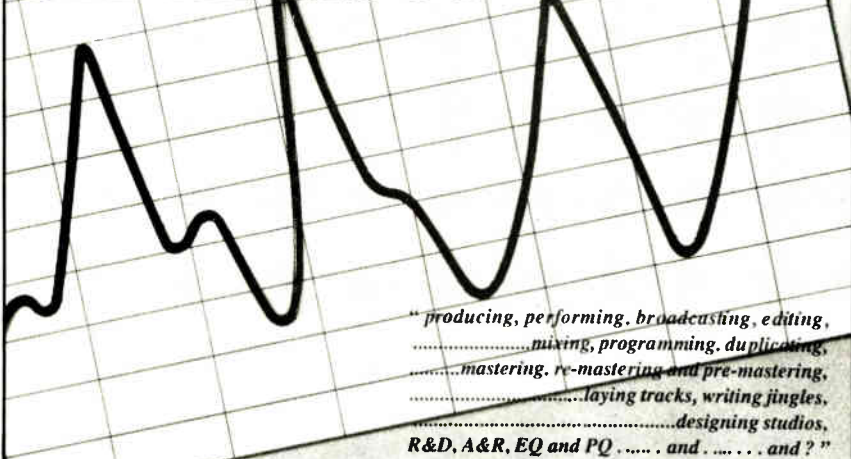
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priate because right next door was a microwave broadcast facility that took out nine of the 12 chorus mics. So there were just two or three guys in the chorus singing for 30 seconds! There was all this white noise, and we were just turning off mics."

Fortunately, most of the tour's wireless experiences weren't quite so dramatic. They carried a number of different wireless units, including 18 UHF Sony systems packed in the frequency space between 900 and 950 MHz, almost twice the number Sony recommends in that band. Also used were a number of Shure L Series and other Shure VHF systems. Four people were present at the house position: Morgan on the main mix, an engineer for the choir mix and two more whose main job was previewing wireless mics. Keeping the show working smoothly meant getting one's priorities straight.

"We gave high-gain transmitters and receivers to the principals," Morgan explains. "The people who only had one line [had their] mics off for parts of the show. In the worst-case situations, we simply had to punt on two or three mics."

So, you've done your best to pre-screen the venue, and you're setting up for the show. What else can you do to minimize the chance of a nasty surprise? "You have to walk the unit everywhere it's going to be in the performance," advises Morgan. "I like to get stagehands to simulate the performers and strap the pack to them and have them walk around and see what kind of problems unique to the venue or geographical area occur. Also, you can't just check them individually—you need to check all parts of the system [together]."

"Next," he continues, "create an environment within your production for radio. Are huge masses of steel blocking sightlines to both antennas? You have to work that out with the performers and the art department. Metal sets have to be grounded. It's always going to be voodoo, but if you increase your awareness of your surroundings and [create] a fail-safe network in your production, you're going to have a reasonable *probability* of success. But, there's no way to predict actuality!"

Even a radio-friendly production environment won't help you if your own house isn't in order. "In every situation," Iacono explains, "there is

a more and a less optimal way to position antennas. Every day I see antennas that are poorly assembled or placed: That can make or break you right there. [For example, preventing] the antennas from having a reasonable ground plane affects the performance of the entire system. It's possible to position an antenna so poorly that you almost might as well not have it."

An understanding of potential interaction between wireless systems is also crucial. "Our clients are using both VHF and UHF systems," Iacono notes. "A lot of people are under the mistaken impression that the two bands are mutually exclusive. But under certain conditions, VHF systems can clobber UHF systems, although it would be unlikely to happen in reverse. For the longest time, no one had much UHF out there. It was fairly uncongested in theory, although in a place like Los Angeles, there's an awful lot of UHF TV. If you happen to be in a spot where your antenna is way up on the side of a hill, or you're getting really good reception, you can get television stations way, way, beyond their normal range."

As the airwaves continue to fill up, users and manufacturers search for ways to make more effective use of an increasingly scarce resource. One such approach is frequency-agile wireless systems, but these are not without limitation, according to Iacono: "In [a conventional wireless system], the front end of the receiver is tailored so that it rejects the frequencies that it doesn't want and accepts those that it does want. So [these systems can be] specifically tuned and filtered so that only the desired frequency comes through, significantly reducing your possibility of taking an intermod hit right in the front end of the receiver.

"However, in most frequency-agile systems," Iacono continues, "the front ends are as wide as a barn. They have to be, because they are tuning over a big portion of the spectrum in order to be able to change channels. By definition, your front end has to be quite a bit wider, so you're susceptible to interference and intermodulation that occurs in the front end of the receiver, simply because it's much more wide-band in its capability to receive."

In the longer term, help may come from developments outside

the audio industry. "I expect some serious new things to happen in the next five or ten years," says Iacono. "Take a look at how the cellular system is working now. It's a technology that says, 'You're a smart transmitter, and I'm a smart receiver, and between us, we're going to find a clean channel. And when [the link weakens due to range or interference], I'll pass you off to the next cell and another clean channel.'" Of course, off-the-shelf cellular won't cut it, for obvious reasons. "It's been designed for speech communication, and fidelity is not one of their

criteria. But some of that technology could be utilized in our field."

Until that golden age arrives, one is advised to keep one's expectations in line with the complexities of the airwaves. "Remember, you're dealing with a radio link: This is not an off-the-shelf appliance, like a toaster," concludes Iacono. "You just don't plug it in, put in bread and get out toast. It's a little more involved than that." ■

Sound reinforcement editor David (Rudy) Trubitt is still trying to get reproducible results from his toaster.

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—FROM PAGE 110

even possible to program fades by using a Quick Keys Macro and storing them in the Event Editor. Of course, once stored there, they can be edited easily.

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Probably the most exciting thing about the introduction of the Dyaxis II is that we are seeing a machine that takes us one step closer to having the ability to make ideas a reali-

ty. As you become comfortable working on Dyaxis II, you begin to forget the machine. Your ideas are allowed to take precedence, and they easily become real.

When I was a teenager studying photography, I used to fantasize that one day I would be able to take pictures without a camera, somehow being able to store images in my mind, and then process them later on. The Dyaxis II is the closest realization of that kind of interplay between imagination and reality that I have ever come across.

PRODUCT SUMMARY

Dyaxis II Multichannel Digital Audio

Production System

Price: \$28,950 for an 8-track/4-channel system (including a 1GB hard disk); six processors can be combined for 48 tracks of simultaneous processing. Each processor includes multitasking CPU, eight digital signal processors, SMPTE time code reader/generator/synchronizer and four channels of digital and analog I/O.

Studer Editech; 1370 Willow Road, Suite 201; Menlo Park, CA 94025; (415) 326-7030. ■

Steve Rowland produces audio documentaries for American Public Radio and received a 1991 Peabody Award for his series on Miles Davis.

Using the Dyaxis II in Audio Post

by Jim Baldtree

Studer has taken the powerful editing interface of the original Dyaxis and added features like instant waveforms, sync cuts, collapsible cuts, real-time fades and envelopes within ingredients. They super-charged the power with 900 million instructions per second—increased the inputs and outputs to a maximum of 24 each—and called it the Dyaxis II.

In one sentence, Dyaxis II is the perfect tool for audio-for-video post-production because of its tremendous power and flexibility. Whether the task be ADR, voice-over, Foley recording, dialog editing, sound design or music editing/mixing, the Dyaxis II excels in all areas.

Synchronizing the Dyaxis II into the post environment is accomplished by means of a few simple steps via the Multi-Mix software. As Dyaxis II contains an onboard SMPTE/VITC reader/generator, it can be a master time code source or a slave device with sample-frame accuracy. The Dyaxis II word clock can be resolved to incoming time code, house sync or digital word clock from an external source.

For ADR, voice-over and Foley recording, Dyaxis II operations emulate a standard multitrack tape recorder with automated

punch-in and monitor-switching capabilities. However, with Dyaxis II, all punches are non-destructive and can be independently manipulated relative to time code location, level, fades, etc.

When it comes to dialog editing, the ability of Dyaxis II to generate waveform information on-the-fly is definitely a time saver. The other major features needed in dialog editing is the ability to auto-conform from multiple source reels and dialog splitting. Dyaxis II accomplishes the first of these tasks through the implementation of SmartLog™, which does automated loading and assembly of coded audio source material from a video edit decision list, like those generated by a CMX editor.

Splitting dialog with Dyaxis II is an effortless process using the View Pane portion of the Edit Desk. Each line of dialog can be isolated quickly using the waveform display and the cursors, which define the in and out points of each edited section. Once trimmed and edited, the lines of dialog can be dropped instantly into the assembly area of the Edit Desk, known as the Graphic Edit Decision List (EDL). The individual dialog elements can be channel-assigned either before or after they have been placed in the Graphic EDL. Additionally, the operator has complete creative control over each element's level and sync point with subframe resolution to $\frac{1}{100}$ of a frame.

For sound effects design, no matter how many real-time tracks you need, you never seem to have enough. This is where VirtualMix™

adds power to Dyaxis II. The ability to stack as many elements as you want, without working around the limitations of DSP bandwidth or "voices," is great! Most people don't realize how powerful it can be to have 25 or more layers on a single track all being mixed at seven-times real time. VirtualMix keeps the creative options open and saves the time and trouble of having to generate submixes, not to mention the disk space that is saved.

Music editing is a pleasure with Dyaxis II. The waveform looks great, which makes it easy to see what's going on. Cuts, crossfades and level changes are instantaneous, and collapsible cuts disappear instead of inverting video, which makes it possible to see the newly edited duration. In order to create different versions, the Save As... feature makes it possible to complete one version, make a copy and make changes on previous edits without affecting the original.

Though there are many different aspects to the A/V post process, Dyaxis II tackles them all with speed, elegance and efficiency. Given the fact that Dyaxis II is barely six months old, and many new features and functions are continually being added, the Dyaxis II is clearly destined to become the DAW of choice in the audio post environment. ■

Jim Baldree is the chief digital editor at the Post Complex in Los Angeles.

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RECORDING SESSIONS

MINGUS + WILLNER = MAGIC

After a few years in the recording business, most engineers have worked on so many projects that they develop specific ways to record different instruments—after all, the instrumentation from session to session usually doesn't change that much. But what happens when suddenly you're forced to work with instruments you've never even heard of? That almost no one has ever recorded before? That was the quandary facing New York-based engineer Joe Ferla when he was tagged by producer Hal Willner to work on *Weird Nightmare: Meditations on Mingus*.

Willner, of course, is well-known for interesting and eccentric recording projects in which he assembles unusual star groupings to perform the



PHOTO SUE GRHAMMINGUS



PHOTO SANDY SPREER

music of people like Thelonious Monk, Kurt Weill, Nino Rota and now, the great Charles Mingus. (Actually Willner's most commercial project was probably his left-field treatment of music from Walt Disney films.) Mingus was such an unconventional writer

Left: Charles Mingus, below: Hal Willner and below-left: Harry Parch



PHOTO JIMMY EWNER JR

that even his best-known compositions were a few steps away from the jazz mainstream, and the music on *Weird Nightmare* is by and large fairly obtuse, even by Mingus' standards. You know something strange is in store when song titles include "Gunslinging Bird, Or If Charlie Parker Were a Bird

—CONTINUED ON PAGE 131

Warren Haynes: Allmans Axe Ace's Solo Debut

One of the most pleasant musical surprises of the last few years has been the complete revitalization of the Allman Brothers—for my money the most creative blues band ever. This is no joke, as anyone who has seen the latest incarnation of the group in concert can tell you. The band really has hit a new peak: They play Allmans' classics with all the verve and gusto you could hope for, and the best of their recent material—some of it blues, some

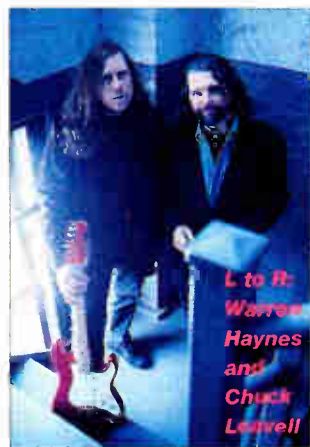


PHOTO TVRADIO NEWS

L to R: Warren Haynes and Chuck Leavell

obviously jazz-influenced—compares favorably with those classics.

The main reason this version of the group can stand up to comparisons with the original lineup is a

guitarist named Warren Haynes. This is not to take anything away from the amazing (and still underrated) Dickey Betts, the group's leader, or from Gregg Allman, or drummers Butch Trucks and Jaimoe, or bassist Allen Woody. They're all playing incredibly well. But Warren Haynes is the first player in the group to really take on the ghost of Duane Allman and come out of it triumphant. Not only does he play Duane-like slide parts with an ease and confidence that borders on the frightening—he's really internalized this music—he has his own wicked slide

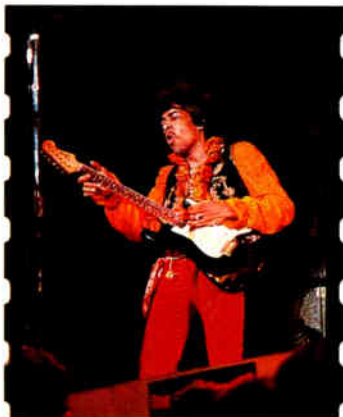
—CONTINUED ON PAGE 131

Hendrix at 50: Remembering His Life in the Studio

by Bruce C. Pilato

Despite musical trends changing and bending with the times, the undeniable influence of Jimi Hendrix on the contemporary music and recording industries never seems to wane. Many of the biggest acts in rock 'n' roll pay tribute to Hendrix by covering his songs and emulating his guitar techniques, and record producers and engineers continually try to recreate those richly textured guitar sounds Hendrix first pioneered in the studio.

November 27, 1992, would have been Hendrix's 50th birthday. As with Jim Morrison, Buddy Holly and Elvis Presley, speculation abounds as to what Hendrix might have



accomplished had he lived.

That, of course, will never be known, but a recent book called *Hendrix: Setting the Record Straight*, cowritten by journalist John McDermott and producer/engineer Eddie Kramer—who engineered all of Hendrix's legitimate recordings—seems to have the best grasp of what Hendrix was really all about while he was still alive and creating his distinctly brilliant music.

There are many who claim they were close to Hendrix and are therefore qualified to write his biography, but it was Kramer, the British recording engineer, who spent hour after hour—often alone—with the guitarist in the one domain Jimi Hendrix called home: the recording studio.

"I'm not sure I knew the real Jimi Hendrix," Kramer says. "I don't think anyone really knew Jimi that well. I worked with him in the studio for almost four years, but that's a very narrow focus. I know how he made his records. But personally he was a very tough guy to get to know."

"In the studio he was a funny man," he adds. "Jimi use to crack us up all the time with a lot of jokes. We had a very close working relationship. When we

were making those records, we were on the edge of something that had never been done before. Jimi was making these incredible sounds; no one



Producer/engineer and writer Eddie Kramer

had ever heard anything like this before. His innovations brought out my innovations, and all of a sudden I was panning the

—CONTINUED ON PAGE 133

Artist's Studio: Hit Songwriter Diane Warren

by Adam A. Dobrin

You know you're in Hollywood—near Sunset and Vine, to be exact—when the subject of your interview walks in with a pet bird on his shoulder. In this case, it's producer Guy Roche, who works mainly with hit songwriter Diane Warren. Warren also has a bird. So does Doreen Dorion, president of Real Songs, Warren's publishing company.

Forgive me, but is Real Songs for the birds? Definitely not. Diane Warren, 36, Real Song's owner and only

writer, is by any measure one of the most successful songwriters of all time. Simply put, no other songwriter in the past ten years has had more hits or charting singles than Warren.

Just in the past five years Warren's achievements have been mind-boggling. In November 1989, her "Blame It on the Rain," performed by Milli Vanilli, and "When I See You Smile," performed by Bad English, occupied the Number One and Number Two spots on *Billboard's* Hot 100 singles chart—a new record for a

songwriter who does not also perform or produce. It was also a first for a fe-



Diane Warren and Guy Roche

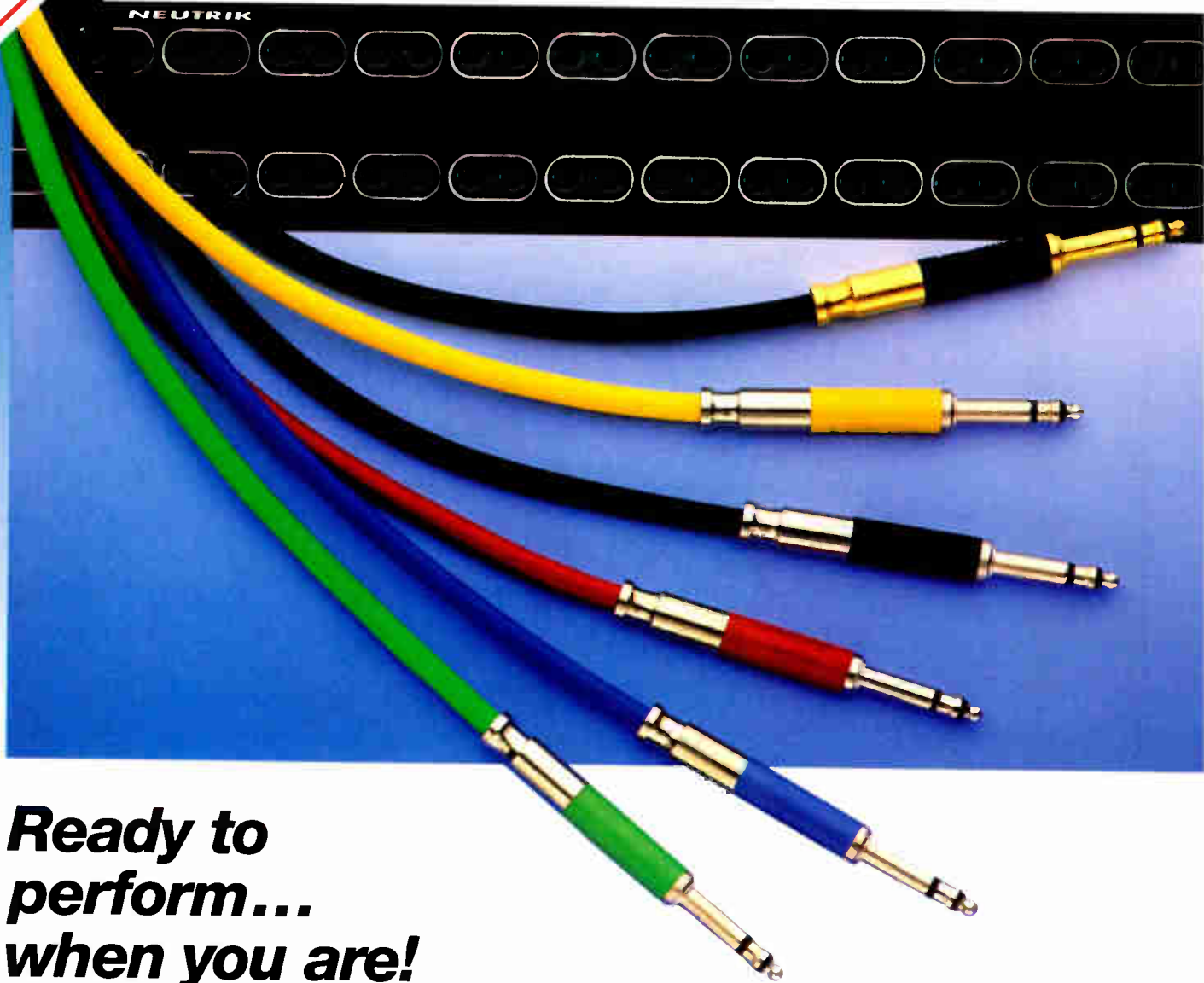
male songwriter. Warren has been ASCAP's songwriter of the year for two years in a row—another first for a female writer. Since then, she has had more than 20 other records reach the Top 10, and she is still the only songwriter to log seven hits by separate artists on the Hot 100. In all, more than 50 major artists have recorded Warren's songs.

Roche is French Tahitian, and he produces all of Warren's demos, as well as hits for such artists as Cher, Michael Bolton, Asia, Eric Carmen and others. Recently, Roche produced Warren's song "If You Asked Me To," recorded by Celine Dion,

—CONTINUED ON PAGE 134

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—FROM PAGE 128. MINGUS + WILLNER

There'd Be a Whole Lot of Dead Copycats," "The Shoes of the Fisherman's Wife Are Some Jive Ass Slippers," and "Oh Lord, Don't Let Them Drop That Atomic Bomb on Me."

In typical Willner fashion, the musicians come from all sorts of different worlds. Who else would have New York guitarist Bill Frisell, the Rolling Stones' Keith Richards and Charlie Watts, percussionist extraordinaire Don Alias, Living Colour's Vernon Reid, and Elvis Costello all on the same record? Costello, Robbie Robertson, Public Enemy's Chuck D., punk poet Henry Rollins, Leonard Cohen, Dr. John and the incomparable Diamanda Galas are the album's vocalists, in most cases offering effective short readings from Mingus' very colorful hep-cat autobiography, *Beneath the Underdog*.

But the truly "weird" aspect of the project was Willner's decision to use extremely unorthodox musical instruments—designed by American composer Harry Parch (1901-1974)—as the primary musical tools on the disc. Another noted eccentric, Parch is known for developing a musical scale with 43 tones to the octave and then building instruments to accommodate that scale.

What we hear on *Weird Nightmare* are such fanciful instruments as Cloud Chamber Bells, which are a set of giant Pyrex bottles cut to various sizes and played almost like bells; a Cone Gong, which is really the nose cone of a Douglas Aircraft gas tank; a Surrogate Kithara, which has two sets of eight strings over a small resonating box and is played with a glass rod; the Harmonic Canon, a 44-string instrument; and odd marimbas, such as the Bass Marimba, where the performers stand on a platform and strike wooden block keys suspended over resonating boxes that are several feet tall.

This marks the first time Parch's instruments have been used on a project not involving Parch's own music, though Willner did use musicians who have extensive experience playing them. Not surprisingly, recording these instruments provided quite a challenge to engineer Ferla, a veteran of countless jazz (and other) sessions through the years.

"The first thing I did was contact the guy who was in charge of these instruments, and I went down to

where they were kept," Ferla explains. "This person has a group of people who really know how to play these instruments. Well before the session I got to listen to these instruments, so I had some kind of clue as to what they sounded like. They're amazing-sounding instruments; I've never heard anything like them in my life.

"I took a minimalist approach to recording them," Ferla continues. "I thought that what I needed to do was get some presence on them, but I also needed to capture the low end. There's *so much* bottom that it's really fundamental to capture it, or a lot of smaller speakers are not going to be able to capture it in playing back this record. What I needed to do was boost higher low frequencies on it, so at least you'd get a sense of what the instrument was doing on a small speaker that didn't have 20Hz information.

"The other thing I found was that a close microphone was not going to pick up that low frequency," he adds. "This was a really large room we recorded in [Mastersound Studios in Astoria, N.Y.], and we had that room *full*. We had a set of drums, bass, guitar, acoustic piano, Art Barron's setup of dijeridoos and trombones and tubas—he was on a 9x12-foot Oriental rug. Then there was Don Byron's clarinet stuff, percussion, plus all the Parch instruments, most of which are really big. There was not a lot of open space left after we got done with the setup.

"There were so many microphones set up in the room on various instruments," Ferla explains, "and what I found was that those distant mics on other instruments helped add to the low end of these instruments, because a low-frequency sound wave needs some length to really develop. The tight mics I used on the instruments gave me the definition I needed, and I made sure the microphones I chose gave me the attack I needed from the mallet to the instrument. The distant mics that were on other things in the room gave me the low-frequency tone. I also set up a Calrec Soundfield microphone—which is a brilliant microphone—in the center of the room. [On the instruments] I used [AKG] 414s, I used some B&Ks, some Neumann TLM 170s, to name a few."

Most of the sessions were cut live on Mastersound's Neve V with

Diskmix automation; most songs required just three or four takes. Some of the vocal "narration" was done in other studios and then flown in during the mix, most of which was done at Manhattan's Eastside Sound on a Harrison 10 console. "This is an incredible board," Ferla says. "It's an analog board, but all the controls are digital, so after quite a bit of testing, checking out the EQs and limiters and every other parameter I could think of, I decided my approach was going to be to use it and not use any outboard equipment, except for a [Lexicon] 480L. I used the 480 on a real natural program: a small church program where I tweaked the parameters a little bit and tried to simulate what Mastersound was like. I used the room mic, too, but the 480 gave me a little more control.

"This is one of those recordings I'm real proud of, that was really dear to me," Ferla concludes. "Everybody involved was on top of it; these guys were serious. It was really about capturing the moment but also creating something that had a flow as a complete work." ■

—FROM PAGE 128. WARREN HAYNES

style too, and his more traditional lead playing is often breathtaking and very far removed from Duane comparisons. Because he plays in a blues-rock band that is (unfortunately) not considered on the current cutting edge of rock music, Haynes hasn't garnered the kind of accolades that the Satrianis, Vais and Holdsworths of the world have. But I'm here to tell you this guy is one of the best pickers around—he's at least a guitar demi-God—and he's just hitting his stride.

And now his first solo album is out, a tough collection of gritty, riff-heavy, blues-based rockers (and a couple of choice ballads) called *Tales of Ordinary Madness*, on the hard-rocking Megaforce label. Most of the material is consistent with the type of rough-and-tumble songs he's brought into the Allmans' songbook, but he also moves in some new directions, especially on the ready-for-radio tune "Invisible" and the exquisitely beautiful and moving ballad "Broken Promiseland." And how's this for a dose of irony: The album was produced by one-time Allman Brothers keyboard whiz Chuck Leavell, who's spent much of



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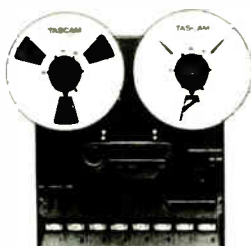
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band, The Experience. "He only got to use the studio for about four months, but when we were cutting new tracks there was a new vibe," Kramer notes. "Jimi was a very proud owner of that studio, and he was on time every night for sessions, promptly at 7 p.m. Jimi was always right there in the control room during the mixing. When we did stuff together, he was right next to me. On the early albums, he was right next to Chas."

—FROM PAGE 129. DIANE WARREN

which hit Number One on the Adult Contemporary chart and went Top 5 on the Hot 100.

With all this success, it's surprising that Warren just recently built her own project studio, a state-of-the-art facility dubbed The Banana Boat, located in Burbank's Studio Row area. Described by one producer as a "songwriter's dream palace," the facility is primarily a personal studio for Warren and producer Roche, although they will occasionally accept outside projects.

According to Roche, The Banana Boat got its name from Michael Bolton. "When I first met him, I guess I was kind of shy and he said, 'So I guess you just got off the banana boat.' I felt really humble and little next to him because I'd just met him."

But Roche hasn't been shy about assembling a first-class studio in a building he and Warren also own. The 2,000-square-foot facility features a 64/128-channel in-line board that was custom-designed by Gary Liden of Aphex Systems, Sony 48-track digital recorders, and an impressive arsenal of computers, samplers, keyboards and outboard gear that includes Genelec and Yamaha monitors, Eventide 2016s, Lexicon PCM70s and Sony R7s, Roche's favorite reverb box of the moment.

Clearly, a major key to Warren's success is the fact that she works at her craft at least ten hours a day, often seven days a week. Consequently, there is an endless backlog of songs that need to be demoed. "It just got to the point where we were spending too much money on demos, because I write so many songs," she says. "The new studio is a really good situation. We will do all my stuff, Guy's stuff, and accept outside projects we are comfortable with."

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by Philip De Lancie

MULTIMEDIA UNIVERSALIS

CAN 3DO END THE FORMAT WARS?

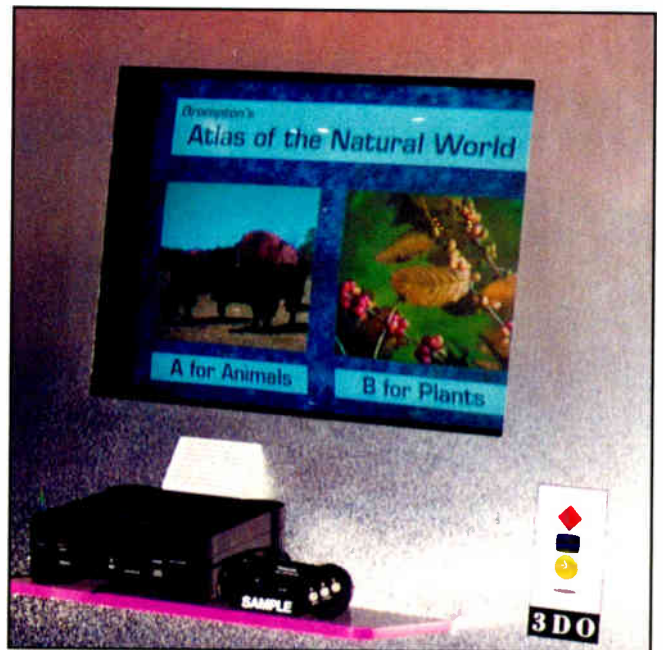
In retrospect, 1992 may well come to be seen as a pivotal year in the development of interactive multimedia. For years this industry-in-the-making has been referred to as "technology in search of a market." But evidence from the past year suggests strongly that multimedia's journey from the fringe to the mainstream is now well under way.

On the "desktop" side of the business, *Billboard* estimates that the installed base of CD-ROM drives connected to Macintosh and IBM-compatible PCs "numbers between 750,000 and 1.5 million." The number of titles designed to play on these drives (or on portable players like Sony's MMCD) has grown dramatically. The ninth edition of the CD-ROM Directory, released in December by TFPL Publishing, puts the total at about 3,500, an increase of nearly 1,400 over the prior year.

This title explosion is attributed both to established disc publishers broadening their range of offerings and new publishers entering the field. Strong interest in areas such as reference and training reflects the success of publishers in communicating the benefits of the new technology to business and home office users, whose needs are generally clearly defined. In the looser and potentially much larger market for stand-alone multimedia players—those designed to hook up to TVs instead of computers—hardware makers have had a harder time articulating the *raison d'être* of their machines and capturing the imaginations (or at least the disposable income) of consumers.

Last year saw CD-I (Philips) and CDTV (Commodore) joined in this consumer market by similarly posi-

tioned VIS (Tandy). At the same time, Sega leapfrogged the general-purpose players with an entry strongly oriented toward electronic games. But perhaps the most significant long-term development was the emergence of 3DO as a major factor, with that company's ambitious attempt to bring the consumer multimedia market to life by promoting a universal hardware standard.



Panasonic's 3DO Interactive Multiplayer, with remote, sits on a shelf in foreground. The screen shows an example of an interactive education title.

INTERACTIVE ENTERTAINMENT

The standard multimedia player pitch has so far relied largely on heart-warming imagery of all-American (affluent white) families gathered around the "electronic hearth." If

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these folks really are interested, however, in learning together about the nation's art treasures or the mating habits of the bottleneck fly, they apparently don't know it yet. General-purpose multimedia players, offering golfing lessons for Dad and geography lessons for Junior, have been out for a while now. So far, there is little indication that they are catching on like wildfire: See "Tape & Disc News."

One explanation for the tepid response is offered by industry analyst Bob Kleiber of Piper, Jaffray and Hopwood. Kleiber feels that the attempt to be all things to all people results in "middle-of-the-road" machines that are technically mediocre, with "okay capabilities at this and okay capabilities at that." In contrast, video game giant Sega has taken a more focused approach with its new CD player, which is designed to hook up to the millions of Sega Genesis gaming systems already in consumers' homes. Sega CD is free of the identity angst that afflicts its pricier cousins: You can use it to play audio CDs (and CD+G, if you can find any), but it was born to be a video game player, pure and simple.

Sega and other game system companies prefer the term "interactive entertainment" to "games." By whatever name, however, their market is booming. Depending on whom you believe, total retail value of video game sales hit \$4.25 to \$5.3 billion in 1992. That compares to markets valued at roughly \$8 billion for prerecorded music (retail software sales) and \$10.3 billion for consumer audio hardware (1992 factory-to-dealer shipments). But the game market is growing rapidly. Nintendo reported selling 6.6 million Super NES systems and 23 million SNES game cartridges for the year, while Sega sold 4.5 million Genesis systems and 16 million 16-bit games.

Despite the upward trend, Sega and Nintendo have seen that ROM cartridges have their limitations as a distribution medium. CD-ROM is far cheaper to produce and offers vastly greater storage capacity. That translates into enhanced entertainment for the user, with more and better sound, video capability and far greater "game play depth" (possible permutations and outcomes). Industry leader Nintendo has been unable to bring to



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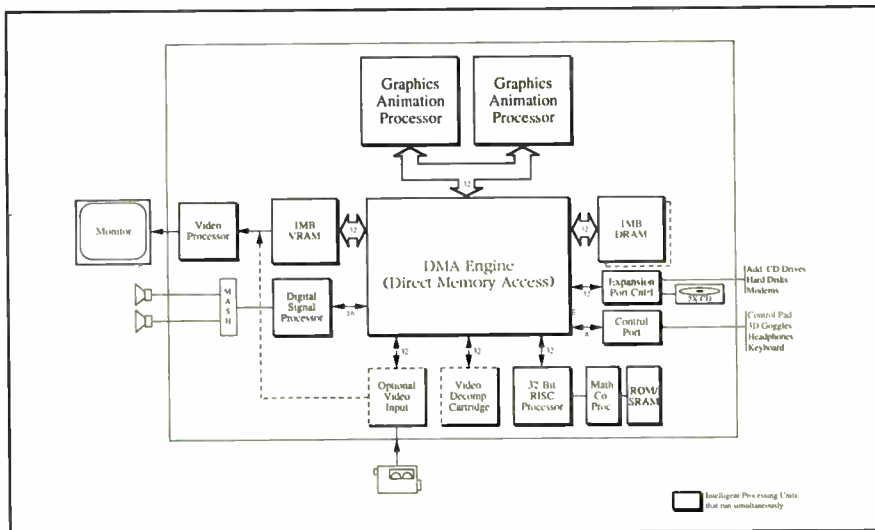
fruition its CD plans, which have included a reportedly rocky joint venture with Sony. But Sega has jumped right in.

Sega's 16-bit cartridge games, with a 12MB to 16MB data capacity, deliver graphics and animation that appear quite respectable to this uninitiated observer. But Sega CD, hooked to the basic Genesis unit, uses two Motorola 68000 microprocessors (the kind found in the Macintosh Plus), along with various custom sound and graphics chips. So better graph-

ic limitations must be overcome before interactive multimedia can become a huge market for creative services or a transforming influence on the way we educate and entertain.

LIMITATIONS

The first set of limitations is technological. The standard CD data transfer rate is about 1.4 megabits/second. An interactive multimedia designer has to decide how much of this data-stream will be allocated at any given moment to the various audio, graph-



System architecture for 3D0 Interactive Multiplayer

ics are possible on the CD system, along with better audio and special graphic effects. Particularly important to game players, says marketing director Doug Glenn, is the new realism added by the incorporation of video.

Sega CD launched in November 1992 to a warm reception from consumers. According to Glenn, dealers quickly sold out the company's initial run of 200,000 drives and 400,000 game CDs. The company projects 1993 sales of 1 million of the \$299 hardware units and 3.5 million CDs at \$50 to \$60 each.

Sega CD's fast start demonstrates that there is a market for consumer multimedia where the technology is optimized for its target application. And it suggests the opening of new opportunities, not just for CD replication plants, but perhaps eventually for providers of audio production services as well. Despite the promise shown by Sega CD however, signifi-

ic and video elements. Because video is enormously data-intensive, various data compression techniques are needed to squeeze video bit-stream requirements down into a usable range. Hardware decompression approaches such as MPEG (Motion Pictures Experts Group) and DVI (Digital Video Interactive) require special chips in the playback devices to decode the video data stored on disc. In software decompression, like that used on Sega CD, the datastream itself contains information telling the playback unit how to handle the video data.

Even with these compression techniques, there still aren't enough bits in the stream to render all elements with maximum quality. If you want full Red Book (CD-quality) audio, for example, you don't have any room left over for other elements. Part of the art of program design is in deciding how to make the necessary compromises. But no matter how artful the designer may be, compromise is evident.

In the case of Sega CD, there is a vast difference in image quality be-

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tween the animated graphics and the video. The graphics are crisp, clean and colorful. The video, at least on two of the games that Sega showed at the Winter Consumer Electronics Show in Las Vegas, is jerky and smeared. (The monsters-menacing-coeds premise of one of these games, "Night Trap," proves once again that technological innovation and social responsibility need not go hand-in-hand.)

Glenn says that video quality will improve as developers get a feel for image-capturing and compression techniques that minimize playback artifacts. His assertion was supported by a prototype shown of a new game scheduled for release later in the year. It did look better than the first-generation games. But a stunning breakthrough in compression would be required to achieve a video signal anywhere near VHS—not a particularly high standard—within the standard CD bitstream.

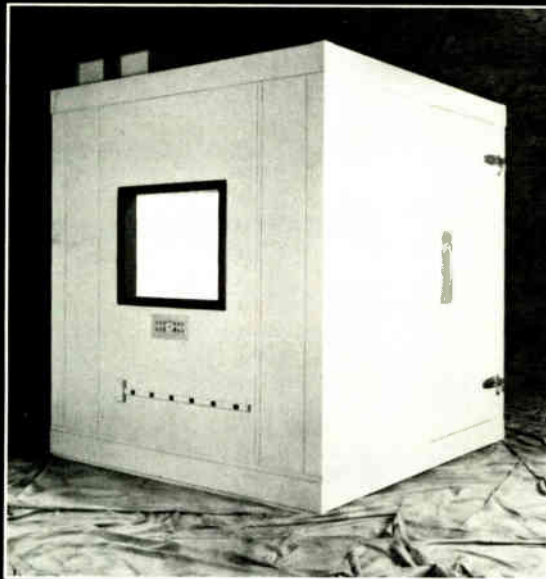
Beyond technical limitations lies the thorny question of compatibility. All of the multimedia players double as CD-Audio players, and some support the Kodak/Philips Photo CD standard. But when it comes to playing multimedia discs, the systems are completely incompatible.

For consumers, the idea that these expensive and identical-looking discs will play in some machines but not others is both confusing and alienating. For software publishers and developers, it is a source of immense frustration.

Incompatibility not only stunts the growth of the overall market, it diverts major energy and resources from the creative work of product development to the drudgery of preparing different versions for different platforms. And the uncertain outcome of format competition means that the extra effort may turn out to be a total waste. So incompatibility imposes its own limitations, discouraging developers from devoting their talents to innovative software that could help the consumer market to blossom.

3DO

To date, the most promising effort at transcending the twin evils of incompatibility and limited technology comes from The 3DO Company (San



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Mateo, Calif.), which debuted at WCES after months of speculation. 3DO is the brainchild of Trip Hawkins, a former Apple Computer marketing director who went on to found Electronic Arts, now a \$200 million per year entertainment and educational software company.

Over the years, Electronic Arts developed titles for over 20 different platforms. But only a handful of those platforms are still viable today. Reportedly frustrated with the waste of company resources on competing machines, Hawkins decided that a universal hardware standard was needed to do for the interactive multimedia market what VHS has done for the film industry. He also recognized that the standard would have to be technically advanced, offering, in his words, "a whole new level of interactive realism and responsiveness, as well as multiple-use options for the whole family." If he succeeded, there would be little reason for anyone to buy or publish for any other machine.

Hawkins established The 3DO Company in 1990. 3DO's approach differs from that of other multimedia hardware companies because it will not manufacture or sell any retail products. Instead, the company describes its mission as "developing and evolving the technology for its Interactive Multiplayer, and then licensing it to the world's hardware and software manufacturers." In that sense, the company's role will be analogous to that of Dolby Labs Licensing Corporation in the prerecorded cassette industry.

Hawkins hasn't tried to go it alone in his new venture. He has pulled together an array of "strategic partners" that testify to both the comprehensive scope and technological appeal of what he envisions. These investors include Japanese electronics giant Matsushita (Panasonic, Technics), which will also be the first hardware licensee to market and manufacture Interactive Multiplayers.

This multimedia player is only the first of many applications that 3DO foresees for its technology. Investor AT&T is involved in designing versions of 3DO, due in 1994, that can be used for interactive networking via cable or telephone lines. 3DO expansion cards are planned that will allow 3DO discs to play on personal computers. And applications are ex-

pected in coin-operated arcade games, theme park rides and exhibits.

On the software side, major investors include Time Warner, the second largest cable provider in the U.S., and the owner of publishing, motion picture and music holdings that offer a huge reservoir of potential content for the new format. MCA (owned by Matsushita) also has interests in film, television and music, as well as theme parks and theaters. And Electronic Arts rounds out the picture with its expertise in the computer software and games markets. In addition to these investors, more than 100 software houses have signed up as licensees.

THE INTERACTIVE MULTIPLAYER

With its powerful partners, 3DO appears well-positioned to realize its ambitious goals. But is the technology really spectacular enough to win over apparently reluctant consumers? The first test will come in the fall, when Panasonic brings its Interactive Multiplayer to market. The machine is expected to sell in the same price range as competing CD-I, CDTV and VIS players: around \$700. According to Hawkins, 30-40 titles are expected to be ready in time for the launch.

3DO sales and marketing VP Bob Faber estimates that 500,000 hardcore gamers will be "immediately interested" in the machine, and another 5 million "early adopters" will follow closely on their heels. This initial group of knowledgeable, affluent consumers, Faber says, will be strongly attracted to the system's interactivity. He expects sports, flight simulation and other interactive entertainment—the kind of titles that benefit most from high-performance graphics—to provide the draw on the software side, though "edutainment" titles may offer a backup rationale to justify the purchase.

A second wave of buyers, Faber predicts, will be drawn in by the "multiplayer" idea. The 3DO machine (like some of the existing multimedia formats) will play CD-Audio and Photo CD. A plug-in cartridge for decompressing MPEG video will also be available once MPEG standards are finalized. That will eventually allow users to view full-screen, full-motion feature films playing back from CD in "VHS quality."

Prototypes of the Interactive Mul-

—CONTINUED ON PAGE 174

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Tape & Disc News

WCES REPORT: DCC/MD...

January's Winter Consumer Electronics Show in Las Vegas was the first such exhibition since the roll-out of DCC and MiniDisc into stores in November (DCC) and December (MD) of 1992. Distribution was initially limited to selected stores in selected markets, with availability broadening over time. For many retail dealers, the off-site hospitality suites set up by Sony and Philips offered the first real opportunity to evaluate final production models of the rival formats.

In addition to Sony and Philips, a number of other hardware makers, including Sanyo/Fisher, Sharp, Denon and Pioneer, showed prototypes of one or the other format. These companies, technologically prepared to go either way, wanted to get some feedback from their dealers to help them decide what to do.

According to Kerry McCammon, senior manager of marketing for Pioneer, neither format was seen by dealers as absolutely crucial to their business. But he said more dealers at the show were taken with MD than DCC, in particular for its portability. Dealers already carrying both formats reported brisker sell-through for MD, especially the recording portable. McCammon cautioned that there are still customers interested in tape, and Pioneer hasn't ruled out DCC. The company's next step will be decided at meetings in Japan in February.

McCammon's observations on dealer leanings were echoed by Steve Jean, Fisher's national product manager. Jean reported that MD was the format dealers inquired about first and more frequently. Among the factors expected to help the format prevail, Jean cited MD's high-tech appeal and Sony's superior marketing and distribution muscle in the U.S. consumer market. Dealers also pointed out that it's hard to go back and sell tape after years of trying to educate customers to the advantages of discs. DCC's seemingly superior audio fidelity is apparently not expected to be an important issue.

...AND MULTIMEDIA

While 3DO and Sega made the headlines at the show (see "Multimedia Universalis," page 137), multimedia veterans Philips (CD-I) and Commodore (CDTV) were there as well. (Tandy did not exhibit at the event, and thus its new VIS system was not shown.) Philips showed its new consumer CD-I player, the CD-I 220. The unit sells for the same price as the old model 910 (\$699). It is functionally the same, but in a smaller box.

Philips had earlier been expected to show its long-promised FMV cartridge, which would upgrade CD-I's video playback capabilities to full-screen full-motion (30 frames per second using MPEG compression). Shortly before the show, however, the company indefinitely delayed introduction of the cartridge. Philips now says only that final introduction plans will be announced before the summer CES in June. A company spokeswoman downplayed the significance of the delay by noting that it made no sense to introduce the cartridges before titles using FMV are on the market. She declined to comment on whether the cartridges are technically ready.

As for CDTV, rumors of its demise are exaggerated. The question is, by how much? At WCES, Commodore's John Di Lullo told *Mix* that the system is popular in the U.S. as a low-cost delivery platform for interactive training in business applications, especially where users are less than comfortable with computers.

But while the business community had been accepting of the new technology, Di Lullo said, the company was "tired of banging its head against the wall in the consumer market." He pointed out a lack of interest in CD-I to illustrate the difficulty of getting a multimedia player off the ground. Still, he said CDTV has been meeting with some success in Europe as a "multimedia computer" (with its keyboard and mouse accessories) in consumer and "prosumer" markets. He emphasized that Commodore had not given up on the consumer market.

One further development on the interactive scene was the introduction by Pioneer of LaserActive. LaserActive machines are "combi-players" for conventional laserdiscs and CDs. But they also have optional plug-in "control packs," which allow them to

play interactive titles. The Mega-LD pack developed with Sega enables playback of Sega CDs, Genesis ROM cartridges, CD+G, and new 8-inch and 12-inch Mega-LD discs. The LD-ROM2 pack, developed with NEC, will play 8-inch and 12-inch LD-ROM2 discs, as well as Turbo Graphics cartridge and CD-ROM games and CD+G. A third pack is available for LaserKaraoke.

The LaserActive ROM formats (Mega-LD and LD-ROM2) will use the laserdisc's 540 MB of digital storage for data rather than CD-quality audio. That will give them great potential for delivering interactive titles, especially considering laserdisc's high-quality analog video signal. But the large size of the discs, and the expense of replication compared to CD, may limit widespread enthusiasm for the new system. LaserActive players are due on the market in the summer of 1993. Pricing has yet to be finalized.

SPOKEN WORD SALES UP

The Audio Publishers Association reports a dramatic upsurge in the spoken-word cassette business in 1992. A survey of APA member companies showed a 43% jump in the value of net sales, while net units sold rose 16%. Final industry earning figures for the year are expected to exceed \$1 billion.

SPLICES

The first CD plant in Indonesia, P.T. Dynamitra Tara, opened in December. According to *Billboard*, the plant has a current annual capacity of 3 million, replicated on an ODME Monoliner MK2... Music Annex Duplication has expanded its production, warehousing and fulfillment capabilities. The Fremont, CA-based company moved its fulfillment operations into a new 8,800-square-foot space adjacent to the duplication plant, allowing the warehousing of more than 1 million units of finished goods. The plant also has increased packaging capacity with the addition of a Paktec JC-7000 automated cassette J-card inserter... Fujii International (Northridge, CA) introduced replacement pinch rollers for Gauss Series 1200 and 2400 master bins and slaves. Fujii claims the new rollers offer 35% to 40% longer life than those they replace, with greater resistance to cleaning materials and oxide build-

up... Maxi Cassette Productions of Irwindale, CA, purchased two additional slaves for its Versadyne 1500 high-speed cassette duplication system. The company also installed a new J-card inserter... Randy Kling of Nashville's Disc Mastering was tapped by Epic to oversee mastering of a three-CD set chronicling the 25-year career of Tammy Wynette... Rocket Lab engineer Ken Lee mastered the latest from Digital Underground on Tommy Boy Records. Colleague Paul Stubblebine, meanwhile, was in the San Francisco facility mastering for Night Ranger Brad Gillis... Trutone

(Hackensack, NJ) was busy mastering for T.L.C. (Arista), Boy Crazy (PolyGram) and Celia Cruz (Sony)... At Clinton (NYC, not D.C.), salsa Grammy-winner Juan Luis Guerra sequenced, edited and mastered his latest for Karen Records... Electro Sound (Sun Valley, CA) announced the retirement of Bob Fonda, a veteran of the company's worldwide field service department who joined the company in 1968... BASF's 2-inch Studio Master SM 911 tape now begins with a one-minute level and frequency check as leader, recorded full-track from 31.5 Hz to 18 kHz. ■

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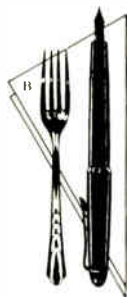
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by Mr. Bonzai

BRANFORD MARSALIS

SAX ADVANCES



In 1960, saxophone virtuoso Branford Marsalis was born in New Orleans. The eldest of six sons, his higher musical education began at Louisiana's Southern University and continued at Boston's Berklee School of Music. While still a student at Berklee, he picked up his baritone sax and joined Art Blakey for a European big band tour, and also landed a school vacation gig with the Lionel Hampton Orchestra. In 1981, he recorded *Fathers and Sons* with his dad Ellis and brother Wynton. The album marked Branford's decision to pursue the tenor sax, which he describes as "the closest instrument to the human voice."

In the early '80s, Branford joined Herbie Hancock for some world tours and recording, worked with his brother Wynton's band, and in 1985 hooked up with Sting for more

world touring and the recording of *Dream of the Blue Turtles*. In 1986, he recorded *Romances for Saxophone* with the English Chamber Orchestra, featuring music by Ravel, Satie and Debussy. In 1987, he hosted VH-1's *New Visions* and took an acting role in Spike Lee's *School Daze*. He continued his tours and albums with Sting, nabbed a series of Grammy nominations for his jazz work, and in 1992 began his five-year contract as the leader of the *Tonight Show* band. His most recent album is *I Heard You Twice the First Time*, an exploration of the blues, both basic and beyond.

I met Branford for the first time this past January at the NAMM convention and afterward caught one of his blues concerts, featuring his regulars: Kenny Kirkland on piano, Robert Hurst on bass, and Jeff "Tain" Watts on drums. Special guests were Albert Collins, Linda Hopkins and Kevin Eubanks.

In a recent conversation with Harry Connick Jr., I asked Harry to tell me about Branford. He replied, "When I first moved to New York most of the guys were older than me, and they had their own kind of clique. They could be mean, but Branford always came through as a friend, both on and off stage. I've known him since I was 8 years old, and there is not a mean bone in his body. He's a raw, natural talent—not the kind of guy who practices—he was just meant to play the saxophone. Now he is becoming this complete legend. Not many play at his level."

Bonzai: How does it feel to be a legend?



Bill Turner, Musician & Producer

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Bill Turner is an expert on professional sound studios as well as being a renowned session musician. Among his noteworthy accomplishments, he played lead guitar with Bill Haley, and most recently toured Europe with a revival of the original 1954 Comets band. He currently performs and records with his own band, Blue Smoke.

Bill is equally talented as a producer in his Brooklyn, New York, studio, Bill Turner Productions (BTP). "Being an independent producer, we often have to create the product on location and many times outdoors. This is the trickiest...anything can happen outdoors. We eliminate a lot of the 'gremlins' by using only the parts and connectors we feel are the best...and that

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Marsalis: I'm not a legend, and I don't think of myself as one. And I do practice now.

Bonzai: Are you studying with someone in particular?

Marsalis: No, I'm working on my own. I've had enough good teachers—all I might need is someone to point out some mechanical flaws in the future. Right now, I know what needs to be done, and I can do it myself.

Bonzai: Could you tell me about Robert Hurst III?

Marsalis: To me, he is the consummate bass player. There are a zillion approaches to jazz, but in the end, if it doesn't swing, then it's all for naught. He has a marvelous intellectual approach to the music, and he swings—the best of all possible combinations. He has a wonderful harmonic sensibility, and basically anything that I play, he is on it.

Bonzai: And he plays a real, acoustic, stand-up bass. Why is that so important to you?

Marsalis: Amplification is about enhancing a sound, making it louder. In these days and times, amplification *is* the sound. For instance, you hear a great guitar player on a record and they come to play live and they've got about 25 pedals. I like devices. In fact, I've encouraged my rhythm guitarist, Kevin Eubanks, to use them. I'm a fan of digital reverbs, and, in the old days, the Echoplex, flangers, processing. This has become a part of the sound of today's guitarists and bass players—that *is* their sound, and it's not just an effect.

Bonzai: Would you say the acoustic bass is more expressive?

Marsalis: Oh, it is when it's played correctly. I had a big argument with some rap friends because I said we should use acoustic bass. People don't think you can play contemporary music on acoustic instruments.

Bonzai: Well, you're known for playing an acoustic instrument and also for understanding the electronic side of music. How do those two elements fit together?

Marsalis: Electronics are fun, like the Akai EWI is fun to work with. I haven't spent as much time as I need to, but I think it is possible to

use it as an expressive instrument. Michael Brecker plays it better than anyone I've ever heard, but if you see his show five nights in a row you hear pretty much the same sounds.

Bonzai: When you're composing do you use electronics?

Marsalis: Yes, I use a computer to compose a lot of my songs simply because it's easier to throw some stuff down in the sequencer than it is to pull out pen and paper at three in the morning.

Bonzai: What is state-of-the-art for you in '93?

Marsalis: Well, I just got the new Digidesign Pro Tools last week. I upgraded to four tracks of digital audio, and I have the latest version of Studio Vision. I use the Studio 5 with all of the Opcode products because I think they're the best.

Bonzai: When you were quite young, you worked with Art Blakey and the Jazz Messengers. What did you learn from Art?

Marsalis: I realized that most jazz drummers aren't like regular drummers. Most drummers are really percussionists, but jazz drummers have a melodic sensibility that is even better than some of the instrumentalists. Art could sing Charlie Parker solos that he remembered from when Bird played with him. For instance, my drummer, Jeff "Tain" Watts, has perfect pitch, which I don't have. Tain was a multiple percussion major at Duquesne University, so he can jump on the vibes and start hittin' out bebop solos. And they sound better than a lot of the cats who play all the time.

Working with Art Blakey made me understand that the drums are a melodic instrument when played correctly. Most people don't think of the drums as a drum *set*. The monitor guys ask if you want to hear the kick and the snare. I tell them I want the drum *set*, the working unit.

Bonzai: What does your drummer's nickname, "Tain," stand for?

Marsalis: We were in Florida once

driving past the Chieftain gas stations and everyone was getting nicknames, so we called him Chief Tain—and he's the chieftain, all right.

Bonzai: Is it true that when you were young you wanted to play the electric guitar, but your father wouldn't let you do it?

Marsalis: True.

Bonzai: How did you take up the saxophone?

Marsalis: Well, I played clarinet in the elementary school band, but I didn't want to play in an orchestra. I didn't want to play Dixieland jazz, as they called it. I didn't want to play traditional New Orleans music, simply because of the avenues open to you as a musician. You have to put up with all those asshole club owners in New Orleans.

New Orleans is a town that is vibrant with culture, teeming with culture like no other city in America. No other city can say it has its own music, this indigenous sound. Almost all the people who play it are from New Orleans, and those who really appreciate it are from

New Orleans. But when it comes to an intellectual expansion of that culture, people just shut down. They can't deal with it. They can only deal with it in the folk form.

New Orleans is a tourist town, and the club owners never give the artists an opportunity to establish a clientele. Not that they could anyway, because people in New Orleans don't go to hear music. [Laughs] It's funny. They go out at Jazz Fest time, but they don't consistently go to hear music in the clubs. The club owners just want to fill those seats, and they say "Take my offer, or stick it." That's the approach.

Bonzai: Did you look up to any comedians—did any humorists shape your life?

Marsalis: No, I've just always been a "wild and crazy guy." Actually, when I was a kid, I was very much affected by humor. I remember tun-

People constantly try to compare rappers to beboppers, but I don't see that in any way, shape or form.



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ing in the National Lampoon Radio Hour, then I'd listen to Dr. Demento, and then I would run to the television to watch Monty Python. The first two records I bought, when I was ten years old, were Elton John's *Goodbye Yellow Brick Road*, and Cheech and Chong's *Big Bambu*. I've always been into humor, and my son is like that, a funny guy.

Bonzai: Well, let's get back to the music. At your concert last Saturday night, you handed out sheet music to all the guys in the band. Was that for real?

Marsalis: Well, we don't play this music all the time. We've been on a tour, but we haven't even had ten shows with Albert Collins and Linda Hopkins. And the last one was a month ago. In a way it was real, and in a way it wasn't. In case you get in a little trouble, you might need it there.

Bonzai: When you went into the Louis Armstrong tune, could you feel that big wave of energy from the audience?

Marsalis: I could tell that it was the kind of song that people can understand, but when Louis Armstrong recorded it 70 years ago, nobody understood it. It takes a while for people to catch up to the musicians.

Bonzai: How does rap music fit into all this; how is it related to jazz or the blues?

Marsalis: It's somewhat related because it's about spontaneity and improvisation, but the rappers still have to sit down and work on their lyrics. And when the rhythm is good—that shit is great, man. When you have a kid who can really rap and break up the rhythm, it's great.

People constantly try to compare rappers to beboppers, but I don't see that in any way, shape or form. Charlie Parker was 25 when he started to be considered great, and he was the greatest of them all. When you have 19-year-olds who are self-proclaimed geniuses based on selling 500,000 records, it can't really be considered an art form: If you try to grab art in one hand and money in the other, the two don't mix.

Bonzai: Was it really shocking when you left the band with Wynton and joined up with Sting? Did the jazz people hit the roof?

Marsalis: Most of the jazz people

didn't hit the roof. That was just something to say, because they didn't like us in the first place. You can pull out review after review putting Wynton down, putting us down, calling us sad-ass imitators and neo-classicists. It just sounded good in the press.

But Wynton was very upset, and rightfully so. In the years since, we've been expanding on that music in my band. If you notice, the musicians in my band are the same ones who were in his band. This means that there aren't that many musicians who can do this shit. There ain't but one Tain, ain't but one Kenny Kirkland. There are only a few who can play this type of music, the modern music. It's the same music that everybody was putting down, but nobody could play.

When you start working with musicians, you have an idea of how they sound in your head. So, you start writing music for instrumentalists, not just for trumpet, sax, trombone—you write for specific people. When we left Wynton's band, he had all this music that he had written, and there was no one to take our places. If you look at Wynton's music now, it's nothing like what it was ten years ago.

Bonzai: Well, what did you gain from the experience with Sting?

Marsalis: I became a stronger player, 'cause I had to play loud all the time, and I wasn't really an aggressive musician at that point in my career.

Bonzai: With your new record and this ongoing tour, are you pushing the blues to a new level?

Marsalis: No, I'm just doing what I like. It's just my interpretation of the blues. And working with people like B.B. King is great: He is more expansive than most of them—really open ears. John Lee plays in E, and that's it. Albert Collins loves working with us, and we love playing with him.

Bonzai: Harry Connick was pretty low-key in his piano cameo at your concert.

Marsalis: Harry realizes something that I've talked to him about a long time ago. Fame is cute, and it's nice, but in the end it will be a drag. You spend so much of your life learning how to become a good musician, so much time with something, and not

—CONTINUED ON PAGE 158

by Chris Stone

POST-PRODUCTION JUNGLE

FINDING NEW CLIENTS

D

uring my many years in the business, I often emphasized that pop music recording is tough, but the audio post-production business is even tougher. With film and TV, there are stricter budgets, more challenging format requirements, mandatory deadlines and uncompromising clients who would just as soon take your head off as say "good morning." Also, if you don't always have an on-time start, or if your machinery breaks too often, they will walk in a hot second.

If you are not totally secure about having the right equipment and/or personnel (including visiting engineers) to do the job on time and on budget, don't even think about being in this business. If you are in it, the major problem you all share is finding new clients to take up the slack of available time.

We spoke with Chris Anderson of Sound Techniques in Boston, Ken Yas of Prime Access in Los Angeles, Nancy Berke of Robert Berke Sound in San Francisco, and Pete Caldwell of Doppler Studios in Atlanta, to see how they successfully find new business in their markets. All of them shared the axioms of knowledgeable and loyal personnel, the correct equipment to satisfy the needs of the client, the mantra of "Service-Service-Service," and a pleasing environment. Each of them had their own secret spin for doing it right.

TRIED-AND-TRUE

Chris Anderson, post-production supervisor of Sound Techniques, uses tried-and-true methods, which have rewarded him with maximum-capacity business. As he says, they "must be doing something right." His

secret spin is "early telemarketing efforts by our account executive, who spent her first three months on the phone raising sales and making contacts. Also, production directories, trades and professional organizations

**"In
Hollywood,
good will and
a good reputation
generate leads
and close deals
at both the studio
and independent level."**

—Ken Yas

were prospected to further supplement the list. In addition, we give quantity discounts to our high-volume clients, an occasional commission to freelancers who use us often, and barter our sound services in return for ad space and other commodities with potential new clients to show them what we can do. Also, we are active in community affairs to enhance our facility's visibility and name awareness. Every little bit helps."

THE ROCKET MAN

Ken Yas is an old friend who has successfully hustled the nonlinear elec-

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tronic editing business in L.A. since the earliest days of Lucas EditDroid in the '80s. Hollywood is even tougher and bigger than New York in the video post business. It is the largest market in the world and the most cut-throat. Even New Yorkers like Howie Schwartz don't mess with the Hollywood big boys. They "affiliate," because it saves a lot of bloodshed.

Ken's newest business, Prime Access, has an ad with the headline "It *Is* Rocket Science," referring to video post-production. What he means is (and this is his spin), "We replace old tools with new tools. Nonlinear editing is the visual equivalent of word processing. To attract new clients in this environment, you must show that your product or facility will make post-production more creative, faster and, especially, more cost-effective. If we can't convince them of that, they have no reason to even try us or our equipment.

"Since over 90 percent of episodic television is edited electronically (feature films are also discovering the technique)," he continues, "our excellent service and support reputation is mandatory to convince our potential clients that we have a better, low-maintenance editing environment than the competition. In addition, we must be better than the other post houses at anticipating the needs of the client well in advance of the project start date. In Hollywood, good will and a good reputation generate leads and close deals at both the studio and independent level."

SOFT AND CONFIDENT

Up the coast in San Francisco, the atmosphere is historically much more mellow. Nancy Berke of Robert Berke Sound has been running a successful facility since 1976, specializing in audio-for-video, corporate work and foreign language dialog replacement. They have a large repeat client base and good word-of-mouth referrals.

Berke believes, "We are most successful in getting a job from a new client if we can actually meet with them in person. We always offer a free consultation with the manager and an engineer to analyze their project and assist them in budgeting and preparation. We also host seminars and open houses for trade organiza-

tions, which gives potential clients a chance to see our facility and meet our dedicated staff. We also do regular press releases and occasional trade magazine advertising. Our best marketing tool, though, is the studio itself. We always make sure that clients' needs are being met. We have many audio and video formats available, are maintenance fanatics, and consistently present a visually pleasing environment."

THE HUMAN APPROACH

Down in Atlanta, Pete Caldwell of Doppler Studios, a past SPARS president who has been doing a lot of things right for a long time, has a dual-market facility that services post-production clients during the day and music recording clients at night. He believes that a recording facility attracts clients from the personal style of the management. He also treats his post-production media clients like the artists they are, and therefore is a believer in the soft sell.

Caldwell says, "You can't kid a kidder, as the saying goes. We lump new business marketing or prospecting in with our broader marketing approaches. The idea is not a targeted direct sell, but rather a long-term, ongoing image campaign. This is a personal, low-key-but-persistent effort aimed at image building, brand awareness and name recognition. Our major tools to accomplish these goals are a good, solid public relations campaign, a flexible targeted mailing list that presents concise and factual information about the facility, and personal contact by the owner or manager with the client on a regular basis. Don't sell too much, just ask for the business.

"Remember, the most important part of sales and marketing is keeping the business," he concludes. "You must show every client a better overall recording experience than he or she has known elsewhere. We are in the service business, and service is the name of the game. Get them in the door however you can, but once inside, keep them. That doesn't require any marketing at all, and in the very long haul, that is the best marketing there is." ■

Chris Stone is a former studio owner, a business consultant to the recording industry and president of the World Studio Group.

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C O A S T

L.A. GRAPEVINE

by Fred Jones

As I write this, L.A. is in the middle of a torrential downpour, which is causing me great frustration with items such as plastic sheeting, duct tape and bricks. However, I shall continue undaunted to bring you the latest news from the streets, although they are flooding. Boy, am I dedicated or what?

First of all, Cherokee Recording just completed a serious quarter-million-dollar upgrade of Studio 4. This room now sports a vintage 48-input Neve 8128 with

—CONTINUED ON PAGE 154

In Hollywood, Record Plant's new Neve 1 room features a 96-input Neve VRSP Legend console with GML automation; acoustic design by studio bau:ton.



PHOTO: ELIZABETH ANNAS/PHOTOSENSATIONS

NASHVILLE SKYLINE

by Dan Daley

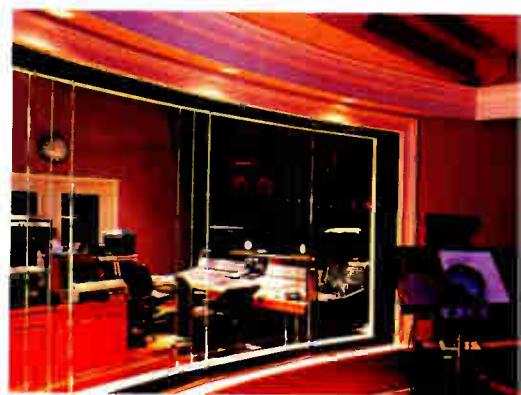
Sign O' the Times: You gotta call long distance to see what's going on locally. As reported a few months ago, Devonshire, an audio post house in North Hollywood, Calif., purchased nearly three acres in Brentwood, a Nashville suburb, intending to build a recording and post facility. Plans have crystallized some since then, according to studio owner David Mancini.

The 40,000-square-foot facility will be a four-roomer, each capable of music and post work. There will also be a 50x90-foot shooting stage with its own control room, and ADR and Foley capabilities are being considered. Design will be by R.L. Light and Henry Bledsoe Jr. of The Genesis Group, with acoustic consulting by George Augspurger. The facility will also feature an indoor swimming pool, tennis court and putting green.

While the facility is intended for commercial use, Mancini said that its main focus will be to support a new independent record label that Devonshire is starting. Negotiations are now underway with a major label for distribution. Despite the fact that the record industry and the studio industry are both somewhat saturated in this region, Mancini said he's confident that a "well-managed independent label with its own recording facilities can compete."

Also coming from

the left coast is a joint venture between Ocean Way owner Allen Sides, engineer Bill Schnee and Memphis and L.A.-based Gary Belz of Kiva fame. They purchased the shuttered 18,000-square-foot Tony Alamo church on the Row and will construct a self-designed two-room studio inside it. Sides said



The Bennett House, a studio built into a Victorian house in Franklin, TN, recently underwent major technical and architectural renovations. Yellow Elephant Music Inc. (Bennett owner Keith Thomas' production/publishing company) occupies a newly added 1,700 square feet of studio and office space and features a Calrec UA8000 automated console, a Sony PCM-3348 recorder and a formidable array of MIDI gear.

the studio, expected to open sometime later this year, will follow the Ocean Way pattern of large, live rooms and custom discrete consoles and monitoring. Sides wouldn't disclose a dollar value on the project, but said that costs would be watched closely.

On the subject of migrating to an already cluttered studio environment, and one complicated by a network of producer-owned facilities with strategic alliances with major labels, Sides was forthright, saying that while Nash-

—CONTINUED ON PAGE 154

C O A S T

SESSIONS & STUDIO NEWS

by Jeff Forlenza

SOUTHERN CALIFORNIA

Aaron Neville was at L.A.'s Capitol Recording Studios with producer Steve Lindsey and engineer Gabe Veltri tracking the follow-up to his megahit *Warm Your Heart*... Hot producer Michael Wagener was at Scream Studios (Studio City) working on a couple of projects: He mixed the upcoming EMI/London release from Helloween, and he edited and sequenced the upcoming Ozzy Osbourne live album for Sony Music on the DD-1000 optical disc system... Engineer/producer Bill Metoyer tracked the serious sounds of Tourniquet at Silver Cloud Studios in Burbank. Metoyer operated the Trident Series 80 board and Sony 24-track on the in-your-face project for Metalblade/Frontline Records titled *Pathogenic Occular Distance*... At Aire L.A. Studios (Glendale) Eric Thorngren and Bobby Sommerfeld mixed the latest Capitol Records release from Johnny Clegg. Hilton Rosenthal produced the South African world music sensation with assistance from Rob Seifert and Mike Scotella... Ronnie DeVoe (Bell Biv DeVoe) was at Hollywood Sound Recorders overdubbing his latest PolyGram/DeVoe Records release with producer Bobcat, engineer Jay Lean and assistant Doug Boehm... MCA artist Mary J. Bilge was at L.A.'s Studio Masters mixing a song for an upcoming soundtrack, with producers Ky Griffin and Ike Lee, and engineer Robert Brown... Producer David Kershenbaum (Tracy Chapman, Joe Jackson) was at Hollywood's Music Grinder Studios working with EMI artist Joshua Kadison. Kevin Smith engineered the sessions with assistance from Lawrence Ethan...

SOUTHEAST

At Sound Stage Studio in Nashville: Marty Stuart worked with producer Richard Bennett and engineers Rocky Schnars and John Thomas II; and McBride & the Ride came in with producers Tony Brown and Steve Gibson and engineers John Guess and Marty Williams. Both projects were on MCA Records... Butch Vig was at Triclops Sound Studios (Atlanta) with alternative band Smashing Pumpkins recording their first album for Virgin Records. Vig produced the project with engineer Mark Richardson... New country sensation Blakey St. John recorded her debut album with producer Larry But-



ler at Nashville's Eleven Eleven Studios. Joining St. John and Butler for the sessions were engineer Billy Sherrill and veteran musicians Nigel Olsson (Elton John's drummer), guitarist Brent Rowan and bassist Bob Wray... Columbia/Sony recording artist Peabo Bryson was at Musiplex Atlanta working on his new release. The sessions were engineered and mixed by David Norman... Flat Duo Jets—forerunners of the

—CONTINUED ON PAGE 155

N.Y. METRO REPORT

by Dan Daley

Back in February, I reported a meeting between New York studio owners and the city government that would hopefully open a dialog between them to provide some sort of municipal attention

Chuck Berry and Little Richard at Omega Studios (Rockville, MD) during prerecording sessions for Bill Clinton's inaugural gala.

for this industry in New York.

A similar dialog also got underway early this year between the mayor's Office of Film, Theater and Broadcasting and David Letterman's producer, Robert Morton, according to a *Post* story. With Letterman's move from NBC to CBS, New York is trying to head off the possibility of the late night talk show switching coasts.

—CONTINUED ON PAGE 157

—FROM PAGE 152, L.A. GRAPEVINE

GML automation, completely refurbished by the legendary Cherokee tech staff.

This unique studio features a control room and studio that are separated by double acoustic sliding glass walls, which allow for traditional live recording with the wall closed. However, when you open the wall, this spacious suite will accommodate the largest synthesizer or outboard rack imaginable. The monitors for this room are a custom JBL component system designed by the famous Steve Brandon. (I used to know him when he was just plain "Coco.")

Also recently upgraded was Studio 2. Now sitting in the extremely large (and very posh) control room is a 64-input SSL 4000 G Series console with Total Recall. This room also features a living-room-style design, so you can feel comfortable during your session and still have enough room for the outboard stuff that inevitably enters into the control room.

This studio also has a huge entertainment area in the rear that can be used for synth or outboard gear, or it can accommodate the largest entourage (the politically correct term for

"hangers-on"). A large, free-standing George Augspurger monitor system with subwoofers completes the upgrade of this room.

The first and second Neve Capricorn consoles in North America will be installed at Santa Monica's Pacific Ocean Post. (Isn't it nice to know that they're both going to the same home and won't miss each other?) The Capricorns will be housed in two main mixing/re-recording suites that are nearing completion in P.O.P.'s new 17,000-square-foot audio facility, which is adjacent to its 30,000-square-foot video facility.

Add to this a third mixing/re-recording suite with a new AMS Logic 1 digital console, and two prelay suites, and you have a very nice all-digital audio post-production facility right near the beach.

As for the reasons they purchased the Capricorns, president and CEO Alan Kozlowski said, "We tested the Capricorn boards ourselves at Abbey Road Studio in London. After hearing both the analog recording and the all-digital mix, the digital sound really opened up. The Neve gave a spatial presence to the mix and an unmatched sonic quality, even to the silences."

Oh, and in case you didn't already know, P.O.P. (no relation to the old amusement park in Santa Monica) acquired Digital Magnetics and the well-known and respected Bruce Botnick late last year, so the new Neves will probably get quite a workout.

And now for some "Quick Bits." Otari and FMT Audio have opened a new demo facility where you can play with their latest versions of both the Series 54 console and the ProDisk-464 Digital Audio Workstation, along with selected Otari tape machines.

Bruce Conover, "The Studio Guy," called to tell me that he has been very busy with studio sales recently. Among them are Producers 1 & 2, which was purchased by West Beach Recorders—contact Donnell Cameron at (213) 461-6959 for details—and Granite Records, which is the old Silvery Moon Studios at 326½ N. La Cienega Blvd. Jim Daily is the man to talk to about this at (310) 659-8565.

Now for my favorite part of this column, "Overheard at the Hamburger Stand." While waiting for my lunch date, I was perusing the latest copy of the "Signals" Catalog (Available from the WGBH Educational Foundation, P.O. Box 64428, St. Paul, MN 55164), and there on page 38 was an item that I think is destined to become required standard attire for all HARP member studios. Available as a T-shirt, sweatshirt or coffee mug, it says "I am a professional. Do not try this at home." It probably loses something in the translation, but it struck me as funny. Hey, maybe I'll wear one to the next HARP meeting. ■

—FROM PAGE 152, NASHVILLE SKYLINE

ville is crowded, the market here can support more large, world-class rooms. He also feels that a new facility of this type, as well as ones like it that already exist here, can maintain a rate structure that will keep them viable and above the cost-conscious fray that's developing as competition increases.

Russ Berger is redoing the Sony/Tree in-house studio, which is being upgraded as part of Sony's new office complex on the Row. Tom Bulla is the architect. According to Tree Productions general manager, Pat McMakin, the new Sony room stays true to its school, with a Sony 3056 console and Sony 24-track digital deck planned for installation. The console will have ten plug-in API modules and JL Cooper automation. ■



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—FROM PAGE 153, SESSIONS & STUDIO NEWS

Chapel Hill, NC, music scene—were at **Kraptone Studios** (Chapel Hill) with producer **Caleb Southern** working on their fourth album...The band **Kidd Gypsy** used the newly installed 24-track ADAT system at **Powersound Studio** in Clearwater, FL, when they recorded their latest project with chief engineer **Jordan D'Alessio**...

NORTHEAST

Omega Recording Studios (Rockville, MD) played host to a series of major sessions as artists prerecorded material for their inaugural gala performances. The Inaugural Gala All-Star Band (which consisted of **Chuck Berry**, **Little Richard**, **Stephen Stills**, **Max Weinberg** and **Nathan East**) worked in Omega's Studio B with engineer **Brian Gerstner**. Other gala artists at Omega included **Barbra Streisand**, **Barry Manilow**, **Gregg Allman**, **George Duke** and many others...Famed cellist **Yo Yo Ma** was at **Sound Techniques** (Boston) with a camera crew to tape a performance for the CBS series *Street Stories*. **Jim Anderson** engineered the sessions while Boston's CBS-affiliate WHDH-TV videotaped the event...Vibraphonist **Dave**

Samuels mixed his latest GRP release, *Del Sol*, at **BearTracks** in Suffern, NY. **Larry Swist** engineered and co-produced the project with **Samuels** and assistant **Stephen Regina**. Guest musicians included **Andy Narell** on steel drums, **George Strunz** on acoustic guitar, **Danilo Perez** on piano and **Richie Morales** on drums...**Monster Magnet** recorded and mixed their A&M Records debut at **The Magic Shop** in Manhattan. The album was produced by bandmember **Dave Wyndorf** and engineered by **Steve Rosenthal**...Heavy metal act **Wizards** were at **BMG/RCA Studios** (NYC) completing their upcoming CD, which will include a remake of **James Brown's** "I Feel Good." **Glenn Kolotkin** engineered the **Wizards** project...**Billy J. Kramer** cut tracks with the band **Chrome Omen** at **De Facto Records Studio** in Locust Valley, NY...

NORTH CENTRAL

Mike Konopka and **Ron LeSaar** remixed and sweetened tracks by one of Chicago's hottest acts of the '70s, **Pentwater**, at **Seagrape Recording Studios** in Chicago for a **Symphonic Records** release. **Symphonic's** **Greg Walker**

worked in conjunction with staff engineer **Konopka** and bandmember **LeSaar** on the retrospective CD, *Out of the Abyss*, which features nine previously recorded-but-unreleased **Pentwater** cuts...Jazz quartet **Northcoast** recorded their first album at **Metro Studios** in Minneapolis with engineer **Tommy Tucker Jr.** for indie label **Black Pearl Records**...**Soundstage Recording** of **Galesburg, MI**, completed projects by **Candace Anderson**, **Knee Deep Shag**, **Country Express** and more. Engineering on the **Soundstage** projects was handled by **Joel Newport**, **Melissa Liverance**, **Benny Oldenburg** and **Jim Cummings**...

SOUTHWEST

Alternative rock band **The Blue Johnnies** recorded their album *Delirium Tremens* at **Planet Dallas** with engineer **Rick Rooney**, who mixed and produced the project with the band...At **Sound Arts Recording Studio** in Houston, owner **Jeff Wells** reports recent sessions: **Poetic Souls** (rockers who recently signed with **PolyGram**), rock acts **Z-Lot-Z** and **Cinema**, and rappers **Point Blank** and **4 Deep** all worked on projects at **Sound Arts**...

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NORTHWEST

At Fantasy Studios in Berkeley, CA: Testament were in Studio A overdubbing and mixing a Westwood One Remote recording for Atlantic records with engineer Michael Rosen; while Oaktown's funky divas, En Vogue, worked on overdubs in Studio B...At San Francisco's Different Fur Recording, Penelope Houston mixed and CD-mastered her first release for Heyday Records called *The Whole World*. Houston produced. Howard Johnston engineered and Nancy Sharlau and Adam Munoz assisted...Also in San Fran, Mango Jam recorded their first album with engineer Jane Scolieri at Mobius Music. Mango Jam combines Latin and Caribbean rhythms with Middle Eastern melodies and jazz improvisation to create their own unique sound...Ancient Future recorded their latest release at Banquet Sound Studios in Santa Rosa, CA. Warren Dennis handled all engineering duties on the project for Narada Productions...

STUDIO NEWS

Columbia College Chicago acquired more than \$1 million in production and recording equipment from Zenith/dB recording. The college also agreed to a long-term lease of the 14,000-square-foot complex at 676 N. LaSalle St. in Chicago and will convert it into classroom and lab space for its sound program. The facility will now be called the Columbia College Audio Technology Center and will house two film mix suites, a video post-production suite, a 24-track recording studio, two voice-over and production rooms, and full transfer and dubbing facilities...Smart Studios in Madison, WI—the seven-year-old facility that gained national recognition from early recordings by Smashing Pumpkins and Nirvana—underwent a complete renovation. The Russ Berger Design Group provided acoustical consulting and design services for Smart's renovation, which began with the demolition of all existing interior walls of the two-story building...After three years of planning and construction, Soundhouse Recording finally opened in Seattle. Reportedly "the first studio in Seattle to be built from the ground up," Soundhouse was designed by Chips Davis of Frank Hubach Associates and includes extensive use of diffusers and bass traps in every room...Club Dog Studios, which bills itself as "Colorado's first and only fully digital 24-track studio," recently opened in Boulder.

The studio features an Alesis ADAT, a Digidesign Pro Tools 4-channel recording system and Opcode's Studio Vision software. Club Dog also features a Peavey AMR 2400 console and Meyer HD-1 monitors. . . **Studiomedia Recording Company** (Evanston, IL) installed a Sony 3324A DASH tape machine and a Roland DM80 8-track hard disk recorder, giving them high-end digital audio capabilities. ■

—FROM PAGE 153, N.Y. METRO

something that Letterman has discussed as a possibility.

Late Night With David Letterman has been a broadcast audio pioneer, going stereo early on, using top-notch musicians and providing a platform for a wide range of new music acts almost nightly. The show also brought on Mike De Lugg, former star engineer at the now-defunct Media Sound, as an audio consultant several years ago.

Marathon Recording closed shop in mid-January. The two-room facility, once the home of artist/producer Kashif, was purchased a year ago by Juniper Entertainment from former owner David Forrest, who stayed on in management on a contractual basis. While

Forrest said that Juniper did not fully meet its obligations to him, he attributed the closure to high overhead and New York's increasingly competitive studio environment, which he said has been aggravated recently by further price cutting. However, Forrest added that there is a good possibility that another studio will open up in the space. Former chief engineer Will Schillinger said he took his own gear from the five-year-old studio after it closed, as well as some additional gear in lieu of payments owed him.

She's right, y'know: Maxine Chrein, co-owner of Master Sound Astoria in Queens, pointed out that while both the trade and general media have given much attention to the demise of the BMG/RCA studios and their large rooms, New York still has other spacious facilities, including MSA, which recently completed a 48-audio channel send/16-return fiber-optic link with Lifetime Network's 8,000-square-foot soundstage in the same facility. MSA also operates a Neve V console and digital multitracks.

"I'd be happy if RCA had remained open, since we shared a lot of clients," said Chrein. "But it's a bad slam on the industry at large in New York to say

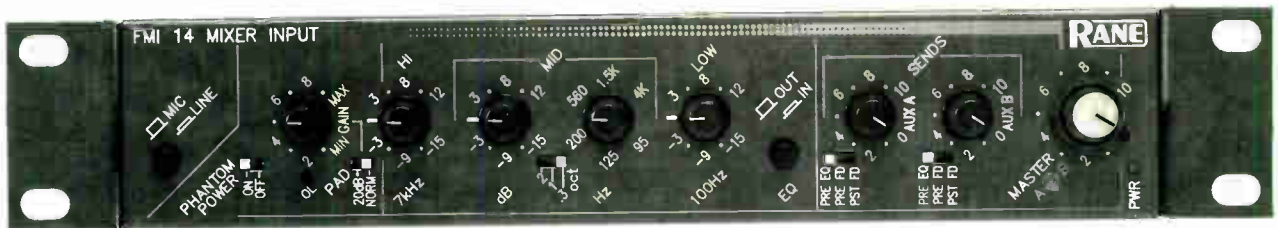
there are no alternatives. There's also Kaufman Astoria Studios. The industry needs to know there are alternatives here."

New Studio—Mixed Nuts, a division of Post Perfect, opened its doors in January. The three rooms in the facility are all equipped with SSL Scenaria systems. The facility is aimed at advertising and radio production clients, according to studio operations manager Lisa Auerbach, who added that the studio's marketing plan included bringing in engineers with their own clientele rosters, including Richard Becker, Joe Vagnoni and Bart Smith.

Power Station International, a network of studios organized by Power Station New York, has established linkage with a French entertainment entity with its own studios in Paris and Versailles. The joint venture will call for French artists to use the New York Power Station facilities as well as bring in Power Station's own production teams, headed by Tony Bongiovi, to France to do productions, said PS president Nick Balsamo.

This is all part of a larger effort to connect Power Station to other recording centers in the world. ■

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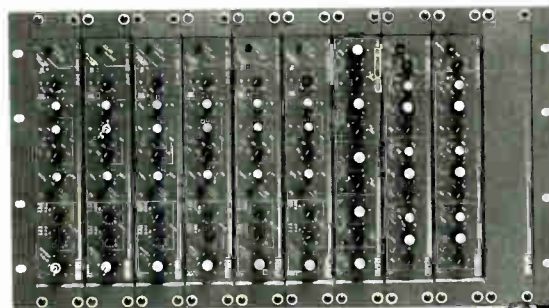


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—FROM PAGE 92, PRODUCTION MUSIC

producer can check out the music before committing to a license.

If you're familiar with the long-standing audio debates over tubes vs. transistors or analog vs. digital, then the question of buyout vs. signatory should be familiar. Also, be forewarned that very few companies offer both plans: This is strictly a case of either/or. The obvious advantage of a buyout agreement is that once the initial investment is paid off, the user is free of future financial obligations. One trade-off is that buyout libraries tend to be fairly small when compared to the signatory libraries, many of which contain hundreds of discs. After a year or so, you may start to get tired of a buyout library that once sounded so good.

On the other hand, the original media cost for a signatory library is comparatively much smaller, so you can start off with a fairly large collection of discs and pay needle-drop or per-use fees as they come along (these, of course, are passed along to the client). Many libraries available on annual or other long-term

agreements also offer leasing arrangements, which might provide a tax advantage in the long term.

One alternative is to use both types of libraries, perhaps with a buyout or long-term license library for everyday use, adding occasional needle-drop cuts on an *a la carte* basis for variety.

Perhaps the most difficult decision for any potential production music user is the choice of the library itself. This is an extremely personal and subjective decision, based on the types of material you'll be working with and the needs of your current (and future) clients. This is no easy task, but fortunately all music libraries have demos of available offerings to help you decide. Whether you go with a small "boutique" supplier or a large company having dozens of collections with hundreds of discs, you will find that adding a production music library to your studio arsenal may do a lot more for your business than yet another digital multi-effects gizmo in the rack. In fact, it may be the year's best investment. ■

LUNCHING WITH BONZAI

—FROM PAGE 148

one of your fans appreciates it.

Most of Harry's fans appreciate his looks and his voice, and that's it. They don't appreciate his piano playing at all, or his musicianship, or his melodic ability. They don't know anything about it, and they don't give a damn. Harry wanted to come out there and play. He didn't want to come out there and wave and sing. He just wanted to be a musician in our band.

It's a shame that he will never be known for the good musician he is. We were talking today, and he told me he hadn't really played piano in two years. He needs to gig, but if he does that, people won't come. He's caught, man.

Bonzai: Have you made any mistakes in your career?

Marsalis: Not like that, no, but it's not really a mistake. It's a choice you make. I played with Sting and lost my audience and had to get a new one. Then I got a new audience and

went on tour with Sting again and had to get another one. Now I'm on TV and have to get a whole new audience. I think that the L.A. audience last week was probably there to hear the blues and enjoy Albert, not there to hear us. Two years ago we were selling out big halls and playing the wildest shit imaginable. Now when we play our music we get no response at all.

When we play music that writers understand, it's seen as good music. The moment we play something that loses the critics, the same music becomes "self-indulgent."

Bonzai: You have such great self-respect—who do you look up to?

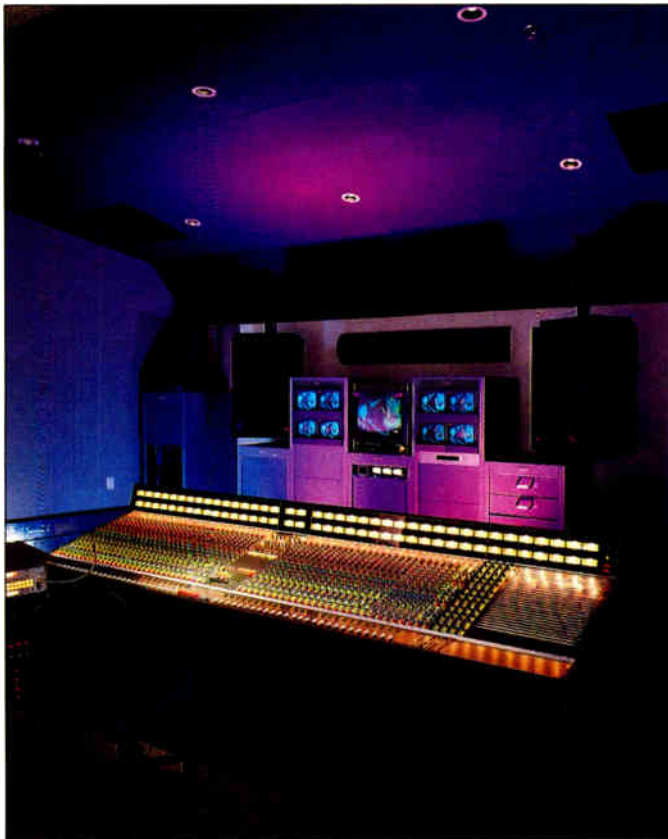
Marsalis: My parents and nobody else. They have more dignity and self-respect than anyone I know. And they were born in the '30s, in the South. To have that kind of dignity is heavy—it's really something. ■

Roving editor Mr. Bonzai is the glockenspiel-playing member of the famous musical Bonzai family.

Video Production & Post Production

Information in the following directory section is based on listing applications mailed earlier this year and was supplied by those facilities listed. *Mix* claims no responsibility for the accuracy of this information.

Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.



In Hollywood, CBS Television City's new Studio 36, along with its mirror image, Studio 46, are among the largest videotape production facilities in Los Angeles. Audio mixing for the two 15,400-square-foot stages is provided by a 64-input Trident Vector 432 console with VCA automation. Video production is centered around Grass Valley 300 switchers. The studio offers multiple tape formats, and a satellite up/downlink is also available. Recent clients include Nova, AT&T commercials and a new Dudley Moore sitcom. **Photo:** Ed Freeman.

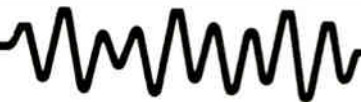
CONTENTS

161	NORTHEAST U.S. FACILITIES
165	SOUTHEAST U.S. FACILITIES
166	NORTH CENTRAL U.S. FACILITIES
168	SO. CALIFORNIA/HAWAII/SOUTHWEST FACILITIES
171	NORTHWEST U.S. FACILITIES
173	OUTSIDE U.S. FACILITIES

Upcoming Directory Deadlines:
 Independent Engineers & Producers: **April 8, 1993**
 Facility Designers & Suppliers: **May 7, 1993**
 Southern California, Southwest & Hawaiian Studios: **June 8, 1993**

Mix listings procedure: Every month, *Mix* mails listing applications to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a Bolta'ace Listing (name, address, contact) and an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department, 6400 Hollis Street #12, Emeryville, CA 94601; toll free 800-344-LIST.

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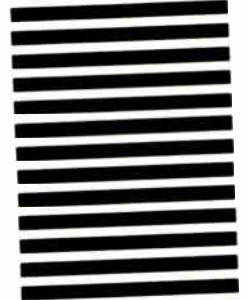
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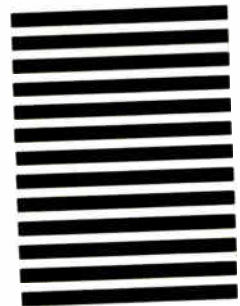
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234 East Ave.; Rochester, NY 14604; (800) 836-0438; (716) 232-1480.

DC POST INC.



1155 21st St. NW; Washington, DC 20036; (202) 466-7678. Owner: Tom Angell. Manager: Adam Hurst. Video Tape Recorders: (9) Ampex VPR-3 1" Type C, Ampex VPR-300 D-2, (4) Sony BVW-75 Beta SP, (3) Sony BVW-950 SP U-Matic. Video Monitors: (36) Sony/Ikegami. Switchers/editors: (2) Ampex AVC-330 switcher, (2) Grass Valley GVG 51-EM editor, (4) Ampex ADD w/concentrator. Video Cameras: (2) Sony DXC-3000 color camera in suites. Synchronizers: Alpha Audio Boss system w/TimeLine Lynx. Video Effects Devices: (4) ADD-3000 w/concentrator and Infinity software, Abekas A-62. Audio Recorders: Studer A820 24-track, Studer A820 2-track, NED PostPro 8-track direct-to-disk. Audio Mixers: DDA DCM-232 2x32, Yamaha MR142. Soundstages: 15'x30' w/25' hard

NORTHEAST

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ACME

RECORDING STUDIOS INC.

ACME RECORDING STUDIOS INC.
Mamaroneck, NY

ACME RECORDING STUDIOS INC.



112 W. Boston Post Rd.; Mamaroneck, NY 10543; (914) 381-4141. Video Tape Recorders: 3 machine audio-for-video lock-up, JVC 3/4" or Sony 1" video machines, 1/2" 4-track or 3/4" w/Dolby SR, A or dbx noise reduction. Video Monitors: Protoc and Sony monitors. Audio Recorders: Ddari MTR-90 MkII 24-track, Sony and Tascam DA30 DAT, MCI 1/4", 1/2" mastering machines, Dolby SR, A and dbx noise reduction. Audio Mixers: Automated 28-input Brunel discrete console, 4-band EQ, 8 aux sends, SMPTI, disk-based automation, faders and mutes. Soundstages: Studio area large enough for voice or single instrument recording, control room with full audio-for-video post-production and complete M DI complement. Other Major Equipment: Lexicon 224 digital reverb, Lexicon LXF-1 processor, Lexicon PCM41 delay line, Neve and Sontec EQs, dbx 165 discrete limiter, dbx 166 limiter/gate, Eventide 910 Harmonizer, dbx de-esser, dbx single-ended noise reduction, Symetrix phase link, DD1000 digital workstation/editor with 24-bit optical disk storage. Hard locks to SMPTE time code, 4-track playback (individual outputs) for crosstabs, SFX work, vox flying, ACR, CC mastering, etc. Akai S1100 stereo 16-bit sampler, S950, S900 samplers, Eventide H3000 with sample board. Sound effects: LucasFilms, Sound

Ideas. Hollywood Edge and Acme in-house sound effect libraries with computerized (in control room) index. Also extensive original and CD music library. Rates: Regular sweetening \$125 per hour. Specialization & Credits: 35 minutes from Manhattan, Acme is the logical alternative to high-pressure, high-cost NYC post houses. The Peoples Palace/PBS, Marilyn, The Last Interview/HBD, RFKHBD, Lincoln/ABC-TV mini-series, Russia for Sale/PBS, Atlantic Starr/Hanna Alone/HFox, all sweetening by in-house owner/engineer Jay Brown.

AMERICAN SOUND & VIDEO CORPORATION

3 Fairview Crescent; W. Caldwell, NJ 07006; (201) 575-8484. Manager: Michael Pugliese.

ASL MOBILE AUDIO



PO Box 791; Flushing, NY 11352; (718) 886-6500; FAX: (718) 886-7214. Owner: Aura-Sonic Ltd. Manager: Steven Remote.

THE AUDIO DEPARTMENT INC.



119 W. 57th St.; New York, NY 10019; (212) 586-3503; FAX: (212) 245-1675. Owner: Joe Danis. Managers: Kim Feit, Sue Danis.

BEXEL CORPORATION



625 W. 55th St.; New York, NY 10019; (212) 246-5051; FAX: (212) 246-6373. Owner: David Trudeau. Manager: Kirk Rhinehart.

BH AUDIO INC.



319 York Rd., 2nd Flr.; Baltimore, MD 21204; (410) 296-7997; FAX: (410) 296-7999. Owner: Betsy Harmatz. Manager: Lisa Dubyoski. Specialization & Credits: BH Audio offers top-quality, award-winning audio production services in an atmosphere that is friendly to producers, clients, talent...and...your budget! We're experienced in working with major agencies as well as individual producers on a full range of projects from audio-for-video sweetening to voice-over recording and editing to multitrack recording and mixing. Our specialty is MIX-TD-PIX using the AMS AudioFile Plus hard disk workstation with 1" and 3/4" audio. We also do commercial and industrial voice-over recording, editing and mixing, digital remote recording, custom SFXs, 24-track analog recording and custom music-scoring. We are proud that some of our work has been honored by Qio, Addy, BPME, Radio Festival of NY and Cannes International Advertising Film Festival, but we are most proud of our longstanding relationships with our clients.

- Video production
- Video editing
- Mix to picture
- Music scoring
- Sound editing/design
- Automatic Dialog Replacement
- Foley
- Location audio for film/video



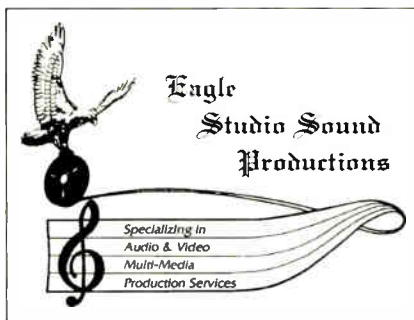
—LISTING CONTINUED FROM PREVIOUS PAGE

cyc. **Other Major Equipment:** Synclavier w/32MB, 32 poly, 32 FM, 16 outs; Studer A721, Studer A727, Dolby SR on all tracks, Quantel PaintBox and Wavefront 3-D software, Roland D-550, Yamaha TX802, optical disk. Rates: Call.

DUPLICATION SPECIALISTS



4584 Austin Blvd.; Island Park, NY 11558; (516) 432-7107; FAX: (516) 432-7091. Owner: David Schwartz. Manager: Randy Finnerty.



EAGLE STUDIO SOUND PRODUCTIONS INC.
La Plata, MD

EAGLE STUDIO SOUND PRODUCTIONS INC.



812 Washington Ave.; La Plata, MD 20646; (301) 870-2138. Owner: Joseph B. Williams. Manager: Renaldo Orenca. Video Tape

Recorders: (2) Panasonic 1960 S-VHS, Panasonic 7750 S-VHS, Sony 9600 U-Matic SP. **Switchers/editors:** Amiga A-2000 25MHz Video Toaster, Amiga A-2000 50MHz Video Toaster, (2) Amiga A-3000 25MHz Video Toaster. **Synchronizers:** Amilink V, Tascam 50/51. **Video Effects Devices:** (2) Lightwave 3D, Morph Plus. **Audio Recorders:** Tascam MSR-24, (2) Tascam 238, (2) Tascam DA30. **Audio Mixers:** Tascam 3700-32 automated, Tascam 688 MIDI controlled. **Soundstages:** 16'x18'. **Other Major Equipment:** Showmaker, (2) Art Dept. Pro, (2) Delux Paint IV, Morph Plus, Dr. T, (2) BCD-2000A. **Specialization & Credits:** Danny Galtton, Billy Hancock, Dave Chapel, Dave Elliott, Francis Thompson, Dick Van Nostrand, Joe Williams, NEECCII, Dynamo Grin, Elevation Zero, Butterfly Clan, Lost Weekend, Free Bier, Islander, Kingdom Records.

EDIT MASTERS



1000 Laurel Oak Corporate Center, Ste. 108; Voorhees, NJ 08043; (609) 784-1177; FAX: (609) 346-2697. Owner: Michelle Pruyn. Manager: Ben Benecivenga.

EDITEL/NEW YORK



222 E. 44th St.; New York, NY 10017; (212) 867-4600; FAX: (212) 682-2634. Manager: Rita Sitnick, VP/general manager. **Video Tape Recorders:** (32) Ampex & Sony VPR-3 & 2-B, BVH-2000, (4) Sony DVR-1000 D-1, (4) Sony DVR-10 & 18 D-2, (7) Sony BVW-65 & 75 Betacam. **Switchers/editors:** (8) Grass Valley VVG 300 and 200, Alpha Image 500, (7) CMX 3400 & 3100, Axial Digital. **Video Cameras:** (15) Sony CCD. **Synchronizers:** (2) Adams-Smith Zeta-3 & 2600. **Video Effects Devices:** (3) Grass Valley Kaleidoscope, (3) Ampex ADO. **Audio Recorders:** Sony PCM-3324, Studer A827, Sony PCM-1630. **Audio Mixers:** Solid State Logic SL6000E, Sound Workshop 34C. **Other Major Equipment:** Quantel Henry, (2) Quantel PaintBox/Harry, (3) Wavefront animation systems, Rank Cintel Ursa, (2) Rank Cintel MkII-C, (4) Abekas A-60 & A-62.

FLITE THREE RECORDING LTD.



1130 E. Cold Spring Ln.; Baltimore, MD 21239; (410) 532-7500; FAX: (410) 532-5419. Owner: The Ayd Corporation. Manager: Rita A. O'Brennan, VP/operations.

GWSC POST



250 Harbor Dr.; Stamford, CT 06904; (203) 965-6060. Owner: Group W Satellite Communications. Manager: James R. Crowe.

HBO STUDIO PRODUCTIONS



120A E. 23rd St.; New York, NY 10010; (212) 512-7800. Owner: Home Box Office Inc. Manager: Judy Glassman.

HELIOTROPE STUDIOS LTD.



21 Erie St.; Cambridge, MA 02139; (617) 868-0171. Owners: Boyd Estus, James Griesch.

LIGHTSCAPE PRODUCTIONS INC.



158 W. 29th St., 7th Flr.; New York, NY 10001; (212) 695-6434; FAX: (212) 695-6794. Owner: Jeffrey Poretzky. Manager: Tina Davis.

LION AND FOX RECORDING INC.



1905 Fairview Ave. NE; Washington, DC 20002; (202) 832-7883. Owners: Hal Lion, Jim Fox, Sally Lion. Manager: Rob Buhrman.

MASTER SOUND ASTORIA



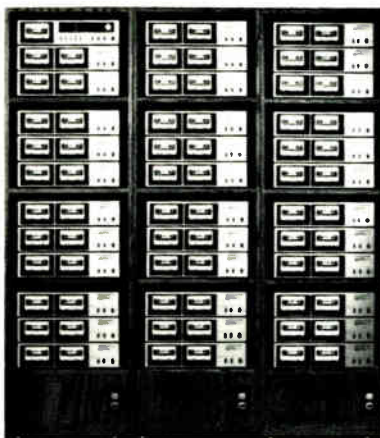
34-12 36th St.; Astoria, NY 11106; (718) 786-3400; FAX: (718) 729-3007. Owners: Ben Rizzi, Maxine Chrein. Manager: David Brownin, dir. of post-production.

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THE MIX PLACE INC.
New York, NY

THE MIX PLACE INC.



663 5th Ave.; New York, NY 10022; (212) 759-8311; FAX: (212) 838-6952. Owner: John M. Quinn, president. Manager: Maureen Miller.

MIXED NUTS RECORDING STUDIOS



220 E 42nd St., Fl. 2 South; New York, NY 10017; (212) 972-NUTS; FAX: (212) 953-1889. Manager: Lisa Auerbach. **Specialization & Credits:** Mixed Nuts Recording Studios features three audio rooms (control rooms 27'x25', studios 25'x15'). Each studio utilizes the SSL Scenaria, a 38-input fully automated digital console with 24-track hard disk recorder. Scenaria integrates the SSL ScreenSound digital editor and VisionTrack. VisionTrack is a random-access digital picture system with instant lock-up to ScreenSound and Scenaria. Mixed Nuts can accommodate any audio or video format with a full complement of microphones and outboard gear. Engineers: Richie Becker, Joe Vagnoni, Bart Smith. Go Nuts!



NATIONAL SOUND
New York, NY

NATIONAL SOUND



460 W. 42nd St.; New York, NY 10036; (212) 564-3434; FAX: (212) 947-0863. Owner: Jennifer Fish. Manager: Jennifer Corton. **Specialization & Credits:** Four mix-to-picture suites, including full MIDI capability, NEB PostPro S/D with Synclavier 6400 and 3200, 24- and 48-track music studios and PCM-1630 digital audio transfers. Complete stock music and SFX libraries. Original music scoring for TV, radio, film, commercial and corporate productions, with an experienced, award-winning staff. National Sound focuses on the creative, with composers and engineers who perform mix-to-picture, sweetening and ADR in digital and analog formats. Their backgrounds include numerous television themes and commercials, Emmy-nominated children's songs, #1 singles and compositions for the Olympic Games. Our clients include the major networks, corporations, ad agencies and production companies, who rely on National Sound for complete audio post at the same location as a state-of-the-art video production/post facility. This connection allows a project to be post-ed from start-to-finish with a unique, creative continuity.

P&P STUDIOS INC.



109 Forest St.; Stamford, CT 06901; (203) 359-9292; FAX: (203) 325-8329. Owner: John R. Fishback. Manager: Aldena Leonard.



PHOTOMAGNETIC SOUND STUDIOS
New York, NY

PHOTOMAGNETIC SOUND STUDIOS



222 E. 44th St.; New York, NY 10017; (212) 687-9030; FAX: (212) 687-9298. Manager: Bev Dichter-Jacobs.

POWER STATION STUDIOS



441 W. 53rd St.; New York, NY 10019; (212) 246-2900; FAX: (212) 586-0326. Owner: Tony Bongiovi. Video Tape Recorders: Sony D-

2 digital video, Sony BVH-2800 1", Sony BVU-950 3/4". Synchronizers: (3) Adams-Smith synchronizing systems, Adams-Smith AV-2600 system, MotionWorks system. **Audio Recorders:** Sony PCM-3348 digital 48-track, Sony PCM-3324 digital 24-track, Otari DTR-900 digital 32-track, AMS AudioFile digital workstation, New England Digital Synclavier 9600, New England Digital Direct-to-Disk PostPro, Studer A800 analog 24-track, Studer A80 2-track 1/4" or 1/2", Studer A80 2/4-track 1/2", Studer B67, Panasonic SV-3700 DAT. **Audio Mixers:** Custom 40-input Neve 8088, Solid State Logic SL6060 w/G Series computer, 60-input Neve VPP w/Flying Faders console automation system, 80-input Solid State Logic SL4080 w/G series computer, AMS Logic 1 digital audio console. **Soundstages:** Studio A is large enough to accommodate a 60-piece orchestra. **Other Major Equipment:** Magna-Tech dual 4-track 35mm playback system, General Electric Talaria video projection system w/10" screen, (4) Mitsubishi 35" color data monitors, (2) Dolby CAT 43 film processors, Dolby SEU4 Surround encoder, Dolby SDU4 decoder, (3) custom Augsburg two-way speaker systems w/two custom subwoofers, (4) JBL 8330 Surround Sound speakers. **Rates:** Available upon request. **Specialization & Credits:** Winner of five consecutive Technical Excellence & Creativity (TEC) Awards from *Mix* magazine, Power Station's great recognition in CD and album recording over the past 15 years (more than 300 Gold and Platinum albums) is now being very successfully applied to audio post-production and sound design. Both Studio AV-1 and Post-1 offer the highest audio quality for major motion pictures, commercial spots, industrials, and music videos. Recent credits include high definition audio and stereo Surround Sound for "Liza Minnelli Live From Radio City Music Hall," sound design and audio post-production for *Laws of Gravity* from RKO Pictures, and audio post-production for such major ad agencies as Ogilvy & Mather, Backer Spielvogel, DDB Needham, BBD&O, Saatchi & Saatchi, and Grey Advertising. Power Station also provided soundstage and mixing facilities for Eric Clapton and Queensryche's performances on MTV's *Unplugged*.

RBV PRODUCTIONS INC.



920 N. Main St.; Southbury, CT 06488; (203) 264-3666; FAX: (203) 264-3616. Owners: Evan Jones, Moira Jones. Manager: Marjorie Jones.

RODEL AUDIO



1028 33rd St. NW; Washington, DC 20007; (202) 338-0770; FAX: (202) 338-7695. Manager: Renee Funk.

HOWARD SCHWARTZ RECORDING INC.



420 Lexington Ave., Ste. 1934; New York, NY 10170; (212) 687-4180; FAX: (212) 697-0536. Owner: Howard M. Schwartz. Manager: Beth Levy Davis. **Video Tape Recorders:** Sony DVR-10 D-2, Sony BVW-70 Betacam, (12) Sony/JVC BVU-950, CR-850 3/4" VCR, (5) Sony BVH-3100, Sony BVH-2000 1". **Video Monitors:** (16) Sony, Videotek PVM-2530, PVM-2030, 1380, Mitsubishi projection monitor, (4) Ikegami, Tektronik TM-14 14". **Synchronizers:** (4) Adams-Smith AV-2600 motionworker compact controller, Adams-Smith Zeta-3, (3) ECCO MQS-100A. **Audio Recorders:** (6) Sony 3348/PLM-3324, (8) Studer, Otari, Sony 24-track analog recorders, (20) Otari, Sony, MCI 4/2-track. **Audio Mixers:** (3) SSL 6048, 4040, (4) Sony MXP-3036. **Other Major Equipment:** (6) Magna-Tech 6/4/3/1-track film dubbers, (3) SSL ScreenSound workstations, (2) Nagra IV STC, 4.1, (8) Dolby SRA multitrack noise reduction, (9) Sony, Panasonic R-DAT w/time code.

SERVI SOUND STUDIOS



35 W. 45th St.; New York, NY 10036; (212) 921-0555; FAX: (212) 869-4296. Owners: Michael Shapiro, Chris Nelson, Rick Elicker, Diane Colasurdo. Manager: Tammy Fiscella. **Video Tape Recorders:** Sony D-2 DVR, Sony BVW-75 Beta, Ampex 1", Sony BVU-800 3/4". **Synchronizers:** (4) CMX/Lynx edit systems. **Audio Recorders:** (3) Otari MTR-90, (6) Sony DATs, (10) Sony APR-5003s. **Audio Mixers:** Sony MXP-3000, Mitsubishi Westar. **Other Major Equipment:** (2) Fairlight MFX workstations, (2) AMS AudioFiles (16), AMS Logic 1. **Rates:** Upon request. **Specialization & Credits:** Servi Sound is a complete audio production and post-production facility working in all formats. Recent projects: *Saturday Night Live* satirical commercials; several Discovery Channel series; HBO, USA, Showtime, Sci-fi channel promos; PBS *Renaissance* series; Cousin Brucie's syndicated radio program; Rabbit Ears audio series; TV spots; TNT Jimmy Cagney special; *Rediscovering America* series on Discovery Channel.

SIGMA MEDIA CENTER



212 N. 12th St.; Philadelphia, PA 19107-1689; (215) 561-3660; FAX: (215) 496-9321. Manager: Frank McNulty.

SOUND ON SOUND RECORDING INC.



322 W. 45th St.; New York, NY 10036; (212) 757-5300; FAX: (212) 757-5816. Owner: David Amlen. Manager: David Amlen.

SEE PAGE 161 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 159.



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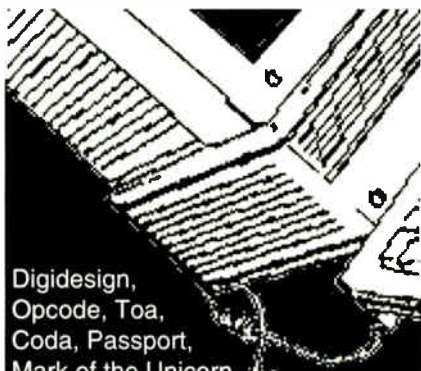
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Video Production & Post Production



SOUND TECHNIQUES INC.
Boston, MA

SOUND TECHNIQUES INC.



1260 Boylston St., Boston, MA 02215; (617) 536-1166; FAX: (617) 536-4446. Owner: Sound Techniques Inc. Manager: Lance Duncan. Video Tape Recorders: Sony BVH-3100, Sony BVW-70. (4) Sony VO-5850, Sony BVU-800, Sony BVW-75. Video Monitors: (2) Sony PVM-2530, Sony PVM-2030, Sony PVM-19420. Switchers/editors: (2) Solid State Logic ScreenSound, Digidesign Sound Tools, TimeLine/SSL System Supervisor, Solid State Logic Scenaria. Synchronizers: (8) TimeLine Lynx. Audio Recorders: (2) Sony 3324A digital, Sony APR-24 analog, Otari MX-70 w/dbx. Audio Mixers: Neve V 36, SSL 4056G w/Total Recall. Soundstages: Studio A: 37'x21', Studio B: 30'x17', Studio C: 10.6'x7'. Other Major Equipment: Allen and Heath Sabre console w/MIDI muting 32x16, (6) analog 2-track recorders of various makes, (5) digital 2-track recorders of various makes, Magna-Tech M 10036-4 film recorder/dubber. Rates: \$150/hour-\$325/hour. Specialization & Credits: Sound Techniques Inc. brings a new standard of audio post-production for video to the New England area. Its new location in Boston's Back Bay houses four studios that offer picture lock-up capability via the TimeLine Lynx System, so that virtually any sound-to-picture task can be accomplished, be it scoring, sound effects editing, ADR, Foley or final mix. Central to this system is the SSL ScreenSound, a powerful tool for editing and mixing of soundtracks to picture. Multitrack digital (up to 48 tracks), 24-track analog, 16-track analog and all the common 35mm and 16mm mag-film formats are also available through a machine room that is central to all three studios. Offering original compositions and sound design, notable clients include Coca Cola, McDonalds, NE Telephone, Disney, WNBC, MGM/Universal, Fox Network, Reebok, Warner Bros., Discovery Network and the Learning Channel to name a few.

SOUNDWAVE INC.



2000 P St. NW, Ste. 200, Washington, DC 20036; (202) 861-0560; FAX: (202) 466-2377. Manager: Trevor Seneff.



SYNC SOUND INC.
New York, NY

SYNC SOUND INC.



450 W. 56th St., New York, NY 10019; (212) 246-5580. Owners: Bill Marino, Ken Hahn. Manager: Sherri Tantleff. Video Tape Recorders: Sony BVH-2000 1" w/Oolby, Sony BVH-2830, Sony D-

2, Sony BVU-850 SP, VHS Hi-Fi, Betacam SP, PAL Betacam SP. Video Monitors: (2) Panasonic 100" video projection systems, Sony. Switchers/editors: (4) AMS AudioFile Plus w/4-hour memory, NED PostPro SD. Synchronizer: Proprietary edit system allowing lock-up, edit rehearsal and editing to subframe accuracy of all audio, video and digital machines, CMX-compatible auto conform. Audio Recorders: Sony PCM-3348 48-track digital, Sony PCM-3324 24-track digital, Sony PCM-1630 2-track digital, F1 and time code R-DAT digital, Otari MTR-90 with 24/16/8-track heads, Otari MTR-20 4-track w/center-track time code, stereo and mono Nagras, MTE and MTM 35/16 mag film recorders, Nagra IV STC, AMS AudioFile, PostPro, cart machines, Nakamichi audio cassettes. Audio Mixers: SSL 6000 G Series automated w/stereo modules, SSL 4000 E Series automated, Sony MXP-3036. Other Major Equipment: Lexicon 224X w/LARC, Dolby SP 24, Dolby CAT 43, Dolby SR, Dolby Surround mixing, Neve stereo limiter, dbx subharmonic synthesizer, Tube-Tech PE-1B, Sontec EQ, AMS 15-80, Yamaha DX7, Roland EQ, Ellison noise reduction, Eventide H3000. Rates: Call for information. Specialization & Credits: Nominated for numerous TEC Awards and recipient of the 1991 Best Audio Production Mixer Award, Sync Sound is a full-service, audio post-production house featuring a staff of Emmy Award-winning sound editors and mixers. Sync Sound is specifically designed to accommodate editing and mixing-to-picture (digital or analog). Facilities include (5) non-linear digital sound editing suites, (4) mixing rooms, an ADR (looping)/Foley stage, a huge automated sound effects library, and sound design suite. Sync Sound performs a wide variety of services for network and cable programming, home video, albums and commercials.

TEL-E-VUE PRODUCTIONS



Box 217 Old Route 17, Ferndale, NY 12734; (914) 292-5965; FAX: (914) 295-2451, x. 2473. Owner: Paul Gerry. Manager: Patricia Gerry.

THIS WAY PRODUCTIONS INC.



503-11 Broadway, Rm. 519; New York, NY 10012; (212) 431-5894. Video Tape Recorders: (2) JVC 6650. Synchronizers: Adams-Smith Zeta-3 w/remole. Audio Recorders: Ampex MM-1200 24-track, Digidesign Pro Tools digital audio workstation (8-track), Tascam OAS30 DAT, Ampex ATR-102 2-track, Ampex ATR-104 4-track, Fostex 20 w/center-track time code. Audio Mixers: Soundcraft Series 1600/24. Rates: Call! Specialization & Credits: Now in its fifth year, This Way Productions is a comfortable, mid-priced facility specializing in audio post and music recording. Most of our production work utilizes the Pro Tools digital audio workstation, in addition to Sound Tools for digital mastering. We specialize in creative custom sound designing, mixing, music recording, and feature a comfortable, relaxed atmosphere in which you can produce high-quality work—the kind of environment we think is unmatched by other studios in our price range. Some of our recent clients and projects include: *Pets or Meat—Return to Flint* (Michael Moore's follow-up to *Roger & Me*), *White Homeland Commando* (feature executive produced by Willem Dafoe), Radio campaigns: "Radio Fire Moosehead," "Evan, and the American Experience, MTV, Turner Cartoon Network, Time Warner "The World Is Our Audience," "Sasson, "MCI-As the Network Turns" (binaural radio play), Reebok "Talking Tennis Balls," Sonic Boom, Tom Pomposello Productions, Chiat/Day/Mojo.

TODD-AO STUDIOS EAST



259 W. 54th St., New York, NY 10019; (212) 265-6225; FAX: (212) 247-5206. Owner: Todd-AO Corp. Managers: Richard Hassenein, Steve Castellano.

THE VIDEOCENT OF NEW JERSEY INC.



228 Park Avenue, East Rutherford, NJ 07073; (201) 935-0900. Owners: Frank O'Connell, Bob Camitta, Bob Schaffner. Manager: Bob Schaffner. Video Tape Recorders: (2) Sony OVR-20, DVR-28 digital, (3) Sony BVH-2000 1", (3) Sony BVW-75, (2) Sony BVW-70 Betacam SP, Sony BVU-800 3/4" cassette, (3) Sony BVW-50 Betacam SP field recorders, Sony EVO-9850 Hi-8mm recorder. Video Monitors: (2) Shibasoku CM93 A1, (2) Sony PVM-1960, (2) Sony BVM-1291, BVM-12701; (6) Sony BVM-1201, PVM-1270, 8020, 8221. Switchers/editors: (2) Grass Valley 200, 100 group switcher, Sony BVE-5000 editing system, Sony BVE-910 editing system. Video Cameras: (3) Sony BVP-7 CCD, (2) Sony BVP-3. Synchronizers: Sony APR-5003/BVE-5000 audio 1/4" direct-to-editor. Video Effects Devices: Ampex ADO-2000 digital optics, Abekas A-52 digital effects. Audio Recorders: Sony APR-5003 2-track 1/4" w/center-track time code, Otari 5050BH 2-track 1/4". Audio Mixers: Altec 1678C gated 8x2, Panasonic/Ramsa 8616 16x2, Sony MXP-290 8x2, Yamaha M406 6x4. Soundstages: 24'x24'x12' w/hard cyc (full TV insert stage). Other Major Equipment: Sony BVX-30 color corrector/noise reducer, Zaxcom HCP400 tbc master control station, Compositing digital F/X computer graphic workstation, Ultimatte 300 chromakey system.

THE VIDEOHOUSE INC.



975 Greentree Rd., Pittsburgh, PA 15220; (412) 921-7577; FAX: (412) 921-6937. Owner: Ron Bruno. Manager: Chuck Morse.

SEE PAGE 161 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 159.



VIDEOMIX
New York, NY

VIDEOMIX



123 W. 18th St., New York, NY 10011; (212) 627-7700; FAX: (212) 727-3075. Owner: CP Sound Inc. Manager: Kathleen Spellman-Krause. **Video Tape Recorders:** Sony DVR-10 D-2, Sony BVW-75 Beta SP, (2) Ampex VPR-6, (5) JVC 850 3/4". **Video Monitors:** Ikegami TM-20, (2) Mitsubishi 35". **Synchronizers:** (2) Soundmaster 8 machine "SmartSync" systems. **Audio Recorders:** (3) Otari MTR-90 24-track, (7) Otari MTR-12 2/4-track, Otari MX-70 16-track. **Audio Mixers:** Sony MXP-3000 w/automation, Amek Mozart w/automation, Sound Workshop 34 w/automation. **Other Major Equipment:** Digidesign digital workstation, 4-track online interlock 1635 Mag. D-20 online DAT recorder, Dolby SR on all recorders. **Specialization & Credits:** Certified Dolby Surround all-Tannoy room. Audio-for-video post-production specializing in SFX, laugh tracks and music scoring. World's finest SFX collection, all major music libraries. Full audio duplication and fulfillment capability. Interformat audio/video/multitrack/Dolby/abx dubbing. International multilingual tracks—our secret specialty.

VIDEO PRODUCTION ASSOCIATES INC.



525 Bridgeport Ave., Shelton, CT 06484; (800) 394-8869; FAX: (203) 925-0344. Owner: Joseph Sullivan. Manager: Gayle Fredericks.



ZEDZ MUSIC
Malden, MA

ZEDZ MUSIC



49 Hanover St., Malden, MA 02148; (617) 324-1989. Owner: Zed McLarnon. Manager: Zed McLarnon. **Video Tape Recorders:** Sony Beta, Panasonic AG 6810 Hi-Fi VHS, Panasonic Omnivision VHS. **Synchronizers:** Fostex 4030/4035. **Digital F/X. Audio Recorders:** Digital F/X EX 16-track digital w/700MB hard disk and 1-hr. memory, TEAC 650MB 8mm 1-hr. backup drive for EX, Sony/MCI JH-16 2" 16-track analog, Sony PCM-2300 DAT, Sony PCM-F1, TEAC 1/4" 2-track. **Audio Mixers:** API 2488 discrete 18 mic/line inputs w/550A EQs, 8 buses and 4 returns; Biamp 12-channel MIDI mixer. **Soundstages:** 12'x15' studio, 15'x20' control room. **Other Major Equipment:** Texture/IBM 24-channel MIDI sequencer, (2) Sequential Circuits Prophet 2002 stereo samplers, Sequential Circuits Prophet VS synthesizer, LinnDrum machine w/MIDI update, Lexicon 224 digital reverb, Lexicon Prime Time digital delay, (2) Aphex Aural Exciter, Alesis MIDiverb II, (2) Kepex Gain Brain limiter/compressor, (3) Kepex noise gate, (2) API 525 limiter/compressor, (2) JBL 4311 monitors, ZEDZ MUSIC Production Music Library and Sound Effects on CDs. Rates: Audio Production: \$35 to \$100/hr. Audio-for-Video: \$100/hr. **Specialization & Credits:** Creators of the ZEDZ MUSIC Production Music Library, ZEDZ MUSIC provides custom music and digital audio for film/video clients such as: WGBH/all PBS affiliates, Salada Tea, Bechtel, Grossman's, Kansas Dept. of Transportation, Harvard Medical School, MIT, General Electric, etc. Founder Zed McLarnon has been recording world-class, award-winning albums and soundtracks since 1970 for clients such as the Paul Winter Consort, Michael Kamen, Rupert Holmes, David Darling, Livingston Taylor, Calico, Moonfleet, etc. Album credits include A&M, First American, Living Music, Rounder Records, Thistle Records and fifteen others.

SOUTHEAST

Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia

ALLEN-MARTIN PRODUCTIONS INC.



9701 Taylorsville Rd., Louisville, KY 40299; (502) 267-9658; FAX: (502) 267-9070. Owners: Ray Allen and Hardy Martin. Manager: Bill Porter, president.

AMERICAN SOUND & VIDEO CORPORATION

2225 Faulkner Rd. NE, Atlanta, GA 30324; (404) 633-4577. Manager: Peter Thomason.

CENTRAL FLORIDA PRODUCTION SERVICES



1745 Olde River Trail; Chuluota, FL 32766; (407) 365-2985. Owner: Carl Carden.

CENTURY III AT UNIVERSAL STUDIOS



2000 Universal Studios Plaza; Orlando, FL 32819; (407) 354-1000; FAX: (407) 352-8662. Owner: Ross M. Cibella, president. Manager: Pamela Warren, dir. sales and marketing. **Video Tape Recorders:** (5) Sony BVH-2000, Sony DVR-1000, (5) Sony DVR-10, Sony DVR-18, (4) Sony BVW-75, (4) Sony BVU-870, Abekas A-62. **Video Monitors:** (2) Sony BVM-1910A, Sony BVM-1915. **Switchers/editors:** Ediplex editing system, (2) Grass Valley 300-3B switcher, Grass Valley 100-N, Grass Valley 200, (2) CMX 3600, Sony 9000 Beta component PAL suite. **Synchronizers:** (2) Timeline Lynx, Alpha Audio Boss machine controller. **Video Effects Devices:** (2) GVG Kaleidoscope DPM-1 2-channel system, (2) GVG 300-3B switcher w/3 effects banks, DFX Composium w/D-1 and A-60, Colorgraphics DP 4:2:2 w/Mosaic, Wavefront, Elicon motion control camera system, Quantel PaintBox, Star-Film System II. **Audio Recorders:** (2) Sony 3324 24-track digital, Otari MTR-10 2-track w/center-track time code, (3) Sony APR-5003, (2) NED PostPro direct-to-disk system, Synclavier 9600. **Audio Mixers:** Solid State Logic 4000 w/G Series automation, Soundcraft 600, Soundcraft Delta 200. **Other Major Equipment:** Magna-Tech 636 4-track film recorder, (2) Nagra T-audio 2-track w/TC resolver, VVX first video affiliate, on-site C & KU band teleport w/fiber.

CRAWFORD POST PRODUCTION



535 Plasamour Or. NE, Atlanta, GA 30324; (404) 876-7149. Owner: Jesse Crawford. Manager: Steve Davis.

CREATIVE VIDEO INC.



1465 Northside Or., Ste. 110; Atlanta, GA 30318; (404) 355-5800; FAX: (404) 350-9823. Owner: Jim Rocco. Manager: Barry Sikes. **Specialization & Credits:** Creative Video is a full-service production facility created by producers, for producers. Two online edit suites with digital effects allow D-2, Beta SP, 1" and 3/4" interformat editing. For location shooting, Creative Video has three Betacam SP field packages complete with crews, chip cameras, mini-jib, dolly and wireless mics. Complementing Creative Video is a 400,000-shot all-video stock footage library. Skylines, white collar, farmland and people—a small part of this growing, Betacam SP-original resource. At only \$150 per shot, the world is at your fingertips at a price within any budget. Call Armistead Whitney at (404) 355-5800.

DIGITAL MULTI-MEDIA POST INC.



502 N. Hudson St., Orlando, FL 32811; (407) 293-3390; FAX: (407) 292-5447. Owner: Robert Storer. Manager: Marie Hamlin.

DIXIELAND PRODUCTIONS INC.



3440 Oakcliff Rd., Ste. 104; Atlanta, GA 30340; (404) 458-1168; FAX: (404) 458-1872. Owner: Richard Rex. Manager: Glen Fisher.

DOPPLER STUDIOS



1922 Piedmont Cir., Atlanta, GA 30324; (404) 873-6941. Owner: Pete Caldwell. Manager: Bill Quinn.

EASTERN VIDEO CORP.



10880 NE 6th Ave., Miami, FL 33161; (305) 751-0880; FAX: (305) 751-0113. Owner: Susan Allen.

GETTINGS PROD./STARKE LAKE STUDIOS



275 N. Lakeshore Or.; Ocoee, FL 34761; (407) 656-8989; FAX: (407) 656-9862. Owner: Glen Gettings. Managers: Bob Webb, Paul

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Minor, Video Tape Recorders: (2) Sony 9800 3/4" SP recorder w/TC, Sony 9850 3/4" SP recorder w/TC, Panasonic AG 7750 1/2" S-VHS recorder w/TC, Sony VO-8800 SP portable deck w/TC. **Switchers/editors:** Amiga Video Toaster w/Amlinik Editor Ver. 2.0. **Video Cameras:** Sony 325-SL 3-chip digital camera. **Synchronizers:** (3) TimeLine Lynx. **Audio Recorders:** Otari MTR-90 24-track, Otari MX-55 2-track w/TC, New England Digital PostPro 16-track digital recorder. **Audio Mixers:** Mitsubishi Superstar 52-input/32 bus with Otari DiskMix III automation. **Soundstages:** Studio 1: 55'x43'. **Other Major Equipment:** NED Synclavier, EMT 250 digital reverb, (2) AMS 1580 delay, (2) Eventide H3000 processor, (2) Lexicon 200 reverb, AMS RMS digital reverb, Lexicon 224XL digital reverb, Steinway 7' grand piano, various other neat studio gear.

IMAGE RESOURCES INC.



4545 36th St., Orlando, FL 32811; (800) 393-4300; FAX: (407) 843-5876. **Owner:** Bob Brook. **Manager:** Randy Noble. **Video Tape Recorders:** Sony BVW-75 Betacam SP w/DT, Sony BVW-35 Betacam SP portable, Sony BVU-150 3/4" SP portable, Sony VO-8800 3/4" SP portable, Sony BVV-5 dockable Betacam SP back, Sony BVU-950 3/4" Editor w/TBC card. **Switchers/editors:** Sony BVS-3200 switcher, Sony 910 edit controller, JVC KM-2500 switcher, JVC KM-1200 switcher. **Video Cameras:** Sony BVW-300 3CCD Betacam SP, Sony DXC-537 3CCD w/CA-537 adapters for 3/4" portables or dock to BVV-5, Ikegami HL-79E. **Video Effects Devices:** Sony DME-450 digital effects. **Audio Mixers:** Sony MXP-290 8-channel, Yamaha 16-42 16-channel. **Other Major Equipment:** Sony multicamera production rack, Fujinon 8.5x5.5 wide angle lens, Inscrber 3.1 text/graphics software, Animator Pro animation software, Autodesk 3-D studio modeling software, ATT RIO compositing software, Truevision Paintbox software, Sony Betacam SP editing, 3/4" SP editing.

KNOWLES VIDEO INC.



2003 Apalachee Pkwy., Ste. 204; Tallahassee, FL 32301; (904) 878-2298; FAX: (904) 656-0119. **Owner:** Karl Knowles. **Manager:** Guy Kathe.

MUVIES



1918 Harrison St., Ste. 108; Hollywood, FL 33020; (305) 925-6805. **Owner:** Cinema Ex Machina Production Systems Inc. **Manager:** Purves "Turk" Harley, Jr.

NATIONAL TELEPRODUCTIONS INC.



5022 50th Way; West Palm Beach, FL 33409; (407) 689-9271; FAX: (407) 640-4677. **Owner:** R.M. Peterson. **Manager:** Mary Eddy.

PLATINUM POST

FULL SAIL CENTER FOR THE RECORDING ARTS



3300 University Blvd., Ste. 160; Winter Park, FL 32792; (407) 671-1111; FAX: (407) 671-1112. **Manager:** Buffy Thibodeaux.

THE POST GROUP

DISNEY/MGM STUDIOS



Roy O. Oisney Production Center; Lake Buena Vista, FL 32830; (407) 560-5600; FAX: (407) 560-5483. **Manager:** Jack Peter, general manager. **Video Tape Recorders:** (12) Sony DVR D-2, (11) Sony BVH-2000 1", (10) Sony BVW-65 and BVW-75 Betacam, Sony DVR-1000 D-1, (2) Panasonic D3. **Switchers/editors:** (2) Grass Valley 300, (2) Grass Valley 200, (3) CMX 3600 edit systems, GVG-8000 switcher, 9100 edit system, 5100 edit system. **Synchronizers:** Synclavier. **Video Effects Devices:** Compositum by Digital Effects w/Abekas A-64, (3) Paint FX systems by Digital Effects, Grass Valley 2-channel Kaleidoscope w/Kurl, Abekas A-62 digital disc recorder. **Audio Recorders:** (4) Sony 3324A digital 24-track, (2) Nagra T 2-track, Otari MTR-901I, (2) Sony PCM-3402 digital 2-track, (3) Sony 5000 2-track. **Audio Mixers:** SSL 500M 96-input console w/moving fader automation, Total Recall and instant reset; Sony MXP-3000 36-input, (4) Sony MXP-2000 12-channel mixing consoles. **Other Major Equipment:** Chyron 4200, Ultimatte V, Telecine Suite w/Rank Cintel, Quantec room simulator, Publison Infernal Machine 90, TC Electronic 2290, Lexicon 480L, Avid 2300.

PRODUCTION PLUS



1710 29th Ct. South; Birmingham, AL 35209; (205) 879-2853. **Manager:** Jim McLean.

RON SCELZA SOUND RECORDING DIGITAL



PO Box 546108; Surtside, FL 33154; (305) 861-4149. **Owner:** Ron Scelza.

SCENE THREE



1813 Eighth Ave. South; Nashville, TN 37203; (615) 385-2820; FAX: (615) 383-1026. **Owners:** Kitty Moon, Marc Ball. **Manager:** Greg Aildredge.

SONIC III INC.



7162 SW 47th St.; Miami, FL 33155; (305) 662-3919; FAX: (305) 662-4867. **Owner:** Hernan Polo. **Manager:** Ken Campbell.

NORTH CENTRAL

Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

AMERICAN SOUND & VIDEO CORPORATION

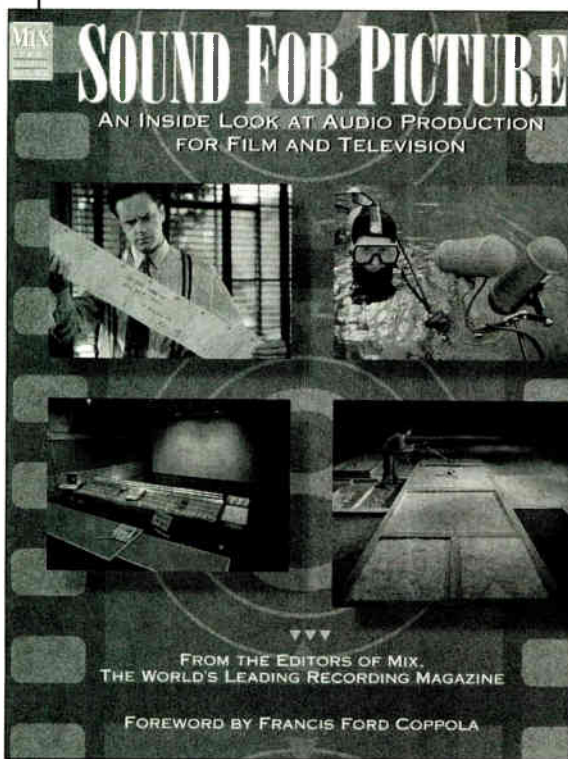
7300 Miller Dr.; Warren, MI 48092; (313) 268-5558. **Manager:** Paul Hayes.

AUDIO ART RECORDING STUDIO INC.



403 SW 8th St.; Des Moines, IA 50309; (515) 282-3223. **Owners:** Dr. James Skinner, Patrick McManus. **Manager:** Keith Brown, chief engineer.

SEE PAGE 161 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 159.



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BUSBY PRODUCTIONS INC.



1430 Locust St.; Des Moines, IA 50309; (515) 244-0404; FAX: (515) 246-1855. Owner: Busby Burnell. Manager: Don Flannery.

CINE SOUND 2



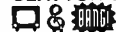
6461 Lyndale Ave. S.; Minneapolis, MN 55423; (612) 866-5049; FAX: (612) 866-1638. Owner: Dennis O'Rourke. Manager: Teresa Loesch.

CLASSIC VIDEO INC.



5001 E. Royalton Rd.; Cleveland, OH 44147; (216) 838-5377; FAX: (216) 838-1240. Owner: Jerry Patton. Video Tape Recorders: (4) D-2, (12) 1", (3) 950 3/4", (8) Betacam SP, D-3, (10) M-2 Video Monitors: Ikegami. Switchers/editors: (3) Calaway, Grass Valley, edit controllers, GVG 200, 100 video switchers. Video Cameras: (6) LDK 90, (2) LDK 900 w/44x1 zoom lens, NEC SP3. Video Effects Devices: Abekas A-72 character generators, Abekas A-51 and A-53 DVE, (3) DSC Eclipse. Audio Recorders: Solid State Logic Screen-Sound digital system, Otari 1" 8-track, MCI 8-track, Fostex 16-track, 1/4" 2/3/4-track, Alesis 8-track ADAT. Audio Mixers: Yamaha all digital DMC1000, (3) Yamaha A-to-D DMP7. Soundstages: 60'x70', 24'x22', 22'x19'. Other Major Equipment: (2) Avid Media Composer 2000, Avid Media Composer 2500, SoftImage, Vertigo, Cubi-comp, Eddie, 5-ton grip truck, Panther dolly system, HMI lighting. Specialization & Credits: A full-service production facility for studio and remote production, multiple-format editing, audio sweetening, duplication and syndication plus language translations, international standards conversions and closed captioning. Special features include: 60'x70' studio with 3-wall cyclorama. CCD cameras for studio and remotes. Five-ton feature grip truck with many extras. Panther camera dolly with 360-degree super jib arm. Two Avid non-linear and one Calaway linear offline edit suites. Three deluxe online edit suites with digital video effects and multitrack formats including D-2, Betacam SP, M-2, 3/4" SP and 1". Full scenic design and construction. 3-D animation. Classic productions include prime-time broadcast series: *David Frost: The Next President* and *Talking With David Frost*. Corporate sales and training presentations for: Firestone, Sherwin-Williams, Little Tikes, American Greetings, BP America, The Westfield Companies, Eagle Picher. Broadcast programs and commercials for: Consumer Direct, Progressive Insurance, Cleveland Cavaliers, The Home Shoppe, JC Penney, Stouffers, Fitness Quest and many others.

CLAYTON STUDIOS



1126 S. Big Bend; St. Louis, MO 63117; (314) 781-6200; FAX: (314) 781-0524. Owner: Dick Ulett. Manager: Robyn Hunter.

CPI INC.



804 N. Milwaukee St.; Milwaukee, WI 53202; (414) 291-9666; FAX: (414) 291-9585. Owner: James J. Kagan. Manager: Cindy Peschong.

CRYSTAL PRODUCTIONS

DIVISION OF TELETAINMENT INC.

1024 Blouin Dr.; Dolton, IL 60419; (708) 841-2622; FAX: (708) 841-2721. Manager: Tim Dwyer, operations manager.

THE FILM HOUSE INC.



130 E. 6th St., 2nd Flr.; Cincinnati, OH 45202; (513) 381-2211. Owner: Ken Williamson. Manager: Lynn Thompson.

FUTURE MEDIA CORP.



2853 W. Jolly Rd.; Okemos, MI 48864; (517) 332-5560; FAX: (517) 332-5080. Owners: Bob Bishop, Ed Cheeny. Manager: Sirkka Sonnenberg.

INNERVISION STUDIOS



11783 Borman Dr.; St. Louis, MO 63146; (314) 569-2500; FAX: (314) 569-3534. Manager: Mike Stroot.

POSTIQUE INC.



23475 Northwestern Hwy.; Southfield, MI 48075; (313) 352-2610; FAX: (313) 352-3708. Owner: President/CEO: Bernie Green. Manager: VP/COO: Mary Suzanne Patek.

PRIME TIME STUDIOS



1317 Clover Dr.; Bloomington, MN 55420; (612) 884-0778; FAX: (612) 884-1078. Owner: Jim Barker. Manager: Jim Barker. Video Tape Recorders: (6) Sony VB-9000 series 3/4" U-Matic SP, JVC S-VHS, Sony Hi-8. Switchers/editors: Grass Valley GVG 100 switcher,

Sony BVE-600 editor, EC-740 For-A editor. Video Cameras: (3) Panasonic 200/300 CLE 3-chip. Synchronizers: Tascam ES-500. Video Effects Devices: Sony DME-450. Audio Recorders: Tascam MS-16 1" 16-track, (2) Tascam S2 1/4" 2-track, (2) R-DATs (Sony, Panasonic). Audio Mixers: Allen and Heath Saber 36x24x8x2. Soundstages: 30'x40'. Other Major Equipment: Complete studio and location facilities, HMI-Richardson and Lowell lighting, location multiple-camera capabilities.



SNYDER FILMS & VIDEO
Fargo, ND

SNYDER FILMS & VIDEO



1419 First Ave. South; Fargo, ND 58103; (701) 293-3600; FAX: (701) 293-9670. Owner: Meyer Creative Productions. Manager: Tom Tollefson. Video Tape Recorders: (2) Sony DVR-10 digital video player/recorder, Sony BVU-95 3/4" player/recorder, Sony BVW-70 Betacam player/recorder, Ampex VPR-80 1". Switchers/editors: Ampex VISTA-17. Video Cameras: Sony BVW-400 Betacam. Video Effects Devices: Ampex ADO-100. Audio Recorders: Nagra IV-L field recorder, Sony SH-24 24-track. Audio Mixers: Neotek Elite 32-input. Soundstages: 2000 sq. ft. Other Major Equipment: Chyron SuperScribe character generator, Ampex Ace-Micro editor. Specialization & Credits: Snyder Films & Video—Location/Studio Production: 16mm/35mm film, Betacam SP & 3/4" video; time lapse & film animation; 2000-square-foot sound stage; commercial still photography, 8x10 format. Multiformat Online Edit Suite: Composite digital post from D-2, 1", Betacam SP or 3/4" SP; ACE editor, ADO and Chyron SuperScribe; 16mm flatbed edit and offline video suites. Meyer Sound Studios—Complete 24-Track and Post Audio: Large "reflection-free zone" control room; 3000-square-foot main recording area with variable acoustics; featured in August 1991 issue of *Mix* magazine as one of the "Class of 1991—A Look At America's Hottest New Rooms."



STUDIO M
Saint Paul, MN

STUDIO M



45 E. 7th St.; Saint Paul, MN 55101; (612) 290-1453; FAX: (612) 290-1180. Owner: Minnesota Public Radio. Manager: Craig Thorson. Video Tape Recorders: JVC 8250 3/4". Panasonic PV-1462 1/2" VHS, (2) Sony 1/2" Beta. Video Monitors: Sony 19". Switchers/editors: Digital and analog audio editing only. Synchronizers: BTX Cipher Shadow interlock system. Audio Recorders: (2) Sony 3402 2-track digital w/editor and SMPTE, 3M DMS 32-track digital, Otari MTR-9011 24-track analog, Otari MTR-12 w/SMPTE center stripe, (5) Otari MTR-10 2-track, (3) Studer A810 2-track, MCI JH-110 2/4-track. Audio Mixers: Neve V Series 36x36x36, Neve 5106 40x8x4. Soundstages: 45'x36'x25', 15'x15'. Other Major Equipment: Lexicon 480L digital effects system, Lexicon 224XL digital effects system, (3) misc. manufacturers R-DAT (SV-3700, DA50, DA30), (5) Dolby 363 A/SR noise reduction, Steinway 9' concert D grand piano. Specialization & Credits: We specialize in superb acoustic recording. Spacious studios, a superlative signal chain and staff with knowledge and experience all add up. We know how to listen. Studio M offers a wide range of facilities and services, including digital and analog multitrack recording, synchronized audio post-production for video and DDD capabilities (recording, editing, Xfer and premastering all in digital domain). Studio M is actually three separate facilities, which can be reconfigured as needed to fit your project. Our largest acoustic space will comfort-

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ably accommodate a 40-piece orchestra. We also have proprietary audio lines to/from the World Theatre (a lovely reconstructed 800+ seat auditorium) for the highest-quality live concert recordings. Credits include: Host location/facility for the Disney Channel *A Prairie Home Companion* cable series. Ongoing live music broadcast for Minnesota Public Radio (including the #1 American classical broadcast *Saint Paul Sunday Morning*). Classical releases for Virgin Classics (including 1990 Grammy winner recorded by staff engineer Preston Smith). Releases for MCA, Capitol, A&M, EMI London, Columbia and independent labels.

TAKE 1 PRODUCTIONS

(505) 559-2241 & (505) 559-2242
5325 W. 74th St.; Minneapolis, MN 55439; (612) 831-7757.
Owner: Teri Murphy. Manager: Rob Hewitt.

TRIO VIDEO

(312) 421-7060
2132 W. Hubbard; Chicago, IL 60612; (312) 421-7060; FAX: (312) 421-0361. Manager: Debra Zouvas.

VIDEO ARTS STUDIOS

(701) 232-3393 & (701) 232-3393
1440 4th Ave. N.; Fargo, ND 58102; (701) 232-3393; FAX: (701) 232-9439. Owners: Art Phillips, Mary Ann Phillips. Manager: Art Phillips.

VIDEO I-D INC.

(309) 444-4333
105 Muller Rd.; Washington, IL 61571; (309) 444-4323; FAX: (309) 444-4333. Owner: Sam B. Wagner. Manager: Gwen Wagner.

ZENITH AUDIO SERVICES INC.

(312) 444-1198
32 W. Randolph St., 15th Flr.; Chicago, IL 60601; (312) 444-1101; FAX: (312) 444-1198. Manager: Ric Coken.

SOUTHERN CALIFORNIA/HAWAII/SOUTHWEST

Arizona, Arkansas, Hawaii, Las Vegas, New Mexico,
Oklahoma, Southern California, Texas

AARON & LE DUC PRODUCTIONS

(310) 396-8265
2002 21st St., #A; Santa Monica, CA 90404; (310) 450-8275; FAX: (310) 396-8265. Owner: Greg Le Duc. Manager: Nick Roberts.

ADVANTAGE AUDIO INC.

(818) 566-8555
1026 Hollywood Way; Burbank, CA 91505; (818) 566-8555.
Owner: Bill Koepnick, Jim Hodson. Video Tape Recorders: Ampex VPR-6, (2) Sony VO-9800. Video Monitors: Sony 1042Q (10" diagonal) video projector, Sony 1342Q, Pioneer SDP-503P (50" rear projection), Mitsubishi 35". Switchers/editors: (2) Digidesign Pro Tools recording/editing system. Synchronizers: (2) Adams-Smith 2600 w/VTC. Audio Recorders: (2) Otari MTR-100, Otari MTR-12, Sony 2500 DAT, (2) Panasonic 3700 DAT. Audio Mixers: Otari Sound Workshop Series 54/46, Studer 921, Otari Sound Workshop 34C. Soundstages: A: Dubbing 17'x33' (25' ceilings); B: Foley 17'x20' (22' ceiling)—12 surfaces including water; C: Editing 11'x13'; D: Editing 11'x10'; F & G: Editing 10'x10'; H: Dubbing 15'x13'. Other Major Equipment: Dolby SR/A on all analog tape, DiskMix III moving fader automation, KRK 15A-01, 1002 and 703 audio monitors, Stiga Professional ping-pong table. Rates: Call for rates.

AMERICAN SOUND & VIDEO CORPORATION

27790 Ave. Hopkins, Valencia, CA 91355; (805) 257-0700. Manager: Gerald Pool.

ASSOCIATED PRODUCTION MUSIC

(213) 461-9102
6255 Sunset Blvd., Ste. 820; Hollywood, CA 90028; (213) 461-3211; FAX: (213) 461-9102. Manager: Jerry Burnham. Specialization & Credits: Exclusive U.S. representatives of the KPM, Bruton, Sonoton, Carlin, Selected Sound and Themes Int'l production music libraries. Supplying film, video, AV and multimedia producers with

the highest quality production music in the world. Recent credits include *Honeymoon in Vegas*, *Straight Talk*, *Class Act*, *America's Funniest Home Videos*, *Northern Exposure*, and *Murphy Brown*. APM also supplies special music packages—"Broadcast One" and "Broadcast Two" to radio and television stations nationwide. Also "Sound FX—The Library" (45 CDs) and "SFX" from KPM (8 CDs).

AUDIO RESOURCE HONOLULU

(808) 526-3733
1084 Young St.; Honolulu, HI 96814; (808) 526-3733; FAX: (808) 734-1840. Owner: Tony Hugar, Milan Bertosa.



THE AUDIO SUITE
Glendale, CA

THE AUDIO SUITE

(818) 241-9090
1110-A W. Glenoaks Blvd.; Glendale, CA 91202; (818) 241-9090.
Owner: Eric Sclar. Manager: Kevin Lange.

THE BAKERY STUDIOS

(818) 508-7800
10709 Burbank Blvd.; N. Hollywood, CA 91601; (818) 508-7800; FAX: (818) 508-7122. Owners: Andy Waterman, Jon Baker. Manager: Stacey Stanley. Video Tape Recorders: Sony BVH-2000 1", Sony BVU-800, Sony 9850 3/4", (2) JVC CR-850, 600U 3/4", (2) JVC BR-611U Pro 1/2". Synchronizers: (2) Adams-Smith 2600 5 machine lock, (3) Adams-Smith Zeta-3. Audio Recorders: Studer A827 24-track, Sony APR-24 24-track, Otari MTR-90 24-track, Otari MTR-12 4-track 1/2", (2) Sony/MCI 5003 2-track. Audio Mixers: (2) Amek Mozart fully automated, Amek TAC Matchless. Soundstages: 50'x20' w/2 isolation booths, 17'x14'. Other Major Equipment: DAWN digital editor 8-track w/4 hrs. stereo sample time, Roland 770 sampler w/CD-ROM and hard drive, full sound effects library, complete sound design synthesizer and sampler collection. Rates: Available upon request.

BEXEL CORPORATION

(818) 841-5051
801 S. Main St.; Burbank, CA 91506; (818) 841-5051; FAX: (818) 841-1572. Owner: David Trudeau. Manager: Justin Paxton. Specialization & Credits: Bexel offers the most extensive inventory of broadcast video equipment for rent in the U.S. With over 75 camera packages available, our camera inventory includes Sony BVP-70 I.S., BVW-400, DXC-537; Ikegami HL-55A; BTS LDK-91; Canon LX-100 Hi-8 camcorder; Elmo EM-401 lipstick, etc. Every VTR format. Specializing in custom packages. Reliable equipment—each piece performance-tested by our staff of factory trained engineers. Real 24-hour emergency service, 7 days a week. Used equipment sales and full repair/maintenance services for broadcast and industrial equipment. Two sound stages at the Burbank facility: 40'x50' and 20'x20'. Offices in Burbank, California; Irvine, California; and New York City, New York.

BIG SKY PRODUCTIONS

(310) 762-1293
20434 S. Santa Fe Ave.; Long Beach, CA 90810; (310) 762-1293; FAX: (310) 762-1374. Owners: Mike Harrington, Dan Donley. Manager: Kathy Harrington. Video Tape Recorders: Sony DVR-10 D-2 VTR, Sony BVH-3100 1" VTR, (3) Sony BVW-70, BVW-75, PVM-2800 Beta SP VCRs, (2) Sony VO-9800, VO-9850 3/4" SP VCRs. Switchers/editors: GVG 141 edit controller, GVG 100 switcher. Video Cameras: Sony BVW-105 CCD, Sony BVW-550 CCD shuttered, Sony BVP-50 CCD. Video Effects Devices: DPM-700 digital picture manipulator. Audio Recorders: 1/4" 2-track/4-track reel-to-reel. Audio Mixers: Shure FP31 audio mixer, Soundcraft 8x4x2 audio follow console. Soundstages: 50'x65' w/3 wall hard cyc. Other Major Equipment: GVG VideoDesigner PaintBox system, Presto 100 character generator, 10'x30' chimera light box, hostess tray. Rates: Please call Big Sky Productions for quote on all equipment/facilities.

BUENA VISTA SOUND

(818) 560-5513
500 S. Buena Vista St.; Burbank, CA 91521-2627; (818) 560-5513; FAX: (818) 562-3262. Owner: Chris Carey. Manager: Heidi Arnold.

FOR MORE INFORMATION ABOUT MIX LISTINGS SEE PAGE 159.

WALLY BURR RECORDING



1126 Hollywood Way, Ste. 203; Burbank, CA 91505; (818) 845-0500. Owner: Wally Burr. Manager: Ellen Burr.

CEREUS RECORDING



1733 E. McKellips, Ste. #107; Tempe, AZ 85281; (602) 990-8163. Owner: Allen Moore. Manager: Dianne Moore.

CHACE PRODUCTIONS INC.



201 S. Victory Blvd.; Burbank, CA 91502-2349; (818) 842-8346; FAX: (818) 842-8353. Owner: Bob Heiber. Specialization & Credits: Audio for video, film and broadcast utilizing unique and proprietary equipment. Chace Surround Stereo™ patented process that creates true directional stereo with surround. Over 500 features mastered including: *Gone With The Wind*, *Yellow Submarine*, *Rocky Horror Picture Show*, *The Ten Commandments*. Chace Optical Sound Processor™ for negative optical soundtrack transfers for less than the cost of a track print. NoNOISE® audio repair system to de-noise, decrackle, depop in stereo or mono. Digital audio editing suites for ADR and Foley recording; airline and television version cut downs; music and effects track construction, even from composite sources. Custom transfer facilities for all audio formats, sync and speed conversions, laybacks to video masters in 1" C and D-2.

CREATIVE MEDIA



11105 Knott Ave., Ste. G; Cypress, CA 90630; (714) 892-9469. Owner: Tim Keenan. Manager: Linda Keenan.

DESERT PRODUCTION CENTER



2235 W. Alice Ave.; Phoenix, AZ 85021; (602) 263-3400; FAX: (602) 263-3577. Owner: Media America Corporation. Manager: Bill Lewis.

DEVONSHIRE POST



10729 Magnolia Blvd.; N. Hollywood, CA 91601; (818) 985-1945; FAX: (818) 985-9915. Owner: David K. Mancini. Manager: Kelle Creamer. Specialization & Credits: Dialog editing, sound FX editing, Foley and music editing on Pro Tools systems and Emulator III. Credits include *Inspector Gadget*, *Super Dave*, *Sonic the Hedge Hog*, *Captain Planet*, *Liquid Television*, *Hanna-Barbera*, *DIC*, *Disney*, *Landmark Ent.*, *Bagdasarian Prod.*, *Colossal*.

DUKE CITY STUDIO



4121 Cutler NE; Albuquerque, NM 87110; (800) 225-6185; FAX: (505) 884-1008. Owner: Jay Lefkowitz. Managers: Chad Chavez, Don Burkhardt. Video Tape Recorders: (10) Sony BVW-75 Beta SP, (3) Sony BVW-70 Beta SP, (4) Sony DVR-20 D-2, (3) Sony BVH-3100 1", (4) Sony BVW-65 Beta SP, (2) Sony BVU-950 3/4", (2) AG 7500 S-VHS. Switchers/editors: GVG 200-2 production switcher, GVG 100-CV component switcher, GVG 100 composite switcher, GVG IPS-100 system, Abekas A-82 composite switcher. Video Cameras: (5) Ikegami HL-55A cameras, (3) Ikegami HL-55 cameras, (3) HK-357 studio cameras. Video Effects Devices: Abekas A-62 digi-recorder, GVG DPM-700 DVE, GVG 51-EM editors, (4) Abekas A-53D w/key channel, (2) Abekas A-42 still store w/expansion, Chyron Infinite character generator. Audio Recorders: Nagra IV STC time code recorder, (3) Panasonic SV-3900 DAT recorders, Tascam 4-track, Fostex 2-track. Audio Mixers: Sony MXP-290 8-input, Sony MXP-2000, (2) EP-42, (6) EP-16A audio DAs. Other Major Equipment: RTS Intercom, wireless IFB, PVM-8020 monitors, Arriflex film equipment, wireless lavaliers, wireless intercom, PVM-13420 monitors, CTM HMI lighting, mole lighting, PVM-2030 monitors, Fisher dollies, Tyler camera mounts, two-way communication, teleprompters, Cammate camera booms, Tulip cranes, Toshiba lipstick cameras, doorway dollies.

EDITROID: LUCASARTS EDITING



3000 W. Olympic Blvd., Ste. 1550; Santa Monica, CA 90404; (310) 315-5050. Owner: LucasArts Entertainment. Manager: Matthew Mitchell.

EFX SYSTEMS



919 N. Victory Blvd.; Burbank, CA 91502-1633; (818) 843-4762; FAX: (818) 848-0706. Manager: Paul Rodriguez, VP/general manager. Specialization & Credits: Digital audio post-production for television and film. The most comprehensive and advanced digital audio equipment from New England Digital and Sony. Award-winning mixers and editors fluent in sprockets and electronics. Facilities include edit and pre-lay; ADR/Foley; television mixing and a fully digital, THX-approved film dubbing stage. Recent credits: Features: *Deadfall*, *Talk Radio*, *Torch Song Trilogy*, *To Sleep With Anger*, *Deep Cover*, *Poison Ivy*, *Weekend at Bernie's II*, *Surf Ninjas*, *Excessive Force*, *The Rapture*. Television: *Dark Justice*, *Silk Stalkings*, *Peter Pan and the Pirates* (animation), *Smouldering Lust*, *The Wild West*

(10-part documentary), *Thirtysomething*, *The Days and Nights of Molly Dodd*, *Charlton Heston Presents The Bible* (also documentary for A&E), *Babylon 5*, *Renegade*. Non-theatrical: "Journey into Nature," Dita Park, Japan; "MuppetVision Pre-Show," DisneyWorld, Florida; "SciFi Drive," DisneyWorld, Florida; "Tierra De Gracia & Concierto Por La Tierra," '92 World's Fair, Spain.

ENCORE COMMUNICATIONS INC.



729 Seward St.; Hollywood, CA 90038; (213) 465-5207; FAX: (213) 465-8676. Owner: Dennis Ho.

FACE BROADCAST PRODUCTIONS



115 N. Hollywood Way, #101; Burbank, CA 91505; (818) 842-9081; FAX: (818) 842-3708. Owner: Ron Malvin. Manager: Ron Malvin.

525 POST PRODUCTION



6424 Santa Monica Blvd.; Hollywood, CA 90038; (213) 466-3348; FAX: (213) 467-1589. Manager: Laura Richards, Executive Producer.

F R A M E W O R K
S ■ U N D

FRAMEWORK SOUND INC.
Burbank, CA

FRAMEWORK SOUND INC.



4321 W. Magnolia Blvd.; Burbank, CA 91505; (818) 843-7042; FAX: (818) 843-7145. Owner: Ken Dahlinger. Video Tape Recorders: Sony BVH-2000 1", Sony DVR-10 D-2, Sony BVW-70 Beta SP, Sony BVU-800 3/4". Synchronizers: Adams-Smith A/V. Audio Recorders: Otari MTR-9011, Otari MTR-12, Panasonic 3700 DAT. Audio Mixers: Otari 54 w/moving fader automation. Other Major Equipment: NED PostPro 16-track digital editing, NED Synclavier 32MB. Rates: Negotiable. Specialization & Credits: Framework Sound, a leader in post-production audio and sound design for video and film, is conveniently located in Burbank, California. The facility is just minutes from several major studios including Warner Brothers, Disney, and Universal. Framework has an impressive list of clients and credits including, MTV: "Movie Awards," "Video Music Awards," and "Unplugged"; HBO Specials: Propaganda; Films: Budweiser, Phillips DCC, Nike, and START commercials; Limelight: Budweiser commercial; Columbia Pictures: various trailers; Columbia Home Video: trailers and commercials; MGM: trailers and commercials; and Warner Bros.: presentations, trailers and commercials. Framework prides itself on maintaining the highest audio quality by its ability to keep digital source audio within the digital domain.

GROUP IV RECORDING INC.



1541 N. Wilcox Ave.; Hollywood, CA 90028; (213) 466-6444; FAX: (213) 466-6714. Owner: Angel L. Balestier. Manager: Lisa Burrowes.

MEDIA COMMUNICATIONS CORP.



2727 W. Southern Ave.; Tempe, AZ 85282; (602) 438-2959. Owner: Ann Bonanno, president. Manager: Randy Kobler, sales.

PREMORE INC.



5130 Klump Ave.; N. Hollywood, CA 91601; (818) 506-7714. Owner: Subsidiary of Solo Cup Company. Manager: Robert Perry.

PRODUCERS POST



2625 W. Olive Ave.; Burbank, CA 91505; (818) 841-6750; FAX: (818) 841-0883. Owners: Barry Jaffe, Gary Hunt. Manager: Larry Guzy.

RAVE VIDEO PRODUCTION FACILITIES



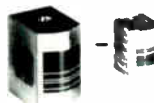
611 N. Orchard Dr.; Burbank, CA 91506; (818) 841-8277. Owner: Rex Olson. Managers: Loren Allread, Pat Cardamone. Specialization & Credits: RAVE Video Production Facilities is a production/post-production facility offering broadcast-quality equipment and

—LISTING CONTINUED ON NEXT PAGE

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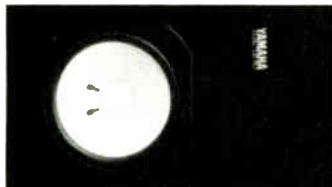
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personalized service. We feature a 2,000-square-foot sound stage, multicamera control room, broadcast cameras and support, lighting and grip equipment. Our edit suite features digital video effects, Chyron graphics and the Newtek Video Toaster computer graphics system. RAVE specializes in bridging the gap between producer and facility by providing a complete production facility capable of taking a production from start to finish. RAVE's staff has extensive experience in the music industry and the production of live music performances, electronic press kits and instructional music videos. Some of our current clients include Motown, Curb Records, I.R.S. Records, American Record Distribution, Herbie Hancock, Starlicks Inc., Hal Leonard Publishing Corp., Doom, and USA Music. In addition to providing high-quality production services, RAVE produces original programming for the ever-expanding broadcast, cable and home video markets.

RESULTS VIDEO



6516 Escondido Or., Ste. A1; El Paso, TX 79912; (915) 581-0184; FAX: (915) 581-0184. Owners: Larry Emerson, Jesse Clay. Manager: Jesse Clay. Video Tape Recorders: Sony BVW-75, BVW-70, BVW-65 Betacam SP, Ampex VPR-2B 1". Sony VO-5800 3/4" U-Matic, Sony EVO-9650 Hi-8 frame-controllable. Switchers/editors: Abekas A-34 digital editor/controller component. Video Cameras: Sony BVW-507 Betacam SP, JVC KY-25U available as Betacam SP or S-VHS; Panasonic GP-CA45 micro color 2/3"x15", 3 & 7mm. Video Effects Devices: Microtime Impact component digital 3-D and image transformer. Audio Recorders: Tascam DA30 DAT, Sony TCD-D10 Pro field DAT, Micro-Tech Micro Sound/Micro Editor digital workstation. Audio Mixers: Mackie CR-1604, Tascam M-216. Other Major Equipment: (2) Topas 3-D animation stations, Micro-Tech digital audio workstation, Electro Sonics M170 Series wireless mic system, Audio-Technica AT-4462 6x2 field mixer. Rates: \$140/hr shoot; \$180/hr edit.

THE RUBBER DUBBERS INC.



626 Justin Ave.; Glendale, CA 91201; (818) 241-5600; FAX: (818) 241-1366. Owner: Peter Smolian.

SANTA FE COMMUNICATIONS



2525 N. Naomi St.; Burbank, CA 91504; (818) 848-5800; FAX: (818) 848-6454. Owner: Ross Eastty, general manager. Manager: Felix Girard, marketing director.



SCOTTSDALE CONFERENCE RESORT
Scottsdale, AZ

SCOTTSDALE CONFERENCE RESORT



7700 E. McCormick Pkwy.; Scottsdale, AZ 85258; (602) 596-7690; FAX: (602) 596-7420. Owner: Scottsdale Conference Resort. Manager: Martin Dempsey, accounts manager; Mike Floor. Video Tape Recorders: Sony BVU-950, (2) Sony BVU-920, (4) JVC CR-850U, (3) Sony VO-5850. Video Monitors: Sony PVM-1220, (10) JVC TM-R9U, (2) Sony PVM-5310, Mitsubishi. Switchers/editors: Grass Valley VPE-B1, Grass Valley 1600-IL, Grass Valley Model 100, Convergence 204 editor, Grass Valley VPE-131 editor. Video Cameras: (3) Sony DXC-M7, Ikegami HL-79 DAL. Synchronizers: (2) Adams-Smith System 2600. Video Effects Devices: Grass Valley DPM-100 w/recursive memory and E-mem. Audio Recorders: Otari MX-70 16-track, Otari MTR-12CT w/center-track time code, (2) Otari MX-5050BQII 4-track. Audio Mixers: TAC Scorpion 24x16, Soundcraft 600 16x8. Soundstages: 17'x21'x14', 76'x76'x14'. Other Major Equipment: Complete

dark room, multi-image staging and production, laser light shows, Topas 3-D animation graphics. Rates: Call. Specialization & Credits: Specializing in video production, post-production, audio-for-video, sound effects, audio production and original music composition. Located in luxurious resort setting with golf, tennis, complete health spa and fitness center with easy access to Sunbelt activities.

SIGNET SOUND STUDIOS



7317 Romaine St.; W. Hollywood, CA 90046; (213) 850-1515; FAX: (213) 874-1420. Manager: Andrew Golov, president; David Dubow, general manager.

SOUND AFFAIR RECORDING LTD.



2727 Crodby Way, Ste. G; Santa Ana, CA 92704; (714) 540-0063; FAX: (714) 540-8359. Owner: Ron Leeper. Manager: Andree Hogg.

SOUTH COAST FILM & VIDEO



5234 Elm St.; Houston, TX 77081; (713) 661-3550; FAX: (713) 661-HELP. Owner: Everett Gorel. Manager: Steven J. Goyette. Video Tape Recorders: Sony BVH-3100 1", (2) Sony/Ampex BVW-70 Betacam SP, (2) Sony/Ampex BVW-65 Betacam SP, Sony/Ampex BVU-950 3/4", Sony BVW-35 Betacam SP. Switchers/editors: Grass Valley GVG 100, Sony BVE-900 editor. Video Cameras: Sony BVW-300 camcorder, Sony BVP-507 camcorder, Ikegami HL-79 EAL. Video Effects Devices: Microtime Genesis Act III DVE. Audio Recorders: Roland DM-80 digital audio workstation, (2) Otari MX-5050B 1/4". Audio Mixers: (2) Ramsa WR-8210 and WR-5216, Mackie CR-1604. Soundstages: 35'x55'. Other Major Equipment: Beta online or offline editing, 3/4" offline; 16mm/35mm film packages available, Silicon Graphics Iris 3-D animation system w/TDI Explore software. Rates: Rate sheets and demos available upon request.

TODD-AO/GLEN GLENN SOUND STUDIOS



900 N. Seward St.; Hollywood, CA 90038; (213) 962-4000; FAX: (213) 466-2327. Manager: J.R. Delang.

VIDEO-IT POST



5000 Overland Ave., #6; Culver City, CA 90230; (310) 280-0505. Owners: John & Felisa Kohan-Mattick. Managers: Kassi Crews, Ken Slater, Keith Manasco.

VIDEO MEDIA PRODUCTIONS



OIV. OF VISUAL COMMUNICATIONS INC.
2727 W. Southern Ave.; Tempe, AZ 85282; (602) 966-6545; (800) BETA-NOW. Owner: James Rinkenberger, president. Manager: Ann Bonanno.

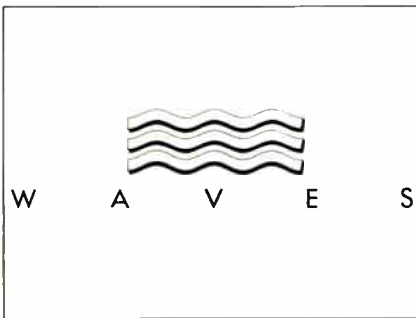
VIDEO POST & TRANSFER



2727 Inwood Rd.; Dallas, TX 75235; (214) 350-2676; FAX: (214) 352-1427. Owner: Neil Feldman. Manager: Jon Mueller. Specialization & Credits: New facility, convenient to Dallas Love Field Airport. Video Post & Transfer offers clients superior post-production capability using digital technology. VP & T telecine features Rank Cintel's MKIII-C w/Digiscan 4, Keycode, RTS (real-time) pin-registered transfers, Meta-Speed digital servo, Accom D-1 still store, Accom D-1 noise reduction, Encore Video Industries PRISM SCC, Steadifilm, Nagra T-audio sync-up and Ultimatte V. Transfers direct to all formats. Graphics/paint/animation includes DFX "Composium" digital paint/production system and Vertigo Series 9 workstation-based 3-D animation. Three digital online suites feature CMX 3600 editors, Abekas A-82 D-2 switchers, three channels of GVG Kaleidoscope w/KURL and Combiner, proprietary dream computer-based, all-digital audio editing/mixing/sweetening/processing system, Abekas A-72 CGs, (2) Abekas A-60s, Abekas A-62, (9) Sony DVR-28/18 D-2 deck, Sony DVR-1000 D-1, (9) Sony 1" decks, (6) BVW-75s, (2) BVU-850/SPs and a Pesa Series 5 routing system. Recently completed construction on a new SSL Scenaria suite, recording/Foley stage and SSL ScreenSound suite.



- Video production
- Video editing
- Mix to picture
- Music scoring
- Sound editing/design
- Automatic Dialog Replacement
- Foley
- Location audio for film/video



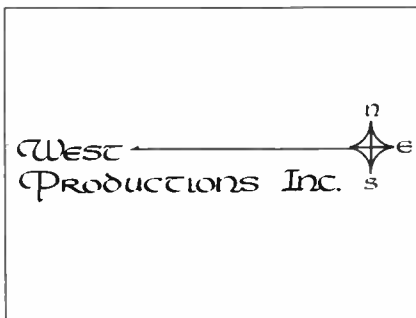
WAVES SOUND RECORDERS
Hollywood, CA

WAVES SOUND RECORDERS

1956 N. Cahuenga Blvd.; Hollywood, CA 90068; (213) 466-6141; FAX: (213) 466-3751. Manager: Beth Merritt. Video Tape Recorders: Sony BVH-3000, Sony BVU-800, (3) Sony VO-7600. Synchronizers: (2) TimeLine Lynx keyboard control units, (5) TimeLine Lynx time code modules. Audio Recorders: (2) Studer A810, Sony/MCI JH-24. Audio Mixers: (2) Sony MXP-3000, (2) Sony MXP-2000. Other Major Equipment: (3) AMS AudioFile Plus digital workstations, Eventide H3000SE Ultra-Harmonizer, Fostex D-20 time code R-DAT, Akai DD1000 digital workstation, Codex digital patch fiber optic telecommunication, Codex DGS fiber optic telecommunication.

WEBSTER COMMUNICATIONS

607 N. Ave. 64; Los Angeles, CA 90042; (213) 258-6741. Owner: Van Webster.



WEST PRODUCTIONS INC.
Burbank, CA

WEST PRODUCTIONS INC.

2921 W. Olive Ave.; Burbank, CA 91505; (818) 841-4500. Owners: George (Ray) West, David West. Managers: David Rawlinson, VP; John Merten. Specialization & Credits: West Productions is a full-service audio post-production facility dedicated to delivering top-quality product at a competitive price. The latest in sound technology is fully utilized, be it digital (Cyberframe digital workstations), analog (with Dolby SR), or a combination (computer-controlled ADR/assembly systems). Our talented staff includes Oscar and Emmy winners and nominees. Current post-production at our facility includes: *The Wonder Years* (New World/ABC), *Picket Fences* (Fox/CBS); Theatrical: *Teenage Bonnie and Clepto Clyde* (21st Century Films), *Hit the Dutchman* (21st Century Films), *Sniper* (Baltimore Pictures/Tri-Star); M.O.W.: *A Good Kill* (Viacom), *Mortal Sins* (Blake Edwards), *Breaking the Silence* (Robert Greenwald), *A Nightmare in the Daylight* (Sabau/Scherick), *Lethal White Female* (Longbow Productions); Animation: *James Bond Jr.*, *Teenage Mutant Ninja Turtles*, *Speed Racer* (Fred Wolf Films).

WILD KAT PRODUCTIONS

P.O. Box 802423; Santa Clarita, CA 91380-2423; (805) 266-3343; FAX: (805) 266-3343. Owner: Jeff Amlong.

NORTHWEST
Alaska, Northern California, Colorado, Idaho, Montana, Northern Nevada, Oregon, Utah, Washington, Wyoming

ABEL VIDEO

1022 S.W. Salmon St., Ste. 260; Portland, OR 97205; (503) 222-9202; FAX: (503) 222-9202. Owner: David Abel. Manager: David Abel.

AMERICAN PRODUCTION SERVICES

2247 15th Ave. W.; Seattle, WA 98119; (206) 282-1776. Owner: Conrad Denke. Manager: Eric Cente.

AVALANCHE RECORDING STUDIO INC.

1065H Irma Dr. #27; Northglenn, CO 80233; (303) 452-0498. Owner: Avalanche Recordng. Manager: Linda Warman.



AVIO PRODUCTIONS
San Mateo, CA

AVID PRODUCTIONS

235 E. Third Ave.; San Mateo, CA 94401; (415) 347-3417. Owner: Henry Bilbac. Manager: Chris Craig. Video Tape Recorders: Sony JVR-10 D-2, Sony BVW-75 SF, Sony BVW-65 SP, Sony BVU-950 SP, Sony PVW-2800 SP. Video Monitors: Sharp XM-1300, (2) JVC TMR-9U, Sony PVM-1344Q. Switchers/editors: CMX 3500, Grass Valley 100 w/linear key. Video Cameras: Sony BVW-505, Sony DXC-3000. Video Effects Devices: Abekas A-53D w/warp, Pinnacle 2040 (DVE, Paint, 3-D). Audio Recorders: (2) Otari MX-5050B, Jigidasign Sound Tools, Opcode Studio Visions, (2) Sony PCM-2540 R-DAT, (2) Sony PCM-2110 R-DAT. Audio Mixers: (2) Scoundcraft Delta B-200. Soundstages: 20'x20' video, 12'x17' audio. Other Major Equipment: Abekas A-72 digital C.G., Pinnacle 2040 paint/3-D animation, Studer Dyaxis 322 disk-based audio editing system, Avid Media Composer offline editing system. Rates: \$150 to \$275. Specialization & Credits: Avid Productions offers many services for the video professional. For production, these include directors, camera operators, grips and gaffers—the artists who paint the frames of video with light and color. The scene may require a helicopter, a crane, dolly, or just a tripod. Using resources efficiently is our forte. In the area of editing, experienced hands anticipate your commands. The precise manipulation of frames, the careful placement of voice and music—this is the realm of Avid's edit suite. Equipment includes CMX 3100B Grass Valley Group 100, A-72, A-53D, Betacam SP to D-2. Graphics: Make text move, use icons, create backgrounds that sparkle and 3-D objects that reflect a world of chrome. Warp, burst and fly your way to places where only the computer can travel. Communicate with precision and clarity (Pinnacle paint system with 3-D animation, Abekas A-72 CG and backgrounds).

ROBERT BERKE SOUND

50 Mendell St. #11, San Francisco, CA 94124; (415) 285-8800; FAX: (415) 285-8847. Owner: Robert Berke. Manager: Nancy Berke.

BUTLER VIDEO PRODUCTIONS

14360 S.E. Eastgate Way; Bellevue, WA 98007; (206) 865-8682; FAX: (206) 865-8653. Owner: Don Waite. Manager: Tom Rehfield.

KEN CARLTON RECORDING

11240 Hwy. 41; Madera, CA 93638; (209) 431-5275; FAX: (209) 431-9145. Owners: Ken and Marilyn Carlton. Manager: Ken Carlton.

JAMES DANIELS PRODUCTIONS

299 California Ave. #306; Palo Alto, CA 94306; (415) 325-8574; FAX: (415) 327-0635. Owner: James Daniels. Manager: Bruce Kaphan.

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136-1/2 Campbell St.; Santa Cruz, CA 95060; (408) 429-8283; FAX: (408) 429-8283. Owner: Rodney Fitzpatrick.

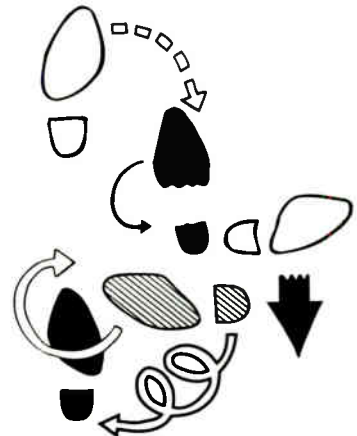
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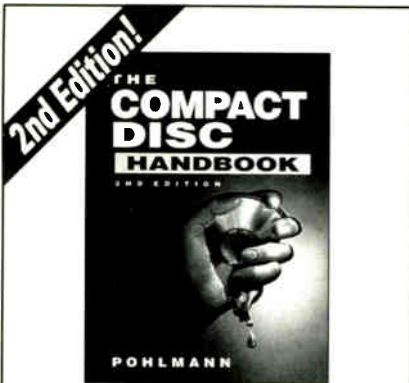
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IN THE

JUNE 1993 MIX

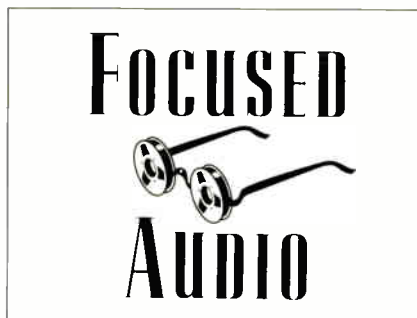
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San Francisco, CA

FOCUSED AUDIO



544 Natoma St., San Francisco, CA 94103; (415) 626-9777; FAX: (415) 626-7123. Owner: Jeff Roth. Manager: Jeff Roth. Video Tape Recorders: (2) JVC CR-850 3/4", JVC BR-8600 VHS, Panasonic AG 7400 S-VHS portable. Video Monitors: (3) Sony. (2) Mitsubishi 35". Switchers/editors: Kelly Quan SC610 audio editing system. Synchronizers: (6) CIPHER Digital Shadow. Audio Recorders: AMS AudioFile digital audio workstation w/8 hrs. storage, MCI JH-24 24-track, Ditar MTR-10 2-track w/CTC, Fostex E-2 2-track w/CTC, all recorders equipped with Dolby SR. Audio Mixers: Sony/MCI 636 40-input. Other Major Equipment: 8-track and 4-track Pro Tools digital audio workstations, Digidesign Sound Tools, DiskMix II Plus console automation. Rates: Call for rates. Specialization & Credits: Focused Audio continues to be a leader in audio post-production and music recording. Having produced over 100 soundtracks for broadcast and cable television, as well as numerous features and documentaries, Focused has moved into the '90s with a brand-new facility. Four control rooms and three recording spaces have been carefully designed and equipped with the best audio tools available today. All rooms are SMPTE-locked to picture and can access any of our available recording formats. Through our main machine room, the appropriate control room, recording space and recording format can be configured easily for any project. Engineers with expertise in feature film and television sound, CD-I, music and radio work are available to put this facility to work for you. Call for our demo reel featuring sound design and original music for national TV spots.

JENSEN SOUND PRODUCTIONS



363 Brannan St., San Francisco, CA 94107; (415) 543-7095; FAX: (415) 543-7098. Owner: Eric Jensen. Manager: Eric Jensen.

JESTER SOUND & VIDEO



423 Kuhlman Dr., Billings, MT 59105; (406) 248-5896; FAX: (406) 245-5658. Owner: Bob Hale. Manager: Grace Fillmore.

MAGNETIC IMAGE INC.

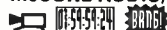


1294 Lincoln Ave., San Rafael, CA 94901; (415) 456-7900; FAX: (415) 456-9086. Owners: H. Cohen, L. Kenworthy. Manager: L. Kenworthy. Video Tape Recorders: Sony LVR-3000N video disc recorder, (2) Sony BVW-50, (4) Sony BVW-35, (2) Sony BVV-5, (2) Sony BVW-25 multicamera fly-pak. Switchers/editors: Grass Valley 100-CV, Grass Valley 100-N, Grass Valley 1600-ILCV. Video Cameras: (3) Sony BVP-90, (2) Sony BVW-400A, (2) Sony BVW-300A, (3) Sony DLX-537. Other Major Equipment: Crew services.

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2200 Army St., San Francisco, CA 94124; (415) 641-1111; FAX: (415) 695-6702. Owner: Harry McCune. Manager: Allan McCune. Specialization & Credits: McCune specializes in full-service production. We offer two complete "Flypack Systems": Sony DXC-537 & M-7 studio configuration cameras; Sony & Panasonic SEG switching systems; Tektronix engineering & routing...3/4" SP & Betacam SP recorders and editors TO GD!...Dur production services are supported by a wide selection of audio visual equipment available from our extensive rental inventory; Sound systems; Video projection; Lighting design; Staging—All under one roof!...An experienced staff to crew your project, from concept & development, through post-production...Call for our demo reel today!

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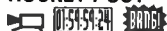
69 Green St., San Francisco, CA 94111; (415) 421-6622; FAX: (415) 391-4995. Owner: Music Annex Inc. Manager: Laura Sarkissian-Boyd.

NORTHWEST VIDEOWORKS



1631 S.W. Columbia; Portland, OR 97201; (503) 227-7202; FAX: (503) 223-7528. Owners: Wayne, Diane and Ken Ahrendt. Manager: Doug Barry.

ROCKET POST



51 Federal St., Ste. 100; San Francisco, CA 94107; (415) 495-2297; FAX: (415) 495-2684. Owners: Dave Haynes, Nancy Evans. Manager: Fred Baysinger. Video Tape Recorders: Sony DVR-18 D-2 digital editor/recorder, (3) Sony BVW-75 Betacam SP editor/recorder, (2) Sony VD-9850 3/4" SP U-Matic editor/recorder, Sony BVV-5 dockable Betacam SP recorder. Switchers/editors: Grass Valley GVG 110-N composite switcher w/ChromaKey and serial interface, (2) CMX 300 A/B/C roll editors w/list management. Video Cameras: (3) Ikegami HL-95B Tube broadcast-quality, (3) Sony BVP-70IS CCD broadcast-quality. Audio Recorders: Ampex ATR-102 2-track 1/4" and 1/2", Studer 820 1/2" and 1/4" with CTC, Sony, Panasonic, various DAT recorders. Audio Mixers: Tascam 208 8x4x2, Mackie 1202 12x4x2.

RUSSIAN HILL RECORDING



1520 Pacific Ave., San Francisco, CA 94109; (415) 474-4520; FAX: (415) 474-7190. Owners: Jack Leahy and Robert Shotland. Manager: Cindy McSherry. Video Tape Recorders: Sony DVR-20, Sony BVH-1100A, (2) Sony BVU-800. Synchronizers: (2) Audio Kinetics Q.Lock 3.10. Audio Recorders: Ditar MTR-100A, Ditar MTR-901I, (2) Otari MX-55. Audio Mixers: SSL 4000E, Neotek Series III. Soundstages: 20'x30" (audio only), 18'x28" (audio only). Other Major Equipment: Dyaxis 4-channel DAW, Dyaxis II 8-channel DAW, KEM K-800 flatbed film transfer system, (2) Panasonic SV-3700 DAT recorders.

SAN FRANCISCO AUDIO NETWORK



39 Gilbert St., San Francisco, CA 94103; (415) 863-6883; FAX: (415) 863-8419. Owner: Gregory Gordon. Manager: Michael Lande.

SKYWALKER SOUND



PO Box 3000; San Rafael, CA 94912; (415) 662-1000. Manager: Kiki Morris.

TELEVISION ASSOCIATES INC.



2410 Charleston Rd., Mountain View, CA 94043-1683; (415) 967-6040; FAX: (415) 964-2453. Owner: Edward Carlstone. Manager: Lauri Clark. Video Tape Recorders: (7) Sony D-2 and 1", (35) Sony Betacam SP and 3/4" SP, (5) various Hi-8 and S-VHS, (200) various VHS. Switchers/editors: (3) CMX 3500, 3400 and 100, (3) Grass Valley 200 and 100, EMC2 non-linear, comprehensive VHS/S-VHS edit master. Video Cameras: (2) Ikegami HL-79E, Sony DXC-3000, access to all Sony and Ikegami chip cameras. Video Effects Devices: Ampex ADO, Laird E-Flex. Audio Recorders: Narration booth for record on all audio tape formats, cassette or reel-to-reel. Audio Mixers: (3) Sound Workshop audio consoles, Tascam, Shure FP42. Soundstages: 30'x40'x14' with complete grid and grip package. Other Major Equipment: Lion Lamb RTC real-time scan converter, Macintosh Quadra 950, Quantel PaintBox, closed captioning system, multicamera fly pack, volume duplication-NTSC, PAL & SECAM conversions; custom video packaging, fulfillment and inventory control; MacroVision anti-copy protection process. Rates: Very competitive! Line item pricing or package deals. Call for information.

VALENTINE PRODUCTIONS



10650 Irma Dr., #27; Northglenn, CO 80233; (303) 457-1755. Owner: Laurie Gordon. Manager: Laurie Gordon.

VARITEL VIDEO SAN FRANCISCO



350 Townsend St.; San Francisco, CA 94107; (415) 495-3328; FAX: (415) 495-0866.

VIDEOFAX



1252 8th Ave.; San Francisco, CA 94122; (415) 661-0500; FAX: (415) 661-2710.

ZOOMA MUSIC PRODUCTIONS



110 Coleridge Ave.; Palo Alto, CA 94301; (415) 323-1217. Owner: Victor Bellomo. Manager: Victor Bellomo. Specialization & Credits: Zooma Music Productions provides music scoring, acoustic recording and sound design for film, video, radio and live performance. We score to the frame for any combination of acoustic instruments, vocal ensembles, electronic instruments and our own custom sound effects. Our facility is equipped with a Sound Workshop Series 34 32x24 mixer with DiskMix automation, Otari MX-80 2" 24-track, Otari MX-5050BII 2-track, Panasonic SV-2500 DAT, large selection of microphones, Fostex 4030 synchronizer, time code machine SMPTE/MIDI converter, JVC BR-S822U and JVC BR-S622U VTRs, Videomeida Micron editor, Panasonic CT 1382 monitors, Macintosh IIfx-based MIDI room with a great selection of synthesizers and samplers with a large library of sounds, acoustic instruments including a 7'6" Yamaha grand piano, Hammond organ w/Leslie and a collection of ethnic percussion instruments. Our clients include award-winning film and video producers, Apple Computer, Intel Corporation, Electrical Power Research Institute, Stanford University and PBS Television.

OUTSIDE U.S.

THE BEACH INC.



619 11th Ave. SE; Calgary, AB, Canada T2G 0Y8; (403) 237-6267. Owner: L.J. Williamson. Manager: Chris McIntosh. Video Tape Recorders: Ampex BVW-50 Betacam, Sony 9600 3/4", Sony SLV-579 1/4". Synchronizers: Adams-Smith Zeta-3B. Audio Recorders: (4) Alesis ADAT w/BRC, Fostex D-20B, Panasonic SV-3700. Audio Mixers: Peavey/AMR 36x24x48 w/automation, Mackie 1204. Soundstages: Dry, 450 sq. ft. Other Major Equipment: Studer Dyaxis, NEC projectors and monitors, Fostex E-2 CTC; Gefel, Neumann AT, Beyer, AKG microphones; Studer A80 16-track; Eventide, Lexicon, Yamaha, Alesis DSP. Rates: Call for rates.

THE CINAR STUDIO CENTRE



1207 Rue St. Andre; Montreal, QC, Canada H2L 3S8; (514) 843-7070; FAX: (514) 843-7080. Owners: Micheline Charest, Ronald A. Weinberg. Manager: Francois Deschamps.

8TH AVENUE SOUND STUDIOS



66 W. 8th Ave.; Vancouver, BC, Canada V5Y 1M7; (604) 873-8765; FAX: (604) 873-6787. Owner: Wayne Kozak. Manager: Cathy Kumpera.

IMAGE GROUP CANADA LTD.



26 Soho St.; Toronto, ON, Canada M5T 1Z7; (416) 591-1400; FAX: (416) 591-6854. Manager: Doug Morris or Jim Goessinger.

MASTER'S WORKSHOP



306 Rexdale Blvd.; Toronto, ON, Canada M9W 1R6; (416) 741-1312; FAX: (416) 741-1894. Owner: Maclean Hunter Ltd. Manager: Jim Frank.

MEDIA HOUSE PRODUCTIONS INC.



1174 Winnipeg St.; Regina, SK, Canada S4R 1J6; (306) 359-0977; FAX: (306) 569-2240. Manager: Bruce A. Solito. Specialization & Credits: Media House is an established video post-production and tape duplication facility. Producers have their choice of two editing suites, a broadcast suite that includes D-3 mastering, Betacam SP mastering/playback, ADO, computerized editing, computer graphics and more; or an S-VHS A/B roll suite that includes switcher, computerized editing, list management for offlining and more. The duplication facility will handle any size order from single to multiple copies with speed and efficiency. All tapes are quality controlled before leaving our facility.

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Box 6057; 121 06 Johanneshov; Stockholm, Sweden; 46 8 393002; FAX: 46 8 393002. Owner: MT Movie Track AB. Manager: Hans Eric Ahn.

SHOOTING STAR PRODUCTIONS



#138 E. Marine Dr., Bldg. C, Ste. 104; Agana, Guam 96910; (671) 477-9348; (671) 477-9349; FAX: (671) 477-6102. Owner: Carlos S. Barretto. Manager: Carlos S. Barretto.

SOUNDS INTERCHANGE LTD.



49 Ontario St.; Toronto, ON, Canada M5A 2V1; (416) 364-8512; FAX: (416) 364-8515. Owner: Super Corp. Manager: P. Mann.

STUDIO PLACE ROYALE INC.



640 St. Paul W., Ste. 600; Montreal, QC, Canada H3C 1L9; (514) 866-6074; FAX: (514) 866-6147. Owners: S. Brown, N. Rodrigue. Manager: S. Brown. Video Tape Recorders: Sony/MCI JH-110 1" layback, JVC 3/4" VCR, (3) JVC 1/2" VCR, Sony Betacam SP. Video Monitors: (2) JVC, (4) Sony, (2) Hitachi, 6-ft. JBL projector. Synchronizers: (2) Soundmaster w/CMX. Audio Recorders: (2) Otari MTR-90, MX-80 24-track, Otari MX-70 8-track, (3) Otari MTR-12 1/4" CTC, MX-55, Dyaxis digital record/edit. Audio Mixers: (2) Amek Angela 32-input, A&H Syncon 24-input, Soundcraft TS12. Soundstages: 25'x15' Foley. Other Major Equipment: Samplers, sound editing and signal processing, all SFX CDs, over 20,000 cuts production music, Dolby SR. Next door to full service video studios. Rates: \$80 to \$150/hr.

ZAP PRODUCTIONS LIMITED



118 Granby St.; Toronto, ON, Canada M5B 1J1; (416) 598-3103; FAX: (416) 598-3103. Owners: Lewis Manne, Wendy Watson. Manager: Lewis Manne.

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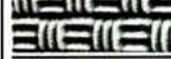
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R. Jose de Freitas Guimaraes, 37; Sao Paulo, Brazil 01237-010; 55 11 872-7837; FAX: 55 11 872-0995. Owner: Eduardo Marote. Managers: Cani Sahm, Edson Hirata. Video Tape Recorders: Sony VO-9850 SP U-Matic, (2) Panasonic AG 1960 S-VHS. Synchronizers: TimeLine MicroLynx w/3rd Machine and video sync generator. Audio Recorders: Akai A-DAM digital 12-track, Roland DM-80 hard disk 8-track, Fostex D-20 DAT w/time code, Tascam DA30 DAT. Audio Mixers: Biamp Legend 32-input. Other Major Equipment: Roland S-770 sampler w/16MB, Akai S1000 sampler, Lexicon 300, Eventide H3000, Roland R-880, Roland D-550. Rates: Call. Specialization & Credits: Promos and commercials for MTV Brazil; music composition and post-production for local and national (Brazilian) commercials.

SEE PAGE 170 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 159.

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—FROM PAGE 66. POST NOTES

sive MIDI arrangement...The Hollywood Film Division of San Francisco-based Dolby Laboratories recently upgraded its quality control with the addition of an Albrecht MB51 magnetic film recorder/reproducer. The capstan-driven MB51 has interchangeable head configurations for mono, 3-track, 4-track and 6-track film formats. The hybrid Dolby/Albrecht machine is capable of running conventional 6-track mag film masters, stereo optical prints and the new Dolby SR•D digital masters with the audio optically encoded between the sprocket holes...The British Broadcasting System is in the process of evaluating the use of custom-designed Graham-Patten Systems interfaces for carrying digital signals over conventional video transmission links. Using a pair of Graham-Patten DATS converters, BBC engineers sent conventional AES3-format digital signals more than 800 miles between studios in London and Glasgow, without any perceptible loss in audio quality...Mixed Nuts update: The Manhattan post facility spotlighted in January purchased six Crown Macro Reference amplifiers for its three Scenaria suites—one for near-fields, one for mains in each room. "The damping factor is really impressive, and it's very musical," says engineer Tom Cahill. "It's got finesse that I didn't expect..."The producers of the TV show *Going to Extremes* converted Grove Studios, a Jamaican 24-track music facility, into an on-site ADR stage, making "looping" available on location. The new portable TimeLine MicroLynx machine control system was flown in and used to synchronize a 24-track recorder and standard 3/4-inch U-matic videotape recorder...Music Annex Audio Post Production (San Francisco) has been with the Digital Patch Audio Network for six months now, mostly sending commercial voice-overs to New York and L.A. Audio is transmitted through ISDN data lines in two-way stereo, 20 to 20k Hz, digitally from origin to reception. More than 20 facilities in the U.S., Canada, Australia and England are members of the network...Howard Schwartz Recording (NYC) added Bill Higley, a ScreenSound specialist, to its audio engineering team. Higley comes fresh from five years at New York's Soundtrack.

—FROM PAGE 141. MULTIMEDIA UNIVERSALS

tiplayer were on display at both the Panasonic and 3DO booths at WCES. According to Panasonic product manager Akio Mihara, the machines shown were "quite close" to the final version. Based on the prototype imagery displayed on the monitors, Hawkins' team has achieved its technical goals.

Graphic images were crisp and vibrant. A "set" created for *Jurassic Park*—Steven Spielberg will populate it later with images shot for an interactive title based on his film of the same name—showed off the richness and depth available from 3DO's Cinematic Software Tools. The tools allow programmer-defined moving light sources, texture mapping, transparency and other effects that contribute to the illusion of three-dimensionality as the user changes "camera angle" via a hand-held remote. Animation displayed on other monitors demonstrated how quickly and smoothly 3DO can handle graphics. And video playback, using software-based decompression at a full 30 frames per second, was more than acceptable, though it will be better once the MPEG cartridge is available.

In addition to the MPEG cart, other options have been designed for expansion, control and upgrades. The control port will accept several daisy-chained controllers such as joysticks, 3-D goggles, keypads and MIDI instruments. The expansion port will be able to handle peripheral devices including memory storage and modems. And an optional video input will allow consumers to edit their home videos and add special effects.

3DO TECHNOLOGY

Among the design features key in making the 3DO technology work is a double-speed CD-ROM drive. The drive doubles the rate at which data can be pulled off the disc and fed into the system's buffer memory, from where, depending on data type, it is routed to the appropriate processor. This increase in transfer rate is crucial for interactive applications involving high-quality audio, because it means the bitstream can accommodate Red Book audio and other elements at the same time. But to

free up even more of the bitstream, most programmers will probably use the system's software-based ADPCM audio compression, said to yield near-CD quality. "3-D Audio Imaging," intended to give headphone wearers an "authentic sense of sound immersion," is also available.

According to Hugh Martin, senior VP for engineering and operations, "There are two ways that we could generate audio in an interactive application. One is that we can take real samples off the disk, and those typically would be compressed with some type of coding like ADPCM. Or we can download a synthesizer application that runs in the DSP.

"So someone can write an application that allows our system to act as a MIDI instrument," Martin says, "because it has a powerful DSP and a high-quality set of digital-to-analog converters. The player would be a sound-generating module itself. But because the machine is doing so much else at the same time, the algorithms will not be very sophisticated. However, the same MIDI commands could be spit out the back port to a really nice MIDI box, and then you can get real high-quality synthesized sound."

In terms of graphics capability, 3DO says its graphics/animation processors, two custom chips working in parallel, can animate up to 64 million pixels per second, compared with about 1 million in 16-bit systems. Serving this graphics core are specialized circuits for video, audio and data flow management. Data is shared between chips over 24 Direct Memory Access channels. The system architecture is reminiscent of the Commodore Amiga (part of 3DO's technical team was involved in the design of that machine). Since the bulk of the work of dealing with the various media is performed by specialized chips, the 32-bit RISC CPU is free to concentrate on interactive program control.

In interactive applications, short segments of various media elements are stored on the CD in individual files with identifying headers. The way in which the elements are combined and synchronized at any given moment is determined by a separate file containing coded instructions to the CPU. The instructions are coded by programmers directly, or created using multimedia programs like Adobe

Premiere or MacroMind Director, which run on 3DO's Macintosh development platform. Routines from the Cinematic Software Tools may be incorporated as needed.

In addition to a high-powered Mac (Quadra or IIfx), developers will need the 3DO development box, which will be provided only to software licensees. The box is connected to the Mac on one end and a TV set on the other. During development, program downloaded from the Mac is debugged and executed by the box so programmers can see the results of their work. Hawkins estimates that total costs for developing a full-featured interactive title may range as high as \$400,000.

Audio elements may be input by internal Mac cards from companies like Digidesign. Video may be processed by frame-grabber cards designed to work with QuickTime, then converted into 3DO's own video format. Elements may also be drawn from the vast 3DO Content Library: 170 CD-ROMs full of useful items like stock footage, matte backdrops, sound effects and musical scores, all of which may be used free of charge by licensed developers. The media includes 60 hours of music, 20,000 sound effects, 20,000 still photos, film clips and clip art. The material covers a wide range of subjects and is accessed by a custom database search engine.

Touches like the Content Library underscore how 3DO seems to have thought through every detail that could contribute to the adoption of a universal multimedia standard. But other players already on the field have huge investments in their own systems, and they aren't likely to simply cower in awe when 3DO appears. Further, experience suggests that multimedia players are a tough sell at 3DO's expected \$700 price point, especially since most consumers don't even know what they are. So the challenge facing Hawkins and his troops should not be underestimated. 3DO appears poised to open a new chapter in the story of multimedia. But whether Hawkins will end up concluding the format wars or merely intensifying them remains to be seen. ■

Tape & Disc editor Phil De Lancie is a mastering engineer at Fantasy Studios, Berkeley, Calif.

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92	019	Russ Berger Design
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114	031	Crest Audio
95	032	Crown
58	033	D & R USA
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148	035	The DAT Store
135	036	dbx
55	037	DIC Digital Supply
18-19	038	Digidesign (Pro Tools)
97	039	Digidesign (Pro Master 20)
50	040	Digital F/X
IBC	041	DigiTech
89	042	Disc Makers
40	043	Dolby
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59	057	Future Sonics
146	058	Gold Line
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138	060	Grey Matter Response
122	061	Haffer
66	062	The Hollywood Edge
155	063	I.D.T.
174	064	illbruck
99	065	Institute of Audio Research
62	066	JRF Magnetic Sciences
162	067	KABA Research & Development
165	068	Klarity Cassette (Cassettes)
167	069	Klarity Cassette (Cds)
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13	071	Lexicon
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165	075	Manhattan Production Music
125	076	Manny's Music
173	077	Markertek Video Supply
64	078	Masterfonics
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134	083	Music Tech
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116	106	Russo Music Center
141	107	SAS Industries
86	108	Sennheiser
38	109	Shape
127	110	Shure
75	-	Siemens Audio
79	111	Simon Systems Engineering
1, 41	-	Solid State Logic (SSL)
21	112	Sonic Solutions
163	113	Sonocraft
10-11	-	Sony
BC	-	Soundcraft
143	114	Sound Ideas
119	115	Soundtracs
160	116	SPARS
23	117	Spatializer
43	118	Spatial Sound
25	119	Spectral Synthesis
3	120	Studer
89	121	Studio Consultants
84	122	Summit Audio
158	123	Sweetwater Sound
145	124	Switchcraft/Raytheon
42	125	Tascam (DA-88)
72-73	126	Tascam (M-3700)
29	127	t.c. electronic
146	128	Tech 21
123	129	Thoroughbred Music
103	130	3M Corporation
170	131	Thrifty Electronics
170	132	Vertigo Recording Services
61	133	Whirlwind
167	134	Whisper Room
147	135	World Studio Group (WSG)
106	136	Yamaha
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92	138	Zoom

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004	029	054	079	104	129	154	179	204	229
005	030	055	080	105	130	155	180	205	230
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013	038	063	088	113	138	163	188	213	238
014	039	064	089	114	139	164	189	214	239
015	040	065	090	115	140	165	190	215	240
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017	042	067	092	117	142	167	192	217	242
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020	045	070	095	120	145	170	195	220	245
021	046	071	096	121	146	171	196	221	246
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005	030	055	080	105	130	155	180	205	230
006	031	056	081	106	131	156	181	206	231
007	032	057	082	107	132	157	182	207	232
008	033	058	083	108	133	158	183	208	233
009	034	059	084	109	134	159	184	209	234
010	035	060	085	110	135	160	185	210	235
011	036	061	086	111	136	161	186	211	236
012	037	062	087	112	137	162	187	212	237
013	038	063	088	113	138	163	188	213	238
014	039	064	089	114	139	164	189	214	239
015	040	065	090	115	140	165	190	215	240
016	041	066	091	116	141	166	191	216	241
017	042	067	092	117	142	167	192	217	242
018	043	068	093	118	143	168	193	218	243
019	044	069	094	119	144	169	194	219	244
020	045	070	095	120	145	170	195	220	245
021	046	071	096	121	146	171	196	221	246
022	047	072	097	122	147	172	197	222	247
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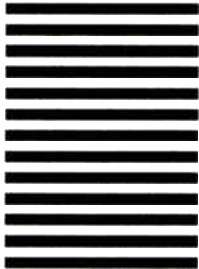
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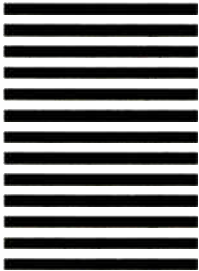
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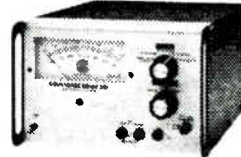
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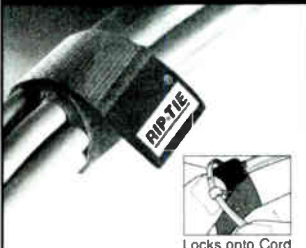
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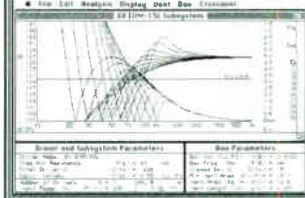
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—FROM PAGE 99

an auxiliary metering system that is compact enough to sit unobtrusively atop a console, yet large enough to be seen clearly from across a room.

The Delta VU's front panel has two bright, 16-segment LED ladders that indicate levels in 3dB steps. Rather than merely providing a bar graph display, the unit uses a novel approach that shows the peak *and* average (VU) characteristics of the input signal. As in other systems, peak levels are indicated by the highest LED, but the Delta VU also uses the average level of the waveform to turn *off* the LEDs at the other end of the bar, resulting in a floating bar of LEDs that simultaneously displays both levels.

The rear panel's 1/4-inch balanced TRS inputs and "mult" outputs allow the meter to be used as an in-line

device (connected between mixer outputs and DAT deck inputs, for example) without affecting the signal. Sensitivity trims for calibrating the meters for use with systems ranging from -10dBV to +4dBu levels are also on the rear panel.

Calibration requires little more than sending a 1kHz sine wave into the unit, while adjusting the trims to



match whatever 0dB reference you prefer. After that point, the Delta VU is pretty much a "set and forget" device.

The Delta VU's floating display combination of VU and peak charac-

teristics requires a little getting used to, but once you're accustomed to it, traditional meters seem ineffective.

I found the Delta VU to be an extremely useful adjunct in my studio, especially as my console has slow mechanical VU output meters. I do a lot of direct-to-digital 2-track recordings and don't always enjoy spending all of a six-hour session with my head cranked to watch the 2-track's meters on the side of the room. The unit is also wonderful for video applications.

Someday, somebody's going to make a VCR with meters that can be read from more than two feet away, but until that happens, the Delta VU is just the ticket. At \$249, it's an affordable solution that should find its way into audio facilities of all sorts.

Peavey Electronics, 711 A Street, Meridian, MS 39302; (601) 483-5376. ■

George Petersen is the author of Tech Terms: A Practical Dictionary for Audio and Music Production, published by Hal Leonard Books and available through Mix Bookshelf.

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