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MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

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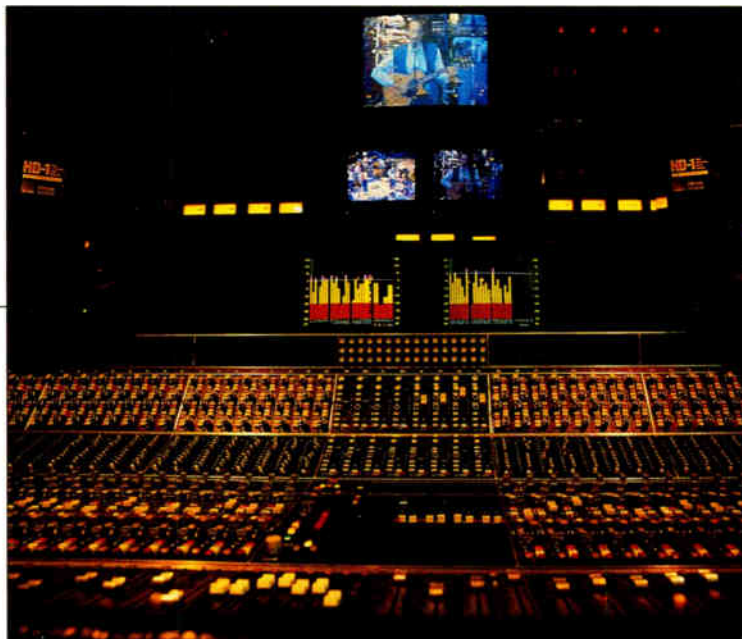
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Cover: Sound for U2's Zoo TV and Outdoor Broadcast tour was provided by Clair Brothers Audio, Lititz, PA. For an in-depth look at the tour, see *Mix* July 1992. Tour personnel included Joe O'Herlihy (primary house mix) and Jo Ravitch (sound system engineer), lighting design by Peter "Willie" Williams and video direction by Carol Dodds. **Photo:** Ken Friedman/Courtesy of BGP Archives. **Inset photo:** Steve Jennings.

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- 186 Sound Reinforcement Companies**



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8 Tracks

RECORD INPUT 1 2 3 4 5 6 7 8

POWER

1 2 3 4 5 6 7 8

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

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

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

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

See your Alesis ADAT Dealer today and start Megatracking on ADAT.

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FROM THE EDITOR

To borrow a well-worn observation from a former music journalist, "I have seen the future of rock 'n' roll—and it looks a lot like Ringling Brothers." At least it did at the recent COMDEX computer convention in Las Vegas, where rock dreamweaver/Pink Floyd saxman Scott Page stitched together a musical multimedia experience for about 10,000 shakers from the computing world. Presented as a benefit for the National Center for Missing and Exploited Children, The Grand Scientific Musical Theater pulled out every high-tech stop to show what could be done to create an exciting concert performance in the '90s.

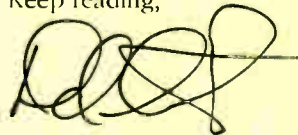
This month we review some of the latest developments in concert sound, from live event production to remote recording to loudspeaker systems. (Many thanks to our live sound editor, Rudy Trubitt, for coordinating this issue.) In covering an area as wide-ranging as live sound, we obviously have to focus on real-world situations, the types of decisions and productions that make up the daily life of a concert sound specialist. But we also have to keep an eye on the future, and the future is looking more and more like the multimedia extravaganza that debuted in Las Vegas.

First there was the music, an eclectic techno-jam of rock and soul standards by many of the music industry's progressive senior statesmen, including Todd Rundgren, Edgar Winter, Jeff Baxter, Jim Keltner, Flo & Eddie, John Entwistle and Jon Anderson, with technical supervision by Alan Parsons and Bill Porter. The performance covered almost the entire floor of the UNLV arena, with room for the Nevada Symphony Orchestra, supporting bands of "cyber-musicians," a stage for the Cirque du Soleil contortionists, a talk show set for L.A. DJ/hosts Mark and Brian, and literally tons of video screens displaying real-time Silicon Graphics computer animation. There were 3-D virtual audio cues, surround lighting effects and even a "smell-o-vision" segment, with perfume scents pumped out to the audience during Jon Anderson's orchestral number.

Just before the event, Graham Nash stressed how important it is for musicians with vision and computer experts with artistic outlooks to work together and push the envelope of the entertainment industry. He and the all-star band planted a few ideas that night in mid-November that will help set the course for concerts to come.

Not everything worked at the performance, and there were probably some in the audience who felt there was a lack of focus. But that wasn't really the point. The free-form spirit of experimentation was alive and well, and the excitement of a new kind of concert experience filled the house. It was rock 'n' roll without a safety net.

Keep reading,



David Schwartz
Editor-in-Chief

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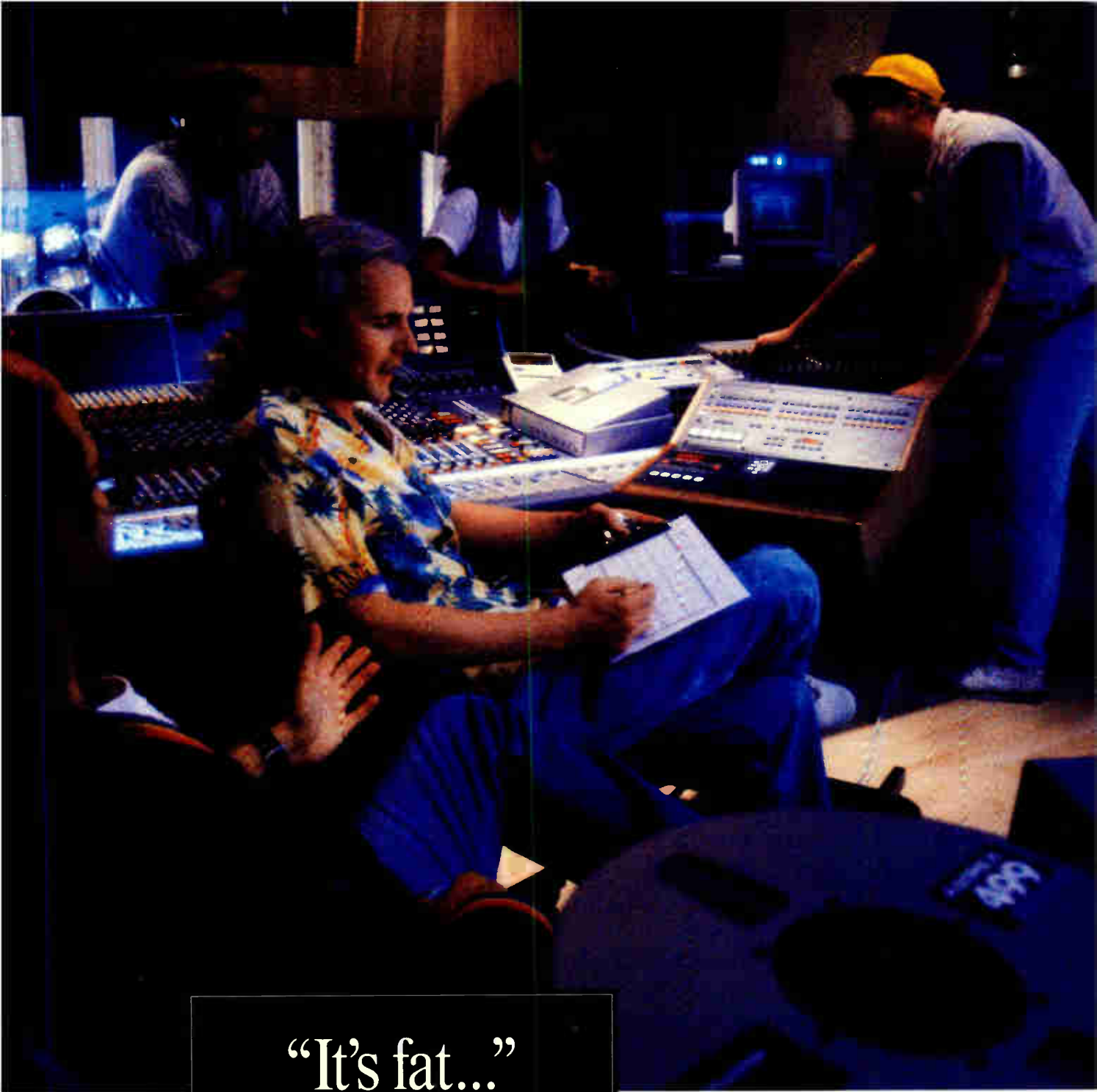
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David Schwartz and Penny Riker Jacob

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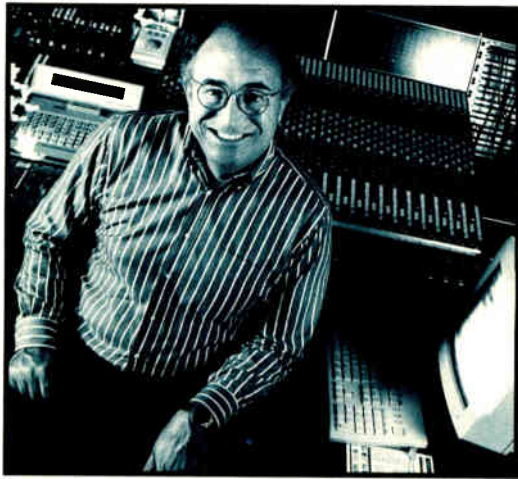
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DIGIDESIGN HOW THE PROS HANDLE



Randy Thom

Film Sound Designer —
Backdraft, Wild at Heart, Star Trek III, Raiders of the Lost Ark

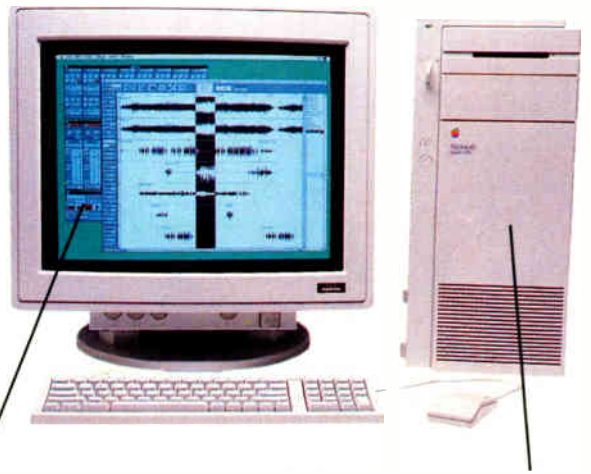
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Geoffrey Rubay

Sound Editor — *Basic Instinct, Reservoir Dogs*

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CURRENT

MITSUBISHI ENDS EUROPEAN PRODIGI SALES

Mitsubishi Pro Audio, in a move that signals its eventual withdrawal from the professional audio market, announced that effective December 31 the company will no longer sell its ProDigi 32-track digital multitracks or 2-track digital mastering machines in Europe. Support and service of the installed base will continue through the company's London headquarters.

The company has not yet announced plans for the North American market, though the distribution arrangement with Siemens Audio (formerly Neve) ended this past summer. Siemens will continue to provide service and support throughout North America.

Mitsubishi introduced the ProDigi multitrack at the 1982 AES convention and for the past decade has battled Sony's rival DASH format for professional acceptance. Otari supplied the transports on which the Mitsubishi models were based and in 1985 came out with its own ProDigi multitrack machine, the DTR-900, since upgraded to the DTR-900II. Meanwhile, Studer, Tascam and others began manufacturing DASH-format recorders.

Speculation since the Mitsubishi announcement has focused on whether the company's abandonment of the market is the death knell for the PD format, a fear that Otari Corp. president Jack Soma would like to dispel. "ProDigi users should have no concerns," he says. "We are absolutely committed to the PD format, and we have a long-term technology agreement with Mitsubishi Electric—essentially a license to the patents—that they have assured us will be complied with 100%."

"Our basic position is that Mitsubishi has been out of the sales and marketing of the PD format for quite a while now," adds John Carey, Otari VP of sales and marketing. "They turned that over to [Siemens] some time ago. From our point of view, there's only one company that's successfully marketing and selling the DASH format, and that's Sony. And now there is only one company effectively selling the PD format. For the size of the high-end digital multitrack market, two manufacturers is an excellent number."

A-1 AUDIO BUYS TASCO U.S. ASSETS

Hollywood-based sound reinforcement company A-1 Audio recently announced the purchase of all assets of Tasco Sound Ltd. U.S. (Camarillo, Calif.). Although terms were not disclosed, a quantity of equipment valued at several million dollars is involved, including four arena sound systems and three lighting systems, as well as equipment from EAW, Crest, Midas, AKG, Meyer and Yamaha. The newly formed Arena Division is now headed by Paul Newman and other former Tasco staff members.

"This is not a merger," says A-1 founder and president Al Siniscal. "This is an asset buyout. By purchasing pre-owned, top-quality equipment that matches our inventory nicely, we gain a tremendous economy of scale. Our goal is to keep all of Tasco's touring accounts fully operational, with a greater depth of support." Recent Tasco accounts include The Cult, Warrant, Poison, Glenn Frey and Morrissey.

Equipment changed hands in early November, and the first task was to refit the Tasco gear to A-1 standardized specifications. "The transition is going quite smoothly, and we are extremely satisfied with the arrangement and the expanded

opportunities," says Newman, former VP of Tasco Sound Ltd. U.S. "We're now able to offer even better service at a fair price, with extensive support capabilities. It's our belief that our combined strengths will allow us to offer exceptional service to our clients."

OTARI FORMS NEW DIVISION

Otari Corp. (Foster City, Calif.) announced the formation of a new corporate division known as Otari Manufacturing Corp., combining the manufacturing facilities of the King Instruments division in Westboro, Mass., and Otari Console Products Group, formerly Sound Workshop, in Hauppauge, N.Y. All U.S. manufacturing operations for Otari-brand audio mixing consoles, automation systems and cassette loaders will fall under the umbrella of OMC. S. Higashino has been named OMC president, and T. Yanagisawa has been named senior vice president.

STEPHEN F. TEMMER, 1928-1992

Audio innovator Stephen F. Temmer, founder of Gotham Recording and later Gotham Audio, died October 8 in his home in Manhattan. An engineer for ABC in the late 1940s, Temmer broadcast the first prerecorded radio programming. He co-founded Gotham Recording in 1950, the first commercial studio to use Ampex tape recorders. As a consultant to the Watergate prosecutors, he helped study the 18.5-minute gap in the Nixon White House tapes.

Temmer was born in Austria, where he sang with the Vienna Boys Choir. A member of the AES, SMPTE, NAB, NARAS and the IEEE, his production credits include *Edith Piaf at Carnegie Hall* and the Chicago Symphony

—CONTINUED ON PAGE 16

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INDUSTRY NOTES

Ensoniq Corp. (Malvern, PA) recently regrouped and created a new company called Emagic. Sequencing and notation products formerly sold under the Ensoniq name (such as Notator SL and Creator SL) are now sold as Emagic products. Ensoniq will provide product support... Sam Ash Professional (NYC) welcomed David Prentice to its pro audio sales staff. The company also announced the opening of its pro audio parts and accessories department, managed by Jim Gillespie and Myron Dubb. The department can be reached at (212) 302-5114... Crest Audio moved to a larger facility. The new headquarters are at 100 Eisenhower Dr., Paramus, NJ, 07652... Sales engineers Keith Risinger and Ray Soldiuk joined SSL's Western regional sales and service team... Chuck Thompson was promoted to VP of sales and marketing at JL Cooper in Los Angeles... Digital F/X Inc. of Mountain View, CA, expanded its sales and service force by more than 200%. The move followed the company's acquisition of effects systems company Microtime. Appointed to key positions were Sheila Ross, director of video products, West, and Marty Frange, director of video products, East... Fostex Corp. of America (Norwalk, CA) appointed Steve Cunningham to the position of VP of sales for the company's full line of professional products... Former Yamaha Music Technologies president John Strawn established a consulting practice called S Systems in Larkspur, CA, which specializes in coding on DSP chips and in high-level languages for audio, data compression, multimedia and DSP... Otari Corp. (Foster City, CA) formed a new corporate division, Otari Manufacturing Corp. OMC comprises Otari Console Products Group (formerly Sound Workshop) and the manufactur-

ing facilities of the former King Instruments division of Otari Inc. Newly named to the top positions in OMC are S. Higashino, president, and T. Yanagisawa, senior VP. Chris Honett was named general manager, New York operations, and K. Taniguchi was appointed VP and general manager, Massachusetts operations... Promotions at Waltham, MA-based Lexicon: Bob Reardon to U.S. marketing manager for random access systems; Paula Polcaro to sales administration supervisor; Brian Zolner to export marketing manager; and Lisa Kaufman to export sales manager... Acoustic Communication Systems Inc. of Plymouth, MN, welcomed Raymond Voss to the newly created position of director of operations... Paul Mastroianni, formerly VP/sales for Magnetic Media, formed AV-Sales Co. (Rancho Santa Margarita, CA), representing Sae Han Media, Magnetic Media, Tapemaker Sales and Camero Magnetics... Composer and producer Craig Brandwein joined the faculty of Five Towns College in Dix Hills, NY, to teach music, MIDI and audio/video post-production... All audio-related schools, programs and resources wishing to be included in the second edition of *New Ears: The Audio Career and Education Handbook* should contact Mark Drews at New Ear Productions, (315) 425-0048... Charles A. Steinberg, president, Sony Corporation of America Business and Professional Group, was awarded a 1992 Presidential Proclamation by the SMPTE board of governors. The award recognizes Steinberg for his contributions to the motion picture and television industries and his long-term support of SMPTE activities... Audio innovator Stephen F. Temmer, founder of Gotham Audio, passed away October 8, 1992, at his home in Manhattan. ■

—FROM PAGE 12, CURRENT

Orchestra. The family requests that memorial contributions be made to the Bronx Episcopal AIDS Ministry, 3061 Bainbridge Ave, Bronx, NY 10467.

CONVENTION NEWS

The 1993 Winter NAMM International Music Market will be held in the Anaheim Convention Center from January 15-18. Of special interest to sound reinforcement professionals, the National Association of Music Merchants will introduce a new Lighting & Sound Arena. Call (800) 767-NAMM for more information

In a related note, the summer NAMM show will be held in Nashville this year, July 17-18, at the Convention Center.

The second annual ShowBiz Expo East and the first East Coast Theatre Conference will be held January 7-9 at the New York Hilton Hotel and Towers in Manhattan. Contact Live Times Inc. at (213) 668-1811.

Finally, the winter Consumer Electronics Show will be held in Las Vegas from January 7-10. Contact the Consumer Electronics Group at (202) 457-8700.

MIX NEWS

Act III Publishing, the parent company of *Mix*, *Electronic Musician* and the Mix Bookshelf, has moved its New York offices. The new address for the *Mix* and *EM* New York sales office is 110 E. 59th Street, 6th floor, New York, NY 10022; new phone is (212) 909-0430, fax (212) 909-0431.

Also, *Mix* recently hired Terry Lowe as the new Southern California/Southwest regional advertising manager. Lowe comes from *Performance* magazine and can be reached at the Act III L.A. office, (310) 551-4035.

CORRECTION

Our June 1992 story on the sound design for *Lawnmower Man* may have given the impression that Frank Serafine created the music for the film. In fact, composer Dan Wyman, owner of Vista Sound in Monte Sereno, Calif., created the music and many of the sound textures. ■

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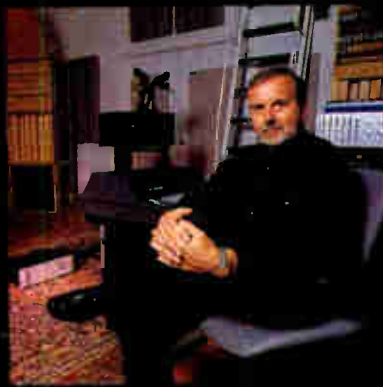
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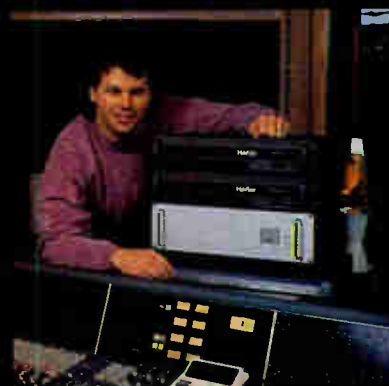
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by Ken C. Pohlmann

MINIDISC TECHNOLOGY

PART 3, MASTERING SYSTEMS

MiniDisc premastering will prove to be a viable profit source for commercial recording studios, and mastering and replication of prerecorded MDs will add to the throughput of existing CD pressing plants. The manufacturing of recordable MDs

isting CD equipment. Fig. 1 shows an MD premastering system as it might appear in recording studios. A 3/4-inch tape is used for MD mastering; digital audio data is coded as a video signal, and the two analog longitudinal tracks contain subdata



PHOTO: ADAM SHERMAN

will greatly increase the production demand for magneto-optical media.

Like CDs, prerecorded MDs contain both audio program and subdata material. This means that there are similarities between the two premastering processes. With proper modification, existing CD mastering systems using a 3/4-inch U-matic tape recorder for digital audio playback can master MDs. In fact, to minimize the capital investment needed to add MD premastering and mastering, Sony devised a signal chain that uses much of the ex-

(track 1) and time code (track 2). The 3/4-inch tape is played back on a digital audio recorder, such as a DMR-4000, through a PCM-1630 digital audio processor while the playback signal is checked for errors by a DTA-2000 digital tape analyzer.

Corrected 16-bit signals are input to a format converter to reduce data requirements; an ATRAC encoder in the converter performs this operation. ATRAC-encoded data is then written to a hard disk storage system. Simultaneously, the converter decompresses data from the ATRAC

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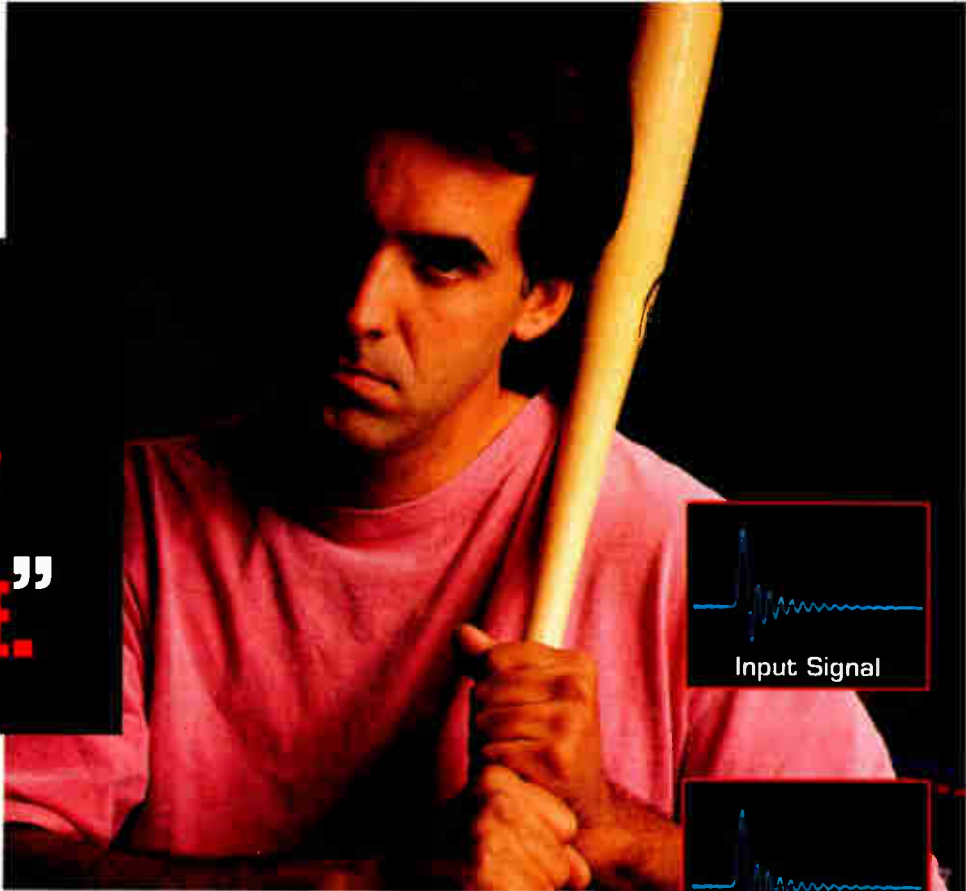
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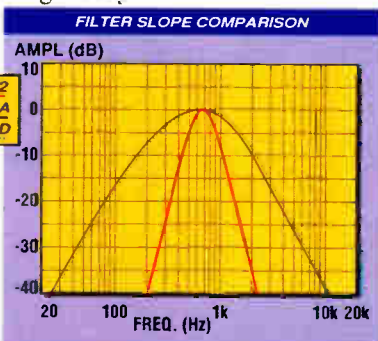
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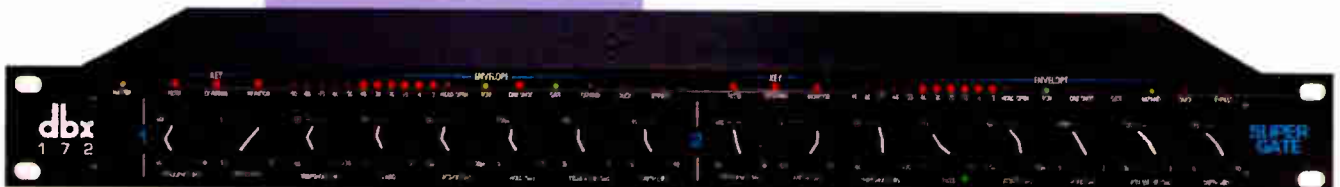
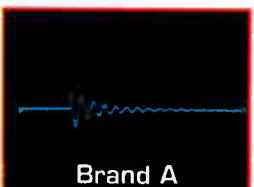
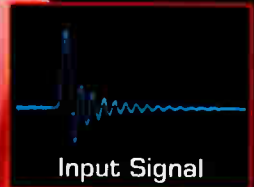
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World Radio History

format to 16-bit PCM, and this bit-stream is routed to a PCM-1630 so the audio program can be monitored in real time for proper quality.

plant. MiniDisc replication typically takes place at a CD pressing plant that has been modified. In CD mastering, the master tape is played on a DMR-4000 master recorder: The

lution. A sync word is added to complete the frame format, and these data packets are output to the glass disc mastering machine.

As shown in Fig. 2, MD mastering proceeds in a similar way, but the

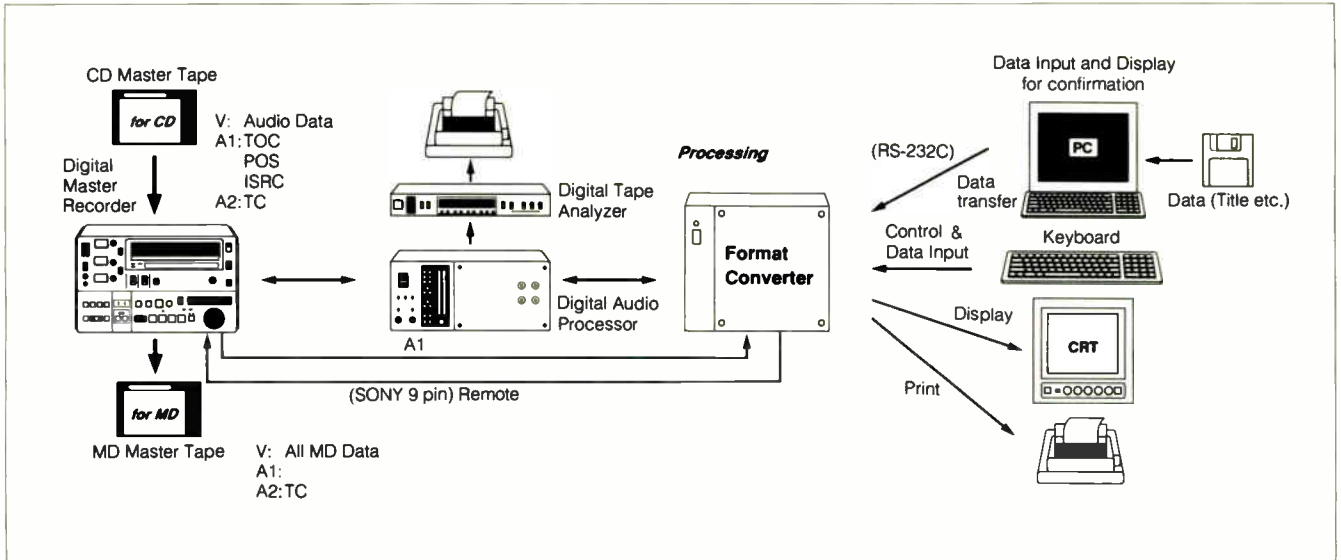


Figure 1: A typical MiniDisc premastering system as it might appear in a recording studio or disc mastering facility.

Subdata recorded on analog longitudinal track 1 of the master tape passes through the format converter, is converted to MD format subdata and then stored on hard disk; text information such as song titles can be entered via a PC. Subdata is combined with audio data in the MD format and copied to another 3/4-inch tape, which becomes the MD master tape. Final quality checks monitor

video signal is decoded into a 16-bit audio signal by a PCM-1630 and checked for errors by a DTA-2000 analyzer; the corrected 16-bit digital signal is input to a CDX-1 CD code processor. The subcode data from analog track 1, along with time code from track 2, is directed to a DAQ-1000/DABK-1000 cue editor/generator and converted into PQ subcode data, then input to the CDX-1 code

PQ generator is replaced by an address generator. The MD 3/4-inch master tape is played on a master recorder, converted to a digital audio signal by the PCM-1630 processor and checked for errors. The digital audio signal and subdata are output through the SDIF-2 interface to the address generator. The MD format of cluster and sector time units is generated and written in the

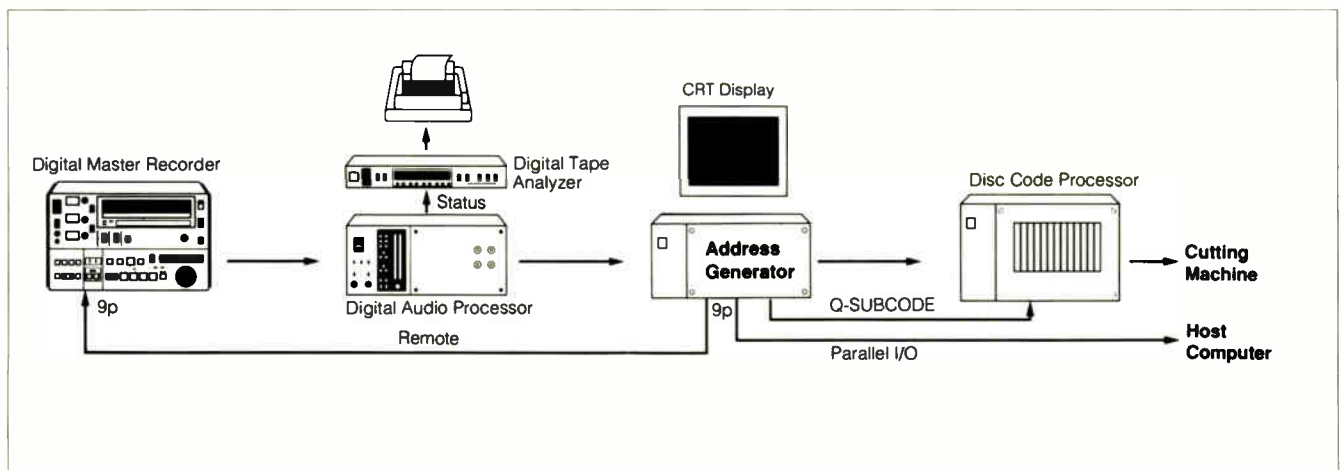


Figure 2: The mastering system used at an MD replication plant.

error count, subdata text contents and other parameters. The master tape, along with printed documentation, is forwarded to an MD pressing

processor. The code processor generates the error correction code, combines it with the audio and subcode data, and performs EFM modu-

Q subcode channel and applied to the CDX-1. Audio data is also applied to the CDX-1, which creates error correction code and performs

modulation. The combined CD-like data from the CDX-1 is subsequently directed to the CD glass disc mastering machine. Following disc mastering and generation of stampers using electroforming methods, replication proceeds as in CD replication. Of course, final MD packaging differs from CD; prerecorded MDs are placed in single-shuttered cartridges.

Some preliminary specifications are available for the two Sony units required to perform MD premastering and mastering. The K-1216 for-

mat converter is used for premastering in studio environments. It provides ATRAC encoding for mastering, simultaneous ATRAC decoding for monitoring, subdata input and editing via keyboard, MD formatting for generation of MD premaster tape signal, CRT display of subdata and print-out of subdata contents through a printer port.

The K-1217 address generator is used for mastering in disc manufacturing environments. It provides generation of MD subdata in MD format, transport control function with time code readout through 9-

pin remote, interface function for the disc-cutting machine using a host computer and confirmation of subdata via CRT.

As with any blank recordable medium, recordable MDs do not require any premastering or mastering processes; however, production of recordable MDs, like any other MO medium, is a good deal more sophisticated than that of CDs or prerecorded MDs. Therefore, manufacture of recordable MDs will be limited to relatively few factories with proficiency in manufacturing blank MO media.

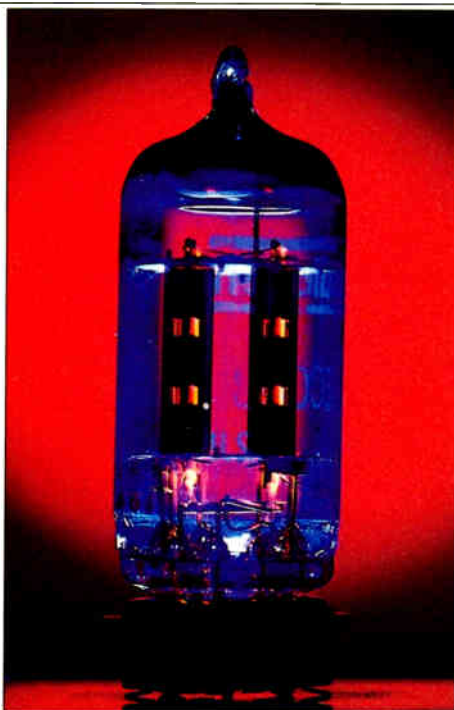
The creation of individual recordable MDs begins with the injection molding of the pre-grooved polycarbonate substrate. The first di-electric, magnetic MO recording, second di-electric and aluminum layers are sputtered onto the pre-grooved surface. These layers are covered by a protective acrylic layer; this curable resin is applied with spin-coating and hardened with UV light. The completed discs are placed in double-shuttered cartridges.

Sony announced MD licensing agreements with a number of media manufacturers. Companies licensed for the manufacture of prerecorded MDs include JVC, Nippon Columbia, Optrom, Philips, Reiner Pilz, SKC, SME and Toshiba-EMI. Companies signed on to manufacture recordable MiniDiscs include Hitachi-Maxell, Hoechst, Idemitsu Petrochemical, JVC, Kuraray, Philips, Reiner Pilz, Seiko-Epson, SKC and TDK. In both cases, other companies are expected to sign agreements. Obviously, Sony intends to manufacture MiniDiscs; its CD pressing plant in Terre Haute, Ind., has completed an extensive expansion for the production of prerecorded MDs.

Thirty-three companies (with more expected to follow) have signed agreements to manufacture MD hardware, including Aiwa, Akai, Alpine, Casio, Clarion, Fujitsu Ten, Goldstar, Hitachi, JVC, Kenwood, Mitsubishi, Nakamichi, Onkyo, Philips, Pioneer, Samsung, Sanyo, Sharp, TEAC, GE, RCA, Telefunken and Yamaha. ■

Ken Pohlmann's newest publication, the second edition of The Compact Disc Handbook, is now available from the Mix Bookshelf in hardcover and softcover.

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Producer/Engineer
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by Stephen St. Croix

THE SWEDIEN TAPES

PART II



As promised, here is the continuation of the Swedien discussion of analog and digital that began at the end of last month's column. First the recap... those of you with analog memories may wish to re-read the last paragraphs of that column.

I am sitting next to Bruce Swedien at his private studio (very nice) as I type these words. His feet are propped up on a Neve, so this might be a good time to ask him what he thinks about all this.

Mix (It's really just me asking questions, but magazines like it if you use their name instead of your own): Mr. Swedien, what was that shocking thing you were just telling me about earlier?

The Man Himself, Bruce Swedien: Well, Steve, actually I have forgotten now, since you asked me that last

month and made me wait until now to answer you.

St.Croix: That's too bad. Maybe we had better start at the start, then. Mr. Swedien, you certainly have seen this industry go through some changes...

Swedien: Yes, Stephen, I have. Back when I started with Duke, Sarah and Basie, my responsibility as an engineer/producer was to present the recording as though the listener were at a concert and to put that listener in the best seat in the house. We delivered as faithful a recording of the original performance as could be done. We recorded live reality and as accurately as possible. Nobody even *thought* of the recording process as anything other than that.

Then along came Les Paul and Mary Ford. They recorded "How High the Moon." He used an Ampex 300 *without any level meters*, and

This interview may or may not actually represent the real discussion that took place, but the concepts disclosed are accurate. I don't type very fast, and I eat NutraSweet, so my memory...

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contrary to what most people think, he didn't multitrack but instead actually used sound on sound! Because he had no meters, he just laid it on until it distorted, and then he backed off a bit.

Les and Mary introduced the world to a new concept in recording that day: They created a musical performance that never really existed. This changed the industry overnight, and it has never gone back. Of course, we do it with multitrack overdubbing now, and no one today would dream of giving up power like that.

St.Croix: I certainly wouldn't.

Swedien: Now we are all creating artificial sound fields that could never have existed in nature. But I try to make them sound as if they *could* have existed. I try to make them organic.

Peter Jennings: New realities that could actually be real.

Swedien: Exactly!

St.Croix: Did I mention that I brought a demo tape with me that I would like you to hear?

Swedien: No, you didn't.

Barbara Walters: Well, on to the issue, then. How do you feel about analog and digital in general?

Swedien: It's like film and video. Take a high-quality Panavision 35mm camera and put the highest-quality studio video camera right next to it, correct the color temperatures and the other variables so that they are matched, and photograph an image. Look at the film—it's beautiful. Then look at the tape, and it's beautiful, too, but it's harsh and cold. It's like that with analog and digital.

The biggest problem I have with digital is that the low-level dynamics suffer. This may or may not be a problem. If you have a piece of music where the *emotion* of the music is not dependent on these low-level dynamics, you can get away with it. You do not lose enough to make a real difference.

But if the piece *does* need to convey this emotion with subtle sounds and background harmonics, then you can lose it, and the song will lose its life.

Dick Cavett: My goodness. That is a good point but a bit surprising. I think that a lot of the world thinks

of you in the studio with Michael Jackson and more digital toys and decks than you can count in binary. I've been there with you, and there has always been enough digital activity to stop a garage door opener from working.

Swedien: What digital does well, it does dramatically well. Once you have the quality and character of the music where you want it, digital is the obvious choice for storage, for archiving. So, yes, you will always see some form of digital storage around me.

Ted Koppel: Tell me more about this.

Swedien: Well, if I do a recording on 24-track analog, or even 2-track, and transfer to digital, 99 percent of it is there in the transfer. But the low-level dynamics are changed. Not just reverb, but the harmonic structure of strings and so on. It drives my ears crazy. But if I'm doing a techno-pop thing where the emotion of the music is not relying on those low-level dynamics, then, boy, the digital is just incredible.

[Steve's Secret Note #1: Although we don't know everything about this

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yet, it is clear that non-linearities in today's A/D converters take away subtleties that we *need*. Because our previous analog recording technologies did not destroy these subtleties, we have not been faced with figuring out exactly what these fine points are until now.]

Dan Rather: So you print analog first?

Swedien: Yes. In fact, it's been about three years since I have recorded straight to digital. I guess I'm using analog as a sort of filter. I'm quite careful about the levels. As we used to say in Chicago, "I fill the meters," but that's it. I don't pin them. I do almost the *opposite* with digital.

Tom Brokaw: So you are conservative in analog, and you don't melt the heads, but you fight for every last bit in digital?

Swedien: Right. My pal George gave me some scary information about digital.

Connie Chung: Yeah, each bit is *twice!* That *should* scare you.

Swedien: Yes, it did. So when it comes down to the last stage of mastering to a 1630—or any digital format—I squeeze the living bejezus

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out of it. For DAT, I'll just pile the level on until it won't take it anymore and then back off one.

Murphy Brown: Yeah, I drive that way. Some Sonys are nice because they actually tell you how much headroom you have left after each recording, so you can keep trimming your analog-input level on each pass until it says you got it all.

St. Thomas: So now we know how hard you hit analog and digital, and why. But I want to know *when*. What do you print on analog and what on digital?

[Steve's Secret Note #2: Bruce Swedien masters to analog tape first, for the *sound*, and then immediately goes to digital tape for archiving. We spent 15 minutes agreeing that you must go to analog somewhere in the chain to get those subtle, magic harmonics to intermodulate in a way that leaves enough signature in the main body of the music to survive digital conversion, but you had better transfer it to some stable (digital) storage medium within the same day, before the analog master starts to forget.]

Swedien: You know all those times when you went to bed feeling that

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Ben Mink, composer, arranger, producer, instrumentalist



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you had an incredible mix in the can, but when you got up and listened the next day it just didn’t sound as good? You were sure that it sounded better last night? You know what? It did!

St.Croix: Some of the subtle clarity and transparency were gone?

Swedien: Exactly. Some of the components that make up the emotion were just too fragile and didn’t make it through the night.

Mike Wallace: So what we really have here is two types of distortion. Neither system is perfect, of course. Digital storage is pretty stable these days, and the dynamic range is certainly nice, but today’s conversion damages subtlety and produces a somewhat cold, sharp feel. On the other hand, we have analog, which actually starts to degenerate within *hours*, but the act of moving bits of rust around on tape by magnetizing a coil of wire next to the bits imparts a beautiful, musical *warmth*.

Morely Safer: What about the thrill of digital accuracy and repeatability? You know, each copy is a perfect clone of the master?

Swedien: One thing I learned while doing Quincy’s album was that even though the manufacturers of these digital machines claim that the 20th generation is the same as the first, it’s bullshit! When I did digital edits on that album and got two or three generations down, it just didn’t *sound* the same. I would have to go back to the original analog elements and build it all up from the bottom. Then it sounded pretty good.

Jane Pauley: Now *that* is scary!

Swedien: It was a real *Thriller*; pretty *Bad*; actually, kind of *Dangerous*.
St.Croix (closing his first interview): Mr. Swedien, anything else you would like to say to the boys and girls back home?

Swedien (closing what probably isn’t his first interview): The importance to me of the sound of my music lies not in any inherent acoustical or technical value, but in what it signifies to the soul of the listener. [This *is* an exact quote. Then the 200-pound dog came in.] ■

Stephen St.Croix knows that computers will never be intelligent, but soon they will be dumb so fast that it won’t matter. Consider that the smallest Mac is already 32 bits!

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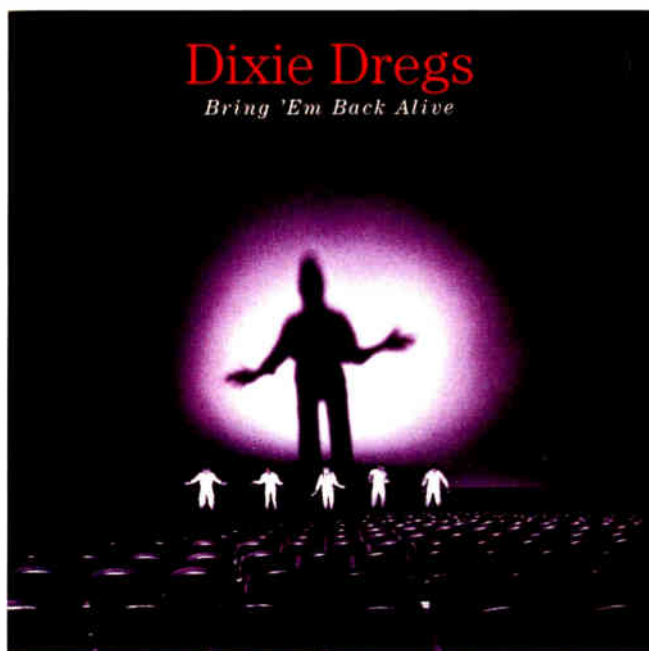
REMOTE TALES

by Blair Jackson

A
LOOK
AT THE
RECORDING
OF FIVE
RECENT
"LIVE"
CDs

"If we're doing our job correctly," says Johnny Rosen of Fanta Mobile Professional Services, "we're an aural photocopy machine. We take down what's there and don't alter it in a way that makes it impossible to remix correctly. What we try to do is capture what's there within the parameters that are given to us."

And those parameters can vary wildly from job to job, as we learned when we looked into the making of five "live" albums released in the summer and fall of 1992. We entered into this with no preconceived notion about what the projects entailed technically; indeed, we chose them first and foremost for their *musical* interest. But along the way we discovered a variety of different approaches to the art of making a live recording, as well as a number of details that make each project unique. And one of the albums, it turns out, didn't even use a remote truck! No doubt about it—the only constant in this business, like every aspect of audio, is *change*.

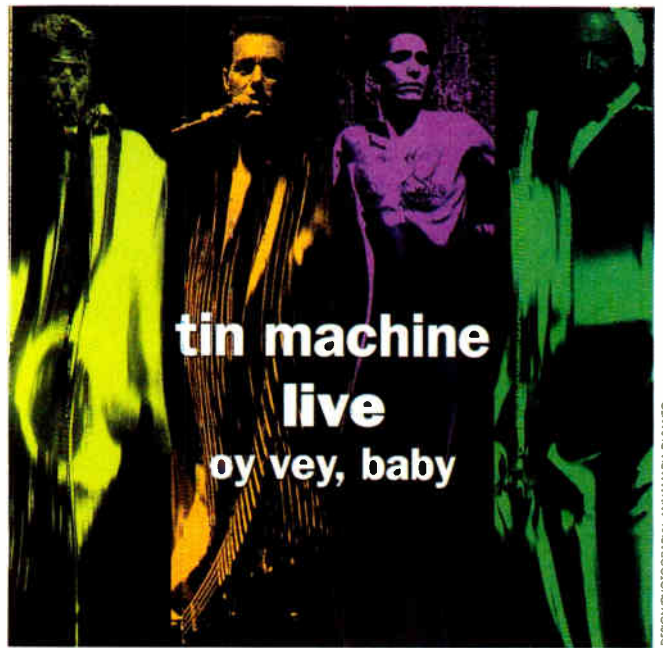
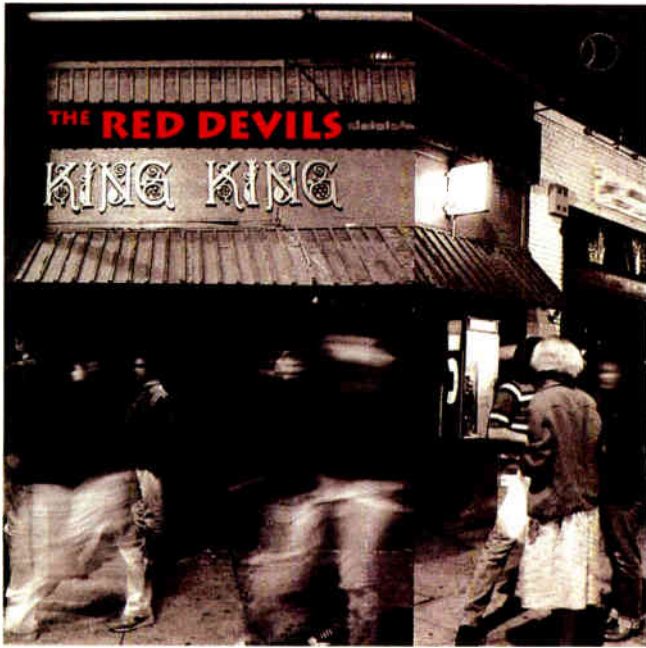


DIXIE COOKIN'

At their peak in the late '70s and early '80s, the Dixie Dregs were truly one of the greatest live bands in America—sort of the rock 'n' roll version of the Mahavishnu Orchestra. They disbanded in 1982 but re-formed last year to record *Bring 'Em Back Alive* for the resurrected Capricorn label. The disc shows why this band were/are so special: They blend strains of rock, jazz and even bluegrass into a fiery—but always lyrical—instrumental amalgam.

The CD was produced by Johnny Sandlin and recorded by Kooster McAllister of New York's Record Plant Re-

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mote over the course of two nights at the 3,000-seat Center Stage arena in the heart of Dregs territory: Atlanta. "We had one setup and rehearsal day and then two show days, though I think everything on the record came from the second night," McAllister says. "The Center Stage is one of the best-sounding rooms I've ever worked in: It sounds huge, but it's not. They use it for everything from professional wrestling to concerts."

Capturing the ambience of the hall ended up being a primary concern for McAllister, so great attention was given to miking the arena: "Mainly we flew audience

mics from catwalks," he says. "We generally use no less than six, but usually eight to ten audience mics for a project like this. I usually use at least one pair of PZMs. My mics of choice lately are a pair of [AKG] 414s, a lot of [Shure] SM81s and two [AKG] 451s with CK-8 short shot microphone heads. Those were all mixed down into a stereo pair. Steve [Morse, Dregs' lead guitarist] really wanted to go for an open feeling, like it was a real performance in a real space. We put *some* ambience in our monitor mix, but not as much as you hear on the record. What we're listening to in the truck is the performance

and how that's going down on tape more than anything. Once I knew the audience [tracks] were where I wanted them to be, I basically left them alone.

"A little trick I use when I'm miking an audience is to put a pair of compressors [dbx 160Xs locked together] on the line and set them so when the band isn't playing and it's just the audience making noise, there's basically no compression happening. Then, as the band gets louder, the compressors kick in. This way I don't have to be riding audience mics, and I get a nice, healthy level of audience to tape. But when

it's the audience by itself, it seems wide open and doesn't feel compressed."

Morse's guitars were miked at the amp using Sennheiser 409s, "which is the only mic I've found that can really handle that level of screaming rock 'n' roll and not break up," McAllister says. "We had two mics on his cabinet, and what he played was what we got, effects and all." T. Lavitz's keyboards were broken up into six or eight pairs. "We concentrated a lot on drum sounds—Johnny [Sandlin] requested 408s on the toms, though I generally use SM98s. [For the bass] we took a DI right out

of [Dave LaRue's] axe, and then we took a DI that was after all his effects and through his amplifier. That way we had more flexibility at the mix. Tracks were really tight on this project to get everything they wanted, and [Morse] wanted me to leave at least one track open in case they had any fixes, which ended up being really minimal. In fact, he didn't have any fixes on his parts—he's amazing!"

Primarily for economic considerations, the project was recorded analog with Dolby SR. "This year especially," McAllister comments, "it seems the economy is finally catching up with my end of the recording industry. People are a lot less eager to spend money." That doesn't mean *he* can stop spending money, however: McAllister just outfitted his truck with a new API console with 48 buses, computer touch reset and GML automation.

LOW-TECH DEVILS

The King King club in L.A. is "a funky little blues bar like you find in every city," says engineer Brendan O'Brien. "There's really nothing to it—it's just a square room and it's not at all acoustically friendly." O'Brien's task wasn't to fight those acoustics—rather, he wanted to capture the room's funky feel when he and producer Rick Rubin set out to make a live record with the club's smokin' house band, the Red Devils. The Devils play raw electric blues—originals and covers by the likes of Sonny Boy Williamson, Little Walter, Howlin' Wolf and other past blues masters. The Devils' Def American debut, *King King*, captures them in all their ragged glory.

"It was Rick's idea to have the record come across being as close to standing in front of the group in the club as possible," O'Brien says. "I hope that's what we've achieved. Our approach was to just put up a few mics and get whatever came out. It was not high-tech.

"I had two or three mics on the drums, and we miked all the other instruments individually, but we also put a pair of mics over the stage, and the majority of the record is from those two mics; they were either 414s or 421s—real basic stuff. We had a 24-track tape filled with guitar tracks and bass tracks and vocals, but we didn't use a lot of it. Actually, on the bass we used quite a

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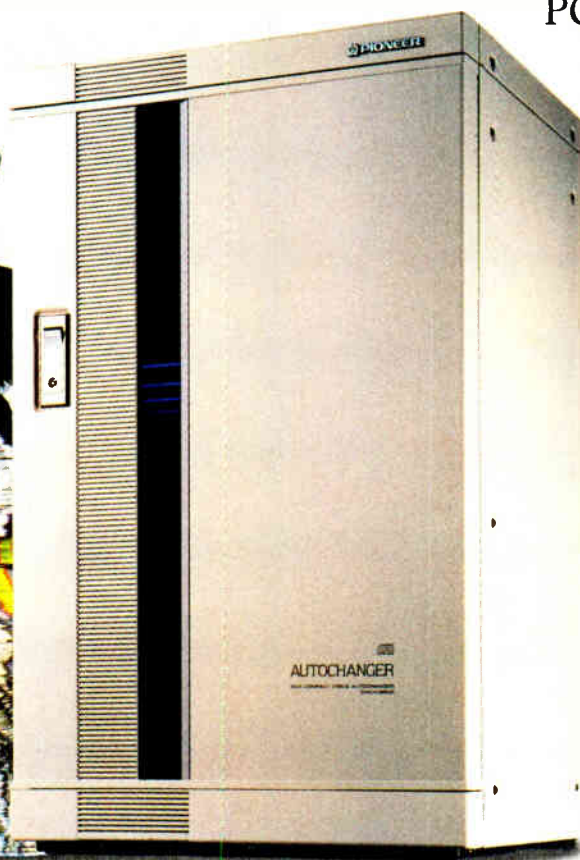
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bit of the direct signal, to keep it present; same with the kick drum. But most of the guitars came from the overheads."

O'Brien and Rubin enlisted the super-equipped Le Mobile remote for the project, "and that worked out great," O'Brien says. "I think the assistants thought we were very strange, but they were nice and very efficient. We were trying to explain to them that we wanted it to sound kind of rough. In fact, when we were setting up, we decided we weren't getting a funky enough vocal sound, so we stuck a mic on the P.A., which was distorting slightly and making the room sound a little garbled. This was about capturing the moment, not technical stuff."

There are no overdubs or fixes on the disc, though O'Brien admits to adding some tape slap on a song or two "because it sounded sort of swamp to me, like Creedence." Rubin objected to even that cosmetic touch, but relented.

"We knew people would really dig it or really hate it," O'Brien says. "I've had people listen to it and say, 'What were you guys thinking?'"

"We wanted it to sound kind of rough. In fact, when we were setting up, we decided we weren't getting a funky enough vocal sound, so we stuck a mic on the P.A., which was distorting slightly and making the room sound a little garbled. This was about capturing the moment, not technical stuff."

—Brendan O'Brien

Well, what we were thinking is that there are so many blues-rock albums out there and they all end up sounding kind of slick. This was supposed to sound the way it does when you walk into a club like that."

DEEP SOUTH, DEEP BLUES

Several years ago, music historian critic Robert Palmer wrote what many consider the definitive book about the spirit of the blues, *Deep Blues*. More recently, Palmer teamed up with documentary filmmaker Robert Mugge and producer/musician Dave Stewart (of Eurythmics fame) to make a film and

CD about contemporary blues roots, also called *Deep Blues*. The intrepid trio traveled all over the South capturing the soulful blues of little-known musicians in juke joints, roadhouses and rural back porches. Both the album and the movie are extraordinary documents of a highly influential culture both frozen in time and changing slightly with each new generation.

With Palmer acting as producer, the task of actually recording the different musicians fell primarily to two men: William Barth, who handled the more intimate porch and house music sessions with a simple stereo Nagra setup, and Johnny Rosen of Nashville-based Fanta Services, who brought his 24-track truck to various out-of-the-way clubs in different parts of Mississippi.

"Knowing that we were working for both film and a record changed things a bit for us," Rosen says of his role in the project. "Besides dealing with time code or 60-cycle sync, we also ran a monaural and stereo Nagra for the [film] editors so they had something to edit with instead of having to remix [the multitracks]." He also notes that he recorded the

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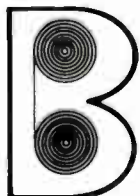
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Nagra editing track drier than the multitracks "so they can find the editing points easily. Like I wouldn't use a reverse-gated reverb on the snare drum, in case somebody has to find an editing point on a snare drum lick.

"Also, I try to get a sense from the director what he's shooting and how he's shooting it, so I know that if everything is all wide shots I don't want to give an editor a mix that's all close-in, tight audio. I don't want to prejudice his mind with stupid audio that interferes with the art of filming."

Rosen, a veteran who has worked in every imaginable recording environment in his distinguished career, says that *Deep Blues* took him to some places he never imagined he'd work. "Kimbrough's Joint [in Holly Springs, Miss.] is a good example of a place you'd never do a live recording," he says with a laugh. "It's a log cabin that is maybe 25 by 25 with a tiny kitchen stuck on the back of it, no heating or cooling, and probably one 30-amp fuse for the whole shack. It was way out in the country, 30 miles from no place. We went out on this little two-lane road in our 40-foot tractor trailer truck, and when we got there, the truck was bigger than the club. Needless to say, we carried our own power."

One naturally wonders if it isn't overkill to bring a truck into a rustic venue to record an unknown blues combo (Junior Kimbrough's three-piece), but producer Robert Palmer says, "The *last* thing that's going to make it sound natural is to just put a mic in the center of the room. My theory on this is that you need to figure out what the sound in the room consists of, break it down, record all the parts separately, then put them back together when you're mixing. When we had the 24-track, in addition to having a direct feed and an amp mic [on the guitar] and a couple of room mics pointed toward the guitar amps, I was really concerned with recording the sound in the Joint to the point of having mics stuck up near the ceiling in all the corners of the room—wherever sound was bouncing, we had a mic." Their mics of choice for the ambient tracks were Sony ECM50s.

"Man, that place was packed," Rosen says. "Between the film crew and the regular Friday and Saturday night crowds, it was *real* crowded. It

was a colorful little neighborhood, too, with a house of prostitution right there, people drinking moonshine in their cars. But it was very, very laid back; not what you think of as a typical blues environment.

"We had to deal with the fact that we wanted it to look fairly natural but also sound good. We didn't want to make it look like we'd put a recording studio in this place that probably had a real estate value of \$750. We wanted to make the recording look as unobtrusive as possible without making any technical sacrifices. In other words, if it took a [Sennheiser] 421 mounted on a boom stand to get a tom tom correctly from this \$50 set of Apollo drums, we went ahead and did it.

"You have to get your head adjusted to working with this music, which is different than most of what I'm used to," Rosen continues. "There are unusual keys and different instruments. Like I wasn't used to a guy playing slide guitar with a spoon. How do you know what that's *supposed* to sound like?"

Deep Blues also took Rosen and his truck to other unusual recording sites in Mississippi, such as the Playboy Club in Greenville and the Pastimes Lounge in Clarksdale, where once again the supplied power was completely inadequate for his truck's needs. "The regular tech power at a place like the Playboy Club was really wobbly—the air conditioners and lights were going up and down all the time, so we had our generator and power regulator and conditioner, and we also filtered the utility power." Otherwise the recordings were relatively straightforward.

For Robert Palmer, whose studio experience dates back to the mid-'60s, when he learned under the tutelage of Chips Moman in Memphis, recording the music for *Deep Blues* taught him that "with recording technology at the level it's at right now, it just is not necessary to record in studios. To bring some of these types of musicians into a studio, there's such a small gain in separation and whatever for such a large loss in spontaneity and being at ease. In fact, since *Deep Blues*, I cut the first-ever album on Junior Kimbrough, and we went back to the Joint to record it, this time with no audience. And it sounds *great*; it really does." This time, too, he even bypassed the remote truck, opting

instead for an 8-track digital recorder on site.

THE BIG TIN MACHINE

Tin Machine's first two albums showed promise—clearly this was more than just "David Bowie's new band." Reeves Gabrels' muscular metallic guitar and the rhythm section of Hunt and Tony Sales boldly ventured into some interesting sonic realms. But it is the group's "limited edition" live disc, *Oy Vey, Baby* (a play on U2's *Achtung Baby*, perhaps?), that most successfully shows true chemistry at work. It's still angular, oftentimes noisy music, but it has more life than either of the group's two studio efforts.

The decision to cut a live album came in the midst of a long tour that saw Tin Machine playing a wide variety of mainly smaller venues in the U.S. and abroad. According to guitarist Gabrels, who helped mix the disc and who is the band's acknowledged tech-head, "We decided to record because we were doing a few live broadcasts anyway, so we had people mixing it to go out over the air. Everything was miked, so why not record it?"

The only downside of this last-minute decision was that unlike most tours that are recorded for albums, this one featured a few different remote trucks and engineers, "so New York was 15 ips with Dolby SR," Gabrels says, "Boston was the same, Chicago was 30 ips without Dolby, and San Francisco was 30 with Dolby. The variation was slightly problematic because it meant we had to re-calibrate. Then, when we got to Japan, we did some things for NHK that they recorded for television, and that was 48-track Sony digital." New York's Effanel Music handled the New York and Boston shows, Metro Mobile did Chicago, NIK the Tokyo concerts, and Gabrels declines to name the company that handled San Francisco: "Those people printed the snare and my guitar together; you'll notice there aren't any songs from the San Francisco show on the record." One song on the album came from the stereo DAT recordings the band's live engineer, Max Bisgrove, made in Sapporo, Japan.

"Max did a great job night to night with the DATs," Gabrels says. "We used his DATs as a reference when we went to mix, and his aes-

thetic shaped the way we approached it.”

Bisgrove, Gabrels and Tom Dube mixed some of the record at Q Division in Boston (“totally manual on an Allen & Heath board,” Gabrels says), and Gabrels, Bowie and David Bianco mixed two cuts at Conway Recording in L.A. on a Focusrite.

The recording team tried to leave themselves as much flexibility as possible in the project, so many of the decisions about ambience and effects came at the mix stage. “At Q Division,” Gabrels explains, “we ran my guitar [tracks] back out through two little Combo amps that were miked; we had them on an effects bus. Some of my effects were printed, like stereo panning—I was doing that from the stage. But all the vocal spins and things like that—none of that went to tape, though it did go out onto the audience tracks.” Those ambient mics also picked up guitars through the P.A., and Gabrels says some of those tracks were used to help widen the sound of the music. Conversely, in concert, Hunt Sales’ kick drum was augmented by a Wendel, but it appears only sparingly on the CD.

“What I like about the record,” Gabrels concludes, “is that it sounds like us. I don’t know if it’s going to win us new fans, but it does capture the energy of the band.”

TRUCKLESS TULL

Jethro Tull’s exceptional live album of mainly acoustic material, *A Little Music*, is probably going to make remote recording engineers the world over a bit nervous. Because the tour consisted almost entirely of gigs in small venues in Europe and the Middle East, using a standard remote truck posed both financial and logistical problems for the band. So the decision was made to have the group’s live sound engineer, Leon Phillips, record the concerts from his mixing position onto a Yamaha DRU8 digital 8-track.

“Unlike Yamaha’s DMR8, which has the desk in it and the effects and more,” Phillips says, “the DRU8 is the rack-mounted unit only, which doesn’t have the A/D and D/A converters on it; you have to have those separate. But it does have onboard monitoring with headphones and selectable monitoring so you can actually listen to what’s going on. I carried it around the whole tour and



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had it in my rack, and I kept an eye on it. I flew the whole thing live—I did the live sound [for the venue], and at the same time I made sure it went to the 8-track."

Phillips got a crash course in using the machine at Yamaha's London R&D facility shortly before the tour, and he admits he was "worried about the headroom live; I didn't want to use any limiters. I was concerned about formatting the tapes, too—they each last about 20 minutes. But it ended up working very well. It's a fixed-head machine and very stable. I never had any problems with drop-outs or digital error correction when I went from country to country." More challenging was adjusting to different consoles as the tour progressed: one day it was a Ramsa, the next a Midas, the next a Soundcraft or Yamaha.

Since this version of Tull was mainly an acoustic four-piece, Phillips didn't have to worry too much about his limited number of tracks. Generally he worked with eight subgroups, which were usually different than the ones he used for the live sound. "You can monitor two tracks—pairs of tracks—at a time," Phillips notes, "or all together and have some control over the volume and panning."

He mainly used Shure 57s and 94s to mike the stripped-down Tull and a combination of the onstage vocal mics and overhead mics on the drums to pick up hall ambience. All the guitar and flute effects went directly to tape. To Phillips' credit, there is an amazing clarity and consistency to the recordings, which were taken from shows in 13 different cities. Phillips says that his backup DATs were almost album-quality in themselves, too.

In the end, Phillips came away from the project believing that the DRU8 and its ilk represent an exciting new wave in remote recording. He foresees connecting two or three of the units together for increased track capabilities. Besides, the live sound engineer in him notes, "I'm suspicious of miles and miles of snakes, people in headsets and all those people sitting away in a truck," he says with a chuckle. "It's much better to do it all yourself." Or, at the very least, cheaper. ■

Blair Jackson is managing editor of Mix.

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ADVENTURES IN
MIXING

THE
1992

MUSIC TELEVISION®

VIDEO
AWARDS

BY DAVID SCHWARTZ

The hard part about mixing a multi-act musical broadcast such as the Grammy Awards, Academy Awards or, in this case, the 1992 MTV Video Awards, is being able to reset the mixer controls for an artist change in a short time frame. September's MTV Awards, broadcast live worldwide from L.A.'s Pauley Pavilion, pushed the envelope on quick changes. From the time Pearl Jam finished their number on Stage A to the downbeat on the Chili Peppers' intro on Stage B, nine seconds elapsed. Dozens of microphone, direct and wireless inputs needed to be switched and adjusted in those nine seconds.

A year-and-a-half ago, when MTV producers called Design FX's Terry Stark to invite their bid as live mix remote truck for the '91 MTV Awards, they had already determined that two trucks would be necessary, due to the large number of live acts to be broadcast and the reset time required for each. Design FX and Westwood One joined forces that year, tediously switching from stage to stage and truck to truck throughout the three-hour live broadcast.

Thom Wilson, live music mixer of the event for the past two years, felt strongly that this year's event could and should be done from one vehicle, using the latest technology to deal with the logistical challenges.

"Thom's feeling was that the only way to really do this thing quickly and successfully," says Stark, "was to use a computerized console that would allow him to do his soundchecks in advance and preset the levels, EQ, panning—whatever he needed to preset. And then, when it became a live show, he needed to be able to go back to those snapshots with the punch of a button, be able to have those mixes come back up the way they were during the soundcheck, and really hope that no bands did any major changing between the soundcheck and the live broadcast."

Wilson suggested to Stark that the only console that would fulfill these strenuous

requirements and still fit into the remote truck was the Euphonix system.

"It was an uphill fight," says Wilson. "Because of the high visibility of the show, no one wanted to go into some experimental technology. But I was really insistent on it and finally was able to convince them to give it a try. Even up to the show there were prevailing thoughts out there that this whole thing was going to crash and burn. I felt sure that it would work, and it was really fortunate they let me run with the ball."

Installing the console into the Design FX truck, on top of their usual API mixer, was no small effort. According to Jack Crymes, who orchestrated the technical interface, "Euphonix connects everything with 38-pin Elco connectors, so I had to interface all their patch bay connectors with our ins and outs, which are on a totally different standard. Our tape machines plug in with 90-

could use the Euphonix board as if it were part of our truck—have talkback, patch in outboard equipment, send feeds out to other trucks. I probably spent a month on that, working with Mark Ryken of David Carroll Engineering, and Allan Baca, the chief engineer of Design FX."

To make the most of the very limited soundchecks for the 12 live performances, Wilson decided to record all of the performers on a Sony 48-track digital machine. He worked with split feeds from the stage, the other half going to the Audiotec engineers who mixed the house sound: "I came right out of the mic preamps into the 48-track digital, and then out of the 48-



Anthony Kiedis of The Red Hot Chili Peppers performing at the MTV Video Awards.

went to their own separate tracks on the 48."

In this way, during the "spaces" Wilson could play back the tape and work on the mixes for each group. Then, when he found the best mix, he could record it as a snapshot on the Euphonix computer. "All I really wanted the snapshot to do was to allow me to hit the ground running," Wilson says. "So when they introduced the group, the mix would be there, and I would continue to ride it through the rest of the song."

"Because of the digital recording, I was under the illusion I was going to have more time [in the soundcheck]," Wilson continues. "On paper we had about an hour-and-a-half with each group, and the way it worked was that most of that time was just mic tapping to find out that there was signal. A lot of the groups just played once through



Thom Wilson with the Euphonix CSII in the Design FX Remote at 1992's MTV Video Awards.

pin Elco connectors, our microphones plug in with AMP Quick-latch Series M connectors, 27 pairs at a time. It took a lot of wiring back and forth so we

track into the line-ins on the console. The faders were used strictly for the 2-track mix, and there was no multitrack busing going on at all. All the microphones



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on the soundcheck, but because of the digital recording, all I really needed was one good performance so I could get all the mic preamp levels, and then I could go back and work from the digital tape on the mix. In reality, a lot of the time that I was going to set aside to work on the mixes ended up being spent doing other things. So by the third day of rehearsals, I had to come in early and stay late to brush up on the mixes.

**"IT SEEMED AS
THOUGH THE EYES OF
THE ENTIRE AUDIO
COMMUNITY WERE
ON US THAT NIGHT,
AND I WAS REALLY
GRATIFIED THAT THE
SHOW CAME OFF
SOUNDING AS
EXTRAORDINARILY
GOOD AS IT DID."**

—TERRY STARK

"After the final run-through before the show," Wilson says, "I still had three bands that I hadn't been able to pre-mix. One was Elton John, because he wasn't there for his rehearsal day. The only time we heard him was once on the preshow run-through, and he sang a lot softer than he did on the live performance. That nailed us on the first line or two of his vocal—he just slammed us. For Guns N' Roses and Def Leppard, I brushed up the mixes in the two hours between the final run-through and the broadcast. I was able to call up the snapshot of the band on the console and play with it for a bit, and when I got to where I liked it, I just stored that snapshot. Then I put all the snapshots in the order of the show, so I could just hit one button that advanced through the snapshots. So as soon as Pearl Jam were finished, I could hit one button and go instantly to the Chili Peppers.

"I was a lot calmer than at other multi-act shows," Wilson notes. "Terry even came up to me right before the show and said, 'You're

so mellow today,' which was completely different than the year before when I was manic and ready to kill people. This time it was a very enjoyable experience, and I was able to even walk out of the truck between groups—get a breath of air and talk to people and keep it nice and relaxed so we could all do our best work, instead of this stress-filled time period where you feel lucky just to get through it. To me, there's no going back for this kind of a show."

"This kind of audio production has never been put together for a

live broadcast before," says Stark, "and if that console hadn't worked, we would have been in some deep doo-doo. It seemed as though the eyes of the entire audio community were on us that night, and I was really gratified that the show came off sounding as extraordinarily good as it did, and the feedback on this show was incredible. We were absolutely delighted with the outcome. It came off without a hitch." ■

David Schwartz is editor-in-chief of Mix.

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by Paul Potyen

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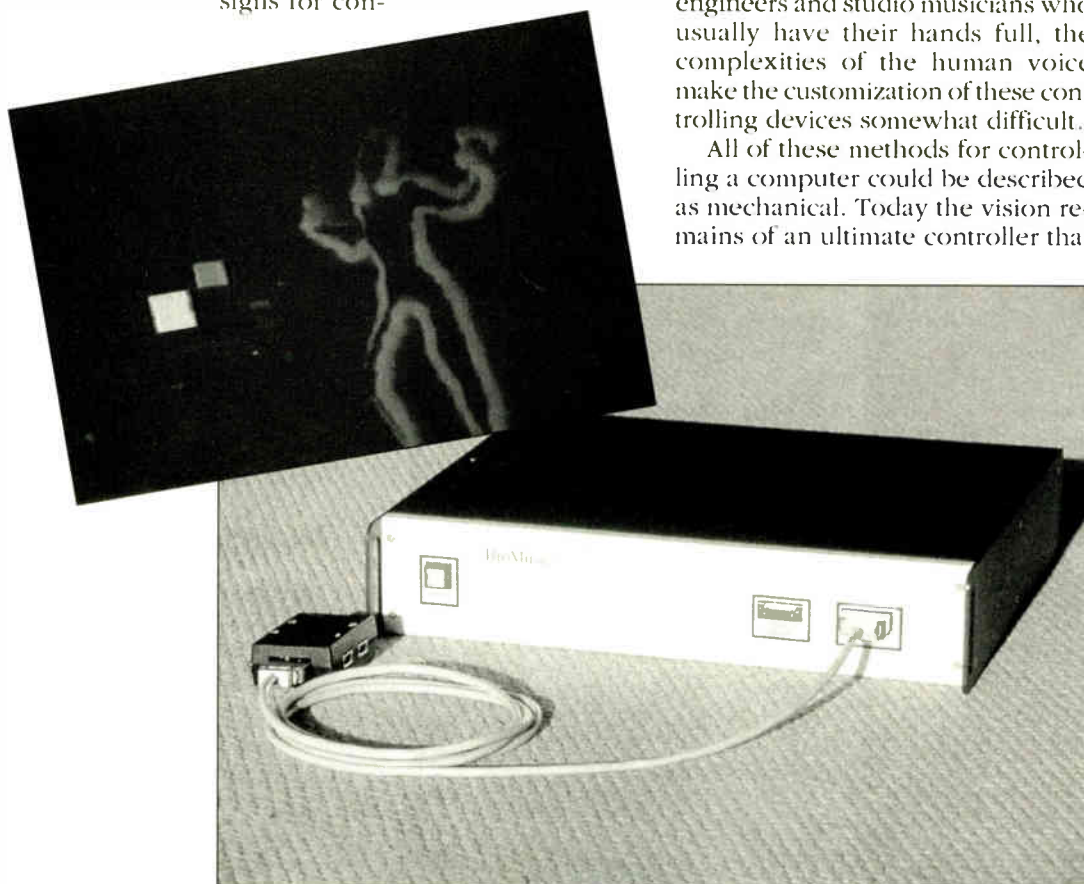
Ever since we've had computers, designers and users have grappled with the question of how to *control* computers. For many, the QWERTY keyboard remains the de facto standard, although the development of the mouse by scientists at Palo Alto Research Center in Xerox PARC in the '70s changed the way software was designed, ushering in a new era of user-friendliness.

As applications have become more sophisticated, we've seen the development of the trackball, the joystick and myriad other designs for con-

trolling what we see on the screen. Graphic artists have taken to pen/tablet devices, and in the audio world J.L. Cooper and others have developed a number of fader/button/jog wheel devices to make computer-based recording and mixing easier.

With the advent of voice recognition software from companies like Articulate Systems (Mac) and Covox (PC), controlling devices took another step toward the ultimate transparent interface. While voice recognition is particularly appropriate for engineers and studio musicians who usually have their hands full, the complexities of the human voice make the customization of these controlling devices somewhat difficult.

All of these methods for controlling a computer could be described as mechanical. Today the vision remains of an ultimate controller that



Top Photo: Galen Brandt performs with the BioMuse at the "Digital Music Under the Stars" concert at Stanford. **Bottom:** BioControl Systems' BioMuse.

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World Radio History

responds to biological rather than mechanical means—that is, to signals coming directly from your muscles, your eyes and even your brain. I'm here to report that progress is being made in this regard.

Hugh Lusted and Benjamin Knapp have been pursuing their vision of such a controlling system since they founded BioControl Systems in Palo Alto, Calif., in 1987, after working together at the Stanford Medical Center in the mid-'80s. Currently, some of the first units of the BioMuse system are being shipped to Volvo in Sweden.

"We have an eye-controlled mouse, which is compatible with any serial port," Lusted explains. "Volvo wants to use it with menu-driven software displayed on the windscreen of the car via 'heads-up display,' which is a transparent, luminant display that's commonly used in air force fighter planes."

Volvo is interested in changing the way drivers interact with the automobile. Some ideas are to have a moving map display, or to have the

ability to dial a telephone or control your air conditioning or other functions inside the car with your eyes, without taking your hands off the steering wheel. The Swedish car maker is also interested in monitoring the driver. BioMuse could conceivably monitor muscle tension, state of arousal or amount of alcohol in the driver's body.

"It's exciting for us," says Lusted, "because when Volvo does it, we hope to see the other manufacturers take notice and say, 'Why aren't we doing this?'"

But that's only one of a rich variety of potential uses for the BioMuse system. Another possible use might be monitoring the level of tension in various parts of the body, with the information sent to a vibrator in an intelligent chair on an airline. Lusted muses, "Wouldn't it be great if you were on a ten-hour flight and you could go to a certain section where you could get a half-hour in one of these chairs?"

Early efforts with the BioMuse involved controlling MIDI devices in performance. In fact, a recent digital music concert at Stanford's

Frost Amphitheatre featured an interactive work for BioMuse performer, BioMuse and MIDI instruments called *Kagami*, by Atau Tanaka. In *Kagami*, the performer is connected to the BioMuse via two arm bands containing sensors. She performs the music by tensing, relaxing and moving her arms in free space. The sensors pick up electrical signals generated by this muscle movement and transmit them to the BioMuse. The MIDI signals generated by the BioMuse are passed to and processed by a Macintosh running the MAX real-time software by Opcode Systems. "It allows for a lot of improvisation on the part of the dancer," says Lusted.

The electrical signals from the muscles are sent to the BioMuse, which digitizes the signal, does real-time processing to extract meaningful components and then sends MIDI out according to an algorithm that maps control code to muscle intensity. The MIDI out goes to the Macintosh, which is running MAX. MAX, in turn, manipulates the MIDI data before sending it out to any number of MIDI devices.

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BioControl Systems demonstrated the BioMuse in the New Ideas room at the recent AES show. "A number of people came up and suggested possible applications for BioMuse," Lusted comments, "including various applications in audio-video production.

"If you have software that uses the mouse," he continues, "then you can use the eye controller as an alternative way of moving the cursor around while your hands are doing something else."

Today very little of the company's effort goes into MIDI. According to Lusted, "We want to get back to the lab and develop some reliable brain-wave pattern recognition algorithms, so that we can train the neural network to recognize what we call subvocalized commands—so you can just think a word, like 'off,' and it will respond accordingly. We already have algorithms that recognize the different phases of sleep.

"It's not a new thing," he adds. "People have been working on this for years. The neat thing is that once they develop the algorithms, they can run them off BioMuse. The hardware device is what's been missing until

BodySynth

Electronic designer Ed Severinghaus and dancer Chris Van Raalte have developed a system specifically for dancers that translates EMG (Electromyogram) impulses from muscles into control signals that create or trigger MIDI events. While the principles involved are the same as with the BioMuse, BodySynth uses wireless transmission, which gives the dancer maximum freedom. Also, up to 12 sensors can be plugged into the body unit, which is usually worn at the waist and features user-adjustable sensitivity levels. The BodySynth receiver/controller translates the incoming data from the body unit and processes according to the patches and settings specified on the front panel of the

controller. The outgoing MIDI information goes directly to the MIDI device.

Note triggers, pitch bend and continuous controller information can be mapped to any muscle group. While the BodySynth doesn't boast the power, flexibility and resolution of a BioMuse system, it works well for dancers, such as Laurie Anderson, who used the BodySynth for her live performances last spring.

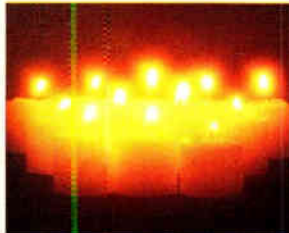
Says Severinghaus, "It's our philosophy to get these in the hands of people who are technical enough and who are in a position to use it, so that we can get good feedback to optimize it even more for dancers. We think of it in its current state as a development platform for merging music and motion." ■

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MoviePak is a real-time JPEG compression/decompression daughterboard for the RasterOps (Santa Clara, CA) line of video and display adapters for the Macintosh. It makes QuickTime video at 30 frames/sec possible, with full-screen playback from RAM or hard disk. MoviePak attaches to any of the RasterOps 24STV, 24MxTV, 24XLTV or MediaTime NuBus video cards and is bundled with Adobe Premiere 2.0. It was expected to be available in November at a suggested retail price of \$1,999.

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ANDROMEDA SYSTEMS MASTER TUNER

Andromeda Systems (Calgary, Alberta, Canada) released Version 1.61 of Master Tuner for the Macintosh. The software package, when used with a MacRecorder or compatible audio input device, turns the Mac into an instrument tuning device. The pitch of the incoming audio is displayed graphically, and the software supports 16 different tuning temperaments, from equal temperament and 1.5% stretched piano to several arcane 12-tone temperaments. Master Tuner is priced at \$69.95.

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INFOTECH CD-ROM INDUSTRY REPORT

InfoTech (Woodstock, VT) has published the 1992 edition of its Optical Publishing Industry Assessment, which details the sales of CD-ROM and related formats from 1986 to 1991, with forecasts to 1995. The OPIA is the only consistent record of verified industry sales, facts, trends, insights and forecasts since the introduction of

CD-ROM. Data is analyzed by country, language, subject, content, target market and other key indicators such as units sold, discs replicated and product pricing. All interactive CD platforms with sales in 1991 are reported. "The InfoTech Annual Report: Optical Publishing Industry Assessment, 1992 Edition," is available for \$500; prepaid, \$450.

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MOTOROLA DSP56004 CHIP

Motorola Inc.'s Microprocessor and Memory Technologies Group (Austin, TX) introduced the DSP56004, the latest in its series of 24-bit digital signal processors. It offers all the architectural features of the 24-bit 56000 product family, with added digital audio-specific enhancements, including a low-cost host interface for communication with any central microprocessor; an external memory interface for glueless communication with SRAMs and DRAMs, which hold stored audio files; and a serial audio port that simplifies interfacing with A/D and D/A converters. Dolby Laboratories is reported to be co-developing the DSP code for Dolby Surround Pro Logic to run on the new chip.

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ATARI FALCON030

Designed specifically for audio and integrated digital media production, Atari's (Sunnyvale, CA) newly announced Falcon030 computer offers onboard 16-bit multitrack digital audio, a Motorola 56001 DSP and a multitasking operating system. Eight independent digital audio Direct Memory Access record and playback channels are standard, with stereo analog DMA audio input/output and internal A/D conversion at sampling rates up to 50 kHz. (DMA allows digital audio to bypass the CPU for more efficient operation.) The first units were to be shipped to North America in November, with 4 MB of RAM/65MB internal hard disk con-



figurations listing at \$1,299

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VOYETRA TECHNOLOGIES AUDIOVIEW

Voyetra Technologies (Pelham, NY) released AudioView, a suite of multimedia sound programs for Windows users. The \$129.95 package contains a digital audio editor; a mixer for controlling MIDI, CD, digital audio and line/mic level analog sound; and a software-based CD player. AudioView is MPC-compatible and works with almost all popular sound cards.

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SCIENTIFIC DESIGN BOXOPT SOFTWARE

BoxOpt is a speaker enclosure simulation and optimization package for IBM PC/compatibles from Scientific Design Software (Chatsworth, CA). It is capable of designing a wide variety of enclosures and comes complete with an environmental database for the saving of frequently used acoustic spaces; passive filter modeling; and active filter simulation. BoxOpt retails for \$349.95; BoxOpt Light (without optimizer) is priced at 249.95.

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at the Loma Linda Med Center, one at Helen Hayes Hospital and others at rehabilitation centers. One is at the Human Interface Technologies Lab at the University of Washington, which is a virtual reality research center. In all, about 30 sys-

tems are out there today. Lusted wants to model his company after Dolby Labs, which has been very successful at licensing its noise reduction systems to manufacturers all over the world.

So it might not be so far-fetched to

imagine a time in the not-too-distant future when the BioMuse logo will be floating in virtual space alongside your virtual mixing console. ■

Paul Polyen maintains a virtual presence as an associate editor at Mix.

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THE BYTE BEAT

Mixing with Glove and Helmet

Jaron Lanier, founder and former chief scientist of VPL Research in Foster City, Calif., incorporated virtual audio mixing into his live musical performance, "The Sound of One Hand," at last summer's SIGGRAPH convention in Chicago. Equipped with the DataGlove and a light helmet (called Eye-phones) of his own invention, Lanier wandered through a strange environment playing whimsical virtual instruments of his own design, while the audience watched

With the virtual console, the engineer could wander around, mixing from any spot in the room.

a projection of his point of view on an overhead screen.

In this setup, Lanier's glove was connected to a large Silicon Graphics 440 VGXT and a Macintosh Quadra 950. Lanier designed his environment using Body Electric, a visual programming language for virtual reality. The larger machine ran this program, while the Mac handled the MIDI information and routed it to a rack of MIDI equipment. Just as MIDI enabled users to separate controller from sound source, VR offers a way to separate performance from controller.

During Lanier's performance, up to three instruments played at once, so mixing controls were important. His approach to the problem was characteristically unorthodox. First, he didn't allow the audience to see the mixing controls on the big screen. And instead of using faders, he designed his own controller—a circle with a rotatable indicator that was attached to the three instruments. By rotating the indicator with his thumb, he could isolate specific instruments or end up with an equal mix of all three.

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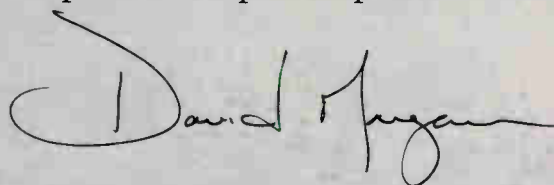
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"On Paul Simon's 'Born At The Right Time Tour,' every vocal microphone was a Beta 58. In addition, 34 of our 100-plus inputs were from percussion instruments. Many rehearsal hours were spent on microphone choice and placement. We found the Beta 57 to be a valuable tool—perfect for bongos, bata, wood blocks, cowbells, and temple blocks. It's a fast, accurate, wide dynamic range microphone with little low-end coloration, strong midrange, and well-controlled high frequency response. Challenged by a virtual forest of percussion gear in close proximity, the side rejection and isolation delivered by the supercardioid pattern proved real assets."



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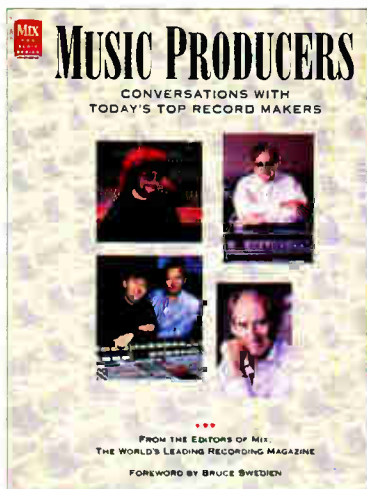
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THE BYTE BEAT

Lanier admits that he'll have to design something different for more than three instruments, but you can bet it's not going to look like your usual mixing board. He points out that in virtual reality you don't have to mimic controllers in the real world—you're free to invent your own.

The concept of a virtual console is appealing. It could clear the way for control rooms with better acoustical properties. But live mixing will probably be the first application to benefit from this embryonic technology. Most engineers are familiar with the problems of mixing live sound: For the club owner, a console takes up good seats and looks bad; for the fire inspector, a large board that blocks aisles is a fire hazard. So engineers often end up with inadequate equipment stuffed in some corner, where getting a good room mix is all but impossible.

Lanier realized that a virtual console would solve all of these problems. Although he never completed such a system, he says the implementation wouldn't be very difficult. The engineer could wear a special glove and a translucent screen over one eye, which would allow him to see both reality and the projected image of the virtual console. When audience members see him reach out his hand or make strange motions with his fingers, he'd actually be adjusting a knob on a board that only he could see. The actual board could be stashed backstage. With the virtual console, the engineer could wander around, mixing from any spot in the room. Currently, the only drawback is the cable that would lead from the VR gear back to the computer, but Lanier sees VR going wireless in the next few years.

In the meantime, Lanier is preparing to perform his piece at Lincoln Center this summer. Plans call for the concert to be recorded and released on Point Records. After clearing many technical hurdles, Lanier is finding the abstract world of virtual reality a fertile medium for creative expression.

—Jim Rasfeld

by Camran Afsari

JOHN LECKIE

FROM ABBEY ROAD TO THE STONE ROSES

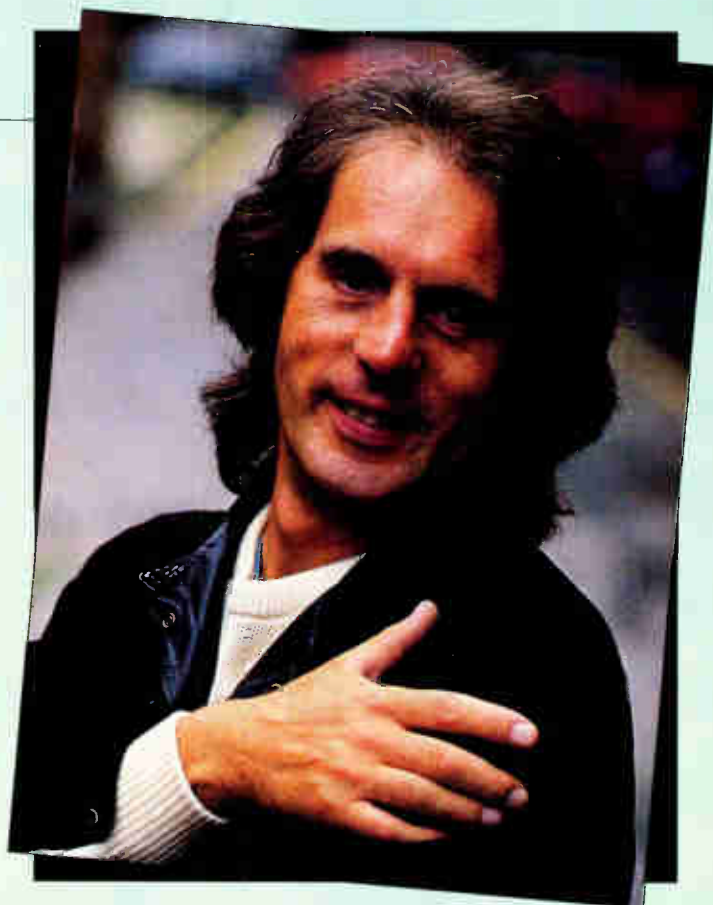
Producer John Leckie will probably never regret changing his mind about becoming a film director. After studying at a vocational arts college in Bromley, England, Leckie briefly worked in audio dubbing for a theater and film company. Finding the sound production aspects of his job to be particularly interesting, he decided to apply to the handful of sound studios in London. One studio, Abbey Road (EMI), was impressed by his precocious thesis on electronic music and offered him a position as tape operator in 1969.

During the next eight years at this legendary facility, Leckie built an impressive musical portfolio that included engineering and mixing albums for George Harrison, Paul McCartney, John Lennon, Be-Bop Deluxe, Pink Floyd and The Hollies. He also worked alongside trendsetting recordists Phil Spector and Mickey Most.

In 1978 Leckie left EMI to freelance as an independent producer. He augmented his discography by producing albums and singles for, to mention a few, Simple Minds, the Human League, XTC, The LA's, The Fall and the outstanding platinum debut from the Stone Roses. I recently had the opportunity to speak with this very English gentleman via a trans-Atlantic phone chat.

Mix: You engineered for Phil Spector in 1970 during the John Lennon/Plastic Ono Band album. What sort of an experience was that?

Leckie: Well, before I worked on the John Lennon record, I was assistant and tape operator for George Harrison's *All Things Must Pass*, which I never got a credit for, but



Phil McDonald engineered and Phil Spector produced. So for the first part of 1970, four months were spent from four in the afternoon until eight in the morning at Abbey Road on George's album. We had a lot of great musicians on that record: Ringo, Klaus Voorman, all the chaps who later became Derek & the Dominoes. Eric Clapton was there. We also had Badfinger sitting in some corner of Abbey Road all summer just having an acoustic guitar jam session! John Lennon would occasionally pop into the studio to see what was going on, and he'd sort of point at Phil and me and say, 'I want them two on my record,' which of course is a great compliment, because if John Lennon says something

like that you can't exactly turn him down, can you?

Phil Spector was great because he didn't allow the technicalities of making music to distract him from his musical vision. It would take a good number of playbacks of a master tape from a previous session for Phil to be satisfied that it was exactly the way he'd heard it the day before. You see, it was next to impossible to get exactly the same mix on two separate sessions. Remember, these were the days before consoles had

recall systems. But Phil needed the exact same blend of tracks, EQ, reverb and other effects. This was his style of being almost indifferent to the technicalities of multitrack recording. Maybe that's why he was so good.

Mix: How did you start to work with Bill Nelson?

Leckie: I first meet Bill when he came to mix *Axe Victim*. That was a quick weekend job, and later he asked me to co-produce the *Sunburst Finish* album in 1976. We did seven albums together, and we always preferred recording in different

locations. We took the Rolling Stones' mobile to the south of France and did some recordings there for a while. We used the Manor and Townhouse studios just as they converted to SSL consoles. During those days, Bill's band, Be-Bop Deluxe, was always experimenting with the latest technologies in both instruments and recording gear. We had the first Poly-Moog here in England, and we tried a lot of keyed gating methods on it. Back then, it was pretty exciting, high-tech sort of stuff.

Mix: Would you say that those days were the blueprints of your personal style now?

Leckie: Yes. I've always believed in recording a live backing track that holds some magical interaction between musicians. This is almost impossible to obtain when doing singular overdubs. So even today I'll start on some songs by getting the bass, drums, a rhythm instrument and the vocal all happening together. I'll choose the take that has this magical interaction or uplift or some spirited feeling that makes the song happen—you just have to feel it. When using a click track and starting with the drums, then bass and so on, you may never have more than one bandmember in the studio at the same time, and it's quite hard to keep a human essence or organic musical dialog.

Mix: What were some of the Pink Floyd sessions like? *Wish You Were Here* was a very popular album.

Leckie: Yes, it was. Unfortunately, I never got a credit for it! But I did work for about four months on that record. I did the recording for "Shine On You Crazy Diamond," which is a live take, except for the vocal. "Wish You Were Here" was the first session using the newly installed Neve desk at Abbey Road. It was quite a special occasion, especially with Pink Floyd, a band that puts recording equipment under scrutiny and pushes the studio to its limits.

Mix: You've mentioned twice now that you were not credited for some of these works—why was that?

Leckie: I think it's because I wasn't around at the end. [Laughs] You see, at the end of the mix, the record coordinator or manager would sit down and write the credits, and they would ask, "Who was the engineer?" And in a couple of cases they just



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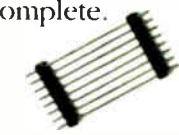


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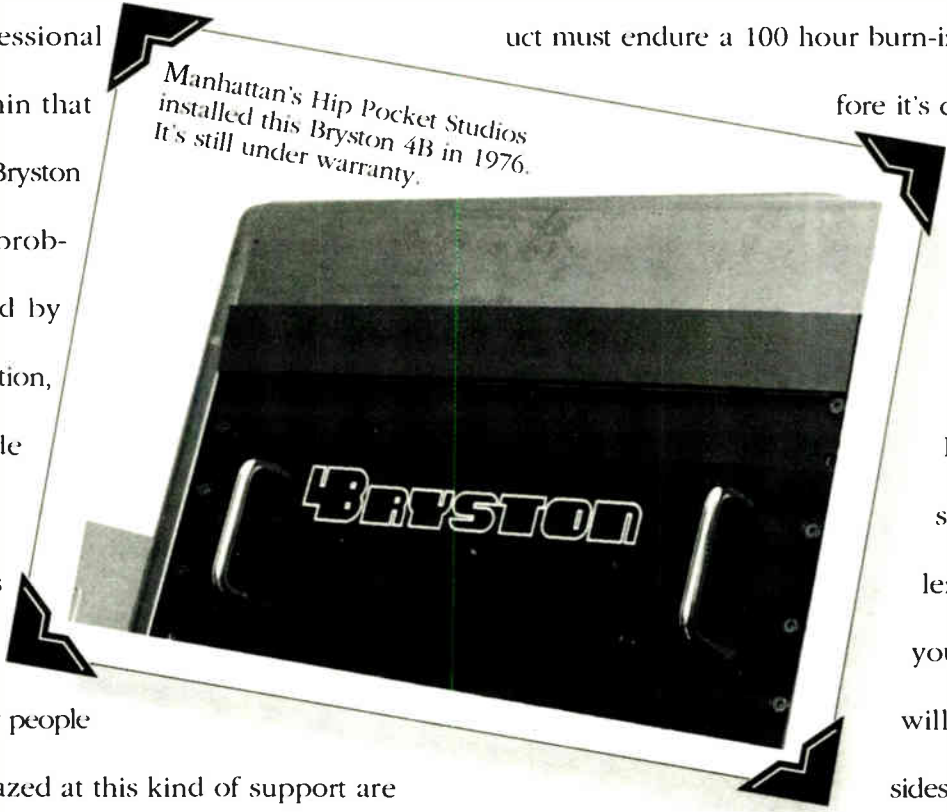
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forgot to include my name! I was the house engineer at Abbey Road. I was always there, and some of these people would consider me under the umbrella of EMI—they thought I was Mr. EMI.

A few years before *Wish You Were Here*, though, I did get a credit for a Pink Floyd record called *Meddle*. On that album we recorded 26 separate "songs" called "Nothing": We cut "Nothing" parts 1-26 at Abbey Road on 8-track and then transferred them to 16-track at A.I.R. Studios, and finally mixed at Morgan's into the song "Echoes." I did other sessions with Pink Floyd that were not used on *Meddle*, such as the legendary household objects recordings. The band and I would spend forever tuning wine glasses and recording them as chords with multiple fader moves, using aerosol cans for hi-hat sounds, tearing newspapers for a maraca shaker sound—all really primitive stuff.

Mix: On sessions you do away from home, do you take any gear with you, such as monitors you trust?

Leckie: Occasionally I take a pair of Tannoy Little Reds for tracking. A lot of people will laugh at them because they're old-fashioned speakers, but I've always had good results on them. With these monitors, you just know how far you can go with EQ: there's an inherent limit for the top and bottom frequencies. At the moment, I'm carrying around a pair of BMW DM1200s, which are British speakers that tend to resonate a little. But I find that if the low-end sounds good on these, it sounds even better on other speakers. I think that in the last few years—and maybe because of the digital revolution—a lot of people have neglected the low-end frequencies on recordings. Either the bottom isn't there or it's very unimaginatively produced. I suppose I'm still a bit of an analog person.

Mix: Your experience goes back before the days when computers, sequencing and MIDI were common tools of the recording studio. Do you find that these technologies play a significant role in your work today?

Leckie: Yes, they do. I use a computer when I have to. It depends on the kind of music and if the songs have been previously structured by

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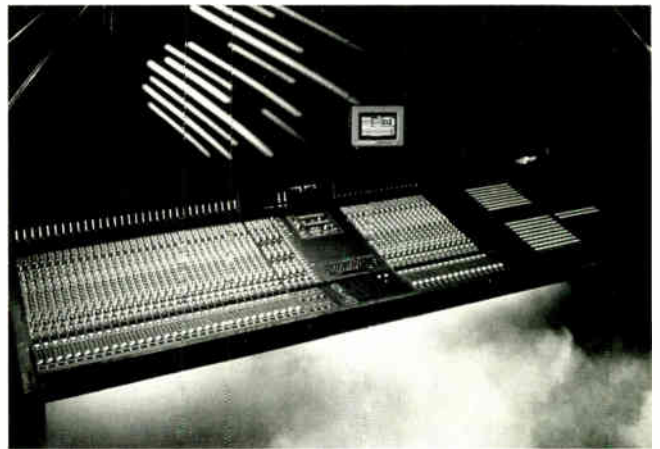
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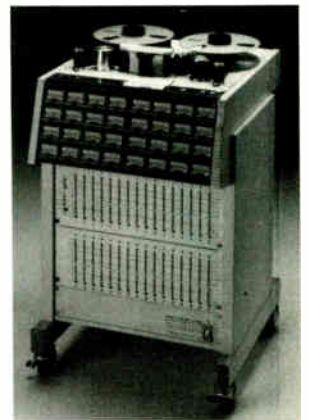
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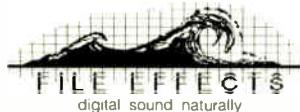
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the writers to require sequencing, a click track or any other technology. One thing I strongly believe is that two of the worst things invented in the last ten years are the electronic guitar tuner and the metronome click track. It's significant to remember that music recorded before this time was tuned by ear, and drummers had only their own human rhythm to work with. Tuning should be a player's common sense. Since the guitar tuner was invented, I've found the timbral quality of the music to be different, sometimes blander to my ears. This could be because it's all so perfectly in tune.

People rave on about the records made in the '60s and how great the music was and how brilliant the songs were. Well, this may be a clue as to why. Musicians used to tune their instruments by ear to a natural harmonic that existed in whatever setting they recorded in. Even if two instruments are out of tune a bit, say a guitar and a bass, good musicians will compensate for this with their playing and touch—by bending the strings a little here or there. Everyone will hear tunings differently, so to have a common reference point is fine, but to have a little risk and excitement involved is one element in the so-called magical vibe that all producers are trying to capture.

Mix: Are there certain characteristics of a song you look for that may define the way you'll approach the recording?

Leckie: Usually the first decision I make is whether to use a live backing track or a computer and click. The songs will shape themselves after making this fundamental choice. Also, your personal approach to a song may vary slightly or radically from inception to finish. It's an ongoing decision-making process all the way through to the final mix. You shouldn't decide that a song is going to be great or of a very specific nature before you begin piecing it together. But when it is good, you'll feel it.

Mix: What's your angle on vocal recording?

Leckie: I always believe in making the vocalist comfortable. Some inexperienced singers cannot perform with headphones. So I see nothing wrong in tracking the vocal with an



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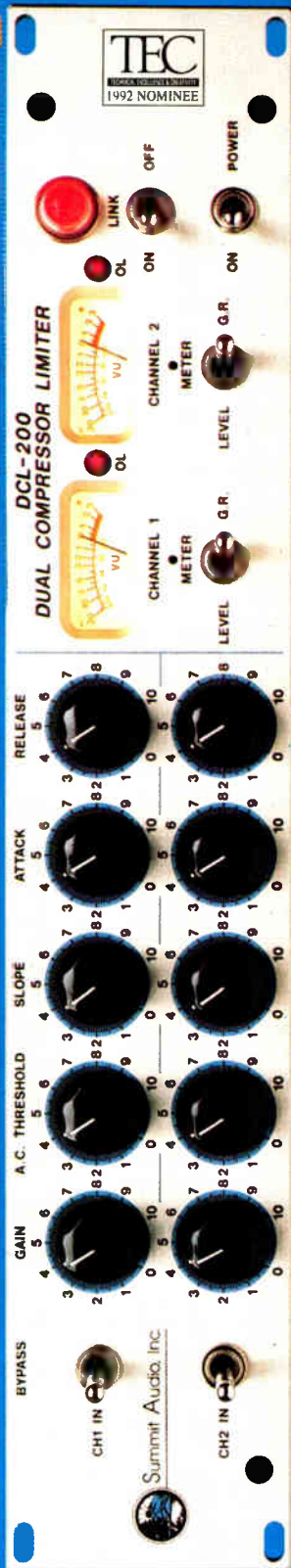
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PRODUCER'S DESK

SM58 in the control room with the monitors cranked up. It's easy to freak about the spill, but you can gate it out later. Sometimes, however, this spill can enhance the rest of the track. It's usually some high-frequency rhythmic thing like a hi-hat that catches the effect on the vocal, and then during the mix this can add a mysterious touch that can work well for the song.

Mix: Are there any particular producers you admire?

Leckie: One producer that comes to mind is Trevor Horn. Not so much for the music that he records, but the big sound of his full-on productions

where, which is XTC incognito. With this second band name, we were all relaxed and felt no pressure to be XTC, and the results were some really fine albums.

Mix: The first Stone Roses record went platinum. There's no doubt that this release launched a stylistic craze based in Manchester influencing many British bands. Why was that album so magical?

Leckie: I think the four members of the Roses have the internal chemistry that's just right. We all had a lot of respect for each other, and the sessions were always harmonious and productive. It's not as if we were intending to make a record that would change the history of

I've always believed in recording a live backing track that holds some magical interaction between musicians.

is great. I'm sure he's very expensive! He's one of these rare producers who uses digital technology and his final product still sounds rich and warm. I also respect some of the DJ [hip hop] producers, such as Public Enemy and some of the acid house recordings going on up in Manchester. At first it was a shock for me to get used to the idea of machines playing music. Some will say that this isn't real music, but it is—it's music of a different order. On these recordings, no human being could play such a kick drum or bass pattern. The music becomes very abstract and goes into a new dimension.

Mix: Let's get into some of the groups you've worked with in the last few years. How were some of your experiences with XTC?

Leckie: XTC are brilliant musicians. They all have very musical personalities. Naturally, this makes a big difference because they always know exactly what they want to do musically, and so that was one thing that I didn't need to worry about. Those guys are a lot of fun to be with. With popular bands like XTC, there's always some kind of expectation from the record company for their albums to be of a certain quality. I think this creates a false urgency for coming out with a fantastic or ground-breaking release. Maybe as a reaction to this, XTC started a very healthy side-project called the Dukes of Stratos-

rock 'n' roll; it just turned into something very appealing. The Roses played their songs comfortably, unlike other bands with little experience in the studio.

The difference between the Roses and what the media has created as Stone Roses clones is that this band actually has songs! Their songs are almost sufficient enough to be played with only an acoustic guitar. So again, it always goes back to the personalities of the players and merging them with my application of the various production methods that I've used over the years. [Editor's note: In the summer and fall of '92, Leckie produced the band's second album.]

Mix: Any parting words for aspiring producers?

Leckie: Just be into the music and try not to worry so much about technology. Do whatever it takes, but you have to enjoy the music you're recording. Never stop looking for different kinds of music to work with—there's a tremendous amount of it out there. Also—this may sound a little odd—try mixing blind. Don't label any of the faders or sends or returns, turn off the VU meters and go from there. It's a whole different experience. ■

Writer/musician Camran Afsari lives in a musical warehouse in San Francisco. He can be seen around town taping his favorite bands.



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MIDI

THE BLUEPRINT FOR THE PROJECT STUDIO

Don't let the title mislead you. This is not an article about a wiring system for MIDI. Far from it. It's a look back at the impact MIDI had on the project phenomenon itself. This being the beginning of a new year, it seems appropriate to look at where we've come from in order to better see where we're going.

When MIDI was first proposed as a protocol in 1981 (Dave Smith of Sequential Circuits is generally credited as the initiator of the format), it was aimed squarely at musicians, not recording studios. At the time, there was a pretty clear distinction between the two: Musicians played instruments, and recording studios recorded them. In 1981, no one could have foreseen the revolution that computers and downscaled (and downpriced) recording gear were about to precipitate.

Cheaper and better equipment, including computers, was probably the single most important factor in the emergence of project studios. And while MIDI can't take credit for starting project studios, it was the right thing

at the right time. It provided creative artists with a grounding in protocol technology. People who started their lives looking at amplifiers and B-3's as the apex of technology now had an expandable format to explore. MIDI provided *individuals* with an interconnectivity between instruments, and most importantly, it laid the groundwork for the concept of the systems approach to making music and recording audio. That was something recording studio operators were already familiar with. The systems—tape and processing equipment on the one hand and MIDI-equipped instruments and sequencers on the other—were as dissimilar as night and day, but they shared a purpose. By getting the future project studio operator comfortable with a systems approach, MIDI made the transition from musician to technologist easier.

"MIDI essentially eliminated the need for large multitrack tape recorders, in some cases before people realized they even needed them," says Lachlan Westfall, president of the MIDI Man-



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STUDIO VIEW

ufacturers Association in Los Angeles and an executive board member of the International MIDI Association, a trade awareness network. He points out that MIDI formed the first connection between computers and musical instruments for both sequencing and data storage, a connection that would make project studios viable and lift them into the world of virtual recording and random access audio more quickly and at less expense than their traditional counterparts.

So MIDI was largely the glue that bonded more affordable and accessible recording equipment to a new type of recording environment, one that was less location-dependent and less reliant upon large capital investment. The fact that MIDI is still perceived by many traditional studios as a purely MI format is telling; for many traditional studios, MIDI is only an occasional working visitor, and in some extreme cases a visceral reminder of the acrimony that personal recording—project and home studios—has engendered.

The future of MIDI is being considered as we speak. While the oft-discussed MIDI II is still wishful thinking, new platforms are being devised to get more out of the existing protocol configuration. MIDI's bandwidth remains somewhat limited, so multiple ports and cables carrying simultaneous transmissions have become hot new tickets. "Computers with multiple ports and new devices like Opcode's Studio 5 will make the existing system more efficient," Westfall says. "It's not a perfect solution, but it will keep the present configuration from becoming obsolete." He adds that new transmission media, including fiber optic cable, are being looked at to increase message speed.

In conjunction with black boxes that reconcile MIDI with SMPTE time code (the post-production standard), MIDI Machine Control is probably the most significant recent advance in the protocol. As its name suggests, MMC allows MIDI control over a tape deck or other recording device in the same way MIDI can control a sequencer. Where SMPTE is a passive clock, MIDI can function as a smart clock and has expanded the project studio's capabilities into

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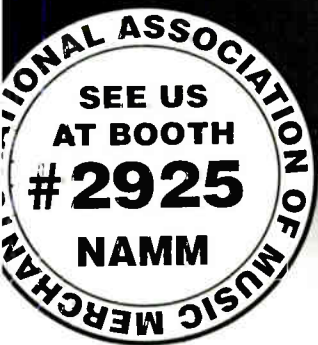
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Thanks to its open architecture, software-based design, and over-the-top specification, the M5000 will never be obsolete. A dream machine today, the M5000 has many futures—this is just the beginning!

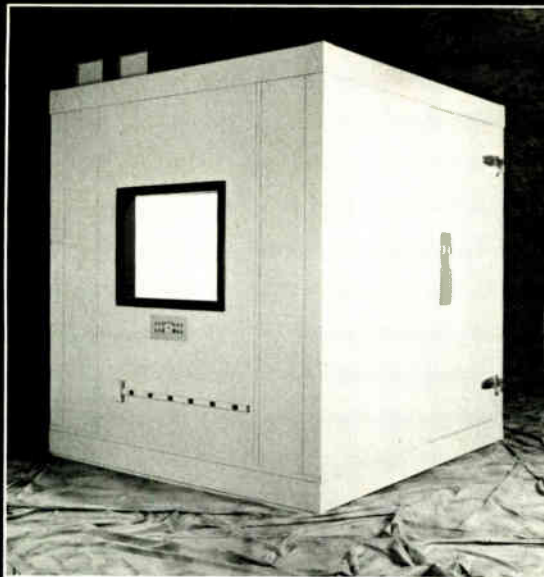
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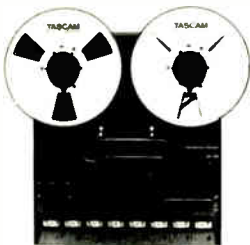
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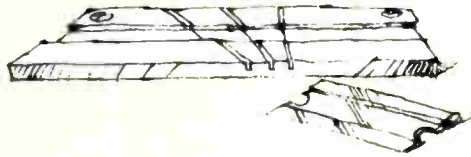
Those traditional studios that continue to regard MIDI as a semiprofessional format are not alone. Manufacturers of big-ticket gear have only tentatively incorporated MIDI into their products. While the down-scaled versions of some equipment, like Lexicon's LXP Series of processors, have included MIDI control capability, it's rarely found on large consoles and multitrack decks. Amek's Mozart is an exception.

"It's quite feasible to put MIDI capability into a Studer 24-track machine for MMC," says Westfall. "Its symbiotic relationship with SMPTE, which is used to lock up multiple multitracks, makes something like that very doable and attractive for very little money." Westfall also notes, however, that a number of manufacturers are now members of the MMA, including console-maker Solid State Logic. "We still run into resistance from some [bigger-system manufacturers], but as we can educate them to MIDI's potential, we find that more of them are beginning to realize how good an idea it is," he says.

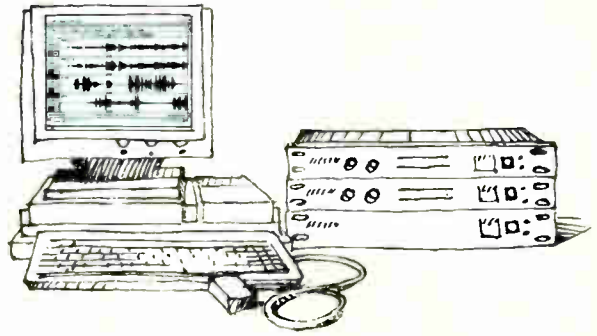
Studer's Tom Jenny says that while the company's hard disk Dy-axis recording/editing incorporated MIDI as a standard feature from the beginning, there are no plans to add it to the company's extensive line of multitrack decks. He notes that the current crop of third-party black boxes handle that task quite well for relatively little money. But as Westfall puts it, "Let's face it, it's a slam dunk to put MIDI into almost any piece of equipment. That's not the problem."

No, the problem is the perception that MIDI isn't the equal of other kinds of protocols, that it looks to some manufacturers like a plastic cup holder option on a Rolls Royce. But if history is any indication, then the future holds that even the largest systems will eventually have smaller, less-expensive versions to meet demand from project studios. Incorporating MIDI into those systems will be an absolute necessity, and it would make sense to start today. ■

Dan Daley is Mix's East Coast editor. However, he also plays one on TV.



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the best-sounding tracks and mixes from the technology at hand; anything that gets in the way during that process will be viewed with suspicion.

And that makes all the more dramatic DISQ's unique concept for the new Digital Mixer Core. Developed jointly by AT&T/Bell Laboratories, Gotham Audio and George Massenburg Labs, the new DISQ Digital Mixer Core combines the signal processing power of a dedicated audio "supercomputer" with the familiarity of your current analog control surface. There is no new control surface to learn; a studio's familiar Neve VRP or SSL 4000/6000/8000 console serves as the front end.

THE
NEW
DISQ
DIGITAL
MIXER
CORE

BY MEL LAMBERT

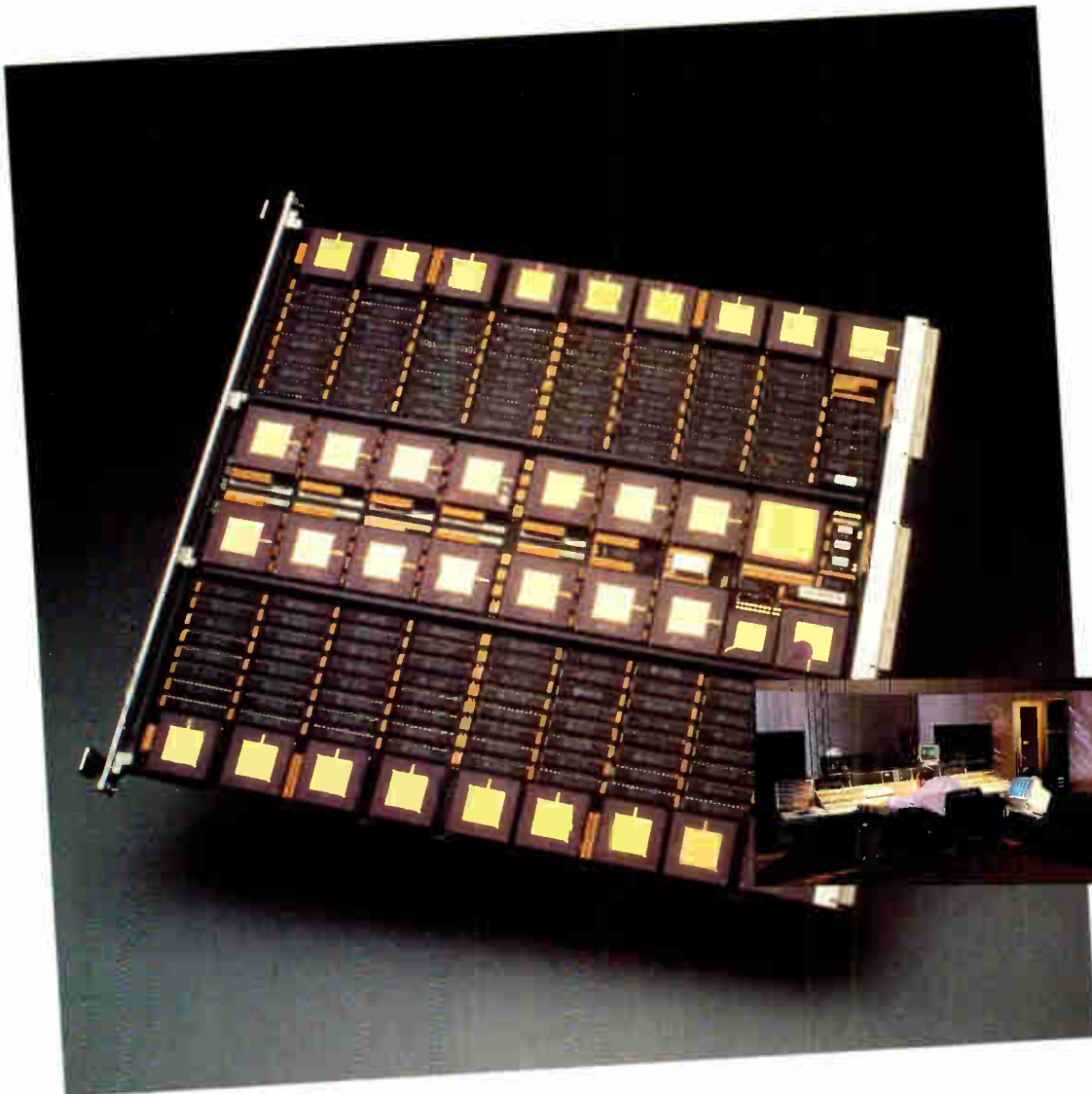
ANALOG FAMILIARITY MEETS ITS DSP FUTURE



Key members of the development team for the DISQ Digital Mixer (l to r): DISQ president David Anderson; Bob Mac Murdo, project manager, AT&T Digital Studio Systems; Cary Fischer of George Massenburg Labs; Russ Hamm, DISQ executive vice president; Ed Morgan, supervisor of the Parallel Processor Design Group of AT&T Bell Laboratories; engineers Allen Meyer and John Musgrave of GML; and chief system engineer Mark Savoca of Bell Laboratories.

Aside from conventional control room monitoring, no audio actually passes through the board's analog sections. Instead, a modified GML Series 2000 Automation System scans the control switches, and encoders fitted to the back of each control dig-

itize the information—along with fader level, EQ, mute and solo status. From there it is routed off via a high-speed Ethernet connection to the main processing rack. Here, a "console in a box" is re-created from a



Cary Fischer of GML operates the DISQ Digital Mixer through a 60-channel Neve VR console, at a product demo in Los Angeles in September '92.

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Can You Get There From Here?

THE ROLE OF A DIGITAL MIXER DURING TRACKING

During a typical music or post-production session, basic tracks are recorded onto a digital multitrack, other material is overdubbed and then the tracks are combined to prepare the final stereo or multichannel mix. Within the analog domain, this is a perfectly straightforward process.

But what about the digital domain? Any computer-based mixing system is bound to produce small but finite processing delays as the signal is digitized, routed to a DSP function, equalized, combined with other tracks, passed to the main monitor outputs, and reconverted to analog.

In the control room, because all of these individual elements will be delayed by approximately the same amount of processing, they'll arrive at ears at the same time. In the studio, however, anyone listening to the foldback system is going to be in some trouble.

Think about it. Each signal from the microphone might be delayed by as much as several milliseconds before it comes back to the cans as a foldback/cue mix. While experienced DJs and broadcast professionals can overcome such delays, vocalists and musicians who have a *very* defined sense of timing could be severely hampered.

According to one respected industry source who has made a study of the subject, a delay as short as 500 microseconds can upset the timing of musicians who play very tight into a groove. Okay, that's a pretty dramatic restriction, but the jury is still out as to whether multiple delays can be handled on a day-to-day basis, particularly if it amounts to several tens of milliseconds. ■

series of sophisticated digital software models that provide a real-time, 72-channel mixing system.

For the user, the end result is totally transparent operation. The various gain, EQ, aux-send, channel and other digitized settings are used as parameters for a virtual mixer running on a high-powered computer that is re-creating the time-dependent level, signal-processing and routing combinations necessary to create the final mix.

And, being totally software-based, the new DISQ Digital Mixer Core can be reprogrammed in ways that we can only begin to appreciate. For example, equalization might be remod-

eled on a channel-by-channel basis to provide Pultec-type EQ on channels 1 through 8, GML on 9 through 16, Focusrite on 17 through 24, SSL G Series on 25 through 32, E Series on 33 through 38...you get the picture. And the dynamics section of each channel input/output could be remodeled to provide time-dependent processing.

SYSTEM COMPONENTS

The DISQ Digital Mixer Core comprises a number of interconnected modules mounted within a standard 19-inch rack system; a 72-channel device occupies ten rackspaces. At its core are AT&T DSP3 Parallel

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Processors, developed originally for the high-power data processing in such applications as radar and sonar signal recognition, speech analysis and image processing. Up to eight DSP3 processor boards can be inter-linked to provide a total capacity of 72 audio channels.

The DSP3's power and flexibility result from the use of multiple AT&T DSP32C programmable processing ICs. A high-speed intermode processing network links as many as 128 individual DSP32Cs operating at up to 40 MB per second. Eight inter-connected DSP3 boards can provide astonishing processing power, as

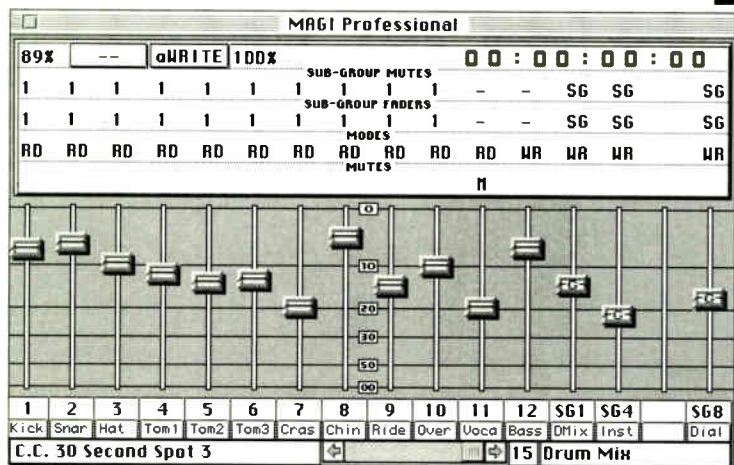
many as 2.5 Gigaflops (floating-point operations) per second required to model a real-time 72-channel mixing system.

The DSP3, in turn, is broken down into three functional subsystems:

1. The Real Time Host (RTH), a Motorola 68030-based processor board that serves as the DSP3's control center for software applications.

2. The Input/Output Subsystem, which supports a number of standard low-speed and custom high-speed interfaces between the RTH and processor node subsystem and outside peripherals.

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Post-AES Reactions to Digital Mixer Core, and Latest System/Sales Developments

According to Gotham Audio's Russ Hamm, who serves as the project's principal system engineer, a DISQ system and Neve VRP console have been out on the road during the past several months. Beginning in Los Angeles the week before its AES Convention unveiling, the "DISQ Road Show" has been to Nashville and, at the time of writing, was scheduled to visit Montreal for the SMPTE Convention, plus other venues to be arranged.

"Reaction in Nashville was very favorable," Hamm reports. "Engineers and producers were much more interested in digital technologies and seemed to be more computer- and digital-conscious than I had expected.

"Our immediate plans are to circulate details of 'QPort,' the basic protocol used to provide serial control of the DSP3 via an Ethernet connection. In this way, outside companies can begin to develop application-specific, virtual-control surfaces that simply hook up to one or more DSP3 systems.

"We have also sparked interest from larger film facilities, where a central DISQ system could be assigned in sections to various rooms during the dialog and effects editing stages, for example, and then used as a multichannel system for the final mix-to-picture.

"In addition to the SSL G Series computer interface, which will be available by early 1993, we are also working on a version that is directly compatible with Neve's Flying Fader automation system. Because it already has a computer front-end, we can offer the DISQ system to a customer with a Flying Fader-equipped Neve VRP console for around \$350,000, a figure that's some \$100,000 less than that for a GML-based system." The Flying Fader-compati-

—CONTINUED ON PAGE 78

3. The Digital Processor System, which consists of eight individual boards and is capable of handling the myriad parallel-processing tasks required to implement a multichannel audio mixing system.

At the DSP3 level, digital I/Os are 32-bits wide. To accommodate real-world digital formats, a dedicated Digital Audio Interface section provides connection between SDIF-2-compatible systems (such as digital multitracks and digital reverbs). Other formats, including AES/EBU and MAD1, will be added as necessary. The DAI handles all data passing into and out of the DSP3, except for the final stereo mix, stereo monitor and eight auxiliary outputs, which are the province of a Harmonia Mundi BW102 digital-to-analog interface system.

The digital audio interface consists of an input and an output section, each with three interfaces to external equipment and two to the DSP3. An internal computer controls the mapping of channels within the input and output sections—in reality, a digitally controlled crosspoint matrix.

Digital System Ins/Outs

In a typical configuration, the Digital Mixer Core might be configured to handle 48 SDIF-2 tape machine inputs; 16 SDIF-2-compatible auxiliary returns from outboard digital delays and reverbs (with clock-slew compensation); 64 SDIF-2 "mic/line" inputs to replace tape machine sources (from external A-to-Ds connected to mic preamps, analog tape machine and other sources); 64 SDIF-2 channel inserts; 48 SDIF-2 tape machine direct outs; 48 SDIF-2 auxiliary bus outs; 64 channel inputs; 64 channel outputs; and up to 32 optional "bus" outputs.

The Digital Audio Interface can be synchronized to an external word-clock source, allowing the entire system to be bit-phase-locked to a single source—a facility's DARS (Digital Audio Reference Signal) or a multitrack—running at rates between 32 and 54 kHz. In this way, a Digital Mixer Core can be run in full varispeed mode without any analog artifacts or sample-rate conversions.

All main mix/monitor outputs are 20-bits wide and can be re-dithered to a range of 16 to 20 bits, depend-

ing on the application and recording media.

Automation Environment

In addition to the channel-level, mutes, solos and EQ in/out functions, the GML Series 2000 Automation System interfaces directly with the control elements fitted to the analog console. The GML computer speeds up the process, however, and allows an entire control surface to be scanned within a second or so; faster rates will be offered in the near future.

In operation, the Series 2000 is constantly scanning the control sur-

face looking for control-function changes. As soon as it detects that a knob or switch has been activated, the computer buffers the information, focusing its attention onto the control being activated. It then generates the appropriate Ethernet commands for transmission to the Digital Mixing Core. Within the DMC, these instructions are used to generate the digital equivalent of a new equalization profile, for example. The information is also displayed graphically on the automation system's high-resolution color VDU.

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racy, plus full serial control of external tape machines and time code synchronization systems. In the near future, the Series 2000 will also provide dynamic recall of all control-surface functions. (Currently, only channel-level and related data is stored, along with snapshots of the current control settings.)

A Closer Look Under the Hood

Within the DSP3, a fully functional 72-input remix console can be modeled and dynamically adjusted. During system setup, each input channel is assigned a main fader, high- and lowpass filter, a 4-band parametric

EQ section, limiter/compressor, expander/gate and up to eight auxiliary sends.

The boost/cut, frequency and Q settings are used to instruct the DSP3 to change the IIR filter coefficients according to pre-calculated lookup tables that occupy some 3 MB of memory. These filter coefficients have been selected to precisely model Neve or SSL equalizer settings. Other coefficients can be used to produce custom curves for specific equalizer types, along with special applications such as noise filtering and de-essing, for example.

A new function, "TRACK," is de-

rived from the console's tape-direct send controls. Its value is used to derive a channel-delay-per-input of +/-50 milliseconds, allowing multi-mic sources, for example, to be brought into phase coincidence.

The expander/gate section offers controls for threshold, depth (up to 50 dB), hysteresis (up to 25 dB), attack (0.1 ms to 1 ms) and release time (30 microseconds to 3 ms); expansion ratio is 2:1. The limiter/compressor section offers threshold, ratio (1:1 to limiting), attack (0.1 ms to 1 ms), release (30 microseconds to 3 ms) and gain make-up (up to 30 dB).

All level, EQ and routing changes are made via high-speed ramp function, to ensure click-free changes as controls are adjusted on the Neve or SSL control surface.

All in all, despite its admittedly high price, the new DISQ Digital Mixer Core will allow a growing number of facilities to explore all-digital mixing using familiar control surfaces.

More information is available from DISQ Inc., 1790 Broadway, New York, NY 10019; (212) 581-8938; fax (212) 765-3417. ■

Mel Lambert is senior editor of Mix and principal of Media&Marketing, a high-tech consulting and marketing service for pro audio firms and facilities.



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—FROM PAGE 76, POST-AES

ble system should also be available early in 1993.

Although at presstime no DISQ systems had been sold, Hamm reports strong interest from several facilities, including Glenn Meadows' Masterfonics complex in Nashville, which has a pair of SSL 4000-E consoles with G Series Studio Computers. Also, a leading Hollywood recording facility equipped with two Neve VRP boards is described as "carefully considering the move to digital." Its pragmatic owner, who prefers to remain anonymous for the moment, offers that "my only concern is, 'Does it work or not?' The system is really too new to judge its reliability in the studio, but I like what I've seen and heard." ■

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Today's market is demanding more complex productions and higher audio quality on shorter schedules and with tighter budgets. Studios and engineers need a console that works as fast as they can create. Old analog boards have charm, but they are too big and take too long to reset. The new all digital desks are underdeveloped, complicated and far too expensive. After four years of continuous development, one company is delivering the product that makes sense today. Euphonix has the speed, power and flexibility of Total Digital Control with the simplicity and natural sound of analog signal processing. It's no wonder industry leaders have made the move to the CSII. And when Euphonix introduces the new additions to their product line, you'll realize the last four years were just a warm-up.

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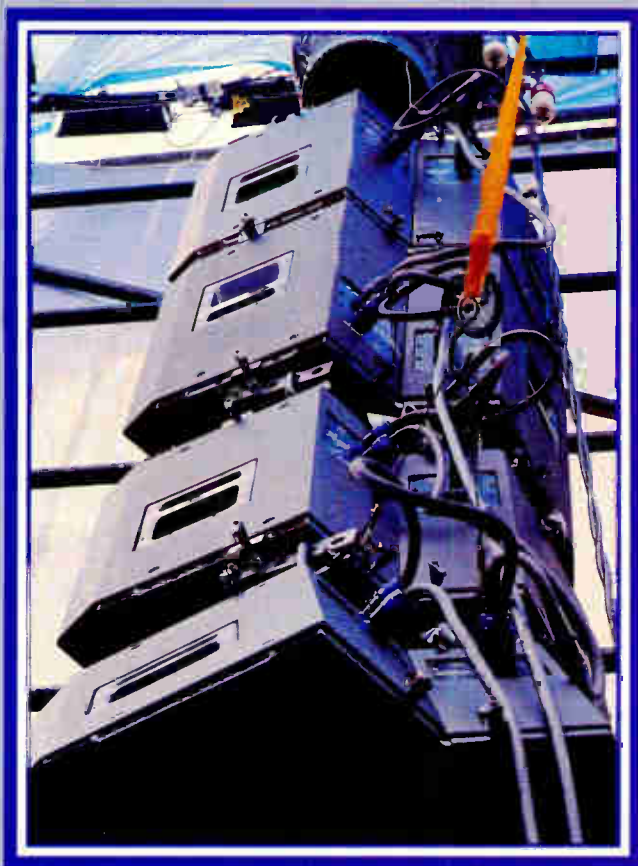
Buying Concert Speaker Systems

Sound Reinforcement
Companies Speak Out

• by George Petersen •

Running a sound reinforcement company is no picnic. The hours are long, the ratio of financial return to investments is low, and the risks are great. Yet staying afloat during these uncertain times requires making informed decisions in order to stay competitive. Perhaps the most important of these decisions is the selection of the most essential (and expensive) component in any concert sound system: main loudspeaker systems. We talked to a number of regional sound reinforcement companies across the country about those factors that led them to select their current systems.

*Detail of
Morgan Sound's
JBL Concert
Series system
at the Mount
Hood Festival of
Jazz in Oregon.*



**Carey Sound
Greensboro, North Carolina**

This 15-year-old business started out as a concert production company and over the years expanded with sales (retail and contract/install) and rental (staging, lighting/concert audio) divisions. Carey Sound made the jump into arena-size shows in 1985, when the company went from proprietary loudspeakers to the EV Manifold MT-4 system. According to owner Ken Carey, the company also offers "The Backstage Pass," a program of educational seminars held on-site before and after concert events, covering everything from contract negotiations to equipment use.

Ken Carey: "I've made some strategic alliances with other companies—both local and some farther away. Some time ago, we set up a pseudo-network for manifold boxes, with several other users, and now Electro-Voice is finally getting going and making it official. My feeling is that Electro-Voice should take a more active role in making sure that I'm busy—they've got just as much at stake and just as much invested as I do in their equipment.

"When this company started, I had a lot of time and no money. So I started constructing boxes—in fact, for years we built boxes for ourselves and several regional sound companies in the area.

When the EV Manifold boxes came out, I was really excited because we had to get more 'oomph' out of smaller boxes. We ordered their first four boxes without even seeing the final versions. Prior to buying the Manifold system, I had never considered buying a piece of equipment that one person couldn't maneuver, because as the owner of a regional sound company—when everybody else disappears—it's up to *you*. In the 'bad old days,' there were more occasions than I care to remember when I literally had to go out and do a show by myself.

"If you take four times anybody else's system and cram it into one box, you've got the Manifold system. So there was an initial perception that you've shown up with a little system, since there are 32 speakers in one block, and you can't see the 12 drivers in each of the top cabinets.

"We currently have six blocks (12 bottoms/12 tops). We can easily do a 15,000-seat hall with six blocks and have all the SPL we need. We can do 2,000 or 3,000 people outdoors with one block [two bottom and two top cabinets]. We're using the stock [EV] MTX-4 crossovers, and we'll stick with those until we can get the new QSC/MediaLink controllers for our EX-4000 amps. MediaLink is a wonderful protocol, and fiber-optic linking is our future."

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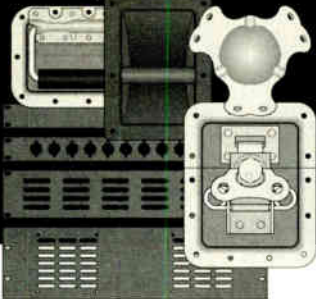
Dallas Backup
Dallas, Texas

For the past 14 years, Dallas Backup has provided sound, lights, staging and musical equipment to a variety of top artists, including country superstar George Strait (a regular customer for nearly a decade). According to president Charles Belcher, the company is quite successful in focusing on the production niche, without relying on the usual sound company sidelines such as sales and installation work. Besides a large roster of country acts, the company also handles conventions, special events and pops concerts for the Dallas symphony. Dallas Backup recently purchased a large selection of Clair 12AM monitors to complement its two main touring systems—a proprietary system using all JBL components and an Eastern Acoustic Works system with KF-850s and 300s.

Charles Belcher: "We built our custom system in 1984, and back then, Clair Brothers, Showco, or any sound company trying to make a name for themselves, would build their own boxes. Since then, of course, the sound reinforcement industry has changed dramatically, and now off-the-shelf speakers are everywhere. We made a decision to offer both our own and a manufactured design, and we chose EAW.

"Buying the EAW system was an orchestrated move when our production business doubled and almost tripled. Fortunately, all the manufacturers have reps here in Dallas, so we rounded up the systems we wanted to listen to in our warehouse—it wasn't too difficult—we listened to them all and picked the one we liked. Now if I was in Boise, Idaho, it would have been a little bit harder. It wasn't too tough, as everything was available to us here. And, of course, if you're going to spend a lot of money, people are going to listen to you [Laughs].

"Proprietary systems don't show up on riders very often, but our system is great for outdoor festivals, and there's always a need for ours. Our regular customers know what our custom system sounds like, because we've had them for so long. The custom system went out with George Strait for the first four years, and when we bought the EAWs, we kept them here for a year and then



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put them out with George.

"Our two systems are comparable in the size of venues they can handle, and they interchange all of the time. We designed the cabling and amp racks to work with either system, and both have [Yamaha] PM3000 consoles, so there's more to it than just the speakers—you have to consider the whole package. Our boxes take up a lot more truck space than the EAWs, which made more room for lighting, so we could have a bigger lighting show. Truck space is always a consideration."

Morgan Sound Lynnwood, Washington

Located just 15 minutes north of Seattle, Morgan Sound is a multifaceted company, offering retail sales (with two pro audio showrooms), lighting and video sales, audio design/installations, service, small system rentals and, of course, touring and regional sound reinforcement with a 70-box JBL Concert Series system. According to owner Charlie Morgan, the 23-year-old company has also diversified into another niche market—renovating the sound systems of 18 cruise ships

over the past seven years.

Charlie Morgan: "It's been five or six years since I bought the JBL Concert Series system. Before that, I had come off the road for 12 years with Gordon Lightfoot, and one of the ways that I auditioned loudspeakers was when I had a block of three dates with Gordon someplace, I rented loudspeakers or I would subcontract a company to do the gig with me so I could hear their speakers. I owned some Northwest Sound stuff, so I rented from Maryland Sound, Clair, Audio Analysts and tried out other systems.

"I went with a JBL system. Building my own speakers was not an option, because I didn't want to get into that much R&D. Having spent many years looking at equipment riders, I knew that if you didn't have the right equipment names, you wouldn't get the work. And the processor-controlled systems I listened to—such as the Meyer and Renkus-Heinz—didn't sound as natural with a microphone plugged into them as the JBL Concert Series did.

"The final major point was that if I bought S4s or Renkus-Heinz M-4s, then I'd need a pretty big stack of equipment to handle a small gig. The M-4 only operated as a three-box module; the S4s were big, unwieldy and heavy—difficult for one or two guys to manhandle into a hotel. The Concert Series appealed to me because I could break it down into small pieces. I could modularly build it up in increments of two boxes and have the ability to splay, as well as separate and do four rooms with one truck with equipment.

"So I rented. I listened. I considered and wanted to go with something where I'd get strong factory support—and I got far more support from JBL than I ever expected. There's another issue. If I say I own 48 mid/high packs and 22 double 18 subs of JBL Concert Series, then somebody has a pretty good idea of what kind of investment I've made. So even if somebody doesn't know my company—at least coming in—they know what I'm using."

ProMix Mt. Vernon, New York

Founded ten years ago, ProMix specializes in audio for theatrical



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shows, along with installations and special events, such as the 1992 Democratic National Convention. According to project manager Mary Falardeau, ProMix currently keeps its large Meyer complement busy with seven shows on Broadway, several touring companies and a number of industrials.

Mary Falardeau: "When we were called to do *Miss Saigon*, it came as a surprise to much of the industry, because no one knew we were big enough to handle it. At the time, we were thought of as a small company, so *Miss Saigon* served as a prov-

ing ground for us. We handled it successfully, and a lot of people who would not normally have come to us with bigger things started calling. It really changed the nature of what we're doing.

"With the big shows, the choice of speakers is completely determined by the show's sound designer. What's out there and working is what gets noticed. The sound designers didn't find Meyer because it was what the rental houses had—they found it because it was out there and was what they wanted. For example, *Miss Saigon* designer

Andrew Bruce is adamant about using a Meyer system. Tony Meola, the designer of *Guys and Dolls* and *Five Guys Named Moe*, also wants to use Meyer all the time. On systems we design or install, we have more of a choice: we occasionally use EAW or Apogee, but frequently go with Meyer. It can deal with rough treatment on the road, and it's consistent, reliable and clean sounding. It's the best thing out there."

**Scorpio Sound
West Bridgewater, Massachusetts**

Founded in 1979 and located about 20 miles south of Boston, Scorpio Sound handles a variety of local one-offs and corporate events, along with regional and national tour legs. About 18 months ago, the company expanded its 60-box EAW complement (32 KF-550s, 18 split KF-550s and ten SB-550 quad subs) with 32 of the larger KF-850s and eight KF-850 subs. Currently out with the Tom Tom Club/Soup Dragons/James/Black Sheep tour, head engineer Carl Gagnon reports that Scorpio's system was recently put to the test at the Boston Garden, for WBCN's "The Rock of Boston," a festival event that required not only a 360-degree arena P.A., but also a separate P.A. for a second stage.

Carl Gagnon: "We decided on the EAW system predominantly because we feel it's the best-sounding off-the-shelf box that you can buy at this point. Also, we're [geographically] close to EAW here and get excellent factory support.

"To a certain extent, the EAW [Virtual Array Group] network was a factor because it makes a lot of sense to have a system that's easily expandable. One problem with the proprietary speaker systems—like the big touring companies have—is that once you run out of boxes you can't get them anywhere else. So at that point, if you want to increase your company's business, you have to invest in building more cabinets to keep up with the demand. Of course, we all know that the demand can be quite large one day and quite minimal the next day. With the EAW system, we can keep our relative inventory low and still be able to have the luxury: If we need 100 boxes for one show, we can get 100 boxes for one show.

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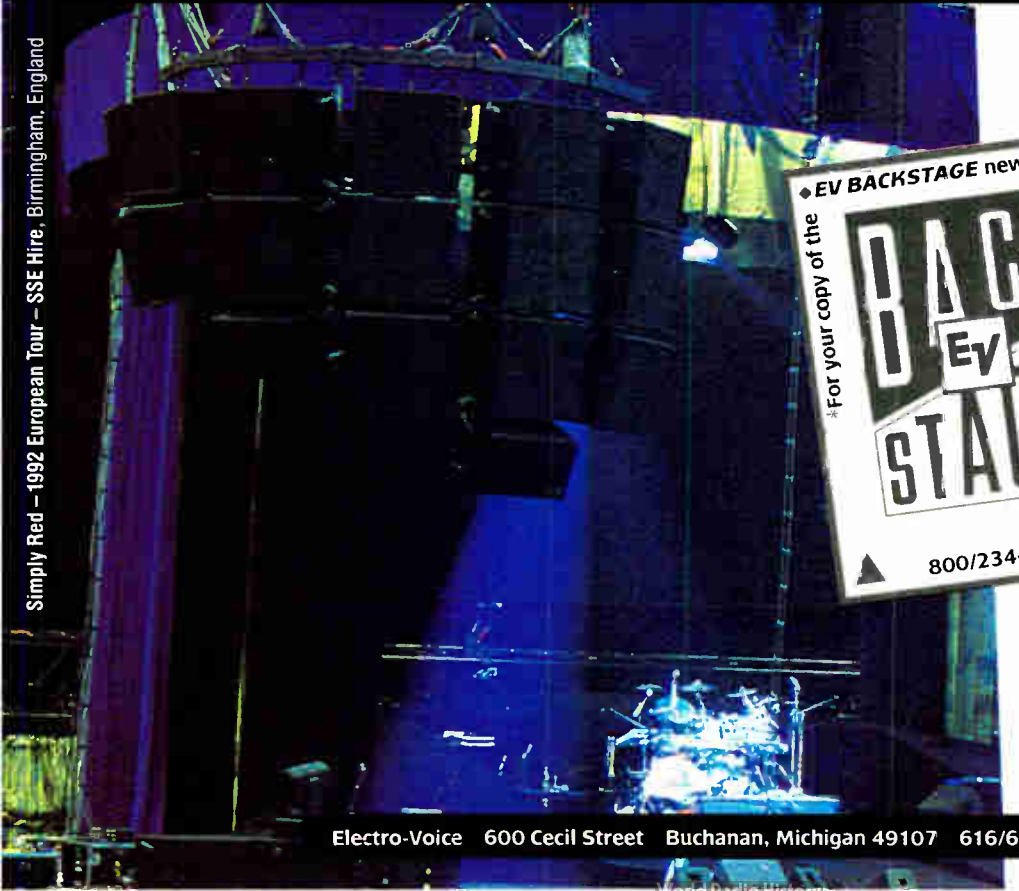
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"On the Soup Dragons tour we're doing a variety of venues, from small clubs to large arenas. If we had our own proprietary system, we'd have to carry enough boxes to handle the largest arena we'd be doing on the tour. So on this tour we're carrying a smaller number of cabinets and locally renting more boxes to handle the larger shows. I carry enough power amps with me to double the size of the P.A. system at any one time, so all I have to do is have more boxes brought in and plug them in."

West River Light & Sound Sanford, Michigan

Located about 30 minutes from Saginaw, Mich., is West River Light & Sound, a full-service company specializing in complete production packaging, with staging, lighting, roofing and audio systems, along with sales and contracting. When we contacted Chris Irons, the owner of this 12-year-old company, he was on tour with Sawyer Brown, a regular client whose five-month U.S. tour ends next month.

Chris Irons: "We've had our Tur-

bosound system for about a year-and-a-half. When we did an installation at the time (a renovation at the Pine Knob Music Theatre in Detroit), Turbosound was a logical choice. There is a noise curfew and sound level situation with some of the local residents, and we put in the delay system for the theater, which is an outdoor shed. They do about 80 events a year; there's a IBL system for the lawn, but most of the touring acts were carrying production [sound systems] in there with them. There's seating for about 6,000 under the pavilion and another 10,000 on the lawn. We proposed a Turbo system with a Crown IQ system, which was ideal for this application because it allows the stage manager to control the level on the lawn area, so the venue doesn't have problems or complaints from local residents. That installation was the beginning of our involvement with Turbosound, and now we've got a 40-box system out on the road.

"We had been doing staging and lighting for quite a while, and over the years we've had different

brands of speaker systems, including some proprietary systems we put together. But there are a number of things that attracted us to Turbosound: The packaging is good; the flying hardware is good; but most of all, it's a good-sounding box. Another thing is that two or three major manufacturers show up all the time on riders, and Turbosound is one of them. After all, we're in the rental business, and we need equipment that is marketable. Ultimately, this stuff has to generate revenue and pay for itself.

"When an artist or client is doing advance work for tours or for one-off dates, it's nice to say that you have a Turbosound, Meyer or EAW system and hear the guy on the other end say, 'It's no problem.' I've also been on the other side of that, doing the advance work. If a local sound company has a proprietary system, trying to figure out what their system sounds like can be a real guessing game. Now, some of those systems work really well, but some of those [proprietary] systems leave you wanting." ■

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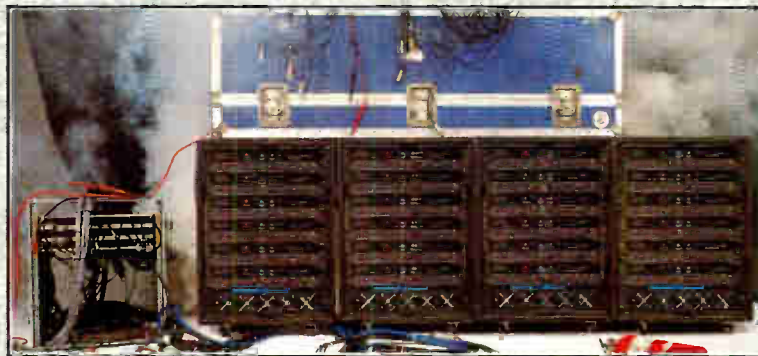
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World Radio History

by David (Rudy) Trubitt

COMPUTER CONTROL & THE AES

In the wake of the AES approval of the PA-422 standard, a group of engineers has been working to help define the next step in audio networking. Although the process has not always been a smooth one, the recent AES convention saw an increasing interest in the subject. Momentum for Lone



**Rane's
Bob Moses**

Wolf's MediaLink system is building, with a number of companies signing on. Simultaneously, Crown is strengthening its position through third-party licensing of the IQ system as well as by directly participating in the standards effort. While the competitive agendas of all parties concerned make the prospect of a unified standard far from certain, progress is being made.

Rane's Bob Moses has been the point man on the AES working group for several years. In this interview, he describes how the process has evolved and where it's heading.

Mix: What is the AES doing, and how is the effort organized?

Moses: SC-10 is the "Subcommittee on Sound System Control" of the AES Standards Committee." SC-10 is in charge of defining how audio devices will communicate over buses and networks in the future. We began as "AES Working Group 10 (WG-10)" and just became an official Standard Committee. WG-10 was responsible for defining the PA-422 protocol. Once that was done, we realized we needed to go the next step and implement a full Local Area Network. WG-10-1 was established at the 1991 NSCA show to study LAN standards in other industries with the hope we'd find something we could adopt. WG-10-1 published a report in the *JAES* (vol. 40, no. 1/2, Jan./Feb. 1992) that concluded that nothing exists today that fulfills all our needs and recommended we define a new standard. WG-10-2 was created in June 1991 with the mission of defining a new Application Protocol. This group has been working hard for the past year.

Now that we're an official Standard Committee, we have a new organization. SC-10 is the mother group. SC-10-1 is the Data Communications Working Group and is responsible for recommending standards for movement of applications data (network hardware). SC-10-2 is the Application Protocols Working Group and is responsible for recommending standards for format, content and meaning of ap-

plication data. SC-10-3 is the Information Working Group and is responsible for disseminating background information and guidelines for applications standards. Finally, SC-10-4 is the PA-422 Working Group, responsible for maintaining the PA-422 standard.

Mix: What lessons were learned from MIDI and PA-422, and how have they affected the SC-10's actions?

Moses: This entire process arose

from the failures of PA-422, with the hope of achieving the successes of MIDI. MIDI showed us what happens when the industry joins together in unity and commits to a standard. PA-422 showed us what happens when a standard is pushed through in a relative vacuum. PA-422 wasn't a closed process, but not very many people were involved. The result was a standard that was not widely implemented, although it did break ground on standards in this area. MIDI, on

the other hand, is maintained by a large, diverse group of manufacturers, and the process seems to work quite well. So, the big lesson learned was this process must include as many people from as wide an array of markets and applications as possible.

MIDI also taught us the importance of extendability. MIDI has been tweaked in many ways since its inception. Today it is used to control just about everything from instruments to A/V equipment and smoke bombs. A standard that is not flexible will become obsolete and extinct. The new standard must be flexible to meet the changing times.

Mix: How forward-looking should the standard be?

Moses: As forward-looking as possible. The reason things have progressed rather slowly so far is we've been trying to get a long-term idea of what the industry at large plans to do with this standard. We refuse to waste our time coming up with a temporary solution.

Of course, no one can write a standard before there's any experience in the marketplace—the standard will reflect a consensus of those who are trying to produce and use these systems. The key is for everyone, from manufacturers to consultants and end-users, to visualize future systems and help plan them. Otherwise, we're wasting our time.

Mix: Every network has two parts—the network hardware and the software protocol used to communicate between devices. Could there be AES standards that encompass only one or the other?

Moses: The "standard" we have been discussing is partitioned into two parts: the data communication path [hardware] and the application protocol. Take the application protocol first. It is the language spoken between devices. The data communication path provides a way to get this language from box to box. We can draw an analogy with the English language. You can speak English, write it down and mail/fax/publish it, broadcast it

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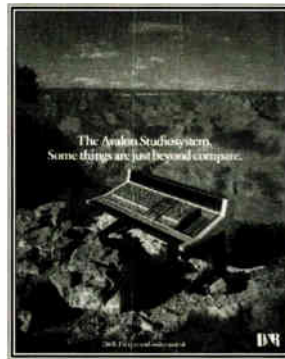
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over radio/TV/modem/etc. The English language is like the application protocol; the various ways of communicating it are data communication paths.

The SC-10-1 working group is in charge of defining a standard for the data communication path. This includes the physical hardware and everything else it takes to pass messages from box to box. SC-10-2 is working on the application protocol, the language spoken over SC-10-1's data path. We will most likely define a couple of standards, each detailing a portion of the overall system.

Mix: For the hardware part of the spec, might the AES endorse an existing proprietary system such as IQ, MediaLink or MindNet?

Moses: Yes. All three are good systems with a lot to offer. We may or may not define an alternative public domain standard. The expertise to develop a robust, workable, comprehensive system is not easily found in our industry. We're audio designers, not network designers. To ask a group of engineers to develop all this for free for the industry, as a public-domain standard, is asking a lot. Lone Wolf, Intellix and Crown have invested years of time and millions of dollars to develop their systems.

Mix: What are the precedents for the success of public-domain vs. proprietary, licensed standards?

Moses: I think you'll find success stories and horror stories for both. MIDI is an extremely successful public standard, the CD format is a successful licensed one. PA-422 is an unsuccessful public standard, and there are numerous unsuccessful licensed ones. I think the basis for success is providing a true value that is priced reasonably, that works and that isn't overly complicated. Whether it's public or private seems to be less important than what it does. [The AES cannot license—the assurance they ask from a licensor is that the technology will become public domain, in effect, if they default.]

Please remember that proprietary standards exist all over our industry. Dolby licenses a number of standards to the industry. Lucasfilm licenses THX technology. Alesis is now licensing ADAT, and I could list quite a few others. What's important is that everyone has equal and open access to whatever becomes *the* standard. Whether that standard turns out to be one of the proprietary networks or something SC-10 defines remains to be seen.

"The key is for everyone, from manufacturers to consultants and end-users, to visualize future systems and help plan them. Otherwise, we're wasting our time. We really need everyone's input."—Bob Moses

Mix: How about price? Is there a cost per node that could make or break the acceptance of a standard?

Moses: This is a tough question to answer. Costs depend on a number of factors. What costs one company \$10 might cost another \$20 or \$5. It depends on scheduling, volume and actual implementation. Lone Wolf, Intellix and Crown are all based on low-cost, common, 8-bit microcontrollers that cost around \$10. We feel this is a reasonable fee, especially since these microcontrollers are almost always in our boxes whether we network or not. We're really just adding different software. But, the specific cost of the technology is not as important as the value added to the devices incorporating it. Five dollars for a worthless feature is worse than \$100 for something that revolutionizes the system.

Mix: What about second sources for proprietary systems?

Moses: Second sources are an issue for the three licensing companies to decide. Lone Wolf is working with several chip manufacturers to provide its chip. I don't know what Crown and Intellix have planned. I think that everyone would agree that second sources are extremely im-

portant, and no one will enthusiastically embrace one standard without them.

Mix: How important is support for existing hardware and protocol standards?

Moses: This is a paramount concern. Already, the three existing systems (IQ, MediaLink and MindNet) offer compatibility with PA-422. MediaLink goes so far as to bridge to MIDI. SMPTE, AES-EBU and just about every other conceivable communication format. We realize that we will never get away with replacing current systems. We aim to provide a glue to connect all these systems.

Mix: What kind of cooperation is under way with other existing standards committees such as the MMA?

Moses: Since I am chairman of SC-10-3 [the information dissemination group] and a member of the MMA, the connection between the two groups is quite healthy. I think both groups understand it would be stupid to forge ahead without the other.

Mix: Will we see a new AES-approved standard for computer control of audio equipment in 1993?

Moses: I don't think we'll have a finished, complete, all-holes-plugged standard [that soon]. What we are trying to do is so far beyond what anybody else has done before—including the computer industry—that it is going to be a lengthy process to standardize everything. We won't see a magic date when a standard is all-of-a-sudden released. It's a much more linear process of evolution. I think early 1994 is a more realistic time frame for a full system to be defined.

Mix: What's the next step?

Moses: We need more participation! We face a major transformation in our industry, and the more input we get, the better our chances are for guiding this transformation to a successful end. It gets very frustrating knowing that everyone is watching us with various expectations but not willing to roll up their sleeves and help. We really need everyone's input. ■



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by David (Rudy) Trubitt

SOUND CHECK



(Left) Michael Hedges; (above) Josh Salesin (l) and Leonard Mirizio

MICHAEL HEDGES TOUR NOTES

Guitarist Michael Hedges was out recently on a string of West Coast club dates. I caught the tour at San Francisco's Great American Music Hall and spoke with independent engineers Leonard Mirizio (house) and Josh Salesin (monitors). Sound for the tour is provided by Rosewood Sound (Syracuse, N.Y.). Rosewood's custom loudspeaker system is unusual in that each of the five bands, from double 18-inch, front-loaded sub-bass to ribbon-tweeter high end, is

housed in individual cabinets of dissimilar dimensions, bucking the trend toward high-mid and low enclosures of identical size. "We can do 1,400 to 2,200 seats with this," says Mirizio. "We can put a lot of them together. We've done some pretty big festivals—4,000 to 5,000 people with about four times [Hedges' configuration] on either side.

"One thing that [Rosewood designer] Mark Fitzgerald is really concerned about is even coverage," Mirizio continues. "That's why everything is in a single

box—you can twist [individual bands] this way or that." Fitzgerald also built custom linear-phase crossovers that include time correction for the sub-bass. The four remaining bands are physically offset to align their transducers along the vertical axis. Ashly power amps, graphic EQs and parametric EQs are used throughout the system.

"Acoustic guitar is an extremely hard instrument to work with, especially Michael's guitars," Salesin says. "He tunes them very

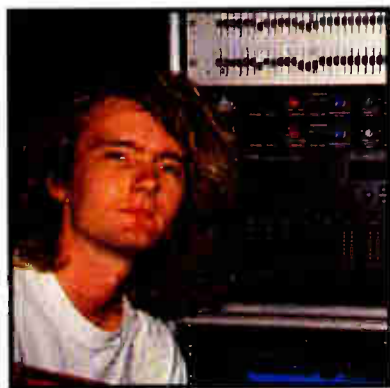
—CONTINUED ON PAGE 104

PHOTOS: STEVE JENNINGS



PHOTO: JAY BLANKENBERG

Nirvana onstage during a previous West Coast tour



Nirvana's FOH engineer, Craig Montgomery

Nirvana

TOURS WITH DSP-CONTROLLED SYSTEM

Performer: Nirvana
Venue: Seattle Center, September 11, 1992
Sound company: Proshow U.S.A., Seattle, Wash.
FOH Mixer: Craig Montgomery
Monitor Mixer: Ian Beveridge
System Engineer: Dave Stevens

by Gregory A. DeTogne
Nirvana, seasoned veterans of the club, theater and festival circuit on a global scale, spent considerable time on the road following the release of *Nevermind* (DGC Records) in the fall of 1991. After traveling to destinations ranging from Japan, Australia, New Zealand and Europe,

the trio returned to the Pacific Northwest in September 1992. Two dates were quickly arranged following the MTV Music Awards (see page 44); the first was on September 10 at Portland Meadows Racetrack, with a second on the 11th at the Seattle Center.

Sound for both shows was supplied by Seattle-based Proshow U.S.A. Using an EV MT-4 loudspeaker system, Midas XL-3 console and Crown Macro-Tech power, the rig was a straightforward rock 'n' roll setup, with the exception of Crown's new Differential mics and the system's front-end drive, which used a TOA SAORI digital signal processor.

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World Radio History

Proshow systems engineer and crew chief for the September '92 Nirvana dates was Dave Stevens. According to Stevens, FOH engineer Craig Montgomery requested that the big pieces in the Nirvana rig include the EV MTH-4 loudspeaker system and the Midas console.

Comprising 24 three-way MTH-4 and 24 low-frequency MTL-4 cabinets, the EV loudspeaker array was augmented by EV's MT-2s for near-field coverage in the first few rows. The MTH-4 enclosures use a manifold design with four 10-inch transducers operating from 160 Hz to 1.6 kHz. Continuing up the frequency spectrum, two EV DH-1A mid-high drivers run from 1.6 kHz out with no filter at the top. For ultra-high frequencies, four EV DH-2010 1-inch compression drivers pick up at 10 kHz and run on out. Used in a one-to-one ratio with the MTH-4s, the MTL-4 low-frequency cabinets house four 18-inch woofers.

"For the Nirvana shows, we built an asymmetrical crossover point into the system that allowed the mid-high drivers to run from 1.6 kHz on out," Stevens says. "With the DH-2010s kicking in at 10 kHz, that meant there was a great deal of overlap between the mid-highs and the ultra-highs, which worked to supply us with added clarity and punch at the top."

A member of the latest generation of Midas consoles, the XL-3 used for both shows was designed to serve as a "universal" mixing desk. "Now that they've been acquired by Klark-Teknik, Midas has combined the best of their performance features with a host of upgrades for the '90s," Stevens points out. "Overall, the console has a sturdy front end, accurate and smooth EQ, and a rugged housing. While some feel it may be more suited to serve as a monitor console because it lacks conventional pushbutton subgrouping, subgrouping can be facilitated by assigning the aux-send buses back into the master section."

In addition to supplying the

Midas console and the EV loudspeaker system. Montgomery also wanted Proshow to put together the pieces necessary for digital control of the front end. "He told us he wanted to do some EQ in the digital domain without getting a lot of phase shift," Stevens recalls. "And he wanted more control over the crossover points and phasing delay between the components. Within those parameters, the SAORI fit the bill perfectly, plus it permitted instantaneous com-

parisons between different crossover settings." Although this was the first time Proshow had used the unit on tour, the company had been installing the SAORI in its stadium systems for the past year.

"Craig prefers not to use an outboard graphic in addition to the SAORI," Stevens points out. "In fact, one of the reasons he chose the SAORI was so that he could plug the console into the unit and then simply feed the amps directly from there. As a



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result, we had a pretty clean chain right on down to the loudspeakers."

Montgomery compared different settings for the crossover points and delay by using programs developed by Proshow (up to eight sets of settings can be recalled by front-panel switches). "The ability to instantly compare different crossover and delay settings is a useful feature," Stevens says. "Like other aspects of the box, it's something you could never do before, but once you start doing it, you can never go back to the way you used to do things. Before we started using this device, we really didn't have the ability to change things once we got going.

"If we didn't like a particular delay, we were pretty much stuck with it," Stevens continues. "We could change the level of the components, but we couldn't change the delay or EQ on any of the bandpasses. All of the EQ contouring and phase delay were set in stone with resistors and capacitors right on a circuit board. Now, with a digital front end, you can change things around to suit the application in an instant. Separation between the bandwidths in the P.A. was good as well. There wasn't a lot of wash back into the low-end from the mid and vice versa. Each group of drivers was able to see just what they needed to reproduce. Clearly, the day of digital control has arrived for touring sound, and it has given us a whole new range of flexibility."

Of course, exploiting the flexibility of a general-purpose system controller requires a deeper understanding than using a dedicated crossover with limited adjustability. "If you have a basic grasp of what's happening in a loudspeaker system, and you understand the principles of driver alignment, crossover slopes and the rest, the SAORI



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is easy to use," Montgomery says. "It replaces a lot of gear in a small space, too. That in itself is a great thing because it simplifies the setup process, and I don't have as many boxes around me on the mixing riser. The main advantage to this kind of device, however, is the sound. When you do all of your audio processing in the digital domain, you throw away the limitations of analog crossovers and equalization."

Also new on the tour were Crown's new CM-310 Differoid microphones. "Prior to enlisting these new mics for the Nirvana shows, sometimes the guitar tones were being followed out by a lot of SPL coming offstage," Stevens notes. "There was an inordinate amount of leakage on the front line, in large part because everyone has a vocal mic. In trying to solve the problem, Craig had read an article touting the virtues of Differoid mics. He asked for some, and we obliged. The first time they were used was at the MTV Music Awards, and they performed admirably. During the dates in September, we found that you could trim the microphones at a level that wouldn't pick up noise from the stage even when you backed away from them. A lot of phase canceling occurs except [for sound directly on-axis]. As a result, that 'whoosh-whoosh' you typically get with a dynamic cardioid microphone when the vocalist steps away was gone."

Montgomery expects to use a similar system on the next Nirvana tour, which hasn't been scheduled because the band's focus now is on studio work. "Later this year we should be doing the next tour," he confides. "We should be going out and delivering the goods in the States, which is something we really haven't done yet." ■

Greg DeTogne is a publicist and freelance writer in the Chicago area.

Rigging Safety Update

Rigging is a safety issue of vital concern to production staff and audience alike. A new information resource for the concerned professional (meaning you, right?) is the "Safety Handbook and Rigging Reference Manual," a succinct booklet put together by ATM Fly-Ware. It begins with a paragraph on rigging philosophy:

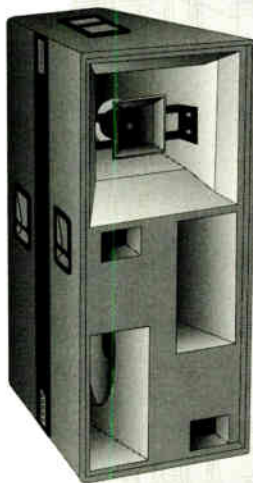
The age-old notion that "attitude is everything" certainly applies to a rigger's profession. A professional rigger should never begin a job without his/her professional rigger's attitude in action. This attitude is the same for all riggers worldwide—SAFETY FIRST. Questions that should be running through every rigger's head before a task is

—CONTINUED ON PAGE 102

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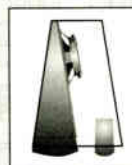
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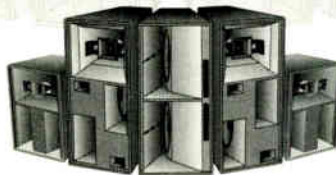
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—FROM PAGE 101. RIGGING UPDATE approached are as follows:

1. Am I likely to get hurt doing this?
2. Is someone else likely to get hurt by my doing this?
3. Would I caution another rigger if I saw him/her doing what I'm doing?

The guide goes on to explain *design factor*, a vital measure of any rigging system's capacity to survive real-world load conditions, as well as a series of for-

mulas, diagrams and charts detailing the widely varying load stress resulting from common hanging techniques. Finally, information regarding the safe use of common components, including shackles, forged eye bolts, aircraft fittings and wire rope, is provided. If that's not enough, the price (free) should be all the encouragement you need to call for a copy today (see below).

Those seeking further information should be aware of periodic seminars on the subject.

The U.S. Institute of Theater Technology (USITT), in conjunction with LimeLight Productions, recently held such a program event at the University of Massachusetts. The weeklong event included visits to venues that have different forms of rigging, with lectures on rigging components, arena rigging, inspection procedures, chain hoists and flying of performers. Contact the USITT for more information.

Harry Donovan, who covered arena rigging for the USITT event, plans a series of slightly shorter events (several days rather than a full week), which he expects to hold in a number of U.S. cities. Donovan's 18 years of experience include Paula Abdul's last tour and the rigging for Proshow's recent install at the Alamo Dome. As soon as he confirms the dates, we'll let you know.

JBL has a well-known technical note on the subject. "Basic Principles for Suspending Loudspeaker Systems" (Technical Note Vol. 1, #14) covers design factor and shock-loading issues, use of rigging hardware and the do's and don'ts of cabinet structural design. The paper concludes with a step-by-step guide to lifting a system with chain hoists and a glossary of rigging terms. The company has also put out the "Array Series SAFE Guide," which includes instructions on the safe flying of its Array Series enclosures.

Finally, those looking for a broad introduction to the subject can refer to the spring '92 issue of *Live Mix*, our sound reinforcement supplement to this magazine, available from the Mix Bookshelf. As Harry Donovan said in that article, "When you're thinking about rigging, you're thinking about killing people or not killing them." Rig safely.

For information on safe rigging, contact: ATM Fly-Ware (310) 639-8282; Harry Donovan Rigging (206) 283-4419; JBL Professional (818) 893-8411; LimeLight Productions (800) 243-4950; Mix Bookshelf (800) 233-9604; or USITT, Jerry Gorrell (602) 262-7364. ■

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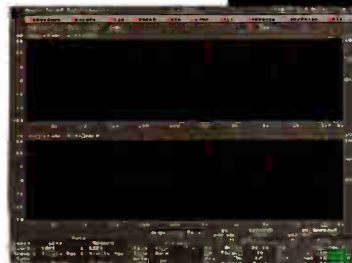


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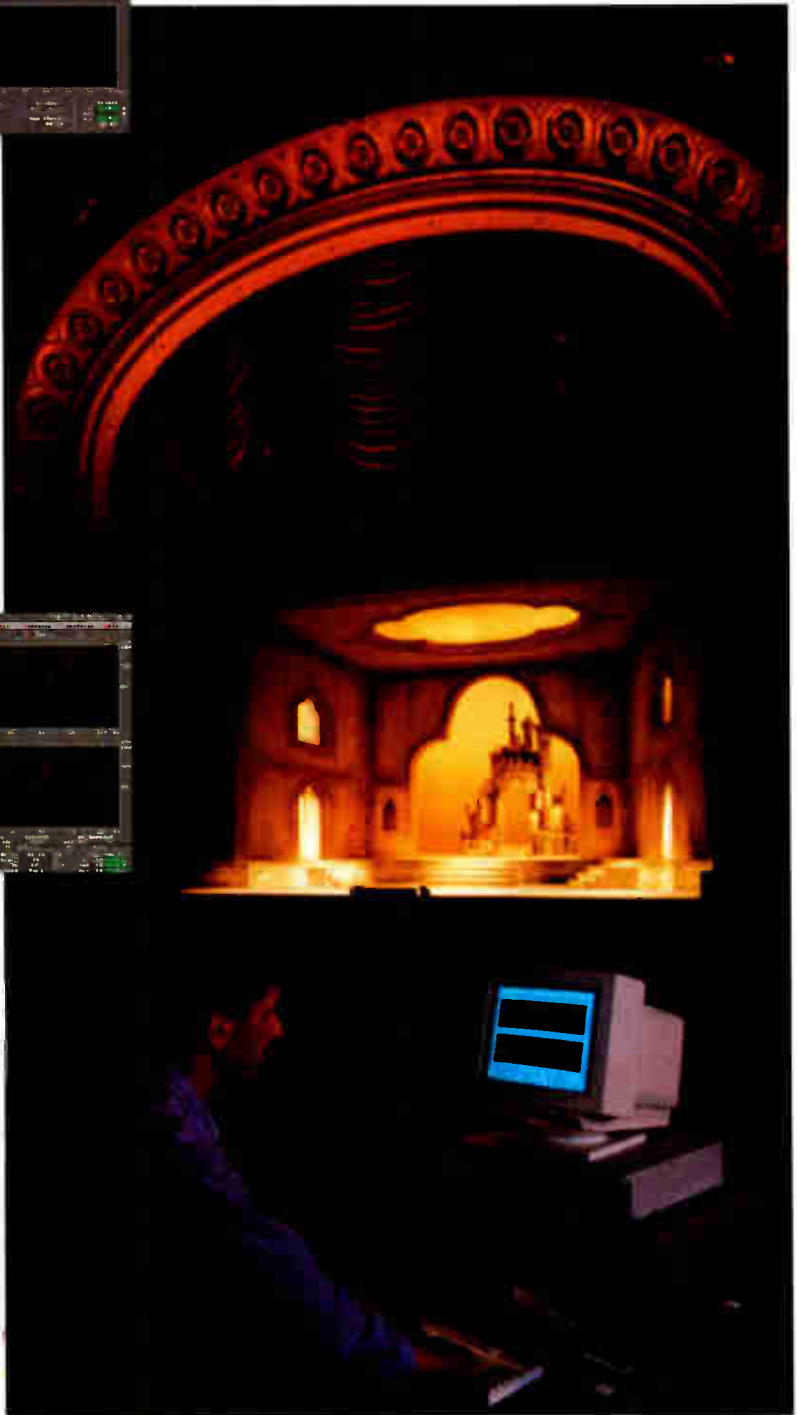
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SIM System II is in daily use at the San Francisco Opera House. Pictured: Roger Gans, sound designer.



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—FROM PAGE 96, SOUND CHECK

low—the low E is sometimes dropped the better part of an octave—and you've still got all the higher harmonics, so we have to cover a much wider range than you'd expect from a guitar. These speakers do a good job of that." Hedges' acoustic guitars are wired with various combinations of FRAP and magnetic pickups and or internal microphones. "The reason that Michael has continually gone with this system," Salesin concludes, "is that its sound is very flat and consistent. Michael is after the best quality that he can get and afford, and he's been real happy."

DIFFUSION SPEAKER SYSTEM AT COMPUTER MUSIC CONFERENCE

San Jose State University's Music Department was the site of the recent International Computer Music Conference. In addition to technical papers and workshops covering everything from synthesis based on computer modeling

of physical instruments to DSP basics, more than 50 computer music works by composers from 12 countries were performed during a series of eight concerts.

The performances were held in a medium-sized concert hall using a multi-loudspeaker diffusion playback system commonly used in Europe for events of this type. Larry Wendt, technical director, describes the setup: "We had two speakers in each corner of the concert hall, a pair in the back of the stage, some hung up high above performers, and a pair of subs on the stage floor. Bag End donated the speakers for the week, including eight TA-12-Cs, six TA-15-Cs, four S18E-C extended low-frequency subs and one ELF-1 dual integrator. Stewart Electronics loaned us the amps. We also had an Allen and Heath board loaned by Brian Trankle and Associates and a Soundcraft Spirit [ganged with the Allen and Heath] running 14 separate speaker channels."

In some of the material, live

musicians played with computer-generated arrangements, and other pieces were strictly tape playback. An unsuspecting listener might well assume that multi-track tape playback was involved, based on the shifting textures of much of the music. "They were all 2-channel pieces," Wendt says. "You control your mix with the group outs. The European composers [are quite comfortable with this], as were the American composers who are used to having their work played in Europe. We're really sold on this type of speaker configuration. I think it's the best way to present this kind of music."

BEASON MEMORIAL

The San Francisco live sound community lost a much-loved member with the passing of Louie Beason due to AIDS-related complications. He was 40 years old. Beason was best-known in the alternative music scene for his work with acts such as Romeo Void, Wire Train,

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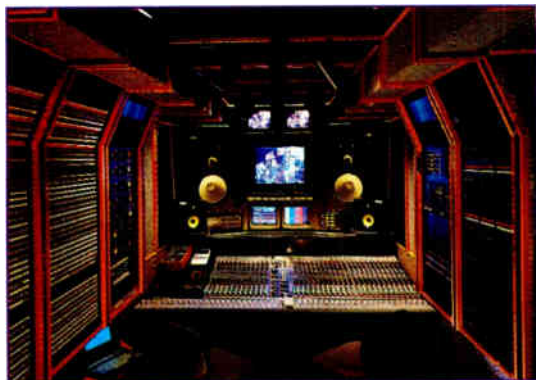


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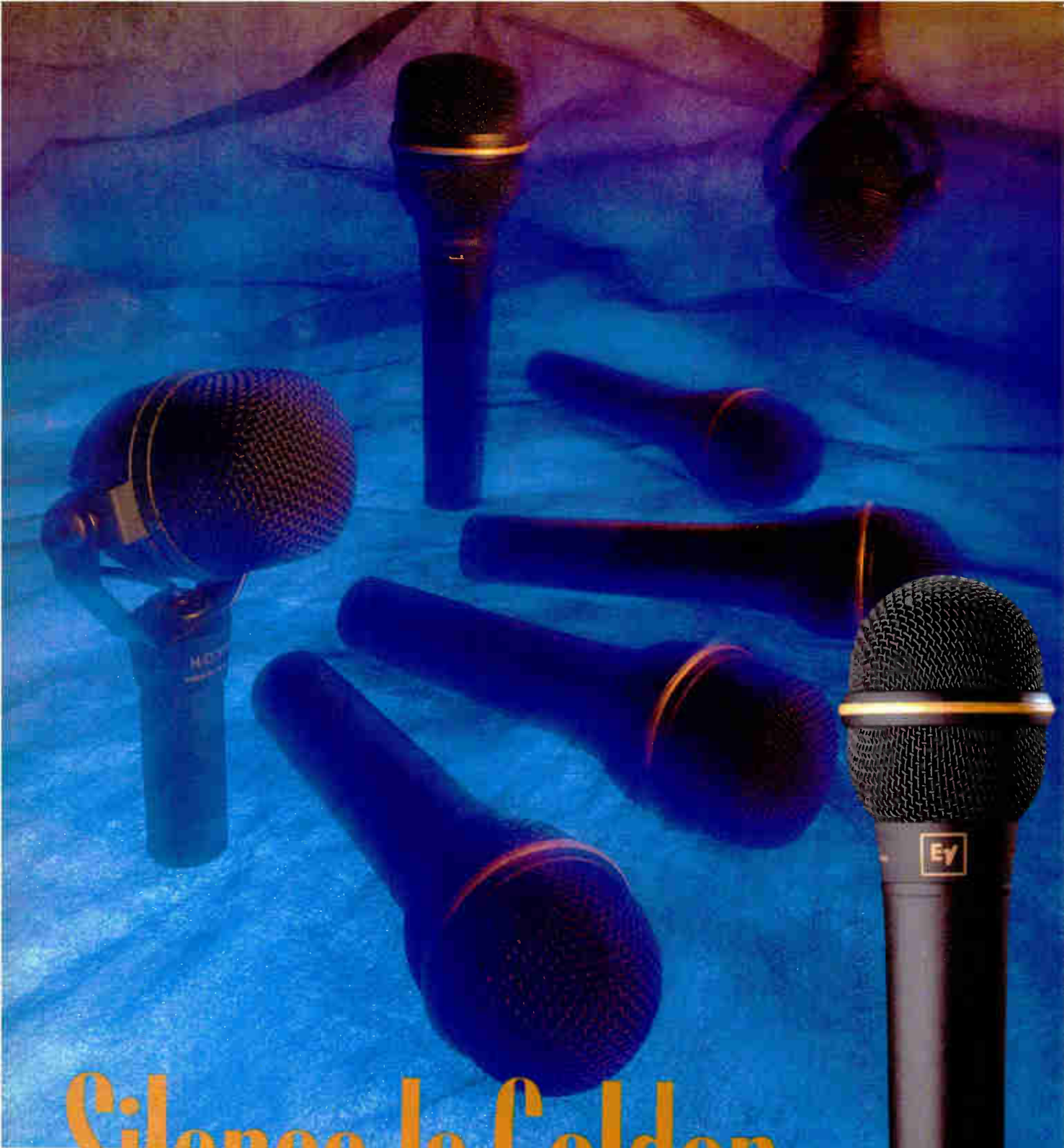
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Translator, Exodus, Nick Cave and Chris Isaak. He also had a long association with Slim's, the San Francisco club, where he was the first production manager. A memorial at Slim's brought together many who worked with Beason over the course of his career.

NEWS FLASHES

On a related note, Delicate Productions (Camarillo, CA) supplied audio and lighting production for a fund-raiser benefiting the American Foundation for AIDS Research. "Jean-Paul Gaultier in L.A.," a fashion show and dance, was attended by 7,000 people at the Shrine Auditorium. Six Martin Audio F2 cabinets were flown per side, with six more F2s and two BSX sub-bass cabinets stacked left and right. Four F1s were used as a center cluster. A Midas XL3, Ramsa WR-S840 and Soundcraft Delta console were used. Delicate's Steve Venezia designed the systems...Milam Audio (Peekin, IL) designed and installed a loudspeaker system in the new 1,600-seat Cristy Lane Theater in Branson, MO. Milam design consultant John Westra directed the installation of 30 Tannoy Contractor Series speakers in two concentric arcs of 15 CPA 15 cabinets each. Westra notes that the arced arrays give a perceptual increase in level of 4 dB to 6 dB without the risk of irritating listeners. Four more CPA 15s were hung under balconies, and two CPA 15.2 subwoofers were built into the stage. Fold-back is provided by a flown array of four CPA 15s for fill and eight CPA 12s as individual monitors...RCS Corporation (Cleveland, OH) recently took delivery of a Ramsa WR-S840 console. The board will be used for live music and corporate work. The 840 joins a WR-S852 already in use by RCS, which used that board on recent dates with A-lo Guthrie and George Clinton and the P-Funk All-Stars. The company also provided its own pro-

prietary house speaker system, the FL4 enclosure, in addition to its own custom monitors. Crest 8001 and Carver 2.0 amps were used for FOH drive, while Ashly FET 2000s were used for monitor power. A Soundcraft 200B was used for monitors in both cases...Ron Montgomery and Associates (Atlanta) overhauled Coca-Cola's 500-seat USA Auditorium there. The centerpiece of the install is a 32x8x2 DDA Q Series console. The board drives a 9-channel surround system consisting of Tannoy studio monitors and OAP subwoofers. The console is also used to feed a multilanguage-translation system and a video production room. Symetrix 501-01 compressor/limiters are used as main overload protection. Separate interactive compression and limiting control allow users to set peak limit without losing the ability to compress mild ratios at a lower threshold...Brigham Young University in Provo, UT, is installing a new sound system in the 23,000-seat Marriott Center. Plans include a computer control system based on Lone Wolf's MediaLink system, which has been integrated into QSC's EX Series amplifiers under the name Q'SControl. Twenty-seven EX4000 and 12 EX1600 amps will be used, driving an Electro-Voice center cluster along with 14 satellite clusters throughout the arena...Soundshine (Miami) recently did an installation at the Isla Mujeres outdoor amphitheater on the coast of Cancun. Several DOD R-430 EQs and a DOD RTA-4315 real-time analyzer are used in conjunction with the main system's BGW power amplifiers, Bose 802 outdoor speakers and DOD 822 mixer...The next session of Crown's IQ school will be held February 23-26 in Elkhart, IN. The class will focus on the practical applications of the current IQ System 2000, as well as the discussion of new products in the line. The four-day program is open to all audio professionals. To register, contact Sandi Walters of Crown at (219) 294-8000. ■

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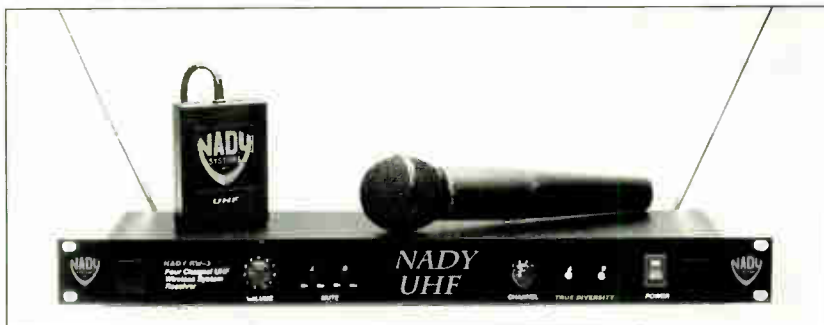
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SOUND REINFORCEMENT NEW PRODUCTS

**NADY RW-3 UHF WIRELESS**

Nady Systems (Emeryville, CA) has announced the RW-3, a rack-mount UHF wireless system featuring four user-switchable channels on the transmitter and receiver, along with true-diversity reception, balanced and unbalanced output, removable front-mount antennas and a dynamic range said to be 120 dB. The RW-3 retails at \$995 (with instrument transmitter); systems with handheld mic or lavalier bodypack transmitters are also available.

Circle #212 on Reader Service Card

CREST CENTURY

Century is the first mixer series from the Crest Consoles Division (Paramus, NJ). Models are offered in 16- to 52-input versions priced from \$5,000 to \$30,000. The Century GT is designed for FOH touring or theater sound applications; the Century SP is a lower-cost version, minus some of GT's advanced features; the Century LM is a monitor board in multi-output mono and stereo configurations. Features include an independent mono bus (fed from any input or group), eight pre/post-fader switchable aux sends (pre/post-EQ selectable on internal jumpers), 4-band sweepable EQ, two matrix mix outputs and full-function returns with high/low EQ, aux sends, bus assign level, pan and mute. Also standard is a scene mute system with four channel and effects input presets and a fifth preset for aux send output mutes.

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SESSIONS CASE HARDWARE

J.H. Sessions & Son (Bristol, CT) offers a full line of case hardware, casters, rack panels and other components for sound reinforcement companies. New to the line is a series of plastic corners for speaker enclosures and carpet-covered racks and cases. They come in several sizes, with and without a stacking feature.

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**ALLEN & HEATH GL-3**

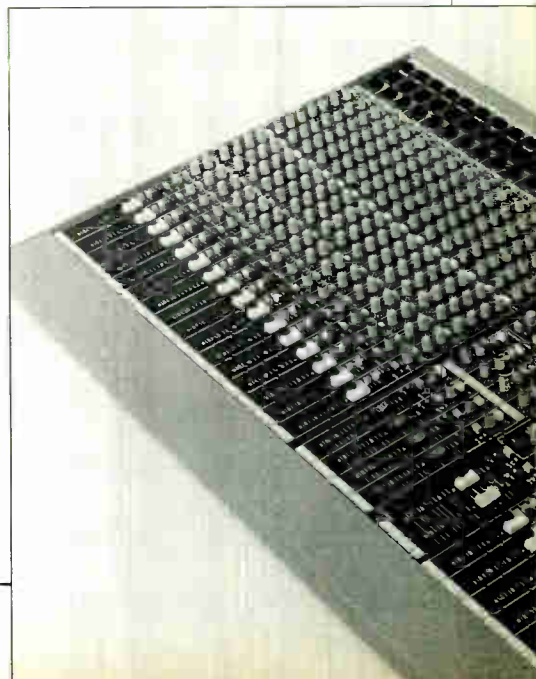
Offering the ability to operate as a main or monitor mixer is the GL-3 from Allen & Heath (Salt Lake City, UT). The GL-3 is available with 16 or 24 inputs (expandable to 32-in), and features include four subgroups, six aux sends (pre/post-selectable), 4-band EQ with sweepable midbands, and long-throw 100mm faders. The six aux sends can be switched to route the auxiliaries through the subgroup and L/R outputs, providing a full-function monitor mixer with six discrete mixes.

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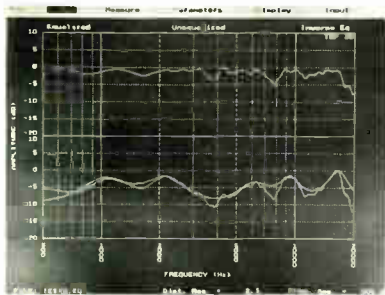
**RAMSA T-SERIES**

Designed to provide wide-range response in a compact, rugged system is the T-Series of trapezoidal speakers from Ramsa/Panasonic, Cypress, CA. At the heart of the two-way system is a new patent-pending, spherical, high-frequency waveguide, which is designed to eliminate the undesirable coloration of traditional horn designs. Coupled to a high-efficiency compression driver, the new waveguide is said to provide uniformly smooth on- and off-axis response with high-constant directivity.

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SOUND REINFORCEMENT NEW PRODUCTS



TECHRON ACOUSTAEQ

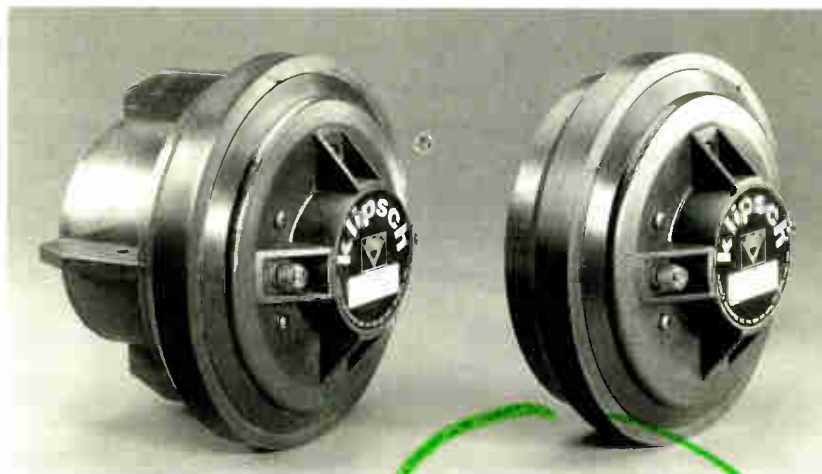
The Techron division of Crown International (Elkhart, IN) is now delivering AcoustaEQ MS-DOS software for the company's TEF 20 analyzer. AcoustaEQ simultaneously gathers and displays a sound system's equalized and unequalized frequency response—as well as the inverse of the equalizer's response—allowing fast, precise room voicing. Additionally, AcoustaEQ can differentiate between problems requiring acoustic and electronic solutions.

Circle #217 on Reader Service Card

SABINE FBX-1200

The latest offering in Feedback Exterminators™ from Sabine (Gainesville, FL) is the FBX-1200, which employs 12 independent filters, each displayed on an LCD showing the filter position, width and depth in real time. A front-panel keypad and menu display provide user control over the number and type (parametric, dynamic or fixed) of filters used. Maximum filter notching depth is -70 dB; filter width is variable from 0.01 to 2 octaves; the typical time for the unit to detect and eliminate feedback is 0.3 seconds; and the response time can be optimized for spoken voice, solo music or group music applications.

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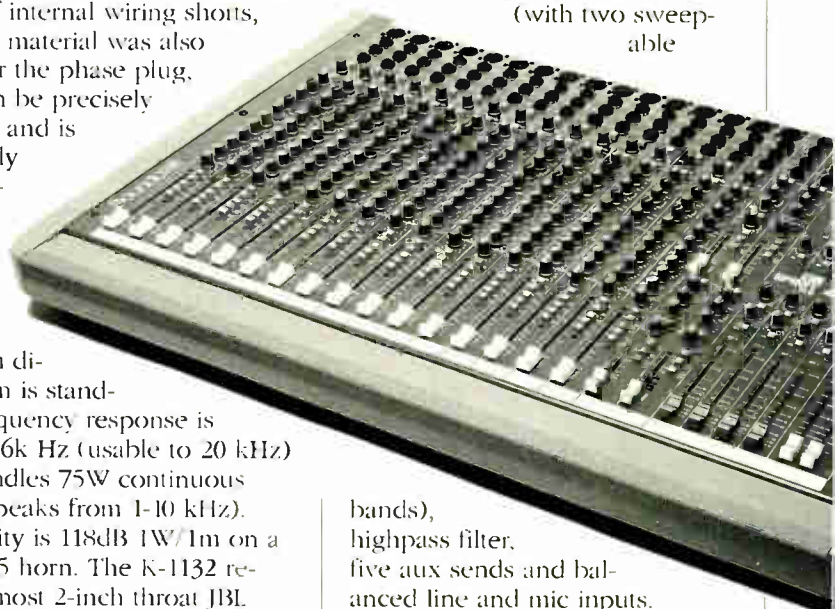
KLIPSCH K-1132 DRIVER

New from Klipsch Professional (Hope, AR) is the K-1132, a large-format compression driver that makes extensive use of Lexan 500 (glass-filled polycarbonate), resulting in a durable, lightweight design. Lexan's non-conductivity eliminates the possibility of internal wiring shorts, and the material was also used for the phase plug, as it can be precisely molded and is thermally conductive to wick away heat. A 3-inch titanium diaphragm is standard; frequency response is 300 to 16k Hz (usable to 20 kHz) and handles 75W continuous (300W peaks from 1-10 kHz). Sensitivity is 118dB 1W/1m on a K-4020.5 horn. The K-1132 replaces most 2-inch throat JBL and EV drivers; the 1.4-inch throat K-1132A replaces most Altec and other EV drivers.

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SOUNDCRAFT SPIRIT LIVE 4

The Spirit Live 4 from Soundcraft (Northridge, CA) is a front-of-house console designed for a variety of sound reinforcement applications. Available in 12-, 16-, 24- and 32-input versions, Spirit Live 4's standard features include four subgroups, 3-band EQ (with two sweepable



bands), highpass filter, five aux sends and balanced line and mic inputs. The 12-channel version has one dual-stereo input; the 16-, 24- and 32-channel consoles have two dual-stereo modules, providing four additional stereo inputs for effects returns or stereo source playback.

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NOISE REGULATION PERSPECTIVES

BY MARIA CONFORTI

W

hen it comes to outdoor concerts, what's a song for audience and engineer can be a headache for the local yokels, depending on how the wind blows. Literally. But the proliferation and variety of sound ordinances leave some pros scratching their heads. When does music become noise? Where do those guys with the little meters come from? What will Johnny Guitar say?

"The issue is not sound pressure level, the issue is noise in the community. And somebody's noise is somebody else's music," says Albert Leccese, VP of engineering at Audio Analysts (Colorado Springs, Colo.). Last summer, the company did

sound for John Mellencamp, Van Halen, ELP, Ringo Starr—all frequent visitors to outdoor venues. Leccese adds, "Nobody has a specific music regulation. It's very hard in indoor/outdoor facilities to get a good grip on what's irritating and what's not, without having it interfere with an artist's performance."

Listeners unconsciously filter out some kinds of noise, points out Jesse Klapholz, consultant at Klepper, Marshall, King & Klapholz (Melrose Park, Pa.). However, it's not easy to ignore music. "Music," Klapholz says, "especially amplified music, always has drums at its core. Drums were designed centuries ago to transmit signaled information over many, many miles. Acoustically, drums put out much more energy than they ever did in the past. So, you've got this tremendous acousti-

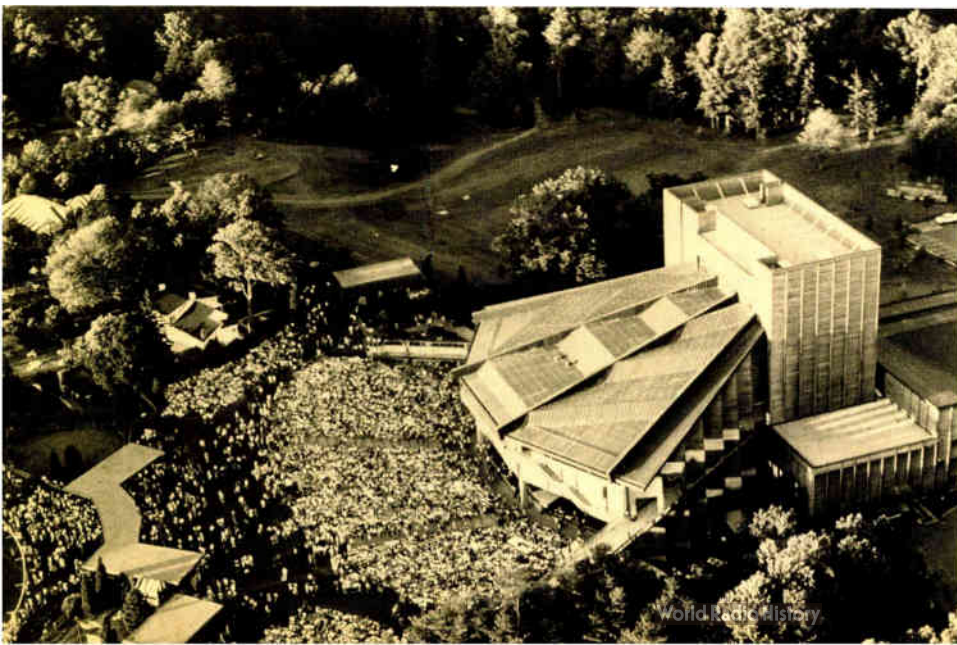
cal signal, and you're amplifying it." And that is keeping somebody, somewhere, from enjoying some late night infotainment.

Though Wolf Trap Farm's neigh-

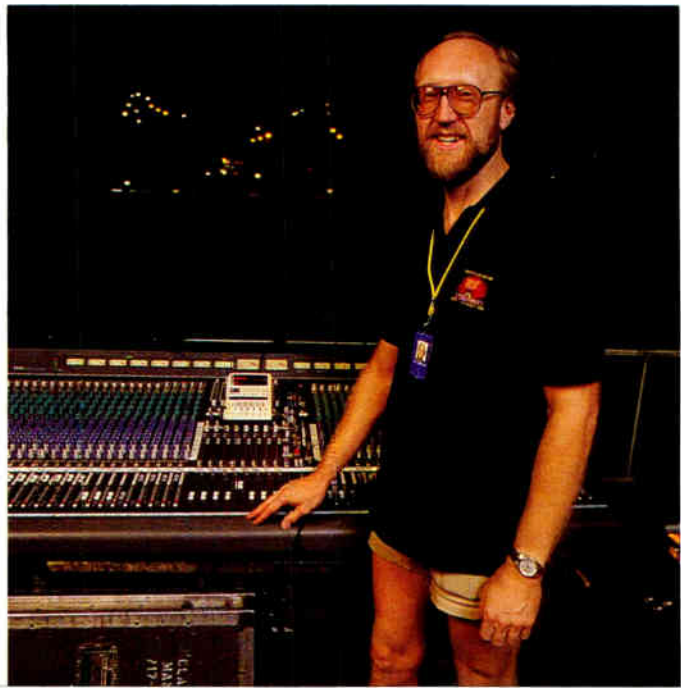


Terry Nelson: "One place they did a great acoustical treatment is the New Pine Knob in Detroit...it used to be harder than anything to get good sound out of there, but I went back this year and the place never sounded better. They put in all new padded seats, tore the gridwork out and deadened all the reflective surfaces on the shed ceiling until the sound was very directed and clean." (The treatment was designed and installed by venue production manager Mike St. Peter.)

Wolf Trap Farm in Vienna, Va.



bors rarely complain, the Vienna, Va., venue has other reasons to set SPL limits, states Ralph Hoffman, chief, division of performing arts. “We feel aesthetically at our house that sound pressure levels over 95 dBA distort and diminish the quality of sound,” he states. “We know this because we produce a lot of shows that our own sound personnel set up and mix. We know how good the house can sound. So, when a group comes in and they don’t pay attention to the acoustics of the hall and just set up their stacks and go about their normal routine [at sound check], they’re mixing in a hall that’s very reverberant, and there’s no audience. All of a sudden, the audience is in and the sun sets and the whole acoustical environment changes in about an hour—they start



“Almost all the sheds have some sort of noise limit now,” says Mike Wolf, Clair Brothers’ system engineer on Elton John’s current tour. “The Woodlands in Houston, which is close to a residential area, is particularly difficult—it’s only 102 dBA at the mixer. The crowd hits that when they start yelling, screaming and clapping, so it’s hard for the show not to hit it. 105 dBA is more reasonable. But we haven’t had any problems anywhere.”



Artie Congero: “[With today’s equipment] we are capable of delivering SPLs well beyond the threshold of pain, without distortion. That needs to be dealt with. Right now we’re just looking at levels, but we should be looking at other things, too. It’s a matter of time vs. level and what frequency and duration creates injury to the ear. There are ways to get around high SPLs and still create a loud feeling.”

mixing and it’s a mess. And we get all the complaint letters. We go to the point where sometimes we put in the program that we’re not responsible for the sound mix.”

A rider to Wolf Trap’s contract stipulates that if an act exceeds 95 dBA, the act is responsible for any resulting lawsuits. Wolf Trap has its own SPL monitoring system that measures levels at two locations in the venue. Mics are set up at the house mix position, 80 feet from the stage, and onstage at the stage manager’s console. Both levels are recorded over the course of each show. There has yet to be any threat of litigation, but Hoffman believes that the contract waiver at least brings the SPL matter to mind during the course of an evening’s work. “Those organizations that do care are watching that little video display and trying to do their best,” Hoffman says. “They’re not going to stay at 95 dBA most of the time, but there is an incremental improvement. At least I perceive that there is one. [But there are still] artists who come in, start at 105, go up to 110 and hold it there until the show is over.”

Those contacted for this article re-

ported encountering limits ranging from 87 dBA 50 feet from the stage through 103 at the console. “You can’t just come up with an arbitrary SPL number and say, ‘I only want 90 dB at the mix console.’ That’s ridiculous. You’re actually infringing on the artist’s freedom of expression,” says Leccese. “If the show is subject to confusing rules and regulations made by somebody with little knowledge and an incomplete understanding of the original intent, then you end up with a problem. Obviously, the guy who is not an expert is going to come to you—and supposedly you’re the expert if you’re the sound engineer—and you can argue until you’re blue in the face, but he’s just going to pull out that regulation and say, ‘To me this is too loud.’ So, you’re stuck between a rock and a hard place, because the artist is telling you to turn it up, and you’re thinking that is not an unreasonable request. But then the guy taps you on the back and says, ‘If you turn it up one more time, I’m going to shut the power off.’ You have to walk a tight line between making the artist, the manager and the engineer happy and

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...that both the basic and Turbo EMAX IIs are now available at unbelievably low prices. No other comparably priced keyboard can offer so much power. It's not even close.

What you don't know can hurt you. So get out of the studio, off the street and into your nearest E-mu dealer for a demo of the EMAX II.



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the local guy who is supposed to enforce [the regulation].

"There is no real standard as far as what you're measuring, over what specific time period," Leccese continues. "So it's very difficult sometimes to deal with a situation where you have a responsibility to your client and these people who paid big dollars to come hear the concert at a comfortable level. The artist feels that this is a comfortable level. The official claims it's too loud for the neighborhood based on his measurements. Unfortunately, that's the law of the land."

That sentiment is echoed by Terry Nelson, producer/audio engineer for Kenny Loggins. "You have an engineer, a mixer, a producer and an artist who want your mix to be heard the way you think it should be, and somebody telling you what to do kind of ruins the vibe. The problem is that there are county and city ordinances, and they hire county and city officials who know minus ten about sound."

From the '40s and '50s until very recently, measurements for hearing damage risk were taken from noise sources, not music, Klapholz points out. "So, you're starting out with some mistrust and animosity because people don't want [the SPL of their] music measured with the same method used to measure a steam generator." Differences in measurement technique further cloud the issue. "People are measuring sound levels," Klapholz continues, "and you don't know if it's short or long term, average or peak level, filtered or weighted, whether it's measured ten feet in front of the sound system or 500 feet away. Everybody's measuring differently and trying to communicate, but the basic precept of communication is that you must agree on the terms. That's a major problem—there are literally dozens of descriptors for levels."

In a couple of years, these murky waters may be cleared somewhat. AES's musical/acoustical levels committee, which Klapholz chairs, has a stated purpose "to encourage research in the measurement and effects of music sound levels and to develop a set of standards for measuring levels." Areas it will address include hearing damage risk due to music in various environments such as live performance venues, control rooms and homes; community dis-

turbance from live music, cars, etc.; and the application of existing noise measurement standards to music sound levels. In the meantime, Klapholz says, volume must be looked at. "The biggest problem is that, in general, we in the industry are too loud. There are many cases where what we do, especially outdoors, becomes obtrusive to the community."


Sound replacement—not sound reinforcement—is the name of the game, says Hoffman. "What you're getting is closer and closer to the effect of playing a CD onstage, except very loudly and with no accommodation to the acoustical environment in which the sound is being mixed. However, the artist doesn't care, the sound engineer says, 'You're a one-night stand, let me do my thing and get out of here.' We're considered pests if we even start to ask them to please consider the hall, consider zone acoustics." And even when rocking the house is not an issue, the sound from a shed's main system combined with its lawn system can certainly keep some of the neighbors up.

Another predicament, even at larger sheds, is overcoming the onstage monitor mix. "A lot of times you will find acts who have a sound pressure level at the console that's already exceeding the ceiling level, and it's only the monitors," says Artie Congero, an independent engineer based in Las Vegas who works with Doc Severinsen and Paul Anka, among others.

"How are you going to put your P.A. system on top of that and stay within the boundaries? It should be balanced from the get-go."

Combining mixing discipline and technique, along with the placement and aiming of loudspeakers, will give an engineer the best sound outdoors and, ideally, the fewest headaches for the night. "[Some] engineers are just going to sit there and say, 'This is stupid.' They get angry right away, and they have a horrible night," Leccese says. "The good, smart engineers will recognize the limitations of the day and say, 'That's what I have to deal with. Let me try to do the best show I can under these constraints.'"

Maria Conforti, a New York-based writer/editor, frequently covers the entertainment field



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JANUARY 1993, MIX 115

NEW PRODUCTS



GENELEC 1032A ACTIVE MONITORS

A larger version of Genelec's acclaimed 1031A studio monitor, the 1032A is a two-way active monitor with 10-inch bass driver, 1-inch dome tweeter, bi-amplified with 160- and 120-watt power amps in each cabinet. Distributed in the U.S. by QMI (Natick, MA) and designed for near-field listening, the 1032A incorporates Genelec's patented HF waveguide for smooth off-axis response and accurate imaging. Frequency response is said to be -3 dB at 42 Hz; maximum SPL at one meter is 124 dB.

Circle #227 on Reader Service Card



RUSSIAN DRAGON RD-R

The RD-R (\$499) from Jeanius Electronics (San Antonio, TX) is the newest version of the rack-mount Russian Dragon, a unit designed to compare the timing accuracy of any two sounds that are meant to happen simultaneously (such as a live drummer and click track), and to correct MIDI timing problems and delay times in delayed loudspeaker systems. The new RD-R model also includes a polarity button for checking the starting direction of input-signal waveforms and a variable masking control for ignoring sounds that are not meant to be trigger signals.

Circle #229 on Reader Service Card

EVENTIDE ULTRA-HARMONIZER DSP4000

Slated for early 1993 release is Eventide's (Little Ferry, NJ) DSP4000, offering true stereo processing, with ± 3 -octave pitch shifting, reverb, up to ten seconds of delay, and a new method of creating digital algorithms by combining multiple effects "building blocks" on a large graphics-based LCD screen. Features include AES/EBU digital I/O, 18-bit A/D and D/A converters, MIDI control and an analog bandwidth of up to 22 kHz.

Circle #226 on Reader Service Card

3M 966 TAPE

A new high-performance analog mastering tape, 966 from 3M (St. Paul, MN) combines high output with print-through levels said to be 2.5 dB lower than any other tape. The formulation is bias-compatible with industry-standard tapes, while its +6dB operating level makes 966 ideally suited for older machines that can't handle the +9dB levels of 3M's 996 tape.

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SADIE

Analog Recording Associated Systems (ARAS) of Ann Arbor, MI. is the North American distributor of the SADiE system. SADiE is a PC-based recording and editing workstation that runs under Windows 3.1 with an intuitive graphical user interface. The system includes the SADiE control software, digital audio processor card with one digital input and two digital outs (32, 44.1 and 48kHz sampling), and a 64-times oversampled ADC and DAC card with SMPTE and MIDI sync. System requirements are an IBM 486 (or compatible) with VGA graphics and SCSI hard drive (1.2 GB provides four track-hours @ 44.1 kHz).

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ROLAND DJ-70

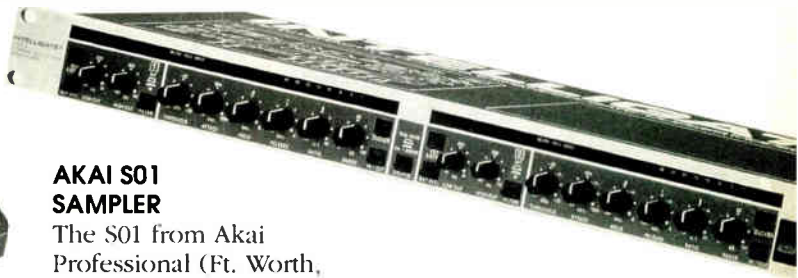
Designed for studios, DJs and broadcast/post facilities is the DJ-70 Sampling Workstation from Roland (Los Angeles). Priced at \$3,495, the DJ-70 combines 16-bit sampling with automated features such as auto-looping, a "scratch" wheel control, and the ability to assign samples to any of its 37 dynamic keys and nine pads. The sample memory can be expanded to 4 MB, providing 45 (mono) seconds at 44.1 kHz or 90 seconds at 22.05 kHz, and the unit has an onboard disk drive compatible with Roland's S-770/750/550/330 and W-30 libraries.

Circle #231 on Reader Service Card

QSC USA LINE

The USA Line of pro power amplifiers from QSC Audio (Costa Mesa, CA) includes three models: the USA 370 (\$578) is a three-rackspace amp rated at 185 watts/channel into 4 ohms; the USA 850 (\$698) is also three spaces but outputs 425 W/ch @ 4 ohms; and the USA 1300 (\$998) is a four-space chassis with 650 W/ch into 4 ohms. All models feature clipping indicators, active balanced inputs (1/4-inch RTS and barrier strip), Output Averaging™ short-circuit protection, mono bridging switch and a three-year warranty.

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AKAI S01 SAMPLER

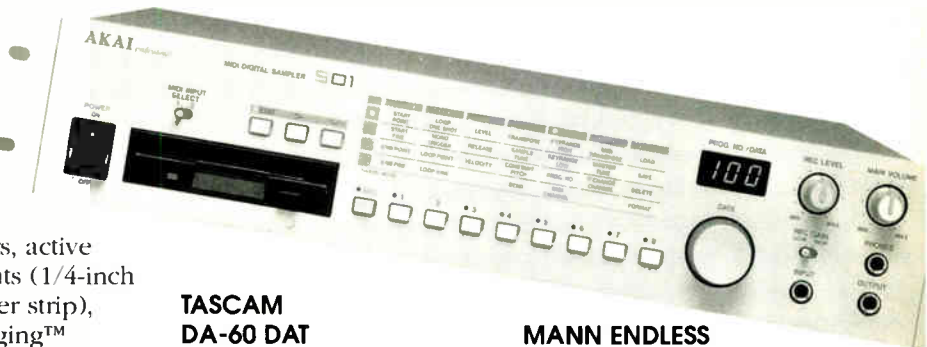
The S01 from Akai Professional (Ft. Worth, TX) is a two-rackspace unit featuring 16-bit sampling resolution, 32kHz sampling rate, more than 15 seconds of sample time (expandable to 31 seconds), 8-voice polyphony and the ability to hold up to eight programs in memory at one time. An onboard 3.5-inch disk drive allows the storage of sounds, and the S01 can load samples from the S1000 sound disk library. Retail is \$995.

Circle #233 on Reader Service Card

BEHRINGER INTELLIGATE

Distributed by Samson Technologies (Hicksville, NY) is the Behringer Intelligate, a stereo/dual-mono expander/gate/ducker featuring an Interactive Ratio Control that automatically adapts to program material and filters for frequency-selective keying. Specs include fast 3µs gating, 100dB attenuation and THD under 0.01%.

Circle #235 on Reader Service Card



TASCAM DA-60 DAT

The DA-60 from Tascam (Montebello, CA) is a full-featured studio DAT offering four-head operation for "confidence" monitoring, RAM buffer for instant starting, jog wheel, auto punch-in/out, AES/EBU and S/PDIF digital I/O, word clock I/O and 37-pin parallel port for external transport control. The deck retails for \$5,499. Optional is a \$599 sync board with SMPTE/EBU reader/generator, time code chase lock, lock to video sync, and 9-pin serial port for editor control.

Circle #234 on Reader Service Card

MANN ENDLESS CASSETTES

Mann Endless Cassette Industries of San Francisco debuts an anti-jam version of its 1-, 3- and 6-minute endless loop cassette tapes, designed to be compatible in all standard cassette tape recorders/players, including auto-reverse portables, car players and the new Philips DCC decks. Applications include cassette singles, karaoke and spoken word programs, as well as telephone "hold" music and point-of-purchase, trade show and museum displays.

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YAMAHA DA2X

Offering 20-bit performance is the DA2X digital-to-analog converter (\$1,900) from Yamaha, Buena Park, CA. AES/EBU, S/PDIF and Yamaha Y2 digital inputs are standard, as are +4dB balanced analog outputs; specs include a 110dB dynamic range and a 2-22k Hz frequency response. A "Vari Pitch" control accepts either fixed or variable word clock rates.

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E-MU SP-1200 RETURNS

Due to significant demand from rap, hip hop and industrial music producers, E-mu Systems (Scotts Valley, CA) has reintroduced the SP-1200 (\$2,795), a 12-bit digital sampling drum machine with ten seconds of sample time, onboard sequencer, eight programmable outputs with mixing capability, and SMPTE read/write facilities.

Circle #238 on Reader Service Card



SYMETRIX 601

Designed as a bridge from the analog to digital domains, the 601 Digital Voice Processor from Symetrix (Seattle, WA) converts analog line or mic inputs to 18-bit digital and then offers 24-bit digital signal processing (parametric and shelving EQ, notch filtering, dynamic filtering, de-essing, delay, stereo synthesis, gating/expansion/compression and automatic gain control). Analog connections are balanced XLR-type; S/PDIF or AES/EBU I/O ports are standard, as are MIDI control and 48VDC phantom power.

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DBX 120XP SUBHARMONIC SYNTH

Now available in a pro rack-mount package is the dbx 120XP (\$299), a subharmonic synthesizer distributed by AKG (San Leandro, CA). The unit synthesizes bass notes exactly one octave below the existing low bass information found in audio program material, building new waveforms with controls for super-low (36-56Hz) and ultra-low (26-36Hz) bass. Along with the stereo outputs, a separate subwoofer out is provided for sound reinforcement, post-production or other multichannel applications.

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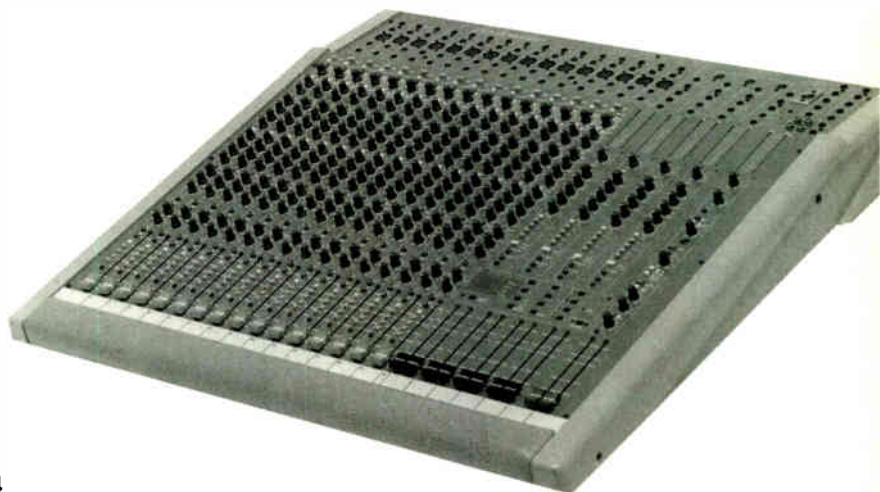
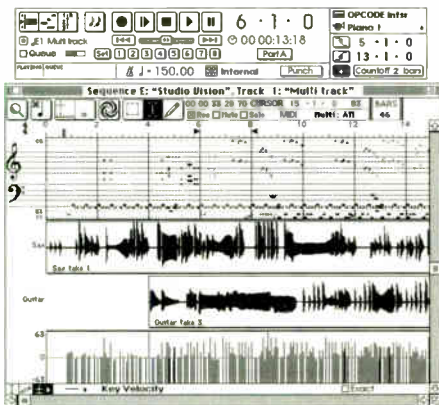
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interface that treats AES and S/PDIF signals properly and allows DAT IDs to be written across the AES digital input. Call (201) 794-3900...**The NVision NV5000 series of universal sync generators** function as a common timing reference for locking NTSC or PAL video, AES/EBU digital audio and SDIF-2 digital audio to a common clock. Selectable word clock outputs are 44.1, 48 and 44.056 kHz; AES alignment tones are available for each frequency, and video color bars or black-burst are selectable at the NTSC and PAL

video outputs. Call (916) 265-1000...The **AirCraft American Music Series** is a six-CD production music library of historical American music styles, from the discovery of the New World to the exploration of the moon. Call (800) 343-2514...Designed for the workstation market, **JL Cooper's PPS-2+** is a \$49.95 user-installable firmware enhancement for the company's popular PPS-2 MIDI synchronizer, which adds the ability to convert MIDI time code to SMPTE time code. At your dealer or call (213) 306-4131...**Time-Stream Technologies**

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**ENSONIQ
ASR-10**

The Advanced Sampling Recorder ASR-10 from Ensoniq (Malvern, PA) is a 61-note keyboard sampler with up to 31-voice polyphony and 2 MB of sample RAM (expandable to 16 MB via standard SIMMs). The ASR-10 features mono or stereo sampling capability, 16-bit linear—with 64x over-sampling—sigma-delta converters, 44.1 or 29.76kHz sample rates, polyphonic aftertouch, onboard signal processing and compatibility with all existing EPS-16 sound libraries. Options include digital I/O, SCSI connections and an expander for six stereo outs.

Circle #241 on Reader Service Card

DIGITECH VOCALIST II

New from DigiTech (Salt Lake City) is the Vocalist II (\$799), a rack-mount device that pitch shifts vocal notes without changing vocal overtones or resonance. Designed for applications requiring one or two extra vocals or a full five-part section, the Vocalist II offers 99 user-definable and factory presets, including intelligent chordal, scalar and chromatic harmonies—even a vocoder mode.

Circle #242 on Reader Service Card

**OPCODE
STUDIOVISION 1.4**

Opcode Systems (Palo Alto, CA) has released StudioVision 1.4, combining all the power of its Vision 1.4 sequencer with digital audio record/playback/editing capability (when used with Macintosh-based, digitizing hardware). New features include real-time editing; loop record/playback; waveform display (with fast-redraw mode); simultaneous counter display in bars/beats and SMPTE or real time; and the ability to set marker points to bar, beat or SMPTE locations. StudioVision 1.4 is \$995 and includes Galaxy, Opcode's universal librarian program. Requirements are a Mac SE/30, Mac II-family or Quadra computer; MIDI interface; MIDI instruments; and digitizing hardware, such as the RasterOps Media-time card or any of the Digidesign disk recording systems, such as Sound Tools, Pro Tools or the Audiomedia card.

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STUDIOMASTER P7

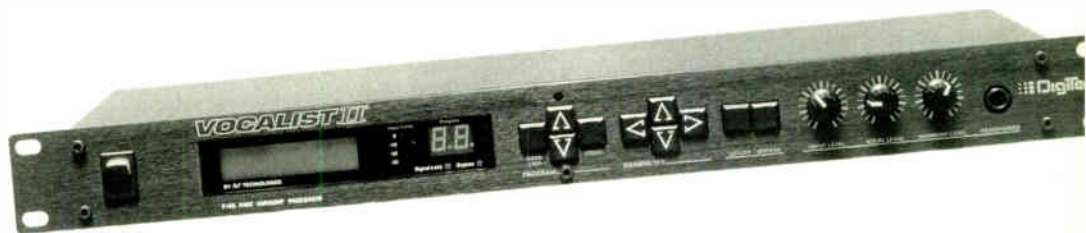
From Studiomaster (Anaheim, CA) comes the P7, an 8-bus recording console with 16 inputs (expandable to 40 inputs in groups of eight) and 99-scene MIDI snapshot mute automation of inputs, monitors and aux sends 1-4. The P7 features 4-band EQ with sweepable mids, five aux sends, in-place solo, EQ-to-monitor switching, phantom power and four stereo aux returns with 2-band EQ, pan, aux send and bus routing.

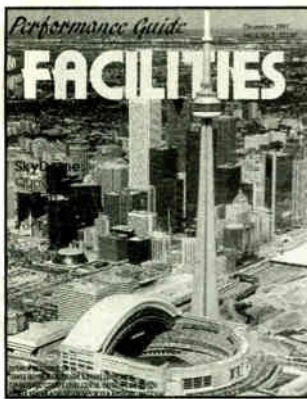
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**FOSTEX DIGITALLY
CONTROLLED MIXER**

The DCM-100 and Mixtab™ controller from Fostex (Norwalk, CA) combine to form a complete mixing system. Controlled via MIDI, the DCM-100 is a single-rack-space mixer with eight stereo/16 mono line inputs, two effects sends, two stereo effects returns, 2-band EQ, pan, mute and solo. Up to three DCM-100s can be linked with all parameters controlled by a hardware or software MIDI sequencer, or by the Mixtab controller, which provides both a tactile interface and status displays. The DCM-100 can store up to 100 settings in snapshot memories, all accessed by a single MIDI program change command.

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FACILITIES

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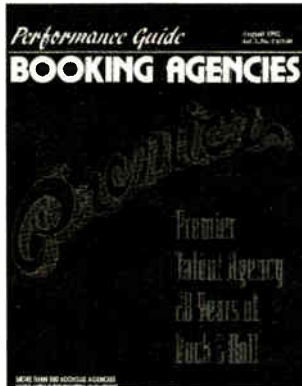
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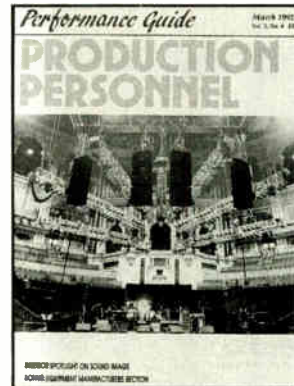
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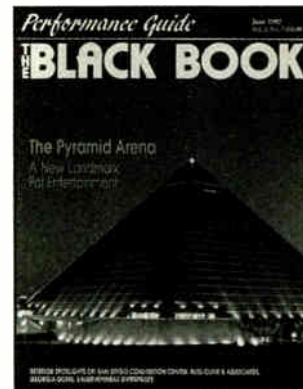
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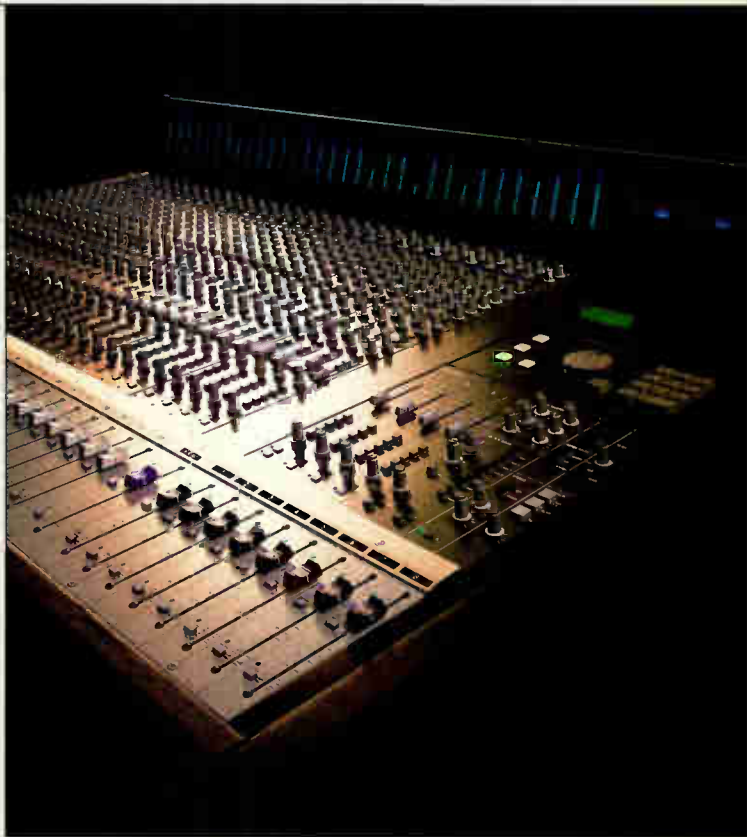
T

ASCAM M-3700 AUTOMATED MIXING CONSOLE

We all know what to expect from automated consoles. They seem to fall into two distinct categories: either some unaffordable fantasy out of the "studio spotlight" segment on *Lifestyles of the Rich & Famous*, or if it's something the rest of us can afford, the automation options are usually limited to MIDI muting or an unwieldy outboard system patched into channel inserts.

With the Tascam M-3700, you'd better forget all about these preconceived notions. Available in 24- or 32-input versions and priced from under \$13,500, the M-3700 provides SMPTE (or MIDI) time code-driven automation of faders and subgroups, with muting of main input channels, monitors, aux sends and EQ in/out switching. The system allows storage of up to 99 automation snapshots, all on 3.5-inch floppy disks for archiving and immediate access to the mix you left the day, week or month before. Additionally, JL Cooper makes a third-party enhancement for the M-3700, which brings the power of the console's dynamic automation system into the Macintosh environment, providing software-based subgrouping, onscreen moving fader status displays and offline editing, with unlimited mix storage capability.

Of course, all of this automation muscle means nothing without a solid console behind it. The audio quality is excellent and the M-3700 delivers the features that the post facility, project room or 16/24-track studio needs. The console's in-line monitor design provides a dual-signal path, so with the four effects returns, the M-3700/24 offers a total of 52 inputs (all with faders); the 32-channel version would have 68 inputs—just the thing for your next mega-input session! Also standard



are eight subgroups, 4-band EQ with two sweepable mid-bands, highpass filters and six aux sends. Control room monitoring is equally serious. There are pushbuttons for monitoring any of the six aux sends, 2-track playback, an external source or the stereo bus, along with main or reference speaker systems switching, solo, PFL, mono, -30dB attenuation (dim) and studio and headphone feeds.

By the way, the M-3700 is no lightweight: the 32-channel version checks in at just over 175 pounds, not including the three-rackspace outboard power supply (another 44 pounds). The cable separating the power supply from the mixer was only five feet long, which may be deficient in some installations.

AUDITIONS

The console layout is logical. Tascam wisely avoided the use of concentric controls, but as a result, the distance from the edge of the armrest to the meter bridge is 32 inches, so getting to some knobs can be a bit of a stretch, even for a 6-foot, 2-inch lunk like me. LEDs are used liberally throughout the board (a definite plus)—for example, there are ten LEDs that indicate status on each channel strip. The headphone jack is under the armrest, so the cable to the phones doesn't drag across the console, but right next to the headphone jack is a remote footswitch jack (for advancing snapshots). It's easy to plug into the wrong jack when you're reaching under the console during a session. One thing I really liked was the placing of the automated muting buttons at the *bottom* of the fader. Access to this essential feature is easy; even in a complex mix, you won't have to hunt for the control.

Metering is via two large, lighted VUs, with switches for routing the eight subgroups or tape returns (for tracks 1-8, 9-16 or 17-24) to eight

LED bar-graph meters. A full-length meter bridge with 24 or 32 additional LED meters is optional.


On the back panel, balanced XLR connections are provided for time code in/out, mic and 2-track inputs, and the main stereo, control room A/B and studio outputs. All other inputs and outputs, including tape and line inputs, group outputs, inserts, aux outs and effects returns, are 1/4-inch unbalanced. For convenience, 1/4-inch unbalanced SMPTE in/out connectors are also provided, as are MIDI in/out/thru ports for communicating MIDI sequencers or other peripherals with the onboard mix automation computer.

It's important to remember that the fader automation only applies to the channel, subgroup and main faders, so unfortunately all those 28+ of extra inputs you can bring in via the effects returns and small faders are limited to mute automation only. While the automation is uncomplicated and the manual does an excellent job of explaining the system, Tascam should include some sort of quick reference card that outlines basic operations for situations when an engineer unfamiliar with the au-

tomation needs to do a session. The automation can be disabled with a few keystrokes for tracking sessions or when a guest engineer doesn't have time to learn the system.


Fortunately, setting up for a mix session is simple. Select a SMPTE frame rate (30, 30DF, 25, 24fps), enter a desired start time and stripe the tape by hitting "shift+2" on the automation keypad to generate code. The M-3700 can also run from MIDI time code or song position pointer, for non-tape-based applications. The backlit LCD is small (2-line x 16-character) but does the job. And the reading, writing and updating of mix data is straightforward.

However, the M-3700's automation takes a quantum leap forward with the addition of the \$695 Pro-3700 hardware/software upgrade from JL Cooper Electronics (12500 Beatrice Street, Los Angeles, CA 90066; [310] 306-4131). The Pro3700 package includes a new ROM and daughterboard that installs into the console in under two minutes and software that runs on any Macintosh with a hard disk and 2 MB of RAM. A MIDI interface is also required, as the Pro3700 software communicates



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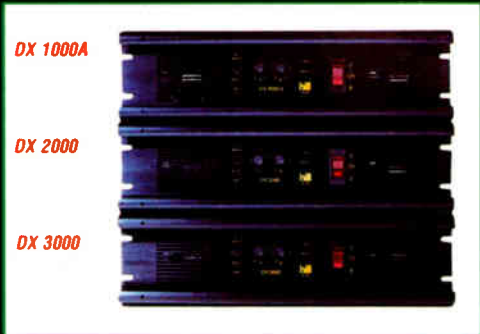
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The Vocalist by DigiTech is the only vocal processor that provides natural sounding harmonies with complete editing and programming capability. Offering a multitude of features and functions, the Vocalist accommodates up to five-part harmonies and even compensates for off-key vocals. Full MIDI compatibility combined with 128 factory presets and 128 user-definable programs make the Vocalist the only harmony processor **THAT DOES IT ALL!**



Glenn Nowak-

professional musician, South Bend, Indiana.

"For a guy like me, the Vocalist is like a dream come true. I'm now able to fatten up my vocals with live harmonies. The audience can't believe they're listening to a one-man band. This product is the biggest breakthrough since multi voiced synths hit the market."



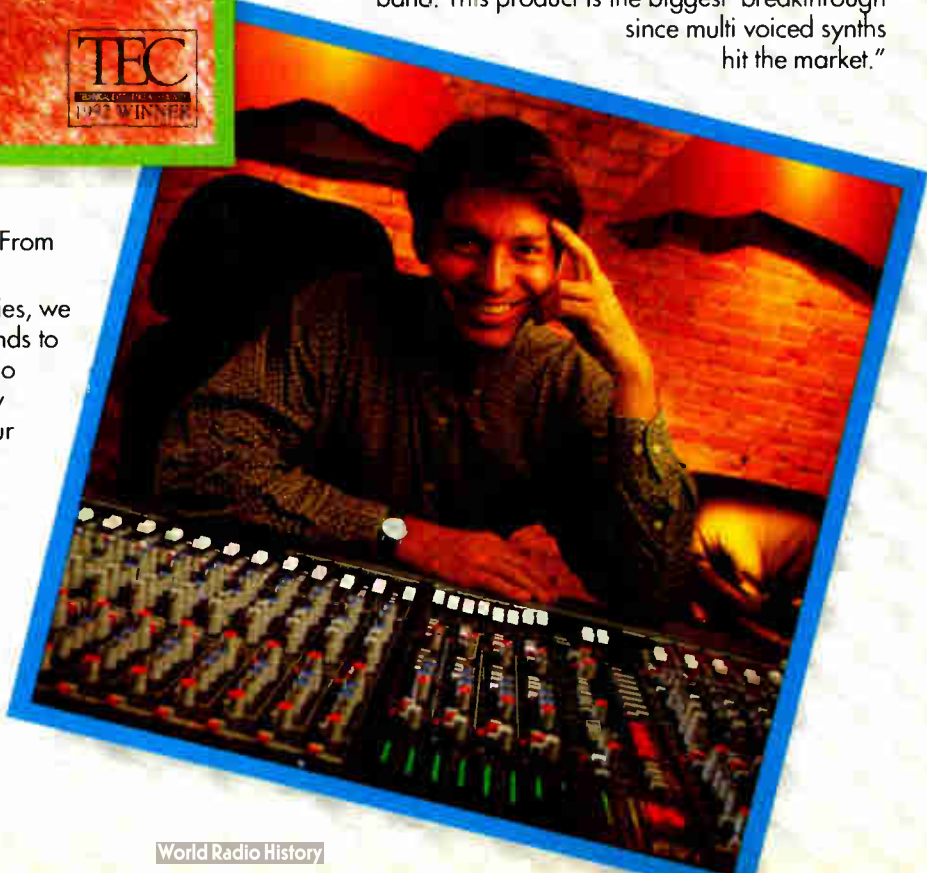
Michael Schoenfeld-owner Third Planet From The Sun Studios, Salt Lake City, Utah.

"As one of the area's top production facilities, we handle everything from recording rock bands to church choirs and we also do a ton of radio material. The Vocalist fits the bill in virtually every application. We now can provide our clients with up to five-part harmonies at the touch of a button, and even fix off-key vocals quickly."

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AMEK/TAC US Operations: 10815 Burbank Blvd, North Hollywood, CA 91601. Telephone: 818/508 9788. Fax: 818/508 8619.

with the console via MIDI. The difference between the stock automation and the Cooper version is startling—in fact, so different that mixes created on the two systems cannot be interchanged.

The most obvious change between the two systems is graphics, with a display that shows virtual fader moves onscreen (along with individual channel status and a large time code display) while mixing in real time. An auto-archive feature automatically saves mix data to the Mac's hard disk, and as automation data is received by the Mac, it is simultaneously entered into a cue list that records all automation functions. From the cue list window, the mix data can simply be altered, cut, pasted, time shifted or edited, with the ability to save an endless number of versions to the Mac. For those who are familiar with Cooper's excellent Magi II automation, the transition to using the Pro3700 version will be a snap. In fact, the two are nearly identical in operation, which should be welcome news for inde-

pendent engineers who have to learn multiple systems.

Beyond the Pro3700's console automation functions, the system can act as a real-time MIDI recorder, capturing and storing incoming MIDI events, such as signal processor data, program changes or triggering sound effects from a sampler (for automated Foley). And the Cooper system increases the speed of disk loading and saving operations by a factor of 25.

Viewed by itself, Tascam's M-3700 is a powerhouse, offering features, inputs and full-function automation that are unknown in other consoles in this price range. Add in Cooper's Pro3700 automation, and the two become one formidable combination—sort of like getting a Porsche for the price of a Chevy. Not a bad deal.

Tascam, 7733 Telegraph Road, Montebello, CA 90640; (213) 726-0303.

GOLD LINE DSP-30 REAL-TIME ANALYZER

Here's an example of a product whose name barely describes its po-

tential. Anyone who has worked in pro audio knows what a real-time analyzer is, but the Gold Line DSP-30 goes a lot further than its name implies.

Let me explain. The DSP-30 is a portable test instrument that does indeed include a 1/3-octave RTA, but it also offers a front panel numeric display for level measurements and



six memory locations for storing frequency response curves; an optional EEPROM increases the capacity to 30 memories. Other options include a

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printer port (for sending response curves directly to a Centronics printer computer), RS-232 port for sending data directly to a computer, RT-60 reverb time interface, speaker timing analysis (for measuring speaker delay requirements from 1-999 ms) and THD analysis system.

Weighing in at three pounds, the DSP-30 is housed in a 9x9-inch package that is ideal for portable or console-top applications. The display is a 10x30 LED matrix with an 85dB range, which can be accessed easily by capturing a response and scrolling up or down through the window to see any part of the curve in detail. The unit provides user-selected .25dB to 5dB scales, versatile enough to equalize rooms, ring out P.A. monitors or, using standard test tapes, calibrate a tape recorder.

The DSP-30 has a balanced XLR mic input with 12-volt phantom power, 1/4-inch unbalanced line input and external DC input for occasions when you want to conserve the life of the eight AA batteries. A calibrated, low-impedance electret

condenser mic is provided.

The DSP-30 stands apart from other RTAs in its \$1,500 price range because of its programmable functions. For example, it allows the sound pressure level or room response measurements in flat, A-weighted, C-weighted or user-designated curves. Filters are selectable, with a choice of Filter I (somewhat sharper than ANSI Class III, this is useful for large dynamic range measurements such as notch filtering) and Filter II (a triple-tuned filter equal to ANSI Class III and used for room equalization). Three decay ranges for the spectral display are provided, as are peak, average and peak hold modes.

Six memories are offered, and within these are options (user-selected variations) that are accessed from the keypad. Among these options are the ability to sum (or subtract) any selected response curves held in memory, and various other subroutines, such as connecting the DSP-30 to an oscilloscope, external monitor or computer, with the latter three requiring additional hardware.

Overall, the Gold Line DSP-30

provides versatility and power in a portable package. Anyone in the market for a solid RTA would do well to check this one out.

Gold Line, Box 500, West Redding, CT 06896; (203) 938-2588.

JVC XD-P1 PRO DAT RECORDER

If Ian Fleming were still around today, he'd insist that James Bond be equipped with one of these. Weighing just over 21 ounces (with battery), the JVC XD-P1 is a modular, full-function professional DAT system in a 3.75x1.5x6.5-inch package.

But the key to the JVC XD-P1's superspy appeal lies in its modular design. The main recorder is barely larger than a pack of cigarettes, yet the range of accessories accompanying the system allow it to magically transform before your very eyes. Add a battery pack and minijack-to-RCA adapter, and you have a palm-sized recorder with coaxial S/PDIF inputs and outputs. If you need optical digital or analog inputs, just snap on the XD-AD1, an onboard analog-to-digital converter with stereo minijack mic/line inputs, -20dB mic attenuator switch, analog-input level

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control and external 9VDC input, the latter handy for running the deck from the AC adapter/charger.

For those occasions when S.P.E.C.T.R.E. agents are nearby and you require unobtrusive operation, a thumb-sized, hard-wired remote controls transport and record functions from a safe distance.

But the recorder's hippest accessory is the MU-Z1 stereo digital microphone. In its simplest application, the mic snaps onto the side of the recorder (taking the place of the A/D converter module) to create a versatile, handheld recording system. Like the recorder, the MU-Z1 has its own set of gadgets, including a removable windscreen, snap-on battery pack (for powering the pre-amp and A/D converter cleverly concealed inside the mic body) and pistol grip. Give a quarter-twist to the Euro-thread stand adapter at the bottom of the pistol grip and out pops a tiny tripod stand, with rubberized legs providing effective shock isolation. This is very cool—almost as nifty as a *garrote*-ing wristwatch or steel-brimmed derby.

The MU-Z1 has controls for sampling frequency (32/44.1/48 kHz), record level, -20dB attenuation, low-cut filtering and a choice of wide or short-shotgun pickup patterns, but no analog outputs. Remember, the MU-Z1 is a *digital* mic (or at least a mic with an internal A/D converter), so an S/PDIF output on a 1/8-inch minijack connects this to the digital input jack on the main recorder unit via a ten-foot cable.

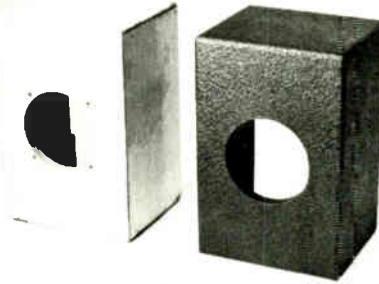
At this point, I had figured out most of the accessories, the only challenge being a couple of practice sessions while I fumbled with the "slot A into tab B"-style assemblage of the various components. After a few minutes, I started out with some listening tests, checking out a few favorite albums and a couple of cuts I had mixed the week before. I listened to these selections through the recorder's analog outputs; by connecting a *mid*-priced outboard D/A converter (meaning it *only* cost twice as much as the entire JVC XD-P1 system!), I could easily make A/B comparisons between the two. I was amazed to hear only the subtlest difference—evidently JVC did a good job in designing the dual DACs, with 18-bit resolution and 8-times oversampling. This is serious

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stuff.

The sound quality of the snap-on A/D converter is equally impressive, employing a 1-bit delta-sigma converter with fourth-order noise shaping and 64-times oversampling digital filters. This just isn't the sort of thing you expect to find in a plastic, clip-on accessory that's a half-inch thick and 6.5-inches long. However, one drawback to such miniaturization is the use of those #@\$%#! stereo minijack inputs, which, combined with the packed circuitry, resulted in somewhat degraded crosstalk performance. Crosstalk spec'd out at 45.5 dB, which is a far cry from what you'd expect from a full-sized pro system, but significantly better than other 1/8-inch minijack input models I've used, such as Sony's consumer DATman.

One sure way to get around those #@\$%#! analog minijacks is to use the MU-Z1 mic, which of course connects directly to the recorder's digital input bus. I was unimpressed by the mic's "tele" (short shotgun) setting, which had a harsh, peaky

character and a noticeable amount of noise. By contrast, on the MU-Z1's "wide" setting (standard stereo), the mic was clean, smooth and natural—remarkably free of coloration. When the MU-Z1 is used with the battery pack, you can use the mic's digital output to drive any S/PDIF device—a useful accessory to have around for multimedia, sampling or workstation applications.

The deck records at 44.1 or 48 kHz, from analog or digital sources. With the mic attached to the deck, the package balances easily in one hand, making the system ideal for location recording, news gathering or sampling on the run. If the eject button is touched even slightly during recording or playback operations, the deck kicks out of record and the tape pops up. This is hardly the sort of thing you need right in the midst of recording one of Auric Goldfinger's calls to Pussy Galore, so the XD-P1 includes a "hold" button that can disable the deck's transport controls, thus avoiding such mishaps. The standard nicad battery provided over two hours of recording and could be recharged in about

the same amount of time.

As the XD-P1's lineage is based on a consumer DAT design, the recorder includes a "hyperbass" low-frequency enhancement switch. The prototype I tested also included another holdover from its consumer heritage: Serial Copy Management System (SCMS), the audio copy protection scheme that inserts a copy-protect flag when a digital-to-digital copy of a recording is made. However, a JVC representative assured me that the final production units were SCMS-free.

The JVC XD-P1 Pro DAT packs a lot of audio flexibility into a compact field recording system. At \$1,800, it could be the ideal choice for the serious sampler, location recordist, news reporter, sound designer—or secret agent. James Bond would have loved it.

JVC Professional Products, 41 Slater Drive, Elmwood Park, NJ 07407; (201) 794-3900, ext. 241. ■

George Petersen lives with his wife and two musical dogs in a 100-year-old Victorian house on an island in San Francisco Bay.

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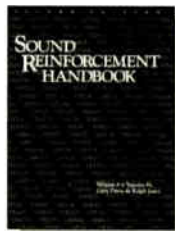
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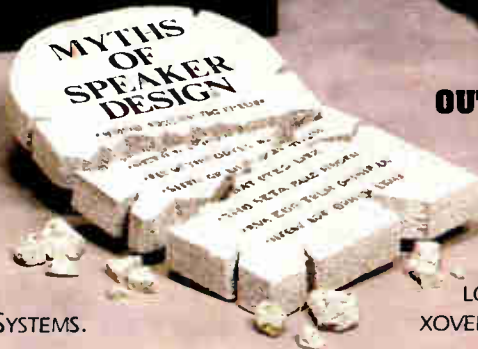


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by Dave Tosti-Lane

SPECTRAL SYNTHESIS AUDIOENGINE



The AudioEngine system is the turn-key version of Spectral Synthesis' digital audio workstation. The system is remarkably complete in its full configuration; unfortunately space limitations allow for only the briefest introduction to this "studio in a rack." My first exposure to the system was a short demo at the factory when I was auditioning systems for my theater effects studio at Cornish College in Seattle. After spending a few weeks with the Spectral system my impression changed significantly, a change that was entirely in the positive direction.

System components: (see page 136)

1. A rack-mounted 386 or 486 computer with VGA monitor/card internal hard drive and at least one floppy drive, Microsoft MS-DOS 5.0 and Windows 3.1 (actual configuration varies per customer options).

2. A Spectral FlyBy bus controller board, the heart of the system. The FlyBy card can be used for two channels of audio input and output via S/PDIF or AES/EBU.

3. A Spectral Digital Studio board, connected directly to the FlyBy board and to a slot in the computer, connecting the FlyBy bus to a SCSI

bus for up to eight tracks of audio.

4. Rack-mounted SCSI hard drives for audio storage. The number and size are determined by customer needs, based on the desired number of tracks and recording time, and range from one 410MB drive (four tracks, 65 track-minutes) to four 1.2-Gigabyte drives (16 tracks, 840 track-minutes).

5. Spectral's Microsoft Windows-based AudioWare software. This includes StudioTracks, a direct-to-hard disk controller for recording, editing and mixing of audio; and PatchBay, a program that allows the engineer to route signals in a most intuitive way.

Optional additional hardware and software are an almost certain part of every practical system and include the following components:

* An additional board attached to the FlyBy called the IO-816 connected to the rack-mount MAX-880 (or the newly announced ADAX-8818). Each board allows 16 channels of digital in/out in either S/PDIF or AES/EBU, and SMPTE sync.

* An MT800 daughter board for the Digital Studio board. The daughter board adds a dual-SCSI bus for handling 16 tracks.

* A/D and D/A converters, such as Spectral's ADIDA-2218 rack-mount modules, providing two channels each of conversion (16-bit A/D with 64x oversampling, 18-bit D/A with 8x oversampling), with both balanced and unbalanced analog as well as digital connections. Fixed frequency sample rates available are 32 kHz, 44.1 kHz and 48 kHz.

* Up to three of Spectral's Synth-CARD DSP cards per system. Each

card has dual 40MHz DSP processors that can be used independently or paralleled for single tasks. These cards allow extensive real-time DSP and sampling operations.

* AudioScape effects "rack," a

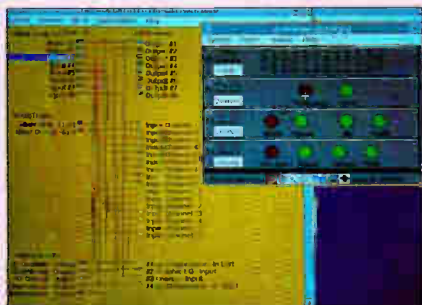


Figure 1: Spectral's optional AudioScape software (foreground) and PatchBay, part of the standard AudioWare package

software program that uses the SynthCARD's DSP capability to provide multiple effects processors in a rack-mount metaphor on the screen, including EQ, delay, chorus, reverb and so on.

* SynthEngine Sampler software, which transforms the SynthCARD into a 16-bit sampler with up to 16-voice polyphony, and MIDI control.

* Magneto-optical, 8mm or data DAT back-up options.

* JL Cooper CS-10 Control Station, providing scrub wheel, pushbutton-style transport controls and eight faders linked to the software mixer. (See "Mix Automation with the CS-10," *Mix*, April '92.)



Figure 2: The Editor window for StudioTracks, part of Spectral's standard AudioWare software

I could probably fill this entire article with a list of possible configurations and still be accused of leaving out the obvious ones. However,

don't be put off by its apparent complexity: In terms of user interface, the system could hardly be more friendly. In addition, one can start with a basic system and increase it as requirements and available capital grow.

The system I tested consisted of the following: 486/33 computer with 4 MB of RAM; ATI Graphics Ultra Super VGA card, internal hard drive; 5.25-inch high-density floppy; Microsoft MS-DOS and Windows 3.1; NEC 5D 21-inch color monitor (and later NEC 4D monitor); FlyBy bus with Digital Studio card; one SynthCARD MAX-880 with I/O-816; four ADDA-2218 A/D-D/A converters; four SCSI hard drives (for audio); JL Cooper CS-10 with MIDI interface box (and card for the computer); and a full complement of AudioWare software, including StudioTracks, PatchBay, AudioScape and AudioVision.

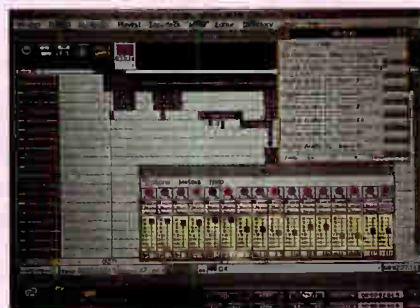


Figure 3: StudioTracks Mixer window

My first impression was that the system is very well-designed and constructed. The complete system can be installed in a short rack, including computer, four drives, and 16 channels of A/D and D/A. My evaluation unit could be packed into a single roadbox, with the exception of the video monitor. Connections are simple and straightforward, and everything is well-labeled. I made a point of setting the system up in the studio without using the manual (though I did check the manual before firing it up), and I had no difficulty making the right connections using everyday (un)common sense.

I didn't care for the "brick-on-a-rope" power supplies used for many of the modules, though this is easily remedied by mounting the supplies

—CONTINUED ON PAGE 135

Live Recording With the Spectral System

by Mark Hermann

Record *live* onto a computer? No tape machine? No truck? You can't do that! Sometimes rules were meant to be broken.

Well, that's exactly what happened recently when Powwow Productions of Playa del Rey, Calif. (headed by producer/engineers Michael Seven and me), brought a Spectral Synthesis digital workstation to the world-famous Roxie Theater in Hollywood.

At the heart of Powwow's totally mobile studio is a 16-I/O.



Producer/engineers Michael Seven and Mark Hermann with the Spectral Synthesis workstation live at the Roxie.

256-virtual track Spectral Synthesis AudioEngine with four 1-Gigabyte SCSI disk drives, the largest system of its kind in Los Angeles, using a 486/50MHz PC. "This system is so portable we call it our 'lunch box.' But make no mistake, the Spectral is a complete digital studio," says Seven. (In fact, it fits into the back of a standard minivan, and the van can still seat five comfortably!)

We felt that while worksta-

—CONTINUED ON PAGE 138

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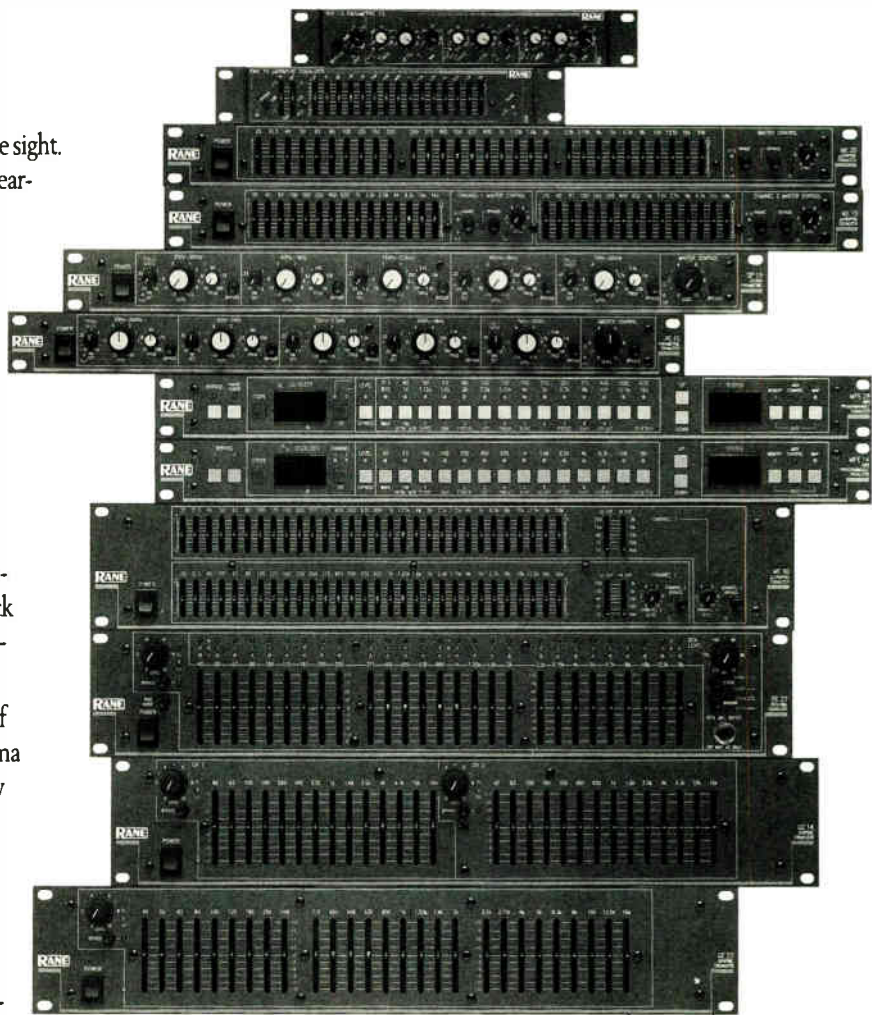
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—FROM PAGE 133

on a panel attached to the rack. Obviously, some care is needed to keep the transformers away from low-level signal paths, but they produced no hum on anything in my studio, and I went out of my way to try them in "worst case" arrangements. The rack-mount computer case is well-designed to shield audio components from the maelstrom of RFI sources in a fast 486. This may seem like a small thing, but systems can be brought to their knees when you ignore such details.

Operation is straightforward. A quick modification of the AUTOEX-

—CONTINUED ON PAGE 136

AudioScope

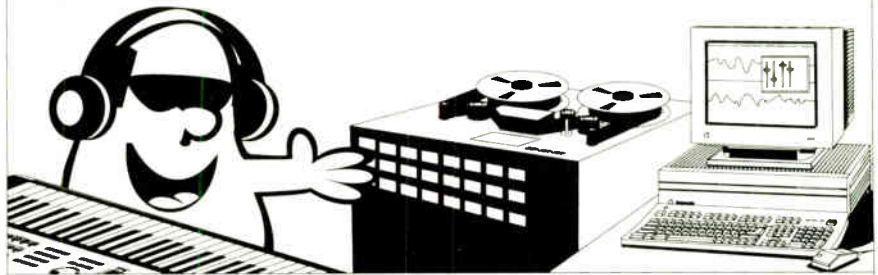
What has 16 digital effects devices with rack-mount ears on each, yet weighs no more than a floppy disk and fits in a bread *crumb* box? It's AudioScope, the digital effects processing software from Spectral Synthesis. Using the DSP processors on the SynthCARD(s) installed in the AudioEngine, AudioScope puts a "rack" of equipment on your screen and allows you to save and recall different racks for different projects.

The individual devices can be patched into the digital path in any combination using the Patch-Bay, and they closely resemble the gear they replace, right down to the little rack ears and mounting holes. Not only can the various racks and patches be saved for recall, you can also use the Windows Macro Recorder to simplify repeated setups. With one SynthCARD, it is possible to have as many as five devices in use, and adding more cards allows more.

These units won't have you throwing your Lexicon 300s in the trash, but they are certainly handy from time to time, and extremely simple to insert into the session. AudioScope includes: stereo 7-band graphic EQ, delay, compressor, 4-channel mono mixer, delay with oscillator, noise gate, parametric filter, test tone generator, chorus and more.

—Dave Tosti-Lane

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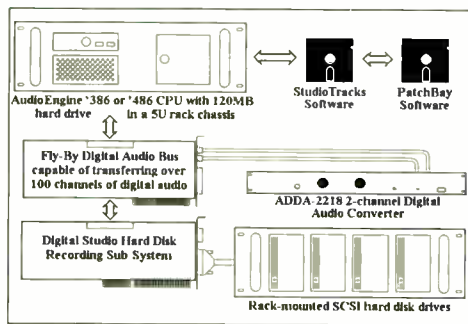
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—FROM PAGE 135

EC.BAT file and the system comes up every time you power on. You can be laying tracks in minutes, without opening the manual. After a two-hour session with Spectral's Mark Donges, I was able to begin assembling an effects track. Most operations are intuitive, and the ability to sample sounds from the directory listings is excellent: Just click on the listing with the right mouse button and the sound plays.

One nice touch is the naming convention for the sound files, which sidesteps the usual DOS 8/3 limitation, allowing longer names with spaces and punctuation. The



AudioEngine system basic components

Windows help facility is context-sensitive and clear. I was able to navigate the program easily, and with the ATI Graphics Ultra in the demo unit, help files came up very quickly.

Most *Mix* readers have seen enough articles about digital workstations to have a good idea of the basics. I'd like to mention a few, but I will concentrate on those points that are unique to the Spectral system. One of the AudioEngine's most striking features is its flexible bus approach, which is particularly handy considering the wide variety of effects "devices" available in the AudioScope program.

The PatchBay program (Fig. 1) provides this flexibility and is aptly named. The graphic image of a patch bay is easy to follow and easy to use; the cursor even transforms itself into a little balanced phone connector when you are adding patches and an "X" when you are deleting them. While the patching assignment is not "attached" to a "project," patching can be saved in a file and quickly recalled. The convention of

using the same name for the patch file and the project file makes this very easy, and the ability to call up different patch setups almost instantaneously is great. Most users will quickly develop a library of patch assignments and be able to set up for a session by simply selecting an appropriate icon, say "record16" (16-channel recorder setup and patched for cue out and studio monitors), mixdown, etc.

Whenever you call up a "rack" of effects equipment in AudioScope, the equipment immediately appears in the current patch bay window, though you do have to make the patch connections to use it. This allows a parametric EQ, for example, to be patched in insert-return fashion on a single input channel and then later be patched in the stereo mixdown by simply recalling a previously recorded patch. Engineers will find this very intuitive and comforting in that it closely resembles our familiar analog world. On the other hand, in the hardware version, when you touch the patch cord, it rarely changes color to highlight its connection. (If it does, it's very late and you should really be in bed.)

The Multitrack window is probably the place most will use as the normal operating environment. A combination of a playlist and a graphic display, it's arranged as a stacked set of "tracks" (up to 256), which appear as a band across the screen, with a title block and a mode button. There is a large "wiper" that locates your position during playback (and recording). Each track has a series of "events" consisting of recorded sounds from the disk.

There can be more than one incidence of each "segment" from the disk, but it actually exists on the disk in only one place. This is why, as with most DAW systems, you can have significantly longer projects than your actual hard disk space could accommodate. Each event has a title, start and end point, and is color-coded to indicate the disk where its original segment resides.

Crossfades between segments are indicated by an "X" at the "splice" and are easy to accomplish. Five switchable buttons at the top of the window provide multiple operations. This sounds awkward but is actually very handy. For example,

Ins and Outs

One of the strong points of the Spectral system is the flexibility of connections it allows. The FlyBy bus board has two channels of S/PDIF in/out itself, and with the addition of the I/O-816 board, the options increase. The MAX-880 rack-mount interface connects to the I/O-816 to provide eight channels of S/PDIF or AES/EBU in and out and can be connected to up to four ADDA-2218 2-channel A/D-D/A converters, with both balanced and unbalanced analog connections. In addition, the MAX-880 can accept an external sync signal independent of the audio signal, allowing the system to be slaved to video.

Just introduced by Spectral is the ADAX-8818, a potential replacement for the MAX-880 on systems that are primarily used for recording analog sources. It provides eight channels of A/D-D/A, along with two channels of S/PDIF and AES/EBU in/out, external sync, including slave to video, all in a two-rack-unit space. In addition, this unit provides a meter bridge for its eight channels. Its projected list price is under \$4,000—about half the equivalent MAX-880 and four ADDA-2218s. It promises to be a popular addition to existing 8-channel AudioEngines and a popular configuration for the typical music studio. If additional digital connections are needed, an ADAX-8818 owner can simply add a single MAX-880 without the ADDA-2218s, or perhaps a second ADAX-8818 for 16 analog and four digital channels.

—Dave Tosti-Lane

when you select a button (originally shown as a question mark icon), it "lights up" and is "sticky." If you then select a segment of a track, a dialog box pops up with information about the selected audio, with options to make adjustments. Select a crossfade, and a similar box appears with the parameters of the fade.

Now suppose you want to adjust the relative volume of each segment in the mix. You click twice on the same button, and a menu pops up.

Choose "change volume" and the icon changes to a volume knob. Now when you click on an event or segment, a little fader pops up, and you can adjust each "piece" of the audio separately, in real time, even while the track is playing back.

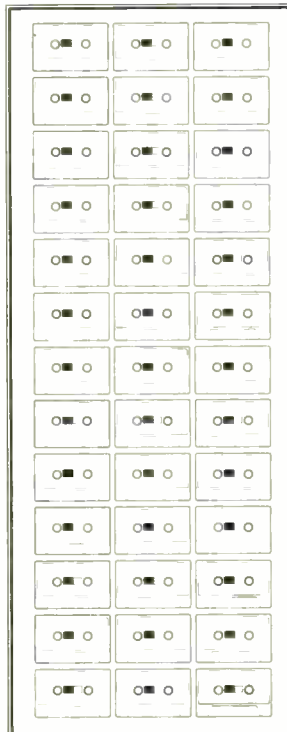
To create crossfades, choose "edit transitions" from the menu. Selecting the end of a segment brings up a dialog box with a number of fade in/out choices. A few words about the way the system handles crossfades: The system defaults to performing the crossfade calculations the first time you hit the play button for an edited file. For a session with lots of crossfades and fades in and out, this can take a while, even on a 486. In fact, you can eliminate any possible frustration almost completely by changing the default for loading a project to "calculate crossfades on open" in the Projects window. I find delays on opening a file to be more natural than delays between hitting play and hearing audio.

Initially, the method of recording a track seemed awkward. If you just set up a patch and try to start recording, you'll get no response. You must first define an empty "event" and then record the audio into that event space. This could be a very good thing: It prevents the accidental recording over a previous event and makes the disk handling easier and more efficient, as you have pre-defined the space needed for the recording. The problem is, you *do* have to make a reasonable guess as to how much space you need. If you overestimate, the fix is immediate and easy: Just select "clear unused space" from the dialog box that greets you after you hit stop. Should you underestimate, the machine simply stops recording at the end of the predefined event space, so you lose the remaining sound.

Once tracks are recorded, you can begin the normal "cut and paste" operations to put together your opus. This can be accomplished in the Multitrack window by dragging and dropping the segments on the screen, or you can switch to the Editor to see a graphic representation of the sound waveshape. You can open as many tracks as you like in the Editor, though the number you can see at once depends on the resolution and size of the screen you use.

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With the very lovely NEC 5D on the evaluation unit set to 1024x768 resolution, it was possible to see and

work with about five tracks at once. With the smaller 4D set to 800x600 resolution, four tracks were on-screen at once, but it was possible to scroll through as many more as you

needed. In addition to basic cut and paste, you can perform DSP operations (Fig. 2) including gain adjustment, normalization, wave shape inversion and reverse playback.

The Mixer window (Fig. 3) is about as easy to understand as it can possibly be. If you can operate an analog mixer, you can operate this one, and with the JL Cooper CS-10 attached, it is even easier. Coupled with the PatchBay, the mixer allows you to mix 16 tracks down to two, or 12 down to four.

The SynthCARD's Sample Editor functions could be the subject of a complete article (if not a small book) in and of themselves, but they offer the capability to edit sampled sounds in the same way you edit tracks. You can also extract envelope information from one sample and apply it to another, as well as "draw" a new envelope for an existing sample. The edited samples can then be mapped across MIDI note parameters to create new "instruments," which can be loaded into the SynthCARD's sample RAM for immediate MIDI playback.

Finally, I'd like to share some observations from my visits to the Spectral offices. I was impressed by the people I met at Spectral. There was an easy and friendly atmosphere, neither big-business stuffy nor techno-nerd exclusive, with a commitment to provide all the needed support to new and existing users of Spectral products. The tech staff was able to answer questions quickly and accurately (though the product was so stable for me that I really had almost no need to call).

The Spectral Synthesis Audio-Engine is one of the most capable, flexible, complete digital workstations available today. And priced from \$13,250 for a turnkey 386/33MHz-based system with 380MB hard disk and 4-channel capacity (an 8-track, 486-33 system with DSP board, AudioScape and 380MB hard disk retails at \$19,480), the Audio-Engine is worth checking out.

Spectral Synthesis, 19501 144th Ave. NE, Suite 1000A, Woodinville, WA 98072; (206) 487-2931. ■

Dave Tosti-Lane is a theatrical sound designer currently serving as chair of the Performance Production Department at Cornish College of the Arts in Seattle.

—FROM PAGE 133, LIVE RECORDING

tions had made sufficient strides in film and video post editing, this was just the tip of the iceberg," Seven explains. "We wanted to take it to another level, into the live setting. The ability to edit and manipulate live audio gives us incredible flexibility to fix, move, even pitch-correct any given track."

Our task was to record Crimey Jean, a headlining rock act in L.A.'s thriving music scene. The band consists of drums, bass, electric and acoustic guitars, four background singers and lead vocal. It was very important to capture the essence of a live Roxie show, so a Sony stereo mic was used for room ambience. Seven handled the live mix, while I oversaw the recording. Consider the memory necessary to record a full 50-minute set on a 16 track contiguous, direct-to-hard disk system, and one begins to grasp the magnitude of such an undertaking: approximately 13 hours of total audio!

After tapping a split from the stage, signal was routed to Manley 40dB tube mic preamps, where the signal continued on to Aphex's 9000 Series modular rack. Within the rack are the 9901 parametric EQs, Expressor compressor/limiters and the Dominator "brick wall" peak stop limiters. The beauty of the Dominator lies in its ability to tune signal peaks to within 0.1 dB. It's a must for full utilization of 18-bit converters when digitally recording.

There was a problem with the bass guitar clipping, even with the mic pre turned all the way down. It was nearing showtime, so we decided to bypass everything and plug the mic cable straight into the ADDA. "We would have to address it later," Seven remembers. "The recorded volume was so low that when we did a peakscan of the waveform it barely showed any appreciable level." Fortunately, the

Spectral system allows for DSP normalization, whereby an audio segment is elevated to maximum peak volume. Seven adds, "We were astounded to discover a crystal-clear bass track with absolutely no distortion or noise."

On playback of the room ambience tracks, we found that the imaging and depth were unreal; like you were right there! There was, however, an objectionable delay between the room and the source tracks due to the mic's position, but we wanted the room to be up front in the mix. We used the mouse to "grab" the stereo room tracks, graphically moving them forward in time and thus bringing the mic position to the stage. (Execution time: 5 seconds. Try that on analog!)

The true power of Powwow's operation lies in the ability to free the artist from the post-production fix-it blues (e.g., "move a late kick here, an early snare there; pitch-correct that vocal"). With no overdubs from the band, it almost sounds like fun.

There's nothing that can compare to that moment when an artist is tuned in, the audience is turned on and the energy between the two becomes pure magic. It's something that could never be captured in a recording studio. How often has an artist felt that if only this or that show were recorded, they could put it out as an album?

"We now have the ability to capture live performances in the truest sense and produce finished digital masters without tape and without involving the artist after the curtain comes down," comments Seven. Taken a step further, Powwow can actually take the best tracks from multiple shows and combine them into one great performance without ever sacrificing the energy from the moment it was created. Sometimes, rules are meant to be broken. ■

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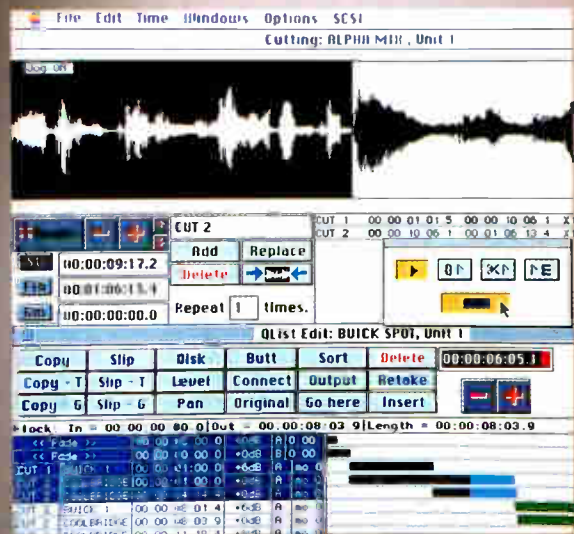
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FACILITY SPOTLIGHT

Post Perfect's Mixed Nuts

Video houses putting in audio rooms is old news. But a video house putting in *three* audio rooms, each with an SSL Scenaria, is big news. Last month Post Perfect, the five-year-old video post house in Manhattan, opened Mixed Nuts, a tapeless digital audio "facility within a facility."

Mixed Nuts consists of three identical audio post rooms—acoustically designed by Bill Morrison—occupying 8,000 square feet within the 40,000-



PHOTO: ROBERT WOLFSCH

square-foot Post Perfect complex. According to VP and director of creative

services Dean Winkler, the facility philosophy —CONTINUED ON PAGE 143

SCORING AT HOME

Bethune: The Making of a Hero

There's a wonderful film being released this month that a lot of people won't

get a chance to see. *Bethune: The Making of a Hero* has played in Canada for more than a year and has seen limited release in Europe, but because present-day Hollywood finds it easier to market films like *Encino*

Man than the life story of rebellious Canadian doctor, many Americans outside major markets and the art-house circuit just don't have the opportunity to see independently produced films, no matter how good they are.

Thankfully, Tara Releasing of San Rafael, Calif., has picked up Stateside distribution for the Nicolas Clermont and Pieter Kroonenburg production. Donald Sutherland stars as Dr. Norman Bethune, a Montreal physician who champions a form of socialized medicine that puts him at odds with the 1930s medical establishment. Following a number of personal and political conflicts, he travels to Spain and introduces battle-line transfusions during the Spanish Civil War. In 1938 he travels to China to join Mao's 8th Route Army in

—CONTINUED ON PAGE 143



PHOTOS COURTESY OF TARA RELEASING

Audio Technologies for Film

PART ONE: PRODUCTION SOUND

Despite what the politicians say, Hollywood is a relatively conservative town. Nowhere is this more evident than in the time it takes to

embrace new technologies. To be fair, there has been a mini-revolution in the audio post-production market, fueled mainly by independent houses that

saw the potential for electronic editing systems early on. And now Sony Pictures, Disney and other majors have entered the digital post age. WaveFrames sit beside (or have replaced) Movio-las, and Pro Tools has its space beside flatbeds. But by and large, filmmaking is a traditional craft run by traditional methods.

Over the next several months in this column, *Mix* will take a look at audio technologies for film. This month we look at production sound,

neatly breaking it down to mics, mixers and recorders. And if anyone thinks that techniques and equipment change slowly in audio post, they need only look at production sound, where a typical Nagra 4.2 has a shelf-life of 20 years and Sennheiser 415s are still boomed every day.

"I jokingly said a long time ago that the only



Nagra IV-S

real advancement in the motion picture industry has been the slate that we use—the clapperboard," says L.A.-based production sound mixer Richard Lightstone, C.A.S. "It went from this chalk slate to a little more sophisticated high-tech plastic with digital slates and time code readouts. There have been developments in tape stocks and film stocks, in tools for post-production, but production-wise we've made mi-

Stelladat



Richard Lightstone

nuscle advances.

"It's funny," he continues. "because there was a time when we worked predominantly over-the-shoulder, and then we started going back to sound carts. And these carts become bigger and heavier, with more equipment than ever before. It's almost like

Nagra-D

we're going back to the days of Westrex recorders in trucks. The more technology we have, the larger surface we need to work on. Portability is not the issue. It's like you have little studios on wheels now, but they're not contained in little air-conditioned trailers. You're out in the middle of anywhere, hauling them upstairs, into rooms, around corners."

RECORDERS

Lightstone's comments may be true, but the production sound communi-



ty is now in the midst of a big change with the nearly simultaneous introduction of the Nagra-D and portable time code DAT machines from Fos-

—CONTINUED ON PAGE 144



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—FROM PAGE 140, POST PERFECT

calls for duplicates and even triplicates. "There's nothing worse than having a client ask, 'How come I'm not in the good room?'" he says. "All of our online rooms and audio rooms look identical, sound identical, have the same equipment complement and the same acoustics. The differences are transparent. We had three mixers lined up—all excellent guys—and that was key. You can have the best hardware in the world, and it doesn't matter if you don't have the people."

All three mixers come from the New York post community. Richie Becker and Joe Vignoni were pulled from Howard Schwartz Recording; Bart Smith comes from BV Sound. Needless to say, they're excited about the opportunity to work on Scenaria. Each room is outfitted with custom Westlake monitors, Otari multitracks, Lexicon, Eventide and dbx outboard gear, and a range of vintage Neumann mics. The Scenarias have been beefed up with six magneto-optical drives and 50 gigabytes of storage.

Attached to each room are *large* vocal booths, which might seem odd considering that the primary function is commercial voice-over. "It's very important that talent feels comfortable," Winkler explains. "There's no advertising like word-of-mouth, and talent has a lot to do with that. Also, the mixers are miking situations where they are creating choreographies, with as many as four people in the booth, and they need a lot of separation to get the ambience they want."

Post Perfect has consistently been at the forefront of digital video technology. The facility was among the first to install Grass Valley Kaleidoscopes and has purchased Quantel's new Henry system; rooms are connected through a Grass Valley 7000 serial digital router; and the central machine room contains nine Sony D2 videotape recorders and six D1 machines. Forty percent of the D1 work has been in the European PAL format. So it might seem odd that initial plans called for high-end analog audio mixing suites, and Winkler admits that part of that comes from an inherent bias against digital audio.

"Like a lot of the record-buying public, I think CDs suck," Winkler says. "I spend a lot of money on

what's sitting in my living room to be able to play the damn things back, and even with a bunch of Wadia products, the sound of CDs is bad: 44.1 kHz at 16 bits is not a reasonable number. If you listen to some of the early [CDs] against the more modern ones, yeah, there's a definite improvement. And I think the move toward 20 bits is a step in the right direction.

"Having said that, I have a big-time bias against digital audio," he continues. "However, in the commercial world we are digitally mas-

PRODUCT SPOTLIGHTS

The Universal Studios Sound Effects Library

Universal Studios, in cooperation with Sound Ideas (Richmond Hill, Ont., Canada), has made available a collection of more than 1,000 classic sound effects from Universal's feature film library. Containing sounds from movies such as *Jaws* and *Earthquake*, and TV series (*Airwolf*, etc.), the five-CD set includes animals, weapons, explosions, wild west sounds, science fiction effects, vintage and modern aircraft, battle and fight sounds, and much more.

TimeLine Lynx-2

New from TimeLine (Vista, Calif.) is Lynx-2, the second generation of the Lynx SMPTE time code module. Completely compatible with all existing Lynx systems, Lynx-2 incorporates all the features of the original Lynx, adding a gearbox processor (for X-frame and variable speed sync) and serial transport control interface as standard equipment. The system requires a minimum of two Lynx-2 modules (one per transport) for basic master/slave operation; however, the system is easily expanded by adding more modules, the Keyboard Control Unit and Lynx System Supervisor. In a controlled system, Lynx-2 allows a tape machine to be connected to a video editor, digital workstation or console automation system. Options include plug-in cards for film bi-phase or VTC operation. ■

tering on the D1 and D2 formats anyway. The trick is not doing a bunch of D-to-As and A-to-Ds—the most evil thing in the audio world—and that's where Scenaria comes in. If we're coming in on DAT, we don't convert at all. If we're coming in on an analog source like a Nagra, it happens once and then gets laid back to the tape machine through serial digital.

"This is the first system I've seen where you jog the video, you jog the audio, and it's all together the way it should be," Winkler adds. "In the commercial world it's normal to revise a spot a half-dozen times. That's life. And with Scenaria, it's all on disk—the EQs, the routing, everything. You want to make a revision? Stick in a magneto-optical and I'll be with you in 30 seconds. That's big.

"Finally," Winkler says, "when we looked at the price-delta between a mid-end to high-end analog room vs. the Scenaria room, it's nothing. If anything, the Scenaria is cheaper than, say a full-blown 48-channel SSL with twin digital multitracks. I think SSL has very cleverly priced these systems." ■

—FROM PAGE 140, SCORING BETHUNE

their battle against Imperial Japan, bringing modern medical care and setting up jungle hospitals and medical training.

Bethune is officially a joint Canada-China-France co-production, which meant that the Western film crews (along with Chinese technicians) were allowed into some of the most remote regions of China, including the lush and magical Wutai Mountains and various stops along the Yellow River. Photography also took place in and around Madrid and Montreal. It is truly a visual feast, deservedly labeled an epic.

It might surprise some, then, that the orchestral score was composed and recorded entirely in the home studio of Alan Reeves. No big scoring stage. No 30-piece string sections. No real bassoon. Few listeners will be able to tell the difference.

"The producers kept telling me over and over, 'Do it at home, but it can't sound like synthesizers. It has to sound like a real orchestra,'" Reeves says. "One of the French investors was quite upset. To quote him, 'My God, you're not going to do it in L.A. with a synthesizer, are

you? As if I use just one."

Reeves certainly uses more than a single keyboard, though his equipment setup might be considered "quaint" by some. A Korg M1 served as the master keyboard, augmented by a Kurzweil 1000PX, SX and HX; Sequential Prophet VS; Roland D-550 and MKS-50; and a Yamaha TX81Z. A Forte MIDI Mentor handled the routing of all MIDI instruments, and Roland S-330 and Akai S900 samplers were used.

The entire score was recorded at Reeves' home to a Linn 9000 sequencer and mixed down to DAT. He uses a Soundtracs PC MIDI 24 inline console, with 56 channels available in mix mode, and monitors through Dahlquist DQN-9 speakers—he's been a big fan since 1975.

All composition and scoring was done to a JVC half-inch videotape recorder with time code capability. "The dialog was on the left channel, and the time code was on the right," Reeves explains. "I took the output of the right channel of the video machine and connected that to the input of the Linn 9000. I set the SMPTE time when the cue would have to start and then put the Linn into 'record.' The very frame it would have to start, the Linn would jump into 'record,' and I would play. It's basically done on the fly. Then we would send off a stereo mix."

Reeves is the first to admit that the Linn seems antique in this age of computer-based sequencers, though his 9000 was highly modified by Bruce Forat after Forat Electronics purchased the Linn inventory. "When this film came up, I was thinking of buying a Mac and picking up Performer or Vision," Reeves says, "but I decided against it because of the learning curve. People would say to me, 'How do you put up with it? You can't go backward, you can't do this and that. Why don't you have a computer?' Well, I'm fast on the Linn, but I've since purchased Studio Vision, along with a Mac IIci and Pro Tools."

Master's Workshop of Toronto, where the final film mix took place, sent Reeves blank DATs (pre-stripped with time code), so he could simply lay the score in at the given points. Editing was minimal. If a part sounded wrong, Reeves would play it again or change a particular bar. Most of it was in real time, not quantized. After two months of composi-

tion and recording, engineer Peter Kelsey was brought in for the mix-down.

Reeves' biggest challenge, obviously, was to make his home recording sound as big and full as a symphony, and he had to accomplish it in three different styles since *Bethune* takes place in three different locations and three totally different cultures.

"I basically had to come up with three very distinct colors," Reeves says. "For the China section, there is the main theme—mainly a string-based orchestra with some piano and bassoon. The rest is mostly harp, Chinese flute and strings. My string sounds come mainly from the 1000PX and SX on the same patch, and I do a slight detune. I complement that with the Roland MKS-50, Korg M1, and sometimes the VS. It's basically a very careful blend of each instrument. The Kurzweil excels at authentic string sounds, yet at the high end it's a bit icy, whereas the Roland, being totally analog, is not authentic but does have some warmth to it. So I edge some of that in to take the coldness out. I spent a long time adjusting those blends.

"The Canadian color was mostly '30s dance band music," he continues, "and there I did use live sax and upright bass. The rest of the orchestra was mostly Kurzweil and some M1. You get some of the fullness by doubling, but you have to be careful because sometimes you start adding and it gets smaller. Detuning helps, and a lot of times the authenticity comes from all the imperfections—players not quite in tune with each other, not quite spot on.

"The Spanish color was entirely acoustic guitar and strings," he adds. "The guitar was Korg M1, which I tweaked a bit, and the strings are again Kurzweils with some M1 added and a little bit of D-550. The flamenco feel comes from the Korg. It's very convincing. The more you have a sound that resembles the instrument, the more you're going to play like the instrument. It was very easy for me to get into the Spanish flavor with the sound that I had."

A completely self-taught musician, the British-born Reeves plays neither guitar, harp or any of the other instruments used in the score. He's a keys man, one of the finest, and a dedicated listener. "Any good composer who has a sampler or

two—maybe some sample playback machines, some analog synths, even some FM synths—can do practically anything," he says encouragingly. "I don't see the limitations. I'm not the first person to score a film at home, and I won't be the last. This was an epic film done with modest equipment. You don't need a million-dollar control room to turn out great-sounding work." ■

—FROM PAGE 141, AUDIO TECHNOLOGIES

tex and Stellavox. Analog Nagras, the industry standard for more than 20 years, will not disappear any time soon. You can be sure of that. We are in the middle of a recorder evolution—not revolution.

"There's so much interest placed on what is going to be the next format," says Mike Riner, senior product specialist at Audio Services Corporation, the unofficial outfitter to the Hollywood production sound industry. "In the past it wouldn't have been such a big issue because the production sound department would buy five of these and five of those and five more of those. But these mixers are now independent, and they have to inventory all this equipment. They want to make sure they buy the right machine. They don't want to guess wrong and have it sit at home while they rent what the producer requests. Nowadays it could be Nagra, Nagra with Dolby SR (Bryston interface), DAT or Nagra-D. I, and we, think the future lies in DAT."

Independent production sound mixer Chris Newman, C.A.S., a 23-year feature film veteran whose credits range from *Medium Cool* to *The Godfather to Silence of the Lambs*, is currently working on a Jonathan Demme film on-location in Philadelphia. He's running the Nagra-D and a stereo Nagra. It's not that he's anti-DAT—he uses a Panasonic machine regularly for effects; it's just that DAT will never have more than two channels, and it's the four channels he wants out of the Nagra-D.

"For a recent low-budget picture shot in New York, we wound up using radio mics 42 out of 47 days, sometimes as many as seven for setup," Newman says. "And that's okay with me, but we only had two tracks available. I would have loved

—CONTINUED ON PAGE 146

to have four tracks. I was a big proponent of 2-tracks when they came out, and I bought my first stereo Nagra 20 years ago. The big attraction of the Nagra-D is its four tracks. The fact that it's digital, that's marvelous. The fact that it is essentially a computer with a transport on it, that's marvelous, because the possibilities go even further than anything we've begun to think about."

Some might argue that four tracks means doubling the possibility of problems in the editorial transfer process. Every production sound mixer has a transfer horror story, a thought not lost on Newman. "Sure, there will be resistance," he notes. "There is still resistance to 2-tracks 20 years later. On the other hand, when we reach the point where we can write instructions on the software without actually affecting the tracks, where we can hand a roll of tape to a transfer operator who is essentially locked out of the transfer process, where we make the fades on a software basis rather than a hard audio basis, then we are right there. We can eventually go back and deal with the tracks in any manner that we want to."

What, then, goes on the four tracks? "If you're doing a lot of lavalier stuff and the people are overlapping, you save yourself having to try to make the fades and hide the background from mic to mic," Newman says. "If you are doing a number of lavaliers and you want to float an open mic to fill the background—to cover clothing noise, etc.—you can put that on a third track. If you do a big, wide shot and you want to use close mics and perspective mics, it's a natural. If you want to do overlaps, where somebody jumps in, you can have a mic waiting. Are we going to use four tracks on every setup? Probably not."

"It's what I would call intelligent sound recording," he says in summary. "Macho sound recording is where you take 29,000 microphones and mix them down to one track, and I'm not sure that macho sound recording is the way to go."

Richard Lightstone recently returned from Zimbabwe, where he captured sound for *Bopha*, an anti-apartheid film directed by Morgan Freeman and starring Danny Glover. In the dry, dusty environment, his primary recorder was the Fostex PD-

2. He ran a Nagra IV-S backup at 15 ips and simultaneously made a digital clone to an Aiwa HDX-3000 DAT machine, which was also used to gather effects.

The Fostex time code DAT has been in the field for more than a year now, and though Version 2 software has corrected most of the time code glitches, one problem remains: DAT machines draw a lot of current. Fostex recommends an Anton-Bauer NP-13 NiCad battery, which most people, including Lightstone, are finding yields about 40 minutes of recording time.

"Because we were in a place that has 240-voltage, I brought about four different power sources," Lightstone says. "I had a 240-to-110 step-down transformer. I used the NP-13s, and they have a superb charger that conditions the battery. And I had a Powersonics lead-acid battery—which Mike Riner helped develop—that is a 12-volt, 33-amp-hour battery with Pelican-type case. I could power the mixer and recorder for literally two days if I had to. Of course, it weighed 26 pounds, which isn't something you put over your shoulder, but it ran very efficiently off my cart."

No power problems for Lightstone, and no problems with the dry dust, which many were concerned about with the DAT medium. This was Lightstone's first experience with the PD-2, and after ten weeks of shooting he's a big fan simply because of the quality. "With digital, everything is so clear," he says. "Those imperfections in your backgrounds, particularly location work, are going to show up. But the dialog elements are so crisp and clean that everything works to your advantage eventually. It all has clarity. What you hear going in is what's coming off the tape, which is not what we're used to with analog."

"When I started the show," he continues, "I was just concerned with recording past the so-called digital-zero. Then I began to think, 'Wait a minute. This is still going to work in an analog medium. I've got to make sure that the mag chain can handle the kinds of levels that I'm putting down.' So I often used the Nagra's modulometers as my reference. I guess I was going back to some tried-and-true methods."

"But I think the interesting thing is that in working with 60-minute

DATs," Lightstone recalls, "I was going through a maximum of two a day. The amount of stock you have to deal with is so much less that it's frightening. You feel like you've forgotten something. I'm used to running at least five reels of 1/4-inch a day, and you work those reloads into your operating scheme. With the DAT, you just never run out of tape. Also, you can roll a little more at the beginning and end of a scene, which helps in post-production—gives them those handles they need for ambience loops and so on."

[Editor's Note: *The Stellavox Stella-DAT, the only other location digital recorder with a confidence head, is now shipping, though information on a field-use project arrived too late for this article. Look for a report in an upcoming issue.*]

MICS

Shotguns, radio and lavaliers. If there has been any trend over the past several years, it has been a move away from shotguns and toward personal radio mics, brought on largely by demand for cleaner dialog in noisy locations.

"Nothing replaces one microphone in the hand of a skilled boom operator—for ease-of-use, for clarity, for less bothering of the actors, for less manipulation in post-production," says Newman. "But if we are going to work on jobs where more actors control the set, where directors give actors the room they are looking for, where locations are getting noisier, then we go more and more toward personal mics."

"Thirty years ago, you didn't have radio mics whose RF transmission, audio quality or packaging was conducive to being put on an actor," continues Newman, who uses Micron wireless exclusively. "The mics got smaller, the transmission range got better—although that's not a serious consideration in feature films—and the audio quality got sufficiently good so that in fact, if you know what you are doing, you can make the radio sound like an open mic."

For shotgun exteriors, Lightstone prefers the Neumann KM82 and 81; for interiors he's a big Schoeps fan, specifically the MK41 supercardioid. "Like most people I use radio mics only when I absolutely have to," he says, with a nod to Vega Dynex II, model numbers 66 and 77. "Many

—CONTINUED ON PAGE 148

TRI-POWER SERIES

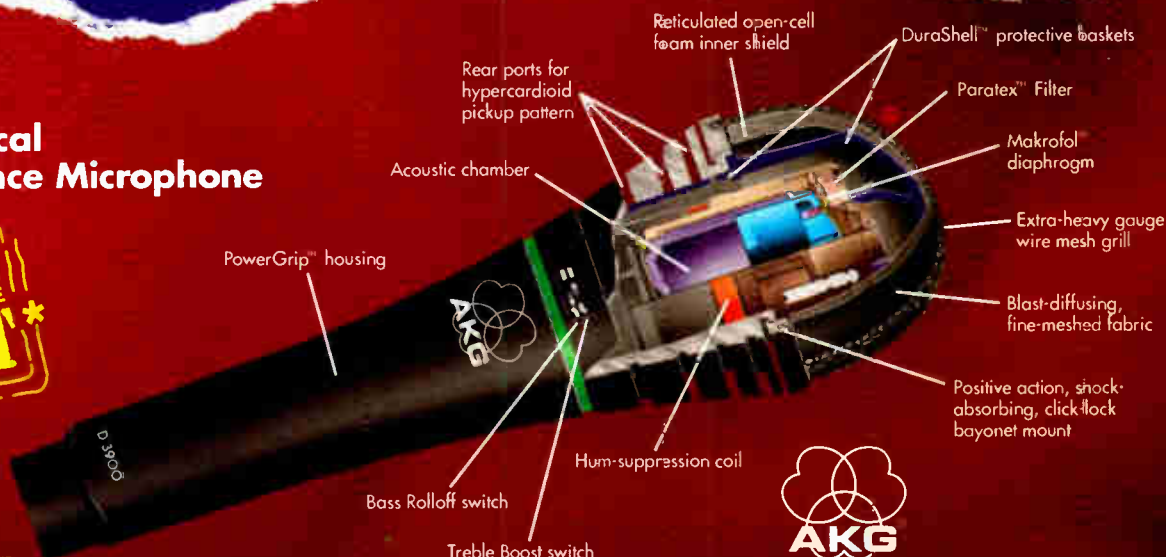
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new directors and production people are not as aware of the tricks used years ago to work out sound editing problems. They might not realize that when radio mics were not prevalent we would cut in the tracks from the medium shots and close-ups, overlap them into the wide shots, and it would work fine. But directors often feel that they have to hear everything in every shot, which leads to the use of radio mics."

Interestingly, neither Newman or Lightstone use the most popular wireless being sold today, the Lectrosonics. According to Riner, Lectrosonics began making inroads about four years ago with its Pro-Mini-L system (CR185 receiver and M185 bodypack transmitter) and now holds a major share of the market. Vegas are also very common, as the company has consistently updated its companding system on the Dynex Series. Micron and Swintek, popular years ago, are still being used but are rarely sold anymore.

With 12 years at ASC, Riner has seen what sells and what doesn't; what's used and what isn't. Neumann shotguns remain popular with

a large group of loyal users; and the Schoeps MK41 supercardioid is standard, often used instead of a shotgun. But the Sennheiser MKH-20 through 70 Series is the most common, with their digital recording series RF condenser microphones, the MKH-60 and MKH-70, outselling all other shotguns on the market, according to Riner.

MIXERS

Not many changes here. It's mostly Sonosax mixers out there, though Cooper is making some inroads with its CS-106. You have to remember that production sound is a relatively small market, with few manufacturers, so equipment tends to have a long lifespan and sound mixers tend to use similar, though often modified, gear. That's one reason the Nagra remains unchallenged (the other being that it's simply regarded as the best analog recorder, production or otherwise) and the Sonosax has such a heavy presence.

"Kind of kiddingly, I've placed certain mixers in certain eras," Riner says. "In my opinion, the Sela was the mixer of the '70s, the Sonosax

was the mixer of the '80s, and because of price and other things, the Cooper is the mixer of the '90s. Yeah, there's an awful lot of Sonosax out there, and very few mixers are trading them in to switch to the Cooper. But if somebody is getting into production sound right now, Cooper offers a better value."

Newman disagrees. "The Sonosax is still the mixer for the '90s," he says, adding that his primary mixer is a highly modified 7x5 Sonosax. "The next thing we're going to see—and this is a number of years away—is mixers with digital outs. The A-to-D [conversion] will be in the mixer. We might even see a mixer with a computer port on it, which will send fade commands to the recorder. This is all quite good in theory, but we'll have to see what they're willing to make and willing to charge, and what we're willing to spend. There comes a point where the law of diminishing return operates, and independent sound mixers can't afford to spend thousands of dollars." ■

Tom Kenny is a Mix associate editor.

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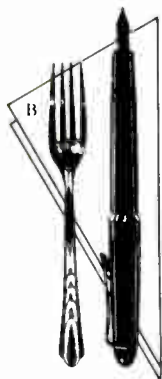
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SUZANNE CIANI

SYNTHESIS OF SOURCES



This lunch started rather late, after a day of AES shenanigans in San Francisco last fall. I found myself in the good company of musicians, producers, recording studio moguls, press champions and—Suzanne Ciani. She had no problem at all joining a bunch of “convention guys” (gads, what a thought!) for an impromptu meal at Little Joe’s, a festive Italian joint in nearby North Beach. I’m sure we were all glad to have this Priestess of the New Age at our table.

A graduate of Wellesley College, Ciani earned a master’s degree in composition from UC Berkeley, studying with such explorers of electronic music as Max Matthews, John Chowning and Don Buchla. She then moved to New York, where she pioneered sound design for television advertising with her Ciani/Musica production company. From there she branched out to scoring films such as Lily Tomlin’s *The Incredible Shrinking Woman*, creating sounds for arcade games and pro-

by Mr. Bonzai

ducing a series of instrumental albums that have touched the hearts of listeners around the world. She has just released *The Private Music of Suzanne Ciani*, a compilation that spans a decade of her work and includes two new tracks.

There is nothing wishy-washy about Suzanne Ciani. She's talented, independent, savvy in business and the arts, and she laughs easily at the absurdities of everyday life. I phoned her a few days later at her new California home, tucked away in some remote redwood sanctuary, both near and far from the hustle and bustle.

Bonzai: How would you trace your new-age roots back in time?

Ciani: When I was 7, my mother came home one day from a fire sale with a huge collection of records, and that was my introduction to music. My roots are basically classical. I grew up with the music of Bach, forward through the late 19th century and the Romantic era.

Bonzai: Is it true that you were

playing Bach before you actually knew the scales on the piano?
Ciani: Yes, I taught myself to read music, which is really pretty rational. If you know where one note is and one line, you can figure out the rest. I discovered where middle C was—under the “S” in Steinway.

I loved it so much, sitting at the piano for hours and hours each day. I was afraid to taint that in any way and avoided a lot of the forums of educational music. When I got around other music students I was uncomfortable because they were so petty: “Did you hear the C-sharp in the third bar?” Although I had friends who were serious musicians, I was very protective of my relationship with music. Eventually, I did major in music in college and went to graduate school for composition and had private teachers.

Bonzai: You studied with some interesting people, like Don Buchla.

Ciani: He's interesting, to say the least. I must say that I was totally under his spell. He came into my life when I was really searching, and it

was a wonderful coincidence of time and place. I had come to the West Coast and graduate school, looking for this thing called a “synthesizer,” this electronic music and new possibilities. After I got my master's degree from UC Berkeley, I immediately went to work for Don. And he fired me after my first day because they found a cold solder joint. He said, “It must be the new girl.”

Bonzai: So you were actually on the assembly line. Were you guilty?

Ciani: I was absolutely not guilty and refused to be fired. I told him that I was not leaving, and I came back to work the next day. He let me stay.

His designs for instruments were extraordinary. This was a guy who brought the thought process of designing musical instruments right down to the origin of physical human nature and music. He's a real instrument designer. There is nobody like him, still.

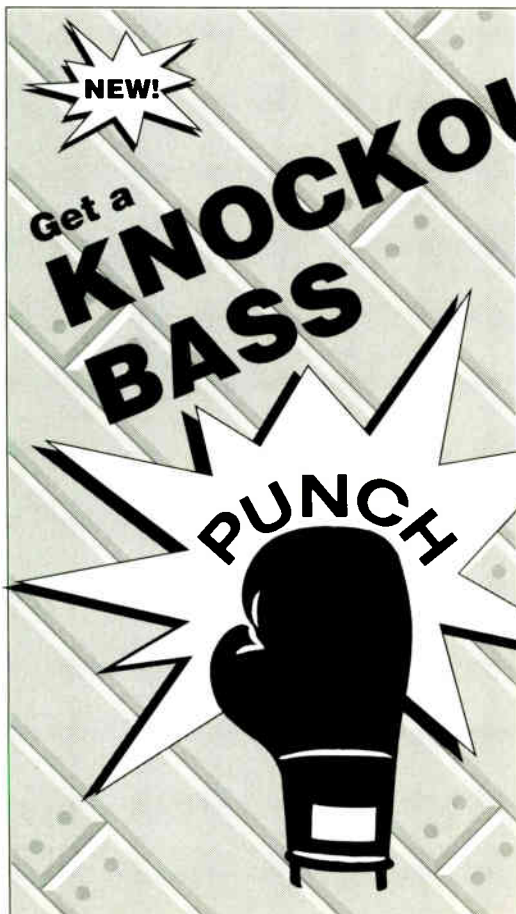
Bonzai: Why hasn't he achieved more recognition?


Ciani: I would say it's a personality

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thing. [Laughs] He's very uncompromising—let's say *totally* uncompromising—and distrustful of the "establishment." He had one early arrangement with CBS where they bought the rights to some of his instruments and then changed them in the manufacturing process. Nobody quite saw his vision, and the marketplace was more concerned with communicating on a mundane level, selling stuff that people understood. His designs were exotic and superior in many ways.

Bonzai: Let's jump to your begin-

nings in the recording world. Your debut album, *Seven Waves*, was first released in Japan—was it successful?

Ciani: This was in the days before fax machines, and communication was slim. I think it did well.

Bonzai: How did the word get out here in America?

Ciani: It was underground here. Before I finished the album in 1981, I started looking for record deals. I went all over the States and all over Europe and got nowhere. Then it hit me like a bullet, and I went to Japan and had five deals offered to me.

Bonzai: How did you finance this globetrotting?

Ciani: That first album was very expensive to do and took me two years. I've always tried to work in

the quality domain and used whatever state-of-the-art was available. I financed my records by doing commercials.

Bonzai: What's your best-known commercial work?

Ciani: I did a popular series of Merrill Lynch spots—the bull in the china shop and all the bull commercials. I did the "Coke and a Smile" campaign, the Columbia Pictures logo, and the General Electric "Beep" talking dishwasher. And this goes way back, but it was all over the world: The Coca-Cola "pop and pour" sound was done on The Buchla.

formance you could hit a key and have it do any number of things—play a note, start one sequencer, stop another one, transpose something else. You could give commands from this keyboard and also use it to play melodies. You could put in portamento or non-portamento. It was a wonderful keyboard, but it was tricky to play.

Actually, when I was doing session work during the disco era I was using that touch keyboard. I injured my finger because I was playing this rhythm part and banging down so hard on the touch plate. I was completely overwhelmed by the volume of the music, and to this day, that finger is sore.

Bonzai: What other tools did you have then?

Ciani: During the recording of the first album, the instruments progressed. I had an Eventide Harmonizer and digital delay. There was an Oberheim that came along. There was an Arp string ensemble. Toward the end of the album there was a Prophet 5. And there was a little thing called an Arp Pro-Soloist, which was a monophonic keyboard. Almost everything was monophonic, and for sequencing there was the Roland MC-4, and somewhere there came along the Sequential Circuits Sequencer, the 800. Then there was my first drum machine, the TR-808. And I must mention the Bode Vocoder, a very special device that allowed me to use my voice as an instrument.

Bonzai: By comparison, what tools did you use for your most recent album, *Hotel Luna*?

Ciani: Today, the synths are mostly rack-mount units, and I use a controller keyboard. I use the Yamaha MIDI-grand piano a lot, a major tool for me. For a controller keyboard, I usually use the Roland MKB-1000. And I control various synths, like the Roland JD-800, D-550, Super JX, Yamaha TX802 or TX816 and the SY55. I used the Korg M1, and my Macintosh, the Roland spatial processor, and my favorite reverb, the Lexicon 224. I love that one, but I do use all of them.

Bonzai: You recently moved to the San Francisco Bay Area. Do you have your studio set up?

Ciani: I'm in the process of setting it up in a beautiful spot I found overlooking the Bay and the mountains.



Bonzai: What were your basic electronic tools at that time?

Ciani: Well, numero uno was The Buchla synthesizer. That was my first instrument. The first four pieces on that album only used a touch keyboard. Even though I had been a pianist, it was under Buchla's influence that I began to see the traditional keyboard as an unworthy interface for electronics. Also, I had done a lot of live performing with The Buchla.

Bonzai: Is it the type of device where you can run your hand anywhere on the scales?

Ciani: It was fretted, something like the neck of a guitar. You had areas where you could call it a note, but it was totally flexible. In a per-

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It's actually an old hunting lodge.

Bonzai: Do you still have a place in New York?

Ciani: I have an apartment, but I don't work in New York anymore. I was there for 18 years.

Bonzai: Do you have a place in Italy?

Ciani: I know my destiny is to be in Italy. I almost landed there this time, but it's a bit of a process to get there. It is where my heart is.

Bonzai: All this success in records, film, TV, and beautiful places to live and work around the world—you're a bachelorette, aren't you?

Ciani: [Laughs] Yes.

Bonzai: Don't a lot of people fall in love with you?

Ciani: This is the anomaly of my existence. Sometimes I ask myself what I'm doing here all alone, especially in this house way out in this remote place. They say a rolling stone gathers no moss, and I guess my lifestyle has been prohibitive to extended relationships. I've been moving so much, so unless I can find someone who can move along with me, well, geography is a potent arbiter of life.

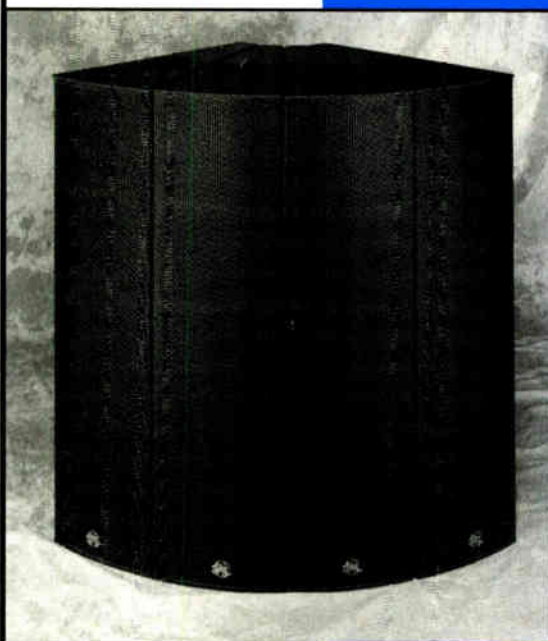
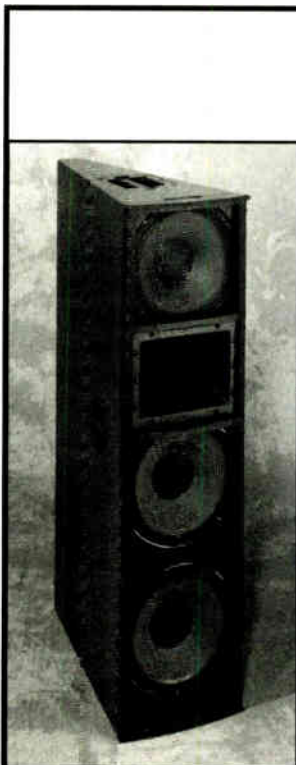
Bonzai: How can we age gracefully?

Ciani: I guess you should try to take care of yourself and listen to your body. For me, music is the thing that keeps me balanced. People tell me my music is relaxing, and I have a need for that. I don't try to make relaxing music, but I do love balance and security.

Bonzai: Are you creating environments for kindred souls?

Ciani: People respond. Music is communication, and when you make it by yourself and to your own satisfaction, the job is done. But it's not really done in this life, because it has a need to go out. There isn't a helluva lot of feedback in this life. You get fan letters, but the music takes on a life that you may never know about. The feedback I get is of an emotional nature. People say it has helped them, or calmed them, or they've been comforted while dying, or someone close to them died and they felt something valuable from my music.

It's an emotional response, and for me, maybe because I am Italian, music is sourced in the emotions. I was never happy in graduate school when we were told to use a system and approach music like architec-



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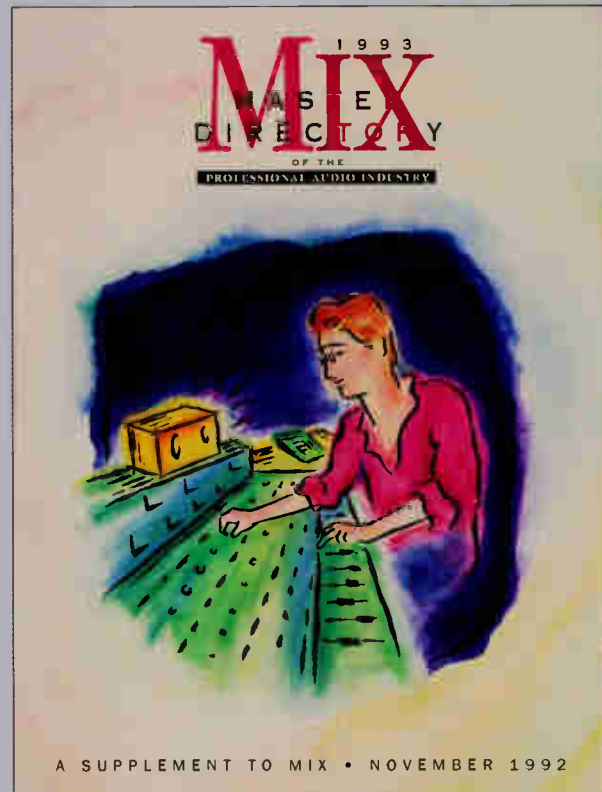
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ture. There are many sources.

Bonzai: Do you visualize images as you compose?

Ciani: Yes and no. There are pieces that have been inspired by visual images, and I do fantasize a lot. Most of my music is about a perfect world, or a fantasy world like Neverland. We have perfect experiences in our lives, peak experiences when we feel fabulous or intensely emotional. Every time I hear one of my songs I know exactly where it came from.

Bonzai: Do you plan to continue your film scoring

Ciani: Let's say that I know that is next for me. I have prepared my life to be available for that type of project. When I had the commercial production company it was hard to take on a film because of the scope. Now I am in position for doing projects of scope.

Bonzai: You have a new collection with two new songs: "Sailing to Byzantium" and "Go Gently." Do these refer to the poems by William Butler Yeats and Dylan Thomas?

Ciani: Very good, you got them both. "Sailing to Byzantium" is about a romantic place from the past, an exotic place. Thomas' poem—well, I have two very ill parents. I have been preoccupied with my dad, an older parent, and sharing the experience with my four sisters. I have been torn between caring for him and focusing on my career. He is raging against the dying of the light and doesn't want to die—he wants life to be full and wonderful. That is my song to my dad. It isn't the way we think it will be—that old age brings wisdom and peace, and we will float off into the next life.

Bonzai: Well, Bette Davis said that old age wasn't for sissies.

Ciani: Right! [Laughs] My dad loves life, and he's not going to sit back and say it's over. Life is the quality. I'm going back next week to play it for him, but he'll probably just say "That's nice." I love him.

Bonzai: Is this compilation like an artist's retrospective?

Ciani: Well, it covers a lot of my history and, in an interesting way, the evolution of the electronic instruments I have used. For instance, if

you know what to listen for, you can hear an old analog filter opening and closing. There are sounds created by devices that they don't make anymore. It's a bit of a time travel, but I don't know if many people will appreciate the details that I notice.

Bonzai: Do you have any words of wisdom for those who would like to follow in your electronic footsteps—any keys to success?

Ciani: I don't have any words of wisdom. I have always been passionate in what I do, and I'm happy that I have something that I love and care about. But when you love something, that is when you are most vulnerable, as well. From a distance, people think things are ideal and easy, but everybody's life is filled with whatever it is that it takes to survive. You just do what you do. Life is day to day. Get up in the morning and don't be lazy. And eat more pasta. ■

Roving editor Mr. Bonzai advocates a plate of linguini and a glass of chianti before attempting the tarantella.

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BITS AND PIECES

EUROPE

E French manufacturer Nexo formed an agreement with Network Ltd. for the distribution of Nexo's line of speakers in the UK...Purchases of Sony's PCM-3348 were spread all over Germany, including Studio Weryton and Touchdown Studios (Munich), Far Studios (Frankfurt), Hong (Berlin) and Studio Ruessmann (Hennes)...Germany's Musik Productiv is a new Symetrix distributor...Mediacom (Ibbenbüren, Germany) was chosen to distribute the Euphonix CSH console in Germany...Swedish TV chose the Sony MXP-2908 console for all of its new D-2 edit suites...Norway's TV2 chose the Xtrack DAW from Digigram (Montbonnot, France)...Genelec (Finland) appointed Lars-Olof Janflod international sales manager...Radiotelevisione della Svizzera

Italiana installed three Sony MXP-2926 audio consoles at the RTSI Italian language TV center in Lugano, Switzerland...The Valkieser Group, known for pioneering CD-I and digital audio and video post-production in Holland, bought another DAR SoundStation II for its Hilversum studio...The recently founded company Danish Pro Audio launched its first products: two acoustic pressure equalization adapter kits for Bruel & Kjaer mics...Midem '93 takes place in Cannes on the 24th-28th of this month...

AUSTRALIA

The new *Australasian Music Industry Directory* is due out this month. Updated twice yearly, it includes

Studio Spotlight

XERIC STUDIOS

Xeric Studios, in Limerick, Ireland, began life four years ago as a small 4-track studio. It rapidly blossomed into a 24-track facility and now operates using a Soundtracs In-Line 48/32 production console with Tracmix Automation. Other equipment includes UREI 809, Yamaha NS-10 and EV Sentry 505 monitors, and Akai digital recorders.

Island Records is a frequent visitor at Xeric. Philip Donnelly, The Cranberries, the Century Steel Band and Harmac are other clients. Xeric is also home to a management company, a record label and a fledgling production company.

The studio is located 15 minutes from Shannon International Airport. Studio staff boast that they can arrange housing in places ranging from a cottage by the sea to Adare Manor.





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World Radio History

categories like record companies, CD and tape duplicators, agents, venues, and legal and accounting experts. As its name implies, the directory provides a guide to the music industry in Australia, New Zealand, Japan and eight other Asian countries. For current prices and ordering information, write the *AMID* at 3 Rose St., Chippendale NSW 2008; call (02) 212-6677; or fax (02) 281-2125...News from Fairlight ESP (Sydney): Alan Burrows was made general manager of the company; Phil Robinson was named North America sales manager; Shane Morris was appointed to service manager; and a Fairlight MFX2 DAW was installed at Australia's HSV Channel Seven...

UK

News from Soundtracs (Surbiton, Surrey): Beyer Dynamic is the new UK distributor for Soundtracs' Solo and Megas consoles; and London's Livingston Studios opened its Studio 5 as a track-laying MIDI suite with a Soundtracs Megas 40-24-2 board... Digital Audio Research (Chessington, Surrey) reports that Twickenham Sound Station posted the Louis Malle film *Damage* using a 16-channel SoundStation II digital audio production system; and Worldwide Television News purchased the same system for use in its London post operation...London-based recording studio The Mill bought a Studer D740 CD-R recorder...Engineer/producer Chris Porter (George Michael's *Faith* and *Listen Without Prejudice*) installed a Euphonix CSII in his southern England studio... Musician Rick Astley chose a Soundtracs Quartz console for his home studio in Gloucestershire.

JAPAN

Fourteen million Japanese listeners enjoyed the fruits of a digital collaboration between Tokyo FM, FM Osaka and Keystone Communications in Hollywood. The three participants staged the first international, full-bandwidth, fiber optic transmission from the U.S. to Japan. The 20Hz-20kHz bandwidth signal was digitized and sent via stereo ISDN circuit from Hollywood to Tokyo to Osaka without any signal degradation. ■



by Colin Paulson

"This has restored my faith in music, in bands, in studios, in recording. It's just been great." So said veteran producer John Leckie [see this issue's "Producer's Desk"] at the end of the second Real World Recording Week last August—a week in which Peter Gabriel invited Western producers and artists to share in his passion for music outside the Western experience.

Leckie's week consisted of finishing one album with a Russian-speaking Turkmenistani band called Ashkhabad and starting several other experimental collaborations involving everyone from indie artist Robyn Hitchcock to classical violinist Nigel Kennedy. Leckie was just one of 17 producers turning out bizarre collaborations. All 17 were party to musical and recording happenings that defied all established rules and conventions.

Bob Ezrin, for instance, was seen leaping around in a large Nissen Hut alongside the Real World Studio site, recording the percussion-crazy band Farafina from Burkina Faso with a superb Cuban trumpeter who just happened by. Two days later Ezrin was mixing a track written and performed by Toni Childs, Papa Wemba, Peter Gabriel and Juan Martin. For a producer renowned for his albums with Alice Cooper and Pink Floyd, these were strange and wonderful experiences indeed.

Daniel Lanois was perhaps more in his element with ethnic instruments. In about four days he recorded and mixed 19 tracks, some of which were also written during that time. By the end of the week he had relaxed into the role of late-night barman, pouring generous tequilas at 4 a.m. in Lulu's Cafe while Canadian songwriter Jane Siberry, Nigel Kennedy, the Electra Strings and the piano tuner from the local music shop entertained the bar's late-night clientele.

The Real World Recording Week

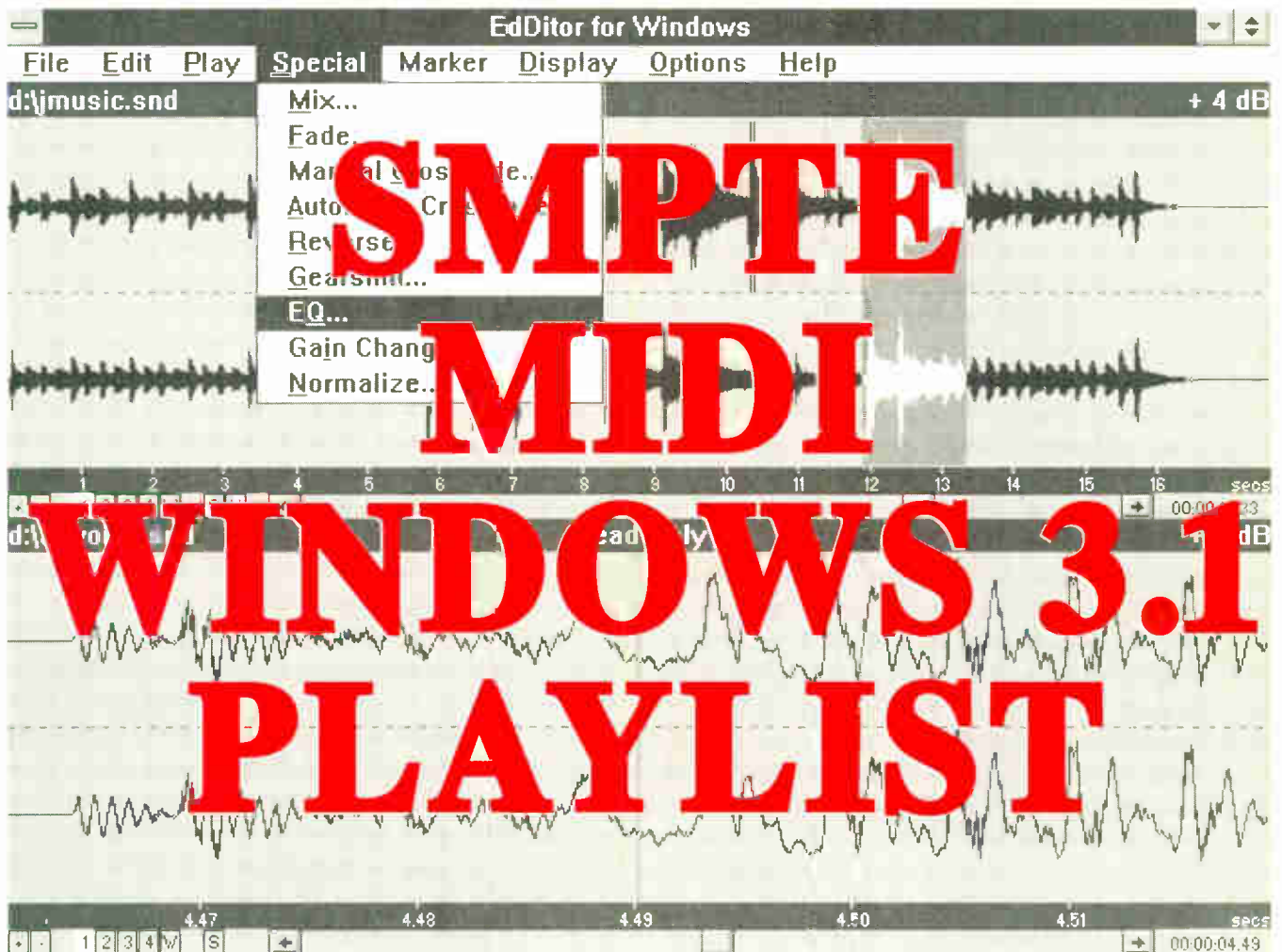
is a mold-breaking exercise in hard work and great fun. Even the less-than-prolific patron, Mr. Gabriel, turned out half an album's worth of brilliance in five days because (with so much creativity in the air) there was no other way to work.

Outwardly, it is easy to see an extravagant week of jamming and collaborating with such diverse and possibly uncomplementary artists as self-indulgent and wasteful. It cost \$150,000, including over \$20,000 in tape. But there will be nine albums resulting from that one week. It may be fun, but it's also business. Real World Records intends to make money for its artists from around the world and of course for its owners, World of Music Arts and Dance (better known as WOMAD), the Real World Group of companies headed by Gabriel and Virgin Records. The music produced during that week was serious stuff—some of it possibly hit material. And like a summer school for superstars, the week was also a great opportunity to learn new ideas in playing and recording.

Billy Cobham reckons his roadies will hate him, but he ordered three unusual percussive instruments that he finally came to grips with during the week. Canadian musical genius and electronics wizard Michael Brook showed that classical violin, Turkish flute, Indian electric mandolin and Brazilian percussion can make the hairs stand up on the back of your neck. Producer Alex Gifford and Jane Siberry learned from Kenyan *nyatiti* player and singer Ayub Ogada that you don't have to include heavy-handed choruses or bridges to carry a song. Ayub, on the other hand, learned that it is difficult to play a B flat *nyatiti* with many Western instruments and has ordered one in A.

Last year when Phil Ramone worked on the Real World Week, he said that this could have happened anywhere, but that it would need a Real World atmosphere and a man like Peter Gabriel to make it happen. Maybe other people should try it, if the experience can restore faith the way it did for John Leckie. ■

Colin Paulson observes the British media production industry from his home base in London.



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by Philip De Lancie

DCC/MD RIVALRY AT AES

It is unusual to see consumer products at a professional event like the AES convention. But the timing was right, and Philips and Sony seized the moment by showing DCC and MiniDisc at the San Francisco event in October. The show was a last opportunity to generate publicity and build audio industry support before the new configurations hit the market.

By bringing consumer electronics to AES, the companies indicated how much they have riding on the outcome of their struggle for consumer acceptance. The fact that their booths faced each other across an aisle heightened the sense of intense competition between the two camps.

Philips and Sony weren't the only companies on hand with a stake in the DCC/MD rollouts. BASF, which has worked closely with Philips on developing DCC tape, reiterated its support at a press briefing. But in an apparent effort to reassure analog duplicators, BASF helped put the anticipated market impact of DCC into perspective by releasing its projections for worldwide sales. Pre-recorded DCC tape sales are expected to grow from 15 million in 1993 to 88 million by 1995. (In 1991, pre-recorded cassette sales were 429 million in the United States alone.) BASF also projects 1995 DCC hardware sales of 12.5 million units.

BASF has begun supplying its DCC duplicating stock to U.S. duplicators and will ship its blank DCC Maxima tapes at the same time as the hardware launch. Among other tape/shell suppliers, TDK announced that it will introduce blank media for both DCC and MD, and shell fabricator GTS came out with D-0s and cases.

Duplication hardware makers on the DCC bandwagon include Lyrec and Duplitronics, both of which showed products at the joint Phil-

ips/Media Technologies booth along with Philips' DCC premastering and downloading gear. The equipment on display was much the same as that which the companies had shown at Replitech, with the notable absence of the Philips/PolyGram four-deck slave unit.



**TDK MiniDisc
(MD) and Digital
Compact
Cassette (DCC)**

Gauss showed a prototype of its MAX digital bin, designed for DCC and/or analog duplication. The company has also been working on a new DCC slave, the 2440. Except for Philips-supplied head blocks, the machine will be designed entirely by Gauss. According to president Jim Williams, availability of Gauss DCC gear depends on when Philips moves from its current pilot-plant approach (in which duplicating equipment may be purchased only through Philips) to a more open market.

One new face in the DCC-MD race is Sonic Solutions. The company is looking to apply its systems for workstation-based CD premastering to DCC as well as MD. According to Sonic president Bob Doris, the PASC audio-coding algorithm used in DCC will be included among the processes performed by Sonic System's Mo-

torola DSP chips. A software module will also be available to support preparation of the ITTS file for display of text (title, artist, track, etc.) on the players.

Doris also said that by the end of the year Sonic will be supporting text generation for MD in the form of an enhanced version of the current PQ editor. The company is also working on incorporating MD's ATRAC algorithm into the Sonic System but is still evaluating whether to provide the capability to write ATRAC-encoded program out to MD master tapes (or CD-Rs).

SONY'S MD WARES

Sony showed the three MD models it plans to market first: play-only and record/play Walkmen and an automotive unit. Suggested list price for the personal portables, as announced September 10, will be \$550 and \$750, respectively, up significantly from the \$400 to \$500 range reported in *Billboard* last March.

In conversation at the Sony booth, Joseph Tibensky and Kenneth Wiedeman of Sony Recording Media confirmed a \$13.99 price for the 60-minute blank MDs. Seventy-four-minute blanks, which were described as "harder to make" than the 60s, are not expected until spring. No price has been set.

For prerecorded MDs, list pricing is expected to be \$15.98, the current standard for front-line CDs. Asked to explain the odd combination of cassette-replacement marketing with CD pricing, Tibensky and Wiedeman emphasized that new formats always launch with high prices, which fall as quantities grow. But they also justified the price by noting that a handful of superstar CD titles are beginning to sell at that level.

Odder still—considering that the show preceded Sony's scheduled U.S. launch by only two months—was the fact that MD units were only shown under plexiglass, and the company was "not ready" to allow attendees to operate or listen to machines, according to Sony Professional Audio product manager Mike Sekiguchi. He said that details of the logic and operation of the launch models were still being finalized, and they would differ slightly (though not cosmetically) from those displayed.

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the Sony booth had a "theater" showing a brief video on MD. The "infomercial" provided a reasonable technical overview—along with a heavy dose of pure promotion. But sound for the "demonstration" came from the audio tracks of the D-2 videotape source, making it irrelevant as a basis for evaluating MD's fidelity. Considering that AES attendees are largely people who listen for a living, Sony's failure to provide meaningful listening opportunities invites speculation about the company's confidence in the new format's fidelity.

Sony did show publicly for the first time two professional products for prerecorded MD mastering. The K-1216 MD Format Converter (\$114,000) takes 16-bit, PCM-encoded audio and subcode information from a CD master tape, stores it on an internal hard drive and converts it to MD's ATRAC format. The data is then output back to a PCM-1630 for recording the MD master tape.

The K-1217 Address Generator (\$38,000) creates error correction

code and MD subcode data for use during cutting of the glass master at the replication plant. The unit is designed to operate within the typical, existing master-cutting setup, substituting for the DAQ-1000 subcode generator used for CDs. Both the K-1216 and K-1217 are available now.

Sony raised the possibility of future professional applications for recordable MD technology with the display of two prototype MD "cart" machines for broadcast uses. No introduction date or prices were given. Also mentioned was the potential for recordable MD as a computer storage medium in place of floppy disks. According to Sekiguchi, development depends on MD-R achieving quantities in the audio market that could provide sufficient economies of scale.

Sekiguchi also clarified aspects of MD's text display feature. The MD standard specifies two categories of text. One set of information (artist, album title, track list, etc.) may be stored in the disc's lead-in as part of a table of contents that is read by the player upon insertion. The other type, interleaved with the audio data,

is only available in play mode, and might be used for track title and lyrics or libretto. Unlike DCC, the MD standard does not require record companies to include a minimum of text on each release, nor does it specify the "user interface" governing text display on the players.



DCC-900 home deck playing U2's Achtung Baby DCC.

PHILIPS BOWS NEW DECKS

In addition to a final version of the DCC-900, the high-end recorder/player that is Philips' first market entry, the company showed "pre-production" versions of two new models on the convention floor. The DCC-600

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and DCC-300, targeted lower in the home market, will be available "within a few months," according to Gerard Lokhoff of Philips' Key Modules Group. Pricing was unknown. Attendees could touch all three models and listen to them on headphones. It was far from an ideal listening environment, but (as previously reported in this space) DCC sounds very good.

In an interview at Philips' suite in a nearby hotel, tireless DCC advocate Gerry Wirtz revealed that none of the initial models will feature a video output for viewing ITTS (text) on a TV. The TV display capability has been a featured part of DCC demonstrations at trade shows, and Philips has worked hard to ensure that all DCCs released will support the 21-line by 40-character "teletext" mode. But Wirtz said that details of ITTS were not sufficiently defined when the company needed to finalize the design of first-generation hardware. So the first machines will display only a single line of 12 characters, a mode originally intended mainly for automotive and portable machines.

Introduction of the auto and personal players is scheduled for April in Europe, but timing for the U.S. is still up in the air. Wirtz, who had a prototype Walkman-style machine on hand, said Philips has switched its development efforts in portables from a first-generation chip set to a smaller second-generation board. (A single IC version of the audio circuits is not expected until the fourth generation.) Portables will use a new 18-track head design in which four of the digital tracks are enlarged to double as analog playback heads (left and right for each direction). That eliminates the need to rotate the head for changes in tape direction, allowing a more compact unit with lower power consumption.

Responding to questions about the vulnerability of heads to clogging from dirty or shedding analog cassettes, Wirtz acknowledged that Philips is uncertain how big a problem this might be. "Philips cannot prevent the playing of shedding cassettes," he said, "but if this is a problem for some consumers, they can use a cleaning cassette." Wirtz pointed out that he believes that after consumers get used to DCC's high-quality sound, they will quickly shift to playing only the newest and highest-

quality analog cassettes in their collections, thus minimizing the likelihood of head clog from shedding.

As for head wear on duplication slaves, Ed Cumings of Capitol EMI Records told an AES technical papers session that there had not yet been enough experience at the company's pilot plant to speculate. Cumings said he heard that life expectancy for the thin film heads is running at "200-plus hours" at PolyGram's Amersfoort plant, but "the prospect for improvement is real."

Wirtz also spoke at the papers session, laying out the reasons be-

hind Philips' tight control over the DCC standard, which he said was the only way to ensure technical and functional compatibility worldwide. He also raised the possibility that the PASC algorithm would soon show up as an audio-encoding option for CD-I. And he said privately that he expects PASC to find its way into the world of professional recording soon, claiming that experience at Decca in London has shown that the algorithm "sounds better than 16-bit PCM." He indicated that PASC converters can handle at least 18-bit, PCM-input signals with no loss of fidelity. ■

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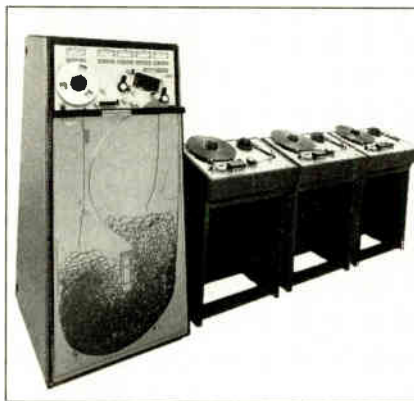


Sony's K-1203 Super Bit Mapping processor

MASTER PREPARATION

Sony unveiled its K-1203 Super Bit Mapping processor. The company made big claims for the \$15,200 device, based on a psychoacoustical approach to the conversion of 20-bit digital recordings to 16 bits for release on CD (see "Getting 20 Bits of Fidelity in a 16-Bit World," December '92 *Mix*). But Sony did little to support the claims with its demonstration on the convention floor because no provision was made for A/B comparison or for minimizing noise from surrounding convention activities... Digidesign was on hand with its new ProMaster 20 (see "The Byte Beat," December '92 *Mix*), a 20-bit version of the Sound Tools editing, mixing and mastering software for the Macintosh. The company also introduced its Intelligent Noise Reduction system, a software module for the removal of hum, hiss and other noises... Sonic Solutions announced that the CD PreMastering module of its Sonic System will support the writing of 80-minute CD-Rs, which may be used for reference and/or sent to replication plants in lieu of PCM-1630 CD masters. The company also introduced enhancements to the Sonic Station, which targets the affordable end of the workstation market... Sonic's rival in the noise removal trade, Cedar Audio, launched Cedar-2. The company claimed "dramatic

improvements" in crackle, scratch and click removal, as well as in broadband noise reduction... Optical Media International showed its TOPIX desktop CD-writing systems. The software supports writing to Sony's CDW-900E, Philips' CDD-521 and Yamaha's 301 PDS CD recorders.



Versadyne 1000 Series high-speed duplication system shown with 1/2-inch master and optional floor pedestals for slaves

DUPLICATION

Versadyne showed its new 1000 Series high-speed bin-loop and slave system, which can be supplied for either 1/4-inch or 1/2-inch masters at 32:1 or 64:1. The large-capacity master unit features dual-capstan drive, Saki heads and the capability of storing three presets for different tape types and ratios. The slave also uses Saki heads and has a 12.5-inch pancake capacity. A two-slave 1000 Series system starts at \$32,000. A "no frills" slave selling for \$3,950, the 600 Series, was also introduced... KABA demonstrated its new distribution amplifier/system controller and a CD player/master for use as a source for real-time and double-time duplication. The company also announced that four workstation manufacturers (Digidesign, Dyaxis, Spectral Synthesis and Sonic Solutions) now support simultaneous A- and B-side duplicating on the KABA system... Otari showed a new, vertical, twin-duplicating slave: the DP-75. The unit accepts 14-inch pancakes and is available with optional Dolby HX-Pro... The Lyrec Kronos 5 cassette loader was on display at the Media Technologies booth. The machine features automatic orientation and batch counting and may be fitted with an optional output stacker... The Concept Design CD 9002, a dual-pancake

loader featuring pre-spooling, made its U.S. AES debut... Also new in the U.S. is the Tapematic model 5200 integrated duplication machine, featuring a master and two slaves in one \$57,000 unit. The HX-Pro-equipped system can be expanded with the addition of stand-alone slaves... JRF Magnetic Sciences introduced a fully adjustable head assembly for the Otari DP-1610 C4 quality-control reproducer... Telex showed two new in-cassette duplicators that operate at 16-times real time. The ACC Series duplicator is expandable up to 27 positions per control unit. The Copyette Series are "economy" units that sell for \$419 to \$1,800, depending on configuration.



Optical Disc Corporation's 530A mastering system

REPLICATION

Automatic Inspection Devices introduced the CD-2, a single-channel CD system for detection of gross read-side-only defects. Integrated with a high-speed, multicolor print machine, the unit delivers 0.5-second-cycle inspection time. A system for detection of lacquer-coating defects that operates on its own or as an add-on for existing AID systems was also announced. And, in a show of support for MiniDisc, AID has developed an MD-inspection system, which will be available in the first quarter at prices ranging from \$103,000 for prerecorded discs to \$121,000 for MD-R... Optical Disc Corporation announced its new 530A Direct-Read-After-Write (DRAW) CD mastering system. It incorporates substantial upgrades over the ODC 530. The enhancements are also available as retrofits to existing systems.

RECORDING MEDIA

Ampex introduced 489 DM, an S-VHS-format tape suitable for use with VLDS high-speed load systems

for loading digital duplication bins. The tape features dual-layer coating and a special, carbon back coat... BASF was on hand with Chrome Plus, the duplication formulation designed to combine the best attributes of chrome and cobalt tapes. The company also showed a final version of its reusable/recycleable Eco Shuttle system for eliminating waste in pancake packaging. BASF will begin shipping in the new packaging at the start of the year... 3M announced improvements to its AUD line of U-matic digital audio tapes used in CD premastering. According to the company, a new coating process reduces digital errors and improves headwear. The tapes also now use an anti-static shell... Sony introduced the MDU Series of U-matic tapes in 30-, 60- and 75-minute lengths. The company also launched a new Pro DAT Plus line of DAT tapes designed specifically for professional applications and featuring new binder and surface-treatment systems... DIC Digital showed its MQ Series DATs, which use a reinforced, dust-inhibiting shell design and a new "formulation finish." The company is also getting into the CD-R market with 63- and 74-minute Orange Book-standard recordable CDs.

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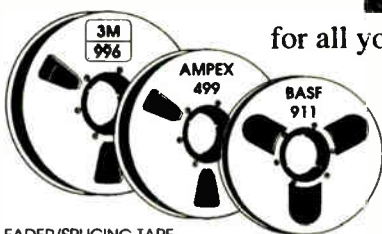
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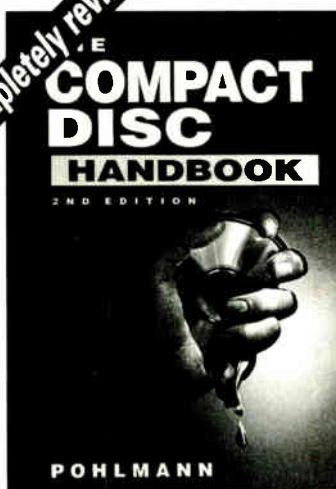
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PRINTING AND PACKAGING

Apex showed an upgraded version of its CA-20 on-cassette printer, which now provides two-color capability. According to Apex's Bob Connigby III, the company is also working on a totally automated five-color, 100-part-per-minute, dry-offset CD printer that incorporates a computerized visual-inspection system. The first machine will go to Cinram in Richmond, IN, early in January... Archon debuted its model 2400XS2MC Arcoset printer. The fully automated, double-side printer handles 3,000 to 6,000 parts per hour. The company also announced the receipt of a patent for the Arcoset Mini Printer... A new silkscreen machine was unveiled by Roldex: The MIK-2 is designed for use on analog, DCC, DAT and videocassettes... Paktec rolled out its JC7000, a machine for inserting audio cassettes and single or multi-fold J- or U-cards into Norelco boxes. The inserter is designed to run over 100 pieces per minute and functions integrated into a production line or as a stand-alone unit. ■

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Tape & Disc News

SONY BEGINS LAUNCH OF MINIDISC...

Digital Audio Disc Corporation, Sony's U.S. replication facility, formally kicked off production of prerecorded MiniDiscs on October 29 in Terre Haute, Ind. Sony announced an "extensive marketing support" program for the new format, and consumer hardware is expected to appear in U.S. stores the first week of December. The company also finalized the capacity of the shock-resistant buffer used in the MD players. The memory chip will allow machines to continue playback without interruption for up to ten seconds after being jarred.

In Japan, meanwhile, Sony placed the first three MD models on sale November 1: two Walkman players, one of which is also a recorder, and

an auto player. The company plans initial worldwide monthly production of 15,000 portable recorders, 10,000 portable players and 3,000 car decks.

...AND TEAMS WITH NINTENDO

Further evidence (as if any were needed) of Sony's commitment to fully exploit its optical disc technologies comes from the *Consumer Multimedia Report*, which published news of the company's activities in the emerging market for CD-ROM-based home video games. Under a recently signed agreement, Sony will manufacture and market a new video game console that combines the Super Nintendo Entertainment System with a CD-ROM drive. Sony will also support the new platform with software based on the CD-ROM/XA standard. Nintendo will market a compatible ROM drive accessory for hookup to existing game players. The SNES systems are tentatively scheduled for roll-out in August. The news came as Nintendo rival Sega was launching its own CD-ROM-based accessory for the Genesis game system. Sony contributes

drives to Sega CD and developed some of the software titles available at launch.

1991 IFPI WORLD SALES FIGURES

The International Federation of Phonographic Industries (IFPI) released its final figures on 1991 prerecorded music sales worldwide, showing totals of 1.1 billion prerecorded cassettes, 1 billion CDs, 150 million vinyl albums and 320 million singles. As reported in *Billboard*, the numbers represent a drop in unit sales of 11% (326 million) over 1990. But the growing impact of high-priced CDs in the overall configuration mix meant that the list value of sales rose 5.5% to \$25.4 billion. Meanwhile, cassette sales fell 21%. The European Community was the world's largest prerecorded music market in 1991 (36% of world sales), followed by the U.S. (31%) and Japan (15%).

TDK TESTS AES ATTENDEES

TDK reports that only 8.7% of 758 AES attendees participating in a double-blind listening test were able to

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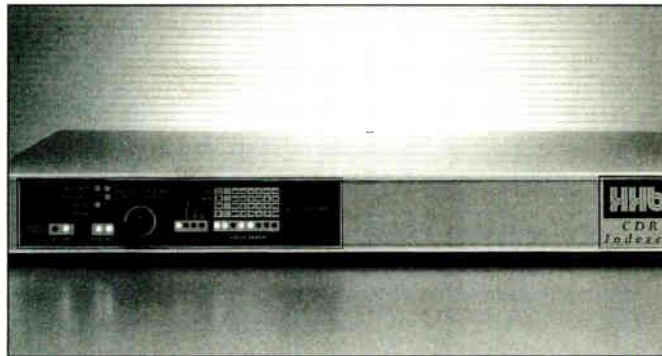
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distinguish "with a 95% confidence level" between a CD and a recording on TDK Pro SA Cobalt. The test consisted of five listening trials in which an ABX switcher randomly determined whether an unidentified source was CD or tape. Participants, listening on either studio headphones or UREI monitors, were then asked to identify the source. Pro SA Cobalt is the company's premium-grade duplicating stock.

FUTURE ADDS SPRINTERS

Future Duplicators purchased ten model HSP-5000 Sony Sprinter machines. The company, which has been using Otari TMD duplicators since 1988, describes itself as the first company to own and operate the two competing high-speed video duplicating systems. Future plans are to use the Sprinters for SP duplication, while keeping the TMD machines for EP titles.



HHB CD-R Indexer

SPLICES

Optical Disc Corporation (Santa Fe Springs, CA) announced the sale of two ODC 530 mastering systems in a Series 500 mastering module to Specialty Records in Olyphant, PA. The installation is part of a 40% expansion in CD capacity at the plant, already the largest prerecorded music manufacturing facility in the world... Saki Magnetics is launching an international program to relap magnetic heads, including audio record and master playback heads for high-speed and in-cassette duplicators. The Calabasas, CA-based company plans to cover any size, format, material or manufacturer in the program... Concept Design (Graham, NC) reports sales of its CD 9002 dual-pancake cassette loader to Cinram (Richmond, IN), Sonrise (Richmond, BC), Imagi-tracks (St. Louis, MO) and Solid

Sound (Ann Arbor, MI)...Versadyne (Campbell, CA) furnished additional slaves to cassette duplicators Alpha Records (Fort Lauderdale, FL) and Premier Cassettes (Issaquah, WA) for expansion of their 1500 Series high-speed systems...Gauss continues to build its European market share with sales of cassette-duplicating gear to five duplicators in Poland and Austria. The company also sold to Focus on the Family in Colorado Springs, CO, for expansion of its operations...Media Technologies (Bohemia, NY) recently delivered a complete Lyrec duplicating system to Tin Man Enterprises in St. Louis. The system includes a Lyrec master loop-bin, Tachos-90 loader, TR-55 QC machine and P-2500 twin slave unit...HHB Communications (London, UK) introduced the CD-R Indexer for translation of DAT start IDs into index flags on recordable CDs. The unit allows for shifting the timing of the flags as well as manipulation of status bits

..Carolina Custom Pressing is now open for business in Greensboro, NC. The new vinyl pressing plant uses SMT presses and virgin dye-based vinyl and offers in-house record mastering...Digital mastering and editing studio Digital Domain added CD replication, booklet printing and graphic design to its services...Masterdisk (New York City) announced the addition of multiple-TEC Award-nominee Greg Fulginiti to its engineering staff...Phil Austin mastered a new Pretty Poison single for Warlock Records at Trutone in Hackensack, NJ...Grammy-winner Dennis Morgan mastered a new children's project at Nashville's Disc Mastering Inc. with owner/engineer Randy Kling...Carlton Batts mastered projects at Frankford/Wayne (New York City) for Shabba Ranks and Oscar on Epic, as well as 12-inch singles by Toni Braxton and Third World...Marc Senesac engineered editing and mastering work on Hammer's new single at Rocket Lab in San Francisco...The Society of Vacuum Coaters will hold its 36th annual technical conference April 25-30, 1993 in Dallas. ■

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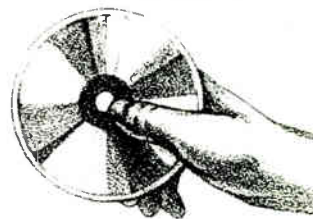
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C O A S T

L.A. GRAPEVINE

by Amy Ziffer

Happy New Year, everyone, and with it, hopefully an improved economic climate and better prospects for the studio business! I had the pleasure this month of talking to people at two studios who have a decidedly optimistic outlook for 1993.

The folks at Westlake Audio have converted space in that multiroom facility to accommodate a new production room and a digital audio editing bay. Production Room 2 (formerly a boardroom) is online as I write this, already having been used by Caliber Records recording artist Celeste for MIDI tracking to 24-track, with Tommy Marolda producing, David Henszey engineering and Cameron Cole assisting. The room is configured around a 44-input Soundcraft Saphyre console and a variety of record-

—CONTINUED ON PAGE 170



Engineer Terry Nelson (left) and Kenny Loggins inside "Rover" (Sausalito, CA) doing overdubs after Loggins' performance at the Luther Burbank Center in Santa Rosa, CA. Bob Skye digitally recorded the show.

SESSIONS & STUDIO NEWS

by Jeff Forlenza

NORTHEAST

Producer Daniel Abraham worked on his production for A&M recording artist Maliaka's song "Baby Don't You Know," at Prime Cuts Studios in New York. Richard Van Benschoten engineered the sessions with programming by Joey Moskowitz...Hefty rap star Heavy D was at D&D Studios (Manhattan) recording and mixing two songs for his next MCA release. Gangstarr's Priemer produced and Eddie Sancho engineered, with Luc Allen assisting...Philadelphia's Sigma Sound has been busy: Teddy Pendergrass was in with producer Leon Huff tracking vocals with engineer Ran A. Shaffer and assistant Andy Starr for an Elektra release; Tom Moulton was at Sigma remixing K.C. & The Sunshine Band's hit "Get Down Tonight" for an upcoming PWL Records release—Shaffer engineered and Starr assisted...The Spelvins were at Baby Monster Studios (NYC) recording their debut album for Zoo/Praxis Records with engineers Dave McNair, Rojo and Steve Burgh...The Homel-Alaniz Band were at GFI Studios in Ontario, NY, working on tracks for an upcoming release. David Nelson (formerly of New Riders of the Purple Sage) produced, and Tony Gross Jr. (of Head East fame) engineered...

SOUTHERN CALIFORNIA

Record Plant/Hollywood hosted Mick Jagger for two months in its SSL 4072G-equipped Studio II. Jagger completed vocals, overdubs and mixes for his album *Wandering Spirit* with producer Rick Rubin and engineer David Bianco...Toni Tony Tone were at Aire L.A. Studios (Glendale) working on their new album with engineer Gerry Brown and assistants Mike Scotella and Gregg Barrett...Interscope Records act Nine Inch Nails tracked and mixed a song for their new album, *Broken*, at Skip Saylor Recording in L.A. The band produced and engineered with assistance from Chris Puram...Johnny Gill was at Elumba Recording in Hollywood working with producer Darryl Simmons and Babyface for a Motown release. Lori Fumar engineered, with Babyface adding background vocals and Nikki Tafralian assisting the SSL 6000E sessions...The McCauley-Schenker Group mixed their new live album for Impact Records at Brooklyn Recording (L.A.)...Dave Mason was at Valley Center Studios in Van Nuys cutting tracks for Play Records with engineer Dave Jenkins and co-producer Michael Leshay...L.A.-based artist Barbara Max was cutting tracks with producer Neil Citron at Sonora Recorders (L.A.), with guest musicians Tony Franklin (of The Firm) on bass, Walter Graces on drums and Stan Cotey on keyboards...

NORTHWEST

Gregg Allman was recently at Studio D Recording in Sausalito, CA, with the Alameda Allstars working on new material. Joel Jaffe engineered with Larry Brewer assisting...Producer/engineer Devon Reitveld recorded and mixed saxophonist Alex Murzyn's Kamei Records release, *Cross Currents*. The project was tracked at Brilliant Studios in San Francisco and mixed at The

—CONTINUED ON PAGE 170

C O A S T

REMOTE RECORDING ROUNDUP

by Jeff Forlenza

Remotely speaking, audio trucks are tracking more than ever. Live albums, remote broadcasts, radio simulcasts—you name it, they're doing it. We spoke



Steve Smith aboard Remote Control, Seattle's only digital remote recording truck.

with several traveling rigs about their recent efforts.

Kooster McAllister operates Record Plant Remote out of West Milford, N.J. McAllister recently added a brand-new API 54x48 console with touchscreen computer reset and Massenburg moving fader automation. According to McAllister, "It's the best-sounding console I've heard." Paul Prestopino is RPR's head maintenance engineer, and Skip Kemp is stage manager. McAllister has felt the recession, saying, "Business has dropped off considerably this year. There's less production companies and bids are lower."

Recent RPR projects include Michael Bolton and a 64-piece orchestra for a live NBC broadcast. The Bolton gig was recorded to 48 tracks of digital, which used almost 100 inputs from the orchestra, Bolton's band and a minimum

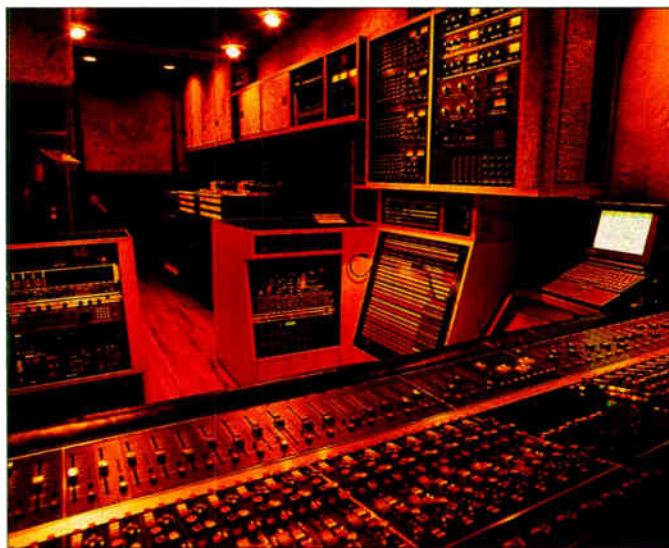
of six mics on the audience. For such an extensive project, it took three consoles and close-miking on everything. An environmentally correct project for Greenpeace is next for RPR: They will travel to Athens, Ga., to capture R.E.M. from the 40-Watt club with a totally solar-powered truck. The Greenpeace Records project will be distributed by Elektra/Asylum and will feature a variety of artists, including U2.

Other Record Plant Remote gigs include the Grammys from Radio City Music Hall ("a great-sounding room, though the stage is massive, and it's a little difficult to deal with"); and the Telluride Bluegrass Festival ("We recorded 28 hours of music—Emmylou Harris, Bela Fleck and The Flecktones, Shawn Colvin—for a two-CD release").

Based out of New York City, Randy Ezratty's Effanel Music remote recently underwent a complete remodeling. Ezratty purchased a 52-channel SSL

—CONTINUED ON PAGE 171

Kooster McAllister's Record Plant Remote out of West Milford, NJ, with its new API console at the Telluride Bluegrass Festival.



N.Y. METRO REPORT

by Dan Daley

Now that the old RCA studios are officially toast (okay, on March 31), BMG has commissioned the design and construction of new mastering facilities in town. The mega-firm of Shen, Milsom & Wilke will oversee the project, subbing out part of the work to ARcoustics, according to acoustician Francis Daniel, who is both a senior associate at Shen and a principal of ARcoustics. Victor Schwartz of ARcoustics is the primary architect.

The new facility at 1540 Broadway will house ten rooms: seven identical mastering suites, two mixing rooms (one equipped with Dolby Surround) and a CEDAR-equipped prep room. There will also be tape duplication capability. Part of the design includes machine alleys between rooms separate from walkways,

—CONTINUED ON PAGE 174

PHOTO: RODDY MACLELLAN

—FROM PAGE 168, L.A. GRAPEVINE

ing media, including hard disk, analog tape and digital tape. A selection of tube processors is also planned.

Digital Audio Edit 1, scheduled to open around the holiday season, will be a hard disk/DAT-based digital audio editing and transfer bay complete with video interfacing. Westlake's Steve Burdick says, "The room's main focus will be remix editing and album compiling on our hot-rodded Digidesign 8-channel Pro Tools." Other gear will include a Yamaha DMC-1000 digital console, with that board's usual automation and parameter recall, and a Yamaha CD recorder. Both rooms will share a new 95-square-foot overdub booth.

Burbank's Blue Nile has also undergone some changes since I first mentioned it in this space in September of 1991. Owner Stephan Baer and engineer Steve Shepherd decided earlier this year to trade control room and studio spaces, making the control room a much larger and more comfortable place to work. They are concentrating on making the facility amenable to composers by stocking and running the most commonly used hardware and software, so clients can pop in a disk and begin working without having to cart in a lot of gear. They've developed a clientele who like this approach and the atmosphere, and they're anticipating a good year.

Lovell Brooke Studios is the name owner John Pratt gave his facility in the Carolco Building at 8800 Sunset Boulevard. ("Lovell" and "Brooke" are the names of his nephew and niece, respectively.) He took over the former SBK/EMI in-house studio some time ago when Carolco Films bought the building and had no plans for the existing studio.

The single-studio facility contains an Amek Angela console with Jensen preamps, an MCI JH-24 multitrack and a rack of API 3124s; but one of the biggest draws has to be a bay window from which Pratt and his clients can view the action on Sunset Strip from four floors up. Yet, as Pratt says, "The vibe is very private. There's security at the front door, private, secured parking, and it's comfortable. Some of the EMI roster still like coming over to a familiar place."

Pratt has made a go of the place by taking on a little bit of everything. MCA recently brought in Donna de Lori, Madonna's backup singer, for an album, and Pratt uses the space quite a

bit for his own writing (film and industrial scoring, as well as jingles) and for spec music deals.

In people news, Sound Services Inc. just welcomed two new sound engineers, Wouter van Herwerden and John Warren. Van Herwerden comes from Complete Video in London, where he gained experience in mixing and studio management. One recent accomplishment was mixing sound for the CBS broadcast of the 1992 Winter Olympics. Warren is a former staffer at Soundmaster U.S.A. Inc., makers of audio editing systems used at SSI and elsewhere around the world. In addition to engineering, Warren will be taking on marketing duties to promote a planned expansion at SSI that includes a new telecine suite, digital audio workstations and duplication equipment.

Meanwhile, on November 13, well-

—FROM PAGE 168, SESSIONS & STUDIO NEWS

Plant in Sausalito, with producer **Allyn Rosenberg**... **Denny Brown** completed tracking his newest release, *On The Esplanade*, with producer **Erik Neilsen** and engineer **Tom Flye** at the **Music Annex** in Menlo Park, CA...

SOUTHEAST

The **Dirty Dozen Brass Band** were at **Ultrasonic Studios** in New Orleans working on their next album, a tribute to **Jelly Roll Morton**. **Danny Barker**, New Orleans' avuncular musician/historian, was in the studio to film his recollections and anecdotes from working with **Jelly Roll**, which will be used as part of the Sony album's promotional package. Producer **Scott Billington** and engineer **David Farrell** handled the audio recording... **Maureen Tucker**, formerly of the **Velvet Underground**, was at **Cheshire Sound Studios** (Atlanta) mixing her latest album for **New Rose Records** with **George Pappas** at the console... Noise recording artists **Kreator** completed their latest album, *Renewal*, at **Morrisound Recording** (Tampa, FL). **Tom Morris** produced and mixed the project with engineers **Brian Benscoter** and **Mark Prator**...

SOUTHWEST

At **The Hit Shack** in Austin, TX, **Debra Peters** and **The Love Saints** worked with producer/engineer **Jay Hudson**, and **Alejandro Escovedo** recorded his latest **Gravity/Watermelon Records** release with producer **Stephen Bruton** and engineer **Dave McNair**... At **Planet**

wishers bid farewell to **Billy James**, publicity consultant to the Los Angeles chapter of **NARAS** and 30-year music biz vet, at a small party in Burbank attended by friends throughout the industry. James and his family have relocated to Redwood City, Calif., but he can be reached in care of the local **NARAS** chapter at least for the immediate future.

And this month marks my farewell, too. This is my last time writing the "L.A. Grapevine." It's been a blast, and I'd especially like to thank all those who made kind comments or who helped me out by returning my persistent phone calls. For the immediate future, should any reader want to contact me personally, I can be reached at (818) 567-1429. Send studio news for future issues to **Fred Jones** at 859 Hollywood Way, Suite 128, Burbank, CA 91505; or fax (818) 506-1071. ■

Dallas, alternative rock band **Tripping Daisy** recorded their **Dragon Street Records** release with producer **Patrick Keel** and engineer **Rick Rooney**... At **Studio Seven** in Oklahoma City, **Charley Wilson** of the **Gap Band** tracked vocals for his new **MCA** release; the **Otis Watkins Band** tracked their newest release for **Lunacy Records**; and **The Dirt Poets** tracked their latest for **Lunacy Records**...

NORTH CENTRAL

At **Paragon Recording** in Chicago, alternative rock band **Wait For Light** mixed three songs for a **TOW Records** release. Mixes were handled by engineer **Thom Fiegle** and producer **Phil Bonnet**... At **Smart Studios** (Madison, WI) remixes were done for **Nine Inch Nails**, **The Cult**, **House of Pain** and **EMF**. **Butch Vig** produced and engineered with assistance from **Steve Marker** and **Doug Erikson**...

STUDIO NEWS

Studio 13 in downtown New Orleans upgraded its studio with a new **Trident** console, **Studer** 24-track tape machine, **Sound Tools II**, **Panasonic DATs** and various outboard gear. The facilities have also been expanded to include a spacious client lounge, conference area and pool table... **Sear Sound** in New York City announced a new service known as "Bring Out Your Dead." **Walter Sear** and **Co.** invite you to dig up equipment considered dead and see if it can be resuscitated. They will pick up the gear (in the NYC area),

diagnose the problem, and give you an estimated cost to revitalize your gear. Call (212) 582-5380 or fax (212) 581-2731 for more info...Kajem Studios in Gladwyne, PA, recently celebrated its 15th anniversary. Kurt Shore, Mitch Goldfarb, Joe Alexander and Sam Moses started the operation in 1977 as an 8-track studio in the garage of a nun's house. Today, there are lots of gold records on the walls of the SSL-equipped, 24-track studio with its own in-house production company, Kajem Productions. Look for an expansion to another room soon...

Send nationwide sessions and studio news to Jeff Forlenza, c/o *Mix*, 6400 Hollis St. #12, Emeryville, CA 94608. ■

—FROM PAGE 169, REMOTE RECORDING

console with Ultimotion and Total Recall, making Effanel the first Ultimotion remote. Ezratty is most pleased with Effanel's 52-channel Hardy M1 mic preamps. The Hardy preamps are placed onstage so that line level amplification goes straight from the stage to two Sony 3348s, with monitoring via the console. Recent Effanel projects that used the Hardy preamps were George Harrison live in Japan and Lou Reed doing a Wim Wenders film soundtrack in Berlin. Effanel head engineer John Harris worked the sessions, and both Harrison and Reed raved about the Hardy preamps.

The recession has finally reached Effanel. As Ezratty puts it, "It used to be that record labels would record bands live and *maybe* do a live album—just put it on the shelf; those types of things aren't happening anymore. Record labels are really feeling the recession, and it's trickling down to us. Live recording has remained steady. But the 'questionable projects' have dropped."

Some recent Effanel projects include Paul Simon *Unplugged* and U2 for MTV from Detroit; Elton John live in Mexico City with a portable system; The Cure's live album and video from Detroit; and Genesis from Philadelphia and Syracuse for a recently released pair of live albums.

Rover, The Plant's remote truck out of Sausalito, CA, has been active. Bob Skye reports a busy summer and fall touring season and subsequently lots of remote work. The Plant's remote staff includes Chris Charucki as crew chief and audio stage manager and

Sean O'Brien handling internal machine operation. As part of The Plant Recording Studios, Rover can act as a fifth control room in a pinch. "Once there was a power outage in Marin," Skye recalls, "and [advertising agency] Keller&Cohen had to get their project done. So we had a generator sent out and finished the session from truck. The clients went away happy."

Recently Rover ventured to the Berkeley Community Theater to capture The Miles Davis Tribute featuring a "reunion" of V.S.O.P. (Tony Williams, Ron Carter, Wayne Shorter and Herbie Hancock) with Wallace Roney replacing Miles on trumpet. For the Doobie Brothers Reunion from the Concord Pavilion, "Westwood One handled half the inputs and we had the other half," Skye explains, "and then Biff Dawes had to mix it all together later, since they produced the whole show." The Plant's remote handled percussion, bass and audience (four mics) feeds. The Doobies had four sets of drums onstage, so there were at least 29 inputs of percussion.

Skye says they're recording more gospel: Two recent Rover gospel recordings were Edwin Hawkins (fa-

mous for "Oh Happy Day," a Top 40 hit in 1967) at the original church that the hit was recorded; and the San Quentin Mass Choir (featuring San Quentin inmates and employees) for an album project with Tom Flye engineering.

Designed in 1987, Steven Remote's ASL Mobile Audio (a division of Aura Sonic Ltd.) operates out of Queens, N.Y. Remote reports some recent upgrades to their truck: 24 custom API 3124 mic preamps, 24 channels of Dolby XP SR, and a pair of Genelec 1031A monitors.

Remote says the recession hasn't affected ASL: "Business is up, but people are more cost-conscious and they shop around," he reports. "MTV is a strong force in keeping music live. We did a lot of bands for the [now-defunct] series *Hanging with MTV*. MTV turned me on to a lot of work." Some of the bands Remote worked with for MTV include The B-52's, Rob Halford with Skid Row, the Spin Doctors, Richard Marx and Morrissey—all out of the MTV Studios in New York.

The ASL truck is diminutive but ergonomically designed, which is perhaps its greatest strength. It's 30-foot long (bumper to bumper), 11.5-foot

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high and eight feet wide. It can get through any tunnel or bridge in the NY area—like the Midtown tunnel—when big rigs can't. The future holds a lot more producing and engineering on his own for Steven Remote, and he intends to use the ASL truck to capture more young up-and-coming bands and then pitch the bands to labels. As for the truck, they plan to "reskin" the outside to get it to look as good as it sounds inside.

Reelsound Recording Co.'s remote out of Austin, Tex., has added the following equipment to its 48-track unit: three API 550A EQs, an API limiter and mic preamp, two Neumann U47 mics, and a UREI 530 graphic EQ. Head of Reelsound, Malcolm H. Harper Jr., reports on some recent Reelsound projects:

Reelsound completed the 1992 season of *Riverwalk, Live from the Landing* for American Public Radio, which included guest musician/jazz greats Clark Terry, Milt Hinton, Benny Carter, Dick Hyman and Lionel Hampton playing with the Jim Cullum Jazz Band live from The Landing nightclub in San Antonio. Margaret M. Pick, Lynne Cruise and Jim Cullum produced the *Riverwalk* series, and Jim Andersen mixed the sessions with assistance from Greg Klingensmith, Gordon Garrison and Malcolm Harper. The Reelsound remote also traveled to Monterrey, Mexico, to capture Emilio Navaira and Gary Hobbs for a Capitol/EMU Latin Records release. Manola Gonzales produced the live recording for Capitol;

engineering was handled by Gilbert Velasquez with assistance from Klingensmith, Jerome Bustos, Chip Demetri and Harper.

Recent TEC Award-winning truck Westwood One out of Culver City, Calif., just put in two Studer 827s. Westwood engineer Biff Dawes reports some recent Westwood gigs: Little Feat and George Thorogood from the Concord Pavilion; a *Rip* magazine party from the Roxie in L.A., featuring Bon Jovi, Warrant and Kik Tracee; and the Doobie Brothers reunion concert at the Concord Pavilion. The recession hasn't affected them since they have plenty of Westwood One radio programming: Dawes says the truck's been busy recording and mixing. Upcoming shows include Megadeth from the Cow Palace and Robert Cray from the Warfield, both in San Francisco.

Operational as of August 1992, Seattle's Remote Control is "the Pacific Northwest's first—and only—digital remote/mobile recording truck." Remote Control features a Sony 3324A digital 24-track recorder, an Audio Media Research console, and KRK and Tannoy monitors. Remote Control chief engineer Steve Smith came north from L.A. in 1990 when Nancy Wilson recruited him to direct and coordinate the design, construction and equipping of Bad Animals/Studio X.

American Music is the parent company of Remote Control, which Smith designed to capture live music in the burgeoning Seattle scene. According to Smith, the truck is "not fancy but



Inside Randy Ezratty's recently remodeled Effanel Music truck, based in New York City.

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very functional and affordable. The overall length is under 20 feet, with a 14-foot cube on a Ford chassis." Recent Remote Control gigs include Pearl Jam at Magnuson Park, the Seattle Symphony, local band Jumbalassy, solo artist Carol Lund with producer Jimmy Robinson, and a series of shows called *Backstage Pass* for local TV.

Lonnie Bedell operates the Goin' Mobile audio truck out of Boston. Goin' Mobile equipment includes the two-console tagteam of a Seck 1882 and a Hill Multimix, a Tascam MS-16 recorder, Yamaha NS-10 monitors and a Sony DAT Walkman, which Bedell calls "pretty much a requirement."

Recent Goin' Mobile gigs include Bill Bruford's jazz band Earthworks on its Northeast tour; Sire recording artists Throwing Muses at a club in Rhode Island for a radio show on Providence's WBRU; and a minute-and-a-half video for Digital Electronic Corporation with Boston's Videocraft Productions to be used at Digital's DECworld show.

Out of Toronto, Ontario, is Comfort Sound's mobile unit. Well known throughout Canada, Comfort boasts a 50-input Neotek console, configurable for up to 48 tracks, as well as two 24-track recorders. Recent Comfort gigs include capturing Bryan Adams in Vancouver for a segment on MuchMusic's Canadian Music Video Awards, with Comfort's chief engineer Doug McClement engineering. ■

—FROM PAGE 169, N.Y. METRO

and the use of individual glass-fronted machine alcoves in each room rather than a central machine room. The April 1 deadline will be tight, Daniel admits, especially in light of BMG's high specs: transmission loss at 63 Hz to be between 60 and 70 dB, and an NC 20 or better noise factor. "We'll get very close to those specs, but it'll take a lot of interesting math," he says.

The raison d'être behind Skyline Studios' new MIDI room is as much pragmatic as it is technical, graphically reflecting the changes the studio industry is undergoing in New York and elsewhere, according to studio co-owner Paul Wickliffe. "I can see this technology eventually cutting into the business of traditional studios, and the point of the MIDI facility here is to bridge that gap," he says. "If you don't adapt, you die."

Skyline's MIDI room is encountering the incompatibility problems that

still plague the workstation world. Interfacing Pro Tools, Performer and Studio Vision via an Opcode Studio 5 interface is viable but takes finesse, says Wickliffe. "If more than one application is open at a time the Studio 5 can get confused," he adds. "The technology is great, but it can be frustrating at times. Traditional studios have to address these changes if they want to survive because the very nature of the business is changing with the advent of project studios. Sooner or later, they will seriously cut into the traditional business."

Greene Street Recording will likely be replacing its Trident TSM console with a completely new custom Rupert Neve design. "I wanted an 8068, but a new one," says Steve Loeb, Greene Street's owner, who even roamed around Eastern Europe looking for one in pristine condition. In discussions with Rupert Neve and Amek over the last six months, Loeb says that a new design incorporating the essence of the original 8068 is being developed for Greene Street, possibly based on a Rupert Neve design for Amek that was intended for release at this year's AES but which was delayed. The new console could be installed by June and is tentatively called the Rupert Neve 9098. Loeb says he will probably temporarily install an API board in the meantime. Greene Street's other room holds an Amek APC.

Audio-Techniques held its fourth annual microphone seminar on November 5 in Manhattan. Doug Cook, A-T executive VP, said that more than 100 registrants were expected to participate in open discussions with seven microphone manufacturers: Audio-Technica, Beyer, Microtech Gefell, AKG, Shure, Sennheiser and Neumann. "We feel that this is our way of being responsive to the New York pro audio community for their support of us all year long," Cook said.

The Nashville Chamber of Commerce held a reception co-sponsored with *Fortune* magazine in Manhattan on December 8 at the Rihga Royal Hotel. The purpose, according to co-vice president Will Beasley, was to increase national awareness of Nashville as a place to do business. Contacts by the Chamber came from several New York recording studios, including Power Station and Hit Factory, regarding the possibility of extending their facilities to Nashville. I live in both cities; I'm staying neutral. ■

Remote Recording and Sound Reinforcement

Information in the following directory section is based on listing applications mailed earlier this year and was supplied by those facilities listed.

Mix claims no responsibility for the accuracy of this information. Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.



Sheffield Audio-Video Productions' new 48-foot audio remote truck at the 1992 New Orleans Jazz and Heritage Festival. Based out of Phoenix, Md., the Sheffield truck houses a 48-input SSL E/G console and a custom 24-input Neve console, as well as two Sony digital 24-tracks and two Otari MTR-9011s. The new truck, designed by Sheffield owner John Ariosa and remote engineer Garth Michael, features a ten-foot ceiling and a client lounge that is raised three feet above floor level in the back of the control room.
Photo: Owen Murphy.

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Upcoming Directory Deadlines:

Video Production & Post-Production Facilities: **January 8, 1993**

Northeast Studios: **February 8, 1993**

Southeast Studios: **March 8, 1993**

Mix listings procedure: Every month, *Mix* mails listing applications to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a Boldface Listing (name, address, contact and descriptive icons) and an Extended Listing (equipment and services and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department, 6400 Hollis St., #12, Emeryville, CA 94608, toll free (800) 344-LIST (344-5478).



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ASL MOBILE AUDIO
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ASL MOBILE AUDIO



PO Box 791; Flushing, NY 11352; (718) 886-6500; FAX: (718) 886-7214. Contact: Steven Remote, dir. of operations. Touring Radius: National and international. Vehicles: 16-ton Navistar International turbo diesel w/four door "comfort zone" crew cab and air ride suspension. **Mixing Consoles:** Harrison MR-4 40mic/line, 4 stereo line modules, (24) API 3124 mic preamp w/a Speck assign 28 8 bus mixer, (2) Mackie CR1604 submixer, Hill Multimix 16x4x2x1 sub-mixer, Roland M-160 16x2 line mixer. **Audio Recorders:** (2) Otari MTR90 48-track digital available, (2) Sony DTC-1000ES DAT, Panasonic SV-3700 DAT, Panasonic SV-250 DAT, Nakamichi DMP100 w/(2) Sony SL-HF900, (2) Akai GX-912 cassette deck, (2) Sony TCWR-900 dual cassette deck. **Monitors:** (2) UREI 813 w/(2) Bryston 4B's, (2) Genelec 1031A, (2) Yamaha NS-10M w/Yamaha P2200, (2) K&H 092 for studio/stage playback. **Snakes/Splitters Systems:**

142 audio mic/lines via (2) 52 channel and (2) 19 channel snakes, (80) mic splits w/24 mic/line send/returns - 38 additional mic/line stage box. **Other Featured Equipment:** Dolby XP Series SR unit 24 channels, (2) Klark-Teknik DN780 digital reverb/processors, Lexicon PCM70, (2) Lexicon LXP-1 digital reverb w/MRC, Dynacord DRP 20X, Eventide H3000SE Ultra-Harmonizer w/B&S Vai con kits, Yamaha REV7 digital reverb, (3) Yamaha SPX9001 digital reverb/processors, Ursa Major Space Station DDL/reverb, TC Electronic TC2290 DDL w/11 second memory, Lexicon PCM41 DDL, Korg SDD 3000 DDL, Barcus-Berry 802 audio processor, (2) Aphex 612 expander/gate/duckers, Aphex 320 stereo Compellor compressor/leveler/lim, (4) Valley People Dyna-Mite, (2) Brooke-Siren DRP-502 MIDI noise gates, Brooke-Siren DPR-402 comp., peak lim. and de-essers, dbx 162 stereo comp/lim, (4) dbx 160X comp/lim, (2) dbx 160 comp/lim, (2) UREI 1176LN peak lim, (2) Klark-Teknik DNS500 dual comp/lim/expander, (2) Klark-Teknik DN510 advanced dual gates, (2) Klark-Teknik DN360 EQ, (2) Klark-Teknik DN410 para EQ, (2) Klark-Teknik DN300 EQ (room EQ), (16) Rebis Audio noise gates. **Extended Equipment:** Panasonic BT-D191Y 19" color monitor, (3) Sony 5" color monitor, (2) RCA B&W 9" monitor, Panasonic WV-CL300 color camera w/remote zoom, pan and tilt, (6) Kenwood TK-300 6-chan. UHF walkie talkies, Chaos Audio communication, over (130) microphones and direct boxes by Sennheiser, Shure, Sony, EV, Milab, AKG, B&K, Beyer, Neumann, Crown, Realistic, Brooke-Siren, ASL, Whirlwind. Extensive audio/video interface panel at rear of mobile unit. **Specialization & Credits:** We'd like to thank all our clients and friends for their interest and consideration. March 1993 marks the 16th anniversary of Aura Sonic Ltd. ASL has come a long way. We regard your continued patronage as a symbol of all the perseverance and determination we have in cultivating the growth of the ASL Mobile audio truck and services. We'd also like to thank the people who have nominated us for a TEC Award in 1987 and 1991. Recent clients include: A&M Records, Atlantic Records, BMG, MTV networks, Showtime, Sony Music companies, WBCN-FM, WQCD-FM, and Westwood One to name a few.



AUDIO OASIS MOBILE RECORDING SERVICES
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Washington, DC; (800) YO-OASIS; (202) 716-2069. Contact: Remy David, VP/Chief eng. & prod. Touring Radius: National. Vehicles: Mercedes Benz 1117 turbo diesel w/lift gate and 24'x8' box w/3 individual rooms. **Control Room Dimensions:** Control room: 10'x8', machine room: 8'x8', studio/lounge 6'x8', full central air and heat. **Mixing Consoles:** Sphere "Eclipse C" 48x24 with Allison automation, (2) API 3124m, Soundtracs 16x8x16, Yamaha 6x2. **Audio Recorders:** (2) Ampex MM-1200 24-track, Tascam 38, (2) Panasonic SV-3500, Sony PCM-F1, (3) Scully 280B-2, Tascam 122. **Monitors:** JBL 4411, JBL 4408, JBL 4312, (6) Realistic Minimus 7.

Snakes/Splitters Systems: (2) Conquest 250'x20, Whirlwind 100'x20, custom 100'x9, (4) 10x30 splitters. **Other Featured Equipment:** Noise reduction: Dolby SR available, (4) dbx 563 single ended filters. Synchronizer: Adams-Smith Zeta-3. (2) Lexicon LXP-1 w/MRC, Lexicon PCM60, Alesis Quadaverb, Alesis Midverb II, (2) Yamaha SPX90, SPX9001. Delays: Lexicon Super Prime Time, (2) compressor: (3) UREI 1176LN, (2) UREI LA-3, (2) dbx 165a, dbx 160X, dbx 166, Orban 418A stereo limiter, (3) PYE 5452 PDM limiter, dbx 119, (8) Allison Research Kepex, Aphex Type C aural exciter. Amplifier: Bryston 4B, Crown DC-300A, BGW 150, Pioneer Speck 2. Microphones: Neumann U67 tube, KM-56 tube, (2) U87, (2) KM86; (2) AKG 414B ULS, (2) 451; (4) Beyer M-160, M-130; (2) Sennheiser MD-421; (4) Sony ECM-50 (lavs.); (2) Shure SM81, (2) SM57, (4) SM53, (10) SM62; Crown PZM; (6) Realistic PZM; (3) Electro-Voice 635, (2) RE11, RE10, and assorted direct boxes by Proco, Whirlwind, Stewart, Countryman, etc. Video recorders: (2) JVC HRU-6700 SVHS, JVC SVHS camcorder. Switcher: Panasonic. Monitors: (2) Panasonic, Panasonic 13" color, (2) 9" B&W, and much more. **Specialization & Credits:** Audio Oasis is the Baltimore/Washington area's newest and most unique audio/video production vehicle (or AVPV for short). Three specialized rooms reside within the 24' box perched upon a turbo Mercedes chassis. The control room, located at the front of the vehicle, is so ergonomically laid out that all audio processing devices are controllable from the mixer's position. A 10 foot main monitor speaker spread makes for unprecedented stereo imaging, and is made possible by the highly specialized "do it sideways" control room design by producer engineer Remy David. Highly isolated by two solid core doors it offers an extremely quiet mixing environment with little or no conditioning noise. The studio/lounge, smallest of the other two rooms, plays the largest role. Built for comfort as a lounge, it's heavy constructed walls and doors make it an ideal MIDI room, overduo booth for singers, announcers, guitars, saxes, etc. It can also be quickly reconfigured to our video control room or audio sub-mix room for those really big jobs. The machine room, located at the rear of the vehicle, near the climatic system and main entrance way, is home to the power supplies and amps, multitrack audio and video machines, computers, printers and most of the heat and noise producing equipment. Built with a lousy economy in mind, this truck is imaginative, compact, very versatile and extremely affordable. Our low cost "packages" start at \$500 per day.



BIG MO RECORDING
Kensington, MD

BIG MO RECORDING



3301 Decatur Ave.; Kensington, MD 20895; (301) 946-7364; FAX: (301) 946-1687. Contact: Ed Eastridge, pres. Vehicles: 1990 Mercedes Benz. **Control Room Dimensions:** 8'x24'. **Mixing Consoles:** Sony MXP-3036 with hard disk automation. **Audio Recorders:** (2) Sony APR 24 track recorders, (5) Panasonic SV-3700 DAT recorders, (3) A-DAT digital 8 track recorders. **Monitors:** UREI 811B, Yamaha NS-10, Meyer HD-1. **Other Featured Equipment:** Dolby SR 24-channel, Adams Zeta 3 sync, (2) Lexicon PCM70, Lexicon PCM60, Lexicon Prime Time, Klark-Teknik DN780, Roland DEP-5, (2) UREI LA-3A, ADAR stereo compressor/limiter, dbx 160, (2) dbx 900 racks, Valley People rack, (4) Neumann U87, (2) Neumann U89, (6) Sennheiser 421, (6) AKG 451, (6) AKG 535, (4) AKG 414, (8) Shure SM57, (8) Shure SM58, (2) Crown PZM, (2) Neumann KM84, (2) AKG 568, (5) Sennheiser 431, JVC 3/4" QSC, (2) Sony BVU-200 1/2" video recorders, JVC 3/4" editing deck; Panasonic video monitor; Toshiba HI-8 video camera. **Specialization & Credits:** Credits include: WJFK Radio—Melissa Etheridge, live broadcast; WHFS Radio—Richard Thompson Band, live recording; WAMU Radio; WETA TV—"In Performance at the White House"; WHMM TV—Rosa Parks Tribute, with Dionne Warwick, Lou Rawls, Marilyn McCoo; ABC TV—"Project Literacy"; Rounder Records; Folkways Records; Sweetrain Records; The Seidman Scene—"15th Anniversary Celebration," with Linda Ronstadt, Emmylou Harris, Ricky Skaggs, Tony Rice, Danny Gatton; The Nighthawks; Edwin Hawkins; Lynette and Walter Hawkins; Timothy Wright and Gospel Workshops of America. Also available: studio recording and production. Video crew on request. Tony Rice, Danny Gatton, The Nighthawks, Edwin Hawkins, Lynette and Walter Hawkins, Timothy Wright and Gospel Workshops of America. Also available: studio recording and production. Video crew on request.

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PO Box 735; Fishers, NY 14453; (716) 924-0728. Contact: Dillon, manager.

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New York, NY

EFFANEL MUSIC INC.



New York, NY; (212) 807-1100. Contact: Randy Ezratty, John Harris. Vehicles: A: 45' custom three-room trailer; B: 24' step van; C: flight case portable system. **Mixing Consoles:** (A): Solid State Logic F Series (E Series EQ) 52-channel, Ultimotion moving faders plus 12 channel Neve 80 Series Sidecar. (B): Hardy M-1/Otari 34, (C): Hardy M-1/Otari 34. **Audio Recorders:** (2) Sony 3348 48-track digital, (2) Otari MTR-90/2 24-track analog, (2) Sony 3402 2-track digital, (2) Panasonic 2700 DAT. Monitor: (4) Meyer HD-1, assorted nearfields. **Other Featured Equipment:** (2) Lexicon 480, Lexicon 300, Lexicon 224, (4) Neve 33609, (2) GML compressor, API 5502, Eventide 3000SE, TC 2290, Drawmer 201, (4) TubeTech EQ, (2) TubeTech compressor, (2) UREI 1178, (16) dbx limiters, de-esser, gates; noise reduction: Dolby SR/XP 24-channel; synchronizer: Lynx; microphones: world-class selection; power amplifier: Bryston; video recorder: Sony BVU-800; video monitors: (5) Sony, Panasonic; switcher: SSL; video effects devices: dirty lens; cameras: (2) semi-pro color for on-site monitoring only; Hardy M-1 52-channel discrete microphone preamp for on-stage used, line-level audio to truck, 96-channel Jensen passive split. **Specialization & Credits:** Recent credits include: U2—MTV Video Awards, Paul Simon's Concert in Central Park, Eric Clapton's "24 Nights", George Harrison's "Live in Japan", Lou Reed "Magic and Loss" video concert and all Lincoln Center Jazz concerts. Effanel's unique "porta 48" flight case system facilitates 48-track digital recording worldwide.

EIGER ENGINEERING



222 Palfrey St., Watertown, MA 02172; (617) 924-6514. Contact: Thomas P. Scheuzger.



GBH MOBILE
Boston, MA

GBH MOBILE



125 Western Ave., Boston, MA 02134; (617) 492-2777 x2302; FAX: (617) 864-7927. Contact: John Voci. Vehicles: MCI bus. **Mixing Consoles:** Amek 39x24x2, (4) Yamaha M406 sub-mixer. **Audio Recorders:** (2) Otari MTR 90-II 24 track, (2) Panasonic SV-3500 DAT, (2) Otari 5050 MK-III 2 track. **Snakes/Splitters Systems:** Belden multicable containing 40 mic lines, communication, video and telco hookups, custom Jensen equipped mic splitter, (3) 12-pair stage snakes on winders, (3) 4-pair stage snakes on winders. **Other Featured Equipment:** Dolby SR 24 channel, Lexicon 224 reverb, (8) dbx 903 compressor/limiter, (2) Amek PM01 EQ, (2) Amek BPF01 EQ, (2) Amek CL01 compressor/limiter, Lexicon PCM70 reverb, (2) Lexicon PCM41 delay, dbx 162 stereo compressor/limiter, RTS TW intercom system; Panasonic WVCD20 video camera; Panasonic 19" color monitor; B&K 4006, 4011; Neumann KM83/84, SM23, U87, KM130/140/150, SM69; Shure SM57, SM58, SM81; AKG C414B; Sennheiser MD211, MD421; EV RE20, RE16; Schoeps CMC5, MK8/MK4; Crown PZM, Countryman DI; Production lounge w/seating for live, central HVAC, Uniden cellular telephone. **Specialization & Credits:** WGBH TV and Radio, PBS, National Public Radio, American Public Radio. TV credits include: Evening at Pops (1980-1991) with John Williams, Bobby McFerrin, Peter, Paul and Mary and Dave Brubeck; American Playhouse; Let the Good Times Roll with B.B. King. Recording credits: Aerosmith, Maurice Starr, Darius Brubeck, Tom Rush. WBCN Radio live broadcast series (1981-1991) includ-

ing: Animal Logic, BoDeans, The Cars, Toni Childs, Godfathers, Georgia Satellites, Little Feat, Ziggy Marley, NRBQ, 10,000 Maniacs, Todd Rundgren, George Thorogood, Johnny Winter. Festival Recording & Broadcasts: New Orleans Jazz & Heritage, Festival International de Louisiane, Newport Folk, Boston Early Music, American Jazz Radio Festival recordings of Henry Threadgill, David Murray, Carla Bley, John Scofield, NPR World of Opera: Philip Glass' The Juniper Tree. Winner of 1989 and 1990 Edwin R. Armstrong award for Technical Achievement for live festival recording of 1989 Newport Folk Festival and 1990 New Orleans Jazz & Heritage Festival.

GOIN' MOBILE



304 Newbury St. #357; Boston, MA 02115; (617) 232-7969; FAX: (617) 232-7969. Contact: Lonnie Bedell, owner. **Specialization & Credits:** Goin' Mobile operates a 1" 16-track remote recording truck based in Boston. We offer live concert recording, on-location sessions and broadcast mixes to clients through the Northeast and beyond. Past clients include: Bill Bruford's Earthworks Northeast tour (MA, NY, VA & PA), Throwing Muses (Sire Records), Bim Skala Bim, Bebop Productions (MD), Fort Apache Studios, New Alliance Audio Productions, Harken Productions (NJ), Double Edge Music Liam Clancy, TAANG! Records, Worpraise Records (NY), Rambo McGuire Ministries (TN), Faith Fellowship Ministries of New England, CF Video, Cambridge Studios, Videocraft Productions and many, many more. Goin' Mobile fills an important gap between throwing together rentals in a back room and the high cost of 24-track. At 50-75% less than 24-track, you owe it to yourself to get our quote before you decide. Call or write for free information package.

HARRISON DIGITAL AUDIO SERVICES



670 Amherst Rd., Granby, MA 01033; (413) 467-3737. Contact: Jeff Harrison, owner.

MUDDY HOLE STUDIOS



Rt. 1, Box 60-Jesterville Rd., Tyaskin, MD 21865; (410) 873-2927; FAX: (410) 873-2927. Contact: Jim or Pam Smith, owners. Vehicles: 1984 Mack MS-10 diesel w/an 18' box. Control Room Dimensions: Approx. 16'x7'7". **Mixing Consoles:** Soundcraft 600B 24-channel (primary) heavily modified to improve metering, monitoring and 24-track direct sends, Soundcraft 200B 8-channel modified (auxiliary). **Audio Recorders:** Tascam ATR-80/24 24-track 2", Radio Systems/Sony RS-DAT, Tascam 42 2-track analog, Marantz portable cassette, Sony 601 digital processor w/two SL-2000 Beta, Panasonic SV-3700 DAT, Aiwa HX-1 portable DAT, Turtle Beach 56K hard disk recorder w/1 gigabyte of storage on a 486/50MHz platform. **Monitors:** Meyer Sound Labs HD-1 (primary), Yamaha NS-10M (secondary), Calibration Standard MDM-4 (auxiliary), Auratone Sound Cubes (auxiliary). **Other Featured Equipment:** Dolby XP Series SR 24-channels, Dolby 363 SR/A stereo, (3) dbx 160X compressor, (3) ART DR-1 digital reverb, LXP-15, PRS "warm interface," (2) ESE digital up/down/preset broadcast clocks, (2) Aphex DA, (2) Aphex balancing interface units, Aphex Compellor stereo, Henry mono summing D.A., UREI 565 notch filter, (2) Alesis 363 compressor/gate, Marshall time modulator, Syncom Pro SMPTE/MIDI read/write/regen/translation timebox; microphones: (2) Neumann KMR81, (4) Neumann KM84, AKG 426 stereo, (4) AKG 414, AKG 422 stereo, (2) AKG D-112E, Sennheiser 421, (5) Shure SM87, (4) Shure SM57, (10) Countryman Isomax, (2) Audio-Technica ATM 31R, (2) EV 635A, (2) Countryman active DI, (2) Whirlwind active DI, (5) Whirlwind passive DI power amp; Yamaha F2100; video monitors: Universal Systems CCTV B&W w/two cameras, (2) Panasonic color monitors w/two cameras; Kurzweil PX1000, Linn drums w/MIDI, PRS guitar, Roland MIDI driver, Gibson bass, PRS bass, 36-channels of isolated mic split. **Specialization & Credits:** The Muddy Hole remote truck was designed to provide effortless, affordable simultaneous live mix and 24-track recording for broadcast, compact disc, or any audio medium where quality counts. Our production expertise will get it right the first time and carry you through to completion within your budget. Clients and credits: Dizzy Gillespie, Ahmad Jamal, Stanley Turrentine, Praise Records, National Public Radio, Wynton Marsalis, Smithsonian Jazz Masterworks Orchestra, Tom Larsen, Ramsey Lewis, Folkway Records, Johnny Shines, WSLC-FM "Radio Free Delmarva," WETA-TV/PBS, WETA-FM, KCRW-FM WETA-FM, KCRW-FM The Capitol Steps, Ed King (Lynyrd Skynyrd), PRS Guitars, Country Music Foundation, Steve Wariner, Chet Atkins, Emmy Lou Harris, Charlie Byrd, Max Roach, The Talbot Chamber Orchestra, Max Roach, WBUR-FM, WPFV-FM, TV-48, Nasar Abadey, Malachi Thompson, Carter Jefferson, Paul Winter, Suzanna Mallow, Abdullah Ibrahim, Sunnyside Records, Kirk Lightsey, Archie Shepp, Aster Aweke, Don Pullen, The Graverobbers, Ralph Peterson Fo'tet, Andrew White, Don Cherry.

NEW ENGLAND MOBILE RECORDING



PO Box 409; Stow, MA 01775; (508) 562-2111. Contact: Jay W. Goodrich, chief engineer. **Specialization & Credits:** New England Mobile Recording is a complete 8/24-track location recording studio. It is ideal for large or small projects, location and stationary recording, or radio broadcast work. The facility has an attractive and spacious interior that can accommodate an entire band as easily as a stationary studio. Three isolation chambers provide recording possibilities unavailable from most mobile units. The bus, a customized Eagle motor coach, is wired for 16 video and 52 exterior audio in-

—LISTING CONTINUED ON NEXT PAGE

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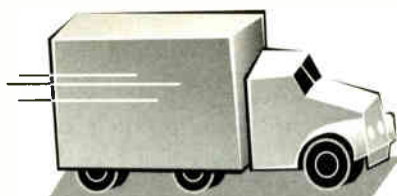
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Remote Recording

—LISTING CONTINUED FROM PREVIOUS PAGE

puts and 40 interior inputs. We use equipment by MCI, Tascam, ADR/Scamp, JBL/Augsburger, Shure, AKG, Audio-Technica, Sennheiser, Dolby, Countryman, Sescom, custom-made snake (200') and splitter (52x2), inputs. We use equipment by MCI, Tascam, ADR/Scamp, JBL/Augsburger, Shure, AKG, Audio-Technica, Sennheiser, Dolby, Countryman, Sescom, custom-made snake (200') and splitter (52x2). knowledgeable staff would like to confer with you about your recording needs. Call for further information.

POMEROY AUDIO



193 Baltic St.; Brooklyn, NY 11201; (718) 855-2650. Contact: Doug PomeroY, owner.

PRODIGAL SOUND



64 Sip Ave.; Jersey City, NJ 07306; (201) 653-3354. Contact: David Vanderheyden. Control Room Dimensions: 7'x7'x18'. Vehicles: 22' International truck. Mixing Consoles: Tascam M-2524, Yamaha 1602 16-input. Audio Recorders: Sony 24-track digital, Sony PCM-501ES 2-track digital, Panasonic R-DAT, Tascam 32-2 analog. Snakes/Splitters Systems: 40 channel microphone splitters with snake. Other Featured Equipment: Lexicon LXP1. Lexicon LXP5 MRC remote control, ART 01A digital reverb and ART Multiverb, Ursa Major digital reverb, (3) Barcus-Berry Sonic Maximizer, (6) dbx 160X, (4) UREI LA-3A, Valley People Dyna-Mite, Shure SM58, SM57, SM51, Beta 58; AKG D112, 330; Sennheiser 409, 518; Countryman Isomax IIC, Countryman direct boxes; Beyer 201, UREI 809, Tannoy NFM-8, PBM-6.5, Carver 1.5, Haller P220.



RECORD PLANT REMOTE INC.
West Milford, NJ

RECORD PLANT REMOTE INC.



109 Pinecliff Lake Dr.; West Milford, NJ 07480; (201) 728-8114; FAX: (201) 728-8017. Contact: Kooster McAllister, pres./owner. Touring Radius: National. Vehicles: 1990 Volvo FE7. Control Room Dimensions: 8'x30'. Mixing Consoles: API 48x48 All Discrete Console, with Massenburg Automation and Computer Touch Screen Reset; (4) Yamaha 406 6x3 mixers. Audio Recorders: (2) Ampex MM-1200, Tascam DA-30 DAT, (2) Denon cassette recorders, (2) Sony DTL 1000ES DAT, (2) Sony 3348 available on request, (2) Mitsubishi 32-track available on request. Monitors: (2) Meyer Sound Labs HD-1, (2) Yamaha NS-10M, (2) Tannoy 6.5, (2) ROR. Snakes/Splitters Systems: Jensen 56 channel 3-way w/JE-MB-D splitters; UTC 12 channel transformer, 3-way; 600'x56 channel snake. Other Featured Equipment: Dolby SR 24 channel, (2) Lynx TimeLine, BTX, Audio & Design TCR-1 reader, Lexicon 300, Lexicon 200; Eventide H3000SE Ultra Harmonizer; Yamaha REV7, Yamaha SPX900, Yamaha SPX90II, BBE 822, Aphex compellor, (2) Drawmer DS-201 stereo gates, Aphex 612 stereo gate, (6) dbx 160, (4) dbx 160X, (2) UREI 1176 compressor/limiters, (8) dbx 903 compressors, NEC 20" color monitor, (2) Panasonic 9" color monitor. Specialization & Credits: Record Plant Remote has just installed a new API All Discrete console with Computer Touch Screen Reset and Massenburg Automation. This console blends the latest in cutting edge technology with the famous API Discrete Sound. Our expanded control room interior provides for a pleasant and comfortable production environment, while maintaining the highest technological support and efficiency. Some of our clients include: MTV, Michael Bolton, The 1992 Grammy Awards, Prince, Guns N' Roses, Whitney Houston, Pavarotti, INXS, Patti Austin, Emmy Lou Harris, Wynnton Marsalis, Mary Chapin Carpenter, Patty LaBelle, Billy Ray Cyrus, The Judds and Harry Connick Jr. Our reputation speaks for itself!!

REMOTE MEN VISUAL MUSIC



PO Box 791; Flushing, NY 11352; (718) 886-6500; FAX: (718) 886-7214. Contact: Steve Remote. Specialization & Credits: Remote Men Visual Music is the production end of Aura Sonic Ltd. Remote Men is available for on-location audio-for-video production. From TV and radio broadcasting to dual analog or digital multitrack recording, Remote Men will accommodate your every need nationwide via The ASL Mobile Unit and/or the mobile unit of your choice. Recent artists include Manhattan Transfer, Midnight Oil, Little Village, Rodney Crowell, Benny Green, Williams Quintet, Procol Harum, Melissa Etheridge, Bobby Caldwell, Diane Shuur, Megadeth, Faith No More, Sonic Youth, Morrissey, Richard Marx, B-52's, Skid Row, Rob Halford, Spin Doctors, Denis Leary, Bon Jovi and Arrested Development to name a few.



REMOTE RECORDING SERVICES INC.
Lahaska, PA

REMOTE RECORDING SERVICES INC.



PO Box 334; Lahaska, PA 18931; (215) 794-5005; FAX: (215) 794-3263. Contact: David Hewitt, pres. Touring Radius: International. Vehicles: Custom Peterbilt tractor w/44' custom trailer. Control Room Dimensions: 8'x9'x36' plus production room 8'x9'x8'. Mixing Consoles: Neve VRM 48-input, Flying Faders 3.0. Studer 361 10x2, Studer 362 14x4, (3) Yamaha PM180 6x2. Audio Recorders: (2) Studer A-820, (2) Sony 3324 digital available, (2) Studer A-810 2-track center track 1 me code, (2) Panasonic SV-3700 DAT, Aiwa Strasser DAT, Sony 1630 available, (2) Sony DMR-4000 VCR available. Monitors: (2) KRK 15A-3 triamped w/Bryston 3B & 4B amp, (2) KRK 703C, (2) Hartke M18 aluminum cone, (2) JBL 4411, (2) Yamaha NS-10. Snakes/Splitters Systems: (84) 1x3 mic splitters, 1500' main snake anc aux line level & video and sub snakes active splitters/remote preamps available. Other Featured Equipment: Dolby SR 48-channel available, (4) Lynx modules available, Aphex Compellor stereo comp/lim, (7) API 525 comp/lim, (6) API 550A, 550B, 560A, 560B EQ, (7) dbx 903 comp/lim, Drawmer 1960 tube comp, (2) Dynaflex Dynamic noise filters, (4) Dyna-Mite 340 noise gates, Eventide H300J Harmonizer, Lexicon PCM60 digital reverb, Lexicon 480L, Neve 33609 stereo comp/lim, (5) UREI 1176 limiters, (4) UREI LA-3A comp/lim, Yamaha REV7 digital reverb, Sony 27" XBR video monitor, (2) Mitsubishi 14" multi sync video monitor, (2) KVC 12" video monitor, (3) Sony 5" video monitor. Specialization & Credits: Recent credits include: Mariah Carey "MTV Unplugged," Donald Fagen "New York Rock N' Soul Revue," Allman Brothers live a bum, Don Henley "ABC In Concert," Neil Young "Arc Weld," Jimmy Buffet "Feeding Frenzy," Live from the Met.



RIGHT COAST RECORDING INC.
Lancaster, PA

RIGHT COAST RECORDING INC.



151 Delp Rd.; Lancaster, PA 17601; (717) 560-1530; FAX: (717) 560-0433. Contact: Dave Wilkerson, pres. Touring Radius: International. Vehicles: Portable system—sets up anywhere. Control Room Dimensions: Varies—minimum 12'x16'. Mixing Consoles: Trident Custom Series 24 - 36x24x24, Hill Custom Multimix - 16x4x2, SSL 4048E with G Series computer available for longer-term projects. Audio Recorders: Sony TCD-D10 DAT, Tascam DA-500 DAT, Apogee AD-500 analog to digital converter, Apogee DA-1000 digital to analog converter; any format of analog or digital recorder

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supplied to customer specification. **Monitors:** Right Coast LRM-2 mastering monitor, Right Coast LRM-1 near field monitor, JBL LIIZ control monitor, (2) Yamaha NS-10M near field monitors. **Snakes/Splitters Systems:** 300' 76 channel + 4 video snake, Jensen 60 channel transformer splitter, custom 16 channel line amp/isolation system. **Other Featured Equipment:** (2) Lexicon 224 reverb, Lexicon 200 reverb, Lexicon 97 DDL, Yamaha REV5, (2) ADP vocal stresser; Drawmer DS-201 gate, (4) dbx 165 limiter, (4) dbx 160 limiter, (2) dbx 162 stereo limiter, (5) UREI 1176LN peak limiter, Spectra Sonics 610 compressor/limiter, dbx 900 rack w/4x903, 4x904, 4x905, 2x902; Valley People rack w/6x Kepex II, 3x Maxi-Q, 2x Gain Brain; (2) Eventide H910 harmonizers; custom automatic voltage regulator/filter a.c. distro; (2) 32 channel video bargraphs; six station intercom system; 8 mix headphone cue system; over 50 mics & D.I.'s from AKG, B&K, Beyer, Milab, Countryman, Sennheiser, Shure and Jensen.

THREE COMMUNICATIONS PRODUCTIONS



510 Main St., Middletown, CT 06457; (203) 347-8439. Contact: Mike Araleh.

WARM BROWN SOUND



PO Box 1888; Brattleboro, VT 05302; (802) 254-4283. Contact: Chris Kelly, proprietor/engineer.

WINTHROP PRODUCTIONS



156 W. 94th St., New York, NY 10025; (212) 662-8685; FAX: (212) 749-8387. Contact: Susan Winthrop, owner.

WQCD MOBILE PRODUCTION TRUCK



220 E. 42nd St., Ste. 2812; New York, NY 10017; (212) 210-2773; FAX: (212) 210-2771. Contact: Andy Bater, technical dir. **Touring Radius:** Local and regional. **Vehicles:** Custom-built Midwest M-22 truck. **Control Room Dimensions:** 8'x8'. **Mixing Consoles:** Soundcraft Delta 32-channel. **Audio Recorders:** Sony, Panasonic, Tascam DAT, Otari 2-track, Tascam cassette. **Monitors:** Tannoy System 8DTM. **Other Featured Equipment:** Noise reduction system; ANT; outboard equipment: Aphex, Yamaha, Orban, Drawmer, dbx; microphones: Neumann, Shure, Electro-Voice, AKG, Samson wireless; power amp: Hafler; video monitors: Sony color monitor/receivers; cameras: Panasonic color CCD camera. **Extended Equipment:** WQCD's unique digital audio remote pick-up (RPU) system utilizes a highly advanced digital data compression system developed by Audio Processing Technology (APT), a subsidiary of Solid State Logic. Offering real-time compression and retrieval of audio data, with no subjective loss of quality, the APT-X100 system allows the satellite and terrestrial transmission of CD-quality digital audio previously unattainable within an economical data bandwidth; also featured: Benchmark mic preamp system; 24-channel Whirlwind mic splitter, Denon CD players, JVC and Sansui F1 encoders/decoders; Comrex wireless IFB system; two-channel RTS intercom system; two TFT 450MHz RPU transmitters; two TPL 100 watt power amplifiers, on-board 6.5KW generator with Sola regulator, 42-foot heavy duty Wilbury mast with quickset pan/tilt. **Specialization & Credits:** WQCD's Mobile Production truck is the vehicle of choice for high-quality remote broadcast transmission/production in the New York area. Our unique digital microwave system is specifically designed to bring back compact disc-quality audio from remote locations, for example we served as the key digital audio link from Central Park for Westwood One's live Paul Simon broadcast. Other transmission credits include ABC, IDB, Minnesota Public Radio (Garrison Keillor), National Public Radio, RTE Dublin, Radio France, WNEW-FM, WXRK, WFUV, WRTI and the Howard Stern Show. On-board mixing credits include Angela Boffill, Grover Washington Jr., Dave Valentin, Diane Reeves, The Radiators, George Benson, Roberta Flack, Billy Childs, T Lavitz, Vinx, Dave Koz & Phil Perry, Spyro Gyra, Manhattan Transfer, and Steve Wariner



SHEFFIELD AUDIO-VIDEO PRODUCTIONS
Phoenix, MO

SHEFFIELD AUDIO-VIDEO PRODUCTIONS



13816 Sunnybrook Road; Phoenix, MO 21131; (410) 628-7260; FAX: (410) 628-1977. Contact: Richard Van Horn, vice president/audio. **Touring Radius:** International. **Vehicles:** 48' custom design trailer, 68' w/tractor, 10' ceiling, 30' length, 8.5' width, rear of truck contains a client/producer lounge that is raised 4' above the control room floor for ease of observation. **Mixing Consoles:** SSL E/G 4048, Neve 24-input. **Audio Recorders:** (2) Sony digital, (2) Otari MTR9011 analog, (2) Panasonic SV-3700 DAT, (2) Tascam cassette decks. **Monitors:** UREI 815C, Yamaha NS-10. **Snakes/Splitters Systems:** 72-input splitter w/Jensen transformers, 350' 52-pair cable w/XLR to Amp Quick Latch, 350' 28-pair cable. **Other Featured Equipment:** Eventide H3000 (fully loaded), Lexicon 200, Yamaha REV7, (2) Yamaha SPX90, TC2290, (6) Neve limiters/compressors, (3) UREI 1176, UREI LA-4, (2) UREI LA-3, (4) Kepex II gates, Nakamichi CD player, Sony V-7600 3/4" video player/recorder, Sony VHS Hi-Fi video player/recorder, Cipher Digital 750 time code reader/generator/insert, CC TV camera, (2) 25" color monitors, (3) 19" color monitors, RTS communication. **Extended Equipment:** Shure mics, Sony mics, Beyer mics, Neumann mics, Crown mics, Sennheiser mics, AKG mics, EV mics. **Specialization & Credits:** Sheffield's remote audio truck is the largest "audio only" truck in North America. The truck is not just a remote audio truck, but a complete audio facility. Recent clients include the Miami Hurricane Relief Concert featuring Gloria Estefan, Crosby Stills & Nash, Jimmy Buffett and many others. Other shows and clients include the New Orleans Jazz Festival, Motown, Elektra, CBS, IRS/Grand Slam, Capitol, Atlantic, Westwood One, Nocturne, Cyralis, Giant, Warner Bros. and more. Sheffield also has a full service facility that offers a large studio with SSL E/G console, multitrack analog and digital recorders and a large selection of outboard gear. In addition, we offer full video production services that include a 30' remote video truck, two 1" console, multitrack analog and digital recorders and a large selection of outboard gear.

STRAIGHT ARROW RECORDINGS



(FORMERLY BACKTRACKS), 3 Kent St., Montpelier, VT 05602; (802) 223-2551. Contact: Mike Billingsley. **Specialization & Credits:** Our specialty is completely faithful and natural recording in good halls and on location. Using all 44.1k digital recorders (R-DAT and Apogee-modified PCM), we capture the nuances of live performance, ambience and action. As inventors and patent holders of the Crown SASS™ microphone, we continue our pioneering work with stereo imaging, including a special 4-channel SASS-plus-digital recording system for on-site discrete surround. We use all the best components for accuracy and detail, including modified mics and power supplies for our SASS-Ps and Bs, Star-Quad cables and well-maintained, custom-modified recorders, as well as a full complement of standard remote and field recording gear. We do not do multitrack remotes but are well-versed in live performance mixing. Our new studio and post-production facility is set up for comfortable editing and compact disc premastering, giving us full control over the final stereo or 4-channel image. Our many credits include acoustic ensembles (folk, international and classical), percussion, location samples and sound effects, environmental ambience and artist installations.

SEE PAGE 176 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 175.

SOUTHEAST

Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia

BRANTLEY SOUND ASSOCIATES INC.



204 Third Ave. S.; Nashville, TN 37201; (615) 256-6260; FAX: (615) 255-9369. Contact: Leland P. Brantley, president.

GERALD LEWIS RECORDING



10264 Quiet Pond Terr.; Burke, VA 22015; (703) 425-5210. Contact: Bruce Kane, owner.

MAGNETIC MEMORIES



PO Box 3373; Kingsport, TN 37664; (615) 246-3010. Contact: Lawrence Morris, pres.

PROGRESSIVE MUSIC STUDIOS



2116 Southview Ave.; Tampa, FL 33606; (813) 251-8093; FAX: (813) 251-6050. Contact: Ken Veenstra, owner.

RM AUDIO



3586 Pierce Dr.; Atlanta, GA 30341; (404) 458-6000; FAX: (404) 458-0276. Contact: John Lewis Tyler, Dir. of operations. **Specialization & Credits:** Studio sound in the field? No problem. We've got what it takes to get your sound on tape the way you've always heard it. Our Trident-equipped dual 24/48-track truck and legendary crew are ready to assist you in audio-for-video live broadcast/telecasts, and especially live album projects. We've recently worked with

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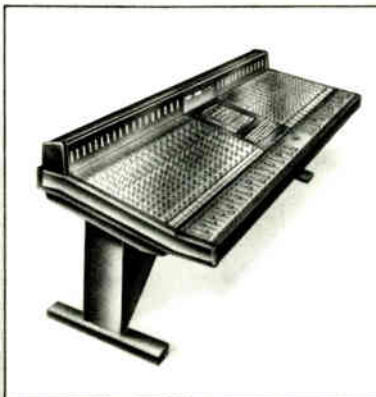
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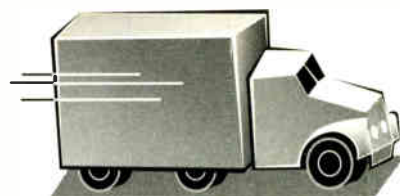


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Remote Recording

—LISTING CONTINUED FROM PREVIOUS PAGE



RM AUDIO
Atlanta, GA

UNAC 5/Birmingham, Gramercy Records, Ichibon Records, Neville Bros., Yellow Jackets, Joe Satriani, The Tams, The Lettermen, Follow for Now, Wynton Marsalis. Touring in the Southeast? Give us a call.

TRAVELING TRAX MOBILE RECORDING



810 Harbour Dr.; Punta Gorda, FL 33983; (813) 624-4521. Contact: Don Brown, chief technician.

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ACCUTRACK RECORDING & SOUND CO.



1828 Johns Dr.; Glenview, IL 60025; (708) 724-9200; FAX: (708) 486-8007. Contact: David Levit, owner.

BARON VON SONIKS



PO Box 340277; Beavercreek, OH 45434; (513) 433-8090. Contact: Stephen Miller, owner.

Remote Audio

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GBH Mobile

John Voci
GBH Mobile
125 Western Avenue
Boston, MA 02134
617.492.2777 x 2302
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METRO MOBILE RECORDING
Glenview, IL

METRO MOBILE RECORDING



2097 John's Ct.; Glenview, IL 60025; (708) 998-6420; FAX: (708) 998-6421. Contact: Timothy R. Powell, owner. Touring Radius: National. Vehicles: 1983 Chevy Hi-Cube truck. Control Room Dimensions: 14'x8'. Mixing Consoles: Nectek Elite 50x26, (2) Hill Multi-Mix 16x4 rack mount mixer, Hardy M-1 4x4 mic preamp, Val ley People Dyna-Mic 4x2 mixer, Shure FP-42 4x2 mixer. Audio Recorders: (2) Sony/MCI JH-24 24-track, Panasonic SV-3700 DAT, Panasonic SV-3500 DAT, Sony TCD-10 Pro portable DAT, Sony 300ES DAT, Fostex E-16 1/2" 16-track, Ampex ATR-100 1/2" 4-track. Monitors: UREI 809, Yamaha NS-10, AR Red Box II, Tannoy 6.5 PRM, JBL 4313. Snakes/Splitters Systems: 48 channel, 3-way transformer splitter, 36 channel 3-way transformer splitter, 52 channel multipair

SO. CALIF./SOUTHWEST/HAWAII

Arizona, Arkansas, Hawaii, Southern Nevada, New Mexico, Oklahoma, Southern California, Texas



DESIGN FX REMOTE RECORDING
Culver City, CA

DESIGN FX REMOTE RECORDING



PO Box 491087; Culver City, CA 90049; (310) 838-2400; FAX: (310) 838-5173. Contact: Terry Stark, director. Touring Radius: international. Vehicles: GMC 35'x9'. Control Room Dimensions: 7'x27'. Mixing Consoles: API (custom) 44x24 (24 bus) w/550-A EQ, custom patch bay, various rack mixers available, Sony MXP-61 12x4. Audio Recorders: (2) Sony PCM-3348 48-track digital, (2) Mitsubishi X880 32-track digital, (2) Otari MTR-90 24-track, (2) Mitsubishi X850 32-track digital. Monitors: (2) KRK 15" custom, (2) Meyer Sound Labs ACD 15". (2) Yamaha NS-10. Other Featured Equipment: Noise reduction: (2) Dolby XD SR24. Dolby A 48 channel; synchronization: (2) Lynx TimeLine; outboard: GML stereo EQ, (2) Pultec EQP-1A3, (2) Teletronix LA-2A EQ, Summit Audio stereo EQ, (44) API 550-A EQ, (4) UREI 1176 limiter, (4) dbx 160 limiter, Summit Audio TLA 100 tube, (4) GML preamps, DMX DDL Harmonizer, AMS RMX reverb, Yamaha SPX90 reverb, Lexicon PCM70 reverb, Roland SRV-7 reverb, Yamaha REV7 reverb, Yamaha REV11 reverb, (10) Drawmer DS 201 gate, Aphex Compellor, Aphex Dominator; microphones: Neumann, AKG, Sennheiser, Sony, Shure, RCA, Crown, B&K, EV, Schoeps; power amps: Perraux 600 stereo, BGW 750 stereo, Bryston 4D stereo; video monitors: Panasonic 19" color, (2) Sony 9" color, (3) Panasonic B&W; cameras: (2) Sony color; other equipment: Panasonic SRV-3700 DAT, (2) Yamaha C300 cassette recorders. Specialization & Credits: Gary Ladinsky of Design FX Audio, Culver City, CA, which has served the studio community for years with its massive rental inventory, and Terry Stark, ex-chief of Wally Heider's and Record Plant Remotes, joined forces last year to create the awesome Design FX Remotes. Aided by chief engineer Jack Crymes (ex-chief engineer of Wally Heider's and Record Plant Remotes), and Allen Baca (Design FX Audio), they have created what many feel is the most versatile and best equipped remote truck in the world. We even helped engineer Bill Schnee win an Emmy this year by providing him with our facility for the Natalie Cole "Unforgettable" PBS special! In conjunction with sister company Design FX Audio's renowned rental division, Design FX Remotes can offer virtually anything that any producer or engineer may ever want, from 48-track digital recorders to the rarest tube mic. Some projects that were done during the year included: Bruce Springsteen *Unplugged* (MTV), Emmy winning (audio) Natalie Cole "Unforgettable," 1992 MTV Movie Awards (MTV), Gary Moore (Virgin), Gipsy Kings (Sony), Tesla (Geffen), 64th Annual Academy Awards (ABC), 1992 & 1993 MTV Music Video Awards, MTV 10th Anniversary Special (George Michael) (ABC), Billboard Awards (Fox), Bill Graham's "Day on the Green" (Metallica, Queensryche) (MTV), Great White (album project) (Capitol).

DIGITAL SERVICES REMOTES



5805 Chimney Rock; Houston, TX 77081; (713) 664-5258. Contact: John Moran. Touring Radius: International. Vehicles: Chevrolet C-50 truck. Mixing Consoles: MCI 636, Neve 5442. Audio Recorders: (2) Sony PCM-3324, Otari MTR-9011, Sony PCM-1610, Tascam DA-30 DAT, (2) Nakamichi cassette, Otari MTR-12 1/4". Monitors: JBL 4412, Yamaha NS-10, Auratone, Ed Long MDM-4. Other Featured Equipment: Synchronization system: TimeLine Lynx modules; outboard equipment: (2) Lexicon PCM70, Lexicon LXP-1, Lexicon LXP-5, (4) dbx 160X, (3) dbx 166, (4) Audio & Design compressor, (8) Audio & Design noise gate, DeltaLab delay, RTS intercom, RTS audio distribution amp; microphones: Neumann U69, U87, U89, TLM170, Sennheiser 421, 441, Shure SM57, SM58, SM81, SM89, AKG 414, 460, Crown PCC 160, Isomax, Countryman DI, Electro-Voice RE20, RE10; power amps: QSC 3500, Crown D-75, Crown PS-400; video recorders: Sony BVU-800; video monitor: Panasonic 1020; other equipment: SSL studio for post-productions and mixing, 2500' soundstage, Fairlight /MIDI production room, ScreenSound digital post room, Foosball table. Rates: Not expensive at all. Specialization & Credits: Clients: B-52's, Genesis, JVC Jazz festival, Houston Grand Opera, Houston Symphony Orchestra, Van Cliburn International Piano Competition, B.B. King, Neil Young, Edwin Hawkins, KUHT, KTRK, et al. Specialization: 24/48-track location audio, audio/video mixing, satellite and broadcast audio distribution. Pulling rabbits out of hats and putting out fires before they start. Top equipment and an experienced crew.

snake system w/275' of cable. Other Featured Equipment: Eventide H3000SE Ultra-Harmonizer w/sampling card, Lexicon PCM60, Yamaha REV7, (2) Yamaha SPX90 digital processors, (4) Yamaha D1500 digital delay, Roland SRV-2000, Roland Dimension "D", (2) Studio Technologies AN-2 stereo simulators, UREI 1176LN limiter, (2) UREI LA-4 limiter, (2) UREI LA-3A limiter, Aphex Compellor limiter, Aphex Type C Aural Exciter, (3) Aphex 612 noise gates, (5) dbx 160X limiter, (5) dbx 166 limiter, dbx 165A limiter, (2) dbx 463X noise gate, (2) dbx 263X de-esser, (2) dbx 563X Silencer. Extended Equipment: (2) Sony CVN-1270 color monitor/receivers, Sony PVM-1380 color monitor/receiver, Panasonic WV-F2 CCD color video camera, Otari EC-201 SMPTE time code reader, 120 AMP single phase power distribution w/350' of cable, Clear-Com intercom system w/5 beltpack/headset, (2) Motorola radios w/4 channels, Missing Link, Stewart, Pro-Co, Sescor direct boxes, cables, stands, subsnakes, headphones and more; portable drum baffles, (12) studio blankets, plexiglass drum booth, complete cue system w/30 headphones, Adams-Smith Zeta-3 transport synchronizer w/SMPTE, (2) Tascam 112R auto-reverse cassette. Microphones: Bruel & Kjaer, Schoeps, Sennheiser, Neumann, Sony, AKG, Electro-Voice, Shure, Beyers, Fostex, Milab, RCA, Audio-Technica; Power amps: Bryston 4NB & 3B, Carver 1.0T, Crown D150, (2) Crown D-75, Yamaha P20754, Sony TAN-5550, Rane HC-6, (2) Marantz 8B. Specialization & Credits: Featuring Chicago's first and only 48-track audio truck. Metro Mobile offers the finest in location audio services for live radio & TV broadcasts, audio-for-video and film production, on-location commercial recording, and live album and CD production. Recent clients include David Bowie, The BoDeans, Indigo Girls, John Mellencamp, The Replacements, Living Colour, Chicago Blues, Jazz and Gospel Festivals, Eleventh Dream Day, Poi Dog Pondering, Jesus Jones, Don Dixon, Circus of Power, The Descendants, Ministry, Revolving Coats, Tattoo, Big Bash, The Drovers, Material Issue, Free Hot Lunch Band, Dream Syndicate, Adrian Belew, Soul Asylum, John Hiatt, Kiss, Winger, Robert Cray, Lonnie Brooks, Lonnie Mack, Shriekback, The Nylons, House of Love, The Pixies, Neville Bros., REO Speedwagon, The Church, The Winans, Edwin Hawkins, Santana, WXRT's Sunday Night Concerts, WLUP, WFMT, WBBM-TV, WTTW-TV, WBZ, HBO, MTV, ShowTime, Westwood One, The A&E Network, PBS, National Public Radio, The Disney Channel, A&M, MCA, Alligator, PolyGram, CBS, Atlantic, Island, Elektra, Warner Bros., Epic and Geffen Records.

MODERN MINSTREL MIXING & RECORDING



PO Box 19112; Minneapolis, MN 55419; (612) 824-4135. Contact: C.W. Frymire.

PRODUCERS VIDEO SERVICE INC.



PO Box 1865; Palatine, IL 60078; (708) 934-0999. Contact: Jerry Skora, pres/gen. mgr.

R/J RECORDING & SOUND



PO Box 302; 530 Lark St.; Geneva, IL 60134-0302; (708) 232-1932; FAX: (708) 232-1938. Contact: Richard J. Peck. Specialization & Credits: We at R/J Recording & Sound pride ourselves on providing very high-quality recording services. We do on-location digital recordings of live events such as symphony orchestras or corporate functions. We also have a complete studio facility for projects such as band recording, commercial music production and editing. Credits include: Ides of March, Fox River Valley Symphony Orchestra, New Philharmonic Orchestra, Elmhurst College Jazz Festival, Elgin Community College Jazz Festival, The LOOP FM 98 and WGN-AM 720. Specialization: Our educated staff of friendly engineers will work with you to help you get the most out of your studio time. We'll promise you a worry-free production environment and high-quality results. So give us a call today because we sound terrific!

TRIO VIDEO



2132 W. Hubbard; Chicago, IL 60612; (312) 421-7060; FAX: (312) 421-0361. Contact: Debra Zouvas, production mgr. Touring Radius: Regional. Vehicles: 19ft., 30ft., 45ft. and 48ft. television production trucks. Mixing Consoles: Audio rooms carry Soundcraft 800 32 input stereo, Soundcraft Europa 40 input stereo. Also includes surround sound capabilities, cart, cassette, reel-to-reel and CD formats available. Other Featured Equipment: State-of-the-art broadcast equipment featuring Grass Valley switchers, Sony BVP-360 and BVP-350 cameras, Sony 3100 1" and BVW-75 Beta-SP tape machines, Chyron graphic systems, Abekas A53 DBE, Abekas A42 Still Store. Experienced staff and freelance crews also available.

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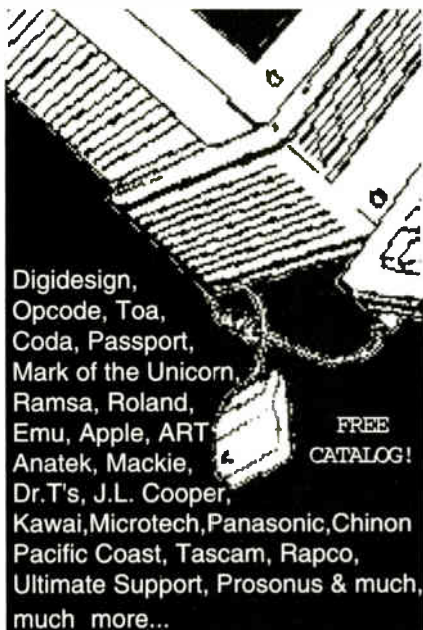


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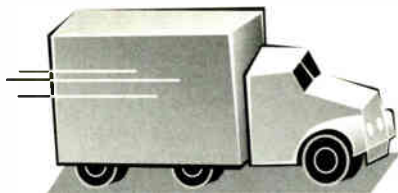
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Remote Recording



MIDCOM REMOTE SERVICES
 Irving, TX

MIDCOM REMOTE SERVICES



3 Dallas Comm. Complex, Ste. 108; 6311 N. O'Connor Rd., LB-50; Irving, TX 75039; (214) 869-2144; FAX: (214) 869-0898. Contact: Jeff Jones, manager. Touring Radius: Regional. Vehicles: 1982 GMC 24' straight truck. Control Room Dimensions: 8'x20'. Mixing Consoles: Soundcraft TS-24 32 channel w/custom 8 stereo/16 mono sub-master routing system, 32x24x16x2x1; Amek/TAC Bullet 10x4x2. Audio Recorders: (2) Otari MTR-9011 24-track, Studer A810 2-track w/center-track time code, Nakamichi MR-1B, Panasonic SV-3500 DAT. Monitors: UREI 811B time-aligned, Digital Design LS 161 and 261 near-field, Westlake BBSM-6, Auratone 5C. Other Featured Equipment: TTM 24 channel noise reduction will accept Dolby, dbx, Telcom; Cipher Digital Shadow II w/Shadowpad, Cipher Digital "Cypher" time code generator/reader, Lexicon 480L digital effects, Lexicon 224XL digital reverb, Lexicon Model 95 Prime Time II, Eventide H910 Harmonizer, dbx Series 900 frames w/9023 comp/limiter, 904 noise gate, MICMIX dynamex/exciter cards, Lexicon PCM70 digital reverb, (2) dbx 160X compressor/limiter, Aphex stereo Compeller; microphones: Neumann U89, Neumann TLM170, Neumann KM84, AKG C-414, Sennheiser MD-441, Sennheiser MD-421, Beyer M69, Beyer M88, Beyer M500, Beyer M201, Beyer MC734, Shure SM58, Shure SM57, Shure SM81, Shure SD85, Crown P2M GPB30, (2) Crown 2LV, Cetec Vega R42 handheld and lavalier wireless microphone system available at extra charge; power amps: (2) Hafler P-505 on mains, Hafler P-230 on near-fields; video recorders: Sony VO-5800 3/4" U-matic, Panasonic AG-6800 1/2" VHS Hi-Fi; video monitors: Sony CVM-1900 19" NTSC monitor/receiver, (3) Panasonic BMW 5"; switchers: (2) Panasonic 12x1 routing switcher, (3) ADC Humbuckers, (8) external inputs. Specialization & Credits: Past projects include: The Cure 1989 "Prayer" tour; Marcus Roberts "Deep in the Shed" music video; 1989 Miss USA Pageant, Mobile, AL, for CBS TV; Aida; Nixon in China; The Aspern Papers Great Performances Series for PBS; Dolly, ABC-TV prime time; "The Texas Debates" presidential debates for American Public Radio; live, broadcast for Z-Rock Radio Network including: Metallica, Dio, King's X, Black Crowes Nevada Black, Every Mother's Nightmare, Network; George Strait, MCA Home Video; 7th Van Cliburn Competition, American Public Radio; Benjamin Lees' Memorial Cardies, American Public Radio; score for Texas, Oramalex production at Palo Ouro Canyon; Fashion Hit Revue, Sanger Harris live TV special; Mary Kay Cosmetics seminars 1985-1990; League of Women Voters; 1984 Democratic Presidential Candidates Debate, PBS network special; Bob Banner Associates' Face of the '80s syndicated TV special; ACTS TV Network, Country Crossroads, two 13-week series; Bob Stivers Productions' Stars Salute the U.S. Olympic Team, NBC prime time special; Bugs Henderson live LP project; two live albums for The Vocal Majority; and more.

OMEGA PRODUCTIONS



7027 Twin Hills Ave., Ste. #5; Dallas, TX 75231; (214) 891-9585; FAX: (214) 891-9623. Contact: Paul Christensen. Touring Radius: International. Vehicles: 1986 Kenworth diesel, 40' fixed unit with 1,700-mile refueling range. Control Room Dimensions: 30'x8'x10'. Mixing Consoles: API 32x32 w/API 550A EQ 32 program buses w/8 stereo VCA groups, Hill 16x8x4x2, Yamaha PM3000. Audio Recorders: (2) Otari MTR-90 24-track, (2) Sony 3324 24-track, (2) Mitsubishi X-850 32-track. Monitors: (2) JBL 4430, (2) Auratone, (2) Yamaha NS-10. Other Featured Equipment: Noise reduction; Dolby SR, 24 tracks; synchronization; BTX 4700 Shadow; onboard equipment: Teltronix LA-2A limiter, dbx 165 limiter, (7) dbx 160

—LISTING AND PHOTO/LOGO CONTINUED TOP OF NEXT COLUMN



OMEGA PRODUCTIONS
 Dallas, TX

limiter, ADR Vocal Stresser, (2) UREI 1176LN limiter, MXR 01a digital reverb, (3) Yamaha SPX90 special FX processor, (4) DeltaLab Super Time Line, (2) dbx 162 limiter, Dyna-Mite limiter; microphones: (8) AKG C-414EB, (4) AKG C-451EB, AKG D-12E, (6) Beyer 201, (2) Neumann U47, (4) Shure SM81, (12) Shure SM58, (8) Shure SM57, (4) Shure SM53, (6) Crown P2M315, (7) Sennheiser 441, (3) Sony ECM-22P, (2) Sony ECM-50, (2) EV RE20, (7) Countryman DI box, (10) Heider DI box, Audio-Technica ATM-5R; power amp: (2) Yamaha P2200, Yamaha P1000; Video recorder: JVC 6600U; video monitors: Sony Triniton 14", Panasonic 19". Specialization & Credits: Omega has been supplying remote audio recording services to clients of the record, film and video industry since 1973. During that time, Omega Audio has worked with over 200 major recording artists, all major television networks and on numerous feature films. Omega Audio has received two Platinum Records, five Gold Records, two Ampex Golden Reel Awards, three Grammy nominations and six Dove Awards. Partial credits include: Moody Blues, Genesis, Poi Dog Pondering, Oamn Yankee, Lyle Lovett, Vince Gill, Mark Chestnutt, Dr. John, Buddy Guy, The Highman, Travis Tritt, Garth Brooks, Clint Black, U2, REM, Lynyrd Skynyrd, Amy Grant, B.B. King, Dizzy Gillespie, Joe Walsh, Fats Domino, Ray Charles, Paul Shaffer, Prince, Cameo, Johnny Cash, The Judds, WNET-PBS Great Performances, Dick Clark Productions, Pat Benatar, Joe Jackson, Hall & Oates, Anne Murray, Art Garfunkel, Al Jarreau, Molly Hatchett, Neil Young, Ben Vereen, Bo Diddley, The Big Easy, Baja Oklahoma.



REELSOUND RECORDING CO.
 Austin, TX

REELSOUND RECORDING CO.



2304 Sheri Oak Ln., Austin, TX 78748; (512) 472-3325; FAX: (512) 282-0713. Contact: Malcolm H. Harper Jr., owner. Touring Radius: International. Vehicles: 42' Sierra-Hidley designed trailer-truck unit. With control room, iso-lounge overdund booth and storage. Control Room Dimensions: 20'x7'. Mixing Consoles: MCI/Sony JH-600 36LM automated, Allen and Heath 18x4x2. Audio Recorders: (2) MCI/Sony JH-24, Panasonic SV-3700 DAT, (2) MCI/Sony JH-110C 2-track, (2) Nach cassette deck, Sony 3324 (available for extra rental). Monitors: JBL 4425, Westlake BBSM-6, Tannoy PBM 6.5, Meyer HD1. Snakes/Splitters Systems: (86) Jensen transformer splits w/Mogami cable. Other Featured Equipment: Dolby SR 363 unit, Dolby SR 24-track unit (for extra rental), MCI/Sony JH-45 lock unit, AMS RMX-16, Lexicon PCM70, (6) Drawmer DS201 gates, (4) Aphex Compeller, (4) UREI LA-3A limiter, (3) API 525 limiter, (10) API 550A EQ, (9) API mic preamp, (2) Drawmer 1960 limiter, (4) Valley Dyna-Mite, Valley 415 DSK unit, Yamaha SPX90II, dbx 900 rack w/(4) 901, (2) DS units, UREI 535 graphic, (5) Sennheiser 421, (2) Neumann KM84, (2) Neumann FET47, tube mics, DI's all the normal and not so normal stuff. Specialization & Credits: So many I can't remember them all. But, I thank all of them for the opportunity to serve them. Here's a few from the last 22 years: Genesis, Journey, Bee Gees, Christopher Cross, Todd Rundgren, Cinderella, the Gap Band, Carole King, Alabama, Charlie Daniels Band, Ray Charles, The Fixx, Michael Bolton, Robert Plant, Ricky Scaggs, Glen Campbell, Willie Nelson, AC/DC, Pattie LaBelle, Kool and the Gang, George Strait, Phil Collins, Kentucky Headhunters, Neil Young, Chagall Guevara, The Who, BB King, Dolly Parton, Ted Nugent, Stevie Ray Vaughan, Judas Priest, Queensrÿche, Jerry Jeff Walker, Michael W. Smith, Amy Grant, Asleep at the Wheel, Frankie Beverly, Little Joe and La Familia, Eric Johnson, John Michael Talbot, Oe Gramo and Key, and Dave Perkins. Recent projects: Farm Aid V, Bronco Live in Monterey, Allen Jackson Video, TNN, Riverwalk Live from the Landing 92, Stephen Curtis Chapman Live from Dallas,

PROFESSIONAL SOUND AND RECORDING



3100 W. 71st Ave., Westminster, CO 80030; (303) 426-7819. Contact: Phil Crumrine. Touring Radius: Regional. Vehicles: 1984 Winnebago Centauri van. Control Room Dimensions: 7x14. Mixing Consoles: Soundcraft 1624 24x16x24, Rowland Research 8x2 Audiophile, Soundcraft 2008 16x4. Audio Recorders: (2) Stephens 821A 24/16 track 2", Nakamichi DMP-100 PCM digital, Revox PR99 1/2-track 1/4", (10) TEAC V2-RX 3-head cassette deck, Panasonic SVDA-10 DAT machine. Monitors: Yamaha NS-10, B&W DM-100, EV Sentry 100A, Spica TC-50. Other Featured Equipment: Lexicon PCM60, Yamaha REV7, Yamaha SPX9011, (2) Symetrix 501 comp/limiter, Symetrix 511 noise reduction unit, dbx 900 rack w/(4) compressor, (2) parametric and (3) gate, (2) Symetrix 522 comp/limiter, BBE 202R stereo processor, UREI LA-3 compressor, (2) AKG C-414 EB-P48, (2) AKG C-451 w/shotguns, AKG C-33 stereo, Schoeps CMTS 301 stereo, (4) Schoeps CMC-3, (2) Sennheiser MD-421U, EV RE20, (3) Shure SM81, pre-Crown P2M, (2) Countryman lavaliere, Rowland Research Model 5, Hafler DH-200, Panasonic AG-6400 VHS hi-fi, BMC 13" color video monitor, Sony DAT machine.

REMOTE CONTROL



4327 Fremont Ave. N., Seattle, WA 98103; (206) 545-2908. Contact: Steve Smith, chief engineer. Touring Radius: Regional. Vehicles: Ford 350. Control Room Dimensions: 13'x8'x7'. Mixing Consoles: Audio Media Research 32/16/32, Mackie 1604, 10 channels Studio Tech Mic-Preamps. Audio Recorders: Sony 3324-A 24-track digital open reel, Sony PCM-2300 R-DAT, Tascam 2-track cassette deck. Monitors: KRK 703, Tannoy PBM-8, Yamaha NS-10M, (10) AKG and Sony headphones. Snakes/Splitters Systems: (2) Whirlwind Concert 32; 150' mains, 25' splits, jumper snakes. Other Featured Equipment: KT Quad Gate, Ensoniq DP/4 (Digital-EFX), Eventide H3000 SE, AMR-SDR 20/20, Sony DSP R-7, (2) Yamaha SPX900, Clear-Com Intercom (2 station), video camera and monitor, variety of microphones, including AKG, AMR, EV, Sanken, Shure and Sennheiser. Specialization & Credits: The only digital and mobile recording facility in the Northwest. Remote Control is a division of American Music and offers clients the full line of retail, rental and service resources and support of American Music. Chief Engineer Steve Smith has 17 years of experience in the recording industry, and has assembled a crew of industry veterans. Recent Remote Control projects include: The Seattle Symphony, Pearl Jam, The Endfest, and local clubs.

RANDALL SCHILLER PRODUCTIONS



1207 Fifth Ave., San Francisco, CA 94122; (415) 661-7553. Contact: Randy Schiller.

SHYNE SOUND



Box 2280; San Rafael, CA 94912; (415) 459-2833. Contact: Leroy Shyne, owner/engineer.

SOUND ODYSSEY



115 42nd Ave., San Mateo, CA 94403; (415) 345-7011. Contact: Paul Stryer, owner.

OUTSIDE U.S.

BASTION CITY MOBILE RECORDING LTD.



3760 Departure Bay Rd., Nanaimo, BC V9T 1C4; (604) 758-3424. Contact: Scott Littlejohn, chief engineer.

COMFORT SOUND AUDIO MOBILE



26 Soho St., Ste. 390; Toronto, ON M5T 1Z7; (416) 593-7992. Contact: Doug McClement, pres. Touring Radius: International. Vehicles: GMC 5-ton w/22" box. Control Room Dimensions: 8'x16'. Mixing Consoles: Neotek Elite 50 mic inputs, 16 assignable line inputs. Audio Recorders: (2) Ampex MM1200 24-track, Tascam R-DAT, TEAC C-3 cassette. Monitors: Tannoy NFM-8, Yamaha NS-10, Auratone. Snakes/Splitters Systems: 54 pair 3-way transformer isolated split. Other Featured Equipment: Lexicon PCM60 digital reverb, Yamaha REV7 digital reverb, Yamaha SPX90 digital processor, Yamaha D1500 DDL, Rane stereo 1/3-octave EQ, (3) Drawmer 201 dual noise gate, (6) dbx 160 compressor, (2) dbx 165 compressor, CDT 8-channel compressor, SMPTE time code reader, QSC, BGW, Amcron power amp, Panasonic CCTV system, Clear-Com intercom system, SDLA 5KVA AC power regulator, (20) microphones. Specialization & Credits: Clients include: MTV, Disney, CBS, MuchMusic, k.d. lang, Steve Earle, Dzzie Dsbourne, The Police, King Sunny Ade (in Nigeria), Glen Campbell, Motorhead, Ice T, Showtime, Bryan Adams, Daniel Lanois, Living Colour, The Neville Brothers, Todd Rundgren, Stevie Ray Vaughn, Cowboy Junkies, Jeff Healey Band, Super Dave Osborne Show, Ray Charles, Oscar Peterson. With over 1,000 live radio broadcasts, television specials, live albums, award shows, and telethons to our credit since 1978, Comfort has the ex-

perience and equipment to provide CD quality sound for your project. We also have a 24-track system which fits in eight flight cases for remote audio recording anywhere in the world.

KARISMA RECORDING INC.



1565 Iberville, Ste. 203; Montreal, QC H2K 3B8; (514) 522-0802; FAX: (514) 522-7559. Contact: Marcel Gouin, owner/operator. Touring Radius: International. Vehicles: 40'x8'x13' trailer. Control Room Dimensions: 25'x8'. Lounge/iso booth/2nd control room: 10'x8'. Mixing Consoles: Mitsubishi Westar 8000 52-input, full parametric, bargraph, Diskmix; Soundcraft 600 40 inputs for up to 92 mic inputs. Audio Recorders: (12) Alesis ADAT w/BRC for 96 tracks or 48 tandem, (2) Sony/MCI JH-24 24-track in tandem or 48 track, Sony 7030 time code DAT, Fostex D-20B time code DAT, (3) MCI JH-110 1/4" 2-track one w/centertrack time code, (2) Tascam 122 cassette, MCI JH-110B 1" video layback. Monitors: (2) Westlake BBSM-10, (2) Studer 2706 (lounge), (2) JBL 4406, (2) Auratone 5C. Snakes/Splitters Systems: (92) Jensen transformers 375', MTC multitap AC line matching transformer, MTC computer AC regulator filter. Other Featured Equipment: (16) Aphex Expressor compressor, (8) Aphex gate channel (612), (4) Aphex compeller channels, (2) Valley Audio de-esser channel (415), (2) Valley Audio Dyna-Mite channel, Lexicon 480L digital reverb, Lexicon PCM70 digital reverb, Lexicon PCM60 digital reverb, Eventide H3000 SE Ultra Harmonizer, Eventide H949 Harmonizer, Roland SDE-3000 delay, Roland SN-550 de-noiser, TC Electronic 2290 delay sampler, Sony MUR-201 digital reverb, Marshall 5002 time modulator, EXR SP-1 Aural Exciter, Alesis D-4 drum replacement unit, (2) Wendell Jr. drum replacement unit, (11) audio and video line isolation transformer, (50) microphones by: Neumann, AKG, Sennheiser, Schoeps, Beyer, Shure, etc.

LE STUDIO MOBILE



PO Box 367, Outremont Station; Montreal, QC H2V 4N3; (514) 273-6861; FAX: (514) 273-4605. Contact: Guillaume Bengle, owner.



PICHON MOBILE STUDIO
Buenos Aires, Argentina

PICHON MOBILE STUDIO



Juan B. Alberdi; 3293 Olivos (1636); Buenos Aires, Argentina; (541) 52-1066; FAX: (541) 52-1066, (541) 865-2286. Contact: Gustavo Dal Pont, director/manager. Touring Radius: Local and international. Vehicles: (1) trailer. Control Room Dimensions: 14'x7'x7'. Mixing Consoles: D&R 4000 Series in-line format 26-module ch/54 in remix, D&R Dayner in-line format 24-module ch/48 in remix. Audio Recorders: Fostex G-24S 1" 24-track w/Dolby S, Fostex G-16S 1/2" 16-track w/Dolby S, Soundcraft 762MKII 24-track 2", Panasonic SV-3700 DAT, Panasonic SV-255 DAT, Tascam/TEAC 32 2-track, Tascam 122MKII. Monitors: (2) UREI 809, (2) Yamaha NS-10M. TV audio monitor. Snakes/Splitters Systems: Alden w/32 microphone lines, Belden w/27 microphone lines, (12) Pro-co splitters x4 channel 48 split. Other Featured Equipment: (2) Fostex Card 8330, Fostex 4030 sync, C-Mix DMS 32-channel fader automation, Crown PS-400 monitor amplifier, Crown PS-200 monitor amplifier, Lexicon PCM70, (2) LXP1, LXP5; Roland SDE-3000 delay, (2) dbx 166 dual compressor, Symetrix 544 quad expander/gate, Aphex Exciter Type C; microphones: (2) AKG 414, (2) Neumann U67 condenser, (24) Shure SM57 dynamic, (12) Shure SM58 dynamic, (3) Shure SM81 condenser, AKG D-112; Panasonic AG190 video camera, Panasonic AG-1730 video recorder, Philips 14" color monitor video. Specialization & Credits: Concerts post-production sync w/video. Recording in Buenos Aires The Iron Maiden Concert (July 25, 1992). This new facility is the only mobile studio in Argentina. In 10 months of recording: Iron Maiden (England), Rata Blanca (Argentina), Roberto Carlos (Brazil), Pimpinela (Argentina), Ricardo Montauver (Venezuela), Joaquin Sabina (Spain), Charly Garcia (Argentina), Miguel Mateos (Argentina), Cesar "Banana" Pueyreiro (Argentina), Los 7 Del Fines (Argentina). Direct transmissions to TV controlled from the mobile studio.

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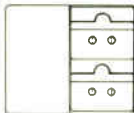
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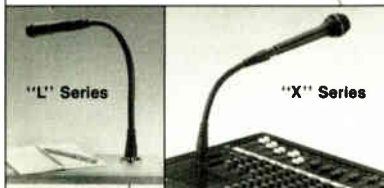
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APPLIED AUDIO



2 Townline Cir.; Rochester, NY 14623; (716) 272-9280. Contact: Roger/Seth/Dan/Lou. Touring Radius: Regional. Maximum Venue Size: 10,000. Vehicles: Mack Midliner 16', International 20'. GMC 14' cargo van. Flying System Available: Yes. House Loudspeakers: EV MTL/MTH4, EV DML 2181/1152, Community RS660/VB415. Monitor Loudspeakers: EV FM 1502, EV FS212. House Consoles: Yamaha PM3000, Soundcraft 800, Allen and Heath SRC, Ramsa 840, Soundcraft Venue. Monitor Consoles: Yamaha MC 2408, Ramsa 840, Soundcraft Delta monitor. Lighting: (200) PARs 160" truss/motor, (200) ERS, (4) Orbiter spotlights/Color Pros. Other Major Equipment: Outboard equipment: UREI, Alesis, Yamaha, Audioarts, Rane, Klark; power amps: Crest, Crown, QSC, Carver; microphones: EV, AKG, Sennheiser, Beyer, Audio-Technica, Crown, Vega wireless, HM Electronics wireless; other equipment: Smoke machines, special effects, manlifts, video projection.

ATS CORPORATION



Avon, MA 02322; (508) 583-4000; FAX: (508) 583-1378. Contact: Rick Mansur, pres.

AUDIO 300 INC.



60 Oolt Ave.; Albany, NY 12205; (518) 489-5848. Contact: Dave Elliott, Mike Doss. Touring Radius: National. Maximum Venue Size: 10,000. Vehicles: 22' in-house. Flying System Available: Yes. House Loudspeakers: EAW KF 850, EAW SB 850. Monitor Loudspeakers: EAW SM 222. House Consoles: Yamaha PM3000-40, TAC Scorpion 32. Soundcraft 200-24-16. Monitor Consoles: Ramsa 840-40, Soundcraft 500-40, Yamaha 2408. Staging: 36'X24' @4' in-house. Other Major Equipment: Outboard equipment: Lexicon PCM-70, Roland SDE-3000, Yamaha SPX900, Yamaha REV7, Klark gates, Klark comps; power amps: Crest 8001, Carver 1.5; microphones: 57, 58, 421, RE-20, 409, Shure RF, Telex RF; other equipment: video production, fast-fold screens.

THE AUDIO WORKSHOP



1728-R Leishman Ave.; Arnold, PA 15068; (412) 335-8974. Contact: James N. Guzzo.

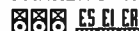
AUDIOWORKS



PO Box 263; Plantsville, CT 06479; (203) 621-2154. Contact: Joseph Bush, owner/engineer. Touring Radius: Regional. Maximum Venue Size: 1,000. Vehicles: 14' box truck. Flying System Available: No. House Loudspeakers: (8) EV 1810L, (4) EV 1810H. Monitor Loudspeakers: (6) EV 1202. House Consoles: Soundcraft 24x3. Monitor Consoles: Upon request. Lighting: Upon request. Other Major Equipment: (2) Alesis MIDiverb III, Aphex Type C, Ashly Audio gates and compressors, (3) Rane ME30, Yamaha SPX900, (2) QSC MX2000a, (4) MX1500a, instruments and amps available upon request. Rates: Upon request.

SEE PAGE 187 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 175.

PARKER BANDY'S SOUND ADVICE INC.



440-B Ramsey Ave.; Chambersburg, PA 17201; (717) 263-8289; FAX: (717) 261-9699. Contact: Parker Bandy III, president.

BURNS AUDIO



4588 Eisenhower Ave.; Alexandria, VA 22304; (703) 212-8500; FAX: (703) 212-8503. Contact: David Hoover, sales representative.

CABIN SYSTEMS



PO Box 735; Fishers, NY 14453; (716) 924-0728. Contact: Dillon, manager.

CHANNEL TWO SOUND/STUDIO



364 White St.; So. Burlington, VT 05403; (802) 860-1509. Contact: Don Quenneville, owner.



CLAIR BROTHERS AUDIO INC.
Lititz, PA

CLAIR BROTHERS AUDIO INC.



PO Box 396; Lititz, PA 17543; (717) 665-4000; FAX: (717) 665-2786. Contact: Gregory Hall. Specialization & Credits: Offices: Pennsylvania; Mexico City, Mexico; Basel, Switzerland; Tokyo; Sydney, Australia. Recent Tours: U2, Michael Jackson, Elton John, Joe Cocker, Bob Dylan, Roxette, Indigo Girls, Prince, Steve Miller, 38 Special, Sophie B. Hawkins, Lynyrd Skynyrd, Kenny Rogers, Donald Fagen, Amy Grant, Mr. Big, Lionel Richie, Sting, Paul Simon, Don Henley, Yes, Young Messiah.

COMMERCIAL AUDIO SYSTEMS



245 Rocky Hill Rd.; Hadley, MA 01035; (413) 549-5466; FAX: (413) 323-9661. Contact: Howard Rose, owner.

EAR FORCE SOUND CO.



201 Beacon St. (rear); Greensburg, PA 15601; (412) 834-4100. Contact: Chris Armbrust, Randy O'Connell. Touring Radius: Regional. Maximum Venue Size: Monitors only. Vehicles: Various. Monitor Loudspeakers: (2) EV MTL-4 sidetill low, (2) EV MTH-4

ILLUSTRATION: OAVE EMBER

sidefill low-mid, high-mid, high. (12) EFS 2-12", 1-2" wedge monitor (all JBL-loaded), dual 18" drumfill low. Monitor Consoles: Various upon request. **Other Major Equipment:** (8) UREI 539 1/3-oct. EQ, Klark-Teknik DN300 dual 1/3, (5) dbx 166 comp/limiter, (2) EV MTX processor, (6) Brooke-Siren FDS-310 crossover, (9) Crown MA-2400, (6) Crown MA-1200, various microphones upon request. **Extended Equipment:** Various upon request.

ECLIPSE AUDIO



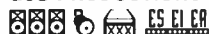
2328 Lower Lake Rd.; Seneca Falls, NY 13148-9417; (315) 568-6690. Contact: Lea A. Stevens, owner.

EIGER ENGINEERING



222 Palfrey St.; Watertown, MA 02172; (617) 924-6514. Contact: Thomas P. Scheuzger.

GSD PRODUCTIONS INC.



270M Duffy Ave.; Hicksville, NY 11801; (516) 933-6200; FAX: (516) 933-6216. Contact: Glen Davis, pres.

GUSSOUND



2809 Lakehurst Ave.; Forestville, MD 20747; (301) 967-7267; FAX: (301) 967-7654. Contact: Shawn Vitale, vice pres. operations.

IN PHASE AUDIO



73 Pond Rd.; Wilton, CT 06897; (203) 761-1366; FAX: (203) 761-0552. Contact: Jim Durkin, president.

snake w/1 direct, 2 iso output, (2) custom 100 A distros; bass amps: SWR 400, Goliath 4x10, Fender Showman 2x15, Ampeg B-15; guitar amps: (3) Fender Twin w/JBL, Roland JC-120, drums: Yamaha Stage Series, 5 pc. Sabian cymbals. Rates: Competitive: regional tour discounts. **Specialization & Credits:** Klondike Sound Company specializes in acoustic music reinforcement for architecturally challenging venues and outdoor music festivals, requiring full-bandwidth, low-noise systems. Clients served for New England appearances include Wynton Marsalis, Lyle Lovett, Nanci Griffith, Arlo Guthrie, Paul Winter, Beausoleil, Mary Chapin Carpenter, Billy Bragg, MJD, Chick Corea, Mel Torme, Portland Symphony Orchestra, Ladysmith, the Neville Brothers, Chet Atkins, Sun Ra, Jonathan Edwards, Arkansas Traveler Revue, and many more. KSC has the capability to field multiple systems for festivals. Clients include Hudson River Revival, Maine Arts, New Music America, Cajun-Bluegrass/RI, Falcon Ridge/NY, La Kermesse/ME, New England Vaudeville, Jackie Robinson Jazz/CT and numerous First Night celebrations. KSC has a production services office in Portland, Maine. Contact Gary Massey, manager; (207) 799-0372. John "Klondike" Koehler is the Audio Director of the New Orleans Jazz and Heritage Festival, and a regular house mixer for Garrison Keillor's live radio broadcasts.

MAJDR SDUNOWDRKS



PO Box 28; Salem, NJ 08079; (609) 299-3858; FAX: (609) 935-9525. Contact: Mark Major.

MAX SOUND



11 Montrose Rd.; Yonkers, NY 10710; (914) 793-9735; FAX: (914) 591-6667. Contact: Christopher Greco.

METRO SOUND®



PO Box 1263; Port Ewen, NY 12466-1263; (914) 331-5168. Contact: Alan Thompson, owner.

NORTHWOOD SOUND OF MARYLAND



12509 Rosebud Dr.; Rockville, MD 20853; (301) 933-0800. Contact: Nick Cavaris, owner/engineer.

DMNI-TECH OF ALBANY INC.



1177 New Scotland Ave.; Albany, NY 12208; (800) 225-8002; FAX: (518) 452-2377. Contact: Dan Toma, president. **Touring Radius:** National. **Maximum Venue Size:** 15,000. **Vehicles:** Mitsubishi 434 diesel 20' box vans. **Flying System Available:** Yes. **House Loudspeakers:** EV MT-2 manifold system (MTH-2/94 high pack, MTL-2 subs). **Monitor Loudspeakers:** Clair Brothers 12AM, EV FS212, EV 1502, EV DML-1152. **House Consoles:** Soundcraft 200 Delta 32 ch., Soundcraft 200SR 8 ch. **Monitor Consoles:** Soundcraft monitor 40x12. **Staging:** Wenger 4'x8' interlocking platforms. **Other Major Equipment:** Lexicon PCM70, Eventide H3000, Yamaha SPX900, Yamaha REV5, Klark Teknik DN360 EQ's, DN410 Parametric, Klark Teknik RTA, QSC EX4000, MX2000 MX700 amplifiers, Carver/Clair PT1250 amplifiers. Rates: Please call for rates.



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4516 Byron Ave.; Bronx, NY 10466; (718) 325-8888; FAX: (718) 325-6858. Contact: Jim Salta, Don Perlman.

RJK PRODUCTIONS



PO Box 248; Peekskill, NY 10566; (914) 739-4500. Contact: Bob Killenberger, owner.

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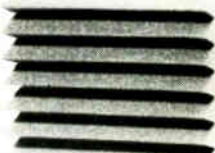
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KLONDIKE SOUND CO.
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KLONDIKE SOUND CO.



37 Conte Dr./A-91 Industrial Park; Greenfield, MA 01301; (413) 772-2900. Contact: John "Klondike" Koehler. **Touring Radius:** Regional. **Maximum Venue Size:** 10,000. **Vehicles:** Cargo van, Cube van, Ryder contract. **Flying System Available:** Yes. **House Loudspeakers:** (12) EV Delta Max 1152 APF, (4) 2181 AP sub, (12) Turbosound TM54, (8) Turbosound TSE 111/118 split, (20) various EV 2-way fill speaker. **Monitor Loudspeakers:** (12) EV FM 1202 ER, (12) EV FM 1502 ER, EV Delta Max or Turbosound sidefill/drumfill. **House Consoles:** Yamaha PM1800 A-32, Wheatstone 8000-24, (2) Soundcraft 200 Delta-24, 200 Delta-16, Yamaha 1604, various EV and Yamaha 8x2 and powered mix. **Monitor Consoles:** Yamaha PM2800 M-32, Soundcraft 400 B-24. **Staging:** (4) Complete scaffold sections for sound wings/delay towers, (2) 8x8 drum risers. **Other Major Equipment:** Outboard equipment: multiples of: Yamaha SPX900, REV7; Roland SDE-3000, Lexicon LXP1, 5, 15, 60; Klark-Teknik DN360, Yamaha O2Q031-A, Rane GE27, SM26, dbx 160, 166, 363; BSS crossovers. **Power amps:** (9) Crest 8001, (3) Crest 7001, (3) Crest 4801, (16) QSC MX1500, (6) ass't QSC, Yamaha. **Microphones:** professional assortment of Shure, EV, Sennheiser, AKG, Crown, Sony and Countryman. **Other equipment:** 40-channel 200'

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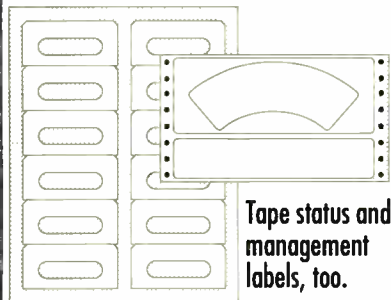
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710 North Ave.; Garwood, NJ 07027; (908) 789-9352; FAX: (908) 789-2428. Contact: Tom Mathews, owner. Touring Radius: Regional. Maximum Venue Size: 10,000. Flying System Available: Yes. House Loudspeakers: Meyer MSL-3, Meyer 650-R2. Monitor Loudspeakers: Bi-amped floor monitor loaded w/JBL drivers, tri-amped sidefill/drum monitors loaded w/JBL drivers, Meyer UPA-1A, UMI-A. House Consoles: Yamaha PM3000 40C, Soundcraft 500 32x12, Yamaha MC2408. Monitor Consoles: Ramsa 840. Soundcraft 500 32x12, Yamaha MC2408, Yamaha 16x6. Staging: 60'x40' Biljax custom scaffold stage, w/adjustable screwjack legs from 4' to 6'. Lighting: Subcontracted. Rates: Please call for rates.

SBP INDUSTRIES



1429 Rte. #1 N.; Rahway, NJ 07065; (908) 382-8787; FAX: (908) 382-8780. Contact: Jack Lesley, dir./Audio division. Touring Radius: Local, regional, national & international. Maximum Venue Size: 50,000. Flying System Available: Yes. House Loudspeakers: "FRB" (SBP tri-amp design: 15x2, 12x2, H & Bulletsx2), Community RS880, Intersonics SDL subs. Monitor Loudspeakers: JBL bi-amp 12x2, H; Martin 15.H; Renkus-Heinz, 12, H; Community, 12, H. House Consoles: All Ramsa. Monitor Consoles: All Ramsa. Lighting: Stadium only. Other Major Equipment: Power distribution-10meg., generators-10KW thru 1500 KVA.

SCHARFF WEISBERG INC.



599 Eleventh Ave.; New York, NY 10036; (212) 582-2345; FAX: (212) 757-6367. Contact: Norman England, rental mgr.

SIGNET SOUND



115 E. 87th St., Ste. 10A; New York, NY 10128; (212) 348-9335; FAX: (212) 439-9109. Contact: D.B. Weiss.



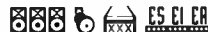
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SK SYSTEMS INC.



1560-5 Ocean Ave.; Bohemia, NY 11716; (516) 563-7375; FAX: (516) 563-3794. Contact: Thomas Heinisch, James McKeveny.

SNOW SOUND



441 Baileyville Rd.; Middlefield, CT 06455; (203) 349-8211; FAX: (203) 349-1966. Contact: Robert Neumann, chief of operations.

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14 Solar Dr.; Clifton Park, NY 12065; (518) 383-6501; FAX: (518) 383-6506. Contact: Michael Cusick, pres. Touring Radius: National. Maximum Venue Size: 25,000. Flying System Available: Yes. House Loudspeakers: EAW KF850, SAVI K-4 proprietary, Meyer UPA-1, Apogee AE-5, Intersonics SDL-4 subs, Meyer UPM. Monitor Loudspeakers: Meyer UM-1A, JBL 4604 bi-amp, Meyer UPA-1, EAW KF850. House Consoles: Yamaha PM3000-40. Soundcraft. Monitor Consoles: Yamaha PM2800-40, Soundcraft. Other Major Equipment: dbx 900 Series, Meyer CP-10, Sennheiser wireless mic system, Vega wireless mic system, Yamaha REV5, Klark-Teknik, Brooke-Siren, Lexicon.

SPL SOUND INC.



27 Temple Rd.; Vineland, NJ 08360; (609) 691-6690; FAX: (609) 692-8439. Contact: Steve Ponzetto, pres. Touring Radius: National. Maximum Venue Size: 10,000. Vehicles: International 26'. Flying System Available: Yes. House Loudspeakers: EAW KF-850-T, EAW SB-850. Monitor Loudspeakers: Custom SPL 2-way wedges with 1-15" & 1-2". House Consoles: Yamaha PM4000C 48x8, plus 4 stereo fx returns; Soundcraft 500 32x8, plus 4 stereo fx returns. Monitor Consoles: TAC Scorpion II 40x12 foldback console. Other Major Equipment: Mics: AKG, Beyer, Crown, Countryman, Audio-Technica, Shure, EV, Sennheiser, Milab, Ramsa, Yamaha; FX: Aphex, Klark-Teknik, dbx, Drawmer, Lexicon, Omni Craft, Roland, Summit Audio, Yamaha; DI: Countryman, Demeter Tube, Whirlwind, Rates: Please call for rates as we are continually updating our equipment.



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1591 Broad Run Rd.; Downingtown, PA 19335; (215) 383-1083. Contact: Price, Jay, Mary Beth.

STUDIO INSTRUMENT RENTALS



520 W. 25th St.; New York, NY 10001; (212) 627-4900; FAX: (212) 627-7079. Contact: Bo Holst, general manager. Touring Radius: Local and regional. Maximum Venue Size: 2,500 seats. Flying System Available: No. House Loudspeakers: EAW KF850 cabinets, EAW SB850 sub-cabinets, EAW KF800 cabinets, EAW SB250 sub-cabinets. Monitor Loudspeakers: Meyer UM1B wedges. House Consoles: Soundcraft Venue II 40 ch., Soundcraft Delta 32 ch., Soundcraft Venue 24 ch., Soundcraft Delta 12 ch. Monitor Consoles: Soundcraft Delta 32x10. Staging: Stage risers 4'x8'x8", 16", 24", 32". Other Major Equipment: Crest power, Klark-Teknik EQ, Yamaha SPX1000, 900, TC Electronic 2290, Drawmer gates, dbx 160XT, Pro Co snakes, Eventide H3000SE.

SUN TECHNICAL SERVICES INC.



518 Pleasant St.; Northampton, MA 01060; (413) 586-3489; FAX: (413) 586-5633. Contact: Bob Humphreys, president.

TAPESTRY SOUND & RECORDING



151 W. 19th St., 4th Flr.; New York, NY 10011; (212) 741-0076; FAX: (212) 929-3163. Contact: Anne Sopher. Touring Radius: National. Flying System Available: Yes. House Loudspeakers: Apogee 3x3, AE5, AE3, AE2, AE-1, Klipsch LaScala, Hershey. Monitor Loudspeakers: EAW, JBL. House Consoles: Soundcraft, Ramsa, Hill. Other Major Equipment: Outboard: Yamaha, Symetrix, Hill, UREI, Rane; power amps: Carver, Crown, Crest; microphones: AKG, Shure, Crown, Audio-Technica, HM Electronics R/F; other equipment: numerous custom-designed communication systems for industrial theatre, RTS communications w/wireless, Panasonic SV-3900. Rates: Please call Chuck, Annie or John for a quote.

TPA SYSTEMS



PO Box 31; Devon, PA 19333; (215) 647-1570. Contact: Tom Porhilla, owner.

WARM BROWN SOUND



PO Box 1888; Brattleboro, VT 05302; (802) 254-4283. Contact: Chris Kelly, proprietor/engineer.

SOUTHEAST

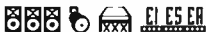
Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia

AFM SOUND AND LIGHTING



11336 Sweetwater Ct.; Clermont, FL 34711; (904) 394-5885 office; (904) 394-7388 night; FAX: (904) 394-2070. Contact: Jim. Specialization & Credits: Specializing in professional quality for smaller events. Full complement of sound and lighting equipment for ballrooms, clubs and outdoors. Unique, crane-mounted system for large, outdoor events. Sets up in only two hours and covers up to two square miles. Sound systems by JBL, EV and Bose. Yamaha consoles, Sennheiser, EV and Shure Pro mics, plus complete range of effects, delays and 1/3-octave equalization. CAE lighting consoles with wide choice of fixtures. ENG (location) lighting package for video. Have it your way for a change. Rental package, delivery and setup or full production service. Twenty three years of experience.

ALPHA SOUND & LIGHT



325 W. Summit Ave.; Charlotte, NC 28203; (704) 372-1264. Contact: Al Forbes, owner. Specialization & Credits: Alpha Sound & Light has been in operation since 1975, providing sound, lighting and band gear rental for all types of events. We specialize in large outdoor venues, including stadiums, and indoor venues that do not require hanging systems. We have the equipment and personnel to handle large festivals with multiple stages or large areas requiring delay stacks. Our systems feature equipment by Midas, Wheatstone, Soundcraft, Yamaha, Klark-Teknik, dbx, UREI and Lexicon. We maintain an inventory of over 150 specialized microphones (including wireless), and if we don't have what you need, we'll get it. Systems are powered by Crest amplifiers, speaker components are JBL. Several monitor configurations are available, all bi-amped. We have a large stage equipment inventory and can quote on complete packages including sound, lighting and stage gear. We have vast experience with all types of music, including symphony. Systems travel in three company-owned trucks.

AUDIO & LIGHT INC.



1604 Holbrook St.; Greensboro, NC 27403; (919) 294-1234; FAX: (919) 854-6099. Contact: Jim Hoyle, operations manager.

BACKSTAGE INC.



310 W. Broad St.; Richmond, VA 23220; (804) 644-1433; FAX: (804) 644-4913. Contact: Fred Brumbach, pres., artistic dir. Touring Radius: Regional. Maximum Venue Size: 10,000. Vehicles: 26' Rollings high cube lease, 16' Iveco 15/14. Flying System Available: Yes. House Loudspeakers: (20) PAS MRS-1 w/extra mids, (14) Ramsa WS-200 w/subs for small venues, (60) QSC 1500 amps, general mix of house processing & effects. Monitor Loudspeakers: (22) Renkus-Heinz 15/2" - 15/1" biamped wedges, (2) Double 15 Renkus 2" drumfills, (8) Community RS-440 sidefills, (2) PAS MRS-1 sidefills. House Consoles: Ramsa WR-S852, Soundtracs M Series 32x8, Ramsa WR-S4424, Soundcraft Delta 200, (2) Tapco M100, Tapco 200M. Monitor Consoles: Soundtracs M Series 32x10, Allen and Heath SR 24x8, Rane 1/3 EQ, QSC Power. Staging: (120) BS stage - 4x8. Lighting: 80' Thomas Truss and cans, 300' Aluminum box w/ aluminum cans, AVOE and Leprecon controllers. Other Major Equipment: (250) single lighting units. PAR 64, 6" Leico, 6" Fresnels, (36) Lowell D lighting heads, (8) Litetronics RM82 dimmer packs; lve audio controls, TEF12 analyser; Anchor bandshells large & small, Anchor tents; band back line equipment, KX88, Korg MI, Roland D50, DX7, DX7II, Yamaha CP70, Hammond B-3, Tama Grandstar 8 pc. drum kit, Cunga, Timbolli, Gallen-Kruger 800 w/Hartke & Mesa Boogie Bass cabinets, Fender Twins, Roland JC-120; costumes, soft goods, scenery props.

BARNABAS MULTIMEDIA



1305 Glen Eden Dr.; Raleigh, NC 27612; (919) 782-1095. Contact: Chris Droessler, manager.

BRANTLEY SOUND ASSOCIATES INC.



204 Third Ave. S.; Nashville, TN 37201; (615) 256-6260; FAX: (615) 255-9369. Contact: Leland P. Brantley, president.

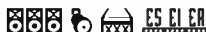
CHOSEN SOUND & LIGHTING



1335 Bennett Dr., Ste. 169; Longwood, FL 32750; (407) 830-8200; FAX: (407) 830-0098. Contact: Robert Hardtke, owner. Touring Radius: International. Maximum Venue Size: 20,000 seats. Vehicles:

2 - 24' straight trucks, 1 - 48' trailer. Flying System Available: Yes. House Loudspeakers: (120) JBL front loaded cabinets, proprietary. Monitor Loudspeakers: (40) JBL cabinets, proprietary. House Consoles: (2) Yamaha PM3000 40 channel, Yamaha PM1800 40 channel, Soundcraft 500 32 channel, Soundcraft 200 24 channel, Ramsa 24, (2) Yamaha 24. Monitor Consoles: Ramsa 840, Yamaha PM2800-40, Soundcraft Spirit 24, Yamaha 2408. Staging: (250) 4x8 scaffold and deck. Lighting: Thomas double hung trussing, 240K, ETA-Electrol dimming, Leprecon 24, 36, 72 consoles. Other Major Equipment: All Crest power amps; BSS, Klark, dbx, Lexicon, Yamaha processing. Rates: Quoted per event.

CONCERT SYSTEMS - USA



4505 LeMans Way; Pensacola, FL 32505; (904) 438-8249. Contact: David M. Flaucher, owner.

DB SOUND SYSTEMS



810 Harbour Dr.; Punta Gorda, FL 33983; (813) 624-4521. Contact: Don Brown, chief technician.

GEMINI CONCERT SYSTEMS



PO Box 2123; West Monroe, LA 71294-2123; (318) 325-9940; FAX: (318) 397-2491. Contact: Randy Plyant.

INDEX AUDIO



PO Box 22654; Nashville, TN 37202; (615) 399-8830. Contact: Tim Prince, owner.

JACK HAMMER LIVE AUDIO INC.



236 Laihant Ct.; West Palm Beach, FL 33409; (305) 923-0452. Contact: Robert Bludau, owner. Touring Radius: Regional. Maximum Venue Size: 1,500. Vehicles: Leased. House Loudspeakers: (6) EAW 528 Forsythe 2-18 subwoofers w/JBL 600 watt, (6) JBL 4732 Trapezoid cabinets w/TAD 4001 drivers, (4) EV proprietary 2x18 cabinets, (4) EV proprietary 2x12/1-2" mid-high cabinets. Monitor Loudspeakers: (4) JBL floor wedges w/1-1" horn & 400 watt JBL 12, (2) Tri Amp sidefills, 18-12-2", (6) proprietary wedge, 2" Gauss & 600 watt JBL, (2) drumfill boxes, 18" subs, 2-12's & 1-2" JBL, (4) proprietary wedge, 2-12", 1-1". House Consoles: Yamaha 3204, Yamaha 2404, Ramsa 8724 24x4x2x1, Soundcraft 1S 20 channel. Monitor Consoles: Yamaha 2408, Peavey 16x6. Staging: On request. Lighting: On request. Other Major Equipment: (2) Klark-Teknik DN300, (2) BSS FOS360, (4) Drawmer DS-201 gates, (6) dbx 160X, (4) dbx 166, (8) QSC EX4000, LMX2000, (5) Yamaha SPX90II, (2) Yamaha REV7. Rates: On request. Please call.

MR. O SYSTEMS



2080 Phillips St.; Columbus, GA 31903; (706) 689-0000; FAX: (706) 689-0005. Contact: Maurice Owens, owner.

MUSE PRODUCTIONS



PO Box 381235; Birmingham, AL 35238-1235; (205) 631-8834; FAX: (205) 985-0780. Contact: Robert Hawthorne, Russ Thatcher.

NASHVILLE CARTAGE & SOUND



PO Box 121742; Nashville, TN 37212; (615) 386-3700; FAX: (615) 386-3077. Contact: Sheila O. Barnard, Jim White, owners. Touring Radius: National. Maximum Venue Size: 20,000. Vehicles: West Trucks, 24' to tractor-trailer. *Have rehearsal rooms with stage available. Flying System Available: Yes. House Loudspeakers: (24) White Design COL-4, (16) G.F.T. trapezoid. Monitor Loudspeakers: (16) EAW 222, (8) Eden 1" - 15", (8) Peavey HD H-M. House Consoles: Yamaha PM3000 C 40 ch., Yamaha 2404, Audioarts 32x4x2, Yamaha PM916. Monitor Consoles: Soundcraft 500 40x12, Ashley 24x8, Audioarts 24x8, Peavey Mark IV. Staging: 40'x30' any height, 8'x16' wings. Lighting: (10) Section Thomas double hung truss, 72 ch. of dimming. Leprecon, (8) Clay Paky goldenscan 1200, 30 color scrollers, Celco Navigator (1) zero 88 Sirius 48 with computer. Other Major Equipment: 3 miles of Trilight truss, 40'x30'x24'H stage top, over (100) musical instrument amps, Hammond Organs, musical instruments; drums: Remo, Pearl, Yamaha, O.W. and L.P.

OFF-THE-WALL SOUND & LIGHTING INC.



2020 N.E. 153rd St.; N. Miami Beach, FL 33162; (305) 944-3334; FAX: (305) 945-4040. Contact: Blair Simmons, pres.; Andy Kakas, audio eng.

RAM SOUND



PO Box 906; Mary Esther, FL 32569-0906; (904) 664-6859. Contact: Bob McTyre, owner.

FOR MORE INFORMATION ABOUT MIX LISTINGS SEE PAGE 175.



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3586 Pierce Dr.; Atlanta, GA 30341; (404) 458-6000; FAX: (404) 458-0276. Contact: John Lewis Tyler, Dir. of operations.

ROADWORX AUDIO & LIGHTING



3714 Alliance Dr., Ste. 304; Greensboro, NC 27407; (919) 855-5432; FAX: (919) 855-1488. Contact: Hugh Sarvis Jr., Vickie Hutchins (gen. mgr.). Touring Radius: National. Maximum Venue Size: Unlimited. Vehicles: Tractor trailers and 30' vehicles. Flying System Available: Yes. House Loudspeakers: TAD TCM1631, TAD TCM1821, TAD TCM1621, TAD TCM1121, Woodworx SR Series. Monitor Loudspeakers: TAD TWM1622, Woodworx MAX Series. House Consoles: Soundcraft Vienna Series, Yamaha PM3000. Monitor Consoles: Soundcraft 8000 Series, Ramsa WR-S840, Soundcraft 500 Series. Staging: Bil Jax staging available in various sizes, Thomas load bearing roof systems, WACD scaffolding, Headblock roof systems. Lighting: Avolites QM500, Diamond & Rolocue 60 consoles, LMI & CAE dimming systems, Thomas double hung truss; PARS, Leicos, Frenels, Intellibeam, lighting pods, Lycian spotlights. Other Major Equipment: CM Lodestar 1 ton motors, Genie Super Towers.

ROCK 'N' ROAD AUDIO



5007 S. Royal Atlanta Dr.; Tucker, GA 30084; (404) 493-6862; FAX: (404) 491-3996. Contact: Kirk Marks, pres.; Roy Drukenmiller, sec. tres.

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SERIOUSLY SOUND
 Atlanta, GA

SERIOUSLY SOUND



2296 Chamblee Tucker Rd.; Atlanta, GA 30341; (404) 986-0346; FAX: (404) 986-9586. Contact: Garry Sharp, Dave Lowell. Touring Radius: National. Maximum Venue Size: 15,000. Vehicles: Mack 24', Ryder lease, Kentucky air-ride trailer. Flying System Available: Yes. House Loudspeakers: EAW KF850, SB850, Renkus-Heinz SR-2, Renkus-Heinz LR-2, Meyer MSL-3, Meyer 650 subs. Monitor Loudspeakers: Woodworx Max II, Woodworx Max I, SSI TAD sidefills, Woodworx drumfills. House Consoles: Yamaha PM3000 40-channel, Yamaha PM2000 32-channel. Monitor Consoles: Ramsa S840 40x18, Soundcraft 500 40-channel. Lighting: In-house 200-light system, CAE-Thomas format etc. Full theatrical inventory: ellipsoidals, FarCyes, etc., soft goods, special lighting, Lycian, high-end, data color pros, ACLS etc. Other Major Equipment: Outboard equipment: Lexicon PCM70, Yamaha REV5, Yamaha REV7, Yamaha SPX90, Yamaha SPX90II, Lexicon LXP-1, Roland SDE-3000, dbx 166, M69, full Symphonic mic package; large inventory of stage equipment, complete audio/visual rental inventory. Specialization & Credits: Partial client list: Lakewood Amphitheater, Atlanta Jazz Festival, Pace Concerts, Maryland Sound, Frankie Valli, Four Tops, Smokey Robinson, Atlanta Ballet, R.A. Roth Inc., Turner Broadcast Systems, Six Flags Over Georgia Concert, Southern Promotions, GA Dome.

FOR MORE INFORMATION ABOUT MIX LISTINGS SEE PAGE 175.

SHOWNET INC.



311 S. Main St.; Versailles, KY 40383; (606) 873-4999; FAX: (606) 873-4174. Contact: Lewis Warford, pres.

SPELLBOUND SOUND



PO Box 2441; Fort Myers, FL 33902; (813) 332-0607. Contact: Martin Towne, manager.

STAGE SOUND INC.



103 8th St. S. E.; Roanoke, VA 24013; (703) 342-2040; FAX: (703) 345-5158. Contact: Reid C. Henion, pres.

UNITED SOUND & ELECTRONICS



165 W. Main St.; Bridgeport, WV 26330; (304) 842-6030; FAX: (304) 842-7160. Contact: Rob Harold, owner. Touring Radius: Regional. Maximum Venue Size: 5,000. Vehicles: Vans, 14' Iveco box truck. Rental vehicles when required. Flying System Available: Yes. House Loudspeakers: (8) JBL Concert Series, (6) JBL 4560 horn loaded, (6) JBL 4699, (4) US&E custom subs, dual EVX180 loaded; several tripod & single speaker systems available. Monitor Loudspeakers: (8) JBL 4604 15" horn, biampable; US&E custom drum monitor, 15" & 2" horn. House Consoles: Yamaha PM1200-32, Soundtech STS 844, EV/Tapco C12, other consoles available upon request; small 6, 2 and 12 channel, powered and non-powered. Monitor Consoles: MC2408, MC1608. Staging: 4x8 up to 32x24 with cover & lighting truss. Lighting: (32) PAR 64 1kw; 24 channel ETA microprocessor control; 12 channel, 2 sense, manual control. Small spotlight and supertrouper available. Other Major Equipment: Rane DC24, UREI 7110; ProVerb, SGE, MidVerb effects; 1/3 octave equalization on macas & monitors; horn systems for fairs and festivals. Rates: Quoted upon request.

NORTH CENTRAL

Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

ACCUTRACK RECORDING & SOUND CO.



1828 Johns Dr.; Glenview, IL 60025; (708) 724-9200; FAX: (708) 486-8007. Contact: David Levit, owner.

AERIAL ENTERPRISES INC.



10106 Industrial Dr.; Whitmore Lake, MI 48189; (313) 231-2500. Contact: Jim Lillie, Steve Fisher, Ed Learned.

AMBIENCE AUDIO SERVICE



2006 Jackson Ave.; Wichita, KS 67203; (316) 262-2336. Contact: Jay England, owner/eng.

ARROW AUDIO INC.



101 W. Edison Ave.; Appleton, WI 54915; (414) 731-4888; FAX: (414) 730-9372. Contact: Dan Van Elzen, mgr.

BLUE AUDIO INC.



1517 W. George St.; Chicago, IL 60657; (312) 327-4709; FAX: (312) 327-4709. Contact: Brian Anderson, pres.

CHICAGO SOUND



6124 Madison Ct.; Morton Grove, IL 60053; (708) 581-1720; FAX: (708) 581-1723. Contact: Ian Hunt.

CLEARWING AUDIO & CASE CO. INC.



1637 S. 83rd St.; West Allis, WI 53214; (414) 258-6333; FAX: (414) 258-7722. Contact: Gregg Brunclik, pres. Touring Radius: National. Maximum Venue Size: 40,000. Vehicles: Rent/lease. 24' bobtail/45' tractor trailer. Flying System Available: Yes. House Loudspeakers: Martin F-2, Martin RS-1200, Martin VRS-800, Clearwing LRC Proprietary, Martin S-2 subs. Monitor Loudspeakers: Martin LE700, Martin LE400, EAW 155. House Consoles: Midas DA01, Soundcraft 800, 600, 200, Yamaha 2404, Audioarts 8000, Allen and Heath. Monitor Consoles: Midas Pro 04, Audioarts, Yamaha 2408, Soundcraft. Staging: Safway/Tomcat 40x32. Lighting: Thomas/Altmann 144K. Other Major Equipment: Klark-Teknik DN360, Martin MX-4, Lexicon Reverb, Yamaha REV7, SPX90, etc., Roland DDL, dbx 900, 160XT, 166, Brooke-Siren; wireless mics: Samsong, Audio-Technica, Shure. Fender amplifiers, Roland amps/keyboards, Yamaha keyboards, Korg keyboards, Ampeg bus rigs, Tama drums, Yamaha drums, Hammond organ.

CMH ELECTRONICS



134 Hillcrest Ave. NW; North Canton, OH 44720; (216) 497-8100. Contact: Carl Hearne, owner.

CONTINENTAL SOUND CO. INC.



PO Box 388173; Chicago, IL 60638; (312) 284-0418; FAX: (312) 586-5225. Contact: George R. Minol, pres.; Andre Roy, audio eng. Touring Radius: Local, regional and national. Maximum Venue Size: 20,000. Vehicles: As required. Flying System Available: Yes. House Loudspeakers: (16) Adamson Acoustics MH225, (16) Adamson Acoustics B218, (12) subwoofers CS218. Monitor Loudspeakers: (16) wedges CS151 3-way, (8) sidefills CS2152 3-way. House Consoles: Soundcraft Europa, Soundtracs Megs, Peavey MKVII, as required. Monitor Consoles: Ramsa WR-S840, Soundtracs MCX40, as required. Staging: Available. Lighting: Available. Other Major Equipment: (12) QSC EX4000, (22) Carver PM-1200/1.5A, (6) Carver PM-300, (12) dbx comp/limiters, (8) Shure wireless systems, (6) Samsun wireless systems. Rates: Variable.

DODD TECHNOLOGIES INC.



10888 Allisonville Rd.; Fishers, IN 46038; (317) 842-4905; FAX: (317) 842-4966. Contact: Mark Dodd, pres.

DRAGON SOUND AND LIGHT



1562 S. Mahoning; Alliance, OH 44601; (216) 823-9472. Contact: Vance Gardner, owner.

E.P. SYSTEMS



9914 W. 62nd Terr.; Merriam, KS 66203; (800) 886-6771. Contact: Rental Dept.

HALF STREET PRODUCTIONS



5835 Victoria Ave.; St. Louis, MO 63110; (314) 644-0992. Contact: Ken Bohannan.

LINNEMANN SOUND INC. (LSI)



1020 Somonauk St., PO Box 452; Sycamore, IL 60178; (815) 895-8219; FAX: (815) 895-7837. Contact: Terry Linnemann, pres.

LITTLITE/CAE INC.



10087 Industrial Or.; Hamburg, MI 48139; (313) 231-9373; FAX: (313) 231-1631. Contact: Sharon Suffolk, sales & mktg.

C.V. LLOYOE MUSIC CENTER



102 S. Neil St.; Champaign, IL 61820; (217) 352-7031; FAX: (217) 352-4679. Contact: Stephen Morris, VP - services.

MAC RAE PRODUCTIONS



233 Glendale Cir.; Gretna, NE 68028; (402) 332-3325. Contact: Alan King, owner/operator.

MODERN MINSTREL MIXING & RECORDING



PO Box 19112; Minneapolis, MN 55419; (612) 824-4135. Contact: C.W. Frymire.

R.G. SOUND AND COMMUNICATIONS



414 N. Mill St.; Celina, OH 45822; (419) 586-3671; FAX: (419) 586-9930. Contact: Andy Godwin, owner.

R/J RECORDING & SOUND



PO Box 302; 530 Lark St.; Geneva, IL 60134-0302; (708) 232-1932; FAX: (708) 232-1938. Contact: Richard J. Peck. Specialization & Credits: We at R/J Recording & Sound pride ourselves on providing the highest quality in every facet of our business: sound reinforcement for corporate events, seminars, theaters, local entertainment and national touring groups. Also major festivals, county fairs and concerts. Credits: Elkhart (Indiana) Jazz Festival, Ideas of March, Linda Davis, Asleep at the Wheel, Ray Stevens, Neil Sedaka, Pat Boone, Florence Henderson, John Gary, New York Voices, Drifters, Platters, Louie Bellson, Gary Burton, Ray Price, Clark Terry, Jimmy Webb, The LOOP FM 98 and WGN AM 720. Specialization: Our regular customers call us "the most consistent high-quality sound company in Chicagoland." We have full monitor mixing, Soundcraft consoles, multiple systems, with competent sound engineers and friendly people who care about your events. We'll promise you a worry-free production and the best quality in the Midwest. Call us first and let us prove it to you!

RODEWALD SOUND & LIGHTING CO.



4700 N. University; Peoria, IL 61614; (309) 692-4222. Contact: James M. Rodewald.

SGA PRODUCTION STAGING



16450 Felton Rd.; Lansing, MI 48906; (517) 323-0000; FAX: (517) 323-0219. Contact: Keith Menne, Mark Reed. Touring Radius: International. Maximum Venue Size: As required. Vehicles: Tractor-trailer. Flying System Available: Yes. House Loudspeakers: Meyer Sound MSL-10, MSL-3, VPA-1, 650, VSW. Monitor Loudspeakers: Meyer Sound NSL-3, UPA-1, 650, VSW. House Consoles: Yamaha PM3000, Harrison HM-4. Monitor Consoles: Yamaha PM3000, Ramsa S-840. Staging: Stage Right. Lighting: Thomas, AVO, Leprecon, Lycian, Altman. Other Major Equipment: Pioneer projection cubes, Videowall programming and production. Rates: Call for details, package rates available.

SOUND OF AUTHORITY INC.



221 E. Cullerton; Chicago, IL 60616; (312) 326-1080; FAX: (312) 326-3415. Contact: Ernie Greene, owner/pres.

SOUND PRODUCTIONS

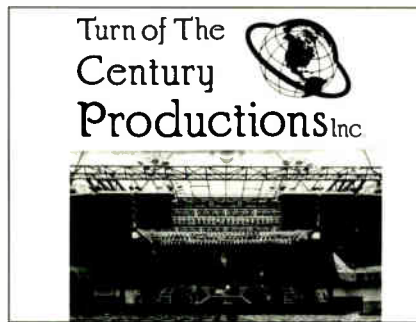


PO Box 1714; Emporia, KS 66801; (316) 342-9245. Contact: Bob Phillips, owner.

TKO PRODUCTIONS



PO Box 12088; Des Moines, IA 50312; (515) 262-0906. Contact: Joe Denton, owner.



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Janesville, WI

TURN OF THE CENTURY PRODUCTIONS



137 Freedom Ln./PO Box 8035; Janesville, WI 53547-8035; (608) 754-2403; FAX: (608) 754-4133. Contact: David Cramer. Touring Radius: National. Maximum Venue Size: Unlimited indoors or outdoors. Vehicles: 48' air-ride trailers with late-model air-ride International tractors, Peterbilt 26' air-ride straight truck w/crew sleeper. Flying System Available: Yes. House Loudspeakers: Turn of the Century Productions' "Dverture System"; Proprietary, full-range flying cabinets w/JBL components, (2) 18", (2) 12", (2) biradials. Monitor Loudspeakers: 2225-2425 bi-amped floor wedges, tri-amped drumfill, tri-amped stereo sidefills. House Consoles: Yamaha PM3000 40C, Ramsa WR-S840, Soundcraft 800B 40x8, Soundcraft 800B 32x8, all w/spare power supplies. Monitor Consoles: Amek TAC Scorpion 40x12 w/balancing update, Soundcraft 40x12, Audioarts 24x8. Staging: 48x40 stage w/load-bearing roof. Lighting: Avolites QM 500 90-channel lighting console, Avolites C 60-channel lighting console, Leprecon LP 2000 lighting console, Thomas Trusses, corner blocks, Thomas spots chairs, custom dimmer racks, utilizing custom Leprecon LD 2400 & Electrol DP6-2500 dimm Lycian HTI 4 truss spots, Altman HM follow spots. Other Major Equipment: Microphones: Extensive collection. Crown RTA-2 real-time analyser, Klark-Teknik DN300 1/3-octave EQ, UREI, Klark-Teknik DN360 1/3-octave EQ (monitors). Yamaha, 1/3-octave EQs also available, UREI LA-4 compressor/limiter (mains), BSS FDS-360 crossovers, BSS FDS-310 crossover, UREI 525, Loft 602, Loft 603, dbx F900 mainframes w/902, 904 modules, dbx 160X, dbx 166 gate/limiter, Omni Craft GT-4 quad noise gate, Roland SDE-3000 DDL, Yamaha REV5, Yamaha REV7, Yamaha SPX90II, Yamaha SPX90, Yamaha R1000, Eventide H3000 Ultra-Harmonizer, Eventide H910, Eventide F201, Lexicon 200 digital reverb, Lexicon PCM60, Lexicon PCM41, ClearCom MS200, main stations, Nakamichi MR-28 cassette decks, TEAC, Technics, CD players, Crown D-75 headphone amps, Sony V6 headphones, Furman PL-8 light modules, other outboard gear available upon request; power amps: Crest 8001, Crest 4001 w/1,875 watts/cabinet, QSC 3800, QSC 3500, Crown PSA-2, Crown DC-300 Series 2. Extended Equipment: Yamaha Stage Series drum kits, Yamaha CP70 piano, Yamaha DX71IFD, Roland D-50, Roland JC-120, Fender Twin, Marshall 100-watt w/4x12 angle tops and bottoms, Gallien-Krueger 400RB, Guild-Houtke 4x10, SVT heads and

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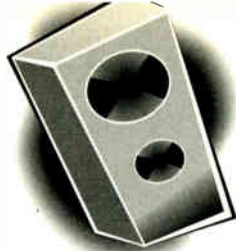
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—LISTING CONTINUED FROM PREVIOUS PAGE

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WILLIAMS SYSTEMS



PO Box 5901; Lafayette, IN 47903-5901; (317) 447-2435; FAX: (317) 448-6383. **Contact:** Mark Williams, owner. **Specialization & Credits:** State of art stage monitor systems, pd. Engineering, design and mfg. of speaker systems, pd & packaging. We have full shop facilities for cabinetmaking, fiberglass, electronics, machine shop and welding for steels and aluminum. Custom splitting system for TV and recording (48 ch). We also do shows when we get around it.

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A-1 AUDIO INC.



3780 Scripps Way; Las Vegas, NV 89103-3001; (702) 364-0203; FAX: (702) 362-7607. **Contact:** Glenn Kern, Tony Caporale. **Touring Radius:** International. **Maximum Venue Size:** Unlimited. **Flying System Available:** Yes. **House Loudspeakers:** A01 Audio fully integrated flying P.A. w/Meyer Sound Labs MSL-3, UPA-1, USW, 650, EAW 850, EAW 4000. **Monitor Loudspeakers:** Meyer Sound Labs UPA-1, UM-1, MSL-3, custom double 12" and single 15" slants. **House Consoles:** Yamaha PM3000, PM2000, PM1800, DMP7, Harrison Alive, Cadac, Soundcraft 800C. **Monitor Consoles:** Ramsa WR-S840, Yamaha PM3000-40C, MC2408, Harrison, Soundcraft 800C. **Other Major Equipment:** Outboard: Lexicon, Yamaha, Klark-Teknik, BSS, dbx, UREI; power amp: Crest, BGW, Yamaha, Meyer Sound Labs; microphones: Sennheiser, AKG, Shure, Beyer, Countryman; wireless systems by: Sennheiser, Vega, Micron; tape system: reel-to-reel, cart and DAT, Infrared system. **Specialization & Credits:** With its facility located next to the Las Vegas strip and in Hollywood, CA, A-1 Audio Inc., has provided superior equipment and services to the entire entertainment industry for over 20 years. A-1 Audio has a complete music/film/video "soundstage" with a hard three-wall cyclorama, as a new addition to the facility. Grip, audio and lighting packages are available. Providing support and customized systems to international concert touring, television, film, theater, corporate events and showrooms with our extensive fabrication and technical departments. We maintain service and testing procedures to ensure the usefulness and safety of our systems, close manufacturer ties to help our clients fill their needs and custom modification facilities to allow us to fulfill the diverse and specialized requirements of the industry. Recent Showrooms Include: Arizona Charlies, Bally's, Caesar's Palace, Colorado Belle, Desert Inn, Dunes, Golden Nugget, Imperial Palace, Las Vegas Hilton, Riviera, Sands, etc. In addition A-1 Audio has provided sound reinforcement and production services for the following large industrial show clients: AFLAC, Ford, General Motors, Honda, IBM, Intel, NFDA, Mazda, etc.

A-1 AUDIO INC.



6322 DeLongpre Ave.; Hollywood, CA 90028-8191; (213) 465-1101; (800) 446-9967; FAX: (213) 465-9467. **Contact:** Al Siniscal, Bobby Ross, Jan Cash Landy, Bob Marshall. **Touring Radius:** International. **Maximum Venue Size:** Unlimited. **Flying System Available:** Yes. **House Loudspeakers:** A-1 Audio fully integrated flying P.A. w/Meyer Sound Labs MSL-3, UPA-1, USW, 650. **Monitor Loudspeakers:** Meyer Sound Labs UPA-1, UM-1, MSL-3, custom double 12" and single 15" slants. **House Consoles:** Yamaha PM3000, PM2000, PM1800, DMP7, Harrison Alive, Cadac, Soundcraft 800C. **Monitor Consoles:** Ramsa WR-S840, Yamaha PM3000-40C, MC2408, Harrison, Soundcraft 800C. **Other Major Equipment:** Outboard: Lexicon, Yamaha, Klark-Teknik, BSS, dbx, UREI; power amps: Crest, BGW, Yamaha, Meyer Sound Labs; microphones: Sennheiser, AKG, Shure, Beyer, Countryman; wireless system by: Sennheiser, Vega, Micron; tape system: reel-to-reel, cart and DAT. **Specialization & Credits:** With its 20,000-sq.-ft. headquarters cen-

trally located in Hollywood, CA, and a similar facility in Las Vegas, NV, A-1 Audio, Inc. has provided superior equipment and services to the entire entertainment industry for over 20 years. Providing support and customized systems to international concert touring, television, film, theater, corporate events and showrooms with our extensive fabrication and technical departments. A-1 Audio has a complete music/film/video soundstage with a hard cyclorama as a new addition to their Nevada facility. We maintain service and testing procedures to ensure the usefulness and safety of our systems, close manufacturer ties to help our clients fill their needs, and custom modification facilities to allow us to fulfill the diverse and specialized requirements of the industry. Recent clients include: Paul Anka, Ann-Margret, Natalie Cole, Harry Connick Jr., Joel Gray, Engelbert Humperdinck, Chris Isaak, In Concert 91 (ABC-TV), Michael Feinstein, Long Beach Civic Light Opera, Shirley MacLaine, Barry Manilow, Johnny Mathis, MC Hammer, MTV Unplugged, Oba Oba, Jeffrey Osbourne, REO Speedwagon, Frank Sinatra, Starlight Express, Lily Tomlin's The Search For Intelligent Life In The Universe, Music of Andrew Lloyd Webber, Dionne Warwick.

ARIZONA PRO SOUND INC. (APS INC.)



1035 S. Tyndall; Tucson, AZ 85719; (602) 884-8550; FAX: (602) 884-7681. **Contact:** Mark Cowburn, pres. **Touring Radius:** National. **Maximum Venue Size:** 15,000. **Vehicles:** Five ton local. **Flying System Available:** Yes. **House Loudspeakers:** (20) horn loaded enclosures, (2) JBL E120, 2445, (20) subwoofer "W" enclosures, McCauley 18". **Monitor Loudspeakers:** Monitors bi-amped/tri-amped: Yes. (16) trapezoid OAP112 (McCauley 12", McCauley 1"); (21) wedge (McCauley 15", JBL 1"). **House Consoles:** Ramsa WR852, Yamaha PM2000, Yamaha MC2404. **Monitor Consoles:** Yamaha MC2408, TAC SR6000, Ramsa WR4424. **Lighting:** Concert lighting systems. **Other Major Equipment:** Power amp: Crown Macrotec 2400s 1200s, 600s and Crown Microtec 1200s. Outboard: White, Ashly, Rane EOs; Klark-Teknik, dbx comp/flimters; Klark-Teknik gates; Yamaha REV5s, REV7s; SPX900 reverbs, Yamaha and Roland delays; Ivie IE30 analyzer. Mics: Shure SM57s, SM58s, SM81s, Sennheiser 421, EV RE20, AKG 451, Crown PGC160; wireless systems (16) Sony UHF, (4) Samson UHF, (16) Samson VHF, with Sennheiser MKE2 lavalier or SM58 handheld transmitters. Thomas truss ground support or flying, Crown system 12 T.E.F. analyzer, acoustical consultants, authorized recone center for JBL, McCauley, Yamaha, Gauss, EV.

ATLANTIS AUDIO & LIGHTING



2518 N. 82nd St.; Scottsdale, AZ 85051; (602) 994-9257; FAX: (602) 994-9257. **Contact:** Will James, partner/chief engineer.

ATM GROUP



20960 Brant Ave.; Carson, CA 90810; (310) 639-8282; FAX: (310) 639-8284. **Contact:** Drew Consalvo, project mgr.

AUDIO SERVICES CORPORATION



10639 Riverside Dr.; North Hollywood, CA 91602; (818) 980-9891; FAX: (818) 980-9911. **Contact:** Scott Bernard, sales mgr. **Specialization & Credits:** Audio Services Corporation sells, rents and repairs everything for pro audio. ASC features product manufacturers such as Neumann, Sennheiser, Bryston, Hafler, Drawmer, Klark-Teknik, Lexicon, Schoeps, AKG, Rane, Yamaha, Sony, Soundcraft, QSC, 3M, Ampex, TDK, Switchcraft, Neutrix, Canare, Mogami and Carver Pro. ASC's sales and rental inventories are among the world's largest, offering everything from microphones to complete recording packages. ASC's Service Department provides factory certified repair and maintenance for every leading brand of professional audio gear.

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645 Milwood Ave.; Venice, CA 90291; (310) 821-1391; FAX: (310) 452-0959. **Contact:** Bob Parmenter, owner.

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5500 Bolsa Ave., Ste. 245; Huntington Beach, CA 92649; (714) 897-6766. **Contact:** Rob Rizzuto.

BEST AUDIO



P.O. Box 2366; Van Nuys, CA 91403; (818) 763-2378; FAX: (818) 505-9211. **Contact:** Larry Estrin, president.

BURNS AUDIO



4330 S. Valley View #110; Las Vegas, NV 89103; (702) 873-0468; FAX: (702) 876-4858. **Contact:** Mark Ockenfels, sales representative.

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2627 Ariane Dr.; San Diego, CA 92117; (619) 490-3930; FAX: (619) 490-0121. **Contact:** Mark Ockenfels, sales representative.

BURNS AUDIO CORPORATION



10937 Pendleton St.; Sun Valley, CA 91352; (818) 768-2370; FAX: (818) 768-2414. Contact: Joe Manning, vice president.

CONCERT SOUND CONSULTANTS



PO Box 831; Julian, CA 92036; (619) 765-2220; FAX: (619) 765-2520. Contact: David Scheirman, owner.

CROSSROADS AUDIO INC.



2623 Myrtle Springs Ave.; Dallas, TX 75220; (214) 358-2623; FAX: (214) 358-0185. Contact: Chuck Conrad, president. **Touring Radius:** Regional. **Maximum Venue Size:** 20,000 indoor/60,000 outdoor. **Flying System Available:** Yes. **House Loudspeakers:** Crossroads C-48 flying proprietary w/EV and JBL components, C-52 proprietary dual subwoofer cab, Peavey 3020HT, Bose 802, EAW KF-300. **House Consoles:** Yamaha PM3000 40-ch., Ramsa WRS-4424, Yamaha MR1642, Yamaha 2404, several small 8-16 channel utility mixers. **Monitor Consoles:** Ramsa WRS-840 40-channel, Yamaha PM2800-32, Midas Pr-04 24x8, Yamaha MC2408. **Staging:** 20x30 sectional platform 2' high. **Lighting:** Full concert system. **Other Major Equipment:** Yamaha SPX90s, Yamaha SPX900s, Yamaha REV7s, Lexicon PCM41s, dbx 900 rack w/gates/limiters, Brooke-Siren FDS360 crossovers, Klark-Teknik DN300B EQs, dbx 160X limiters, Roland SDB-300s, Symetrix 9244 4-way crossovers, Peavey PC-4XL digital crossovers Loft 3-way crossover, Audio Logic quad noise gates, Yamaha Q2031 dual-channel EQs, Clear-Com bell-pack/main stations, TEAC or Technics cassette decks, Technics or TEAC CD players, Telex five-station wireless intercom, Symetrix quad noise gates, BBE exciters. **Power amps:** QSC EX-4000s, QSC MX1500s, QSC MX700s, QSC 1400s. **Other Equipment:** Large selection of mics, CM Lodestar 1-ton chain hoists, Genie Super Lifts, 250-amp power isolation transformers, 200-amp power distribution systems, 400-amp power distribution systems. Full concert lighting system. **Rates:** On request.

DALLAS BACKUP INC.



12569 Perimeter Dr.; Dallas, TX 75228; (214) 686-4488; FAX: (214) 686-7732. Contact: Charles Belcher, president.

DELICATE PRODUCTIONS INC.



1390 Flynn Rd., # A; Camarillo, CA 93012; (805) 388-1800; FAX: (805) 388-1037. Contact: Spy Matthews, chairman.

ELECTROTEC PRODUCTIONS INC.



6660 Varie! Ave.; Canoga Park, CA 91303; (818) 888-8687; FAX: (818) 703-6254. Contact: Pierre D'Aslugues, pres.

FILAMENT PRO AUDIO



143 E. Arrow Highway; San Dimas, CA 91773; (714) 592-2848. Contact: Frank Offenstein. **Touring Radius:** Regional. **Maximum Venue Size:** 20,000 seats outdoors. **Vehicles:** 16-30 ft. trailers, Chevy C30s, Dodge 350s. **Flying System Available:** Yes. **House Loudspeakers:** (16) JBL 4870 midhigh, (8) JBL 4842 subwoofer, (4) JBL SR4718, (4) JBL SR4725, (20) JBL 4560, (8) JBL 4550, (8) JBL 2380 horns w/2441, (6) JBL 2360 w/2441. **Monitor Loudspeakers:** (18) JBL 12" 2-way, (6) JBL 15" 2-way. **House Consoles:** Soundcraft Venue 32x8, Walker 32x4x4, Biamp 1642, Ramsa 8716. **Monitor Consoles:** Studiomastr 32x12, Canary 16x6. **Staging:** Up to 80x40x4. **Lighting:** (100) PAR 64 1000 watts, (2) 40 ft. Truss, 40-channels of 2.4K dimmer. **Other Major Equipment:** Outboard: dbx 166, 160 comp limiters, Valley People 430, Valley People Gatex auto gate, dbx 383 quad gate, Yamaha SPX90II, ART Multiverb LT, ART Multiverb III, ART DR 1, DeltaLab 1024, EXR exciter, UREI 5547, Rane MA27, ME30, ME6, TDM crossovers, Crown UFXA2 crossover, power amps: QSC EX4000, QSC 1700, Carver PM1200, PM300, B&W 750, B&W 7000-500; microphones: Shure SM57, 58, AKG D112, 451, Beyer 201, 280 TGX, 580 TGX, EV ND 257, 357, 757, Audio-Technica ATM 41, 63, 11, 10, 91, 31, Sennheiser 421, 441, wireless mics; other equipment: spot lights, radio, intercoms, power distros. **Rates:** Negotiable.

FITZCO SOUND & LIGHTS



2600 W. Wall; Midland, TX 79701; (800) 292-6877; (915) 684-0861; FAX: (915) 682-9978. Contact: Milt Hathaway. **Mark O'Neal Touring Radius:** Regional. **Maximum Venue Size:** Unlimited. **Vehicles:** 14', 24' & 42' Air-Ride Kenworth. **Flying System Available:** Yes. **House Loudspeakers:** (12) EV MT-4 stack, (2) Renkus-Heinz MR-1 stack. **Monitor Loudspeakers:** (13) Renkus-Heinz bi-amped cabinet, (4) Renkus-Heinz W-1 cabinet, (2) Renkus-Heinz SR-2 cabinet (sidefills), (4) Renkus-Heinz SR-1 cabinet. **House Consoles:** Wheatstone MTX-80 40x8x3, Audioarts LM-80 24x8x2, Audioarts M-44 16x4x2, EV BK 2442 24x2. **Monitor Consoles:** Wheatstone M-16 32x16, Yamaha 2408 24x8. **Lighting:** Leprecon LP-2000 48-channel, LM-850, Tomcat prerig truss (132 fixtures), Leprecon dimming (144 kW), Genie Super Towers, Martin foggers. **Other Major Equipment:** Outboard: Lexicon, PCM 60, dbx, Alesis, Audioarts,

DeltaLab, Nakamichi; power amps: BGW, GTA, GTB, 750 B, L, D, E & F, 8000, EV 7600; microphones: Shure, Sennheiser, AKG, EV, Crown.

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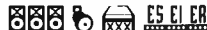
930 N. Elm #6; Orange, CA 92667; (714) 997-7363; FAX: (714) 997-0748. Contact: Dave Forney, mgr.

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3353 Chicago Ave.; Riverside, CA 92507; (714) 683-5860; FAX: (714) 683-8345. Contact: Daryl Ballou, pres.

LD SYSTEMS INC.



483 W. 38th St.; Houston, TX 77018; (713) 695-9400; FAX: (713) 695-8015. Contact: Kim Sevier, marketing. **Touring Radius:** Local, regional, national & international. **Maximum Venue Size:** No limit. **Flying System Available:** Yes. **House Loudspeakers:** LD Systems 2x4 (2-box, 4-way), LD Systems 1x3 (1-box, 3-way), Tubosound TMS-3, Meyer UPA-1, EAW KF-850, KF-600, SB-850, SB-600, EV Delta-Max. **Monitor Loudspeakers:** LD Systems bi-amp wedge, LD Systems 3-way sidefills and drumfills, Tubosound TMS-3. **House Consoles:** Yamaha, Ramsa, Soundcraft. **Monitor Consoles:** Ramsa, Soundcraft. **Lighting:** Thomas pre rig and utility trussing, Celco control, CAE dimmers. **Other Major Equipment:** Intellibeams, HX-700 fixtures, HX-700, LCD and Compulite controllers, Data Flash, Color Pro, Color Ranger, Color Cue, 500 & 1200 amp generator. **Rates:** Negotiable.

MAUI SOUND SYSTEMS



365 Hooehana St. Bay E; Kahului, Maui, HI 96732; (808) 877-2533; FAX: (808) 877-3568. Contact: Jason J. Ambrose.



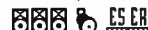
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812 N. Grand Ave.; Covina, CA 91724; (818) 331-8866; FAX: (818) 332-9669. Contact: Matt Nelson, owner. **Touring Radius:** Regional. **Maximum Venue Size:** Arena. **Vehicles:** Mack 24' bobtail, Iveco 14' utility. **Flying System Available:** Yes. **House Loudspeakers:** EAW KF850, EAW SB850, Apogee AE5, Apogee AE10. **Monitor Loudspeakers:** Apogee AE 6B, Apogee AE 6NC, Apogee AE5, Apogee SSM, Renkus-Heinz passive wedges 12x1. **House Consoles:** Yamaha PM4000, Ramsa WR-SB52, Ramsa WR-S4424. **Monitor Consoles:** Ramsa WR-S840. **Staging:** Drapery, scrims. **Lighting:** Systems available as needed. **Other Major Equipment:** Lexicon 480, Aphex 9000 processing racks, KT DDL, KT DN360, Sennheiser & HME wireless, ATM Flyware, Aphex Expressors.

ORION/COEMAR



2506 Freedom; San Antonio, TX 78217; (512) 826-6066; FAX: (512) 826-5120. Contact: Bobby R. Price, national sales dir.

PETERSON LIGHTING PRODUCTIONS



4898 Ronson Ct., Ste. J; San Diego, CA 92111; (619) 277-0260; FAX: (619) 277-6331. Contact: Larry Peterson, owner.

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11818 Felton Ave.; Hawthorne, CA 90250; (310) 676-4702. Contact: Michael Bell, general manager.

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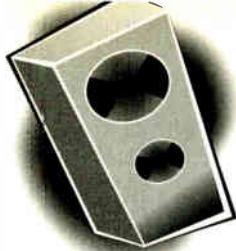
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Albuquerque, NM

QUICKBEAM SYSTEMS INC.



3716 High St. NE, Albuquerque, NM 87107; (505) 345-9230; FAX: (505) 345-4604. Contact: Gary Mathews. Touring Radius: Local, regional, national. Maximum Venue Size: 30,000 outdoors. Vehicles: 1989 Kenworth, Fruehauf 40' w/air ride, Hertz/Penske, Ryder, Budget national accounts. Flying System Available: Yes. House Loudspeakers: (16) Apogee 3x3, (8) Apogee AE-5, (16) QSI H-1 bass w/JBL 2240 18" driver, (16) QSI H-3 3-ways mid-bass horn w/JBL 2225 15" driver, JBL 2445/2385, (2) EV ST350. Monitor Loudspeakers: (10) QSI 2x12, (2) JBL E120, JBL 2425/2370 biamped, (6) QSI 1x15, JBL 2225, JBL 2425/2370 biamped, (6) QSI 1x12, JBL E120, JBL 2202 passive. House Consoles: Yamaha PM3000 40x8, Soundcraft 800B 32x8 plus, (10) FX, Soundcraft Delta 200 24x4, Yamaha 2404 24x4, Yamaha PM1000 16x4. Monitor Consoles: TAC Scorpion 40x12, Yamaha PM1000 32x6. Staging: Wenger staging available w/crew. Load-bearing roof systems also available. Lighting: (300) PAR 64 air bulb sizes and ACLS, (148) 2.4K dimmers (Tectronics-CAE), Celco Series II. Other Major Equipment: Yamaha REV7, Yamaha SPX900, Roland SDE-3000, Roland SDE-1000, dbx 903, cbx 902, Lexicon PCM60, DeltaLab DL-4, Lexicon LXP, Yamaha SPX901I, Yamaha KX900U dual cassette, Carver CD player, Klark-Teknik DN27A, Klark-Teknik DN360, UREI 525 crossover, dbx 162; Klark-Teknik DN360 and Rane AC22 monitors; power amplifiers: (26) Carver PM 1.5 A, (5) Carver PM 350, (8) Crest 8001, (4) Crest 7001, (4) Crest 4801; microphones: (18) SM58, (24) SM57, (8) Sennheiser 421, (8) AKG 451, (4) AKG C-747, (4) Beyer M88, (20) Isomax IIC, (12) Countryman DI, (4) Cetec/Ramer R42A/T-88 w/SM87-77 and Sennheiser Mke-II many other mics, DIs and pickups. Extended Equipment: Tomcat truss systems, QSI power bars, multicable, 6,000-watt "B" system, custom sound and light systems for extended rentals; Clear-Corn, Cetec, Motorola communications rentals. Rates: Negotiable. Specialization & Credits: Denver: (303) 571-1919, Albuquerque: (505) 345-9230, National: (800) 227-6239. Fax: (505) 345-4604. 20,000-watt Carver or 25,000 watt Crest, 40x8 w/patch bay house, 9,300 watt, 40x12 monitors, 300 can, two truss Tomcat stage lighting system. All gear fits easily into company-owned 40' air-ride van. Most complete and versatile quality-oriented rigs available in the Rocky Mountain states. Mains feature Apogee 3x3 and AE-5 systems. Also JBL component main and monitor enclosures designed and constructed in-house and individually tuned to maximum specs. State-of-the-art monitor system quality and performance. 52-channel transformer snake system. Systems flyable, sound in the round for medium-size (12,000 seat) arena. Quality, veteran house and monitor engineers and lighting designers available with or without systems for special events or touring. Extremely good references. Company specializing in outdoor festivals, corporate and industrial production. New Orleans Jazz and Heritage Festival, Jazz Aspen, Colorado State Fair, Albuquerque International Balloon Fiesta, outdoor concerts at Vail, Aspen, Breckenridge, CO, numerous outdoor events throughout the Rockies and Southwest. Call for complete referral list.

REAL TIME AUDIO INC.

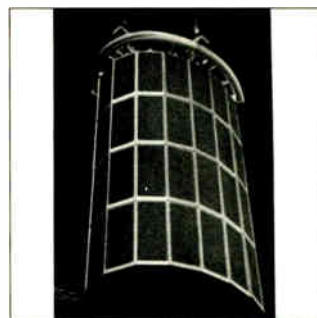


10153-1/2 Riverside Cr., Ste. 409; Toluca Lake, CA 91602; (818) 506-1527; FAX: (818) 506-3070. Contact: Jonathan Deans, pres.

SERIOUS SOUND



1506 Westmoor Dr.; Austin, TX 78723; (512) 451-0652. Contact: John T. Gigliotti, owner.



SHOWCO INC.
Dallas, TX

SHOWCO INC.



201 Regal Row; Dallas, TX 75247; (214) 630-1188; FAX: (214) 638-3245. Contact: Robin Magruder, M.L. Prociase, Randy Wade. Touring Radius: International. Maximum Venue Size: From theaters to stadiums. Flying System Available: Yes. House Loudspeakers: Prism speaker systems, Prism digital control system. Monitor Loudspeakers: Showco biamp floor monitors, Showco B-1 enclosures, Showco SS enclosures. House Consoles: Harrison HM-5, Yamaha PM3000, Soundcraft Series IV. Monitor Consoles: Harrison SM-5. Specialization & Credits: Recent worldwide credits: Genesis, Rolling Stones, Paul McCartney, Reba McEntire, Eric Clapton, ZZ Top, George Michael, Rock in Rio II, Vince Gill, George Harrison, Harry Connick Jr., INXS, Extreme, Lisa Stansfield, Black Crowes, Soundgarden, Clint Black, James Taylor, The Highwaymen, Megadeth, Dzy Dsbourne, Skinny Puppy, Spinal Tap, Santana, Moody Blues, Willie Nelson, Farm Aid V, Linda Ronstadt, Beach Boys, Salt N' Pepa, Arizona State Fair.

SOUND IMAGE



258 La Moree Rd., Ste. 101; San Marcos, CA 92069; (619) 744-8460; FAX: (619) 744-8467. Contact: Greg McVeigh, mktg. director.

SOUTHERN CALIFORNIA SOUND IMAGE



258 La Moree, Ste. 101; San Marcos, CA 92069; (619) 744-8460; FAX: (619) 744-8467. Contact: David R. Shadoan, president.

STARLIGHT SERVICES INC.



258 La Moree Rd., Ste. 102; San Marcos, CA 92069; (619) 744-1666; FAX: (619) 744-0805. Contact: Bill Eisinger, vice president.

SUNBEAT SOUND



15900 Crenshaw Blvd., Ste. I-332; Gardena, CA 90249; (213) 532-9443. Contact: John Lackner, owner.

WESTCOAST SOUND INC.



3605 W. MacArthur Blvd., Ste. 706; Santa Ana, CA 92630; (714) 850-0471; FAX: (714) 850-9972. Contact: Mark Williams, president.

NORTHWEST

Alaska, Northern California, Colorado, Idaho, Montana, Northern Nevada, Oregon, Utah, Washington, Wyoming

AMERICAN MUSIC RENTALS



4327 Fremont Ave. N.; Seattle, WA 98103; (206) 547-9609; FAX: (206) 632-2773. Contact: Ross Harney, rental mgr. Touring Radius: Local and regional. Maximum Venue Size: 5,000. Vehicles: (2) 26' Mercedes-Benz, (2) Chevy vans, (2) 14' Ford cubes. Flying System Available: Yes. House Loudspeakers: (16) JBL 4732, (16) JBL 4718, (16) Ramsa A 500, (8) Ramsa A 550, (8) Peavey HDH1, (8) Peavey HDH3. Monitor Loudspeakers: (20) JBL 4704, (8) JBL 4732, (8) JBL 4718, (8) EV FM1502, (8) EV FM1202. House Consoles: Ramsa WR-5852, Soundcraft 800, PV Mk VIII 36, (4) Yamaha MC2404. Monitor Consoles: Ramsa 840, Soundcraft 800, (4) Yamaha MC2408. Other Major Equipment: Eventide H3000SE, (2) Lexicon PCM70, (4) Yamaha REV7, (4) Lexicon LXP15, (8) Yamaha SPX900, (4) Symmetrix 525, (4) dbx 160XT, (6) dbx 166.

ARMADILLO PRODUCTION SERVICES



2496 S. Memphis Way; Aurora, CO 80013; (303) 755-5239; FAX: (303) 750-4959. Contact: Waldo White, owner. Touring Radius: Regional. Maximum Venue Size: Arena, theater, club, etc., and out-

—LISTING CONTINUED TOP OF NEXT PAGE

door up to 10,000. **Vehicles:** International w/24' box, DT-466, 5+2, Great Dane 45' electronics van. **Flying System Available:** Yes. **House Loudspeakers:** (22) APS trapezoid w/(2) JBL 2204 12", JBL 2245 2" driver, McCauley horn and JBL 2205 slot tweeter. Speakers are individually horn loaded. Foam grill, EP-4 connectors, each is 3-way w/passive tweeter. (22) JBL double manifold bass cabinets w/JBL 2255 15". **Monitor Loudspeakers:** (12) JBL E-140 15" w/JBL 2425 drivers, double 15", JBL 2225 w/JBL 2440 2" driver (drum monitor), double 12" JBL 2204 w/JBL 2425 driver (key wedge), 14 wedges total plus stereo sidefills, (13) Yamaha SM15II monitors. **House Consoles:** Yamaha PM1800 40x8 w/6 aux sends, Wheatstone 8000 32x8 w/4 aux sends, smaller consoles upon request. **Monitor Consoles:** Yamaha PM2800 40x14, Peavay Mark IV 24x8. **Staging:** Monroe sections 4x8 sections, WACO scaffolding, any size need. 40'x40'x5', trailer stage (flatbed w/ (2) 16'x40' outer extensions). **Lighting:** Celco controls, Spectrum dense packs, Genie Super tower, CM chain hoist, double-hung box or triangle truss and followspots. **Other Major Equipment:** Outboard: (2) Yamaha REV7, (4) SPX-90, (4) dbx 166, Lexicon Prime Time delay, (2) GateX 4-channel gate, Aphex Aural Exciter, White 4650 EQs; power amps: BGW 8000, BGW GTA and GTC; microphones: Shure 58, 57, 81, Sennheiser ATM-25; other equipment: Clear-Corn, drums, guitar amps, keyboards, etc., A/V equipment, 46x46 load bearing roof. Rates: Variable. Call for quote.

ASSOCIATED SOUND



1417 Del Paso Blvd.; Sacramento, CA 95815; (916) 649-8040; FAX: (916) 649-0243. Contact: Anthony Brown, Wally Clark, production mgr., owner.

AUDIO ANALYSTS U.S.A. INC.
Colorado Springs, CO

AUDIO ANALYSTS U.S.A. INC.



3286 N. El Paso St.; Colorado Springs, CO 80907; (719) 632-8855; FAX: (719) 632-3638. Contact: Bert Pare, president. **Touring Radius:** International. **Maximum Venue Size:** Unlimited. **Flying System Available:** Yes. **House Loudspeakers:** Audio Analysts HDS-4 custom 4-way, Audio Analysts HD sub custom sub-bass, Audio Analysts HDA-3 custom 3-way, Audio Analysts HDN-2 custom nearfill, Audio Analysts HDLT custom longthrow. **Monitor Loudspeakers:** Audio Analysts HDA-3 custom sidefill, Audio Analysts MAG-3 custom sidefill, Audio Analysts 2x15" custom low profile wedge, Audio Analysts 2x12" custom low profile wedge, Audio Analysts 1x12" custom low profile wedge, Audio Analysts KM custom keyboard monitor, Audio Analysts DM custom drum sub-bass. **House Consoles:** Audio Analysts CADD SMH-1, Soundcraft Series 4, Gamble HC, Yamaha PM3000, Midas, Soundcraft 800B, Soundcraft 500. **Monitor Consoles:** Audio Analysts CADD SMM-1, Soundcraft Series 4, Gamble MC, Soundcraft 500, Midas. **Other Major Equipment:** Amplifiers: Crown 10000, MA2400, MA1200, MA24X6, QSC 3800, 3500, Phase Linear Pro 700, Series 2; microphones: all models by: Shure, Electro-Voice, AKG, Beyer, Sennheiser, Sony, Audix, Milab; crossovers: Audio Analysts CADD DL-1 custom digital, BSS FDS 320, 340, 360 customized, JBL 5234 customized; processing: all available incl.: AMS RMX 16, DMX 1580, Aphex Expander, Compellor, Dominator, Expressor, BSS DPR402, DPR502, dbx 160X, 903, 904, 905, Drawmer DS201, Eventide H3000, H949, H910, JBL 5547, Klark-Teknik DN27, DN60, DN360, Lexicon 224XL, 200, PCM70, PCM42, TC Electronic 1128, 2290, 1280, Panasonic DAT, Sony DAT, Yamaha SPX90, REV5, REV7. **Specialization & Credits:** Audio Analysts, incorporated in 1968, has become a world leader in the supply of professional sound reinforcement systems. With our head office located in Colorado Springs, we provide sound systems to major touring groups throughout the world. Clients include Bruce Springsteen, Billy Joel, Van Halen, Ringo Starr, New Kids on the Block, John Mellencamp, E.L.P., Hank Williams Jr. and Jodeci. Previous clients include Pat Benatar, Bryan Ferry, Heart, Chicago, Foreigner, Billy Squier, Billy Idol, Bobby Brown, New Edition, Roger Waters, Front 242, Bel Biv Devoe and the Winans. Corporate clients include BMG, CBS and Maritz Communications. Installations include the Pacific Amphitheatre and the Greek Theatre in Los Angeles, Chene Park Amphitheatre in Detroit and Kingswood Music Theatre in Toronto. Design consultation services also available.

C&S PRODUCTIONS



PO Box 684; Avon, CO 81620; (303) 949-4753; FAX: (303) 949-4753. Contact: Cyndi or Scott Kirkland, owners.

COLORADO CONCERT SOUND



PO Box 1652; Longmont, CO 80502; (303) 772-3933. Contact: Dan Vanderhoop, pres. **Touring Radius:** Regional. **Maximum Venue Size:** 15,000. **Vehicles:** 83 Kenworth conventional w/45' air ride trailer. **Flying System Available:** Yes. **House Loudspeakers:** (16) TAD TCM 1631 3-way speaker system, (44) various Community horn-loaded speakers, (4) CCS subwoofers, (8) CCS single 15", single 2" TAD load. **Monitor Loudspeakers:** (16) CCS single 15", single 2" TAD loaded wedges, (8) CCS single 15", single 1", EV loaded wedges, (2) EV FM 1201 floor monitors, (4) CCS sidefills w/TAD 2" driver, EV 15" driver. **House Consoles:** Midas PR40 40x12x2, Midas PRO5 34x8x2, various 4 to 24 channel mixers. **Monitor Consoles:** Midas PR40M 32x12, Backstage 16x6. **Staging:** (24) 4x8 staging decks, (4) 2' 4x8 riser, (4) 1' 4x8 riser. **Other Major Equipment:** Lexicon 200, dbx 162, dbx 166, White Instruments 4001, SPX90, Symetrix 501, (130) microphones: Shure, Beyer, AKG, EV, Neumann, Countryman.

DOWLEN SOUND INC.



1260 Everett Ct.; Lakewood, CO 80215; (303) 232-3540. Contact: Bret Dowlen. **Flying System Available:** Yes. **House Loudspeakers:** (24) Dowlen Sound custom trapezoid enclosures containing (2) 15" cone, horn loaded 12", JBL 2450 2" and horn, McCauley 15" & 12", (12) long throw trapezoid boxes, (24) Dowlen Sound 218 subs loaded w/McCauley 6254 18" drivers. **Monitor Loudspeakers:** (15) Dowlen Sound 15"+2" wedge, (4) Dowlen Sound dual 15"+2" wedge, (4) Dowlen Sound dual 12"+2" wedge, (8) Dowlen Sound 12"+2" wedge. **House Consoles:** Soundcraft 800B w/new op amps and capacitors, Yamaha M916, Soundcraft 200B 16x4, Soundcraft Series 4 48x18 fully updated & regrounded. **Monitor Consoles:** Ramsa WRS 840 40x18, Soundcraft 400B 32x10, Soundtracs Megas 32x12. **Lighting:** (80) Pre-hung box truss, (100) triangle truss. **Other Major Equipment:** (3) SPX-900, (2) SPX-90, Lexicon PCM70, (8) dbx 166, dbx 160, (4) dbx 363, (2) Valley 4-channel gates, (2) ART multiverbs, Yamaha REV7, (4) SCV 1/3 octave EQ, (2) Yamaha 1/3 octave EQ, (40) Ashley 1/3 octave EQ, (2) BSS FDS 360, Ashley 4-channel gate, (4) Ashley SC52 compressor, (2) SPE 1000, (2) Effectron II ADM 1024, necessary complement of Dowlen Sound custom crossovers for house and monitor. **Power amps:** (16) Crest 8001, (16) Crest 4000, (8) QSC EX4000, (4) Crest 2001, (10) Ashley FET 500, (4) Crown Macro-Tech 500VZ, (8) CM Lodestar one-ton chain motors, 16 motor control system, various mics, please ask. Rates: Call for quotes.

ELECTRONIC ACOUSTIC RESEARCH



116-B Center Ave.; Pacheco, CA 94553; (510) 682-7081. Contact: Mark Wayne.

ROB FOLSOM/OMB PRODUCTIONS



3910 SE Salmonberry Rd.; Port Orchard, WA 98366; (206) 871-7354. Contact: Rob Folsom, owner; Patrice Gramenz, mktg. mgr.

FRONT LINE SOUND AND LIGHTING



1470 N. 4th St.; San Jose, CA 95112; (408) 453-8481; FAX: (408) 453-8485. Contact: Kimberly, partner.

HTS AUDIO AND CONCERT PRODUCTIONS



1025 Idylwood Dr. SW; Issaquah, WA 98027; (206) 392-6342. Contact: David Harris, pres.

I.A.M.P.



1815 A Contra Costa St.; Sand City, CA 93955; (408) 394-1260; FAX: (408) 646-0951. Contact: Anthony Nocita, owner.

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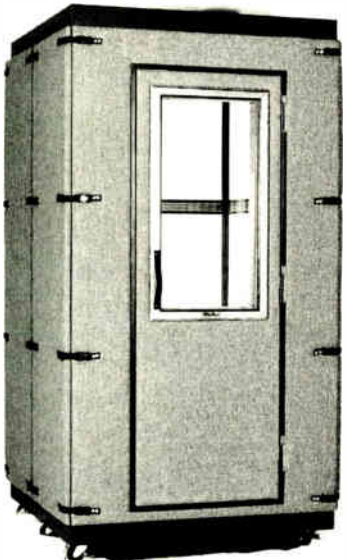
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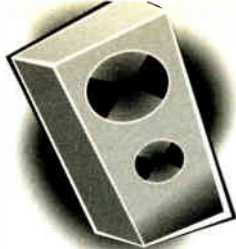
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Pleasant Hill, CA

NARROW ROAD PRODUCTIONS

ES EI EA

3351 Vincent Rd.; Pleasant Hill, CA 94523; (800) 733-9510. Contact: Bob Paiz, operations mgr.

PERFORMANCE AUDIO

ES EI EA

2358 S. Main; Salt Lake City, UT 84115; (801) 466-3196; FAX: (801) 484-1538. Contact: Craig Hylton, manager.

PM ENGINEERING

ES EI EA

PO Box 3040; 6448 S. Skyline Dr.; Evergreen, CO 80439; (303) 674-5933. Contact: Craig Patterson, pres.

POND SOUND & LIGHTS

ES EI EA

PO Box 1224; Renton, WA 98057; (206) 255-4002. Contact: Doug Pond, owner.

PRATT SOUND INC.

ES EI EA

840 W. 1700 South #15; Salt Lake City, UT 84104; (801) 973-4222; FAX: (801) 972-0902. Contact: Ed Pratt, president.



PRO MEDIA
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PRO MEDIA

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3563 San Pablo Dam Rd.; El Sobrante, CA 94803-2727; (510) 222-0307. Contact: John Monitto.

PRODUCTION LOGIC INC.

ES EI EA

PO Box 3032; Oakland, CA 94609; (800) 479-9525; FAX: (510) 852-8389. Contact: Kent Kline, pres.

SEE PAGE 187 FOR AN EXPLANATION OF THE STUDIO SERVICE ICONS. FOR MORE INFO ABOUT MIX LISTINGS SEE PAGE 175.

R. A. REED PRODUCTIONS INC.



955 N. Columbia Blvd., Bldg. A; Portland, OR 97217; (503) 735-0003; FAX: (503) 735-0306. Contact: R.A. Reed, pres.

GEORGE RELLES SOUND REINFORCEMENT



2021 Kincaid St.; Eugene, OR 97405; (503) 686-9325; FAX: (503) 686-9325. Contact: George Relles, owner. Touring Radius: Regional. Maximum Venue Size: 8,000. Vehicles: 1990 GMC W6. Flying System Available: Yes. House Loudspeakers: (16) Meyer MSL-3, (8) Meyer 650-R2 subs, (6) Harbinger 508, (6) Harbinger 512. Monitor Loudspeakers: (4) Meyer UM1, (4) Meyer UPA, (4) EAW 222, (6) EAW 122 AT. House Consoles: Gamble HC40 40x16x2 w/8 line returns, Hill 4400 32x8x2 w/8 line returns, 4 VCA groups. Monitor Consoles: Ramsa 840F 40x18 w/patch bay, Soundcraft 500 32x12. Other Major Equipment: Lexicon 200, Lexicon PCM70, (4) Lexicon LXP1 w/MRC, Lexicon LXP5, SPX900, Eventide H3000S, (2) Drawmer M5000 Dynamics processors, (2) BSS 504 4 ch. gates, (2) Valley PR10 racks; (12) Gain Brain II, (4) MAXI Q, (1) DSP. Rates: Call for rates.



RANDALL SCHILLER PRODUCTIONS
San Francisco, CA

RANDALL SCHILLER PRODUCTIONS

ES EI EA

1207 Fifth Ave.; San Francisco, CA 94122; (415) 661-7553. Contact: Randy Schiller. Touring Radius: Local, regional. Maximum Venue Size: 20,000. Vehicles: 16' to 24' bobtails. Flying System Available: Yes. House Loudspeakers: (8) EAW KF-850 virtual array full-range system, (8) EAW SB-850 sub-bass, (4) EAW KF-300 virtual array full range system, (8) EAW SR-215 double bass bins, (6) EAW SR-115 single bass bin, (32) Cerwin-Vega B36A/L-36PE low frequency folded horns, (16) Harbinger 1208 horn w/JBL 2441 drivers, (16) Gauss 1502 super tweeters. Monitor Loudspeakers: (8) Harbinger 524, (2) Harbinger 514 (bi-amplified), (4) Gauss HF-4000 drivers on Gauss horns, (4) Altec 816 bass bin w/Gauss 5840 driver, (4) JBL 4628B speakers, (4) Harbinger 1116 horn w/JBL 2425 driver. House Consoles: Soundcraft 200B SEQ 24x4x2, Biamp 16x2x1, Biamp 883 8x2x1, Biamp 7500 DJ console, Furman DJ-8 DJ console, (2) UREI 1620 DJ mixing console, Numark 1975A DJ mixing console. Monitor Consoles: Soundcraft Spirit 24x8. Staging: Complete production services available. Other Major Equipment: Yamaha REV7, Yamaha SPX90, Eventide H910 Harmonizer, DeltaLab 2048, DeltaLab DL-2, dbx 161, dbx 163 compressor/limiter, UREI 1178 stereo compressor/limiter, Drban 622B parametric equalizer, (12) Technics SL-1200 MkII turntables, Furman QN-44 quad noise gates, Fosgate Model 1 Dolby Pro-Logic surround sound decoder, Fosgate Model 2, Aphex Aural Exciter Type C, power amps: (2) Crest 4801 300-watt, (2) Crest 8001 750-watt, (3) Carver M1.5T 360-watt, (14) SAE A-501 250-watt, (18) SAE A-201 100-watt, (8) SAE A1001 500-watt, (2) Phase Linear 700B 350-watt/channel, Crown Micro-Tech 1200LX 275-watt, (2) Crest 4801 300 watt, microphones: (2) EV RE20, (4) EV RE15, (4) Shure SM81, (12) Shure SM58, (16) Shure SM57, (2) Sennheiser MD-431, (4) Sennheiser MD-421, (2) AKG D-12, (2) Sony ECM-33P, Samson wireless microphone system, (10) Countryman DI. Extended Equipment: (2) RTS 424 distribution amplifier, RTS 444 stereo buffer amplifier, (5) Crown VFX-2A stereo electronic crossover, (2) Rane AC-22 stereo 2-way electronic crossover, Rane AC-23 stereo 3-way electronic crossover, Uni-Sync MS-10 10x3 mic splitter, SA-3050 spectrum analyzer, Yamaha Q2031 1/3-octave stereo EQ, (4) MXR dual 15-band stereo graphic EQ. Rates: Call for prices on equipment and equipment packages. Specialization & Credits: Randall Schiller Productions has been serving the community for 19 years, designing and installing sound, lighting and video for the Bay Area's hottest clubs, bars and restaurants and full production services for concerts, clubs, bands, parties, street fairs and special events. Check out our new EAW ILF 850 system at the Kennel Club.

SHYNE SOUND

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Box 2280; San Rafael, CA 94912; (415) 459-2833. Contact: Leroy Shyne, owner/engineer.

SOUND CONSULTING

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THIRD EAR SOUND COMPANY

THIRD EAR SOUND COMPANY
Richmond, CA

THIRD EAR SOUND COMPANY



601 S. 8th St.; Richmond, CA 94804; (510) 233-2920; FAX: (510) 233-1638. Contact: David Trincherro, Raul Suarez. Touring Radius: National. Maximum Venue Size: 20,000. Vehicles: GMC 18' bobtail (diesel), Ford 15' box van, cargo vans. Flying System Available: Yes. House Loudspeakers: (64) Third Ear M-1800 cabinets, 3-way 2-box system. Monitor Loudspeakers: (50) Third Ear stage monitors, various types. House Consoles: Soundcraft Europa 40-channel w/matrix, Soundcraft Venue 32-channel, (2) Soundcraft 800B 32-channel, various other consoles. Monitor Consoles: Soundcraft Series 4 40-channel 16-mix, (2) Soundcraft 800B 32-channel 10-mix, Soundcraft 400B 24-channel 10-mix, various other consoles. Staging: Referrals available. Lighting: Referrals available. Other Major Equipment: Outboard equipment: White Instruments, Klark-Teknik, Audio Logic, UREI, Orban, Audioarts, dbx, GateX, Yamaha, Roland, Eventide, Aphex, etc.; power amps: Carver PM-2400, PM-1800, PM-1200 and PM-175; microphones: Sampsom CR2X RF, Shure, Sennheiser, AKG, Electro-Voice, Beyer and others available; other equipment: Clear-Com intercom system, power distribution system and generators. Rates: Superior service and best prices. Call for quote.

XXXX AUDIO SYSTEMS



6384 Freepoint Blvd.; Sacramento, CA 95822; (916) 443-3535; FAX: (916) 427-1455. Contact: Doug Purmphrey, owner.

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16508 111th Ave.; Edmonton, AB T5M 3V8; (403) 486-4000; FAX: (403) 444-5920. Contact: Clive Alcock, Gary Urlacher. Touring Radius: Local, regional, national. Maximum Venue Size: 20,000. Vehicles: Vans and trailers. Flying System Available: Yes. House Loudspeakers: (36) ASD 1502FB full range, (18) ASD dual 18" subwoofers, (24) ASD 1222 full range, (24) MT-2 dual 18" subwoofers. Monitor Loudspeakers: High power biamp & triamp processor-controlled 1x15 and 2x12 with 2" horns; two- and three-way sidefills, heavy-duty drum monitoring. House Consoles: Soundcraft and TAC up to 40x16. Monitor Consoles: Soundcraft up to 40x12. Lighting: Thomas, Altman, Tomcat equipment, Celco control, Dilor dimmers, compact folding truss systems. Ground support and rigging. Other Major Equipment: Outboard gear: BSS and custom processor-controlled crossover systems, Klark-Teknik graphs; we specialize in Drawmer and TC Electronic products including DS201 & DL241 gates & limiters as well as TC 2290 DDLs and M5000 reverbs. Most standard effects available. Power amplification: QSC. Rates: Phone for quotes. Specialization & Credits: Concert sound & lighting systems. Corporate presentations. Music & arts festivals, special events. Edmonton Folk Festival, Edmonton and Calgary Jazz Festival, 1988 Olympic Winter Games, Edmonton Symphony Orchestra, Calgary Philharmonic Orchestra and the Vancouver Symphony Orchestras.

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Sound Reinforcement

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tra, Bryan Adams, Colin James, Blue Rodeo, kd lang, Fishbone, Neville Bros. and many others.

ALLSTAR SHOW INDUSTRIES INC.

ES EI ER
4027 4th St. SE, Calgary, AB T2G 2W4; (403) 243-8099; FAX: (403) 243-8105. Contact: Peter Kaminski.

OYONG SOUND SERVICES LTD.

ES EI ER
271 E. 2nd Ave.; Vancouver, BC V5T 1B5; (604) 873-3841; FAX: (604) 873-1928. Contact: Darwin LeMay, mgr.

FM SYSTEMS

ES EI ER
16423-117th Ave.; Edmonton, AB T5M 3V3; (403) 451-1353; FAX: (403) 451-2858. Contact: Brian Thomas.

GOULO VIBRATIONS

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1405 Lorne St.; Regina, SK S4R 2K3; (306) 565-3111; FAX: (306) 565-8772. Contact: Derek Gould, owner/manager.

L.R. LIGHT AND SOUND

ES EI ER
Box 7834; Drayton Valley, AB T0E 0M0; (403) 542-5282. Contact: Lonnie Ross. Touring Radius: Local. Maximum Venue Size: 2,000. Vehicles: Ford 3-ton w/22' van. Flying System Available: No. House Loudspeakers: (4) Meyer UPA-1A, (4) Meyer USW1. Monitor Loudspeakers: (6) EV FM1502, (2) Sonic M115H, JBL, (2) EV FM1202 ER. House Consoles: Hill J Series III 24x8x2 w/Multipin 200' snake. Monitor Consoles: Allen and Heath Brennel SRM 186 18 6 w/Multipin. Staging: (2) 6x7x1 riser. Lighting: (2) LDS 12-8 desk, 76' of trussing, (3) LDS DR12000 dimmer packs—36,000-watt 2x12 channels, (2) followspots, ACL, PAR 64, 56, 46, 36-3.50, Lampo ET, Optikinetics, smoke, fog, cobweb spinner, gobo patterns. Other Major Equipment: Outboard equipment: (2) Yamaha SPX90, ART Multiverb II, Roland SRV-2000, Roland SRV-3000, (3) Loft 400 gate/limiter, (2) Klark-Teknik DN300, Aphex Type C Aural Exciter, Loft 410 complex/expander, Pulsar RTA150 real-time analyzer, Technics RSM270X cassette deck, (2) Audio Logic SC30 15-band graphic EQ, (2) Yamaha Q2031 31-band graphic EQ, (2) DOD Electronics R813A 30-band graphic EQ, Carver TL3200 CD player, dbx 166; power amps: (4) Carver PM 1.5, (4) HH Electronic V800 MOSFET, HH Electronic V200 MOSFET, Yamaha PD2500, Hill Chameleon; various microphones; other equipment: dry ice maker, (2) isolation transformers, (2) smaller systems for rent. Rates: Negotiable.

MUSIK SOUND

ES EI ER
Kleine Schmutzstrasse 11; D-2440 Oldenburg-Holstein, Germany; (49) 4361-3817; FAX: (49) 4361-4517. Contact: Burk or Ingo Haasch. Touring Radius: International. Vehicles: Own service with air-ride trailers. House Loudspeakers: EAW, MS-Audio, EV, Meyer. Monitor Loudspeakers: EAW, MS-Audio, EV, Bag End. House Consoles: Ramsa 8000, Soundtracs and smaller models. Staging: Nussli (The Wall, Berlin), Layher and Schnaberg. Lighting: To meet any plot. Other Major Equipment: Outboard equipment and microphones, you name it. Backline (Band-Gear), merchandising. Rates: Call. Specialization & Credits: Chick Corea Electric Band, Lee Rite-nour, Dave Grusin, Tom Scott, Berlin Jazz Festival since 1982, Saalfelden Austria since 1988. Special Events: Cosmopolitan Greetings (opera with Robert Wilson, Rolf Liebermann and George Gruntz). Staging credits: Classic Open Air's for Schleswig Holstein Musik Festival, subcontracted staging for David Bowie, Prince, Michael Jackson, Philip Glass. Mobile power and distribution: Festivals: staging and services for Schutteldorf and Juback since 1988, both are 50,000 venues. Several German artists like Peter Maffey and Classic Open Airs.

Pro Audio dictionaries and technical reference guides are available through the Mix Bookshelf catalog. Call toll-free (800) 233-9604 for your free copy.

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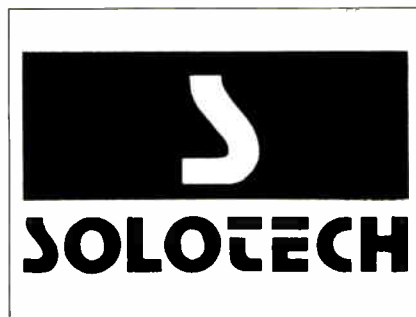
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PO Box 4; Agana, Guam, 96910; (671) 477-1826/7/8; FAX: (671) 472-1826. Contact: Paul S. N. Shimizu, gen. mgr. Touring Radius: Regional. Maximum Venue Size: 25,000. Vehicles: Flatbeds, covered vans, fork lifts. Flying System Available: Yes. House Loudspeakers: (16) Showco AX 4-way JBL line array, time-corrected system w/digital crossover/processor. Monitor Loudspeakers: (4) Showco SS 4-way LBL line array system, (24) proprietary bi-amp PAS/TAD coaxial wedges, 1x15, 1x2; proprietary bi-amp PAS/TAD coaxial wedges, 2x15, 2x2, (4) T2 I system, trapezoid vented enclosures each containing PAS 2580 CX 15", (8) T2 II system, trapezoid vented enclosures each containing PAS 2580 CX 15", TAD 4002 2". House Consoles: Crest/Gamble EX 56x8x2, TAC Scorpion 30x8x2. Monitor Consoles: TAC/Scorpion II 40x12. Staging: 48Wx32D 16x16x wings (indoor), 48Wx40D 16x24 wings (outdoor), 44Wx40D mini Aztec (roof). Lighting: 150/200 lamp system (available upon request).



SOLOTECH INC.
Montreal, QC H1Y 2T8;

SOLOTECH INC.

ES EI ER
4820 4th Ave.; Montreal, QC H1Y 2T8; (514) 526-7721; FAX: (514) 526-7727. Contact: Francois Menard, vice president. Touring Radius: International. Maximum Venue Size: 75,000. Vehicles: (4) tractor Ford 9000, (2) truck 24', (6) trailers 48', (2) emergency truck service. Flying System Available: Yes. House Loudspeakers: (48) Meyer MSL-3, (60) Meyer UPA, JBL loaded cabinets. Monitor Loudspeakers: (200) mixes of monitors: JBL, EAW, Meyer UM1. House Consoles: Soundcraft Europa, (12) Yamaha PM3000, (6) Midas. Monitor Consoles: Soundcraft Series 8000, (7) Soundcraft Series 500, (4) Midas, (2) Yamaha 2800. Lighting: (60) Super Scan 1200 HML, (3500) Pars 64, (100) 5K and 2K Fresnel. Other Major Equipment: (6) 5K hardware Xenon projector, (2) Compulite, (10) impact stand console, (12) Avlight and Celco, (10) Xenon Trooper follow spot, (100) CM Loadstar. Specialization & Credits: Since 1976 Solotech has been the leader in its field of sound reinforcement and lighting in the entertainment as well as the corporate world.

SPECS AUDIO

ES EI ER
195 Deveault; Hull, QC J8Z 1S7; (819) 777-3681; FAX: (819) 777-0428. Contact: Gaetan Lanier, technical director.

WESTBURY NATIONAL SHOW SYSTEMS

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36 Malley Rd.; Scarborough, ON M1L 2E2; (416) 752-1371; FAX: (416) 752-1382. Contact: Ike Zimbel, production manager. Touring Radius: International. Maximum Venue Size: 30,000. Vehicles: 5-ton, tractor-trailer, cube vans. Flying System Available: Yes. House Loudspeakers: (50) Adamson B-218, (50) Adamson MH-225, (12) Proprietary WS-4B twin 18" bass, (24) Proprietary WS-4T mid-high, (14) Proprietary WS-5 3-way. Monitor Loudspeakers: (28) Proprietary WNSS-212M, (26) Proprietary WN-1122M, (4) Proprietary WS-3 side/drumfill. House Consoles: Yamaha PM4000-48, (3) Yamaha PM3000-40, Yamaha PM1800-40, (2) Soundcraft DELTA 200-32, (12) assorted Midas, Soundcraft, Soundtracs, Yamaha under 32 channels. Monitor Consoles: (2) Yamaha PM2800, Soundtracs 3210, (2) Yamaha MC3210. Staging: (50) Wencer risers, crowd barriers, outdoor stage, roof, custom sets. Lighting: AVO QM-500 90-channel console, (5) LMI high-density dimmer rack 72x1-2 & 48x1-2, (60) Strand and Altman Leico. Other Major Equipment: (400) Thomas PAR can, (20) Pan Command gel scroller, (14) Intellabeam moving light fixture, 600' truss sections, (20) 1-ton chain motors (CM), (12) Dataflash strobes, assort. extra dimming and consoles, full rehearsal space 40x40, air-conditioned w/hardwall CYC. Rates: Available on request.

FEEDBACK

CHERRY, CHERRY

Thank you for the publication of your recent interview with me ["Designer on Call," August '92]. Like most audio professionals, I am accustomed to an essentially anonymous role, and that's as it should be—the artists and producers deservedly get the lion's share of the attention when things sound good.

Joe Schick's interview contained one small inaccuracy I'd like to clear up. Johnny Yuma's console is a custom fitting of two Neve 8068s. The job was handled by Johnny Yuma technical director Paul Ricchiuti. The vintage 32-input consoles were discovered in France by producer Nick Griffiths for Patrick Leonard and Yuma engineer/studio manager Marc Marceau. Patrick described finding them as "a little like stumbling across twin cherry '56 T-Birds." Paul's modifications to the consoles and the process of fusing them together took a little over a year, and the end product is absolutely spectacular!

*Ted Rothstein
New York City*

THE SEARCH FOR COMPATIBILITY

Digital audio will obviously have a critical impact on current post-production processes, so I was pleased to read Tomlinson Holman's article, "Digital Delivery of Film Sound," in the September '92 *Mix*.

In that issue, Mr. Holman talked about the existence of "eight different incompatible systems." It is important to point out that not only are these systems incompatible with each other, many are also not compatible with existing equipment and processes. This is because many

of the digital sound for film systems will require a special, dedicated and different sound track on the film print, as well as the installation of an optical reader on projectors.

However, there is a technology being developed that is backward- and forward-compatible. The Karasync system achieves digital sound while maintaining the use of regular optical or magnetic sound tracks and the standard theater projector. Karasync technology uses the analog and digital audio that are recorded from the same audio master, and thus have very similar audio structures. These are continuously compared by the Karasync electronics, and, as a result, the multichannel digital audio can quickly be correlated and synchronized to the film's sound track. The Karasync system is based on U.S. Patent #4,839,733.

*John J. Karamon
Stamford, CT*

ANOTHER FINE FORUM

Just a note to say thanks for the interesting article on telecommunications ["Byte Beat," November 1992]. You left off a very interactive service that shares much of what CIS has to offer, at a lower price, with a better interface for Mac users, but plenty of tools for the DOS world as well. The interface program is *free* as well!

America Online should be mentioned as another important source of information. The MIDI & Music-forums provide a wonderful area for live online chats (no CB channels), plus a complete series of files dedicated to music and other sound manipulation on the Mac.

AOL also has gateways to Internet that allow you to send and receive information from around the world. It's cheaper, too...6 p.m. to 6 a.m. weekdays is \$4.95 per hour at 2400 baud.

*Larry Fitzgerald
Director of Remote Production
WFMY-TV
Greensboro, NC*

THE CORRECT CREDIT

In regards to Dan Daley's "Studio View" column in the November '92 issue, please be informed that the statement that Steve Horelick wrote the musical theme and score for *When It Was a Game, I & II* is incorrect.

This music was written and produced by Ferdinand Jay Smith. Horelick's involvement was to supply some of the incidental music only. Because, as artists, we receive two things in life for our music—a fee and a proper credit—I would be most appreciative of a correction.

*Ferdinand Jay Smith
Rochester, NY*

NEW BREED IS CLASSIFIED

As one of the first of the new breed of high-tech music stores that developed in the 1970s, I have never been comfortable with the MI (musical instrument) classification to describe my operation. Granted, it was a quantum leap from "Combo," which always reeked of "the room in the back where all the rock 'n' roll noise comes from." I think it's time to tell it like it is.

Gand Music & Sound and many other stores did *not* grow out of band instruments or piano and organ dealers. We started from scratch with a new vision of the music industry. The technical innovations of the last two decades proved our predictions for the future: synthesizers, drum machines, samplers, computers and music software, to name a few. We are now seeing rapid

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7) Where your audio-related work takes place (check all that apply):

- 37. Commercial (public) production facility
- 38. Private (personal) production facility
- 39. Corporate or institutional facility
- 40. Remote or variable locations

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MIX Reader Service

P.O. Box 5069, Pittsfield, MA 01203-9856

Issue: *Mix*, January 1993 / Card Expires: May 1, 1993

Name _____ Title _____
 Company _____
 Address _____
 City _____
 State _____ Zip _____
 Phone (____) _____

1) Your company's primary business activity (check ONE):

- 01. Recording studio (including remote trucks)
- 02. Independent audio recording or production
- 03. Sound reinforcement
- 04. Video/film production
- 05. Video/film post-production
- 06. Broadcast/radio/television
- 07. Record company
- 08. Record/tape/CD mastering/manufacturing
- 09. Equipment manufacturing (incl. rep firm)
- 10. Equipment retail/rental
- 11. Contractor/installer
- 12. Facility design/acoustics
- 13. Educational
- 14. Institutional/other (please specify)

2) Your job title or position (check ONE):

- 15. Management—President, owner, other manager
- 16. Technical & Engineering—Engineer, editor, design engineer, etc.
- 17. Production & Direction—Producer, director, etc.
- 18. Sales & Administration—Sales rep, account executive, etc.
- 19. Artist/Performer—Recording artist, musician, composer, other creative
- 20. Other (please specify)

3) Your role in purchasing equipment, supplies and services (check ONE):

- 21. Recommend the purchasing of a product or service
- 22. Specify makes, models or services to be purchased

- 23. Make the final decision or give approval for purchase
- 24. Have no involvement in purchasing decisions

4) Your company's annual budget for equipment, supplies and services:

- 25. Less than \$50,000
- 26. \$50,000 to \$149,999
- 27. \$150,000 to \$249,999
- 28. \$250,000 to \$499,999
- 29. \$500,000 or more

5) Purpose of inquiry:

- 30. Immediate purchase
- 31. Files/future purchases

6) Where you got this copy of *Mix*:

- 32. Personal subscription
- 33. Recording studio/production facility
- 34. Audio/video retailer
- 35. Newsstand
- 36. From a friend or associate

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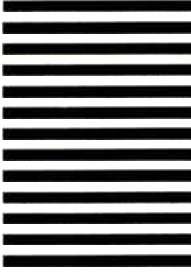
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February 15, '93 deadline for
APRIL '93 issue

(800) 544-5530

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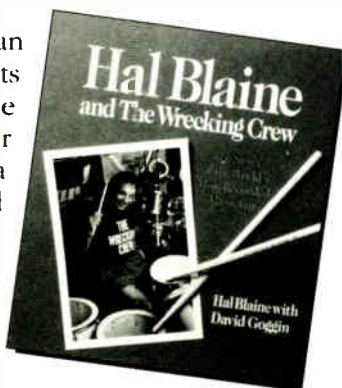
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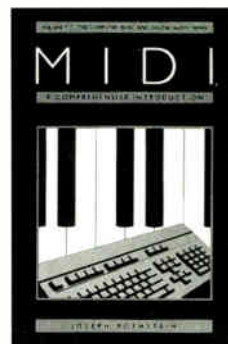
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—FROM PAGE 199, FEEDBACK

advances in digital recording technologies bringing incredible quality at affordable prices.

At the recent AES show in San Francisco, I noticed many music store owners checking out high-end recording and pro audio gear for possibly the first time. This alerted me to a new type of dealer emerging in the 1990s. This dealer is a combination of electronic musical instrument store and pro audio dealer. I would like to coin the phrase "Musical Electronics" dealer for this new animal. The acronym would be "ME." The customers are made up of project studios and MIDI musicians, which I would like to call the "Music & Audio Production" community. The acronym would be "MAP."

With virtual reality just around the corner, we may not even be selling "musical instruments" in a physical form anymore. The 21st century isn't that far off.

Gary Gand

*President, Gand Music & Sound
Northfield, IL*

STUDIO TRUCE

I found the article "Session Players Sound Off About Producers and Engineers" [October, '92] to be very informative and quite amusing. Since I am an engineer/producer in two studios in the Detroit area (United Sound Systems/Sound Suite) and also a session guitarist, I could relate to most of the article.

However, there were a few things that I would like to touch upon. First of all, headphone mixes. Here in Detroit, we don't have many second engineers so that means that when we do a full rhythm section date I have to get there early to do a complete microphone setup, tune the drums, run cables and direct boxes, align the tape machine, lay out cue boxes and headphones, etc. After the musicians arrive, I have to fine-tune most of the stuff that I had already taken care of, then put together a monitor mix for a producer who is asking for different reverbs and delays on everything. That leaves maybe four or five minutes to get a headphone mix for the musicians.

Being that I'm using maybe four

sends for reverb and the like I usually have only one stereo send left to use for headphones. What I do most of the time is do a "stereo to cue" patch or hit a "quad to cue button" and send everyone the control mix. I'm not trying to bail out on the fact that there are terrible cue mixes out there, but sometimes you have to put yourself in the shoes of those on the other side of the glass.

Secondly, there was mention of pulling patch cords and soloing tracks during playback. Why listen to a track all the way down and get excited about a part and then find out that you can't use it because there's hum on the track? And how many of us have blown up a pair of NS-10s because the producer has the monitor pot turned up to 10 and the guitar player unplugs his axe?

I hope that we don't get too hung up on gripes with each other and forget about the music that we are trying to create—because that is the important thing.

Mike Moore

Inkster, MI

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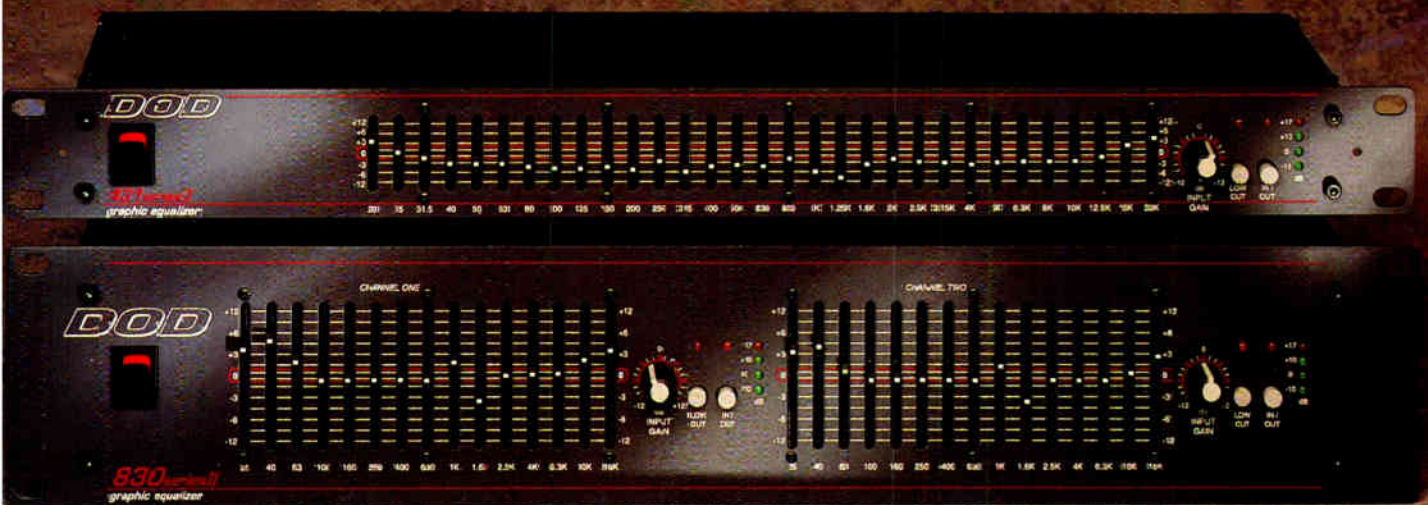
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—Holt Vaughn, President, Eastco Pro

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The competition to produce the "ultimate" sound reinforcement system is fierce. Each new system design brings claims of having *achieved perfection* or touts *this is the one*. Yet, in time, you can expect the very same manufacturers to introduce new models claiming to have further *perfected perfection* or that their *unorthodox* technology has rewritten the laws of physics. Sound familiar? So how do you impress everyone who has heard it all before? Simple.

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Such performance could only be achieved by designing the exact transducers required for the job. The Array Series is the first professional loudspeaker system to use neodymium magnets. The LF transducer's unique motor structure topology also includes proven Verted Gap Cooling (VGC™) and a deep copper-sleeved gap to significantly reduce distortion and power compression.

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The 13 ply hardwood enclosure has 45° sidewalls to match the horn coverage in arrays, and is reinforced with integral steel attachment hardware, designed to interface with S.A.F.E.™ flying hardware for quick and secure cluster assembly.

Pictured above. Array Series installation at the Grand Palace, Branson, Missouri.

System functions, such as crossover filter points, transducer acoustic center alignment, system equalization and protective limiting are achieved totally in the digital domain by the ES52000 Digital Controller. The ES52000 employs Finite Impulse Response (FIR) filters for zero phase shift and requires no amplifier output sensing cables, so you can expand your system by adding Array Series loudspeakers without having to add additional controllers.

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