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DIGITAL AUDIO RECORDER

TAPE MACHINES

■ 15ips vs. 30ips

■ INTERVIEW: ALAN PARSONS

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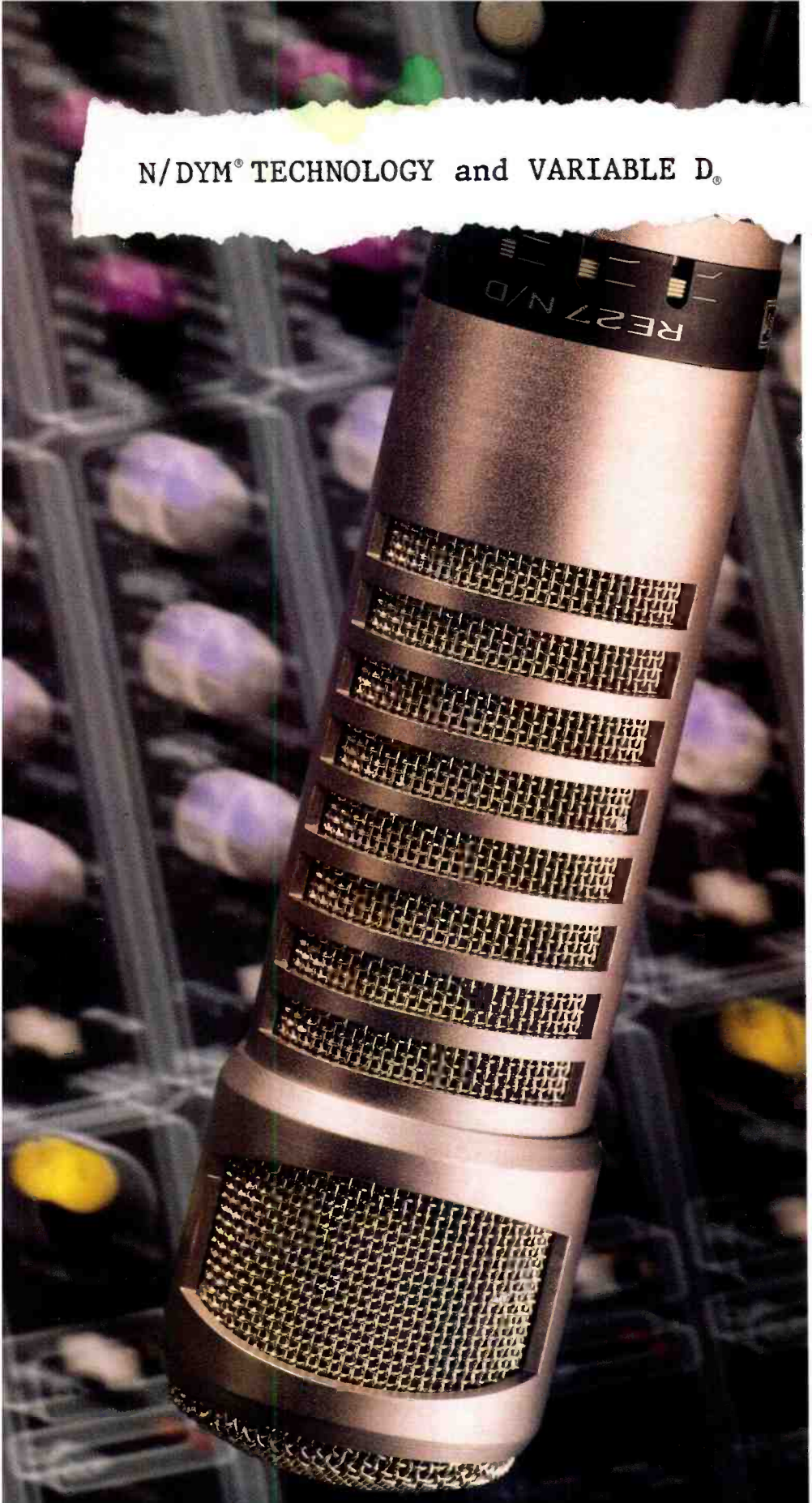

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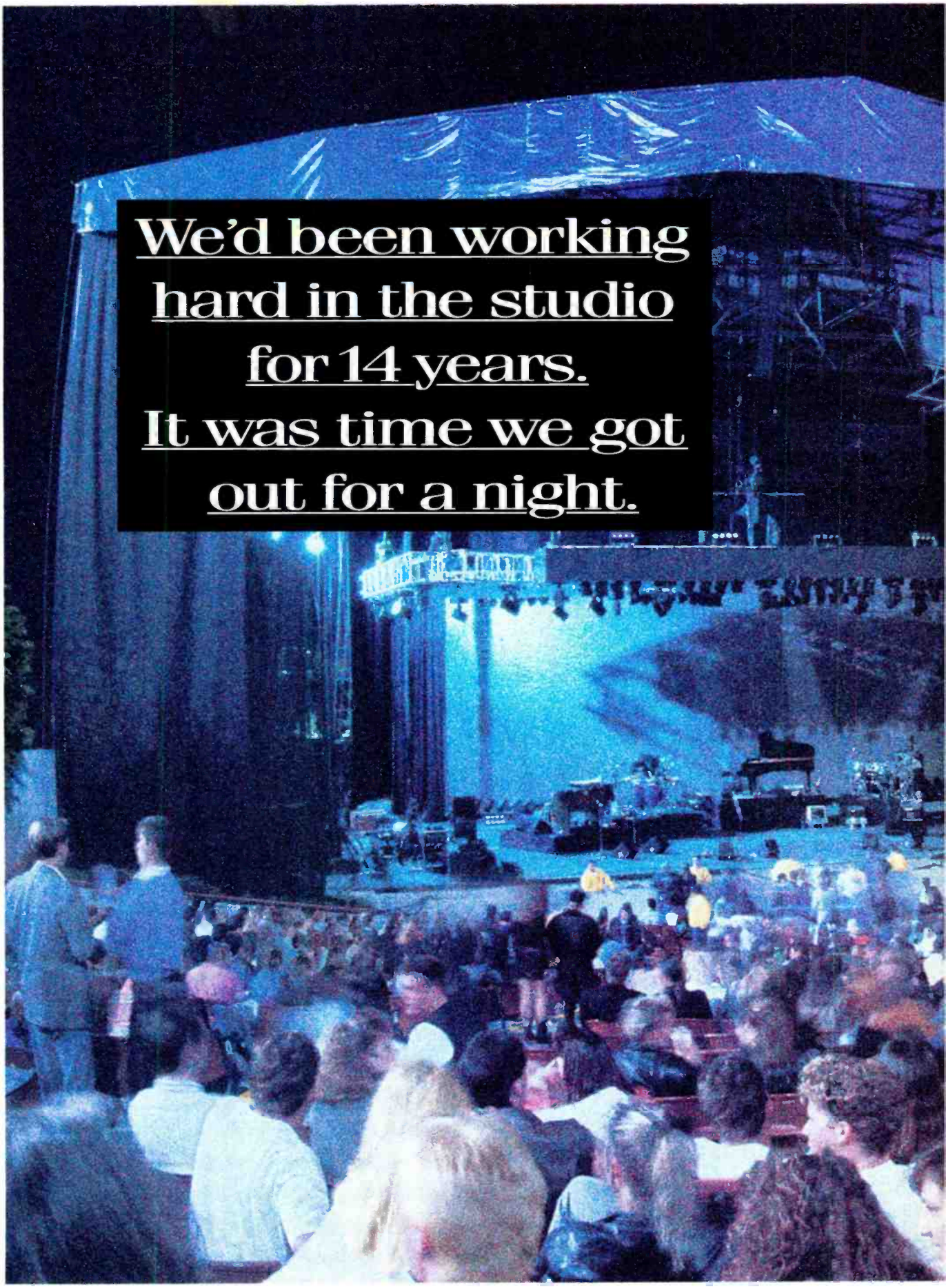

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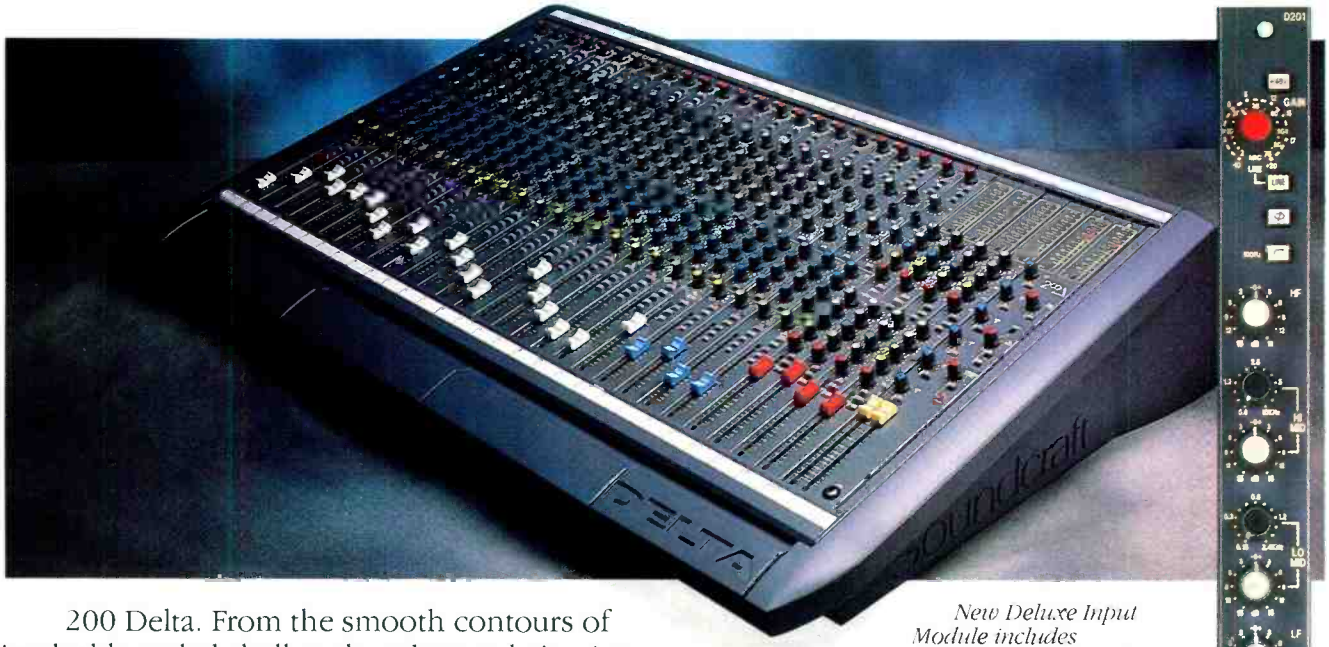

200 Delta. From the smooth contours of its sleekly styled shell to the advanced circuitry that delivers unprecedented performance, Delta is the compact console of the nineties. Expanding on the modular versatility of its 200 Series predecessors, Delta incorporates many innovations unique to Soundcraft. Advances in low profile console design that go well beyond the obvious restyling.

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200 Delta. Engineered for those who hunger for perfection.

New Deluxe Input Module includes expanded 4-band EQ with two mid-sweeps, high pass filter and post-fader direct output. The rackmount Delta, shown below in a 12x2 version using Deluxe Inputs, can be expanded to 24x2 using Dual Line Inputs. Both the streamlined consoles and rackmount models are built to withstand the demands of recording and sound reinforcement.

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From the Top

Analog In A Digital World

Yea, verily, we have been about the world and worshipped at the altar of technological revolution. We have ventured, as pilgrims, to the estates of digital divination, plucking the flowers of knowledge and tossing stones at detractors.

We have been to the stands. NAB. AES. SPARS. NAMM. APRS. MacWorld Expo. We have visited the factories. Lexicon. NED. Dyaxis. Digidesign. Apple. Digital Dynamics. Hybrid Arts. Solid State Logic.

And what have we learned? That analog recording is not dead. That random access, disk-based, graphically interfaced workstations are still very much in development. That the two will work hand-in-hand for quite some time yet. That even among workstations, there are huge differences — some edit, some sample, some mix, some track, some synthesize, some do it all, some better, some worse.

There is currently a solid place for the large, extremely capable production workstations. In many cases, they do more, do it faster and for less money than an entire comparable all-analog studio. Indeed, there are also less-expensive "off-the-shelf" component systems that provide high fidelity and production efficiency beyond existing analog systems.

They have limitations, selectively, pending your application. But, if you have no need to sync to a linear audio multitrack (LTC), a Sony BVU (VITC or LTC) and a rack of MIDI gear (MTC) simultaneously, all the while mixing 24 virtual tracks and outside-sourced digital tracks, additionally performing multichannel DSP-based EQ or F/X processing in real time, then a Mac, MS-DOS or Atari platform will do just fine. The big boys can do the above mentioned and more.

In defense of analog, the obvious must be stated. The storage medium is robust. The technology is known, easily understood and universally translated. Compatibility is a non-issue. The performance is generally excellent, and in some cases superior to current digital. Sales are still growing, and the current cost for performance is low and continues to decrease.

Digital has its shortfalls. It remains to be seen whether small-package designers will continue to rely solely on the single poor little 80386 or 68030 chips, no matter how accelerated, or fill outboard cards and stand-alone boxes with 56001s, faster, next-generation CPUs, multiple parallel processing number crunchers and high-speed caches. Either way, the key differences for workstations beyond performance will be presentation and interface: What does the screen look like? What kind of device do I touch to get it to dance? How intuitive is it? These things will come to the front as the technology equalizes.

For now, it is enough to say that dedicated-purpose equipment will continue to dominate the higher levels of professional audio production for the foreseeable future. This includes analog and digital tape recorders for multitrack linear recording; analog consoles with digital control and automation; disk-based random access editing/post production stations; and rack-mount processors.

The higher-power, larger-dollar digital production systems will continue to develop, fully emulating the functions of entire studio packages at highly competitive total values, providing superior fidelity at greatly advanced levels of production efficiency. Smaller, computer-based, all-in-one workstations and stand-alone studios-in-a-box will rapidly overtake 8-track and small 16s as the production medium of choice at the lower- and middle-priced strata, as well as in-house and dedicated commercial/industrial production houses, and video or film support facilities.

The price for performance advantages will continue to improve. Mac-based, software-intensive systems will grow in popularity, filling the niche that analog boards, decks and racks satisfied exclusively as recently as several years past.

The bottom line? Analog tape decks and mixing desks are out there in huge numbers, working effectively and efficiently every day. They're going to be around for a while. Don't sell them short just yet.

Mike Joseph
Technical Editor

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Letters

Audio Education

From: Ted Pine, marketing manager, New England Digital, White River Junction, VT.

Mike Joseph's point in the March editorial ["Yearning to Learn"] is well taken. Manufacturers and recording schools should work together to provide training on new technologies for industry professionals.

For the past two years, New England Digital has been working with Full Sail Center for the Recording Arts to provide a 2-week training course in all aspects of operation of our Synclavier and PostPro systems. Recently we have expanded the program to include an intermediate course for existing users, as well as an on-site option where we literally bring the trainers to the engineers. In addition, for the past 10 years, New England Digital has sponsored an annual summer seminar where we preview new technologies and host guest speakers who cover advanced applications topics.

Finally, the company is very active in providing demonstrations of our equipment to meetings of professional associations, such as SPARS, NARAS, SBE and so on. I fully agree that support by manufacturers for education and training is critical at this moment of technological transition. Happily, such programs are not a far-off possibility in the future — they are a successful reality today.

Consumer vs. Pro

From: John A. Bredesen, PE, director of engineering, KLCC, Eugene, OR.

I've just finished reading Laurel Cash's Cutting Edge column in the April issue ["Notes from the Consumer Front"] with a real feeling of deja vu. I've been in the broadcast business for more than 30 years and have seen much the same thing happen in the radio end of the industry.

In the late 1950s (my point of reference) and earlier, the term "broadcast quality" meant the best you could buy, as far as performance and dependability were concerned. The 1960s saw the growth of HiFi and stereo for the home, with a level of performance that rapidly grew beyond the available in so-called broadcast quality equipment. The result was that many stations started using home equipment professionally, usually with mixed results because the durability wasn't there. Nevertheless, consumer equipment began leading the way in performance specifications. And now you're observing the same phenomenon in professional audio.

SSL Inputs: G or E?

From: Francis Manzella, chief technical engineer, Skyline Studios, New York.

I am writing in response to the comments made by Hugh Padgham regarding Skyline Studios in June 1990 [R•E•P Interview]. All of his descriptions of his mixing experience at Skyline were accurate. We did indeed have to refit the console with an additional 32 E-EQ modules that SSL graciously provided (in addition to the 12 modules out of 60 that we had left with E-Equalizers.) Hugh was very understanding once he got over the initial shock and surprise of unknowingly walking in to mix on an almost all G-EQ console! We at Skyline has decided to *upgrade* the Studio 6 console with 48 G-EQs when we put in a new G-Series board in Studio 3 (also fitted with 48 G-EQs and 12 Es.) Thinking we were making an improvement and obviously not being aware of Hugh's strong opinions regarding th G Series equalizers, we had not informed him — our mistake. Live and learn.

Since the Vega projects' completion, I have done considerable investigation into the "G vs. E" question. With the help of our regular clients' and as many other opinions as I could gather (which amounted to quite a few), we decided on a new configuration. We now have 24 E-EQs in positions 1 through 24, and 36 G-EQs in the remaining slots. This configuration is identical on both of our SSLs. This adjustment has been met with favorable response by all of our regular clients. We believe this arrangement gives us enough variety to fill most tastes. Also, this puts the E-EQs where the drums and bass most often fall. Several engineers expressed a preference for the E Series equalizers on these instruments.

We are very happy for Suzanne Vega and wish her continued success with *Days of Open Hand*. It was also a pleasure having Hugh Padgham work here, and I hope we will see him again on future projects. ■

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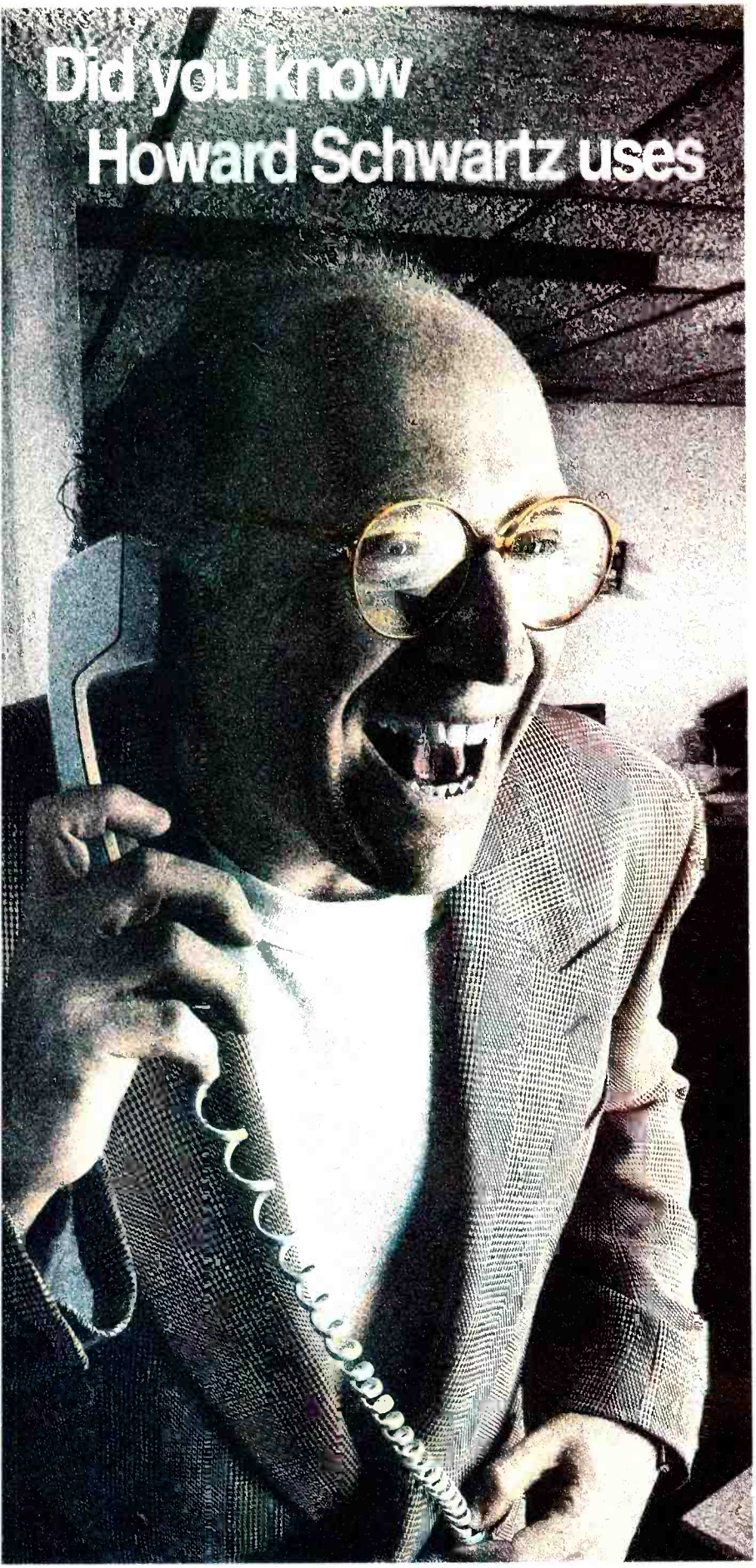
Did you know
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AGFA

Howard Schwartz the man; Howard Schwartz the studio. They've both always done things with a different style.

He's built one of the world's largest recording studios without ever cutting a hit record. Then again, he's always said that audio-for-video was going to be the biggest hit of all.

His competitors laughed, but he laughed last. With eight control rooms in his mid-Manhattan location (including the latest edition — a fully digital editing/mixing suite), Schwartz (the studio) has grown bigger than Schwartz (the man).

But the studio still maintains the creative, warm and friendly character of its founder, who continues to welcome his clients with the finest audio tools, the most innovative engineers, and the best bagels in town.

"People are the only thing you can count on in this business," Howard explains. "I find the talent, I supply them with the best tools, then I let them do what they do best."

One of these tools is AGFA PEM 469 bias compatible mastering tape — the international standard in audio-for-video recording.

"Year after year we have 'shoot-outs,' and AGFA always comes out ahead," he says. "But 'tape...schmape,' people really make the difference. And whatever you need, there's always someone you can talk to at Agfa."

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SUMMER SHOWS

We've just come out of the summer trade show season. Here's a quick roundup of what happened.

APRS: The Association of Professional Recording Studio's annual convention was better attended than last year. Some thoughts on the U.K. industry: Album work is still extremely strong, and there is less audio post than in the U.S. The community is much more receptive to digital audio workstations, whereas there is more of a wait-and-see attitude in the States.

NAMM: If 1989 was the Wake by the Lake, 1990 was the Snore by the Shore. The National Association of Music Merchant's Summer Expo had even less attendance than last year. Many previous exhibitors such as JBL, Electro-Voice, Roland, Korg and Peavey didn't exhibit. Other exhibitors such as Yamaha cut booth space by 50%. Just before the show, NAMM officials announced that the summer show would move from Atlanta to New York's Javits Center on July 18-20, 1991, with a consumer day on July 22.

SMPTE: No, the fall show wasn't early, but the Society of Motion Picture and Television Engineers announced that this October's show is the last one in New York. Starting in 1992, the East Coast show will be in Toronto. West Coast shows will remain in Los Angeles. More news on SMPTE's collaboration with the Audio Engineer Society. AES will participate in SMPTE's 1991 Winter Conference in Detroit on Feb. 1-2. ■

Back Up That DAT

The British Record Producers Guide, a division of the APRS, has warned the U.K. recording industry to make analog backups of all DAT masters for long-term storage. Guild member Tony Swain researched the issue and talked to tape manufacturers to determine if DAT can be used for long-term archiving.

"Digital formats are too new, too liable to change and at the moment not standardized enough to be a safe storage medium," Swain says.

John Matarazzo, national technical manager at Agfa, agrees.

"Even though DAT is a metal particle tape formulation, it seems extremely probably that it has the same potential for deterioration as analog tape," he says. "And since it has no track record, there is no way of knowing if it is even worse than analog for archiving applications."

The guild recommends that in addition to analog backups, recorded DAT tapes should be cycled end to end every year. After five years, the material should be copied onto another DAT cassette. ■

"That's a lot of money for *stereo* equipment."

— Midwest bank loan officer's comment concerning a studio's loan application to buy a Harrison console, AMS digital reverb and Sanken microphones, among other things.

PEOPLE

JVC Professional has appointed **Masaki Yoshida** president ... Sony Pro Audio has named **Clayton Blick** marketing manager and **Gary Rose** national sales manager ... Neve North America has named **Rich Hajdu** vice president of sales and marketing; **Lisa Vogl** has been promoted to director of advertising and promotions ... Intersonics has promoted **Thomas Danley** to general manager, ServoDrive Loudspeaker Division ... **David P. Friedley** has resigned as president and CEO of Tektronix. **Robert W. Lundeen,** chairman of the board, is acting as CEO, and **William D. Walker,** a director, is acting as president/COO until a new president/CEO can be selected ... Bose has made the following staff appointments: **Bruce Hurst**, Eastern regional sales manager; **Tim Landwehr**, Western regional sales manager; and **Phil Nelson**, factory sales representative ... Washington Professional Systems has named three sales assistants: **Paul Freeman, Geren Mortenson** and **Stephen Sadler** ... Illbruck has appointed **Eric W. Johnson** as national sales manager of SONEX Acoustical Products ... **Paul McQuire** has been named president of Electro-Voice. ■

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Tape Machines LIVE

Anyone who doubts the long-term viability of tape machines should look at the combined 1989 sales figures of the manufacturers of "professional-format" tape machines. An informal R•E•P poll of some of these manufacturers — including Mitsubishi, Otari, Sony and Studer — shows some interesting numbers, which are reprinted on the left.

Not bad in an industry where you can find old Ampex and Scully machines still lurking around. On the digital side, forget the DASH vs. PD war. Considering all the competition from digital audio workstations and stand-alone disk-based storage systems, digital tape machines are more than holding their own.

For simplicity's sake, we excluded "narrow-gauge" analog multitrack formats from companies such as Fostex and Tascam, and miscellaneous digital tape formats from companies like Yamaha and Akai, all of which are successfully finding their respective niches. And we didn't even try to consider DAT machine sales, which various industry sources have conservatively estimated at more than 15,000.

Industry professionals may argue the merit of analog vs. digital, but one conclusion is inescapable: The revolutionary cost and capacity breakthrough for disk-based storage still hasn't happened. For most facilities, linear tape formats, whether analog or digital, are still the most cost-effective mediums for short- and long-term archiving. ■

1989 SALES

2-trk Analog	1,279
24-trk/2-inch Analog	318
2-trk DASH	35
2-trk PD	20
24-trk DASH	16
32-trk PD	33
48-trk DASH	20

Anything to This MIDI Stuff?

Ever wonder why the Macintosh is the de facto computer standard for recording studios? The following letter may have an answer. R•E•P recently received this from an IBM market research employee at the Boca Raton, FL, facility:

"I am not knowledgeable about MIDI, but I am very interested in any information you might have collected from your subscribers on the business opportunity for MIDI functions on personal computers.

"I know MIDI is used by musicians, home hobbyists and consumers. What I don't know is if there are businesses that would be interested in MIDI functions on PCs. Have you seen any information where the opportunity for MIDI has been forecast? Is there any segmentation of the market for PC bus architecture (Apple NuBus, IBM AT bus, IBM microchannel)?

"Any information you might be able to provide me would be appreciated." ■

TrendWatch

Sampling: Jimmy Castor's sampling suit against the Beastie Boys has been settled. The suit charged the Beasties sampled "The Return of Leroy (Part 1)" without obtaining permission. It would have been the first sampling case to go to trial.

Legislation: The DAT bill, which would have required consumer DAT machines to be equipped with the SCMS anticopying system, has bogged down in Congress. At a June 13 Senate subcommittee meeting, senators objected to the lack of a royalty for music publishers, songwriters and other copyright holders to compensate for sales lost to home taping. A separate Senate committee handles copyright matters, and there was some doubt if hearings could be scheduled before Congress adjourns for the year. A House subcommittee hearing was scheduled for June 26.

Censorship: 2 Live Crew's "As Nasty As They Wanna Be" was declared to be obscene in Broward County, FL. It is thought to be the first federal court decision on whether a sound recording is obscene. After the ruling, communities in Texas and California were considering if the recording should be banned locally. ■

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If we were to tell you that our new S-770 is the best digital sampler in the world, you'd probably mutter something about truth in advertising and go on about your business. When, as you'll discover momentarily, it's absolutely true. And, as you'll also discover momentarily, the reason for it has less to do with any one feature in particular than it does with several features working in conjunction.

Such as the fact that the Roland S-770 is equipped with AES/EBU Digital I/O, so it's actually possible to set up a fully integrated digital production facility.

We've also equipped our S-770 with both 20 bit D/A conversion and Differential Interpolation, thereby giving it higher resolution than any other stereo sample

And while we're making comparisons, allow us t offer another one. With 24-voice polyphony, the Roland S-770 has more voices than any other comparably-priced sampler. So you're not only assured of getting

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e sound barrier.

xtraordinary sound but the flexibility to go along with it.

Before we forget, the S-770 is also blessed with n elephant-like internal memory. It can be expanded o 16 megabytes which, for those of you without calcu-ators nearby, translates to 83.5 seconds of continuous tereo sampling time at 48 kHz—twice as much as any ampler in its price range.

While we're on the subject of price, there's one nore thing we should mention. On many samplers you have to add a slew of peripherals. On our sampler, you don't. Things like a 40 megabyte hard disk drive, SCSI port, Digital I/O and RGB video monitor output all come standard.

Of course, these are just the highlights. For the rocket-scientist information, write us at the address below or call (213) 685-5141.

And as far as the sonic boom is concerned, that comes later. When you hear the S-770 being played live.

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Random Access

STUDIO UPDATE

Facility/Location	Details
NORTHEAST	
Howard M. Schwartz Recording/ New York	New equipment: Sony DVR-10 D-2 recorder.
SOUTHEAST	
Cinetel Productions/Knoxville, TN	New equipment: Mozart mixing console with AMEK/Steinberg automation.
Miami Street Studios/South Bend, IN	New facility with three studio rooms. Owners are John Nuner and Jack Burke. A third engineer/producer is Howard Lindeman. Located at 1619 Miami St., South Bend, IN 46613; 219-288-TAPE.
Soundshop/Nashville	Studio A redesigned by John Storyk; improvements include expanded control room and iso booths. New equipment: Trident Vector console, Sony 48-track and Mitsubishi 32-track recorders, and Studer A-800 24-track analog tape machine.
Technimedia/Steubenville, OH	David W. Mathes appointed division manager.
MOUNTAIN	
Colorado Sound Recording/ Westminster, CO	Upgraded Trident TSM with Audiomations Uptown Moving Fader system and a Panasonic SV-3500 DAT machine.
SOUTHWEST	
Spectrum Sound Studios	Doug Durbrow, founder of Desitrek Studios (Portland, OR) has joined the staff.
SOUTHERN CALIFORNIA	
EFX Systems/Burbank	Hart Getzen named operations coordinator.
The Post Group/Los Angeles	Rich Thorne promoted to senior vice president, creative activities.
NORTHERN CALIFORNIA	
Poolside Studios/San Francisco	New equipment: Euphonix Crescendo automated mixing console; Studer A-80 24-track recorder: and Macintosh II with Digidesign Sound Tools.
MANUFACTURERS	
AMEK	Sales of the Mozart console: Elias Associates (New York) and House of the Hits (Boston).
Digital Dynamics	Sales of the ProDisc 464: Rebeledit (New York) and Midilab (Chicago).
Dolby	Delivery of 48 tracks of SR to Real World (England).
Hybrid Arts	Installations of ADAP II: Sonic Perfection (San Francisco), Soundelux Studios (Los Angeles); Todd AO/Glen Glenn (Hollywood).
Neotek	Magno Sound (New York) has purchased a 56-input custom film-dubbing console.

NEWS NOTES

The following microphones have been stolen from **Penny Lane Studios** in New York: Neumann U67 SN 761, U87 SN 11300, U87 SN 28456; AKG 414 SN 2681, 414 SN 2679; Beyer M201 SN 020838, M500 SN 20973. If anyone comes across these mics, please contact Eric Levine, Penny Lane Studios, 212-687-4800.

Neve has received Queen Elizabeth's Award for Export Achievement. The award is based on the last three years of business performance.

UCLA Extension has announced its fall 1990 courses for its certificate program in recording engineering. "Recording Engineering Theory" will be held Sept. 26 through Dec. 12, 7-10 p.m. The fee is $450 and includes a studio tour of Digital Sound Recording. On Nov. 3, a 1-day program titled "The State of the Recording Studio Business in Los Angeles" will be held from 10 a.m. to 5 p.m. The fee is $95. The coordinator is Jim Mandell, and guest speakers include, subject to availability, Gene Shively, CMS Digital; Robyn Whitney, Trax Recording; Mike Perricone, Interlok Studios; and Ellis Sorkin, Studio Referral Service. For more information, contact UCLA Extension, The Arts, 10996 Le Conte Ave., Suite 414, Los Angeles, CA 90024; 213-825-9064.

Ediflex Systems, manufacturer of the Ediflex electronic editing system and the Audiflex digital sound editing system, has been acquired by Lawrence Kuppin and Robert Rehme, former co-chairmen of New World Entertainment.

Sony has formed the Sony Communication Systems Division (CSD), a new business unit of Sony Systems & Technology. CSD is involved in the design, engineering, integration and installation of turnkey systems that are comprised of audio, video and systems products produced by various Sony product groups.

Dynaudio has joined forces with Munro Associates and AB Music to develop and market a new pro audio monitoring systems line. The product line will cover all monitoring applications from basic broadcast to full-range mixing,

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with bandwidths from subsonic to 40kHz.

Agfa Magnetic Tape Business Unit has been awarded first prize in the Business/Professional Advertising Association (B/PAA) Annual Pro-Comm Awards ceremony. The award was for the Total Communications Program More Than $150,000. The campaign was designed and created by The Culdan Agency, Hackensack, NJ.

Magna-Tech Electronic received a Technical Achievement Award from the Academy of Motion Picture Arts and Sciences for a remote control system that permits dubbing mixers to remotely advance or retard individual magnetic film reproducers and to make changes in sync while reproducers continue to operate.

NEW COMPANIES

Audiomaster is a new digital recording facility specializing in the production of radio and TV soundtracks for advertising. Jeff Kidwell is the owner. Designed by Systems Development Group, the facility is located at 7101 Wisconsin Ave., Lower Level One, Bethesda, MD 20814; 301-654-1662.

Russ Berger has formed the **Russ Berger Design Group**, a professional consulting firm specializing in recording and broadcast studio design and planning. Formerly vice president of The Joiner-Rose Group, Berger is continuing all in-progress projects with the support of The Joiner-Rose Group. The two firms maintain a working relationship and plan to collaborate on future projects. The firm is located at 4004 Beltline, Suite 110, Dallas, TX 75244; 214-661-5222; fax 214-934-3935.

Soundings-Electrotec specializes in representation of audio technology and techniques in the Seattle area, with particular emphasis on Ambisonic Surround Sound. The company represents Minim and Calrec nationally; and AMS, Bryston, Gefen Systems and Sound-Field Microphones locally. Soundings-Electrotec is located at P.O. Box 10004, Winslow, WA 98110; 206-842-7128.

REP NEWS

Tascam has named **Bowman Audio Marketing** (Sioux Falls, SD) a field sales representative.

MJA Marketing (St. Charles, MO) and **Palmieri Associates** (Ridgefield Park, NJ) have been named reps for Paso Sound Products.

New West Audio (Burbank, CA) has been named the 1989 Representative of the Year by Panasonic/Ramsa Pro Audio.

STUDIO UPDATE

Facility/Location	Details
MANUFACTURERS	
Neve	Consoles delivered or on order: Eldorado Recording (N. Hollywood), V48; Soundcastle Recording Studios (Los Angeles), VRP72 with Flying Faders; City Lights Studio (Hopewell Township, NJ), VR60 with Flying Faders, Mitsubishi X-880 and X86HS; Chung King House of Metal (New York), V60 with Flying Faders and Mitsubishi X-850 with Apogee filters; Grateful Dead Productions (San Rafael, CA), VR48 with Flying Faders; VLM Studio (Santa Barbara, CA), V60 with Necam 96; Pacifique Recording (N. Hollywood), VR72 with Flying Faders; Studio City (Studio City, CA), V60 with Necam 96; Apollo Theatre/Inner City Broadcasting Corp. (New York), VR60 with Flying Faders.
Solid State Logic	Installations: ScreenSound A/V editing suite, Image Express; SLL 4000 G Series consoles to Power Station and Electric Lady; and SL 5000 M Series console to Universal Studios; G Series console, BMG Recording Studios; ScreenSound A/V editing suite, Digital Services.
Sony	Master Mix (Nashville) has purchased a 2-channel PCM-3402 DASH recorder.
Soundtracs	Sales of IL Series consoles: The James Boys, PEP Sounds and The Yard (U.K.); Zomba Productions (United States); Creativsound (Australia); and Nightingale Records (Germany).
Trident	B&J Studio (Hollywood) has taken delivery of a 36-input Trident 24 console.
WaveFrame	Delivery of AudioFrame systems: Chipperfield Post Productions' new facility, The Audio Outpost (London); and Doppler Studios (Atlanta).
DEALERS	
AudioTechniques/New York	Equipment sales: Trident 24 console to Jeff Layton Music Production (New York); Peavey/AMR 2400 Production Series console to John Guth Productions (New York).

ADDRESS CHANGES

Prosonus has relocated to 11126 Weddington St., North Hollywood, CA 91601; 818-766-5221, 800-999-6191; fax 818-766-6098.

Gefen Systems has relocated to 6261 Variel Ave., Suite C, Woodland Hills, CA 91367; 818-884-6294, 800-565-6900; fax 818-884-3108. ■

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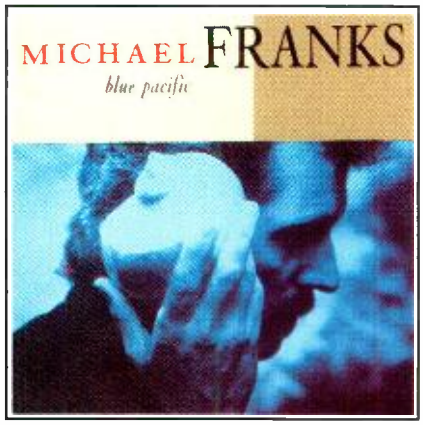
Fresh Tracks

Michael Franks: "Blue Pacific"



Produced By: Jeff Lorber, Tommy LiPuma and Walter Becker
Engineered By: Jeff Lorber, Gabe Moffat, Alan Meyerson, Al Schmitt, Joey Wolpert, Bill Schnee, and Roger Nichols
Recorded at: JHL Sound, Studio Ultimo, Ground Control, Ocean Way, Cherokee, Soundworks West, Los Angeles
Mixed At: Larrabee Sound, Bill Schnee Studio and Soundworks West, Los Angeles
Mastered by: Doug Sax at the Mastering Lab, Los Angeles
Spars Code: AAD

Comments: With an all-star production, musician and engineering cast, "Blue Pacific" lives up to the listener's expectation. Franks excels by offering fresh compositions highlighted by the technical musicianship of each producer.

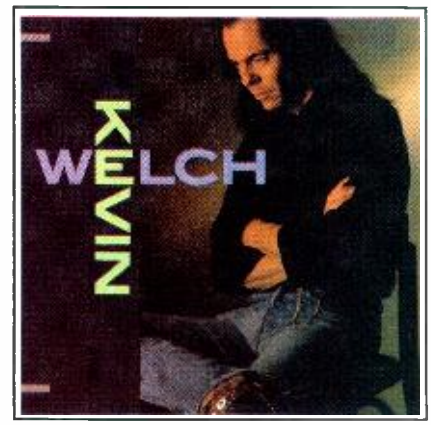
Of special interest: The main focus of this album is, fortunately, not in the technical realm of MIDI sampling, stereo imaging or digital fidelity. The nature of Frank's voice enables it to stand alone, with little or no external signal processing. However, the sparing use of pitch shifting, chorusing and reverberation prove that, in a supplemental state, an artist need not rely solely upon engineering tricks to deliver his message. (On the other hand, it sure can sound hip...) ■

Fresh Tracks is a monthly department spotlighting technical and production aspects of recently released albums. R•E•P is pleased to recommend these for quality referencing and listening enjoyment.

Kevin Welch: "Kevin Welch"

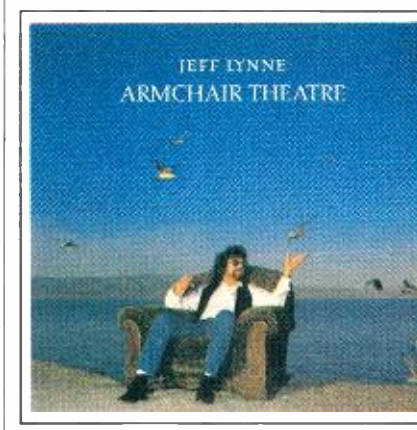
Label: Reprise
Produced by: Paul Worley and Ed Seay
Engineered by: Ed Seay, assisted by Mike Poole and Clarke Schleicher
Mixed by: Ed Seay
Recorded at: Treasure Isle, the Money Pit and Sound Emporium, Nashville
Mixed at: Treasure Isle, the Money Pit and Digital Recorders, Nashville; and the Bennett House, Franklin, TN
Mastered by: Denny Purcell at Georgetown Masters, Nashville
SPARS Code: DDD

Comments: Honest music played by real people. This essentially is a live-in-the-studio album, with most instrumental tracks (and a few lead vocals) cut live, with minimal overdubs. One side note: The SPARS Code in the initial replication run was incorrectly listed as ADD. The album is indeed DDD; according to co-producer Ed Seay, this clerical error at the record company was to be corrected in subsequent runs.



Of special interest: The album was processed using Georgetown Masters' Audio Animation's Muse digital console, capable of incredible precision. Check out these EQ settings Seay supplied for "I Am No Drifter": cut of 1.02dB at 26.44Hz, Q of 19.34; boost of 0.45dB at 74.58Hz, Q of 0.89; boost of 0.49dB at 5,549.34Hz. Q of 0.01; boost of 0.47dB at 15,405.16Hz, Q of 0.11. How's that for control? ■

Jeff Lynne: "Armchair Theater"



Produced by: Jeff Lynne
Engineered by: Richard Dodd
Recorded at: Posh Studios, England
Mixed at: Village Recorders, Los Angeles; Rumbo Recorders, Canoga Park, CA
Mastered by: Steve Hall at Future Disc Systems, Los Angeles
SPARS Code: AAD

Comments: A superb collection of ditties from the driving force behind such mega-groups like the Electric Light Orchestra, the Traveling Wilbury's, etc., "Armchair Theater" follows in the recorded tradition of this lineage. The presentation exhibits sonic depth and unpretentious production.

Of special interest: If there is little more than a single ounce of reverberation on *any* of the album's tracks, we can't find it — and we're damn glad of it. Moreover, the rudimentary, monophonic nature of the mix might shock listeners who are force-fed a barrage of synthesized stereo and rapid-fire panning. Therein lies the true production and musical craft of Jeff Lynne, who uses technology sparingly; the music performance takes center stage to the modern engineering feats. ■

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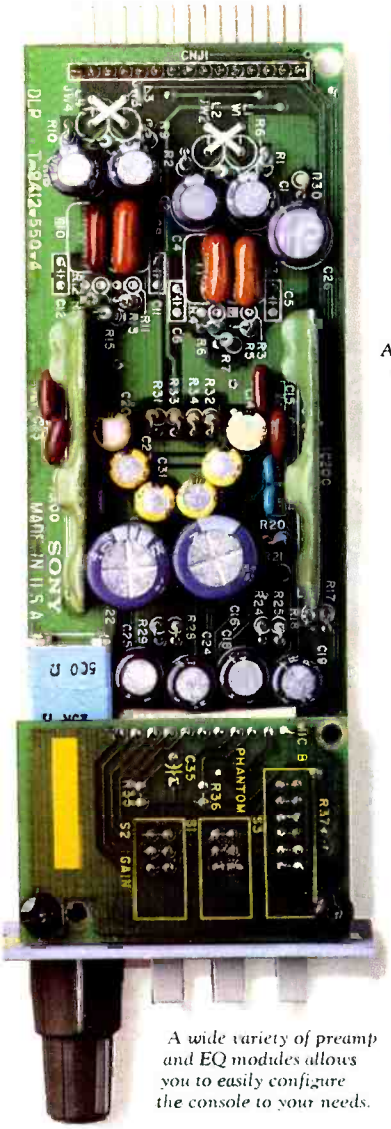
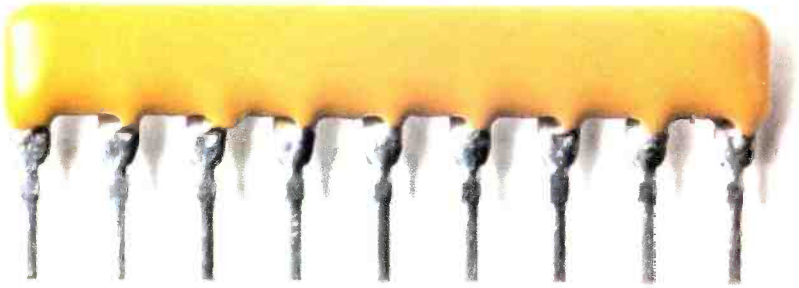
They make beautiful music together.



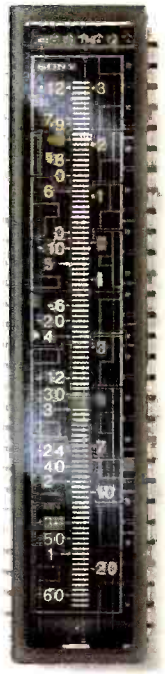
A wide variety of preamp and EQ modules allows you to easily configure the console to your needs.

Laser-trimmed resistor packs and 18-turn trim-pots maintain precise circuit tolerances.

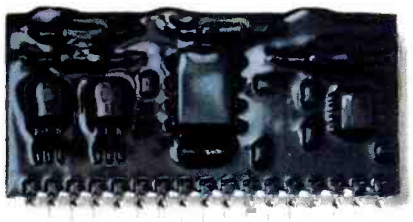


Audiophile-grade capacitors maximize sonic accuracy.

Large crystal oxygen-free cables with gold plated connectors ensure sonic clarity and detail.



Unique vacuum-fluorescent multi-scale metering shows signal levels as low as -60dB, essential for digital recording.



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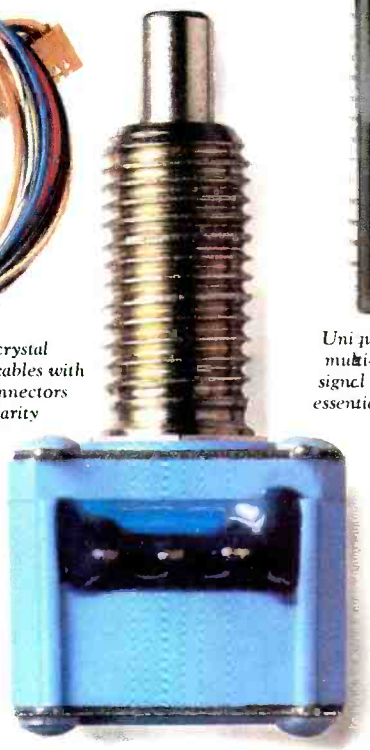

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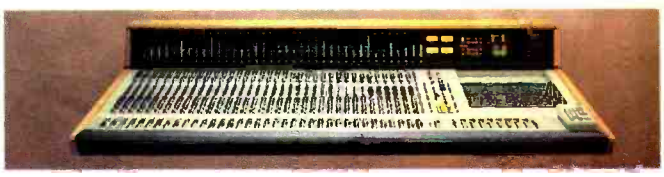

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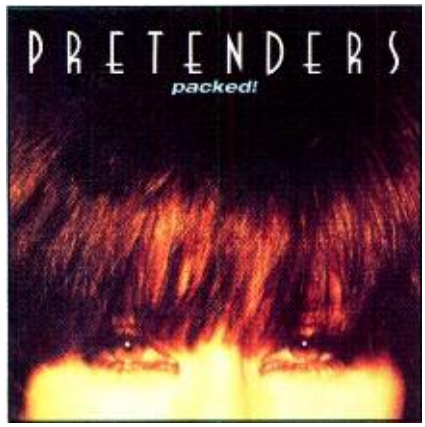
Fresh Tracks

The Pretenders: "Packed!"



Label: Sire
Produced by: Mitchell Froom
Engineered by: Tchad Blake
Mixed by: Tchad Blake
Recorded at: AIR, London; Mayfair, London; Sunset Sound Factory, Los Angeles; Abbey Road, London
Mixed at: A&M Studios, Los Angeles
Mastered By: Bob Ludwig, Masterdisk, New York
SPARS Code: DDD (drum tracks recorded analog and converted to digital)

Comments: The earlier Pretenders album, "Get Close" (produced by Jimmy Iovine), was not a particularly likable record — too big and arena-sounding. On "Packed!," Mitchell Froom's production gives the band its most Kinks-like quality and its most modern update at the same time. The album succeeds because it is startling in its transparency, naturalness and closeness.

Of special interest: The guitar tones are varied and fresh, as evidenced on "Never Do That." "No Guarantee" is an interesting cut because the band is muffled and the vocal is tantalizingly buried in a Presley-like slap. ■

FOCUS:

MITCHELL FROOM — The Pretenders

"We cut the basic tracks analog with Dolby SR because it's easier to edit, and then we transferred to digital and stayed there.

"Certain tracks you just approach conceptually, and those are the tracks that I really enjoy. 'Millionaires' was particularly enjoyable that way because the idea was to have this rock 'n' roll song with a different-sounding backing. We put towels on the drums so there'd be no resonance at all. Then we ran the guitars through all these really dull fuzztones. And then on top of all that, Chrissie's actually singing a really hard rock 'n' roll song."

GUITAR SOUNDS

"You have to be fortunate to be working with really good guitar players. The other thing I would have to credit largely for that is Tchad Blake, the engineer. He has a lot of unconventional ways of miking guitars. He is a guitarist himself— he played on a couple of these tracks, in fact — so he's into strange guitars. Oftentimes, he'll do something like put a metal pipe in front of an amp and then put a mic at the other end of the pipe, for the weird resonances, and mix that in with the sound.

"Mostly, like with the Crowded House record I'm working on now, when there's a person who plays their guitar through their setup in their way, that's the sound you want, that's their distinctive sound. Sometimes if you put a different instrument in their hand, the results are great, other times they're lost. Sometimes if you get somebody who's too good of a musician and all his playing sounds too effortless, then you may want to put an instrument in his hands that he's unfamiliar with and you might get a little more angst out of his playing."

PRODUCTION AND ENGINEERING

"I get involved with an album early on. I'm at the rehearsals, basically just for listening and commenting. I'm not someone who goes in and tries to make a record sound like my record; I think that's a ridiculous idea. I try to get with the songwriter and become a partner with them — working together and trying to get a record. At the end of the record, they feel that it's really the way they wanted the record to sound. I'm not into manipulating people to do things that may give them a short term hit, but, instead, one which they won't be embarrassed about later.

"As far as engineering goes, I let Tchad do his job. I'll make suggestions about trying this or that, or I'll say whether I like something, but I won't get involved with EQing sounds, because I think it can get a little out of hand.

"I think engineering has to be followed through from the beginning to the end, and how one guitar may sound definitely has to relate well to the rest of the track. Tchad is very opinionated — at least as opinionated as I am about things — so very often we'll have intense discussions. But that's good, because at the end of the day you get something that's really good. As far as how sounds fit together, I really leave that to him."

CHOOSING A MASTERING ENGINEER

"Tchad and I did a record at one point, and we sent if off to three different people to master it. Bob Ludwig's version came back and it sounded about 500% better than the others, so since then we've just used him and he's been done an incredibly good job." ■

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Suzanne Vega:
"Days of Open Hand"

Label: A&M
Produced by: Anton Sanko and Suzanne Vega
Engineered by: Patrick McCarthy and Geoff Keehn
Mixed by: Hugh Padgham
Recorded At: Skyline Studios, New York; RPM Studios; Suzanne's living room, New York, with the Effanel Remote System
Mastered By: Bob Ludwig, Masterdisk, New York
SPARS Code: ADD

Comments: With this album, Vega's production finally catches up to the quality of her performance. The tones and recording are superb, and Padgham's mixes stay true with transparency and pellucidity. The big radio sound of "Solitude Standing" came from compression that at times seemed stifling and overbearing. "Days" is more open and less processed-sounding.

Of special interest: Vega's vocals ride on top of the mixes and sound silky without sounding compressed. The strength of the total production is that it never loses sight of the songs. It can be no accident that the best-produced of her three albums is the one in which she shares the production credit.

FOCUS:

SUZANNE VEGA, ANTON SANKO And GEOFF KEEHN

SUZANNE VEGA: PHILOSOPHY OF PRODUCTION

1. "I like to keep to a schedule, say 11 to 7, with one or two days off to keep perspective (if possible; this doesn't always work out)."
2. "Know when to back off (i.e., after someone has obsessed over four chords for ten hours)."
3. "Keep things going forward to keep performances as fresh as possible."
4. "Keep things in time and in tune."
5. "Keep an open mind. Allow yourself to be influenced by everything from Velvet Underground to classical music to Brian Eno, not just mainstream pop. Don't be afraid to blur the categories."

ANTON SANKO: PRODUCTION GOALS AND EFFECTS CHAIN

"On a conceptual level, we were trying to take what Suzanne was known for and just be a little experimental. Instead of using a regular drum kit for a song, we used a Dumbek [Arabic drum] and a Frame Drum, like on 'Room Off The Street.'

"For 'Book of Dreams,' the effects chain for mixing was: Send 1 was the 224X for drums; LXP-1 on Send 2 for the vocals; Send 3 inactive; Send 4 was the EMT; and the REV 7 on Bus 4. Bus 1 was the AMS RMX, which we used primarily on the piano, Buses 2 and 3 were SPX-90/IIs.

"One thing we used on the vocals, particularly on 'Book of Dreams,' was the BBE Sonic Maximizer. So the signal chain was vocal off tape to the BBE, then to a dbx 902 de-esser, back into the board, and then 'verbed with the LXP-1 through the sends."

GEOFF KEEHN: VOCALS AND GUITARS

"Everything we recorded went direct to tape from James Demeter mic pre's. There's not a lot of compression on the vocal tracks—I generally don't like to go to tape with a lot of compression. For EQ, I usually had either a Focusrite or a Pultec on the vocal. I typically added a 12k shelf, and took away some of the sibilances in the 3k-5k range and then a little bit of low-end roll-off. The vocals for these — and the bulk of the record — we did on an old Neumann U-67 that Gotham Audio had just finished cleaning and retubing. We also had an AKG C-41 for awhile.

"For the acoustic guitar, I used a Neumann KM-84 and U-67, and an AKG 414. If you listen to an acoustic guitar being played, and you feel around the tone hole, you can feel how the sound diffracts out of the hole. The diffraction comes out in a 'V'; if you strum the low E you can feel the sound pressure coming out of the hole. I like to put the 84 just out of the diffraction range and as close to the pick as possible, just beyond that low-frequency feeling you have coming out of the hole. It's more or less parallel to the face of the guitar looking across the strings, pointing up toward the top of the guitar.

"The 414 is up on the neck a bit where it meets the body, aiming toward the tone hole. From there I play with their placement for phasing. The 67 is usually back two or three feet picking up ambience, and I just dial in what's needed.

"For guitar EQ, I'd usually do a 500Hz-700Hz roll-off in the middle and add a little high end. What I did on the bottom would depend on the guitar. I try to put as much high end as I can on tape as a rule, both because you can take it away later easier than you can add it, and also as you pass the tape over the heads over and over you're only going to increase your noise level." ■

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ScreenSound. A fully integrated audio for video editing suite

Post production facilities need to take advantage of the efficiency offered by today's technology. Speed and creative flexibility are essential to commercial success. Digital sound quality is no longer a luxury.

ScreenSound is a fully integrated audio for video editing suite. It combines digital audio storage and editing with machine control of multiple VTRs, Laserdisc or film reproducers. It also interfaces with Quantel's digital video editor, Harry.

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Multiple sound reels enable music, dialogue and effects to be laid back to picture and synchronised to the exact video frame.

Edit, review, time offset, track slipping, cross fades and many other production techniques are available at the touch of a pen. Gain and stereo pan controls can be automated to timecode.

AES/EBU interfacing keeps digital audio transfers free of analogue distortions and losses, preserving the highest audio integrity through to the final format.

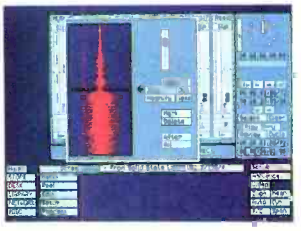
Above all, ScreenSound is a dedicated system - purpose-built to bring the advantages of hard disk sound manipulation to audio post production.

AUDIO STORE

The hard disk store of sound clips gives title and duration, in addition to powerful search and sort routines.

SCRUB EDITOR

Provides accurate edit marking and scrub of audio waveform.



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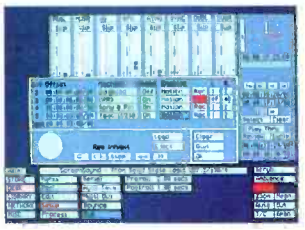

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Financing Your Future, Part 2

By Sandy Schneiderman

It's been 10 years since I last wrote about leasing/financing. Unfortunately, not much has changed.

The recording studio and audio post-production business still is not a familiar area with banks and leasing companies. The situation continues to make it difficult for facilities, recording artists, arrangers and composers in this industry to obtain the necessary financing needed for construction and equipment.

Sandy Schneiderman is president of Terminal Marketing, New York.

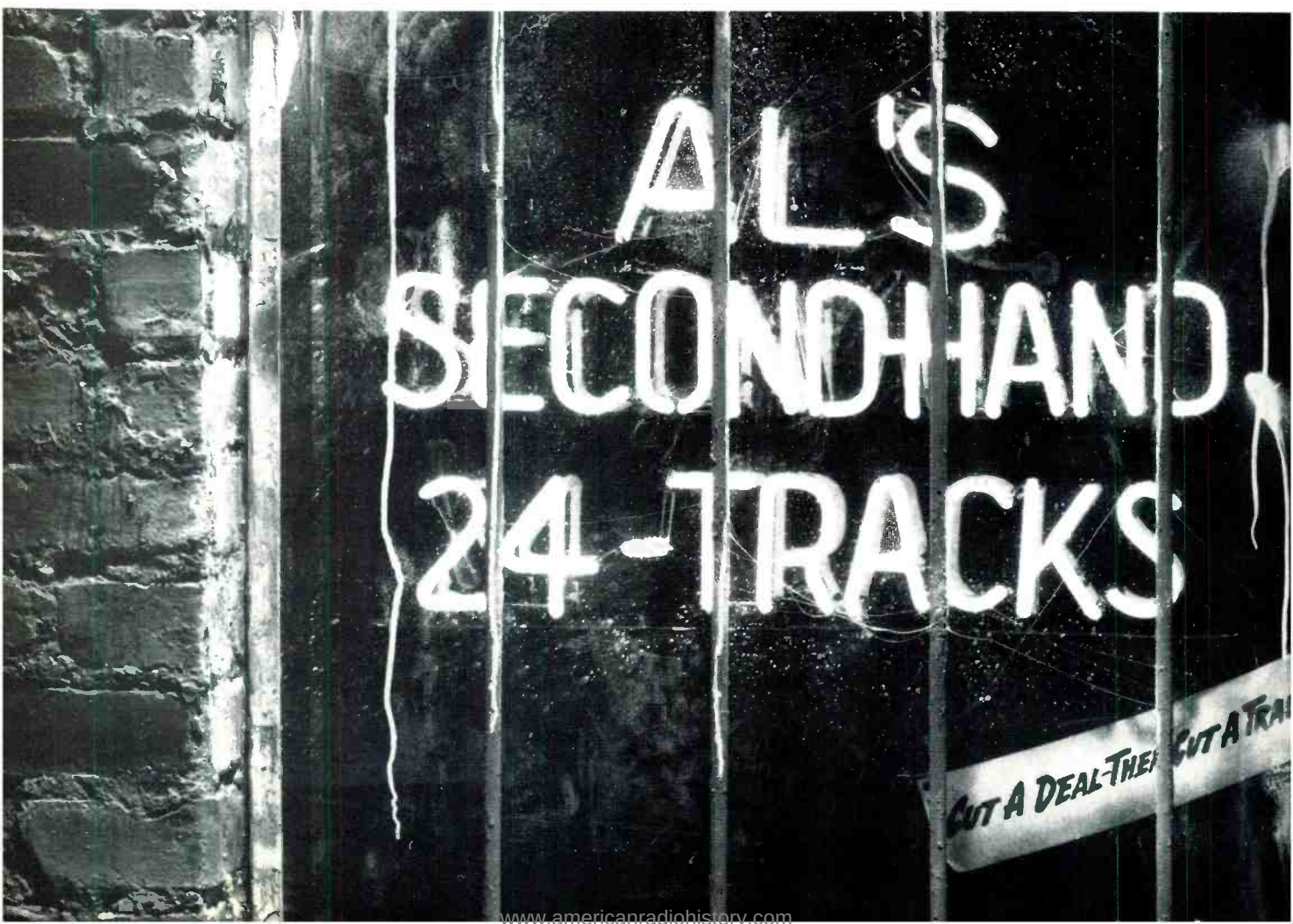
I have escorted many bankers to large and small audio facilities. For the most part (but not always), they are not very impressed with the key personnel. Usually, the pinstripe-suited bankers tell me, "We will loan your company money on the leases that you write with the studios because of your knowledge and track record in the industry. It is not necessary for us to visit your clients." What else is new?

To complicate matters in today's business environment, it is much more difficult to secure financing for equipment, construction and renovation of space, due to the problems banks are having with their existing real estate loan portfolio. This will continue for the next six to 12 months.

The problems are affecting banks' lending policies. The federal government is auditing banks nationwide and is making it very difficult for them to extend credit. Equipment leasing firms are also finding it tougher to secure lines of credit from banks, which in turn provide financing and leasing to their customers.

My first and most important suggestion is for a borrower to work with and establish a relationship with a leasing company that understands the audio/video/film industry and has the financial strength to approve loans on its own. If possible, try to avoid leasing brokers that cannot approve loans in-house and must shop around to various financial institutions with each loan request. In tough times such as these, when banks are restricted to the loans they approve, dealing with leasing companies that are known for their expertise in a particular industry is crucial.

Leasing companies will quickly approve a request for a loan with an existing client who has a good loan repayment history. Again, develop a solid relationship



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with a leasing company and stick with it as your business grows. Sometimes, paying a marginally higher monthly lease payment from a familiar company, which can be more flexible with other terms of the finance package, is beneficial in the long run. Don't concentrate solely on the lowest payment.

Leasing capital, of course, is not a new financing technique. Upon delivery of the equipment to the facility (the lessee), the leasing company or bank (the lessor) leases the equipment to the facility at an aggregate rental sufficient to pay the principal and interest.

At the end of the lease, the lessee can purchase the equipment for an agreed upon price, and title to the equipment passes to the facility. Under the lease arrangement, the facility not only avoids the burden of financing the cost of the equipment out of currently available funds, but also obtains the tax benefits of depreciation.

For example, take the case of a facility that has on order a console that costs $100,000. Upon the studio's acceptance of the equipment, the leasing company pays the manufacturer or distributor $100,000. The studio begins making monthly lease payments. During the term of the lease (which is usually five years), the studio is responsible for insuring and maintaining the equipment.

Banks are more credit-oriented and conservative than leasing companies, and look mainly at the financial statements of each borrower. Leasing companies make their evaluation based upon credit, the collateral and experience of the key employees. They are more flexible than banks. Banks and leasing companies compete with each other on excellent credit companies, but leasing companies will take on a marginal credit company when most banks will not.

An excellent credit company can be defined as a company that has been in business for at least five years; has a net after-tax profit of at least 7% of total revenues; has a net worth of two times the amount of the equipment to be financed; and net after-tax profits, plus equipment depreciation for any given year, exceeds the amount necessary to pay the current year's (12 months) total notes and lease payments. A marginal credit company lacks one or more of the above mentioned requirements.

Interest rates vary on each lease, depending upon the credit of the company. Industry sources see interest rates stabilizing over the next six months, with a slight downturn in 1991. ■

Part 1 of this column appeared in the July issue.

The Society of Professional Audio Recording Services is the audio industry's best source of business information. For information on activities and membership, contact SPARS at 4300 10th Ave. N., Lake Worth, FL 33461; 407-641-6648; fax 407-642-8263.

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The Audience Is Listening

By Rick Schwartz

Or at least some theater owners must think so, as indicated by the acronyms that seem to dominate many theater marquees: 35mm, Dolby Stereo, 70mm, Six-Track, THX, IMAX, SR and now CDS.

Although not everyone may know exactly what these mean, they do know that good sound can greatly enhance a feature film. Some people are surprised to find that THX is simply a theater installation specification and not a mixing process or sound treatment. Although I could easily spend the entire column discussing motion picture sound formats, what does this have to do with digital audio? Plenty, thanks to Eastman Kodak and a company called Optical Radiation Corporation.

CDS, or Cinema Digital Sound, has the potential to be the greatest film sound advancement since Dolby. However, I would like to eliminate any further confusion by stating that CDS is simply a digital mastering process. Currently, all major films are still being made using conventional magnetic recording techniques.

In the case of "Dick Tracy," the mix used for the CDS release was the same one that went onto the 6-track magnetic "stripe." However, with "Days of Thunder," two additional days were spent sweetening the original film mix.

CDS is recorded onto film using 16-bit linear digital audio at a 44.1kHz sampling rate. To prevent the possibility of dropouts, it uses a robust error correction process similar to the one used on compact discs. Aside from its extended frequency response and tremendous dynamic range, another difference from a conventional Dolby release is the fact that CDS has split surrounds that are full-bandwidth, not rolled off.

Mixers will be pleased to note that because of CDS's excellent channel separation, stereo tracks will no longer "collapse" to the center channel or "bleed" out of the surrounds as they sometimes do with a Dolby 4:2:4 matrix.

Currently, CDS is only available on 70mm theatrical releases. According to Jeff Levison of Optical Radiation Corporation, a 35mm version of the same process will be available sometime next year.

"At that time, we will see 35mm with better sonic performance than 70mm mag," he says.

To run CDS, all a 70mm theater needs is a rack-mount CDP1000 sound decoder and a CDS reader that sits on top of the film projector. Of course, it helps to have a great sound system.

CDS has a unique MIDI control channel that can be used to open a theater curtain before a show, dim the house lights and even control special effects — automatically. In addition, by using a MIDI mixer, a show could technically have more than six channels of audio, with the use of MIDI-controlled signal routing.

Although CDS creates a near-perfect copy that almost never wears out, it is only as good as the original film mix. Until we see widespread use of digital "dubbers" or digital multitrack recorders on the re-recording stage, the true potential of CDS may not be realized.

DIGITAL RADIO?

First it was CDs. Now CDS. What's next? Believe it or not, digital radio. Instead of being transmitted over the air, digital radio signals are sent using regular cable television lines. The service is now being offered in selected markets for a monthly charge of $7 to $12. Installation is simple: A subscriber just connects a wire from the cable TV box in their home to a stereo receiver. The fact that the service plans to be commercial-free should appeal to some listeners.

PANASONIC PRO-DAT

The Panasonic SV-3500, considered by many to be the machine of choice for high-end studios, now has two third-generation successors. The new machines, shown for the first time at April NAB convention, were scheduled to ship on Aug. 1. The SV-3700 features a front-panel shuttle wheel and 1-bit Delta-Sigma A/D converters on the analog input. The unit also includes a much-asked-for infrared remote control, faster tape winding (a 2-hour tape in 27 seconds) and push-button fade-in and -out.

In addition to all of the above, the SV-3900 contains a 9-pin serial port to make it compatible with editors and allow it to control up to 32 machines. It also includes AES/EBU digital I/O and allows Start and Skip IDs to be transferred by including indexing information in the subcode data region, like the Sony units do.

FIBER FANTASIES?

From what I have been reading in ads lately, it is evident that some people think we should tear out all of our copper wire and replace it with glass fiber. Why? They say digital audio can't be sent long distances over wire without data errors and suggest that if you don't use their system, it could lead to a collapse of the stereo image and a general muddiness in mid and high frequencies.

This simply is not true. The AES/EBU recommended practice for serial transmission of linear digital audio (ANSI S4.40-1985) suggests that digital audio can be sent over distances of up to 100 meters (about 328 feet) using shielded twisted pair cable. (Much longer distances can be achieved using special wire and line drivers.) The reason for this is because the AES specifies a balanced signal that cancels induced noise, just like a conventional microphone does.

MA BELL LIKES METAL

Recently, I went to a local AES meeting about Integrated Services Digital Network (ISDN). ISDN can transmit data at very high bandwidths (up to 1.54Mbps) over regular *copper* phone lines. The system is already in use in Europe and Asia, and many people believe it will someday change the way we use our telephones — allowing simultaneous transmission of voice and data. The phone company's decision to use copper clearly was an economic one, but the truth is that conventional wire can work well for digital applications.

Don't get me wrong; there are some really good fiber optic systems out there. In my opinion, where fiber really shines is in multiplexing applications.

ENTER THE WOLF

Lone Wolf is one company that is doing some exciting things with fiber. It has a system capable of 32,768 groups, each supporting all 16 MIDI channels. A single fiber-optic cable will someday carry MIDI, SMPTE, computer data, digital audio and more. I was pleased to find that Lone Wolf now has a way to send MIDI from studio-to-studio over the telephone using a modem and baud rate conversion. This could open a whole new area of possibilities in the future. Stay tuned. ■

Rick Schwartz is a sound designer/engineer and director of post-production for Music Animals, Los Angeles.

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THE R-E-P INTERVIEW:

Alan PARSONS

By Richard Buskin

"I've managed to amalgamate the roles of production and engineering, and these days I don't think, 'Am I producing this or am I now engineering it?' I look upon it all as one job. So, obviously, if I were not producing, I'd be a bit of a loud-mouthed engineer, and if I were not engineering, I'd be treading on engineers' feet."

Alan Parsons has never been reluctant to speak his mind in the studio. As a result, he is notorious as one of the first engineers during the early '70s to have musical input on projects. Only several years earlier, studio technicians

Richard Buskin is a London-based free-lance writer.

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THE TRANSFER ROOM

Think you have a problem with formats? Consider the film world's magical back room, which allows incompatible audio to coexist.

By Vince Casper

You just toured a film post-production studio. Quick, what was the most impressive thing you saw? Without a doubt, it would be the dubbing stage, with its big 3-man console and rows of flat-bed dubbers in its machine room. But for maximum activity, the transfer room is where the action is.

Virtually all sound recorded on audiotape, analog or digital, is eventually transferred to magnetic film for editing. The transfer room operator is the first person at the facility to witness the quality of the incoming sound elements. Whether it's field production recordings, music from other studios, Foley or ADR tracks, this person becomes intimately associated with these tracks.

The operator's primary responsibility is to provide accurate reproduction of the source material. There is usually no corrective processing or finessing at this point. That's left up to the mixers on the stage. It is truly a case of what goes in must come out.

Let's try to put the work load of a transfer room in perspective. Several years ago, while working in a busy multiroom music studio, a client used more than 50 reels of 2-inch tape on one album project. You know the story: dual 24-tracks, and nobody could make a decision when to stop tracking.

Vince Casper is a systems engineer at the Saul Zaentz Film Center in Berkeley, CA.

Although this may seem to be an insane amount of tape stock for less than 60 minutes of finished product, it's peanuts compared to the same length feature film. We're talking about tens of thousands of feet of stock. How about one reel in a movie (a feature movie is broken down into 10 to 12 reels) with 64 separate effect tracks plus dialogue pre-mixes and music pre-mixes. All of this sound passes through the transfer department at some time. The source material that the mix team receives on its console faders will have been transferred and edited, often involving hundreds of reels or elements. These are then combined into a mono or stereo master mix.

In the music recording industry, you might complain about the non-standard issues of Pin 2 hot, Pin 3 hot, 32-track vs. 48-track, ProDigi vs. DASH. These are small potatoes compared to what a transfer room operator sees on any given day. You want formats? We got formats!

Table 1 lists the hardware that is used to generate the many types of transfers on any given production. By the way, could you transfer those before lunch? We need to cut those into the new picture change and have them on the dubbing stage at 2 o'clock. Thank you.

IT'S ONLY A COPY

It should be understood that the goal of the transfer is to faithfully mirror the original source. The goal of the editor is to successfully cut and splice the transfers into a cohesive whole. Following this, the mixer attempts to make all of the elements sound uniform within a scene and from scene to scene and reel to reel. This is not an easy task.

Take this real-life scenario: two different takes, from two different days, of the same scene. The director wants some words

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from each take cut together to make a combined whole. Think of the two paths the sound has traveled at the location and from the actor's mouth, the mic placement and the quality of the field recorders. This occurs before it is even transferred and edited as a uniform line of dialogue.

Think of how many things could be different from each take. If the event demanded that the two takes be done at different sites and with different equipment, you can see the complex path the sound bite travels. This requires you to have as accurate a transfer as possible to complement the original and to give the director what he wants to hear.

A little pre-production planning goes a long way toward making a better soundtrack. The point to remember is that good moviemakers pay a lot of attention to details. Each transfer is scrutinized for maximum accuracy.

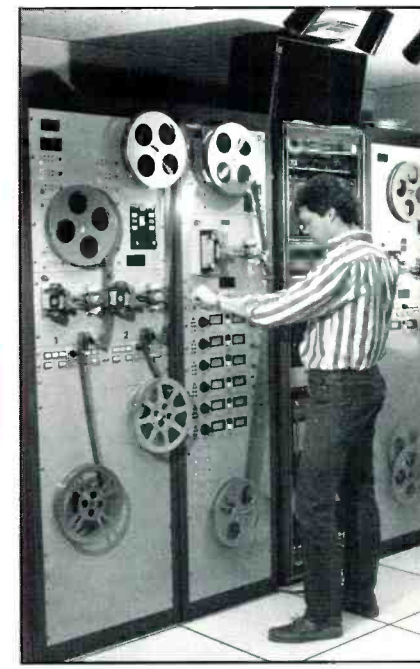

Photo by Wayne Rodgers.

Transfer room supervisor Jeff Whittle works the mag machines at the Saul Zaentz Film Center's transfer room.

TRANSFER ROOM FORMAT LIST

Open Reel

Format	Speed	Sync	Comments
Mono	7.5/15ips	Wild	———
Mono	7.5/15ips	Pilot	50/60Hz
Stereo	7.5/15ips	Wild	———
Stereo	7/5/15ips	Pilot	FM
Stereo	7.5/15ips	SMPTE	Center-trk TC ½"
Stereo	15/30ips	Wild	½"
4-track	7.5/15ips	SMPTE	1&2 program 4 TC
8-track	15ips	SMPTE	Small format ½"
8-track	15/30ips	SMPTE	Regular format 1"
16-track	15ips	SMPTE	Small format ½"
16-track	15ips	SMPTE	Small format 1"
16-track	15/30ips	SMPTE	Regular format 2"
24-track	15/30ips	SMPTE	Regular format 2"

Cassette

Format	Speed	Sync	Comments
Compact Cass.	1/78ips	Wild	———
R-DAT	HelScn	Video	Speed-accurate
R-DAT	HelScn	SMPTE	What standard?
Sony F1	Video	Video	———
Sony 1630	Video	SMPTE/Vid	———
VHS	Video	SMPTE/Vid	Not HiFi
VHS	Video	SMPTE/Vid	HiFi
VHS	Video	SMPTE/Vid	S-VHS/HiFi
Beta	Video	SMPTE/Vid	———
Beta	Video	SMPTE/Vid	Super
U-matic	Video	SMPTE/Vid	On audio trk
U-matic	Video	SMPTE/Vid	Address trk

Sprocket

Format	Speed	Sync	Comments
16mm 7.2ips	Sprocket	———	
25mm strip			
18ips	Sprocket	———	
35mm 3trk	18ips	Sprocket	———
35mm 4trk	18ips	Sprocket	———
35mm 6trk	18ips	Sprocket	———
Optical	18ips	Sprocket	———

Other

Format	Speed	Sync	Comments
CDs	—	Internal	———
LPs	—	Internal	———

Table 1. *Transfer room format list. Not included are equalization standards (CCIR, NAB, AES, Nagra Master, or none, in some cases). Multiply all the reel formats by the EQ standards to get even more variations. And don't forget Dolby A/B/C/SR and dbx.*

So far, all I've talked about is single-track (stripe) transfers. Multitrack formats are often used differently than a music studio would. For Foley transfers, the 24-track tape is divided into three sets of six tracks. Each set is made into a 6-track sprocketed mag element. This format matches the dubber playback head, commonly referred to as "6-track full-coat."

It's not uncommon to "pre-mix" multiple 6-track dubbers down to 6-track and "re-hang" it when doing final mixes. The other types of interesting multitrack transfers are called Combines, Regroups, Collapses and Safeties. These require the utmost attention from the transfer operator because they are usually done with Master units.

Take a look at the small format media in Table 1. They are the cost-effective media in quite a few studio situations. The output of many personal or project sound design suites (such as electronic/sampling/digital/disk rooms) are on these formats. This accounts for a tremendous increase in the amount of transfers and elements hung while doing effects pre-mixing sessions.

TONES FROM AROUND THE WORLD

Often, the transfer department must service many film productions at once. As a movie nears the final mix days, the intensity of the editors' wanting last-minute copies increases at a stressful rate. Projects

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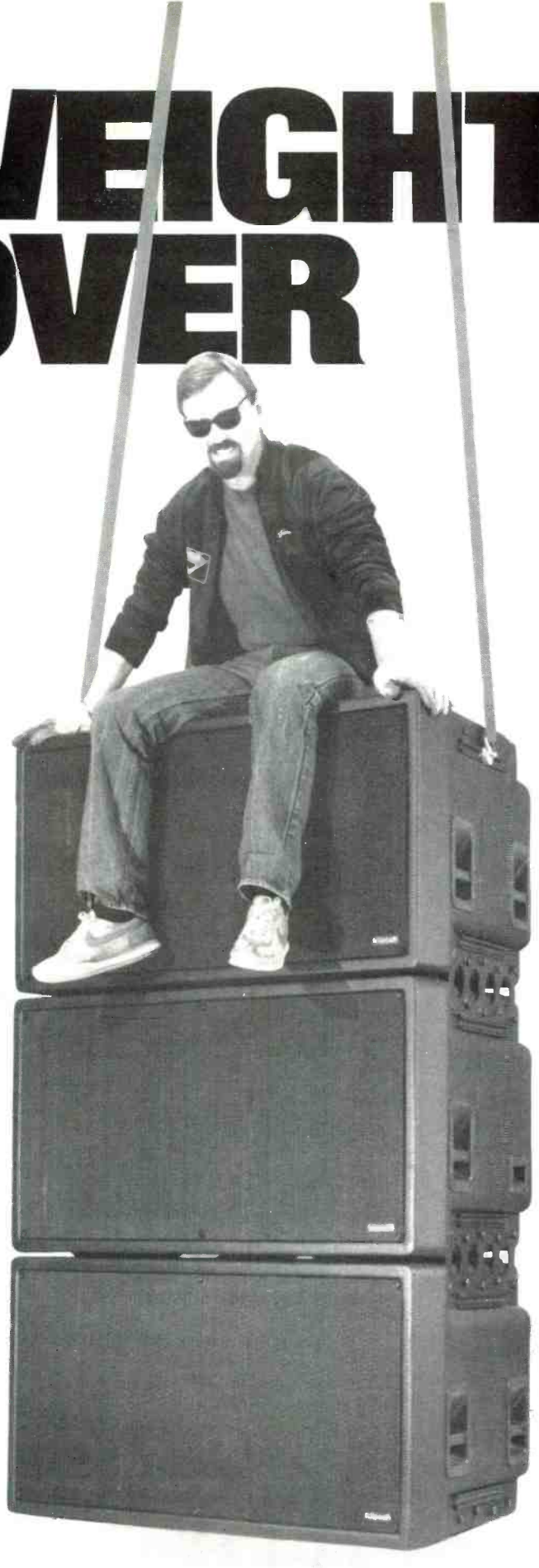
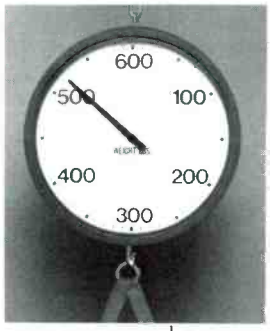
THE WEIGHT IS OVER



520 lbs.= 235 kg



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in the beginning phases can demand 40 to 60 reels of ¼-inch dialogue transferred, two each. Oh, how about those guys doing that 16mm documentary? You get the idea — lots of varied copies, everyone perfect.

To make all of this happen, the transfer room supervisor needs help. Pink-noise loops and pink-noise ⅓-octave analyzers are used to align mag sprocket recorders for bias and EQ. Level is set with 1kHz tone. Operators must be able to convert the mag recorders from 16mm to 35mm, from stripe (1-track) to 3-, 4- and 6-track full-coat and do an accurate job of it. The maintenance department strives to keep all of the machines in top performance, and the transfer operators cut fresh loops of STL pink and 1KHz tone often during the week.

There is more to account for than the sprocket mag recorders. For example, what about the alignment done from the miles of tape that have arrived from the outside world? That's another can of worms.

At the post house, several months into the movie project, someone is finally asking questions about cutting together different format-derived takes. Hopefully, the field recordist is a specification junkie and has top-conditioned recording gear and consistent techniques.

It also is imperative to provide accurate recording logs and to make sure that each is slated, preferably with low-frequency tone for easy locating at cue speed. Identifiable tones for the line-up of reproduce amplifiers are always a welcome sight, too, as would be high frequencies for azimuth tweaking.

If you were to work your way backward from the transfer room to the location of the film shoot, you would realize that there is little control over what format or alignment and slating protocols are used. For example, you're on location in eastern Europe and use EBU/SMPTE or 50Hz pilot, even though the post house is in the United States and the playback will never see a European tape deck. As professionals, we should not have to guess as to what EQ standard or level reference should be set.

YOU CAN HELP

As in the recording world, the film dubbing world is in its infancy in using digital systems. Complete digital machine rooms are not yet a reality. To quote Roger Lagadec in his March 1990 guest editorial ("Digital Audio: A Status Report"), "Film soundtracks are mostly analog because analog technology serves it more elegantly than today's digital equipment can."

In the transfer room, we regularly encounter difficult digital situations. How about searching for a 30-second cue to transfer that is in the middle of a DAT cassette? Do you know how many short cues fit on a 2-hour DAT? Do you happen to have an extra Sony 1630/BVU combo with SMPTE cue list?

Don't get me wrong. I like digital. The alignment process of digital audio tape is wonderful. There is none. (I'm not forgetting about maintenance.) But how about topics like sampling frequency, pre-emphasis, word clocks, SCSI, RS-422, AES/EBU, MADI, and peak levels vs. VU levels? By the way, what D/A converters do you use?

Concerning DATs, questions remain concerning sub-code and index information. We use Panasonic SV-3500s in our facility. Many of our clients use the Sony portables. The indexing information is not the same. The data may be in the same place on the tape, but our studio model DATs won't interpret it. Consequently, either our transfer person is put into a jam or the client pays for someone to re-code the index or apply added search time and cost.

The goal of a transfer department is repeatability of consistent quality transfers. To have less than full cooperation from field recordist and source studios is unacceptable and not professional. We have no problem rejecting mag stock if it does not carry a stable 10kHz tone. So why do we have to accept product from outside sources of which we have to guess the alignment?

Movies and music are a form of communication. How about some communication between the people making the movie? In all fairness, many sound recordists do an excellent job. For instance, the last Ernest picture ("Ernest Goes to Jail") that we posted came supplied with an excellent set of instructions on how to handle the field dialogue tapes.

If at all possible, a business card or address/phone number should accompany any sound logs or track and tone information. The name and phone number of the chief engineer would also be helpful. If there is a person in the chain who is a production or post-production sound supervisor, this individual should attempt to control the path of the sound elements and find out what post house will be used, and the name of the contact person. These two should then talk about the project.

If this is not possible, the post sound super should at least attempt to request formats and standards (from the field) that are consistent with the transfer room hardware. Post supervisors should attempt to influence the production people for the benefit of the project and for his or her reputation.

Finally, and a cry often heard in the studio business, manufacturers should attempt standardization among themselves as soon as possible, especially with the emerging digital technology. This will allow the end users to do a better job. ■

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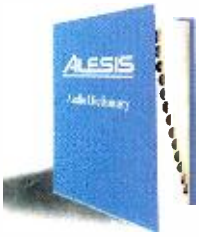
mix·er

(mik'sĕr) *noun*. An electronic device used to *mix* music. Must be clean, transparent and punchy. See Alesis 1622 Mixer. Better yet, listen to it.



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Your mixer is the single most important piece of gear in your studio. It defines the sound of your music. It must be flexible, reliable, and above all, it should have impeccable audio credentials*. That's why the 1622 is your first choice for a mixer. It might be the only choice. Listening to it will convince you.

Visit your Alesis dealer today and hear the 1622. Better yet, buy it.

Call 1-800-5-ALESIS, 9 AM to 5PM Monday-Friday, and we'll send you a brochure on why Monolithic Surface Technology is important to your music.

* "Total Harmonic Distortion + Noise: too low to measure." Keyboard Magazine July 1990.

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By Nancy M. Byers

15ips vs. 30ips:

FACT vs. FICTION

Several factors should be taken into account before deciding on a tape recording speed; faster is not equivocally better.

During the late 1970s, there was a shift from 15ips to 30ips multitrack within segments of the music recording industry. One legacy of this era is a mythology that still surrounds the differences between these recording speeds. It is the purpose of this article to quantify the real differences between 15ips and 30ips, and then to show how a well-designed, properly engineered noise reduction system can dramatically improve both.

In the early 1960s, most professional recording was 15ips 2-track, with 4-track used occasionally. That 24 or more tracks would someday be widely used was barely imaginable. Even with wider tape stock, multitrack recording required such narrow track widths that the resulting tape noise was unacceptable by most professional standards.

In 1966, Dolby Laboratories introduced its first professional noise reduction system, Dolby A-type. It provided a minimum of 10dB of noise reduction (rising to 15dB at higher frequencies) without the audible side effects associated with previous NR systems. This improvement was soon recognized not only for what it did for the formats then in use, but also for what it could do for multitrack.

Pop musicians and producers, in particular, were eager for the greater creativity gained by adding more tracks, and recorder manufacturers responded, first with 8-track, then 16-track machines. The need for noise reduction with these formats was soon recognized. By the early 1970s, 16-track at 15ips with Dolby A-type became the norm in many leading studios for high-quality multitrack recording.

As the 1970s progressed, a trend developed away from this norm toward the use of 30ips without noise reduction. For one thing, new high-output tapes were introduced, and their ability to accept modest increases in record levels was widely promoted by their manufacturers. Conceivably, some studios were attracted to higher stock usage as an additional source of revenue from their clients.

Nancy M. Byers is studio applications manager for Dolby Laboratories, San Francisco.

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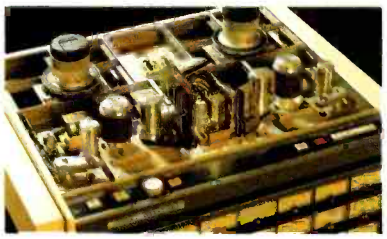
Because compromise is out of the question

Whoever said, "compromise is the oil that lubricates the business process" apparently wasn't in the studio business. To the contrary, in this unique world where art and business meet, and clients expect the best, compromise may be the fastest way *not* to stay in business.

That's why Otari tape recorders come with something behind the meters.

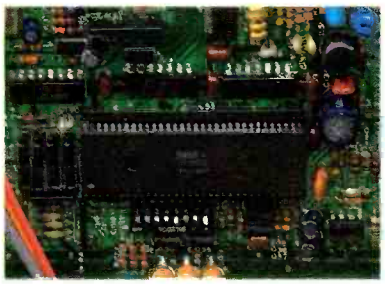


Otari isn't in the toy business. The MX-80 and MTR-90 sport 2" thick cast alloy deck plates, heavy duty swing arms, and motor shafts designed to handle the exceptional acceleration characteristics of these machines.

Our MX-80 and MTR-90 multitracks are used all over the world to produce hit CDs and major motion picture sound tracks, and for good reasons.

For example, if you're involved in audio post, you'll appreciate a capstan motor that is *designed* to be speed-slewed, plus external control connectors for easy interface to any SMPTE/EBU time-code based synchronizer, editor or machine controller.

For *whatever* you do in audio, both machines share constant tension transport technology for high performance, yet gentle tape handling. You'll also get digitally timed, gapless, seamless, punch-in, punch-out. On the "80," an autolocator with search zero and three cue memories comes built-in. And if you're a purist looking for the highest quality sound possible, you'll appreciate the transformerless balanced inputs and outputs.



Otari's proprietary integrated circuitry provides superior reliability and reduces service time.

The MX-80 and MTR-90 were designed from the beginning to lock to external controllers, and therefore provide exceptional performance under these conditions. Pictured is the MTR-90's advanced EC-101 chase synchronizer.

And to keep everything where it belongs as you move from one studio to another, something else you have to look beneath the surface to see—a 2" thick, cast alloy deck plate.

It's not that we don't have our imitators. We do. But to coin an old phrase, beauty is more than skin deep. And someday when you're under pressure to get that track out, and you lock a "90" to your video machine and things happen exactly the way they should . . . Or some early morning after the talent has gone, you sit back and listen to what you've put together, you'll be glad you decided that "compromise is out of the question."

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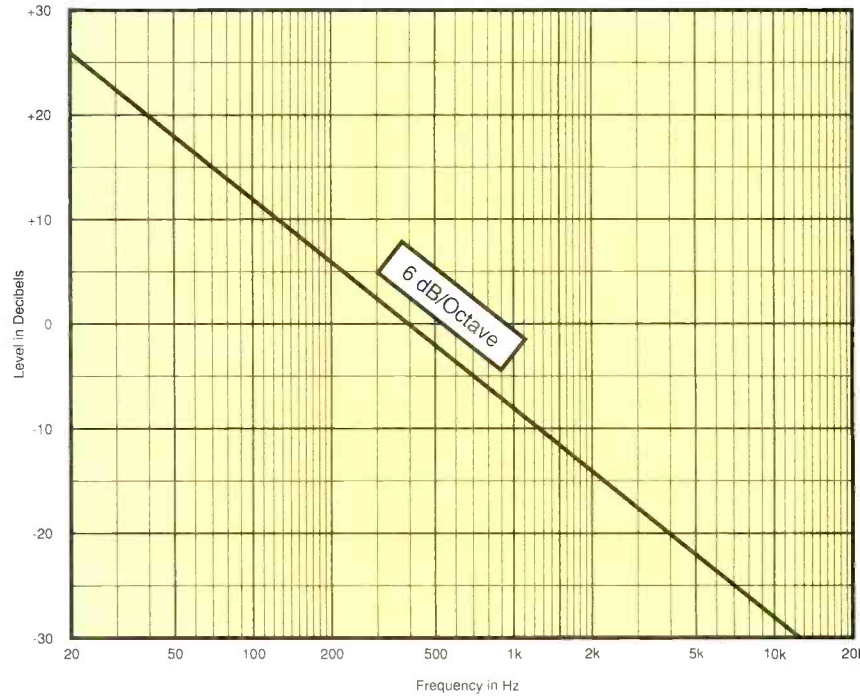

Figure 1. Basic 6dB/octave reproduce amplifier response.

In addition, studios began to find it increasingly more difficult to charge clients for the use of Dolby A-type as it became more widely available. This affected smaller studios in particular. Thanks to the introduction of a new generation of lower-cost multitrack recorders, these smaller studios could now just afford to get into the multitrack business.

Many of these studios, and even some of the larger ones, promoted the use of 30ips combined with the new tapes to forestall investing in noise reduction equipment. The promotion of unassisted 30ips was further encouraged by some skepticism of Dolby A-type, which remained because of misunderstood calibration procedures, and because some studios neglected to put alignment and calibration tones on tapes for interchange with other facilities.

As a result of these influences and the introduction of digital recording, the actual performance differences between 15ips and 30ips became clouded, remaining so today.

EQUALIZATION

The output of a tape machine's playback head is not flat; it has an inherent 6dB/octave rising characteristic. In theory, therefore, playback equalization with a reciprocal 6dB/octave downward slope must be used to flatten response, as shown in Figure 1.

However, in practice, actual playback response deviates from the theoretical because of interactions between playback heads and magnetic tape coatings. Therefore, neither 15ips nor 30ips uses "pure" 6dB/octave playback equalization. As summarized in Table 1, each speed uses its own reproducing characteristic, which modifies the theoretical 6dB/octave slope.

In the United States, the National Associ-

Tape Speed (ips)	Tape Constant (μs)	Transition Frequencies		Standard
		f_1 Hz	f_2 Hz	
15	3180 + 50	50	3200	NAB, IEC 2
30	17.5	0	9100	AES, IEC 2

Table 1. U.S. standard reproducing characteristics.

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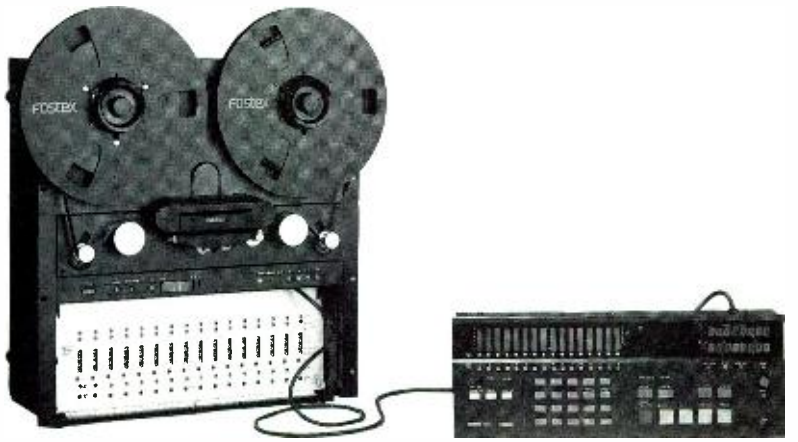
MIDI Spoken Here



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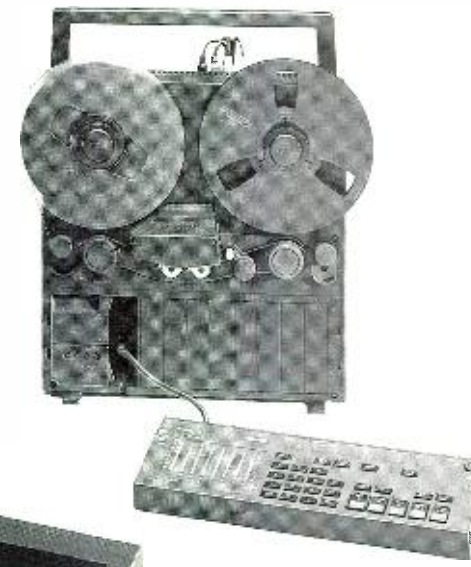

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Fostex offers you by far the most sophisticated MIDI control in all of the most popular recording formats.

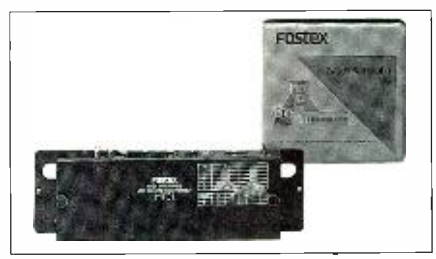
Choose either 16 - or 8 - track open reel or 4 - track cassette and Fostex lets you use MIDI commands to control the recorder via the MTC-1.

It simply plugs into the R8 or 280 and provides a bridge between SMPTE time code and MIDI time code. For the G-16, the MTC-1 is on the optional Model 8330 plug-in synchronizer card.

Dip switches allow you to set a MIDI System Exclusive address (0-16), an address-free mode and MIDI note information.

Thus truly sophisticated MIDI control* with full system integration is now possible.

If you own an Atari™ or Macintosh™ computer, you'll make the most of MIDI control with MidiRemote™ – a Fostex Desk Accessory. In addition to standard tape transport and monitoring control, the software will let you select tracks, locate and loop among ten cue points, automatically punch-in/out, set zone limits, display MIDI time code and generate SMPTE code (all 4 formats).



* The 280/MTC-1 interface does not offer all of the functions available with the open reel interface. • Atari and Macintosh are registered trademarks.

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The Macintosh software works with Performer and Master Tracks Pro. The Atari software works with Master Tracks Pro and Dr. T's KCS.

Steinberg's Cuebase sequencer has a device driver for the MTC-1 and 8330 built-in, so you don't need MidiRemote software with it.

As with all computer interfacing certain restrictions apply. So check the details at your local Fostex Dealer or call Fostex.

No other tape recorder company offers a better combination of hardware and software.

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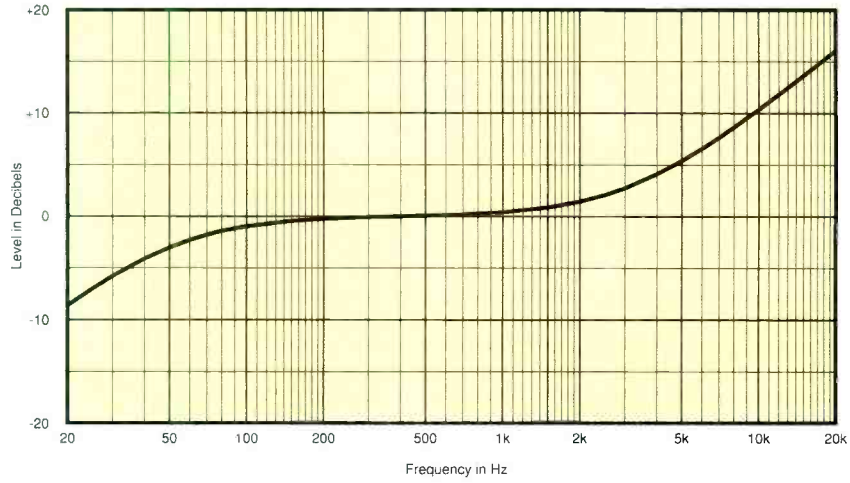

Figure 2a. *NAB 15ips reproducing characteristic.*

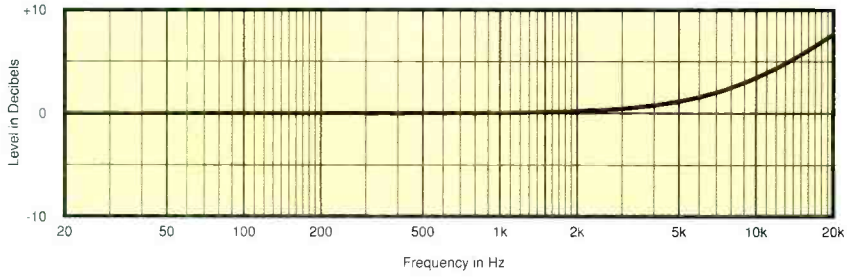

Figure 3a. *AES 30 ips reproducing characteristic.*

ation of Broadcasters (NAB) reproducing characteristic is used at 15ips, with 3180s and 50s time constants as shown in Figure 2a. (In Europe, IEC 1 equalization is commonly used at 15ips, which uses a single 35s time constant with no effect at low frequencies.)

In the United States and Europe, the Audio Engineering Society (AES) Recommended Practice characteristic is used at 30ips, with a single 17.5s time constant, as shown in Figure 3a. The transition points at which the reproducing characteristics depart by 3dB from the basic 6dB/octave slope are 50Hz and 3.2kHz for NAB 15ips equalization, and 9.1kHz for AES 30ips equalization. The amplifier playback characteristics also shown in Figures 2b and 3b illustrate the net effects of combining the reproducing characteristics with the basic 6dB/octave playback slope.

It is not always understood that most differences in performance between 15ips and 30ips are the result of changing the reproducing characteristic, not changing the recording speed. As a result, "more" is not automatically "better." For example, the NAB 3180s reproducing characteristic accounts for slightly lower noise at frequencies below 200Hz at 15ips than at 30ips. However, that same reproducing characteristic also results in lower headroom at low frequencies than at 30ips. Neither difference is attributable to

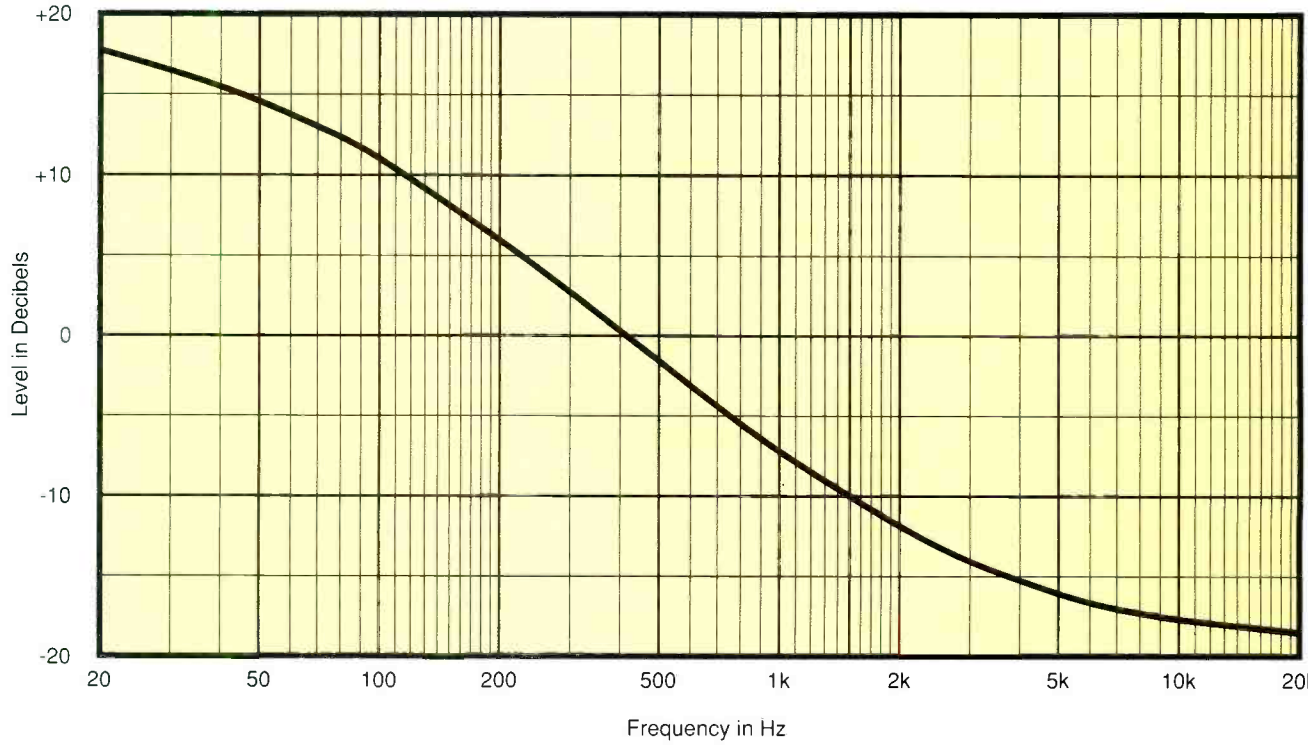

Figure 2b. *NAB 15ips playback amplifier response.*

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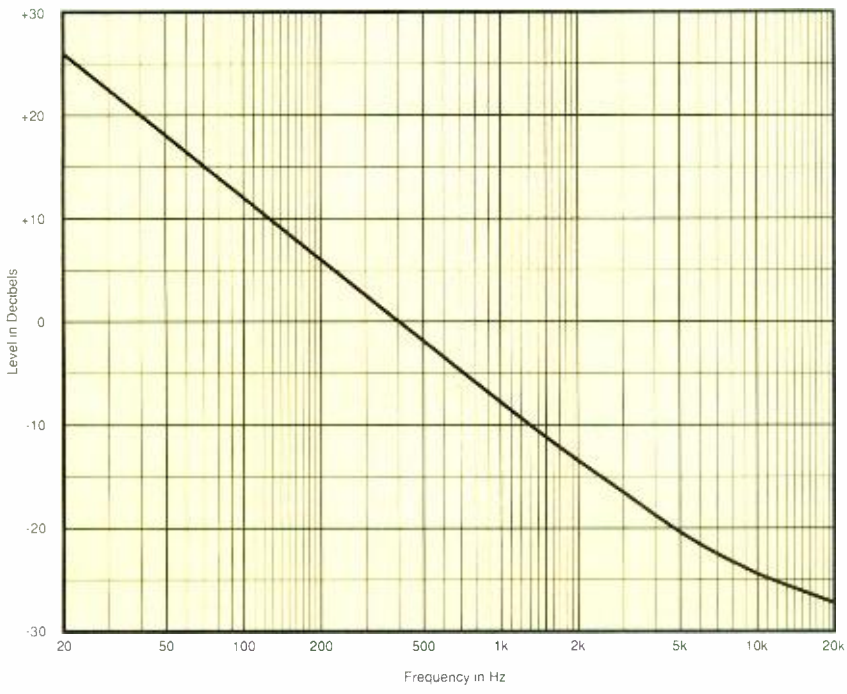


Figure 3b. *AES 30ips playback amplifier response.*

the change in speed per se.

In fact, just about the only practical performance difference that can be attributed directly to the change in speed itself is the effect of low-frequency irregularities called headbumps. These aberrations occur at any recording speed when wavelengths are equal to or longer than the width of the playback head. However, the faster the recording speed, the higher in frequency they occur, and the more pronounced their effect. Thus, at 30ips low-frequency response is both more uneven and less extended than at 15ips.

NOISE

Accurate noise measurements are difficult and time-consuming if they are to be truly useful performance indicators. Proper grounding techniques are necessary to minimize hum, and some circumstances require special attention to factors that might be overlooked. (When measuring noise with Dolby SR, for example, out-of-band noise must be prevented from overloading the input stages of the measuring equipment.)

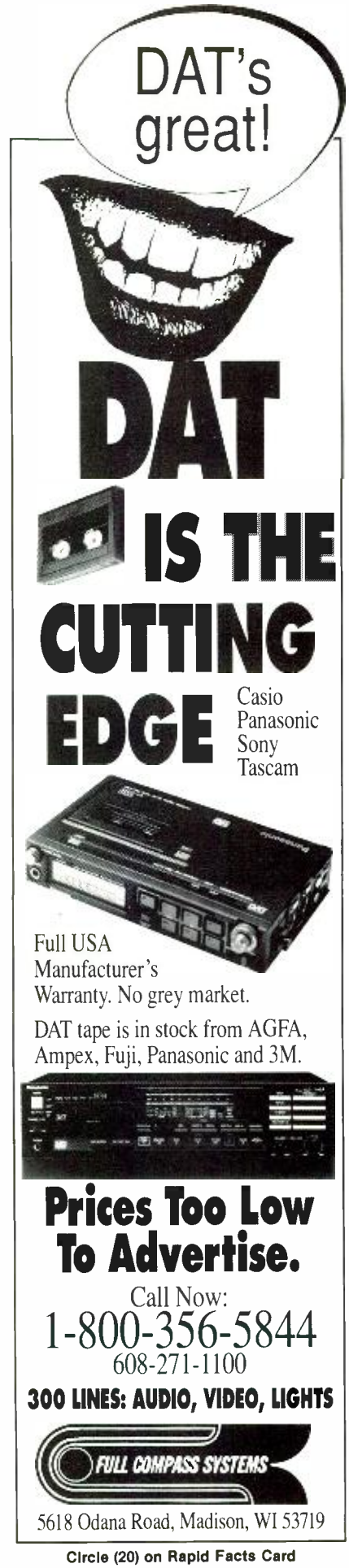
Also, the sensitivity of the human ear, which varies with frequency, must be taken into account. Dolby Laboratories uses CCIR/ARM weighting, which was developed as a particularly practical and revealing method of measuring, specifying and comparing noise levels. [1]

All measurements for this article, including noise measurements, were made on a 1/4-inch, 2-track machine with a track width of 0.075 inches (1.91 mm), using Agfa 468 tape and a reference flux level of 250nWb/m. CCIR/ARM-weighted noise was found to be on the order of 4dB lower at 30ips than at 15ips, again because of the change in the reproducing characteristic (changing speed alone has little effect on noise). This is far less than the 10dB-15dB improvement afforded by Dolby A-type NR, let alone the nearly 25dB improvement of Dolby SR. To extrapolate performance with other track configurations, note that doubling the trackwidth improves the signal-to-noise ratio by 3dB. (S/N is proportional to the square root of the track width.)

MAXIMUM OUTPUT LEVEL

Maximum Output Level (MOL) helps to define the useful upper limits of a tape medium's dynamic range. It is the tape's output in decibels at which third-harmonic distortion reaches 3%, relative to a reference level such as 0VU.

Third-harmonic distortion can be measured for fundamental frequencies up to only about 6kHz. Beyond that, third harmonics are themselves not audible (although their effects can be) and are also not reproducible by the tape machine. Therefore, to closely approximate the 3%



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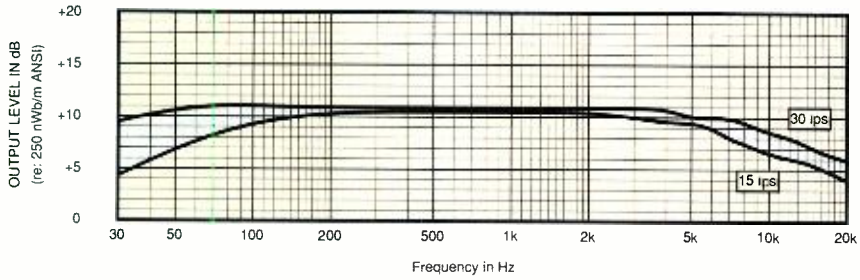

Figure 4. Maximum output level (MOL) at 15ips and 30ips (unassisted).

third-harmonic distortion level above 6kHz, we use a squash level (SQL) method.

SQL is that level which results in a 0.5dB loss of output, or squash, relative to the input. By "splicing" the MOL and SQL measurements, the medium's overall useful upper limit can be seen.

Figure 4 shows the differences in MOL and SQL between 15ips and 30ips. Note that between 200Hz and 2kHz, both speeds provide essentially the same performance. Below 200Hz, low-frequency MOL at 15ips is worse than 30ips by 1dB at 125Hz and 5dB at 30Hz. This is because the NAB 15ips 3180s reproducing characteristic necessitates the use of a corresponding low-frequency boost in recording, which reduces headroom. The AES 30ips reproducing characteristic, having no effect at low frequencies, requires no such boost.

Above 2kHz, 30ips also shows slightly improved SQL, on the order of 2dB. However, the change in reproducing characteristic predicts an even smaller high-frequency improvement in theory (about 1dB at 15kHz), and we regard these particular test results as optimistic. Another test at another time on another recorder and/or tape formulation, no matter how carefully set up, could easily show a smaller difference, or even none at all, between the two speeds. Therefore, high-frequency SQL should be considered practically the same at 15ips and 30ips.

Although occasional musical peaks will reach the MOL or SQL levels, average recording levels are generally 9dB to 10dB lower. Therefore, as useful as they are, the value of MOL/SQL measurements should not be exaggerated. For example, 30ips has higher MOL at low frequencies, but at average record levels, 15ips actually has smoother and more extended low-frequency response. MOL/SQL is only one of several factors to consider.

15IPS OR 30IPS?

Our measurements, as well as years of recording experience, show that neither recording speed can be unequivocally recommended over the other. Therefore, the choice must remain an individual decision involving such factors as the type of music being recorded, budget, desired editing ease, and available equipment.

In an attempt to de-mystify the selection process, Table 2 compares the two speeds, with an emphasis on realistic and practical, rather than emotional and subjective, considerations.

If nothing else, Table 2 points up that actual performance differences between 15ips and 30ips are trivial by comparison to the dramatic improvement a well-designed noise reduction system can make at either speed. For example, the Dolby SR (Spectral Recording) process not only lowers noise, but also extends headroom at high recording levels, and reduces all frequency components not present in the original signal (including those resulting from modulation noise, print-through and IM distortion). These benefits, as well as freedom from audible artifacts, are best judged by means of careful listening tests, whereby original signals (line-in) are compared to the signals off the tape (line-out).

Comparison of Recording at 15 ips and 30 ips

15 ips	30 ips
Advantages	**Advantages**
➢ Smoother, more extended low-frequency response.	➢ Weighted noise level about 4 dB lower (due to the AES 17.5 µs time constant).
➢ Slightly lower noise and susceptibility to hum at low frequencies (due to the NAB 3180 µs time constant).	➢ Higher MOL below 200 Hz (5 dB at 30 Hz).
➢ Half the tape cost and consumption, reel changes, and storage room.	➢ More convenient editing (wave lengths on the tape are twice as long).
➢ Slower head and transport wear.	➢ Less sensitive to tape dropouts, tape slitting and coating problems, and recorder azimuth and calibration misadjustments.
➢ Shuttling to edit points is twice as fast.	
Disadvantages	**Disadvantages**
➢ Weighted noise level is about 4 dB higher.	➢ Irregularities and less extended response at low frequencies due to headbumps.
➢ Lower MOL below 200 Hz (5 dB at 30 Hz).	➢ Slightly higher noise and susceptibility to hum at low frequencies.
➢ Less convenient editing (wavelengths on tape are half as long).	➢ Twice the tape cost and consumption, reel changes, and storage room.
➢ More sensitive to tape dropouts, tape slitting and coating problems, and recorder azimuth and calibration misadjustments.	➢ Faster head and transport wear.
	➢ Shuttling to edit points takes twice as long.

Table 2. Comparison of recording at 15ips and 30ips.

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Dolby Spectral Recording (SR)

Introduced in 1986, Dolby Spectral Recording (SR) is now in use on nearly 40,000 tracks worldwide.

Dolby SR is a complementary encode-decode process that adapts to the spectral and level characteristics of the input signal more discriminately than previous noise reduction systems.

It operates according to what is called the principle of least treatment, whereby an optimum fixed gain/frequency characteristic is applied in the absence of signal, and to low-level signals even in the presence of high level signals. This action is accomplished by ten fixed- and sliding-band filters operating at three levels in two frequency bands. [2,3]

Noise and other low-level disturbances are reduced by nearly 25dB, as seen in Figure 5. (The low-level decode characteristic represents Dolby SR's noise reduction effect.) Equally important is the improvement afforded at high signal levels, where Dolby SR lessens the risk of over-recording the tape (which with analog recording saturates gently in the first place). These benefits are the result of special anti-saturation networks incorporated in Dolby SR.

The improvement at high levels can be illustrated by the MOL and SQL measurement techniques described earlier. Figure 6 compares 15ips with and without Dolby SR, which increases MOL at lower frequencies by up to 8dB (30Hz), at middle frequencies by more than 2dB, and at high frequencies by as much as 9dB (15kHz). Figure 7 shows similar improvements at 30ips: 8dB at 50Hz, more than 2dB at middle frequencies, and 8dB at 15kHz.

At both 15 and 30ips, Dolby SR improves the dynamic range by more than 25dB. Noise is virtually eliminated as a practical consideration, including modulation noise that other systems do little to improve. Maximum record level is uniformly high across the spectrum, including at the frequency extremes, while desirably gentle saturation characteristics are maintained.

With Dolby SR and the continuing refinement of recorders and tape, analog recording remains a useful, economical and high-performance alternative to digital formats.

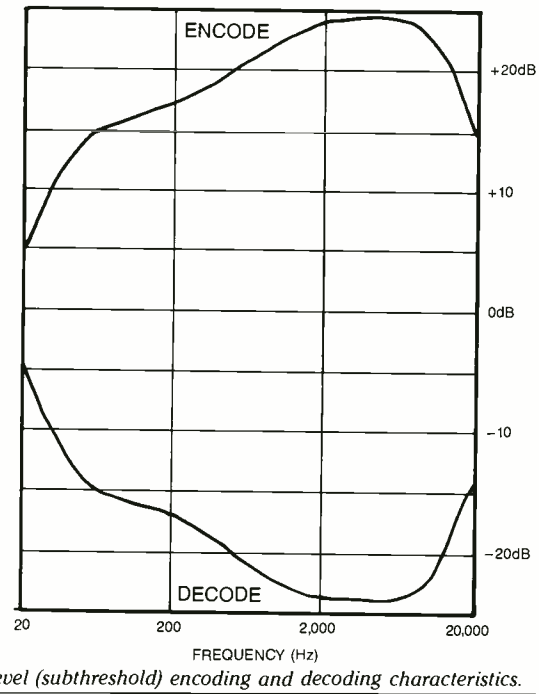

Figure 5. *Low-level (subthreshold) encoding and decoding characteristics.*

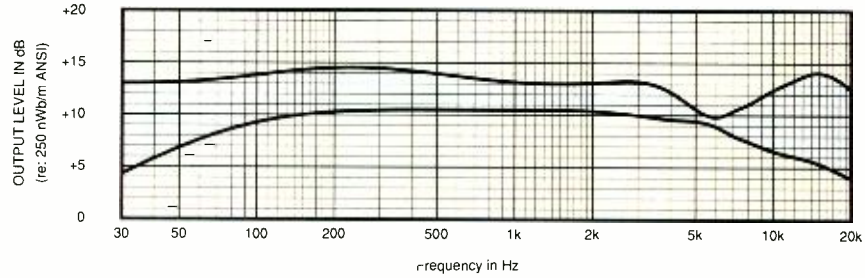

Figure 6. *Maximum output level at 15ips with Dolby SR (top) and unassisted (bottom).*

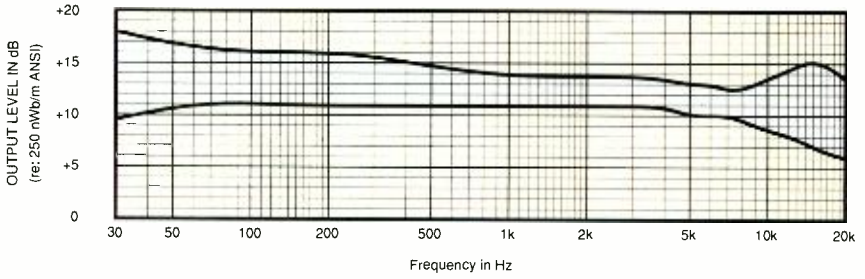

Figure 7. *Maximum output level at 30ips with Dolby SR (top) and unassisted (bottom).*

References:

1. Ray Dolby, David Robinson and Ken Gundry. "CCIR/ARM: A Practical Noise-Measurement Method," J. Audio Eng. Soc., Vol. 27, No. 3 (March 1979), pp.149-157.

2. "Dolby Spectral Recording: What It Is and What It Does," Dolby Laboratories publication S87/6824/7497 (1987), pp.1-8.

3. Ray Dolby. "The Spectral Recording Process," J. Audio Eng. Soc., Vol. 35, No. 3 (March 1987), pp. 99-118. ■

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FIVE QUESTIONS:

Recording Tech

By Mike Joseph

Q: What are ideal tape biases for Ampex 456, 3M 250 and Agfa 468?

A: Sad but true, there are no single values representing exact proper bias levels that apply to every situation. The amount of bias, or high-frequency current, applied to tape is ultimately a compromise between three different things: frequency linearity, noise and distortion. Literally, the curves representing each fall in different places. They indicate that best background noise settings compromise harmonic distortion and frequency response values, ideal frequency response nets inferior noise performance, and for lowest distortion, noise and frequency linearity suffer. Compounding the issue is that tape saturation at high operating levels add additional variables in frequency response and distortion factors.

Mike Joseph is technical editor of R•E•P.

Astute analog bias calibration suggests that the exact setting for a given tape be determined by the style of music, expected dynamics, tape speed and operating level. Record EQs differ at the various speeds, altering headroom and response. Tape batches vary in performance, often as much as 5dB at the top. Some operators use a low frequency tone to listen for tape modulation noise, tweaking with a high frequency tone for fine tuning. Others use a 2-tone mix, one mid-band and one high, measuring for least HD. Tape performance monographs available from all the tape manufacturers clearly delineate exact bias settings and how they affect noise, distortion and frequency response independently.

Q: What is meant by "zero level" on analog tape?

A: Calibration zero levels, tape output levels and noise figures are referenced against a magnetic energy level of 185 nanoWebers per meter, or n/W/m on tape. This standard was chosen as a reasonable level point in light of headroom and dynamic range of earlier tape formulations. Most calibration test tapes and the Dolby calibration zero level-set for film and music recording are standardized at 185. Modern tape formulations, however, allow the recording of a higher magnetic amount (or fluxivity) on tape, so calibrations typically 3dB higher than 185, or "elevated" to 250n/W are often used. Music is often recorded at a level elevated above that, with +3dB or +5dB above 250n/W not entirely uncommon.

Tape headroom is typically measured to the saturation level at 3% distortion, which might be 10dB to 15dB or more over the calibrated zero level, whether referenced to 185n/W or 250n/W. Totally separate is the issue of where one sets the tape deck meter's calibration, or literally what part of the signal you want to watch: 50% of total available signal modulation, or the top 10%. Remember here that all this only refers to where the meter's zero is set, and therefore how much signal you feel comfortable putting on tape when watching the meters. Nothing stops you from setting the meter's zero at 3% distortion (zero headroom/hard ceiling), and counting down from there. The meter is a tool, and the zero reference level is only an attempt at unifying tape

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compatibility standards from one machine or facility to another.

Q: What does the zero level on a digital tape deck refer to?
A: Beats us. Digital has no headroom considerations as we know them, since the modulated recording level on magnetic tape is fixed and the actual signal level is a number-crunching function. Unlike analog recording, there is no "soft" tape saturation; when it crashes, it crashes bad. Whether a rotary-head or fixed-head system, the zero reference on digital is an arbitrary metering point based on a given manufacturer's suggestion as to what your headroom over zero meter level should be. Some call it 1dB below crash, others several. Many consider digital zero to be the actual highest signal level which can be recorded, i.e.: +1dB on the meter doesn't exist. Either way, there is no universal digital standard (such as analog's 0VU equaling 185n/W). Let us know when someone figures this out!

Q: What test gear should I own in order to do proper setup and alignment of my tape decks?
A: As has always been the case, a good stable oscillator such as the reasonably priced Loft or a classic Hewlett-Packard is a must. In-the-console or on-board the tape deck versions aren't always that accurate. Additionally, an analog or digital ac voltmeter, preferably with a calibrated decibel meter, is crucial. VU meters on a tape deck are guaranteed to vary with frequency.

For more sophisticated work, a microprocessor-based unit, such as one of the Audio Precision units which measure distortion, frequency response, phase offset and assorted other goodies, is highly recommended. If money is no object, time domain measurements are best made with Techron TEF-type systems, or FFT packages made by Hewlett-Packard and others.

Q: Are there independent sources, other than manufacturers, for tape deck refurbishing?
A: No doubt there are dozens of companies in America who provide head and motor rebuilding services, as well as replacement parts. Contacting a used equipment broker or the original manufacturer will usually net recommended names. Some of the sources we are familiar with include:

- Acoustronic Sound, Los Angeles, CA, 213-849-4136.
- ElectroSound, Sunnyvale, CA, 408-245-6600.
- IEM, Palatine, IL, 312-843-7400.
- JRF Magnetic Sciences, Greendell, NJ, 201-579-5773.
- MDI/Precision Motor Works, Hudson, MA, 508-562-4420.
- Saki Magnetics, Calabasas, CA, 818-880-4054.
- Sprague Magnetics, Van Nuys, CA, 800-553-8712. ■

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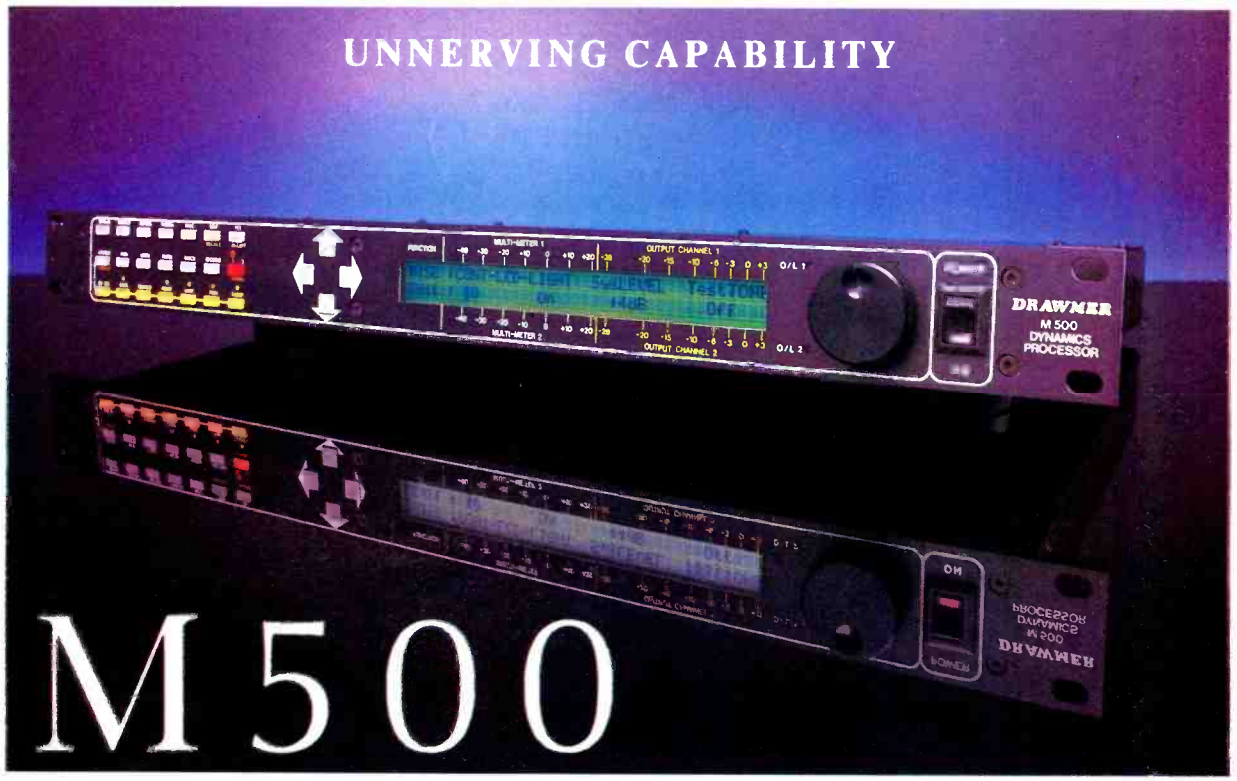

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Read My Lips: Live or Canned?

By David Scheirman

A few months ago, I was at a Los Angeles area recording studio working on a project. In the main room, time had been blocked out for a client who needed a master show soundtrack prepared for about 90 minutes worth of a pop group's tunes. The digitally recorded material was going to be put into a New England Digital Synclavier, which would then be taken on the road.

"Their whole show will basically be done from these recordings," explained the studio engineer. "They'll just lip-sync; their fans won't know the difference."

I didn't think much about it at the time. I filed the event away in subconscious memory under a "trivia" file.

Later, as I pondered what it might be like to operate a concert sound system for such a band on stand, relying on pre-recorded input, I realized that this phenomenon is not all that new. There has always been an act or two that relied on recorded material to support or enhance live shows.

Electric Light Orchestra comes to mind as a group that used pre-recorded music and vocal material. A resulting controversy about "taped music" led to some ticket refunds and national media coverage of the issue. Occasionally, pop bands that cater to pre-teens (Menudo, for example) will use a full master tape that includes vocal parts.

Now that we're in the middle of the 1990 concert touring season, this subject seems to be one in which touring musicians, concert promoters and newspaper critics are quite interested. A number of major touring shows are making use of pre-recorded instrumental and vocal material to ensure a consistent show. Such performers as Janet Jackson, George Michael, Madonna and New Kids on the Block have been mentioned in newspaper articles on the subject as being "guilty" of relying on canned music and lip-sync vocals. Even if the ticket-paying kids don't mind, at least one segment of our society seems to be taking this very seriously: lawmakers.

In New Jersey, Democratic Assemblymen Joseph Mecca and Neil Cohen introduced a bill that would require concert promoters and ticket vendors to inform the public in advance if performers will be lip-syncing their lead vocals. Under the proposed bill, penalties of up to $50,000 could be imposed against promoters and up to $5,000 against ticket vendors if they fail to warn fans of the use of tape-recorded vocals in all printed and broadcast advertising for the concerts.

Since the introduction of that bill, New York State is considering one that would require disclosures in advertising of all music that has been recorded or otherwise reproduced (presumably including all sampled, sequenced and synthesized instrumental parts). Other states have similar bills under legislative consideration.

It's hard to find any concert stage that does not include some sort of pre-recorded music.

So why is this such an issue? Why the lip-syncing in the first place? Why is it more prevalent among entertainers who are marketing a personality, image or fashion style more than musicianship, and why has it turned into something that would concern state legislators?

We owe the whole thing to MTV and the new musical artforms that it spawned. This media vehicle could make "stars" practically overnight. As entertainment managers and video producers became more competitive in an effort to make an exciting, distinctive video, dance routines and flashy choreography took over.

The video image of the singer or band became just as important as the sound of the tunes they were singing. And when that artist needs to present a live show, particularly one that features dance music, the challenge is to let the audience see the visual image of exciting dance steps at the same time that the familiar-sounding radio-and-record hit tunes are being played.

I've never tried to dance on stage to an upbeat choreographed tune while holding a microphone and trying to sing lead on the same tune, but I'll bet it's not that easy.

Take Madonna. Currently on a world tour that includes mega-production stadium shows, she scrambles across the stage. She runs up and down a staircase and even lifts a chair over her head. The whole time, her singing is consistent. She never sounds out of breath. Her mic technique is flawless, just like the record. And yet she's rushing around, twirling and jumping.

Most of us would be out of breath by the second song, even if we didn't have to sing into a microphone at the same time. Is it unreasonable for her to rely on lip-synced vocals in order to present a highly polished live show that matches what the kids have seen on her video clips?

On the other hand, would we expect to see Neil Young, Linda Ronstadt, James Taylor, Willie Nelson or ZZ Top relying on lip-syncing in concert? Of course not. The whole foundation of such artists' shows rests on their musical abilities, not their video image. Yet ... it's all entertainment, and both types of artists draw an audience to live shows.

Philosophical questions, future legal decisions and personal opinions aside, the bottom line is that it's all concert sound, and both the traditional, non-recorded show and the lip-synced, full-taped shows require sound reinforcement systems. If the lip-syncing and recorded-music phenomenon becomes more prevalent, what will it mean for the live concert sound industry? Let's take a look at a few possibilities.

Why is lip-syncing such an issue?

With an all-recorded show, the inventory of mics and stands in actual use decreases significantly, unless they are used as props. So does the size of the mixing consoles (house and monitor), unless a real-time mixdown is being done of separate instrumental and vocal tracks.

Even when that happens, it's usually at most a 24-track playback situation. Fewer snake lines, fewer channel-insertable noise gates and compressors, and fewer effects devices are needed. But the amplifier/speaker system may actually get beefier to handle the high-level constant bass-

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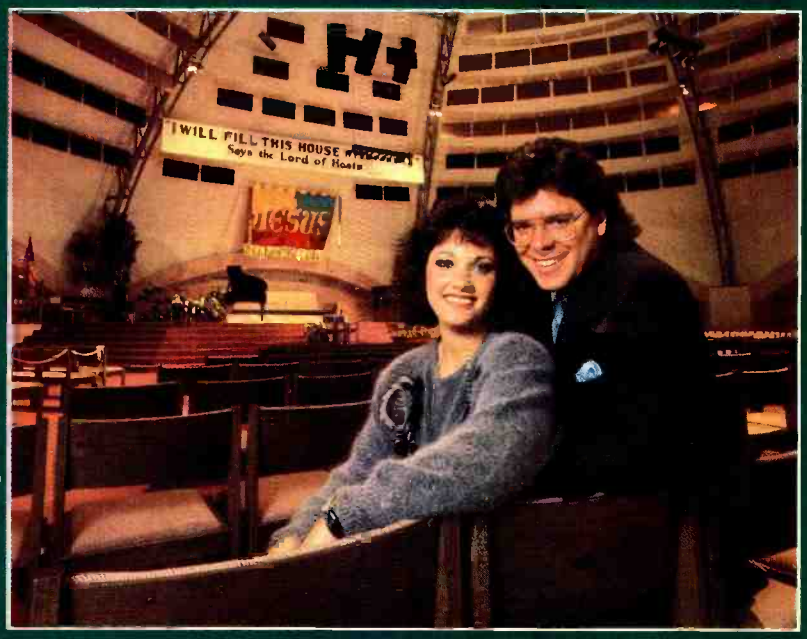

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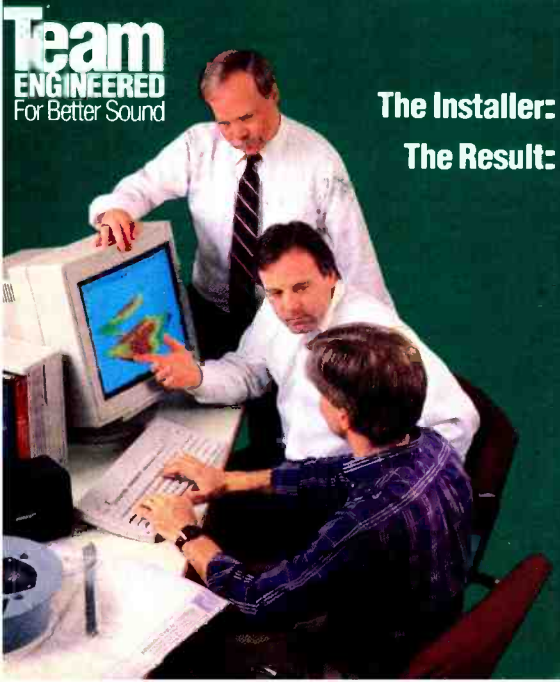

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thumping energy of the MTV dance-music format.

HYBRIDIZATION OF LIVE AND RECORDED?

Some shows on the road this season are relying on digitally stored program material and live vocal/instrumental input. Even though the recorded drums, bass, guitars, keyboards and backing vocals may make up the foundation for the mix, the sound mixer is also expected to "blend in" the actual live vocal and instrumental material on top of the playback.

A click-track keeps the drummer in time, and high-level full-bandwidth stage monitors pump out the recorded tracks to the players on stage. The board operator in the house must carefully use skill and discretion to blend them. When done correctly, the 'live' band sounds "larger than life" and (surprise!) "just like the record." Audiences for video-pop stars don't seem to care whether the music is "canned."

DIFFERENT OPERATING SKILLS?

The person in charge of a sound reinforcement system for this type of show will require different skills than the live sound mixer, who is dealing with dozens of open microphones and real-time musical performance. There may be multitrack tape recorders with which to deal, but more likely there will be an interface with a digital music technical specialist who has the whole show locked away in a computerized rig that is carted around in road cases. Perhaps experimentation with dynamic expanders, spectral recovery units, exciters and other signal processing tools will make the playback sound more live.

RISING SOUND LEVELS?

When a show uses fewer open microphones, the potential for higher gain before feedback is increased. If all vocals during the actual performance are canned, then it's possible to raise the level of the playback through the system with little or no acoustical restraints on an ultimate high volume level. (When the manager comes up to you and says, "The kids are loving it. Pump it up some more," you can no longer beg off by saying, "No way, man, I'm right at the verge of feedback on the lead vocal mic!") When you are asked to bring the in-your-face characteristics of disco sound to an arena or stadium, then you are talking loud.

IN PERSPECTIVE

Today's younger generation, raised on video images, has perhaps come to look at entertainment in a fast-food sense: instant gratification, not knowing or caring about nutritional content. If lip-syncing and digitally stored instrumental tracks enable a show producer to get a video star out on the road faster, in front of the kids, then that's what will happen. Indeed, that's what is happening.

Entertainment has seen many musical trends responded to by the concert sound industry. The current proliferation of lip-synced shows and pre-recorded music is certainly one of them. It will probably be with us for a long time.

It's important to remember that when the first electronic drum pad or keyboard synthesizer hit the concert stage, some thought the end of the world had surely come. Others were quick to refine the new technologies, incorporate them into existing live shows, and it was business as usual.

Today, it's hard to find any concert stage that does not include some sort of pre-recorded music, whether it's a sampled drum sound triggered by an electronic pad, or a vocal harmony chorus called into play by a keyboard pre-set. It may be wise to observe the phenomenon, make the best of it when you are called on to work with it and participate in it, and continue to strive for the best "live" sound possible.

One final thought: If the Eagles (now some 15 years older) really do a reunion tour soon, and perform tunes like "Take It to the Limit" in concert, will those beautiful harmonies that we remember be done only with live mics, or enhanced courtesy of master-tape samples and New England Digital? Does it matter?

To that particular band, it probably does. You'll get the real thing. But other shows getting ready to hit the road may feel differently. You may say, "But it's the music that's important!" Don't look now, but the music is changing — at least the way some of it is presented in live shows. ■

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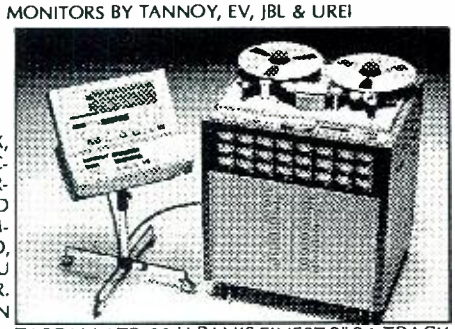

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SOLD-OUT

By David Scheirman

FARM AID IV

Broadcasting and sound reinforcement teams combine to present stereo audio for TV and radio to a nationwide audience.

In a series of benefit concerts for the American farmer, Farm Aid IV met its goal of raising funds and public awareness on behalf of the family-farm crisis in the United States. An estimated $1.3 million was raised for distribution to farm organizations, churches, service agencies and crisis hot lines. Past Farm Aid events have distributed more than $9 million dollars to more than 100 organizations in 41 states.

A primary intention of Farm Aid is to raise the nation's awareness about the family-farm crisis. Organized by country entertainer Willie Nelson, this event featured some of country and rock music's hottest acts. Such artists as Neil Young, John Cougar Mellencamp, Crosby, Stills & Nash, Don Henley, Guns 'N' Roses, Kris Kristofferson, Jackson Browne, John Denver and Bonnie Raitt participated in the program on behalf of the nation's farmers. A surprise appearance was made by Elton John. Through a flurry of advance phone calls, Nelson lined up a varied list of entertainers who donated time to appear, including Lou Reed, Was (Not Was), Iggy Pop, Poco, Taj Mahal, Asleep at the Wheel, Southern Pacific, the Kentucky Headhunters and Kathy Mattea.

Staged on Saturday, April 7, in the Hoosierdome in Indianapolis, the 13-hour show presented more than 70 bands and artists to an audience of 45,000. Starting at 11 a.m., the tightly paced show ran until midnight. The live audience was just the beginning ... millions saw or heard the show through broadcast and recording technologies. The remote audio crews and units that worked behind the scenes faced a formidable task of putting the show out to the rest of the world.

BROADCAST EVENT ORGANIZATION

Farm Aid organizers hired Dick Clark Productions to serve up a live TV show of the mega-event. Known the world over for producing live TV shows, DCP has traveled around the globe to produce and present sports events, pageants and concerts. For Farm Aid IV, director Gene Weed and producer Ron Weed assembled gear and crew from around the country to handle the event's complex requirements. Media projects included a TV show broadcast over The Nashville Network (TNN), radio programming for TNN, a live album recording for Willie Nelson's Pedernales Studio, live recordings for release by Westwood One over FM radio stations, and a host of other short features for such productions as MTV and the USA Network's *Youthquake*. More than 70 radio stations carried portions of the live coverage.

In addition to temporary offices in the Hoosierdome equipped with phones, fax machines and computers, the 'nerve center' for Dick Clark Productions was a remote TV production truck rented from NEP in Pittsburgh. Max Kirkland was the engineer-in-charge. Fanta Professional Services, Nashville, and Westwood One, Culver City, CA, supplied remote audio trucks.

Fanta was contracted to handle live broadcast sound for radio, TV and post-production TV, in addition to recording the

David Scheirman is R•E•P's sound reinforcement consulting editor and president of Concert Sound Consultants, Julian, CA.

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event with 24-track machines for live album release. Westwood One trucks recorded the show for post-production radio, with both country music and rock music specials on the calendar. Live concert sound was handled by Audio Analysts. Live audio feeds from all three sources (Fanta, Westwood One and Audio Analysts) were available to Dick Clark Productions in the NEP truck. (See Fig. 1.)

LIVE EVENT SETUP

To facilitate quick set changes during the 13-hour show, a large rotating platform was positioned in the center of a scaffold stage. Triple-level side platforms ('sound wings') were set up nearly a week ahead to support the 144 HDS enclosures supplied by Audio Analysts of Plattsburgh, NY, and Montreal, Quebec. (See Figure 2.)

An additional long-throw complement was added to the live sound system. One dozen specially constructed horn enclosures were arrayed high atop the center control riser, which served as a support for a giant video screen, spotlights and supplementary crowd lighting for television. This area also offered space for sound and lighting control boards.

Audio Analysts' 7-man crew was headed by the company's equipment manager, Colin Beveridge. Audio Analysts sound mixers Dick Offeringa and Dan Schriber handled live sound for a majority of the acts on the show, commanding a house mixing position that featured Soundcraft Series 4 consoles. Gamble 32×16 consoles on stage left and right were used for monitors.

"We were assembling information on the different acts for nearly a month before the show," noted Beveridge. "We tried to take a look at everyone's input requirements and then lay out our stage wiring so as to have a minimum amount of patching going on. It was not always easy, but weeks of advanced planning helped keep the chaos to a minimum."

To help track the proposed show, which seemingly changed from day to day based on the schedules and availability of different entertainers, audio production coordinator Robin Victor of Fanta Professional Services entered all available data into a computer spreadsheet program. Updates were made constantly as new information was obtained from the various bands and entertainers, many of whom were on the road and difficult to reach before the Farm Aid event.

"We use Lotus 1-2-3 as a spreadsheet program," explained Fanta owner Johnny Rosen. "All the sheets are linked together using Hal, a program utility option. We can sort by any parameter. We can also lay the program out to display stage input lists, and sort the information by groups of different types of inputs to make stage layouts easier."

PRODUCTION LINE SYSTEM

Fanta Professional Services and Westwood One designated an individual to be 'patchmaster' inside the building at the stage. Regardless of the quick changes made during the live performance, it was that person's responsibility to inform the trucks what signal information would be appearing on what line. That meant fail-safe communications and intense concentration.

"It makes for a long day, but things work out best when one person keeps track of the line assignments inside the building," advised Fanta technician Billy Saurel. "It gives us the best continuity for stage-to-truck communications. Because some of the sets are less than 10 minutes long before possible line changes, things move pretty quickly."

Fanta relied on RF communicators with belt holsters, a wireless intercom system from Telex, a hard-wired Clear-Com system as backup, and King Biscuit intercom

FARM AID IV : AUDIO & VIDEO SIGNAL PATH

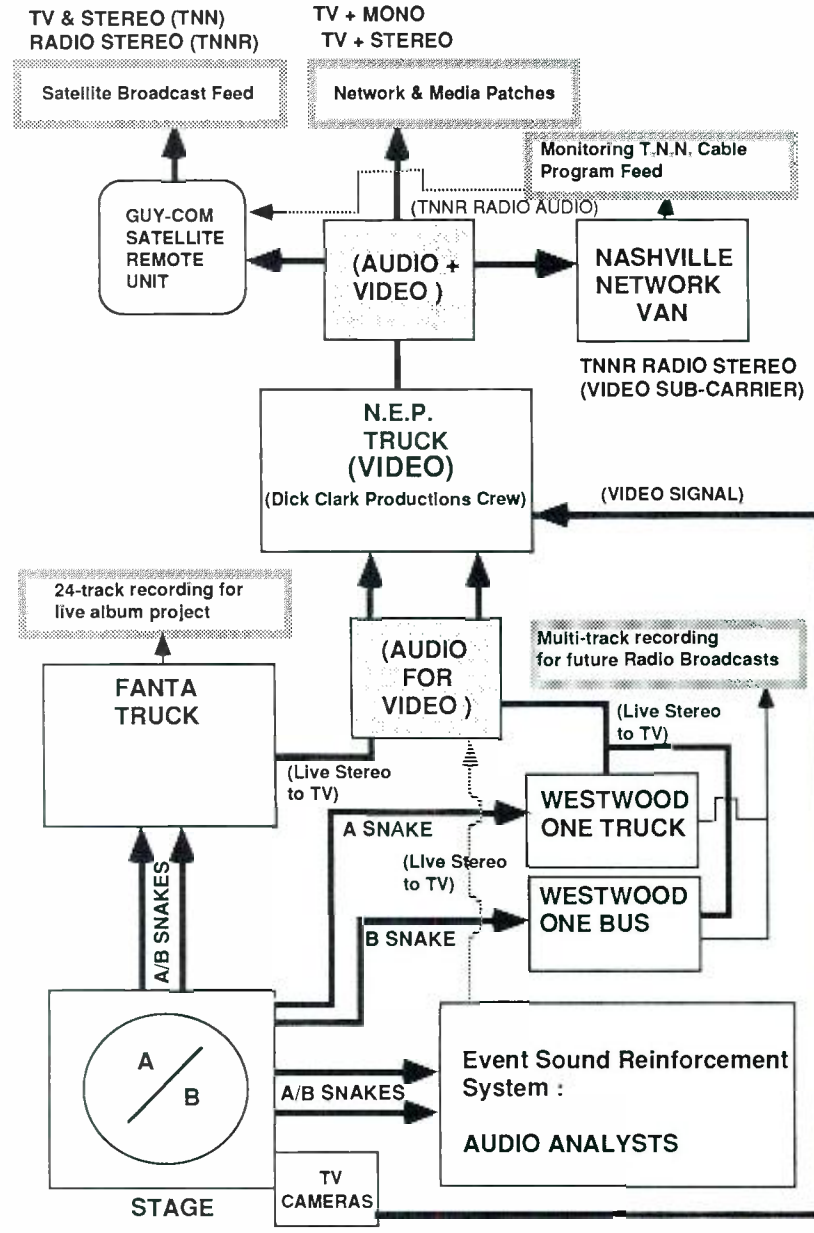

Figure 1. Audio and video signal path for Farm Aid IV.

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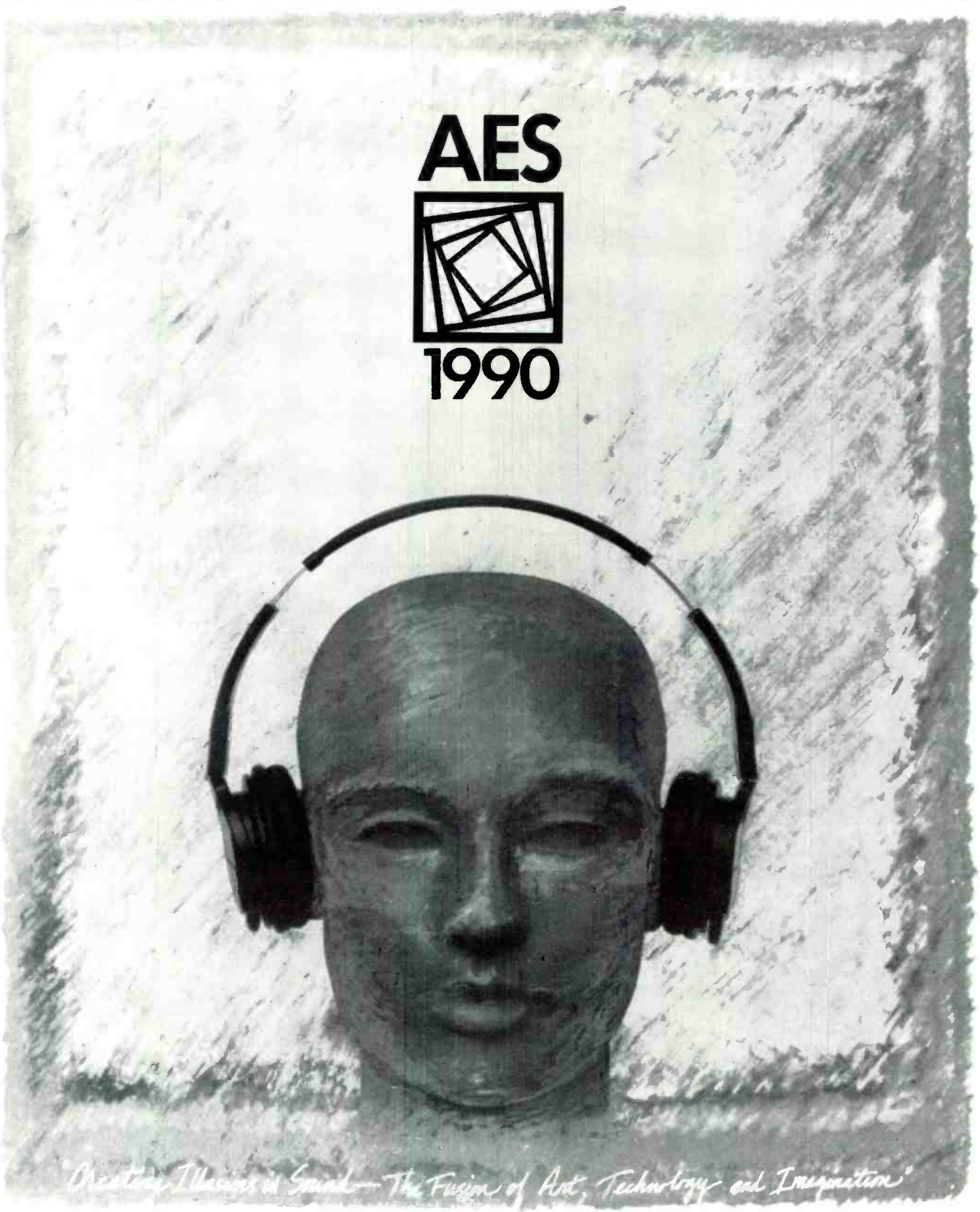

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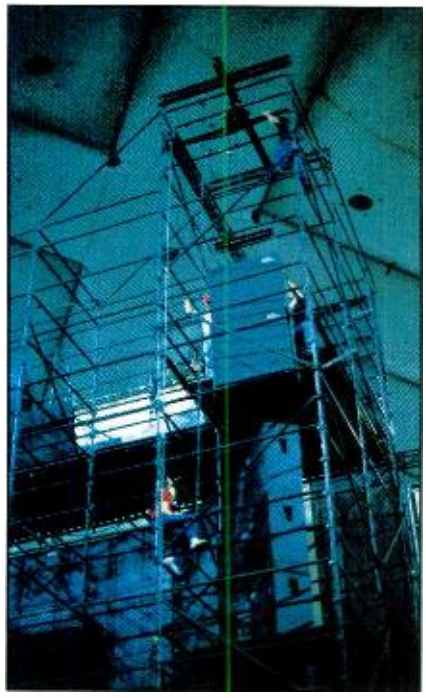

Figure 2. *Audio Analysts technicians work with the sound reinforcement company's HDS full-range enclosures. One hundred forty-four of the speaker cabinets were used for the event, erected in triple tiers on the scaffold sound wings.*

speaker boxes for fixed-location "squawk boxes" in the truck and on the stage. A closed-circuit, black-and-white video system allowed the truck crew to observe activity on the stage area, and production audio/video stereo color monitors let the truck mixers see and hear the broadcast feed.

Additional RTS intercom units in the truck and on the stage linked the Fanta crew and other remote audio units with the show director and main production center in the NEP truck. "It may seem like a lot of hardware and a lot of redundancy, and it is," said Fanta's Rosen. "On a complex special event like this one, a foolproof, accurate and timely communications system is one of your most important tools."

The main 7-channel production line for audio, video and lighting crew communications was centered at the NEP truck. Kirkland produced a line and location assignment chart in advance; technicians then spent a day ahead of the event running P.L. cable and testing lines and stations. "It may look like a complex system to set, but the advance planning for channel and location assignment on a need-to-know basis makes the show run very smoothly," explained audio technician Andrew McHaddad, part of the Los Angeles-based production team under Kirkland's direction.

AUDIO SIGNAL ROUTING

With two separate stages feeding inputs to the audio pool, dual 52-pair snake lines were run from the stage area to the remote trucks parked behind the building. Live sound patching panels were located at the two stage monitor mix positions; split feeds then were run to an upstage center area where patch panels for the recording unit snake runs were set up.

Technicians used 250-foot cable runs to carry mic line signals from the stage area patch center to the Fanta and Westwood One trucks. Each recording truck could access individual lines directly from the P.A. company splitter for the A or B stage, and a stereo reference mix from the Audio Analysts house mixing position was available as well. The master broadcast audio center in the NEP truck could sample this live P.A. mix in addition to the production mixes being prepared in the Fanta truck and the Westwood One units. (See Fig. 3.)

Westwood One units on-site included a luxurious converted bus and a 45-foot semi-trailer unit. One unit handled audio received from stage A; the other handled stage B. Each unit recorded the show for later radio broadcast. The Fanta truck, a 40-foot trailer equipped for remote multitrack recording and broadcast audio production, received input from both stages and did 24-track recording and real-time, audio-for-TV mixing. A unique dual-group submixer setup with A/B relay changeover enabled Rosen to use a single Sphere 32×16×32 master console to send a consistent broadcast stereo audio feed while documenting the event on a pair of Ampex MM-1200 24-track tape recorders.

"In the past, we've handled events like this in a variety of ways," Rosen said. "I've been searching for some time to find the 'ideal' compact audio mixer that could be assembled into a larger mixer group like building blocks. If you had something lightweight that didn't take up a lot of space, offered good audio quality and was cost-effective, it would make sense to create one common audio mixing center that could process the signal input from both stages into the main board. This would do away with calibration problems and level or other audio signal changes from switching back and forth between different consoles. It would also enable the primary mixer to be actively involved in the premixing and group assignments of signals being readied for the next stage changeover."

For Farm Aid IV, Rosen chose the model 1622 mixer from Alesis as the submixer 'building block' for his A/B stage mixing concept. Weighing only 14 pounds each, and measuring 6″×19″×21″, the compact audio mixers were arranged in two groups of four, with one group stacked on a custom-built rack within arm's reach of the main Sphere console on each side. With two upper mixers tucked in close using a hinged mount panel, as many as 64 audio inputs could be received and worked with in a double-tiered space that had a footprint only 38″×21″. (See Fig. 4.)

As one submixer group was in use for the 'live' stage, the upcoming stage mic lines were checked, pre-set and group-assigned by an assistant working on the other side of the main console. An input board was prepared using pre-labeled tape

Figure 3. *Interior shot of the audio control section of NEP's remote truck, which was crewed by Dick Clark Productions. Stereo audio feeds from the Fanta and Westwood One remote audio units were monitored here, along with a reference mix from the live P.A. mixing equipment.*

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Figure 4. *Four Alesis 1622 mixers were held in place by a custom rack. The top two units were on a hinged panel, allowing quick access to the lower pair with little effort on the part of the sound mixer.*

strips; as each act finished and line changes were made on stage, the next strip was placed on the Alesis submixer group that would be on-line in a few minutes. Rosen was the primary mixer and he operated the Sphere console. Technician Shipley Landis from Nashville, TN, and this author served as assistant mixers, preparing the A and B stage line signals on the submixer groups. (See Fig. 5.)

"It's a neat system," said Landis. "Remote truck space is always a precious commodity. When working a double-source event like this, it's really tough to rely on full-size consoles ... the setup gets too large and the primary mixer has a tough time being really able to track and even reach what's going on with all parts of the program input. These little mixers are real problem-solvers."

Fanta and Westwood One prepared stereo audio mixes that were monitored in the NEP truck by Dick Clark Productions, and each participated in producing live audio for broadcast that was used in the final program. Westwood One's multitrack event tapes were used for privately produced radio programs, scheduled at a later date.

TNN, a primary carrier of broadcast program material for the event, located a small van on site to monitor the audio proceedings and to guarantee quality control on the radio signal being sent to the world via a video subcarrier. Parked next to the NEP truck and directed by TNN's director of engineering, Hugh Hickerson, the mini-van was an interesting study in the field use of a miniature radio broadcast facility.

Guy-Com was contracted to supply a mobile satellite uplink station. Parked behind the Hoosierdome, the generator-equipped truck was the final link in a complex audio-video signal chain.

THE EVENT

With audio production systems in place, crews on stage and in the various remote trucks prepared for the marathon entertainment show. Several 'surprise guests' were on tap, and even the production crews had no idea what person might suddenly grab a guitar and walk out on stage. One of these program highlights was provided by Elton John, who quietly strode out to the performance area and sat down at a grand piano to perform several numbers.

A treat for many music fans was the unexpected pairing of different artists. Bruce Hornsby and Don Henley performed several tunes together, as did Jackson Browne and Bonnie Raitt. John Cougar Mellencamp's band acted as a backup group for other artists, including Joe Ely, and Tom Keifer of Cinderella and singer

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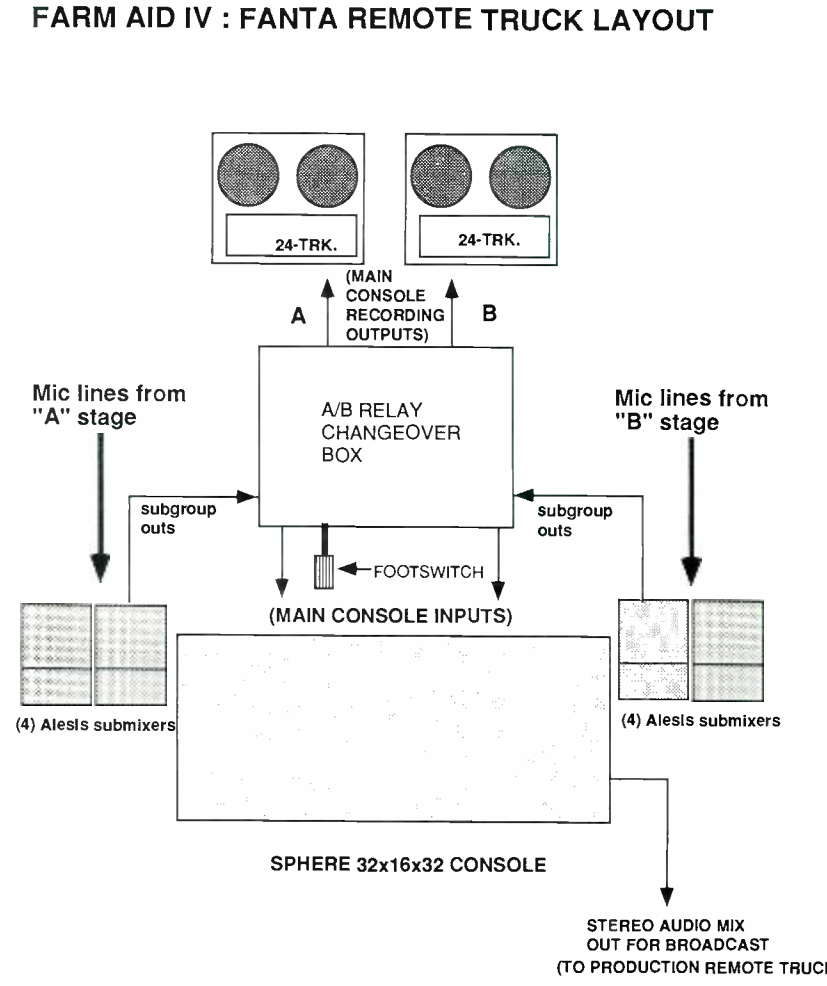

Figure 5. Fanta truck audio signal layout (simplified).

Joanna Dean, who were teamed as a duo. Other veteran performers — John Prine, Arlo Guthrie, Bill Monroe and Carl Perkins — added depth and interest to the show, while many newer artists, such as Nanci Griffith, Ricky Van Shelton and Lyle Lovett, enjoyed increased exposure from the event.

"This has been some fantastic music," Rosen said, as the huge sound system and several recording trucks were packed up after the show. "You get a chance to hear and work with some of the best in the business ... and you really put yourself, your crew and your equipment to the test."

Many companies and private corporations donated time, people, equipment and services on behalf of Farm Aid. A boost was given to the audio production of the event when Agfa donated its top-of-the-line model 469 recording tape on 2,500-foot reels for 24-track use in the Fanta truck. Live recording of the show for Willie Nelson was handled by Eric Paul, the engineer in charge of Nelson's Pedernales Studio in Spicewood, TX. Plans are to quickly edit the music and get an album package out soon to help raise additional funds, said Paul.

With so many different production units on site, each handling a different part of a complex scene, the chance for confusion and error is always there. At Farm Aid, months of planning and a thorough team approach by Dick Clark Productions helped things come together smoothly on-site and over-the-air. Farm Aid IV was an excellent example of how today's large entertainment events can have a global effect through the efforts of sound reinforcement, audio and video broadcast engineers, and event production staffs. ■

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HANDS ON:

Gefen Systems TrackWriter

By Rick Schwartz

If you're a sound editor, Gefen Systems has some software that you should know about. The three programs, which work closely together, are TrackPlanner, TrackWriter and the M&E Organizer, and run on the Macintosh or IBM computers. This review focuses on Gefen's newest addition, TrackWriter, in the Mac version.

TrackWriter is a program designed to create spotting sheets for dialogue, Foley and sound effects. Before TrackWriter, sound editors were forced to write down time code numbers, character names and each line of dialogue by hand. It took hours, and sometimes days. This information would then be typed out so it could be used during the automatic dialogue replacement (ADR) or looping sessions.

TrackWriter can eliminate much of the typing associated with logging. For example, in and out times can be entered by hand or captured using an external (VITC) time code reader from Evertz Systems. Using the latter method, SMPTE numbers are automatically entered (with frame accuracy) by hitting the return key on the computer.

Even if you don't have access to a ¾-inch machine and have to enter times by hand, TrackWriter is still faster, because it remembers the last value that was entered and carries it forward, so you just have to re-enter seconds and frames. I found this to be a real time-saver when entering closely spaced events by hand. If you've ever had to log sound effects for a gunfight, you know what I mean.

Rick Schwartz is a sound designer/engineer and director of post-production for Music Animals, Los Angeles.

FORMAT CONVERSIONS

SMPTE entry is fine, but what if you're "finishing" on film. No problem; TrackWriter will convert all of your SMPTE numbers into feet and frames. Instantly. However, you may have to perform an offset after a conversion. Offsets are easily accomplished using the CHANGE TIME command.

For example, a common transfer request is to have the first frame of picture start at 01 hr., which places the 2-pop at 00:59:58:00. To make 00:59:58:00 match the burned-in feet and frames marking of 9 feet, you must first select all the time values in the list and then offset them so that the sync pop matches the same number on the videotape. For some reason, I was not always able to subtract times using the CHANGE TIME command.

QUICK CHANGES

The arrow keys are used to move rapidly up and down the screen to find a desired time code number. To change a time after you have entered it, simply press the space bar to bring the number up to an editing window. Then make necessary changes and press return.

This worked well enough, but I think it would be nice if you could do the same thing by double-clicking on the number with the mouse. And unlike other logging software, TrackWriter divides a SMPTE time code number into four separate fields (HH:MM:SS:FR), which are accessed left-to-right using the tab key. At first I didn't like using the tab key so much, but once I realized that I didn't have to always type the entire 8-digit SMPTE number, I saw the light.

MY FAVORITE FEATURE

One of the most useful features is the LOOKUP TABLE. If you need to create a dialogue spotting sheet, you first type in all of the character names. As soon as they're entered, each name is sorted alphabetically and animated slowly off the screen to its place in the character list.

From then on, characters are simply picked from the list with the mouse. If you don't like using a mouse or don't want to take your hands off the keyboard when typing, you can enter the first letter of a character's name and TrackWriter will jump to the right place in the list. The only typing needed is to enter lines of dialogue or descriptive information.

Some people complain that the text is too small and hard to read in other Macintosh programs. TrackWriter uses a large, easy-to-read font that can be read from quite a distance. Although you can't change the font size or type, I didn't find this to be much of a problem.

Sound editors need not be intimidated by TrackWriter because the main screen is presented in a very familiar format — a single page with five column headings. (See Figure 1.) I liked the way the titles above columns could be changed by simply typing in new text that replaces the old. By default, the program is set to IN/OUT, CHARACTER and DIALOGUE. I found it useful to change CHARACTER to SOUND FX. This way, a sound editor could pull reoccurring effects using the same

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pop-up list that is normally used to display a roster of characters.

For example, if you were cutting a gunfight, you could select from a list of guns (i.e., Uzi, .45 magnum, shotgun, ricos). The next field would be used for DESCRIPTIONS. Finally, the TRACK heading could be used to show whether the element is a hard effect (FX), background (BG), dialogue (DX) or music (MX). (See Figure 2.) By using these 2-digit codes, you can display or print the entire list by type, just by clicking on a button in the PRINT dialogue box. This way, a supervising sound editor can "farm out" different parts of a show to different editors.

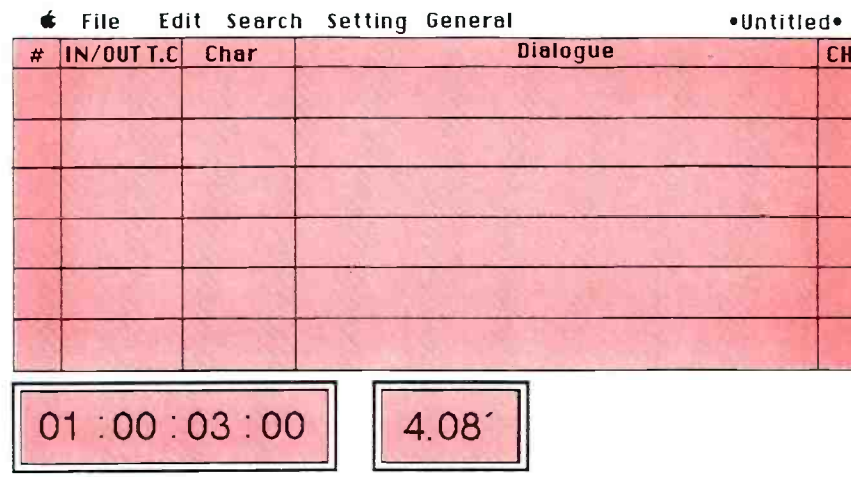

Figure 1. Basic TrackWriter format.

GETTING STARTED

Installation is straightforward, thanks to an installer program. Not once did I need to refer to the manual during my first session, possibly because of the program's built-in command reference that is accessed by pulling down a HELP menu. I later looked at the manual, and although it's brief, it seems to be effective. All of the standard shortcut commands were standard and easy to remember.

The FILE MENU contains all of the normal commands like NEW, OPEN and SAVE, with one noticeable addition — ADD. Although merge or join may have been a better term, the ADD command allows you to merge two TrackWriter files to create a new file. This could be useful if you had more than one person logging the same reel at the same time.

SHARING FILES

TrackWriter can store data in several formats, including the AMS AudioFile, New England Digital and the Larson Technology formats. The program will produce a CMX-compatible list that can be used with the popular CMX editing system. That is, *if* you can figure out how to convert and store the file on disk in a way that it can read with an IBM system. By saving in the Gefen TrackPlanner format, you can import TrackWriter data and use it to print out cue lists to use at a mix. This can save time because you don't have to enter the same data twice. I'm told that TrackPlanner data can be imported into TrackWriter, although I didn't get a chance to try it.

TrackWriter will print either spotting lists or ADR lists on standard 8.5″×11″ paper. By running the program under MultiFinder, you can CUT and PASTE the results of sound effects searches (using the M&E Organizer) into a TrackWriter document. The printouts look great and even include a date and time stamp, along with the page number at the bottom. Printouts can be selected in either portrait or landscape orientation *with* or *without* SETTINGS INFO. PRINT SETUP contains global parameters, such as the title, production company and the editor, which only need to be entered once.

ADDITIONAL GOODIES

I found the RENUMBER feature to be very useful because it will change all of the line numbers if you delete a line. Another nice feature is under the GENERAL/TIME EDITING menu, called DELETE TIME. Because sound editors have to conform audio to picture cuts, this feature allows time code to be shifted, starting at a desired time code location. This can be a real timesaver. The SEARCH command only works on selected text. To search an entire list, you need to press the command key while holding A. For some reason, the FIND command did not contain the whole word and partial word buttons as pictured in the manual.

Although some of the dialogue boxes do not conform with Macintosh guidelines,

Company: Gefen Systems **Title:**BILLLY THE KID **Reel No.:**1
Production: Gefen Productions Inc. **Project:**Demo_ADR **Editor:**John Casy

#	IN /OUT	CHAR.	THE TEXT	CH
001	275.08´ 280.14´	TERRY	DOLAN AND THE SHERIF HAVE JUST TAKEN OVER. MY STORE IN LINCOLN.	1 2 3 4
002	280.14´ 283.10´	TERRY	AND NOW THEY WANT THE RANCH TOO.	1 2 3 4
003	284.06´ 291.14´	TERRY	MISTER RYNERSON HERE SAYS THAT EVEN BY THE HIGHLY FLEXIBLE STANDARD OF THE TERRITORY OF NEW MEXICO.	1 2 3 4
004	292.06´ 296.10´	TERRY	IN THE YEAR OF OUR GRACE, 1897, (INHALE)	1 2 3 4
005	296.10´ 299.10´	TERRY	THIS IS, ...WHAT WAS THE WORD YOU USED?	1 2 3 4
006	320.13´ 321.14´	TERRY	WELL BILLY,	1 2 3 4
007	322.06´ 325.14´	TERRY	(INHALE) WHAT WOULD YOU DO IF YOU WERE ME ?	1 2 3 4
008	351.02´ 376.02´	BILLY	WELL, WELL, WELL, MISTER DOLAN HIMSELF AND SHERIFF BRADY. THEY THINK THEY OWN LINCOLN COUNTY.	1 2 3 4
009	381.14´ 385.12´	TERRY	WELCOME TO THE (EXCHANGE) RIO FELIZ RANCH MISTER DOLAN	1 2 3 4
010	391.02´ 392.08´	DOLAN	THANK YOU	1 2 3 4
011	396.08´ 402.04´	TERRY	(INHALE) MISTER DOLAN I HOPE YOU HAVE TIME TO STAY FOR TEA. WE HAVE SO MUCH TO TALK ABOUT	1 2 3 4

Figure 2. Screen dump of sample ADR list.

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they seem to work fine. While on the subject of non-standardization, you have to jerk the mouse to the left to escape most of TrackWriter's entry screens. Although I liked the fact that I did not have to take my hand off the mouse, I think a keyboard equivalent should be included as well. Normally, a dialogue box would have a cancel button.

I used TrackWriter on both a Macintosh II and a Macintosh SE; the program worked fine on both. TrackWriter can sense which type of computer you are using and adjusts the size of the screen font to accommodate smaller displays. I had a couple of minor problems with screen refresh that were fixed by resizing the screen. Also, on rare occasions the text would not automatically wrap around to the next line like it should, forcing me to hit the return key. Last of all, like a lot of Macintosh software, UNDO is not fully implemented and only works with normal editing commands like CUT and PASTE. I recommend that you always SAVE before you SORT or do a time code offset, just in case you're not happy with the results.

Because of its newness, TrackWriter for the Macintosh is still a little rough around the edges. For example, the close box on the main window does not work yet. I also noticed that a CLOSE command was absent from the file menu, but this is a simple problem that can easily be fixed.

THE BOTTOM LINE

Overall, I found TrackWriter easy to use and would recommend it to anyone who needs to spot videotapes for ADR or sound effects. It will definitely speed up preparation for an ADR session and take care of the paperwork. Although it has been optimized for ADR, I found it useful for any type of logging, especially sound effects. The program was very stable and never crashed while I was using it — which is more than I can say for other software I own. Although Gefen deviates slightly from Apple interface guidelines, it is consistent within its programs. I quickly adjusted to Gefen's way of doing things. The company seems sincerely interested in hearing from users and incorporated several of my suggestions into the program.

Circle (100) on Rapid Facts Card ■

Backgrounder

Gefen Systems (not to be confused with Geffen Records) is a Los Angeles-based company well-known for being the largest distributor of sound effects and music libraries on compact disc. Its client list is a Who's Who of audio.

In addition to TrackWriter, Gefen Systems offers two other programs for sound editors. TrackPlanner is designed to simplify the task of creating cue sheets for mixers. The M&E Organizer Software is a database for popular CD libraries; when coupled with a Sony multi-CD changer, it can greatly simplify the location, auditioning *and* the transfer of sound effects or music. I saw this new automatic transfer feature at work with an AudioFile and was very impressed.

All three of Gefen's programs have a similar look and feel, and use the same menu commands and shortcut keys that make it easy to go from one program to the other. In addition, they can be run simultaneously under MultiFinder (providing you have enough RAM). This is very useful if you want to cut text from one program and paste it to another.

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AES: An Advanced Look

By Laurel Cash-Jones

AES is happening soon. In Los Angeles this year, the convention is scheduled for Sept. 21-25.

Many publications go on and on about the exhibits at each AES convention. While I agree this is a very important part of the show, there are many educational sessions, technical papers, workshops and seminars that are often overlooked. These events are designed to inform and educate you in ways that are not and cannot be done on the show floor.

Laurel Cash-Jones is R•E•P's editorial consultant and a Los Angeles-based free-lance writer.

So with this in mind, this month's column looks at a few of the technical presentations and other events that will be worth your while attending. [Full AES preshow coverage will appear in the September issue — Ed.]

WORKSHOPS

"Digital Audio Workstations: Diverse Applications" is scheduled for Sept. 21. Many people in the recording field have been mystified by the abundance of choices available in this new category. Especially since few of these systems speak the same language, and, therefore, have a hard time exchanging data.

This promises to be one of the hottest workshops at this AES due to the various types of systems represented, including: AKG's DSE-7000, Alpha Audio's DR-2, AMS Industries' AudioFile, Digidesign's Sound Tools, Digital Audio Research's SoundStation II, Digital Designs' ProDisk-464, Lexicon's Opus, New England Digital's PostPro SD, Solid State Logic's ScreenSound, Sound Master's Syncram, Studer Editech's Dyaxis and WaveFrame's AudioFrame.

The focus of this workshop is different than the SPARS Business Conference in May, which featured manufacturer presentation on 11 workstations. All system presentations will be done by an engineer/operator, who will be using actual program material that has been previously processed on each given system.

To qualify for this session, each manufacturer had to have sold and delivered product to customers (not just beta test sites) at the time of this writing. Therefore, it will *not* include products that were not in the hands of end users by press time.

Some of the other workshops to be presented: "Restoration of Audio Recordings," Tom Owen, chairman; "Synchronization: SMPTE Time Code and MIDI," Bill Hogan, chairman; and "Recording Studio Mixing," chaired by NARAS.

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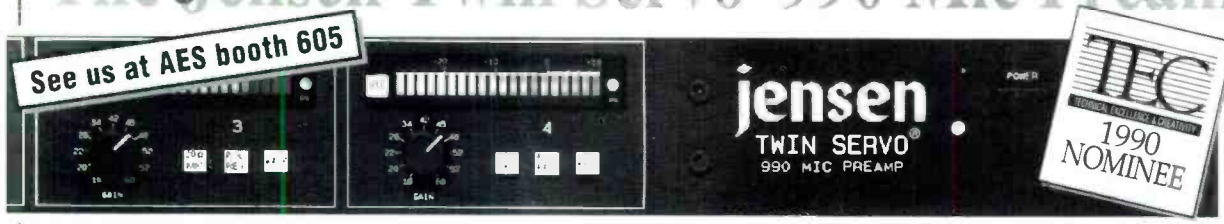

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TECHNICAL PAPERS

"Modeling of Acoustic Spaces," a subject not previously presented at AES, is scheduled for two sessions on Monday, Sept. 24.

What makes these sessions special is twofold. First, they have been organized by the AES Technical Council Committee on Acoustics and Sound Reinforcement, chaired by Ken Jacob of Bose Corporation. There are four AES Technical Council Committees. They include Signal Processing (chaired by Don Eger), Transmission (chaired by Daniel Gravereaux) and Transducers (chaired by John Bullock), and the committee mentioned above.

The second reason these presentations stand out is due to the gentleman chairing them. Dr. Manfred Schroeder is the field's foremost expert on acoustics.

Another session which promises something different is "Audio For Video, Broadcast and Film." Chaired by Phil Mendelson of the Post Group, Los Angeles, this session will take a more "real world" approach, as opposed to the more theoretical approach that one normally hears in the papers sessions.

Two other papers, "Why a Digital Moviola Won't Cut It" by Brian Kelley of Skywalker Sound, and "Toward a Truly Integrated Digital Audio Environment" by Phil Mendelson, promise to be informative from an application-oriented point of view.

SPECIAL EVENTS

- A video presentation of "An Afternoon With Jack Mullin." This one hour long video is from the 1988 AES convention, its subject being "The History of Sound." It will be shown throughout the convention.
- "An afternoon with Keith Johnson" is scheduled for Sunday, Sept. 23. His unique perspective on audio will make this an event that should not be missed.
- "Women in Audio" will be held Monday, Sept. 24. Yours truly is one of the hosts.
- "Jim Macdonald — Sound Effects Man." This is a don't-miss session. Jimmy was the voice of Mickey Mouse for over fifty years, and a prominent member of the sound effects staff at the Disney Studio for many years. Come and find out how it used to be done.
- There will also be the ever-popular technical tours. Friday, Sept. 21 will be the tour of broadcast facilities; Saturday, Sept. 22, film and video production facilities; Sunday, Sept. 23, prominent recording studios; Monday, Sept. 24, sound reinforcement; and Tuesday, Sept. 25, optical media facilities.

Some of these sessions, plus the workshops/seminars and papers sessions, require an "all-access pass." This costs more than exhibits only, but is well worth it.

Obviously, there is much more happening at the convention than can be described in this space. Refer to the September issue for complete information, and to the final show information in case of last-minute changes. ■

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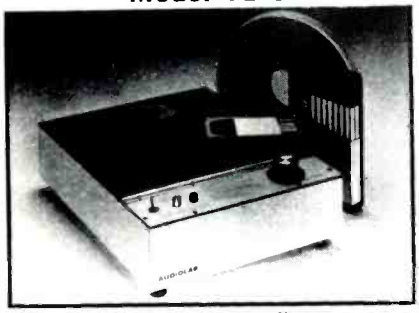

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Control Concepts Islatrol/Plus

The Islatrol/Plus hybrid surge suppression and transient filtration system provides protection when microprocessor-based system malfunction is traced to the ac power line. The system's energy flow, combined with high-energy suppression components, protects against the full spectrum of voltage transients, whether high-energy events or line-conducted noise. High energy protection exceeds the lowest clamping categories designated by UL 1449 catastrophic event specification. MOV arrays rated at 150 MCOV (Maximum Continuous Operating Voltage) provide more high-energy absorption than standard 130 MCOV devices and provide more headroom.

Circle (104) on Rapid Facts Card

Peavey VCM 1 mic

The VCM 1 miniature, fixed-charge, condenser mic features a back-electret condenser, cardioid polar pattern, an external windscreen, a wire-form hanging adapter to allow proper angle, a specially tailored rise in frequency response for off-axis pickup and 9V to 52V operation. A phantom power module and a 25-foot cable are supplied.

Circle (105) on Rapid Facts Card

Peavey 44T compression driver

The 44T features a scalloped uniphase suspension, which enables performance without the "rocking modes" found in many large format drivers. The radial slot phase plug is optimized for maximum high-frequency extension and provides smooth air flow from the diaphragm to the horn throat. The 4-inch diaphragm offers a frequency response from below 400Hz and an 8Ω impedance.

Circle (106) on Rapid Facts Card

Tascam BR-20T mastering deck

The BR-20T 1/4-inch 2-track recorder/producer with center-track time code features servo-controlled motors for accurate transport response, gentle tape handling while under SMPTE outboard control, gapless and seamless punch in/out for transparent editing, independent reel size selection for handling dissimilar reel sizes, and separate record functions for the left and right channels. Retail price is $2,999.

Circle (109) on Rapid Facts Card

Peavey HDH 2T SR enclosure

The HDH 2T sound reinforcement enclosure is optimized to work with the Dynamic System Controller Series HDH in the 2-way, 60Hz mode of operation. The enclosure features the CH-5 horn with a manifold component and four 22A compression drivers to ensure low distortion and high reliability. The low-frequency section is vented, driven by a 1505-8 Black Widow. The 2T is a bi-amp-only enclosure, and even though it is optimized for processor control, it may still be conventionally bi-amped by using the PL-800 EQ or the PL-1200 EQ modules. The connectors are Neutrik 8-pin.

Circle (107) on Rapid Facts Card

Cabtron Firstline Series

The Firstline Series heavy-duty vertical rack cabinets are designed for load requirements of up to 2,000lbs. per enclosure, and are available in both single and multi-bay configurations. The racks are fabricated with 12-gauge frames coupled with 11-gauge front- and rear-mounting angles. Front angles feature tapped 10-32 mounting holes; adjustable rear angles have .281 diameter holes. Cabinets have front and rear ventilating grills with cleanable air filters, and grills are engineered to accept Cabtron's blower system.

Circle (108) on Rapid Facts Card

Crown microphone slide rule

Crown's microphone slide rule relates microphone polar patterns to reverb and gain, and converts between Pascal, Microbar, Dyne/CM squared and dB SPL information. If any two of the following microphone parameters are known, the others can also be determined with the slide rule: open circuit sensitivity in dB re 1V, open circuit sensitivity in mVs/Pa, power sensitivity in dBm, EIA sensitivity in dBm, and impedance. If dB SPL is known for a given distance, a new dB SPL can be determined for another distance. This same information can be used to determine the new output sensitivity of the microphone at the new SPL/distance. Common microphone sensitivity specifications are listed on the jacket, along with five ways to express the same microphone sensitivity. Price is $5.

Circle (111) on Rapid Facts Card

Saki S-800 Series

The S-800 Series replacement heads are for use with the Studer A-80 and A-800 Series 24-track recorders. The heads are made of long-life Permalloy to meet or exceed Studer electrical and mechanical specifications, and are interchangeable with original heads with no wiring modification. A 30-day money-back guarantee is included. List price for each head is $2,850.

Circle (112) on Rapid Facts Card

Arcor XH Series shrink labels

The XH Series retrofit shrink labels slip over terminated cable such as RG8, RG11, RG58, RG62, precision video and twin ax. The also slip over BNC, TNC or twin-axial connectors and A33M and A3F-type microphone connectors. The labels are available in pin-feed flat packs of 84, 210 and 420, and also in 7-, 15- and 100-foot spools. The labels can be written on, typed on or sequence-printed by computer. Arcor will provide printing for a 1-time setup fee of $25 or will supply a computer program on a 4 1/2-inch floppy disk for $125.

Circle (115) on Rapid Facts Card

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27th Dimension Champion Series

The 10-CD Champion Series production music collection is designed both as a complement to the Gold and Platinum Series and as a mini collection. Each selection is of industrial length, and an alternate mix plus a :60 and :30 version is included. A 2-CD Christmas music package, "Sounds Like Christmas," is also available, which includes traditional and original music with seasonal sound effects.

Circle (113) on Rapid Facts Card

Digidesign Deck

Deck, a digital audio multitrack recording program for the Macintosh II, is designed for use in conjunction with Audiomedia or Sound Tools hard-disk recording systems. Developed by OSC, Deck features four tracks of CD fidelity audio with the ability to record while playing back previously recorded tracks; fully automated mixing; digital EQ and effects; and support for simultaneous MIDI file playback. Unlimited track bounce allows the user to mix multiple tracks to disk without any constraint or degradation in quality. To maximize storage capacity, data compression options of 2.1 and 4.1 are provided. List price is $349.

Circle (114) on Rapid Facts Card

VGS mixing stand

The VGS mixing stand is easily adjustable to accommodate almost any keyboard or mixing console. The unit has an overall height of almost 28 inches, with the width adjustable between 32 and 57 inches. The all-black unit is constructed of welded steel and finished in scratch-resistant, high-temperature baked enamel for extra durability. Four casters provide easy movement and locking.

Circle (116) on Rapid Facts Card

Digidesign Clip Tunes

Clip Tunes, a CD-ROM with 600Mbytes of original music and sound effects for use with Audiomedia and Sound Tools, provides high-fidelity original music that is prelicensed so that it can be used freely and repeatedly without use or licensing fees. The recordings are in Digidesign's Sound Designer II file format, with arrangements and regions premarked for maximum convenience in production. Recordings are provided in 44.1kHz and 32kHz sample rates for playback directly from CD-ROM drives, and can also be copied to hard disk for playback. New Age, classical, popular and rock genre recordings are included.

Circle (117) on Rapid Facts Card

Prosonus strings library

The Prosonus orchestral stings library for use with the New England Digital Synclavier is now available on a 1Gbyte optical disk. The library includes samples of a full 35-piece orchestra, and solo and section performances of violin, cello, viola

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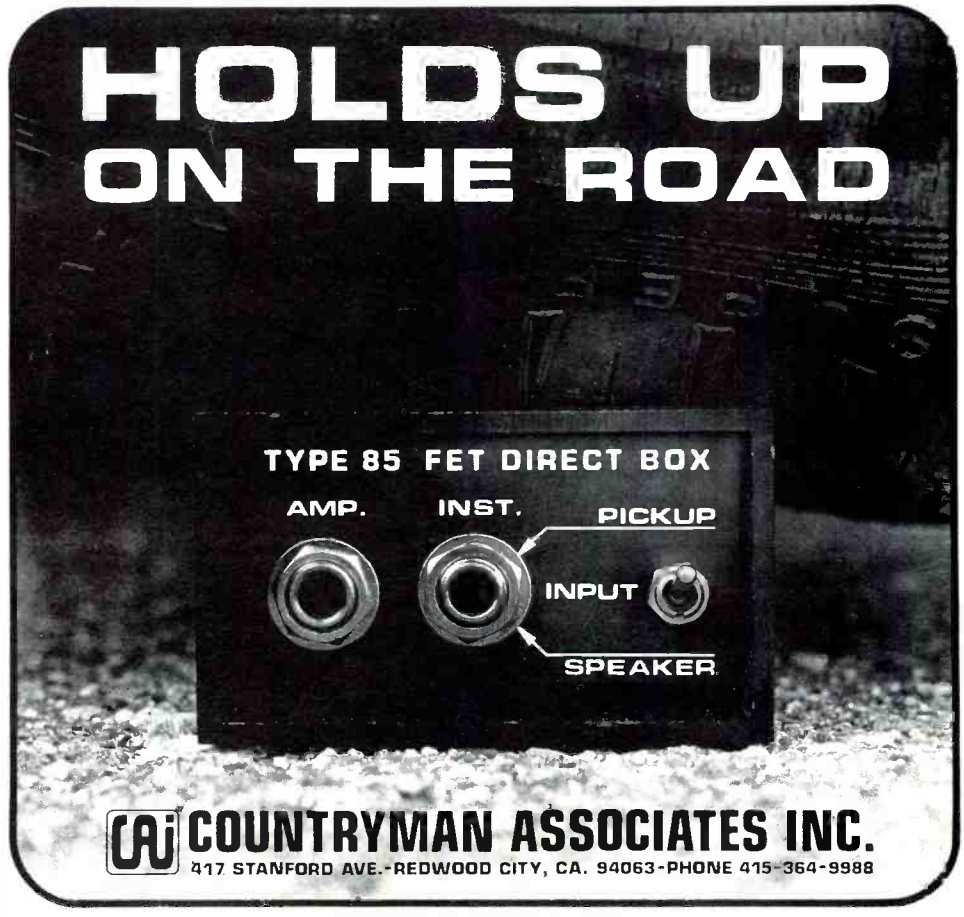

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Cutting Edge

and bass. The orchestra and each of the instruments are recorded in sustained forte, piano and muted tones; an assortment of glissandi, marcato, and pizzicato and snapped pizzicato. Also, each instrument is played with a number of specifically appropriate articulations.

Circle (118) on Rapid Facts Card

Klipsch & Associates KP-115-SW subwoofer

The KP-115-SW relies on a K-48-E 15-inch woofer in a vented enclosure. Frequency response is rated at 40Hz to 2kHz ±4dB; −10dB point is 32Hz. Sensitivity is 101dB SPL, measured at one meter with 2.83V input. Nominal impedance is 8Ω. Maximum continuous power handling is 300W. Maximum output is 125dB SPL. The subwoofer can be rack-mounted when placed on its side. An optional socket, flush-mounted at cabinet top, allows the subwoofer to be used as a base for mounting the main system in the air, eliminating the need for a tripod.

Circle (119) on Rapid Facts Card

Omnimusic Omni FX Series One

Available on CD, the Omni FX Series One contains digitally produced effects from sources such as transportation, office, home, sports, city and suburbia. The collection also features several digitally multitracked environment montages, each running from one to three minutes. Omni FX is available on a 1-time buyout basis and includes 12 CDs, computer-based search system, catalog and cross-reference index.

Circle (120) on Rapid Facts Card

Acoustic Technology FC-100 Feedback Eliminator

The FC-100 in-line signal processor is designed to monitor the signal produced by a microphone and detect abnormal, system-induced feedback signals that ride on top of vocal and instrumental program material. In normal operating mode, the FC-100 provides a neutral conduit for the mic signal with flat frequency response, 0dB gain and greater than 100dB S/N ratio. When regenerative feedback begins to develop, the unit's intelligent microprocessor reacts instantly to suppress the feedback and prevent deterioration of the sound quality. The FC-100 allows 12dB to 15dB feedback cancellation.

Circle (110) on Rapid Facts Card

E-V DML-1152MC monitor

The Electro-Voice DML-1152MC slant monitor is the newest addition to the DeltaMax line of electronically controlled speaker systems. The DML-1152MC features a 15-inch DL15X low-frequency woofer and a DH1A high-frequency driver on an HP64 horn. The square front horn can be rotated for either a 60°×40° or a 40°×60° coverage pattern. The cabinet has three angled sides, providing two horizontal and one vertical positions. The system is in a carpet-covered 14-ply Finnish birch cabinet and is equipped with a Neutrik NL4MP-R Speakon connector.

Circle (123) on Rapid Facts Card

MIDIBuddy Multi MIDI Processor

Introduced by Acme Digital and Eltekon Technologies, and designed for use in conjunction with other MIDI sequencing systems, the MIDIBuddy MMP features a 10-track MIDI sequencer, 10×10 MIDI router, fully featured MIDI data processor and system-exclusive data filer. The MMP also features a built-in 3.5-inch floppy disk drive. The front panel of the 2-space rackmount unit provides a 40 character × 2-line backlit LCD and an ergonomic, user-friendly "soft" button layout. Options include a SCSI port for connection to external Eltekon hard disk drivers, a second 3.5-inch floppy disk drive, and the Optical Network Expansion (ONE) port. List price is $1,495.

Circle (103) on Rapid Facts Card

Panasonic SV-3700 Pro-DAT recorder

The SV-3700 full-function Pro-DAT recorder features a front-panel shuttle wheel, with 0.5 to 15× speed range. At the analog input, there are 4-stage, 1-bit Delta-Sigma A/D converters. At the analog output, proprietary quad 18-bit DACs reduce zero-cross distortion. Also featured in a horizontal cassette tray for easy tape loading; program, absolute and time-remaining displays; and push-button selection of 44.1kHz and 48kHz sampling rates via analog or digital inputs.

Circle (122) on Rapid Facts Card

Altec Lansing Maestro series

The Maestro monitor series includes six 2-way systems. The 55-4A features power handling of 60W of pink noise with a 6dB crest factor, band limited from 100Hz to 20kHz. The M200 with transformer features power handling of 40W of pink noise with a 6dB crest factor, band limited from 90Hz to 20kHz. The M300 offers a matching transformer and optional omnimount brackets. It provides power handling of 75W of pink noise with a 6dB crest factor, band limited from 80Hz to 20kHz. The M400 includes a 1-inch throat driver (902-8B) and rates a power handling of 150W of pink noise with a 6dB crest factor, band width limited from 80Hz to 20kHz. The M500 includes a 909 driver and horn for high-output performance. Power handling is 250W of pink noise with a 6dB crest factor, band width limited from 38Hz to 20kHz. The Altec 604 is incorporated into the M600, which includes tee-nuts for hanging. The M600 has a power handling of 150W of pink noise with a 6dB crest factor, band width limited from 80Hz to 15kHz.

Circle (125) on Rapid Facts Card

Altec Lansing 9446A power amp

The 9446A Anniversary Series dual-channel power amplifier delivers 400W per channel into 8Ω, 600W power channel into 4Ω, or 1,200W into an 8Ω bridged load. The amplifier features Output-Z Protection, which protects the unit from low impedance loads and shorted output terminals.

Circle (126) on Rapid Facts Card

Turtle Beach Systems 56K digital audio system

The 56K digital 2-track editing system for IBM AT or 386 compatible computers combines expandable digital signal processing hardware with high-quality graphic software, which provides professional CD-quality hard-disk recording. The system features the 56K-PC, a full-length 16 bit feature card that provides access to the computers hard disk for recording and playback. It is based on the Motorola DSP56001 chip, and is optimized for commonly used DSP calculations. Communications to external devices is handled by the 56K-D digital audio interface, which provides connections to AES/EBU and SPDIF digital audio interfaces. SMPTE time code and MIDI connectors are also provided. The 56K-A analog/digital converter is designed for users of the 56K system when there is no other means of converting analog audio to digital and back.

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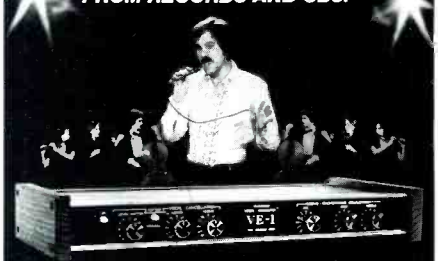

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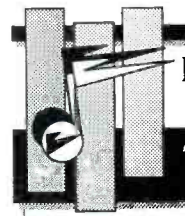

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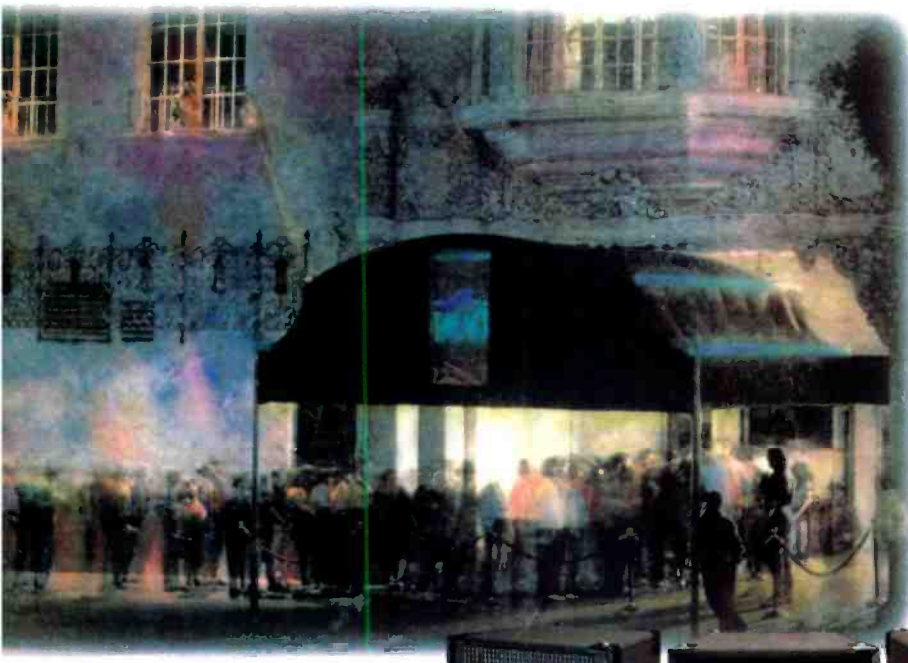

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