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MIX

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**A Buyer's Guide to
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THE RECORDING INDUSTRY MAGAZINE

**Remote Engineers on
the Secrets of
Drum Miking**



**INTERVIEW:
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MIX

JUNE 1989

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FROM THE EDITOR

Founded 1977 by
David M. Schwartz and Penny Riker Jacob



Pictured on this month's cover is the Platinum Post mobile facility. The 52-input, 48-track remote is part of the Platinum Post family of nine extensive audio/video studios. Located in Winter Park, Florida, Platinum serves host to Full Sail Center for the Recording Arts. Photo: Ed Malles.

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Goodbye, Wally

We recently lost another giant of our industry. Wally Heider, a role model for many independent recording studio operators, passed away March 22 after a lengthy bout with cancer.

Wally's influence on the recording industry was enormous. He, perhaps more than anyone else, exemplified the independent recording studio entrepreneur. From his origins as a big band lover who traveled the West Coast in the early '50s with a Concertone deck in his car to record jazz performances, Wally channeled his passion into the development of two of the top independent recording studios in the world, located in L.A. and San Francisco. In the process, he also became the industry's preeminent remote recording executive.

In Wally's later years, his vision and imagination led him to acquire the rights and footage to many of the classic big band performances captured on films of the '40s. He cleaned up these recordings and repackaged many of them for release on his home video label.

Wally was a businessman who lived comfortably with his appreciation of art. He knew how to build a top-notch staff and he knew how to keep them motivated. "If a guy is busting his ass, has the right attitude and takes criticism well," he once said, "you can put up with almost anything else he's doing."

Likewise, Wally's desire to satisfy clients surprised many. In all situations, he knew how to be a total professional, even in the face of disaster. "By and large," he said, "the fact is that the client is right, even if it costs you money. Even if it's a marginal situation and you're extending yourself by doing more than is expected, it will pay off in the long run, and the client will keep coming back."

Wally loved to innovate and had remarkable perception. He was the first studio owner to buy commercial 8-track recorders when they were introduced. He was also at the front of the line when the 16-track machines came out. Along with his penchant for being the first with the best came the prudent thinking that "there is a thin line that has to be walked in keeping studios competitive and up-to-date, and at the same time not investing so heavily that you can't make your money back."

Wally Heider was a rare breed of executive—and an inspiring person to work for. We will miss him dearly.

Keep reading,

David M. Schwartz

It won't hurt your feelings.



This, in a nutshell, is the problem: As rhythm machines have become increasingly more consistent, they've also become increasingly less "human." What you put in has feelings. What it puts out doesn't.

Which is why we're taking this opportunity to tell you about our remarkable new R-8 Human Rhythm Composer, so named because it makes the drumming as natural as you had intended.

The R-8 doesn't simply move beats around or "sloppy up" the groove. To the contrary, it gives you such incredible control that you can shift the timing in increments as small as 1/384 notes.

You can also program pitch, velocity, decay and nuance to such an extent that you'll actually be able to hear the drumstick move from the edge of the ride cymbal over to the cup.

And you can do all of this in either a predetermined way, in which case you use the "Groove" mode. Or in an unexpected way, in which you use the "Random" mode. (Just because we call it "random" doesn't mean you take what it gives. Once again, you can control everything.)

Nor does the "human" touch end here. We've also made the 16 pads velocity- and pressure-sensitive, so that the sounds end up feeling vibrant instead of clinical.

The Roland R-8 has eight patches where these "Human Feel" settings can be stored, and each of these patches functions as an "overlay" for any of the patterns in the R-8.

Of course, all of this wizardry would be lost if the sound quality wasn't what it should be. It is. The R-8 features 16-bit

drum and percussion sounds sampled at a CD-quality 44.1 kHz. And even better, both the eight individual outputs as well as the stereo outputs are available for routing those CD-quality sounds to a mixer for individual processing.

Approximately 2,600 notes, or 10 songs, can be stored in the R-8's internal memory.



Even the drumsticks are more human.

And up to 100 patterns with up to 99 measures each, can be programmed in the unit. The R-8 has 68 internal sounds. And when you combine these

with the two ROM/RAM cards, each of which contains 26 sounds, you have a total of 120 different drum and percussion sounds.

One more thing. If you record a particular pattern on an R-8, you can always go in after it's been recorded and assign panning, tuning, nuance and volume for each instrument for every single event in the pattern. The result can be something totally different than you'd expect from a drum machine.

As you've gathered, our Human Rhythm Composer is a truly remarkable and essential piece of equipment. Or as *Keyboard Magazine* put it, "If you're serious about making electronic music with the depth and expressiveness that used to require real live musicians, you owe it to yourself to get a demo of the R-8."

Our sentiments exactly.

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CURRENT

NEVE LINKS UP WITH MITSUBISHI

In a dramatic announcement at the NAB Convention in Las Vegas, April 29, Neve was named the exclusive distributor of Mitsubishi Electric professional digital audio products in North America.

Effective immediately, Neve will distribute and service the entire line of Mitsubishi ProDigi-format digital reel-to-reel tape recorders and ancillary equipment throughout the U.S., Canada and Mexico.

"It is the quality of the Mitsubishi product that interested us," says Barry J. Roche, president of Neve North America. "The kind of technology they've employed and their dedication to the audio industry, similar to our dedication, really turned us on to coming together.

"In the long term," Roche continues, "we'll be able to produce a better, less expensive, integrated package to the studios—not only the multitrack studios, but also broadcast and post studios, and obviously, film scoring as well. Having some form of storage medium available to us opens up all sorts of possibilities for the future."

Neve, a Siemens Company, will consolidate existing Mitsubishi professional digital audio sales and service offices in North America with its own four sales and service centers in Bethel, Conn. (U.S. headquarters), New York, Nashville and L.A. Sonotechnique, Neve's exclusive Canadian distributor, will serve as distributor for Mitsubishi professional audio products in that country.

DUDDERIDGE ACQUIRES FOCUSRITE

After months of speculation and industry concern over the fate of Focusrite Ltd., Philip Dudderidge announced on April 13 his acquisition of that company's assets, and

the formation of a new company, Focusrite Audio Engineering Ltd. Dudderidge, who recently retired as chairman and marketing director of Soundcraft, emerged from a group that included at least 12 other bidders, according to one source.

"We have a fair amount of work in progress already," Dudderidge says. "The ISA range of signal processors, plus the Forte Series of consoles, gives us a considerable scope for building the company over the next 18 months to two years.

"One of the reasons I was interested in Focusrite was the excellence of its product and the fact that it was so well-received in the U.S. market," Dudderidge adds, saying that he expects to be taking orders for ISA range deliveries in early May, with product reaching the States in early June.

Dan Zimbelman, former president of Focusrite USA and now interim U.S. distributor for the new company, says his phone has been ringing off the hook in recent months, with people both expressing their concern and placing new orders. "There has been incredible market demand for Focusrite products in the North American recording community. We are doing everything we can to support the products we've sold, and we have every confidence that we'll be picking up deliveries again shortly. The product stands on its own."

Focusrite Ltd., which was set up in 1986 by Rupert Neve, had just shipped its first two Forte consoles to Master Rock in London and Electric Lady Studios in New York when it ceased trading on January 30, 1989. Neve recently joined Amek/TAC, but will continue to act as a consultant for the new Focusrite.

The company is in the process

of moving to a new location at Bourne End, Buckinghamshire, near London's west side. A new engineering team has been assembled under the direction of John Strudwick.

CONVENTION NEWS

The Association of Professional Recording Studios will be hosting APRS '89 in London from June 7-9. Now in its 22nd year, the show will present more than 150 exhibitors. Pre-registration is available; call APRS at (0923) 772907.

The opening date of the 87th Audio Engineering Society (AES) Convention has been moved ahead one day to allow expansion of the technical program. Technical sessions and workshops will now begin at 9 a.m., Wednesday, October 18, 1989, and exhibits will open the same day at 1 p.m. The Convention will conclude at 6 p.m., Saturday.

The National Academy of Recording Arts & Sciences (NARAS) is now accepting applications for its 1989 grant program. Applications for the up-to-\$5,000 research grants must be received by September 1, 1989; recipients will be notified on January 1, 1990. Contact NARAS Grant/Research Opportunity Program, 303 N. Glenoaks Blvd., Ste. 140, Burbank, CA 91502-1178.

MIX-UPS

The BusinessPages! advertisement for Kajem Victory on Page 154 of our May issue included an incorrect photo. Check the July *Mix* for Kajem's correct photo.

In our May feature "Digital Signal Processors in Northeast Studios," we incorrectly stated that Manhattan's Marathon Recording Studio was owned by artist/producer Kashif. The Neve-equipped, 24-track facility is owned by David Forrest. Our apologies. ■



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INDUSTRY NOTES

Jerome E. Werner, formerly of Klipsch & Associates, has joined **dbx** (Newton, MA) as its new president. . . In Hollywood, CA, **Thorn EMI plc** plans to acquire a 50% interest in **Chrysalis Record Companies**, of **Chrysalis Group plc**, pending governmental and shareholder considerations. **Jim Fifield** was promoted to president and CEO of **EMI Music Worldwide**; **Bhaskar Menon** will continue as an executive director on the Thorn EMI board. . . **Trident Audio USA** appointed **Donna Zimring** as general manager of its U.S. headquarters in Torrance, CA. . . **George Douglas** joined **Meyer Sound Laboratories** (Berkeley, CA) as director of international sales, marketing and SIM™ operations. . . In Herts, UK, **Philip Dudderidge**, co-founder and former chairman of **Soundcraft Electronics**, retired recently, but will stay close to the company as a consultant. . . **UREI** relocated to the Harman Industrial Business Campus in Northridge, CA; and **JBL Professional** awarded Representative of the Year for JBL and UREI products to **Plus Four Marketing** of Walnut Creek, CA. . . **Centro Corporation** (Salt Lake City, UT) has a new director of operations, **Michael L. Prestwich**. . . **Rupert Neve Inc.** moved its West Coast office to 6353 W. Sunset Blvd., Suite 402, Hollywood, CA 90028. Neve's reps for the Neve Prism Series include **Audiotechniques** (NY) and **Audio Intervisual Design** (LA). . . **Dan Zellman** joined the service staff of **New York Technical Support** (Chappaqua, NY); **Al Theurer** and New York Tech formed an installation company using the latter's name. . . **Electro-Voice, Inc.** (Buchanan, MI) named **Michael V. Tortone** as market development manager, music electronics. . . The tenth annual **Seminar in Audio Recording** will take place at the **University of Iowa** from June 12-23. . . In Salt Lake City, **R. Terry Hoffman** is now president of **Centro Corporation**, specialist in mobile facilities. . . **DOD Electronics**, also of Salt Lake City, presented the Sales Representative Firm of the Year Award to **Crescendo & Associates** of Mirama, FL. . . **Lindsay Allen** was

named manager of professional audio tape products at **Ampex Corporation's** magnetic tape division in Redwood City, CA. . . Audio recording and production company **Music Annex** (Menlo Park, CA) has promoted **Keith Hatschek** to vice president of sales and marketing. . . **Samson Technologies** of Hicksville, NY, signed **Everything Audio** (Burbank, CA) to be area dealer for **Soundtracs plc**; in other news from Soundtracs, **Katie Seaman** was appointed marketing assistant of the Surrey, UK, company. . . **Audix** (Pleasanton, CA), announced several new sales reps: **Jamm Distributing**, **Innovative Sales**, **Elliot Goldman** and **JMS Marketing**. . . **ARX Systems** of Victoria, Australia, established a U.S. branch headed by **Algis Renkus** in Silverado, CA. . . **James C. McKinney** is now chairman of the U.S. Advanced Television Systems Committee in Washington, DC. . . **Matsushita Electric Industrial Co.** formed **Panasonic Communications & Systems Co.** in Secaucus, NJ; **Keith Fujii** will be president and chief operating officer. . . **Altec Lansing** (Oklahoma City, OK) appointed **Frank McMullen** as director of manufacturing. . . In Los Angeles, Emmy winner **Mike Dennis** is now the online editor/producer for **Editel/L.A.**. . . **Audio Animation** in Knoxville, TN, has added six new engineers to its staff. . . **Telex Communications** (Minneapolis, MN) promoted **Dan Dantzler** to vice president of sales; other changes include **Don Merceen** as executive director of marketing and **Ted Nemzek** as senior director of sales, audio-visual products. . . Technical publisher **Gary Davis & Associates** moved to 3237 Donald Douglas Loop South, Santa Monica, CA 90405. . . **Michael Messerla** moved up to national field manager at **JVC Professional Products Co.** (Elmwood Park, NJ); **Donn Barclay** was promoted to national sales and marketing manager of consumer video, **John O. Brown** is the new national manager of market development, **Kevin Weinhoft** is national sales manager of the Portable Audio Division and **Nancy Fleming** joined as public relations manager. ■

S T A F F

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SESSIONS AND STUDIO NEWS

NORTHWEST

At **Triad Studios** in Redmond, WA, **Jeffery Olson** produced a new album for **Leonard the Dog**. . . Recent sessions at **Starlight Sound** in Richmond, CA, included **Little Charlie and the Night Cats** recording their second album on Alligator Records. The album was produced by **Bruce Iglauer** and engineered by **Bill Thompson**, with assistance from **Ron Rigler**. . . Recent happenings at **Alameda Digital Recording** (Alameda, CA) include "Rappin" **Ed Holmes** cutting the official song of the 1989 St. Stupid's Day Parade, with **J.J. Jenkins** and **George Petersen** engineering and producing. . . **Barney Bentall & the Legendary Hearts** were at **Mushroom Studios** in Vancouver, BC, recording the song "True Love Ways" for an upcoming feature film, *California Dreaming*. **Ken Marshall** engineered the session. . . Also in Vancouver, **Turtle Mobile Recording** recently taped live shows for **Michelle Shocked** and **Cowboy Junkies** at the Commodore. The recordings were engineered by **Larry Anschell** and assisted by **Dave Trgovcic**. . . **Robin Hitchcock**, taking a break from his U.S. tour with R.E.M., stopped by **Hyde Street Studios** in San Francisco to record six songs. **Wendy Bardsley** engineered, with **Larry Schalit** providing assistance. . . The members of **Whitesnake** were very busy at **Granny's House** in Reno working on their new album *Work-Fest* with engineer **Mike Clink** of Guns N' Roses fame. . . At **Ironwood Studio** in Seattle, engineer **Jay Follette** was busy working with the **Fraid Nots**, as well as with producer **Linda Waterfall** and contemporary folk artist **Heidi Muller** on her new album. . . **Tuck and Patti** were at **Soma Sync Studios** (formerly Savage Studios) in San Francisco mixing their latest album for Windham Hill Productions. **Howard Johnston** engineered and **Mary Ann Zahorsky** assisted. . . **Heart** finished up sessions at **Steve Lawson Productions**

(Seattle) in preparation for their new album on Capitol. **Brett Eliason** was at the faders. . . British TV personality **Grace Kennedy** was at **Studio D** in Sausalito, CA. Her solo project was engineered by **Joel Jaffe** and co-produced by **Alan Glass** and **Errol Kennedy**. . . At **Different Fur** in SF, **Howard Johnston** was engineering a project for jazz pianist **Henry Butler** and **Dancing Cat Productions**. **George Winston** produced and **Chad Munsey** assisted. . .

SOUTHERN CAL

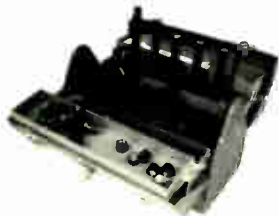
Fishbone was in at **Summa Music Group** in L.A. recording the *Say Anything* soundtrack. The project was produced by **David Kahne**, engineered by **David Leonard** and assisted by **Lori Fumar**. . . At **Westlake Audio**, also in L.A., producer **Michael Masser** mixed down tunes for **Natalie Cole**'s new release on EMI Records, with assistance from **Steve James**. **Cal Harris** was at the board, with engineering assistance from **Mark Hagen**. . . **Juniper Studios** in Burbank has recently completed audio post-production on all the 30- and 60-second syndicated spots for *Hill Street Blues* and *The Bob Newhart Show*. . . EMI artist **Richard Marx** was at **Lion Share Recording Studios** in L.A. recording overdubs and mixing a new album, co-produced by Marx and **David Cole**. **Laura Livingston** assisted Cole with engineering duties, while **Fee Waybill** contributed backing vocals to a few tracks. . . At **The Enterprise** in Burbank, comedian **Charles Fleischer** (the voice of Roger Rabbit) and **Craig Huxley** created special sound effects for Disney's new prime-time CBS series *Hard Times on Planet Earth*. Huxley used the Synclavier 9600 as a workstation to manipulate Fleischer's voice for one of the lead characters. . . The **Doobie Brothers** were seen in The Enterprise's Studio B mixing their highly anticipated reunion album, *Cycles*, for Capitol Records. The project

was engineered by **Devon Bernardoni** and producer/engineer **Rodney Mills**. **Andrew Ballard** assisted. . . The legendary **Ella Fitzgerald** was at **Group IV Recording** in Hollywood working on a new album produced by **Norman Granz**. **Angel Balestier** engineered, assisted by **George Belle**. . . Producer/engineer **Mark Dearnly** was at **Amigo Studios** working on ex-Sex Pistols guitarist **Steve Jones**' second solo album for MCA Records. **Mike Scott** assisted at the sessions. . . Producer/songwriter **Raymond Jones** was at **Pacificque Recording Studio** in North Hollywood laying down vocal tracks with MCA artists **Body**. **Larry Fergusson** and **Khaliq Glover** engineered the project. . . **M'Bila Recording Studio** in Hollywood hosted singer **Stephanie Mills** along with producers **Timmy Gatling** and **Alton "Wokie" Stewart**, working on a "slammin' hip-hop tune". . . At **Village Recorder** in L.A., engineer **Jeff Harris** and producer **Jeff Finer** were completing work on a single for new rock artist **Ronnie Way**. . . Producer **Preston Glass** was at **Mad Dog Studio** in Venice cutting tracks for Japanese artist **Hiroko**'s American debut LP. **Maureen Droney** handled the faders, with **Don Tittle** assisting. . . **Great White** was at **Total Access Recording** in Redondo Beach recording and mixing that band's latest Capitol Records release. Titled *Twice Shy*, the LP was produced and arranged by **Alan Niven** and **Michael Lardie**. Lardie engineered, assisted by **Eddie Ashworth** and **Melissa Sewell**. . . **Paul Fox** was at **Skip Saylor Recording** in L.A. producing Virgin Records artist **In-Tua-Nua**. **Ed Thacker** engineered and **Pat MacDougall** assisted. . . Capitol artist **Suave** was tracking in the Neve room at **Aire L.A. Studios** in Glendale. **Paul Arnold** engineered, with **Anthony Jeffries** and **Jackie Forsting** assisting. . . Atlantic Records' new act **The Subdudes** were at **Sunset Sound Factory** in Hollywood with producer **Don Gehman** (John Mellencamp). **Ed Thack-**

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er engineered with **Scott Woodman** assisting... L.A.'s **Elumba Recorders** reports that **George Clinton** was in mixing a new Warner Bros. act **Treylewd**, featuring Clinton's son. **Donnell Sullivan** assisted engineer Larry Ferguson...

SOUTHWEST

Sugar Hill Recording Studios in Houston reports a flurry of "nuevo-wavo" recording projects. Ramex Records group **Industria Del Amor** wrapped up their latest album, **Xelencia** completed their second album for Cara Records (it's already climbing the Tex-Mex charts), and Spanish artist **Mary Maria** put the final touches on her second album and penned a distribution deal with Cara/CBS International... Austin band **Poi Dog Pondering** was at **Arlyn Studios** finishing up an EP for the Texas Hotel label. **Mike Stewart** produced and engineered the project... Recent Austin activity: **Javelin Boot** at **Cedar Creek Recording**, **Los Deflectors** at **Uppercut Studios** and **The Debonaires** at **Lorien Sound Studio**... Producer **Steven Arnold** completed station ID and music packages at **Future Audio** in Dallas. **Doug Phelps** engineered the sessions. Also at Future Audio, Graceland Records rap artists **PID** were in mixing, with **Randy Adams** at the console...

NORTH CENTRAL

Grammy Award nominees **The Jets** were in **Paisley Park's** Studio B in Chanhassen, MN, working on songs for their upcoming album. The project, tentatively titled **You Better Dance**, was produced by **David Z**... **Andrew Batchelor** recently completed his first full-scale album release at **Kopperhead** in North Canton, OH. The jazz-fusion project made extensive use of the Synclavier Digital Music System, with programming assistance from **Lee Kopp**. The live sessions were engineered by **Bruce Hensal** and **George Payne**... **Mark Manley** was at **Soto Sound** in Chicago to produce an album for singer/songwriter **Marvin July**; **Jerry Soto** was at the board. Also at Soto was blues legend **Mighty Joe Young**... Speaking of legends, **Chubby Checker** was at **McClellan Place Recording Studios** in Toronto putting final vocals on one of his new songs, produced by **Dean Landon** and **Caron Nightingale**. Engineer **Paul Shubat** was at the board, assisted by **Paul Seeley**... Producer/arranger **Tom Ton 99** was at **Tone Zone Recording** in Chicago with R&B vocalists **The Steelers**

working on a hard-luck tune, "I Need Some Duckies." **Roger Heiss** engineered the tracks... "One Shining Moment," the song used for **Super Bowl XXI** and last year's NCAA Basketball Playoffs, was chosen as the theme for this year's NCAA Playoffs. The song was recorded at **Solid Sound** in Ann Arbor, MI, by singer/songwriter **David Barrett**... Jamaica's **Tony Bell & Kutchie** started tracking cuts for an album at **Seagrape Recording Studios** in Chicago. **Tommy White** was at the faders... **Logos Production Studios** recently finished mixing Christian recording artist **Lee Behnken's** album. Also completed at the studio, a jingle for Ball canning jars, engineered and produced by **Steve Mathews**...

SOUTHEAST

CBS artist **Don Johnson** was at **New River Studios** in Fort Lauderdale, FL, recording vocals for his upcoming LP. He was joined by Discos/CBS artist **Yuri Velenzuela** on background vocals. The project was produced by **Keith Diamond**, engineered by **Acar Key** and assisted by **Dave Barton**... Singer/songwriter **Lavonne Battle** was at **Polymusic Recording Studios** in Birmingham, AL, cutting tracks for her debut album. **Charles Hall** produced, with **Michael Panepento** co-producing and engineering. Members of the band **Benz** provided the musical arrangements. Also at Polymusic, the 6-piece *a cappella* group **The Diptones** was in cutting tracks for their first release. Panepento produced and engineered... **Peabo Bryson** completed his Capitol Records release, **All My Love**, at **Cheshire Sound Studios** in Atlanta. He co-produced with **Dean Gant** and **Dwight Watkins**. **Thom Kidd** ran the SSL and **Tom Pee** assisted... **Audio Arts Recording** in Miami supplied 16-track recording equipment to Univision Television Network for a **Maria Conchita Alonso** presentation. Remix was done at the Audio Arts facility. **Jorge Pacheco** handled the sessions... At **The Money Pit** in Nashville, **Highway 101** were in doing vocal, guitar and steel overdubs for their third album on Warner Bros. **Paul Worley** and **Ed Seay** produced, with Seay and **Clark Schleicher** at the controls... At **Music Works** in Hollywood, FL, **John Martyn** and **Michael Shiner** completed a 12-minute post score for the Cenivill Corporation and two commercial post scores for Burdines... Former Jason and the Scorchers bassist **Jeff Johnson** was at **Maxwell Sound** in Athens, GA, producing a demo package for local artist **Clifton Hill**... At **Midi-**

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land Recording Studios in Coral Gables, FL, **Emilio Estefan** was in mixing three songs for Japanese artist **Seiko**. **Clay Ostwald** and **Jorge Casas** co-produced and **John Haag** engineered, assisted by **Will Tartak**. . . There's been lots of activity at **Javelina Recording Studio** in Nashville, including tracking for **Mark O'Connor's** upcoming Warner Bros. release. O'Connor co-produced with Paul Worley and Ed Seay. Seay, assisted by Clark Schleicher, handled engineering duties. . . At **Real to Reel Studio** in Stockbridge, GA, heavy metal group **Snow White** was in tracking and mixing its debut album. **Joe Randolph** engineered and Snow White produced. . . **The O'Kanes** were at **Soundshop Recording Studios** in Nashville self-producing their new album for CBS, with **Pat McMakin** at the controls. . . New York artist **Yazzmin** was at **New Memphis Music** cutting dance tracks, with **Niko** engineering. . . **Roy Clark** was overdubbing at Nashville's **Sound Emporium**, with **Gary Laney** engineering. . .

NORTHEAST

Island Records artist **Laree** tracked and mixed her new single at **Sunset Productions** in New York City, with producer **John Robinson** and engineer **Sue Gibbons** at the controls. . . **Barry Diamant Audio** in Riverdale, NY, recently mastered the new **Guns N' Roses** CD, *G N' R Lies*, for Geffen. Barry Diamant also mastered the **Edie Brickell** and **New Bohemians** CD, *Shooting Rubber Bands at the Stars*. . . At **Evergreen Recording** in Manhattan, **Roy Ayers** completed his upcoming Ichiban Records release. Winding up the project were **Lamont Moreno** mixing and **Eddie Esz** editing and sequencing. . . Capitol artists **The Smithereens** were at **Crystal Sound Recording** in NYC working on songs for their new album. **Jim Ball** and **Larry Buksbaum** engineered the project, with assistance from **David Mann** and **Barry O'Doherty**. . . **Rob Wolf** recently completed his latest track, "Someone Like You." The song, recorded at **Chung King House of Metal** in New York, was produced by **Yaron Fuchs** and engineered by **Kevin Reynolds**. . . **New York Voices**, a new 5-part jazz vocal group, wrapped up work on their first, self-titled album for GRP Records. Producer **Mike Abene** and engineers **Craig Bishop** and **Josiah Gluck** captured the sessions at **Sear Sound** in New York City. . . **Full Force** were back at **Bayside Sound** in Bayside, NY, working on **Doc Ice's** solo album for Jive Records,

with **John Fig** at the controls. . . **Stanley Jordan** was at **Manhattan Center Studios** for a concert/video shoot/digital recording for Blue Note Records. . . Atlantic Records recording artists **Silent Running** were in from Belfast, Ireland, working on tracks for their upcoming album. **Frankie LaRocka** and **Peter Denenberg** produced the sessions at **Acme Recording Studios** in Mamaroneck, NY, with Denenberg engineering and **Tom Leinbach** assisting. . . London Recordings artists **Cookie Crew** were at **Island Media Services** in West Babylon, NY, completing their next single. **Prince Paul** produced and **Al Watts** engineered. . . **Andrea Lauren** was at **Chestnut Sound** in Philadelphia recording three songs and a video for Dorfman Productions. Lauren and **Joe Alfonsi** produced the sessions, with **Les Chew** at the controls. . . The 1989 network music promo for PBS was recently recorded and mixed at **Premier Recording**, Washington, DC. Composed and produced by **Demos Chrissos** and **Matthew Nicholl**, the spot will be customized for individual PBS affiliates throughout the country. . . New label ATCO Records took artist **Tangiers** to **Kajem Victory's** Derringer Gun Factory near Philadelphia to record their first album. **Andy Johns** (Cinderella) engineered and produced the project. . . **John Sebastian** was at **Neveesa Production** in Woodstock, NY, cutting basic tracks for an upcoming album project with **Jerry Marotta** on drums and **Jeremy Alsop** on bass. **Chris Andersen** was at the board. . . Rap artist **Heavy D** was recording and mixing tracks at **Omega Recording Studios** in Rockville, MD, with **Jack Knepley** engineering for MCA/Uptown Records. . . **Allison Maryatt** was appointed studio manager of **Baby Monster Studios**. She recently completed producing **The Thing**, with **Gil Abarbanel** engineering. . . Smokin' Records' **Minutemen** were at **Power Play Studios** in Long Island City working on new material, with engineer **Norty Cotto** and assistant **Yianni Papadopoulos**. . . Virgin UK artist **Raymond Simpson** was at **39th Street Music Productions** working on a new album, with **Don Wershba** engineering, **Ed Douglas** assisting and **Jimmy B.** and **Harvey Goldberg** producing. . . At **Normandy Sound**, Warren, RI, **Phil Greene** and Aerosmith's **Brad Whitford** were producing tracks for the **Neighborhoods** on Road Racer Records. Greene engineered, assisted by **Joe Pires**. . . Producer **Justin Strauss** was at **I.N.S. Recording** in NYC working on overdubs for the remix of "Stop" by **Erasure** for Warner Bros. **Eric Kupper** was on keyboards and

Gary Clugston was at the board. . . **Tuto Aquino** of **Prime Cuts** in NYC edited various cuts on **Paul Shaffer's** upcoming LP, including "Louie, Louie," "Tear it on Down" and "Radio." **Roger Pauletta** edited Shaffer's "Coast to Coast." . . **Nucleus** was at **Home Base Sound Studios** working on its new album, with **Judy Feltus** engineering, **Andy Green** programming the synths and **Joe Webb** and **Dennis Williams** producing. . . **Luther Vandross** was at **Sound on Sound Recording** in NYC recording vocal overdubs. **Michael O'Reilley** engineered with **Bryce Goggin** assisting. . . **Jeff Gottschalk** recently produced a remake (and sang all the vocals) of the classic "Do-Wop" commercial for Crazy Eddie at **Pyramid Recording Studios** in New York. **John Tandy** provided saxophone and **Werner F** engineered, assisted by **Angela Dryden**. . .

STUDIO NEWS


Conway Recorders in L.A., purchaser of GML's first Moving Fader Automation System, has become the first to implement the GML Series 2000 Automation System into the Neve VR resettable console. . . Seattle-based **Steve Lawson Productions** upgraded its audio post-production facility with a NED PostPro, enhanced with a Macintosh II graphics workstation and remote controller/editor/locator. . . **New River Studios**, Ft. Lauderdale, FL, recently purchased a Sony BVU-850 ¾" SP editing VTR. In addition, a Studer A80 center-track time code machine and ½" Studer 4-track machine have been added for layback capability. An Akai S950 sampler with library has been purchased for its audio post-production facility. . . With the help of AudioLine, **Nexus Studios** in Waukesha, WI, has upgraded its 8-track studio to 16 tracks with a Tascam M-600 console, a Tascam MS-16 recorder and an ATR-60 2N recorder. . . Country singer **Emmylou Harris** has taken delivery of a TAC Matchless multitrack recording console at her facility in Nashville. . . **Waves Sound Recorders** in Hollywood, CA, purchased a Magnatech MR-10035-4 35mm recorder to enhance its audio sweetening capabilities. . . **Post Logic** in Hollywood is tearing down walls and building a six-room post facility. The 12,000-sq.ft. facility will house two Synclavier rooms, two SSL rooms and an ADR/prelay room. . . **Steve Vai** and designer **Art Kelm** announced the completion of Vai's new studio, **Mothership**, in his Hollywood Hills home. Each of the five rooms in the facility sits atop floating floor pads, and the control room boasts a

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rebuilt API 40-channel console... **Sound Associates** in New York now has a completely digital MIDI studio with the addition of the AudioFrame digital audio workstation... **Cereus Recording** in Tempe, AZ, added the remote compact controller to its Adams-Smith 2600 synchronizer... **Editel/LA** opened a suite dedicated to color revision, enhancement and correction in tape-to-tape transfer, using the Da Vinci color correction system... **Modern Telecommunications Inc.** (MTI) announced the move of Compugraph Designs and Image Mix to a new computer graphic/special visual effects and post-production center in NYC. The new plant will be called **The Image Group**... UK-based DAR made its first U.S. sale of an 8-channel SoundStation II digital audio recording, editing and production system to **GHL** of Nashville. The SoundStation II will be slaved to a conventional multitrack recorder to enhance creative control over lead instruments and vocals... Savage Studios of San Francisco has changed its name to **Soma Sync Studios** and has acquired a new SSL console featuring a G series computer. Other new gear includes a Lexicon 480L, Eventide Ultra-Harmonizer and Otari MTR-12 2-track mastering deck... **Tim Jordan Rentals** in L.A. purchased a Sony PCM-3348 digital multitrack recorder... **River North Recorders** in Chicago added a 64 stereo-voice, 16-output NED Synclavier 9600 with a Direct-to-Disk™ recorder. The studio plans to connect four rooms to the system with customized Macintosh II graphics workstations... In other NED purchases, **The Plant Recording Studios** in Sausalito, CA, took delivery of an optical disk-equipped Synclavier with an 8-track Direct-to-Disk, which will allow the studio to expand into video and film post-production markets... **Chicago Recording Company's** recent digital recorder purchases included two AMS AudioFiles, a Mitsubishi X 850 32-track and two Sony PCM-2500 DATs. Other digital purchases included two Emulator III samplers and a Lexicon 480L reverb with sample memory expander... **Cantrax Recorders** in Long Beach, CA, added an Alesis MIDlverb II, Alesis HR-16 drum machine, a DigiTech IPS 33 pitch shifter and a dbx 166 comp/limiter... **Turner Broadcasting/WTBS** in Atlanta ordered an AMS/Calrec digitally controlled virtual console system and an AMS AudioFile for its new post-production suite... Newly incorporated **AMI Video/Post Inc.** completed renovation of an edit suite and added a video production sound studio. A 24-track audio-for-video recording suite is in the works. ■



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World Radio History

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by Ken C. Pohlmann

DIGITAL INTERFACING FORMATS

Back in the old analog days, interconnection was relatively easy. As long as you plugged the male plug into the female socket, analog signals were happy. Today, in the digital domain, interconnection is a good deal more complex. Sampling rate, word length, control and synchronization words, and coding must all be precisely defined to permit successful digital interfacing. Sure, you can perform conver-

sion, then interconnect with analog signals, but that's lame. As a result, numerous data formats have been devised to interconnect digital audio devices without degradation. Let's take a quick look at several of the most common: SDIF-2, PD, AES/EBU, IEC (or SPDIF) and MADI.

The SDIF-2 (Sony Digital Interface Format) is employed in some of Sony's professional digital products.

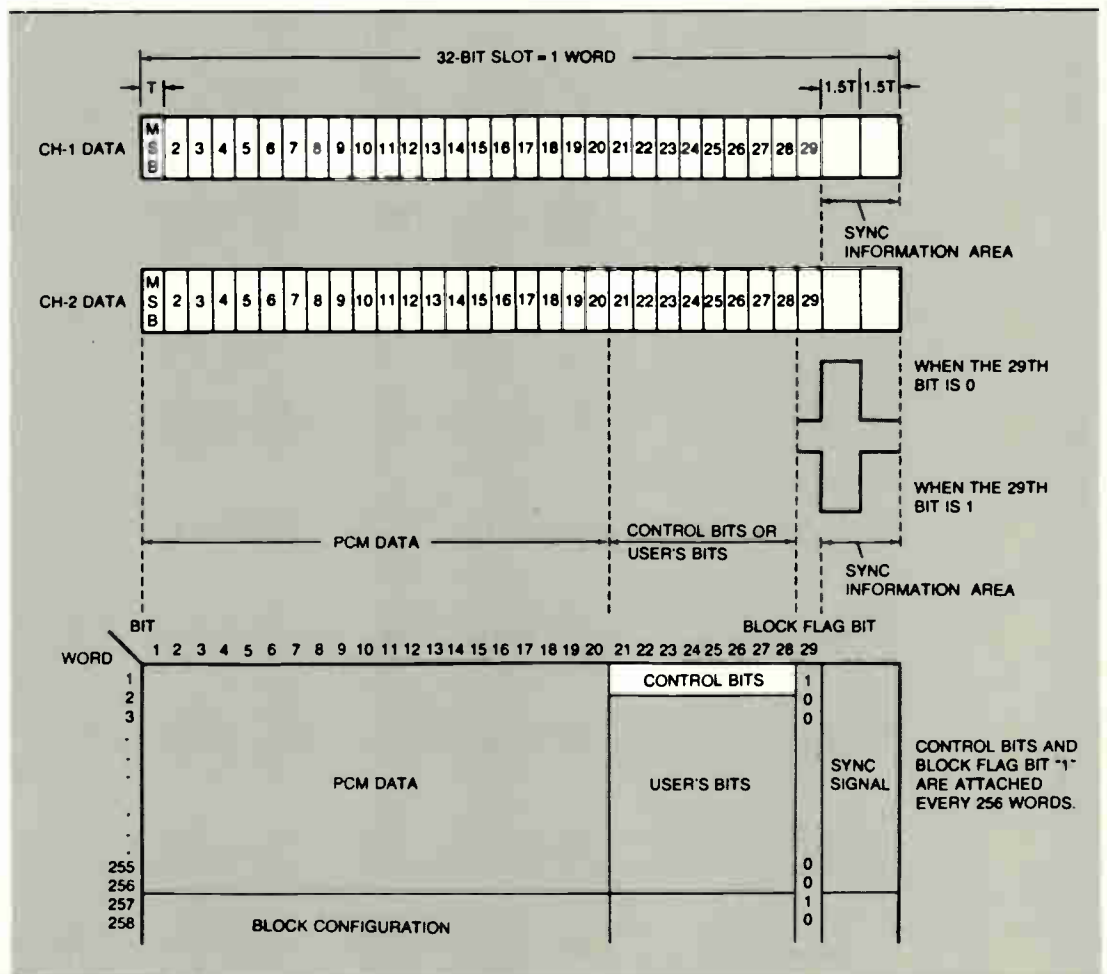


Figure 1: SDIF-2 Interface Format

There are two separate connections, one for each audio channel. A separate connection for word sync is common to both channels. Although any sampling frequency can be used, the intended sampling frequencies are 44.056, 44.1 and 48 kHz. The signal is structured as a 32-bit word, as shown in Fig. 1. The MSB (Most Significant Bit) through bit 20 is used for digital audio data; when 16-bit samples are used, the remaining four bits are packed with 0s. Bits 21 through 29 form a control word. Bits 21 through 25 are held for future expansion; bits 26 and 27 hold an emphasis ID deter-

each sample. Each audio channel is transmitted along a separate electrical conductor. Additional interconnection information is conveyed via two status channels, formatted the same as the audio channel. Two 16-bit words can be used to indicate recording status of the multitrack recorder. For example, the appropriate bits are put in a logical 0 state if the corresponding channel is in record mode. In the 32-track recorder, the first 16 channels are called the Rec. A signal, and the next 16 channels are called the Rec. B signal.

The Audio Engineering Society, in conjunction with the European Broadcast Union, has established a standard

sampling frequency, including, of course, the three sampling frequencies recommended for PCM applications: 32 kHz, 44.1 kHz and 48 kHz.

The format defines a subframe as a set of audio sample data with other auxiliary information; two subframes, one for each channel, are transmitted within a sampling period; the first subframe is labeled A, and second is labeled B. A frame is a sequence of two subframes; the rate of transmission of frames corresponds exactly to the sampling frequency of the source. With stereo transmissions, subframe A contains left channel data and subframe B contains right channel data. For mono, the rate remains at the 2-channel rate, and audio data is placed in subframe A. A block is a grouping of channel status data bits and an optional grouping of user bits, one per subframe, over 192 source-sample periods. The start of a block is designated by a subframe preamble.

The format specifies that a subframe has a length of 32 bits, with fields defined as shown in Fig. 2. The start of the first subframe is designated by a subframe preamble used to synchronize and identify audio channels. Three types of preambles identify: the start of subframe A and, hence, a frame (also the start of a channel status block), the start of subframe A otherwise, and the start of subframe B.

Audio data occupies 24 bits; data is linearly represented in 2's complement form, with the MSB transmitted last. If the audio data does not require 24 bits, then the first four bits may be used as an auxiliary data sample, as defined in the channel status data. Since most devices use 16-bit words, the last 16 bits in the data field are used, with the others set to zero. Four bits conclude the subframe: an audio sample validity bit is 0 if the audio sample is error-free and 1 if the sample is defective. A user data bit may be used as an option to convey user data. The audio channel status bit is used to form a block for transmitting information about the interface channel and other system parameters. This block is formed for each channel from the channel status bits from 192 successive frames. The start of a block is identified by the associated preamble. A subframe parity bit provides even parity for the subframe; this is used to detect errors and monitor channel reliability.

Received blocks of data are formed

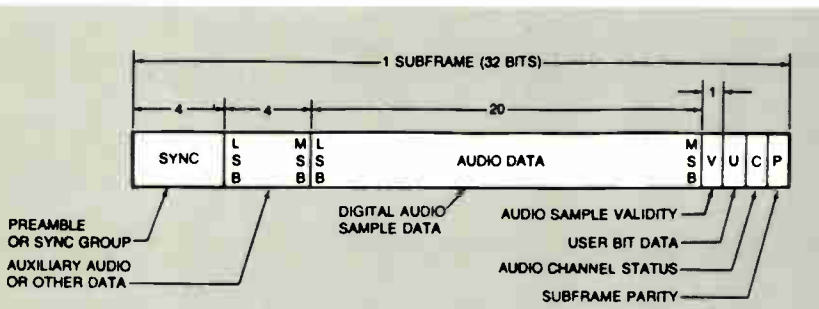


Figure 2: AES/EBU Serial Interface Format

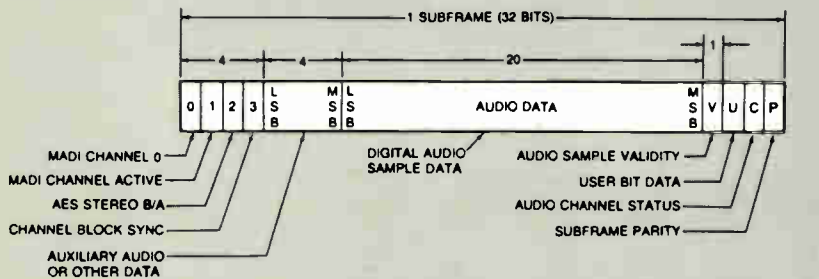


Figure 3: MADI Interface Format

mined at the point of A/D conversion; bit 28 is the dubbing prohibition bit; bit 29 is a block flag bit, which signifies the beginning of an SDIF-2 block. Bits 30 through 32 form a sync word. Internally, data is processed in parallel; however, it is transmitted and received serially through digital input/output (DIO) cards.

Multitrack recorders manufactured by Mitsubishi adhering to the PD or ProDigi format use a unique interconnection format. Blocks are transmitted at a rate equal to the sampling frequency selected. Audio data is given a 32-bit field; the first 16 bits are used (MSB first) in most applications. A word clock marks the beginning of

interface known generally as the AES/EBU interface. It is a serial transmission format for linearly represented digital audio data. It permits exchange of digital audio information, including both audio and non-audio data between professional audio devices.

The AES/EBU format conveys two channels of periodically sampled and uniformly quantized audio signals on a single, twisted wire pair, over distances up to 100 meters. Special processing allows for longer distances. Left and right audio channels are multiplexed, and the channel is self-clocking and self-synchronizing. Because the format is independent of sampling frequency, it can be used with any

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from each of the subframes to yield block A and block B; block size is 192 bits long, from 192 successive frames. Each channel-status data block consists of 192 bits of data, as 24 bytes, transmitted one bit per frame in each audio channel. The channel status block is synchronized by using the alternate subframe preamble every 192 blocks.

Byte 0 of the channel status block contains information on sampling rate and use of preemphasis, byte 1 specifies signal type, such as stereo or mono, byte 2 specifies word length

and byte 3 is reserved for multichannel functions. Bytes 4 and 5 are reserved. Bytes 6 through 9 contain alphanumeric channel origin code, while bytes 10 through 13 contain alphanumeric destination code. Bytes 14 through 17 specify a 32-bit sample address. Bytes 18 through 21 specify a 32-bit time of day time code, with 4-millisecond intervals at 48kHz sampling frequency; it can be divided to obtain video frames. Byte 22 contains data reliability flags for the channel status block and indicates when an incomplete block is transmitted. The final byte, byte 23, contains a CRCC code word across the channel status

block for error detection. The structure of user data is not defined.

The electrical parameters of the AES/EBU format follow those for balanced-voltage digital circuits as defined by the CCITT; driver and receiver chips used for RS-422A communications as defined by the EIA are typically employed. The transmission circuit employs a symmetrical differential source and twisted-pair cable, typically shielded. The cable's characteristic impedance should range from 90 to 120 ohms at the data rate (about 64 times the sampling frequency). The waveform's amplitude (measured with a 110-ohm resistor across a disconnected line) should be between 3 and 10 volts peak-to-peak.

The receiver should provide both common-mode interference and direct-current rejection, using either transformers or capacitors, or optical interface. The receiver should present a nominal resistive impedance of 250 ohms to the cable over a frequency range from 0.1 to 6 MHz. A maximum of four receivers can be connected across one line. Input (female) and output (male) connectors use an XLR-type connector with pin 1 carrying signal ground, and pins 2 and 3 the unpolarized signal.

Consumer products use an IEC format (sometimes called SPDIF or Sony/Philips Digital Interface Format) derived from the AES/EBU standard. It is largely identical to the AES/EBU standard, and in many cases professional and consumer equipment can be directly interfaced; however, differences do exist, particularly in the channel status and user bits. Serial bits are arranged as twelve 16-bit bytes. A general status code format defines the first eight bits and bit 15 of this block. The first six bits define a control word. Bit 0 defines professional or consumer format (as in the professional format), bit 1 defines normal or digital data, bit 2 shows use of copy-prohibit, bit 3 shows use of preemphasis, bit 4 is reserved and bit 5 specifies 2- or 4-channel audio. Bits 6 and 7 define the mode; only mode 00 is presently defined. Bit 15 designates either a consumer/professional mode or program transfer mode.

The consumer interface does not require a low-impedance, balanced line, as does the professional standard. Instead, a single-ended cable is used, with 0.5-volt (peak-to-peak) amplitude. Conventional phono cables

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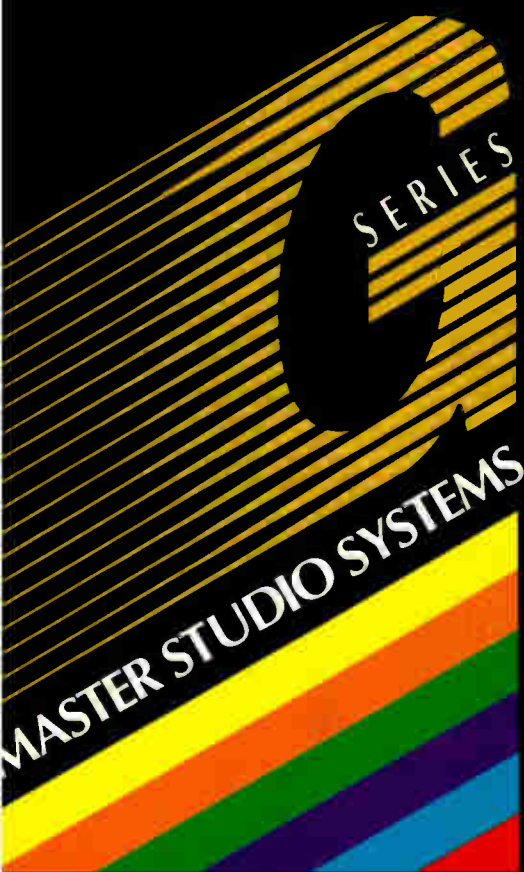
Dominique Blanc-Francard

"It's great to have been involved in the development of the new computer system and its new software features. The huge increase in speed and flexibility of operation makes it by far the most advanced mixing system available. As for the sound, I'm delighted with the end result. The transparent musicality of the new electronics is a pleasure to experience, whether mixing or recording. I'd be at a disadvantage to have to work with anything else."

Bob Clearmountain

今や私には空気のような存在である。——時に音の発想の手足となりあるときは、複雑な要求も応えてくれ、いや、もしかしたら求めた以上のものを与えてくれるかもしれない可能性を秘めている。今や私の仕事空間には必要不可欠なツールである。

内沼映二 **Eiji Uchinuma**



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can be used; however, video-type phono cables are recommended. Alternatively, some consumer equipment uses an optical connector and fiber optic cable.

MADI (Multi-channel Audio Digital Interface) carries the AES/EBU interface one step further; it is intended to provide a standard means of interconnection of multichannel digital audio equipment. MADI allows up to 56 channels of data to be conveyed along a single length of BNC-terminated cable for distances up to 50 meters. Audio samples up to 24 bits are permitted. Using this interface, one can perform a single analog-to-digital conversion on the original audio signal, then perform all subsequent processing through recording consoles, multichannel recorders and mixdown recorders without leaving the digital domain. Whereas an interconnection between console and multichannel recorder with the AES/EBU format requires two cables for every two audio channels (e.g., send and return), a MADI interface requires only two cables for up to 56 audio channels.

MADI protocol is based on the

AES/EBU format; the MADI channel format differs only in the first four bits, as shown in Fig. 3. In the MADI format bit 0 is a flag indicating channel 0, the first to be transmitted in a sampling period. The following channels are transmitted sequentially. Bit 1 indicates whether the data is valid, as interpreted by the transmitting system. Bits 2 and 3 encode the three possible (4-bit) preambles transmitted at the start of an AES/EBU subframe. The remainder of the MADI format is identical to an AES/EBU subframe. This is useful, because MADI and AES/EBU are then compatible, allowing free exchange of data.

However, the physical data links themselves differ. Whereas the AES/EBU can use a twisted-pair wire to convey approximately 3 Mbit/second, MADI must use coaxial cable to support 125 Mbit/second. The interface is designed as a transmitter-to-receiver link; in the case of a console and recorder, two cables for sends and returns are required. Standard 75-ohm video coaxial cable with BNC connector terminations is used. Alternatively, fiber optic cable can be used.

The common data rate may range from 32 kHz to 48 kHz. Higher sam-

pling rates can be supported by transmitting at a lower rate and using two consecutive MADI channels to achieve the desired sampling rate. To facilitate synchronization between equipment, MADI may be accompanied by a separate, distributed, master synchronizing signal applied to all interconnected equipment.

Clearly, the old male/female headaches were nothing compared to today's digital tribulations. Digital audio interconnection is a whole new ball game. But with a little pressure from you, the buying client, a little cooperation and forethought from manufacturers, and a little luck, we could be moving at 100 million BPS with absolutely no hassle. Imagine if all consoles, tape recorders and peripherals had a fiber optic MADI interface. Plug in a couple of little strands, and your studio harness is complete, without grounding problems, hum, interference or even soldering. ■

Ken C. Pohlmann recently chaired the AES International Conference on Digital Audio, held in Toronto, and published the second edition of Principles of Digital Audio, and The Compact Disc Handbook.

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by Mel Lambert

SPECIALIST SKILLS IN THE AUDIO MARKETPLACE

Recently I had reason to ponder the intended nature of my column, mainly because I looked back at what I wrote here exactly a year ago. As chance would have it, my column focus 12 short months ago was live sound production, which happens to be the editorial theme of this issue. In that column I talked about the fact that, by the very nature of their profession, live sound engineers operate under a unique set of circumstances—trying to provide a consistent, high-quality sound in environments far from ideal. Despite that uniqueness, I argued, live-performance console jockeys have more in common with fixed-base engineers than might at first seem to be the case.

Commenting that the technical quality of live-performance hardware has improved radically during the last half-decade, I suggested it is now possible to “achieve a quality of sound in live performance that rivals current-generation control rooms.”

I still feel the same way. But with all due respect to their chosen profession, I still feel that live-sound engineers often try to achieve the impossible. Several times during the past year I

have been confounded by the fact that basic principles of live-sound mixing have gone unobserved, simply because the engineer at the console tried to be too fancy.

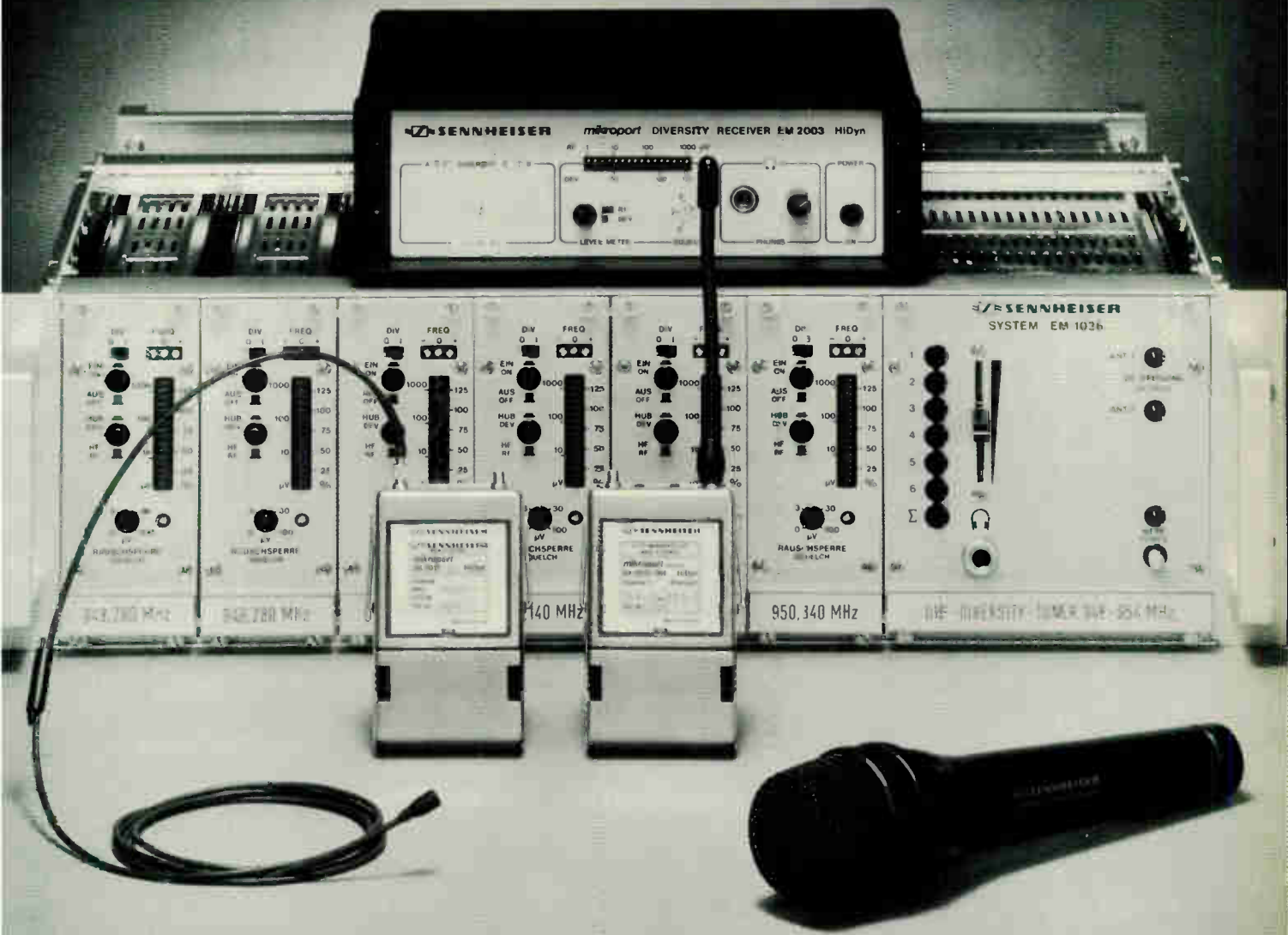
A couple of weeks ago I got into a long, animated discussion with a couple of sound engineers who were handling sound for a national tour. I was particularly interested in the amount of outboard gear they had loaded into a half-dozen large racks at the house mix position, and wondered how they were able to handle such a complex setup.

As it turned out, system control was indeed one of their major problems. In attempting to duplicate in live performance the myriad effects used during production of the studio tracks



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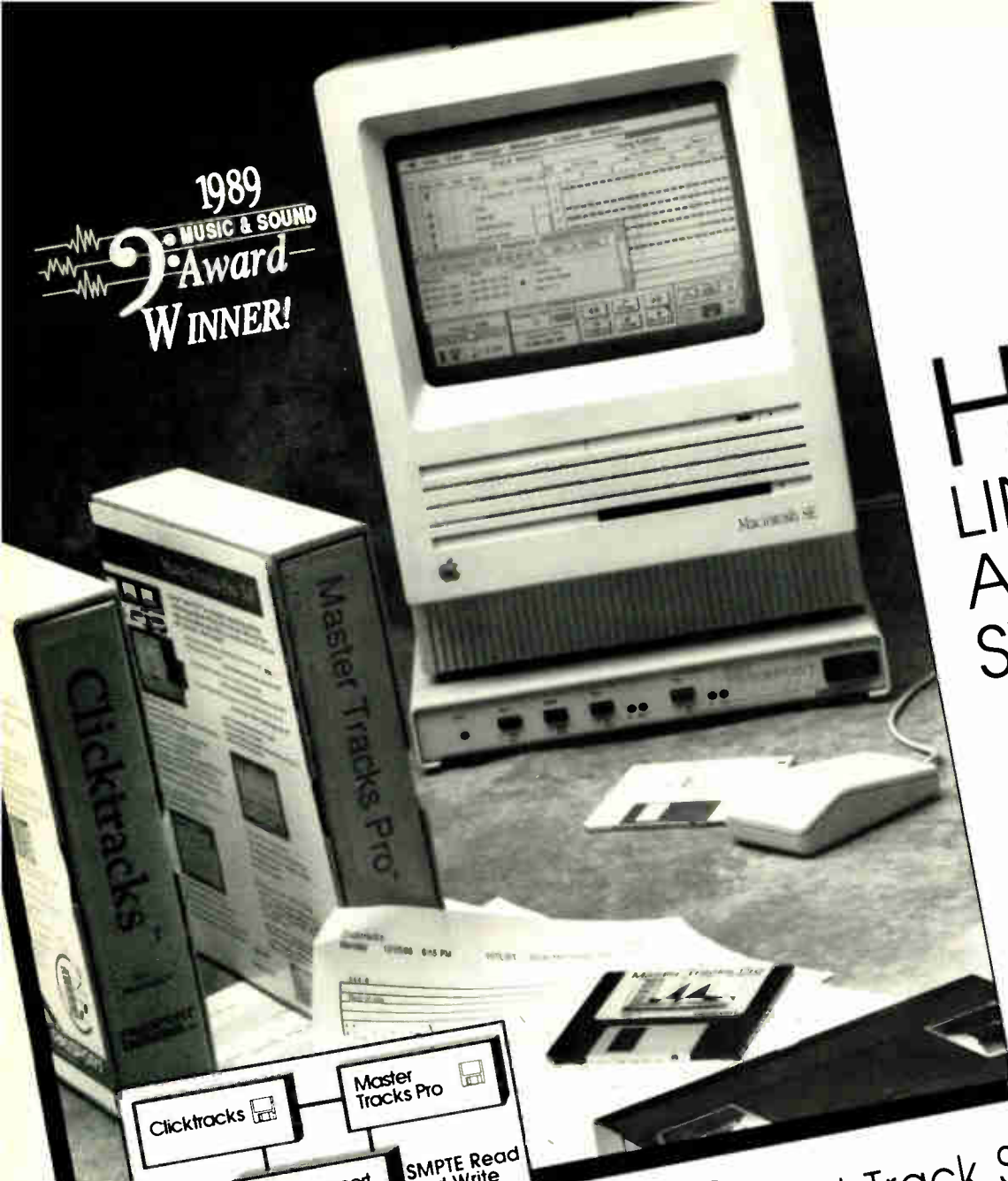
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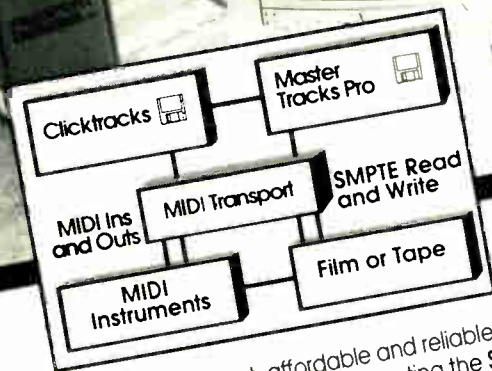
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(one of the engineers had been at some remix sessions, so he was familiar with the sound blenders and benders used in the control room), several factors were preventing them from making much progress.

Not that the mix sounded bad; I can live with a "pared-down" version of a complex studio balance, so long as the performance has that magic of a band enjoying themselves on stage and playing good music for an attentive, supportive audience. Although the drum sound was crisp, tightly gated and well-balanced internally in the live mix, the bass, keyboards and vocals sounded ragged.

I suspected—and my suspicion was later confirmed—that more time had been dedicated to getting the drums down at the start of the tour, and that the overall mix, given the variety of venues encountered on the tour, never developed much from there. In a nutshell, lack of rehearsal, limited set-up time at each venue and sensory overload during the two-hour performance led to compromises.

My advice was to let the drums look after themselves for a couple of nights and spend some time bringing together the rest of the instrumentation; don't even think about the outboards (beyond some EQ, standard compression and basic factory reverb/ambience presets) until the audience begins to hear and enjoy the basic mixes from the stage. Then add refinements, rather than starting out with the idea that everything needs to sound exactly as it did in the studio.

Despite the arsenal of tools at our disposal, producing live sound is a very different proposition from producing in the controlled environment of a recording facility. With the ever-increasing sophistication of studio techniques, the statement I made a year ago—that live sound quality can rival studio sound, provided we operate the hardware with a semblance of intelligence—applies more than ever today. In this context, "intelligence" means conceding that you might not be able to handle every situation exactly as you would like. Compromise is a fact of life.

One way around this problem would be to reevaluate the precise role of live-sound mixing. I suggest that audiences do not necessarily expect the sound at, let's say, LA's Uni-



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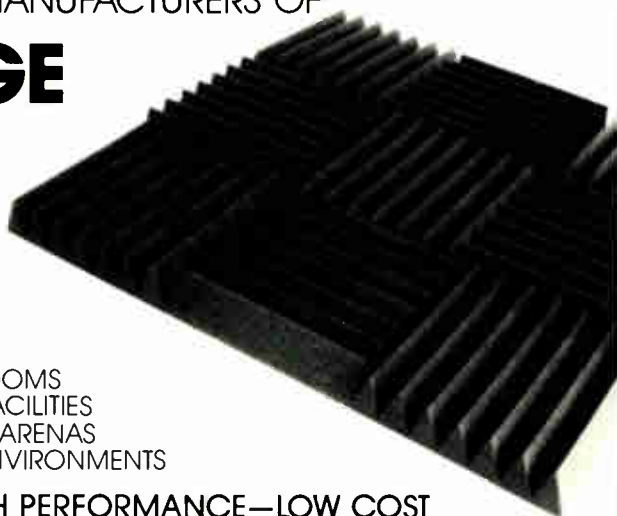
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versal Amphitheater or the Meadowlands in northern New Jersey, to sound exactly like a CD through T-20s. Heck, if they really want ultra-fi, why not just crank up the home stereo?

"Live" is an entirely different experience. An audience wants to see and hear the artists on stage. The nuances of a mix will, by and large, be lost on them; so why not mix sound that's representative of the group's signature, and use your time at the board to follow solos, ride horn and vocal sections, or punctuate the concert with subtle enhancements that add that "something" to the show?

I recall a concept that dates from my college days. During a post-graduate course on "Science, Underdevelopment and the Third World," I studied the ways in which multinational companies sometimes persuade small, technology-hungry nations to reequip their industrial centers and factories with capital—rather than labor-intensive technologies. It makes little sense for a newly independent African nation to adopt, for instance, microprocessor-based manufacturing techniques, when the country doesn't have the trained people to install and maintain the plant, which, when completed, employs dozens rather than hundreds of people.

"Appropriate technology" involves the kind of lower-tech processes that create new jobs for a larger number of people, require little training and make use of hardware that can be installed and repaired by existing maintenance staff. The resultant scenario of "technological dependence"—as a Third World nation finds itself in a debt spiral while it attempts to trade on world markets with products that, for complex reasons, cannot compete with products from developed countries—is still prevalent around the world.

It's also an analogy that works, to a certain degree, with live-sound mixing, where we sometimes forget that while a gleaming box may be offered to us, it might be more appropriate to look elsewhere for a solution, and maybe retain the ability to *use a little to produce a lot*. It's a laudable philosophy for everyone in pro audio. ■

Mel Lambert has been actively involved with professional audio on both sides of the Atlantic for the past decade, and is president of Media&Marketing.

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The Secrets of Drum Miking: Remote Recording Engineers Speak Out

BY GEORGE PETERSEN

Drums are the most difficult instruments to record. Offering extremes in both frequency response and dynamics, the drum set provides a formidable challenge to the recording engineer, even under the best conditions. When an engineer attempts to record a badly tuned kit on a cramped drum riser in a boomy, reverberant hall where the onstage monitor levels exceed the threshold of pain, while sharing mic feeds with a P.A. company, after a generous

11-minute soundcheck, it sometimes amazes me that anything at all comes out on the tape, much less something that resembles art.

We asked a number of remote recording engineers around the nation to share some of their secrets on the rather dodgy subject of drum miking. As expected, their responses were varied, informative and highly opinionated.

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Steve Remote, Owner/Engineer

ASI was established in 1977 and handles a variety of recording duties: albums, live television and radio uplinks, and film and video concert remotes. Recent projects for this 48-track mobile unit based in Flushing, New York, include Living Colour, Public Enemy, Michelle Shocked, Pat Benatar and D.J. Jazzy Jeff & the Fresh Prince.

"I have a saying I live by. When I'm at a live gig, I try to make drums sound like studio drums, and when I'm in the studio, I try to make them sound live," says ASL founder Steve Remote. "If it's not a very heavy show, where there's not much chance of the mics being destroyed, I like to go with really good, high-quality microphones.

"For the most part, I'll go with what the P.A. guys are using, and usually they have the same mics you use in the studio. I love [Shure] SM57s on the snare, and most of the time I'll use an AKG D-12 on the kick. An [Electro-Voice] RE20 is also good, especially for jazz. If the sound company is using 57s or [Sennheiser] 421s on the toms and we just want something else, we may add some of our mics to accompany that, such as [Neumann] U67s or AKG 414s. For dynamics on toms, I like Sennheiser 409s—they're wonderful mics—or 421s; even SM57s can work. If I was stuck in a studio on a desert island and could only have two models of microphones, they'd probably be a 57 and a 421. You can record just about any instrument with those two mics.

"I like [AKG] 451s and 414s on overheads, and some Schoeps microphones," Remote continues. "I don't use hi-hat mics very often, but if the drummer is a light hi-hat player, I'll use a Sony ECM-50, that little lavalier mic. I have a way of hanging it right over the bell for that little bit of sizzle you need. I also might use a SM57 on hi-hat; it's got a mid-range boost that's great for rock and roll.

"Usually when I do soundchecks



Yamaha MZ mics, with the MZ-205 at far left, the MZ-204 at right

Checking Out Yamaha's MZ Series Drum Mics

by Roger Nichols

Every once in a while I run across a piece of equipment that makes my job as an engineer a little easier. If it makes it enough easier, I buy one for my own use. When the Sony PCM-F1 became available, I purchased one so I could take mixes home to check them in a familiar environment. I no longer

had to wonder if the 2-track at the studio captured the actual mix. If the mix was lousy on the F1, then it was lousy back at the studio.

I have added a few microphones to my collection over the years: an AKG Gold Tube, a couple of AKG 451s, a few Shure SM91 condensers, a B&K 4006, a matched pair of trans-

—CONTINUED ON PAGE 44

on drums, I go with a scratch test, making sure every mic is where it's supposed to be, and normally I like to work on my drum sound when the band is playing full blast. Then I can really hear what mics are causing leakage with different instruments. It's the best way to make a drum sound happen."

EFFANEL MUSIC

Randy Ezratty, Owner/Engineer

This New York City-based remote recording company offers two trucks and a portable multitrack system that can be transported anywhere in the world. Past credits include Paul Simon's *Graceland Live in Zimbabwe*, U2's *Under a Blood Red Sky* and *Unforgettable Fire* (the latter recorded at a castle in Ireland), Amnesty International in Argentina and scoring with Peter Gabriel for *The Last Temptation of Christ*. At press time, Ezratty was upgrading Effanel's 45-foot, 2-room, mobile studio with a Solid State Logic console.

"Drums are one of the few things where you can carry over studio practices into a live situation. You certainly

can't use studio vocal techniques on stage because of the monitors, but drummers don't mind when you put a couple of studio condensers in place of what the sound company is providing," notes Ezratty.

"We always defer mic selection to the sound company, unless it's really going to adversely affect the recording. Also, with drums you can sometimes double-mike without anything getting in anybody's way. P.A. engineers will sometimes 'Y' their overheads if they're short on inputs, so in that case we stick in a couple of separate overheads and send them down to the truck. It's the same thing with the kick drum; a 421 is nice for P.A., but sometimes we might want to go with something like a Beyer M88, so we'll stick two mics in there.

"An overhead in a concert situation will not pick up any wonderful drum ambience, it'll pick up everything else on stage, drums included. I might use the same mics as in a studio, but I'd place them much closer. It depends on the music; for a jazz date with acoustic bass, I'd use a nice XY pair for overheads, but if it's Guns N' Ros

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es, I'd want to mike the cymbals and add ambience electronically.

"Isolation is not the be-all and end-all for me, especially with drum overheads. We did a U2 record where even in the studio—er, castle—we were recording in, they set up a monitor system and put the drummer's kick and snare through the monitors as loud as if he were on stage, and recorded it with the overheads. It sounded great, so sometimes isolation is only necessary in degrees.

"One thing I discovered from working on jazz dates with Jim Anderson, a popular direct-to-2-track engineer, was the use of Beyer 160 ribbon mics as overheads. Now they're my choice on most dates. The compression you get with a condenser mic on cymbals is nonexistent with ribbon mics, and they take extremely high sound pressure levels.

"On toms I like the Shure SM98 miniature condenser, and on snare I sometimes use the Countryman 101 or the SM57 that everybody uses. The Countryman mic is great when you've got something with a little finesse on the snare; sometimes I'll record both the 57 and the 101. I like using a ribbon mic or a large diaphragm condenser, such as a 414, on hi-hat. A lot of people use small-diaphragm condensers, but I think they're too thin-sounding.

"If you use condensers on your overheads or hi-hat, make sure the drummer plays pretty hard when you soundcheck. I've seen a lot of engineers use unpadded mics, and later you hear awful-sounding preamp distortion. It's tough to go onstage in the middle of a set and start screwing in mic pads."

GHL REMOTE RECORDING

Gary Hedden, Owner/Engineer

This 40-foot, Nashville-based remote truck has seen a lot of action lately. Recent acquisitions include an 8-track DAR SoundStation—probably the first digital workstation employed in a remote unit—and a new Harrison Pro-7 sidecar mixer. Owner Gary Hedden is also a noted studio designer, having completed work on Cleveland's Sisapa Studios and The Bakery in North Hollywood, which was slated to go on line last month.

"Acoustic drums are made to sound good from overheads: the drummer plays from that perspective and the mics hear the most accurate sound from that perspective. In large spaces

Zen and the Art of Drum Miking

The art of recording drums is something that most of us who have done some engineering come to have mixed feelings about. Just why are drums so devilishly hard to record? After all, the fiendish things are really nothing more than round boxes with skins on them, aren't they?

Well, perhaps this is a bit simplistic. True, they evolved from the basic primeval drum, the hollow log, but today's sophisticated sets produce many killer waveforms that can be awfully hard on a microphone. Come to think of it... a log might be harder to record than it looks!

Let's examine what a drum is actually doing to the air, and we'll try to shed some light on the situation. When the membrane of the drum head is struck, an incredibly steep pressure front is generated as a result of the initial concussion. (As Sammy Davis Jr. would say, "Ouch, man!") This is caused by the drum head moving outward, which compresses and heats the air molecules in the immediate vicinity of the crime. Because the air molecules cannot move out of the way fast enough, due to the viscosity of the medium (air, in this case), the gas compresses to a high pressure caused by the drum head's violent movement. This pressure front then moves through the air with the characteristic velocity of sound. Are you with me so far?

Okay, here's the clincher. As the energy is expended by the drum head, it starts to oscillate, or vibrate, back and forth. The period of the oscillation (called the frequency) is a function of the mechanical and acoustical impedances of the enclosed system, including the head or heads, the shell and the trapped volume of air. In other words, the resonance of the drum is controlled by many things, including the tension across the head. As the head oscillates, further pressure variations occur as a result of the same mechanical coupling that drove the initial front. These waves are generally known



Stephen Paul

as the "decay" period. They contain a nearly infinite set of complex harmonics that vary over time until the kinetic energy stored in the elastic membrane is fully dissipated.

Now that we have thoroughly confused you, let's see how this all applies to the microphone that's trying to record this crazy action. There are a suspicious number of similar terms used in the description of drums and microphones. Could there be something in this? Let's look a little closer. Closer than that even. Yes! Down here, in the basement, are the secrets of the microphone designers. Shhh! We're not even supposed to be down here, you know. But, since we're here, let's have a look around.

As many of you probably know, at this stage of technology, a microphone must have a diaphragm. Birds gotta swim and fish gotta fly, you know? So does a drum. Not fly, I mean, but it must have a diaphragm. A microphone also has an enclosed volume of air coupled to this diaphragm, same as a drum. When you hit a tom-tom that's next to a snare, the snare rattles sympathetically. So does a microphone. You see, we've come full circle. Starting to make sense now, isn't it? Good. Now will someone kindly explain it to me?

Here we are, armed with all this technical knowledge, and all we

—CONTINUED ON PAGE 37

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or outdoors, it's easier to get a good drum sound, because you don't have nearby reflective surfaces and things resonating so much," says Hedden. "On the other hand, the P.A. company is often dictating things, and we end up with mics mounted as part of the kit or internally within the drums, or just used as triggers. I'll put up a second set of mics in those cases, but sometimes it's physically impossible, and you have to live with what's there and make compromises.

"I like using a 421 on kick, a 421 or 57 on snare, and Neumann KM84s on the toms. I like to use my nickel-stereo Neumann SM2 for overheads if I can, or [AKG] 460s. I also like using a 460 or KM84 on the hi-hat. I almost always radically filter the low end of the overhead mics so they feature the high-end snap of the cymbals, without changing the tonal aspect of the low end of the drums.

"I'm not afraid to use liberal amounts of EQ to achieve what's necessary. In the heat of a live recording, that's sometimes the only way to deal with it. You take what's coming from the stage and make the most of it in the truck."

P.E.R. (PHIL EDWARDS RECORDING) Phil Edwards, Owner/Engineer

While perhaps best known for its superb recordings of such jazz artists as Woody Herman and Stan Getz, the 48-track P.E.R. remote truck has hosted a variety of other artists, including George Thorogood & The Destroyers and gospel star Edwin Hawkins. Recently, Phil Edwards took his Hayward, California-based mobile to St. Louis to produce audio for an 8-channel, environmental sound exhibit at the St. Louis Zoo.

"When I contend with miking a live date, I'm concerned with the drums leaking into everything else," Edwards notes. "We do a lot of gospel remotes, and when you're doing a 100-voice choir with a drummer who's thrashing around, it's nearly impossible to keep the drums out of the choir mics. We did a recording in Chicago last year for Edwin Hawkins' Music & Arts Seminar in Medinah Temple, a very live hall, and no separation was to be found anywhere in the building. You can't exactly tack a lapel mic on every member of the choir, so we often use baffles or something similar to surround the drummer.

"The mics I most frequently use for

—FROM PAGE 35, ZEN

really wanted to do was record a drum. Sheesh! Well, okay. So the point is that the microphone's job is to absorb some of that kinetic energy our drum laid on the air-waves. However, to do that, the mic must faithfully follow the activity of the air pressure variations, *without adding any oscillations of its own*. This is indeed the key. For it follows that if a microphone is built along the same lines as a drum, then it too *must have a resonant frequency*. It too must have the same tendency as the drum to continue moving after the stimulus is removed. The degree to which this tendency is controlled is known as *damping*, and it is a crucial factor in determining the sound of a microphone.

Much of the key to achieving top performance from the mic is in the mass of the diaphragm. The faster you can get the membrane into motion, the better you will be able to resolve the slope of the steep initial wavefront. The secret of a great microphone is acceleration. The deceleration must be perfectly matched to achieve real resolution. (It never is. But we try, eh?) This, along with careful capsule design to compensate for the natural resonance of the diaphragm, is the bottom line in reproduction. Mass is Doom, get it?

This is one reason, except in a few cases where the "color" is desired, one who really wants good transient response will reach for a responsibly designed condenser microphone. Dynamic mics have a big wire coil glued onto the diaphragm rear, and thus are not serious contenders for the lightweight battle of the Weather Kings. They do have their place, however, in adding just the right amount of overshoot and ringing

to fatten up a snare sound, for example, in conjunction with a good condenser. (Don't toss that 57!) Overshoot is simply the scientific term for the effect of inertia on the diaphragm that, once moving, doesn't want to stop and shoots right past the point of perfect replication of the waveform. Ringing is the term for oscillations that occur after the event has transpired, remember? It's easy to see that the mic has a tough job when you understand what it goes through in the drum booth. Imagine putting your head where that poor little mic goes. Yikes!

Another thing to remember is that they don't call the Weather King a Weather King for nothing. Humidity has a large effect on membranes, which are noted for their osmotic and hygroscopic qualities. Before you go running for the dictionary, that means they absorb water. It's one reason you can set up a drum kit, place the mics, do your EQ and track, lock-out the room, come in the next day and presto... "That can't be the sound we had last night," come the astonished protestations of the engineer and producer, to say nothing of the drummer (but who listens to the drummer?).

And another careful setup comes to naught. Because of the many factors affecting the successful recording of drums, there are no hard-and-fast rules. There are hard and fast drummers, but no rules. Essentially, what you find working for you *that day* is what you should use. Experiment, and couple your experiments with the search for deeper knowledge, which is the main toolkit of the truly creative engineer. You will always be surprised at what you find and accomplish along the way.

—Stephen Paul

overheads are [AKG] 451s or 452s, although 414s also work well. We use Sennheiser 421s for toms and a 421 or an RE20 for the kick. I prefer using a [Shure] SM56 for snare. We've got about 30 of them. They're nice because they can be angled without the cable poking into the hi-hat, they can be easily positioned, and they can take a lot of sock, like a 421. I use a con-

denser on hi-hat; out of habit I'll pull out a Sony ECM-22, which sounds somewhat like a Neumann KM84.

"Sennheiser 421s, E-V RE20s and AKG D-12s are all fine for kick drum, but more important is how the drum is set up. A couple of tricks to try are dropping out a lot of gain at about 800 Hz, then adding a bunch at about 3 kHz for some snap. Cutting at 400,

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600 or 800 Hz can solve a lot of problems. It tends to make everything sound tighter. I watched Larry Brown do this on a remote in Santa Cruz. I thought it was weird, but it worked; it pulled everything up. He also added a little bottom around 50 Hz and that seemed to work.

"I used to spend time scratching my head and trying to EQ this or that, but the secret is all outside. Either you've got a crummy mic or the drums are not tuned right. A bad-sounding drum kit is an acoustic problem that demands an acoustic solution. You've got to go in there and recommend a few things. Nine times out of ten, the

drummer is delighted, because you can really improve things if you offer suggestions in a diplomatic way. Trying to fix something acoustically is what you should do first. It makes a big difference.

"When it comes to miking, a greater problem is the P.A.—floor monitors, sidefills, wedges—they're the kiss of death and play a greater role than the mics do in how a remote recording sounds. On remote dates we try to spend a lot of time with the monitor mix engineer, going through things carefully, positioning stuff so they're pointed off-axis. We also try to get them to back off the monitors a cou-

ple of decibels, to a point where the talent can hear and everybody feels comfortable. Minimizing that ringing and comb filtering can make a huge difference in the way things sound on the recording."

THE PLANT RECORDING STUDIOS

Bob Skye, Owner/Engineer

"Rover," The Plant's mobile unit, has the distinction of being the first certified LEDE® control room on wheels. Recent projects include the Greg Kihn Band, Joe Satriani and the Zasu Pitts Memorial Orchestra.

"I know what mics I want to use; what I need to do is see what the live sound guy wants to use, because if he's not happy, he's going to take the gig away from me with feedback or monitor problems if he's working with an unfamiliar mic," comments Plant head Bob Skye. "Fortunately, I normally deal with top-notch live sound guys, and more often than not, what I want is among their mic choices. You see a lot of [Sennheiser] 421s out there; it's the all-time, wonderful-sounding, use-it-as-a-hammer-if-you-need-to microphone.

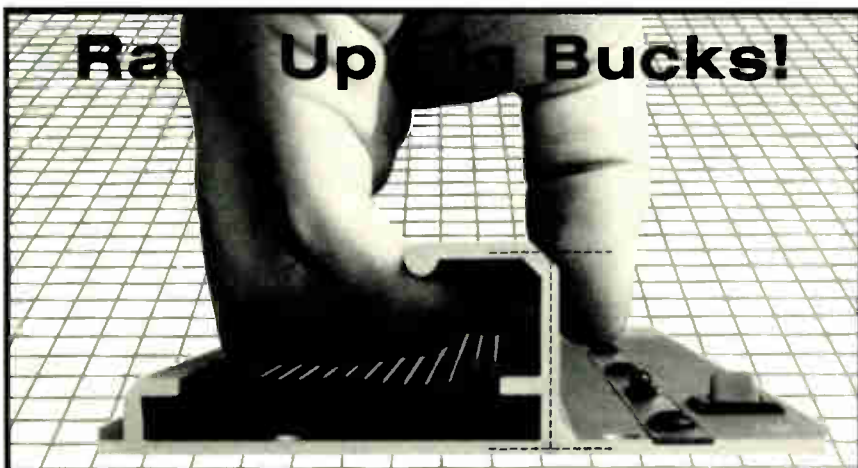
"Recording drums for a video of Ronnie James Dio's Sacred Heart tour was a wild and crazy scene. The drummer had a zillion drums: three kicks, a big gong behind him, and I had an entire side mixer just for drums. The sound company provided all the mics, so I didn't quibble with it. There were a lot of 421s, and four 452 overheads with CK 1 capsules. I like the CK-1 capsules—they're a good, universal drum condenser.

"My standard for overheads is CK-1 capsules with 460 bodies. They sound good, and I can use them in a tight X-Y pair for live-to-2-track jazz work where phasing becomes an important criterion. Wide-spaced mics tend to get noticeable in tight jazz work. In live rock and roll sessions, there's so much noise from onstage monitors that I'll mike the overheads in zones over the kit rather than trying to do an X-Y.

"Shure SM57s are still a standard. I use them on drums for live remotes. In the studio I opt for a CK-1 capsule on a snare. I like 421s on toms; occasionally I use condensers on toms, but it depends on how lightly the drummer plays. If they're really going to bellow on the toms, I go back to 421s every time.

"At least 40% of the time, drummers

—CONTINUED ON PAGE 43



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Steven Remote of ASL Mobile Audio/Video

—FROM PAGE 38, SECRETS

are not completely familiar with the principles of tuning drums. You have to confront the player; if the problem can't be fixed immediately, we look for another snare to replace it, or when all else fails, get out the duct tape. The object of any live gig is to get the best sound possible and go with it."

PLATINUM RECORDERS

Gary Platt, Vice President of Engineering

Housed in a GMC motorcoach with two Otari MX-80 24-tracks and an automated Sony MX-3036 console, the Platinum mobile works double duty as a commercial recording operation and a teaching lab for the Full Sail Center for the Recording Arts. The Altamonte Springs, Florida-based remote unit has worked on projects ranging from 10,000 Maniacs to the Mickey Mouse Club.

"No two situations are the same," says Gary Platt. "There's no formula at all. You go in and you see what kind of kit the guy's got and you deal with it. I've heard live sound guys say you can't mike drums live like you do in the studio, and that's not true. You can use a lot of the same principles.

"The secret of drum miking comes down to making friends. You want a great drum sound? Just make friends with the live sound engineer. If you're going to be the engineer's enemy, you'll never get a good drum sound. Sometimes the live sound guy doesn't want KM84s on the toms because he's not used to their polar pattern, and some people even use one mic between the toms. If they have a miking setup I don't feel is adequate, I put a pair of KM84s on the toms. An SM57 on the snare is fine because I use that a lot. On the hi-hat I use an AKG 460 or 451 or something else; if they have

a chintzy mic, I can change that one, because every live sound engineer would love to have a 460 for hi-hat.

"On overheads, I usually wind up exchanging their mics with a couple 460s, and that works out well. If I'm in a venue without a lot of smoke machines and stuff like that, I might try a stereo AKG C-24 above the kit. I have a Stephen Paul-rebuilt C 24, which gives me that ambient resonance that makes drums sound real. But it doesn't always work in a live situation, especially if I'm picking up too much of the drummer's monitor. I also like to put a pair of [Crown] PZMs on top by hanging them from the rafter or putting them on a tall stand. It's nice for a little high-end zip: I'll take about 16 kHz from that and roll-off the rest. It works incredibly well.

"If the drummer is playing a Simmons-type kit, try miking the drummer's monitor and print that on a separate track. This puts the whole kit in a zone where the real drums and the Simmons drums have the same space; it gives a little ambience, a little air. I did that a few years ago on a project with Bill Bruford and King Crimson. I was miking a monitor just for the Simmons stuff, and I'd bring a bit of that in the mix. You don't need much, but it helps immensely."

REMOTE RECORDING SERVICES

David Hewitt, Owner/Engineer

On an icy winter morning last February, while heading to New York City for a CBS shoot, Remote Recording Services' 36-foot custom Peterbilt truck hit a patch of ice and rolled into a ditch. Engineers Phil Gitomer and David Hewitt suffered only minor injuries, but the 48-track mobile unit was totaled. With some financial assistance from the insurance company, designs for a new truck are underway.

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—FROM PAGE 33, YAMAHA MZ SERIES

formerless Neumann TLM150s, a couple of PZMs, an Altec 623c (figure that one out), Beyer ribbons, some Brooke-Siren direct boxes and a few miscellaneous items. They sound great most of the time, though sometimes I am forced to use equalization to get the sound I want. I hate EQ. Especially if something needs a lot of it. (Is 3 dB a lot?) Vocals start to get sibilant when I brighten them, and drums start to lose their nice attack because of phase shifts added around the equalized frequency.

A few projects over the years have allowed me the time to change whatever was needed to get the sound right. Change drum heads, change drums, change drummers, change room placement, change rooms, change studios, change cities, change the weather—*anything* before equalization. Most projects involving mere mortals, however, do not offer such luxuries. Well, maybe if I just use a little EQ and then twist the knob around on the shaft so that it looks like it points to zero. . . Naaawww.

Two new microphones from Yamaha have changed all that. Yes, I said Yamaha, which is not necessarily the first place I turn to for a new microphone. I recently tried them on a tracking date to record drums and was pleasantly surprised. These little babies were designed for drums. The small ones, the MZ-205s, are best-suited for drums under 14 inches in diameter, which includes small toms and snares. The large ones, the MZ-204s, are geared toward drums over 14 inches in diameter. Floor toms and kick drums fall in this category. Both mics have a connector that exits at a 90-degree angle instead of straight out the back. This allows the mic to get into close spots: between low cymbals and tom-toms, or near the snare drum without getting in the way of the hi-hat. Nice.

The drummers I used as guinea pigs were Peter Erskine, Jim Keltner and Carlos Vega. By the time I finished with them, they were as happy as clams. On Erskine's drums I did absolutely nothing! No equalization on any of the drums. To get the snare drum sound I wanted, all I had to do was change the angle

between the microphone and the snare. Erskine was playing Yamaha drums. I wonder. . . hmmm

After being completely spoiled by this first encounter with these Yamaha mics, I attacked Keltner's kit (non-Yamaha) with the same set of microphones. I couldn't use the Yamaha on the kick drum this time, because Keltner wanted to keep the front head on. I had to settle for one of the mics he has permanently installed, but the rest of the drums sounded great. I did resort to a little EQ on the snare, but a moment of silence while facing George Massenburg's house made it okay.

Basic tracks with Carlos Vega? Same deal. No EQ. No nothing. I began positioning the mics on Vega's drums, and we started rolling tape ten minutes later.

Holy mother of cellular phones! I tried the Yamaha mics on a horn date, using one MZ-204 each on tenor sax and trombone, an MZ-205 on alto sax, and another MZ-205 between the two trumpets. I recorded all the horns on one track and then doubled them on another, with absolutely no EQ on any of the mics. I was surprised by the bite of the horn sound; it was amazing, too good to be true.

I didn't need equalization because of the frequency response curve of these microphones. There are no EQ circuits; their diaphragms are more sensitive to some frequencies than others. This means the amount of signal at 4,000 Hz is louder than the amount at 400 Hz. It's as though you added highs to the mic signal, but without all the phase shifts produced by EQ circuits. Now I have the sound I want for the drums I record without sacrificing the sonic purity of the source.

I just finished mixing the album that included Carlos Vega on drums. I didn't have to use any EQ on the drums during mixing, either. You know, there may be a place in modern music for real drums. What a concept: no programming and no trying to make ice cream out of dog meat to get great drum sounds. All you have to do is tell the drummer what to play and not to hit your mics.

—Roger Nichols

In the meantime, one of the L.A. Record Plant's trucks was brought to the East Coast to serve as a temporary replacement.

Hewitt has specialized in remote recording for nearly 20 years, and his client list includes the Rolling Stones, The Who, Pink Floyd, U2, the Metropolitan Opera, Live Aid and many others.

"On remote sessions, you're typically intercepting a tour that's already underway, and they already have what they want in the house; a lot of things you wouldn't want to change, especially if you're doing a one-night deal. You can't go in there and rearrange everything from scratch, because there just isn't time.

"Usually, toms are miked with Sennheiser dynamics, which I happen to like—421s are just fine on most toms, 441s work well, as do 409s when you can find them. The big things you need to go for are kick and overheads, because the mics used by the P.A. company generally are not what you need for recording.

"What the P.A. wants on the kick is almost invariably not what I want to hear for recording. Often I use two mics, say a D-12 and a 57 or a 421 or something like that, so you have both the attack—the impact of the beater—and some bottom-end air motion from the D-12. I combine these in the live mix or on the kick track. Usually there aren't enough tape tracks to print these separately on a live show when you're also recording audience mics, SMPTE, vocal tracks and all the keyboards you have on sessions these days.

"Overhead miking is an area where I have trouble, due to the ever-present monitor problems. We often put our own overheads out, even if it's a double-mic situation. With rock and roll kits, I've been using Sony 535s and 536s. You don't see many of those out there, but they're nice, with a smooth top end, and not very expensive.

"I like true stereo overheads on jazz or acoustic music, where you don't have to deal with the monitors. You have to do tight zone miking on rock and roll; otherwise, all you'll hear is monitors. The Milab condenser mics [Model DC-96], which look like miniature U87s, are wonderful; I sure like them for overheads. Stereo overheads become practical when recording small-club jazz dates, although in a small club with a low ceiling, I'd probably go back to tight miking in order to minimize the room. Then you might

want to put out some more esoteric mics, such as B&Ks, because in jazz, that cymbal sound is very important."

WESTWOOD ONE
Biff Dawes, Chief Mobile
Recording Engineer

An engineer at Wally Heider Studios for ten years before joining Westwood One seven years ago, Biff Dawes has engineered hundreds of live recordings and broadcasts of artists ranging from Frank Sinatra to INXS to Cowboy Junkies. Dawes recently returned to the Jubilee Auditorium to record Tom Cochrane with the Edmonton Symphony; ironically, he worked as an assistant on the *Procol Harum Live in Concert* sessions with that orchestra at the Jubilee 18 years earlier.

"In studio recording I try to go for a natural room sound where you can place some really nice condenser room mics—like Neumann M49s or AKG C-12s—at various distances, depending on what kind of music you're recording," says Dawes. "In the studio, you can actually use a microphone ten feet above the snare and still have control.

"It's the opposite in live recording. In arenas and stadiums, there's very little ambient sound that can actually help the drums. In clubs you can sometimes get some nice, ambient drum sounds, but generally I go for as much isolation as possible. I'll mike the snare very close with an SM57, and often I'll add a bottom mic to get those transients off the snares themselves. You flop the phase on that [bottom mic] and mix in a bit of it.

"For live situations, I like large diaphragm dynamics on kick drums: RE20, Electro-Voice 666, AKG D-12 and Shure SM7. I like 421s on toms, because generally you can beat the hell out of them. I like KM84s for overheads and hi-hat. It would be nice to have the overheads really high above the cymbals for a splashy, transient sound, but you really have to mike them fairly close and EQ them for extreme top end so you can hear the crashes. I use a transformerless, stereo Schoeps, which I also like to use on overheads.

"I always try to reproduce the band's sound as accurately and naturally as possible and don't try to make the drummer change drums for recording. In fact, I like heads that are broken in. Drummers have a tendency to change drum heads before a show because of the recording, and some-

times these new heads will go out of tune during a show.

"If you come into an arena situation where you're recording three nights of Robert Plant or Bon Jovi, you're dealing with high-quality microphones, 421s and RE20s, overheads that are 414s or 452s; generally, the mic selection is pretty good. You don't want to change somebody's live sound situation or alter the band's sound for just three nights. I like to start with what the P.A. company is using. I'll split everything right away and listen to what they have, and possibly add a center overhead or a bottom snare mic.

"If I'm in a club where all they have

is SM58s and no condensers for overheads, we generally put up all our own mics and give them splits. You get into situations in clubs where the equipment isn't so good, or maybe some cables are out of phase. It gets scary, so we just go with our own cables and mics in those situations, especially with acoustical stuff. A lot of clubs like to see us show up because it makes their life easier." ■

A self-confessed "studio junkie," Mix products editor George Petersen has so far confined his remote recording work to chamber and small ensemble sessions.

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by Iain Blair

ELVIS COSTELLO

AFTER 12 YEARS HIS AIM IS STILL TRUE

Elvis Costello is back. Not much has been heard from the singer since his last album, 1986's *Blood and Chocolate*. In fact, it's been the longest gap without a new record since the prolific artist first hit the charts with his debut album, *My Aim Is True*, back in 1977.

But Elvis has more than made up for any lost time with the release of his new album. *Spike* is his twelfth studio album, and the fat collection features a grand total of 14 new songs (15 on CD and cassette), with Elvis teaming up with longtime collaborators T-Bone Burnett and Kevin Killen on production duties. *Spike* also showcases contributions from such

luminaries as Paul McCartney, Chrissie Hynde, Jim Keltner, Mitchell Froom and Benmont Tench.

Dressed all in black, save for a glittering rhinestone bolo, and comfortably ensconced at Warner Bros.' Burbank offices, Elvis was chatty and upbeat as he talked about his latest record.

Mix: How do you write a song? Do you get a lyrical hook first, or a melody, or does it vary?

Costello: It varies. On the new album, each starting point would be a notion or a feeling, and depending how strong that feeling was, I'd write



the song very quickly. Other times, an idea rolls around in my head for a while before it takes shape.

Mix: How has your compositional style changed over the years?

Costello: I think the main difference is in the arrangements. They're more complex and use different instruments, and that's because the subject matter is different. The way I approached *Spike* was to imagine it as several different scenes in a film. So you wouldn't light them all the same. But that's not to say there's any overall theme or thread running through the songs to connect them. On the other hand, there are a lot more third-person stories on *Spike* than on my other albums. So it was very important for me to find special instrumental sounds that'd bring these songs to life. Sometimes I'd find something in the musical content of a song that'd give me the necessary clue. Or I'd hear a sound on another record that would inspire me. For instance, "Deep Dark Truthful Mirror" is about a guy stumbling home, thinking about having to face himself, and just at the point where he can't go down any-

more, the song's chords rise up. I thought, that's all well and good, but it might be really effective at that moment of desperation for the horns to come in and lift him up. That's the visual way I approached that song.

Mix: What about "Let Him Dangle"? That seems like a similar approach.

Costello: You're right. Marc Ribot, who played the guitars, told me he actually thought of his percussive guitar sound as the sound of the trap door opening. The song is about a famous British murder case and the hanging of Derek Bentley. Now that's perhaps an extreme, even morbid, example, but it shows that it really helps to create a mood when you think like that and use sound to paint a picture. Other times, it's a lyrical idea that inspires a sound effect to heighten the words.

Mix: It's been a long time since your last album. Do you ever suffer from writer's block?

Costello: I do go through periods when I feel I have nothing to say, but it doesn't really bother me much. For instance, I haven't written any new songs in quite a while, but I got involved in making this record, and soon I'll be touring. So the other as-

pects of my career take over. And during that period, I'll be thinking about new ideas.

Mix: Are you very conscious of arrangements while writing?

Costello: More so on *Spike* than on previous albums. The songs on *Blood and Chocolate* were very simple—there was little musical embellishment or sophistication required for the subject matter. But on this record I spent more time getting the right sounds and arrangements.

Mix: Are you responsible for arranging the material?

Costello: Very much so on this album. Obviously it's a collaborative process. You cast the right players to get the right style and sound for each song. For instance, I used the Dirty Dozen Brass Band because I find their sound very attractive, and it's exactly what I wanted. But it's not like going to the synthesizer and just punching up the sample. You still have to work at it and find the exact voicings that fit, and I'm not too schooled in the theoretical aspects of music, so I have to rely on other musicians to work my way through by trial and error. In the same way, different guitarists use different techniques, and I don't have

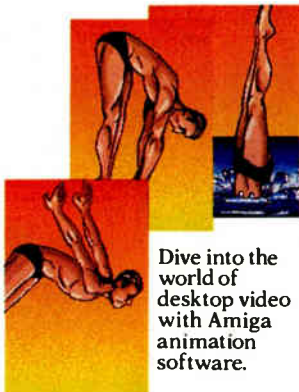
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them all at my fingertips, so there's a fair amount of experimenting to get exactly what I want.

Mix: I see that you play a lot of guitar on the album.

Costello: Yes, and I did it because I felt no one else could do it the way I would. Even with all my limitations as a guitarist, I felt that my playing on "Baby Plays Around" couldn't have been duplicated by anyone else, and it really worked well. Same with "Last Boat Leaving." That's my view of how it should sound. So often it's down to you to get the exact feel and sound you want.

Mix: I notice that you also play Hammond organ on "Baby Plays Around."

Costello: Yes, I literally had to get on my hands and knees to do it! We'd used a wide variety of players and instruments, from Paul McCartney and his Hofner bass to Jerry Scheff, Buell Niedlinger on double-bass and Kirk Joseph on sousaphone. But I wanted a different sort of bass sound for the song, and the Hammond was just right. But I wasn't sure where my feet went on the pedals, so I just got down on the floor and used my hands.

Mix: Do you make a lot of demos?

Costello: I did for this album, and sometimes the sketch of a piece, even if it's not on the right instrument—and I don't play much apart from guitar and a little keyboards—will end up in the final version. In fact, it surprised me when I listened to all the demos just how many rough ideas survived, even if they were later transferred to other instruments.

Mix: What sort of demo equipment do you use?

Costello: I usually go into a regular studio for the day and put down my ideas, on my own. I work very quickly, and I just play in free time. I never use a drum machine. I think they inhibit people, and you start trying to make records instead of just demos.

Mix: On the final mix, do you control the board?

Costello: No. There are three producers on *Spike*. I was really in charge of writing and arranging the material. T-Bone did a lot of practical jobs like writing charts, which I can't, and interpreting my ideas. He was also responsible for the idea of hiring some musicians just to play the changes and some to provide more atmospheric effects. This was because I'd also done a soundtrack since the last album, and

he thought some of my ideas in that area would be useful. T-Bone's other big idea was to get Kevin Killen, who also engineered and mixed the album, to make some sense of everything, because once you start experimenting and juxtaposing all these different sounds and instruments, you need to make it work. For instance, you could take Derek Bell's Irish harp on the beginning of "Any King's Shilling" and easily make it sound like something grafted onto the end of the track instead of something integral.

Mix: Are you into high-tech equipment at all?

Costello: No, I'm just not interested. I know my way around the studio, but I tend to go against the prevailing trends in recording. I don't like SSL boards, for instance. I much prefer to use Neve boards.

Mix: When did you start recording *Spike*?

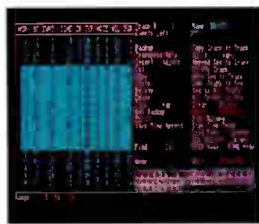
Costello: Last May. It was basically recorded at Ocean Way in Hollywood, Southlake Studios in New Orleans, AIR in London and Windmill Lane Studios in Dublin. We mixed at Ocean Way and AIR.

Mix: Does the title *Spike* mean anything?

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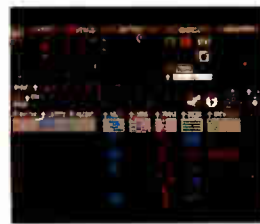
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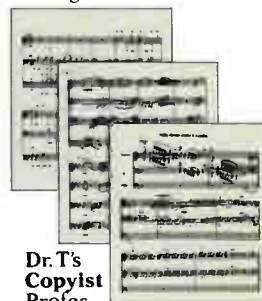
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World Radio History

Costello: Not really. It came out of a conversation about Spike Jones, the comedian, but there's no deep psycho-logical meaning there. It's just a title.

Mix: You worked with T-Bone Burnett on the 1986 LP *The Costello Show: Why do you like to collaborate with him?*

Costello: He's got a good conscience and soul about music, and he keeps it in perspective. It's easy to get dazzled by instrumental gimmicks and to become hypnotized by your own rhythm. T-Bone keeps me true to the original vision of a song. T-Bone Wolk, the bass player from Hall & Oates, is also great in that respect. I wanted him to play more on the album, but he wasn't available. He's a great arranger, too. Same thing goes for Michael Blair, the percussionist on "This Town," "Let Him Dangle" and "Veronica." He makes it impossible to play a stock part, which is great.

Mix: How did you go about finding the right players for the album?

Costello: I drew up a list of players I admired and thought would be appropriate, and just called them up. I spent about a month on the phone!

Mix: How did you hook up with Chrissie Hynde?

Costello: I've known her for a long time. We started off around the same period, the late '70s. We sang together for the first time on a charity show last year, and I really liked the way our voices blended. So when I wrote "Satellite," which is a long and heavy story, I felt it needed another voice to come in and add this sudden touch of drama, and she was ideal.

Mix: What about the Dirty Dozen Brass Band?

Costello: They're from a long New Orleans tradition of marching bands that play at funerals. I'd never worked with them, but I have their albums and I'd seen their shows, and I thought they'd fit perfectly. There's something about the tone and intonation of their playing that creates this slightly strange sound—it's not dissonant, but it just sounds like one big voice to me. It's not a brittle, shiny sound like a lot of brass bands. I used them on "Deep Dark Truthful Mirror," "Chewing Gum" and "Stalin Malone."

Mix: What about the sessions with the traditional Irish players Davy Spillane and Steve Wickham?

Costello: In deciding to record those

songs with those instruments, I didn't want to just use one of the many traditional bands. I wanted to create a hybrid, so I used one of The Chieftains, Derek Bell, one of The Waterboys, who are Scottish, in fact, and various other musicians to get the overall effect. I didn't want to end up with imitation folk music.

Mix: The pairing of Paul McCartney and Roger McGuinn on "This Town" is interesting.

Costello: It happened by accident. I hadn't thought of a guitarist for the song, and we bumped into Roger in New Orleans when we were there recording the Dirty Dozen, and he end-

*"The way I
approached
Spike was to
imagine it as
several different
scenes in a film
. . . you
wouldn't light
them all the
same."*

ed up being about the first person to play on the track, which was done at Ocean Way in Hollywood. Roger's guitar is still very contemporary-sounding to me, and quite unique. We also ended up with this heavy bass drum, almost a rap sound, which freed the bass to be melodic and accented Paul's strengths as a melodic player.

Mix: Haven't you also been working on McCartney's new solo LP?

Costello: Yes, Paul called me up to work on some songs for the album, and the starting point was collaborating on songs we'd started individually. Two of them, "Veronica" and "Pads, Paws and Claws" ended up on *Spike*. We then continued to write another nine songs, some of which will be on Paul's album, although I'm not sure

exactly how many. We wrote very quickly, batting ideas back and forth like ping-pong, and I think we came up with some really strong tunes. It'll be a great album from what I've heard of it so far.

Mix: Elvis Costello and Paul McCartney seems like an unlikely collaboration.

Costello: Yeah, if you stop to think about it, I suppose so. But I treated it just like another day's work. You'd never get anything done once you start comparing his career with mine. So we didn't waste any time on bullshit like that. We just sat down and wrote. And our differing viewpoints undoubtedly helped. There'd be no point in my sitting down and writing a Paul McCartney tune.

Mix: Was there any friction between you?

Costello: Not in the sense of big arguments; just good creative friction. It has to be light-hearted enough so that even when you're dealing with serious emotions and subjects, you can say, "That's totally useless—you can't write *that*." If you can't do that, you're probably being too precious about it.

Mix: There's been a lot of criticism in recent years that McCartney's lost his edge.

Costello: Some people have said the same about me, but it wouldn't necessarily be true. Obviously, I don't think every song he's ever written is wonderful, but then again I'd admit that not every song I've written is wonderful. I think he's done some very good records as Paul McCartney, the solo artist, and some that I don't like so much.

Mix: You seem far less abrasive, far less the angry young man these days. Has marriage to Cait O'Riordan helped mellow you?

Costello: That's hard for me to answer. Perhaps you should ask people who know me whether I'm easier to deal with now! Basically, I don't subscribe to the notion that you have to be miserable to be creative. That's bullshit.

Mix: What do you think of the current music scene?

Costello: I think it's probably the same as it's always been—there's a few great things around and an awful lot of rubbish. The trick is to distinguish between the two. ■

Iain Blair is a Southern California-based freelance writer.

NEW PRODUCTS

Aries Apollo Console

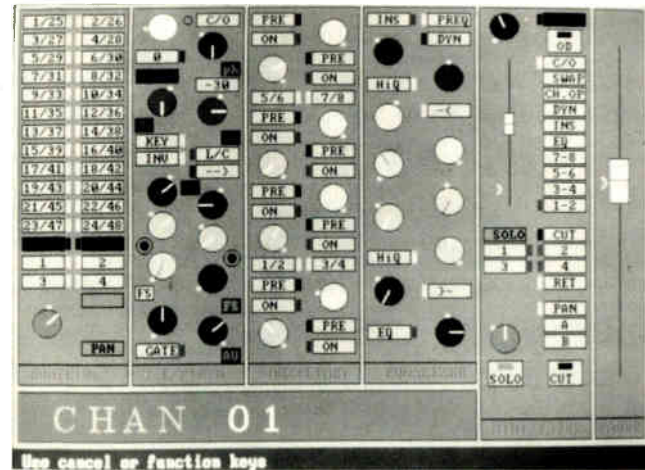
A modular recording console has been introduced by Aries America (Torrance, CA) for the mid-range market. Standard features: balanced mic and line inputs; tape/line switching on all inputs; eight aux sends; 4-band EQ (the high and low sections provide selectable shelving points; mids are sweepable); an output section with 16-track monitoring and 2-band EQ on all 16 returns; access to the eight aux sends from the 16 monitor returns; bar graph metering on bus outputs; VU metering for L and R output; PFL; and an external power supply. Configurations and list prices are: 16×8×16, \$11,950; 24×8×16, \$15,950; 32×8×16, \$19,950; 8-channel expander unit, \$5,450.

Circle #001 on Reader Service Card



Brainstorm JHM-2 Mult Box

MCI JH-24 owners will appreciate this new accessory from Brainstorm Electronics (Los Angeles). The JHM-2 Auto-Locator Mult Box lets you connect the JH-24 to a synchronizing system, without losing use



Neve VR Console ▲

Neve (Bethel, CT) has enhanced its V Series consoles, creating the VR console, which is available as an optional update for current V Series owners. The VR optionally provides the ability to store and recall settings of rotary, push-button and fader controls.

The fast-acting system uses a high-res color graphics display to represent the actual control surface. Online data is automatically stored on a built-in 20-meg hard disk and, if desired, a 3.5-inch floppy disk that holds about 140 complete settings of a 96-channel console. Other goodies include additional features on a larger monitor section, improved auxiliaries and multi-input overload indicators.

Circle #003 on Reader Service Card

Esoteric Turntable

For the first time in 100 years, a turntable has been developed to play the original Berliner gramophone records. Esoteric Sound (Downers Grove, IL) has made a phonograph player with switch-selectable 33, 45, 71.29, 76.59, 78.26 or 80 rpm speed. It's belt-driven, with a DC servo motor, P-mount pickup system and pitch control, and for \$229 comes complete with accessories: a coarse-groove stylus and a vertical/lateral switch.

Circle #004 on Reader Service Card

Avalanche Effects Brianizer

The classic sound of the Leslie rotating organ speaker has been copied and captured in the Brianizer effects box by Avalanche Effects (Toronto). Comprised of a phase-compensated active crossover followed by speed-dependent tremolo, flange and Doppler shift circuitry in the horn and bass rotor channels, the Brianizer is compact and priced at \$400 (U.S.). Both input level and effect intensity are switch-selectable. The

of the recorder's autolocating function. Housed in a small metal box, it provides two sets of remote, autolocator and capstan connectors (with a tach/direction connector for the Cypher Digital Shadow synchronizer), a lifter control switch and a capstan control switch. List price is \$495, which includes JH-24 interface cables.

Circle #002 on Reader Service Card



device's motor accelerations and decelerations have been designed to let you use techniques based on the Leslie's motor inertia.

Circle #005 on Reader Service Card



QSC MX 700 ▲

Slated for introduction at this month's NAMM show, the MX 700 from QSC Audio Products (Costa Mesa, CA) is a high-performance yet low-cost (\$598 list) stereo power amplifier designed for professional studio and sound reinforcement applications. The MX 700 provides 150 watts/channel into 8 ohms, 225 w/ch into 4 ohms and 350 w/ch at 2 ohms. Mono bridged operation is also possible, yielding 700 watts into a 4 ohm load. Other features include fan cooling, 1/4-inch and barrier-strip inputs (electronically balanced), 5-way binding post outputs, front panel gain controls, clip indicators, dual power supplies, power on/off muting, extensive protection circuitry and a 3-year parts and labor warranty.

Circle #006 on Reader Service Card

Ampex 467 DAT

Now you can load 'dem new decks with DAT from 'dose folks at Ampex (Redwood City, CA). The 467 line of digital audio tape cassettes (in 45-, 60-,

90- and 120-minute lengths) has been developed with small tape view windows, providing more room for labeling. The accompanying "DATpak" DAT mastering packaging system includes a two-

cassette storage tray, documentation storage space and labeling supplies that include everything a professional needs to document and package DAT cassettes.

Circle #007 on Reader Service Card

PAiA Electronics MCVI Processor

MIDI-ize your analog synths and voltage-controlled gear with the MCVI circuit card from PAiA Electronics (Edmond, OK). This processor simultaneously converts MIDI data to control voltage/trigger and voltage/trigger

HOT OFF THE SHELF

GML's Moving Fader Automation System, Version 6.0, adds intelligent master machine control, networking capability, 3.5-inch disk drive, optional graphics display and much more; (818) 781-1022. . . **Integrated Media Systems' MacMix V2.0 controller software** and **Abekas digital videodisc interface** are available for use with its Dyaxis digital audio work-



Toa CX-3

signals to MIDI data. It also offers an RS-232 interface to access and alter its programming or download data. An expansion port accommodates memory and interface devices; PAiA plans to offer expansion cards—a multiplexer for processing multiple CV inputs and outputs, a sequencer, and time code and tape deck controllers. The MCVI is available in kit form (\$119.95) or assembled (\$139.95), directly from PAiA.

Circle #008 on Reader Service Card

Toa CX Mixing Consoles

The 12x4 CX-2 and 16x4 CX-3 consoles are the latest pro music products from Toa Electronics (South San Francisco). Both incorporate nine mix buses (four group sends,

stereo L/R and three independent aux sends—pre-fader, pre-EQ or post-fader). Each channel features 100mm sliders, 3-band EQ with sweepable mids, selectable phantom power to XLR inputs, an accessory loop, pan and input level pad with trim and pre peak LED. A cue system on all inputs and the group, stereo and aux outputs allows pre-fader signal monitoring. LED bar graphs meter the group 1-4 outputs, or aux sends 1-3, and stereo L and R outputs. Options include stereo input channels with 100mm faders, and transformers to convert each input and output from electronically balanced to transformer balanced.

Circle #009 on Reader Service Card

HOT OFF THE SHELF

station; (415) 326-7030. . . **FirstCom/Music House's 15 new CDs** contain loads of new production music in a variety of styles; (800) 858-8880. . . **Lo Bianco Enterprises' Milli-Chart** (\$15.95) is a handy, plastic-coated reference chart showing the relationship between digital delay time settings and musical tempi; send \$15.95 to Lo

Bianco Enterprises, 36 Park Ave., Oyster Bay, NY 11771, (516) 922-3958. . . **Jensen Transformers' Twin Servo 990 Mic Preamp** is a rack-mount unit built by John Hardy with Deane Jensen's new 990C discrete opamp; (213) 876-0059. . . **Neuron Music's Click Tables: In Beats per Minute & Frames per Beat** is a comprehensive, 460-page reference volume (\$39.95) by Alex Cima; (714) 680-4959. ■

by George Petersen

PRODUCT CRITIQUES AND COMMENTS

SHURE BETA SERIES MICROPHONES
A legend can be a pretty tough act to follow. This was the task facing the Shure Brothers design team, who began work on the Beta Series microphones some five years ago.

Introduced in 1966, the SM57 and SM58 are still leading choices among engineers throughout the world for instrumental and vocal sound reinforcement applications. However, since times and technology have changed considerably, the Beta Series was developed to fulfill the needs of sound reinforcement and studio pros into the 1990s and beyond. Before any of you form a "Save the SM57/58" campaign and start writing angry letters to the mayor of Evanston, Illinois, let me advise you that Shure has no plans to discontinue these mics. The Beta Series was developed to aug-

ment, not supplant, Shure's line of pro mics.

Physically, the Beta mics are striking. Finished in silver-blue, diecast bodies with chrome-plated steel grilles (the Beta 58 is also available in a matte-finish grille), they balance well in the hand and have a quality "feel" throughout. Engineers who do a lot of drum miking are sure to appreciate Beta 57's all-steel grille. Both mics incorporate upgraded internal shock-mounts that serve the dual function of isolating the capsule from handling noise and stand vibrations, and protecting the mic from road rigors and abuses. Best of all, the system works—handling noise on the 58 was almost nonexistent, while the 57 survived several direct hits (without a scratch) when used for snare miking.

I was impressed with the audio performance of the Beta mics. The use of neodymium magnets in the transducer designs of both microphones provides for an output 4 dB to 5 dB hotter than that of the SM57/58, an important consideration when dealing with long snake runs. A higher output also means greater performer-to-mic working distances and improved signal-to-noise specs, since console preamps can be set at lower levels.

The Beta mics incorporate a true supercardioid polar response. The mics exhibit a null point 120 degrees off-axis, so monitors should be placed



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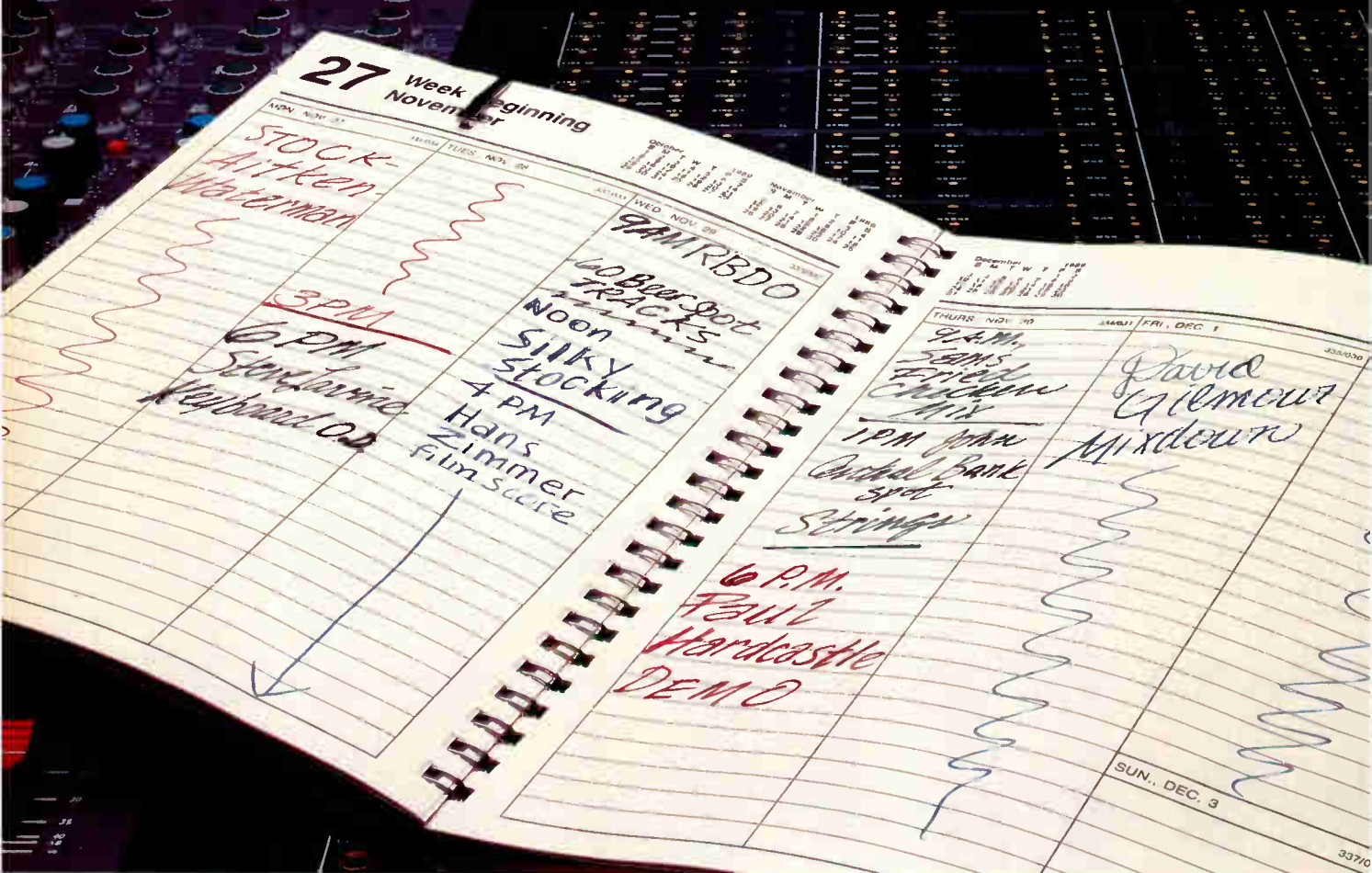
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AUDITIONS

at about a 60-degree angle to the rear of the mic. (Don't confuse this with a true cardioid pattern, where optimum monitor placement is pointing directly toward the rear of the mic.) Both as an engineer and occasional musical performer, I prefer placing monitors off to one side (or both sides), and the Beta's supercardioid response is ideal for this. Besides providing a cleaner stage appearance, placing monitors to the side of the vocalist is a must for singing keyboardists and drummers.

I found the supercardioid pattern to be extremely consistent at all frequencies, thus simplifying monitor setup by reducing monitor EQ requirements. The gain-before-feedback levels were impressive, and off-axis coloration was minimal.

Another benefit of the supercardioid pattern is increased directional control, especially with instrumental miking. Isolation, particularly with drums, has always been a problem, on stage and in the studio. After experimenting with placement for a few minutes, I removed about 75% of a hi-hat bleed problem I experienced with another popular cardioid by substituting the Beta 57 placed close on the snare.

All in all, the Beta Series mics proved to be excellent performers for vocals, snares, toms, congas (I was surprised with the 57's reproduction of this sometimes-difficult instrument), guitar amps, trumpets and sax—in virtually any application suited to dynamic mics. At a user net price of \$258 each (including carry bag and stand clip) these are well worth checking out, and like the SM57s and SM58s, we may be witnessing the birth of a new Shure dynasty. Check back here in about 20 years and we'll see.

Shure Brothers, Inc., 222 Hartrey Avenue, Evanston, IL 60202, (312) 866-2200.

NORTHSTAR SAMPLING DISKS

There's something truly magical about a sampler. Unlike a synthesizer, with its characteristic synthetic sound, a sampler can take you on an aural magic-carpet ride to just about anywhere, at the drop of a disk.

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lator III and Emax; Ensoniq EPS and Mirage; Roland S-50; Akai S900 and S1000; and Oberheim DPX-1. Sounds are available on floppy disks, Mass Microsystems' 45MB data carts for the E-III and on CD-ROM (E-II/DPX-1 format).

Since the Northstar library ranges from about 20 disks (for the growing EPS and S-50 offerings) to over 400 disks in the Emulator II collection, I'm not going to review them all. Here's a sampling (pun intended) of what's available.

I saved the best for first: "Sweet Tenor Sax" (E-II disk 30) is phenomenal. This is the best sax sample I've ever heard. It's perfect for jazz, pop, rock... anything. Put a touch of delay and lots of reverb on this for that bluesy, urban sound. If you have an E-II and don't have this disk, you're really missing out; indeed, it could be the best \$20 you ever spent. Another hands-down winner is "Country Fiddle" (disk 86). I think the name says it all with this one, which also includes pizzicatos, licks, chords and velocity switching slides.

The variety offered in the E-II library is mind-boggling, ranging from orchestral, ethnic, rock and electronic instruments (including contributions from noted synthesists such as Kerry Livgren and Craig Anderton) to dozens of sound effects disks (animals, industrial, household, outer space, crowds, ambience, destruction, weather and so on).

One admirable feature of Northstar's disks is that each one is packed with usable presets and voices. For example, "Pitz Piano" (muted grand piano) has 92 voices and 24 presets to choose from. Other disks have more or less, depending on memory requirements.

Interested in checking out some of Northstar's E-III offerings, I enlisted the help of Eric Jensen (of San Francisco's Jensen Sound Productions), a composer/engineer/producer/E-III enthusiast. Northstar records its E-III disks with a Sanken CMS-7 stereo MS mic, directly to DAT or the E-III, so Jensen's well-equipped, 24-track studio (with UREI 809 monitors, one of my personal faves) was just the ticket.

We started with bank E1, "Stereo Solo Violin." This sounded great and was loaded with 51 *usable* presets, vibrato and straight, with many subtle variations. E4, "Marcato Violins," was exactly that: a nicely pronounced

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Circle #082 on Reader Service Card

by Bob Hodas

THE DYNACORD DRP 20

DIGITAL REVERB PROCESSOR

Dynacord of West Germany has developed a digital reverb processor that also produces special effects. The company has managed to put a powerful, 32-bit floating-point processor into a 2U rack-mount unit controlled primarily from the front panel. The DRP 20 comes with 100 factory preset programs, 128 user storage locations and the ability to store user programs on tape. It is a stereo-in, stereo-out unit that may also be configured as dual mono-ins and -outs for certain programs. MIDI control is offered, as is limited remote control via rear panel jacks.

Due to the proliferation of buttons on new equipment, I have decided that I will no longer bore you with wordy descriptions of control panels. So refer to the photo to get a graphic idea of how the DRP 20 operates. Now let's look at a couple of specifics.

On the front panel, the 2×16 character display uses vacuum-fluorescent technology. This display can be read in bright lighting conditions and from many angles, unlike LCD screens. Parameters and commands are called up mostly one at a time, a process I find time-consuming and frustrating, although it seems to be the industry's standard presentation. I get tired of page upon page of parameters (16 parameters for many of the DRP's reverbs) when trying to quickly get a

sound up in the studio. The choice is either larger screens or fewer parameters. The first is prohibitive at the targeted market price (\$2,495), and as for the second, who wants to give up parameters? So until external buses for computer control get cheaper, we'll have to live with this standard. Operation of the DRP 20 certainly isn't any more cumbersome than comparable Yamaha, Lexicon or Roland equipment—in fact, this unit was much simpler to operate and a lot more intuitive than a PCM70.

The input and output rotary level controls make the DRP 20 handy for interfacing with a variety of other equipment. This is much better than a simple back panel switch, but I'd like someone to explain to me why the input level switch gets set to high for low-level inputs and low for high-level inputs. Anyway, these controls, when combined with the mono-in and -out, allow a guitar player to access the unit directly from the front panel.

On a scale of one to ten, the front panel rates a seven in my book on intuitive ease of use. Calling programs up and manipulating parameters was pretty smooth, as was using several of the dedicated keys. But some of the keys have multiple functions, with the result that I found myself spending significant time reading the manual.



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Some onboard help screens would be handy here. A keypad would also be a nice addition for calling up programs directly and inputting parameter values instead of always scrolling.

The rear panel is fairly straightforward. The only question I had was, "Is this unit balanced or unbalanced?" I guess the "mono jack" input on the front panel is an indication of unbalanced lines, but this is certainly not clear in standard audio terminology. And if it is unbalanced, why would Dynacord suggest using microphones directly into the unit? I don't know

anyone using unbalanced, high-impedance mics.

The DRP 20 does incorporate some convenient features. For example, one may set up parameters in a room and then easily compare the same parameters on a different effects-structure algorithm, such as a plate. There is also a key that allows one to store a program for quick comparison to the program running currently—handy for comparing different parameter settings within the same program.

Many options are available for configuring the unit to the user's preference. The ability to change echo time display from milliseconds to beats per

minute is just great, especially when relating to sequencers and musicians. The internal pink and white noise generators are wonderful for balancing echo returns at the console. The option to start with the status at last shut-down (POWER-ON TO MEMO) should be a factory-standard setting, and I recommend anyone buying the unit to install this option immediately. If you lose power for an instant at a gig, imagine having your program completely changed in mid-song!

One may store all 128 user locations on tape for recall at some later date. This would allow you to load your custom programs into a DRP 20 in another studio, eliminating the need to bring your own unit. Load, store and verify functions will even tell you if it was unable to load specific programs from a defective tape.

On the audio front, I discovered that Dynacord has done its homework, because the unit is very quiet. No hiss or hum is going to get anywhere near your mix. This is the first digital reverb in the lower-mid price range I have tested that has impressed me with its lack of noise. In fact, it is quieter than many reverbs costing considerably more.

The DRP 20 comes with several different reverb types, including room, hall, gate, spring and reverse. Each may be gated, and many parameters are available for manipulation. Dynacord has provided the user with the ability to build a wide range of moderately real and extremely unreal reverbs. You can also create some real sound disasters with the number of options open to you here. With some practice and knowledge, though, this variety should lead to some creative discoveries.

In addition to the supplied reverbs, the DRP 20 comes with numerous special effects programs. These include chorus, flange, echo, multitap and freeze. There are differing combinations on the mono-split programs, which cover areas such as dual echo and effects-reverb combos. A number of MIDI control programs are also offered.

I put several types of instruments through the DRP 20 for the listening test, including a four-piece horn section, an acoustic piano, synths, vocals (male and female), kick, toms and snare. All were prerecorded on analog tape except for the drums, which originated from a Wendel jr.

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World Radio History

Drums were the first test for the reverb programs, and they highlighted the fact that this is a very dense reverb. I had no problems putting lots of bass into the unit, and it handled the kick transients well. Snares and toms sounded bright and modern, and the reverses and gates worked quite nicely.

I easily called up some workable bright rooms that flattered the horn section. Synths also fit into a good number of factory programs without much manipulation.

I found vocals and acoustic piano to be much more critical on the DRP 20; I had to work harder to get a sound that I was happy with. It was the search for a natural reverb that left me disappointed. I think the DRP 20 algorithms are too bright for a truly natural sound. Rolling off high-end effects helped considerably but did not completely satisfy me.

I played with some of the special effects programs and found the echoes to be just fine and the flanges to be effective and quiet.

As I mentioned, the DRP 20 may be used as a straight-through device and not just in a side chain, allowing any instrument to be plugged in directly. Each program has volume control of



Drums were the first test, and they highlighted the fact that this is a very dense reverb.

original and effects signals to get a dry/wet mixture. However, with the original up 100% (straight source, no effects), the audio was altered considerably from the original signal.

A quick word on the manual and construction for the techs. The manual is only adequate, although the English is good. It appears to have been printed using a medium-quality dot matrix printer. It provides just enough information to get off the ground, and all instructions are clear. There are no schematics or troubleshooting guides. Obviously this unit

is aimed at the MI market, and Dynacord assumes that no one can fix digital equipment. But the sound quality of the DRP 20 indicates to me that it will end up in a number of studios, so better documentation would be welcome.

Construction is pretty good except for the tape and MIDI jacks, which are mounted directly to the PC board with no anchor to the chassis. This type of mounting is much too fragile. The board is cleanly laid out and should be easy to maintain.

The DRP 20 is a reverb/effects processor that has a lot going for it, especially when you consider the price tag. It is capable of producing some strong modern rock reverbs and effects. It is quiet, easy to use and certainly worth listening to. I would highly recommend it as a next-step upgrade when moving away from the noisy reverbs in the under-\$1,000 range. ■

Bob Hodas is an independent audio engineer whose credits include Windham Hill Records, The Doobie Brothers, The Village People and Mickey Hart.

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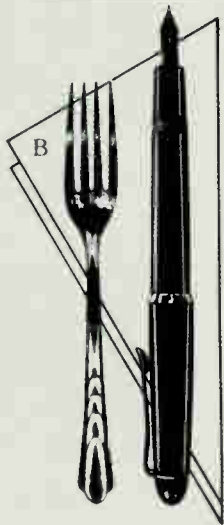
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World Radio History

Circle #122 on Reader Service Card

by Mr. Bonzai

MARSHALL CRENSHAW RIDES AGAIN



Remember those good ol' days of fresh rock and roll, still wet and dripping on the line, still bright and clean like new sweat on a Saturday night? Marshall Crenshaw popped on the scene a few years back with just those qualities and has somehow matured without losing any of that raw juice.

The Bonzaimobile pulled up at Marshall's temporary Hollywood home, rented for the new album sessions. He climbed in with the first mix of the album, and we rocked our way down toward the beach, sunroof open, good tunes filling the car and spilling out on the street. We cruised down Sunset Boulevard, over to La Cienega and out west on the Santa Monica Freeway. It's especially fun to hear a preview recording, and it already sounded like radio playtime.

Although he could pass for an altar boy, he is a responsible Woodstock, N.Y., homeowner, with wife and bulldog. A frequent flier with stops in New York, Detroit, Nashville and Los Angeles, he's settled down to some serious music business. His family hails from the hills of Tennessee—in fact, he just produced a great compilation of late '40s and early '50s gems from the Capitol vaults. It's called *Hillbilly Music... Thank God, Volume 1*. Pure Nashville recordings: incredible feelings, honest hearts, impeccable musicianship and a fair share of zany lyrics. You even get some talkback studio chatter, digitally remastered.

Marshall tells me he is branching out, producing such "crunch" rockers as The Thieves, your basic quartet, with songs by Gwil Owen, a man who knows how to tell us about cheap motels, expensive limousines and hearts like tombstones.

Marshall's new album, produced by David Kershenbaum and Paul McKenna, was recorded mainly at Kershen-



PHOTO: MR. BONZAI

Above: Marshall Crenshaw relaxes with double-necked guitar. **Below:** Crenshaw with co-producers David Kershenbaum (left) and Paul McKenna.



PHOTO: GAIL ROBERTS

baum's Powertrax studio, with additional sessions at Blue Canyon. A fine cast of musicians was assembled and

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deserves mention: Graham Maby, bass; Kenny Aronoff, drums; Sonny Landreth, slide guitar; James Burton, guitar; J.D. Manness, steel guitar; Bob Marlette, keyboards; David Lindley, fiddle; Steve Conn, accordion; Syd Straw, Sammy and Kurt Bodean, Robert Crenshaw and Patti McKenna, backing vocals; and Marshall, singing and strumming.

Marshall Crenshaw is an original, even though he can also be the great pretender. Maybe you know him as Buddy Holly in *La Bamba*, or the '50s rocker in *Peggy Sue Got Married*. He even toured as John Lennon in *Beatlemania*, while John was still alive to enjoy the joke. Half the tunes on his new album are originals, half are outside contributions, including a Bobby Fuller number and an old R&B hit from the Isley Brothers. Marshall Crenshaw is a time machine—he can take you on a trip through years of music and get you home today.

We stopped at the seashore for some oysters with salsa, steamed mussels, raw tuna with Japanese horseradish and Boston clam chowder. Let's sip the house wine and get to know the real Marshall Crenshaw, a kid who's been playing guitar for more than 30 years.

Bonzai: Is there a connecting theme in the new album?

Crenshaw: Well, there are songs about loneliness and isolation, and love and girls...

Bonzai: Can you recall the first music you heard?

Crenshaw: I always heard a lot of pop music and rock and roll around the house. My Aunt Rita had lots of records by the four lads. One record I especially remember was "Rockabilly" by Guy Mitchell, which was anything but rockabilly. I used to put that on and dance around. My teenage cousins had Bill Haley and Carl Perkins records. I listened to rock and roll, but I also had those little yellow 45s that kids had. I had "Yellow Rose of Texas" and "Theme from *The Bridge on the River Kwai*"—'50s stuff. I was born in '53 and was aware of music early on.

Bonzai: Guitar was your first instrument?

Crenshaw: Yes, but I can't remember why. I just always wanted to have a guitar. My dad had one, but he couldn't

play, and I was allowed to drag it around the yard and bang on it. It was one of my toys. When I was about six I got one of my own. I don't remember deliberately choosing to play guitar. I just did it.

Bonzai: Who were your early heroes?
Crenshaw: I liked stuff that was guitar-dominated. I liked Buddy Holly and the Everly Brothers in particular, and a group called Joe Bennett & The Sparkletones. They made a record called "Black Slacks" that I really liked. It has a kind of gargling sound on the vocals.

Bonzai: I was into strange vocals. I liked "Goony Goose," the flip side of a Bozo the Clown record.

Crenshaw: Well, you know, I'm associated with a publishing company

**"I didn't know if
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called Bug Music. They have a label deal with Capitol Records, and part of the deal is to assemble reissues of records from the Capitol vaults. One of our ideas is to reissue those old Bozo records, maybe some Bozo outtakes. Maybe we'll find "Goony Goose" in the vaults.

Bonzai: You're also producing other artists—The Thieves?

Crenshaw: Yeah, I went to their show last night. They're based in Nashville. It's what I call "crunch rock"—two guitars, bass, drums, Marshall amps. I contributed the occasional sleigh bells overdub, spine-tingling three-part harmonies. Good songwriting by a guy named Gwil, who I think is from Iceland. Nice, goofy jokes in the lyrics. It just came out, and it's already getting

some radio play.

Bonzai: I've been thinking of you as The Great Pretender. You were on the road for a couple of years as John in *Beatlemania*, as Buddy Holly in *La Bamba*, and you played in the '50s band for *Peggy Sue Got Married*. How did you get involved in *Beatlemania*?

Crenshaw: I sought that one out. At the time I had decided to make a serious attempt to break into show business, and hopefully the record business. Prior to that I had come to L.A. from Detroit with a high school friend who was in a band. They had a steady job playing up in Alaska, for pipeline workers, I guess. I was going to join his band, but I got involved with *Beatlemania* because I wasn't committed to anything in particular. I didn't know if I wanted to work behind the scenes, or be in a band, or what. I just knew I loved music and was determined to work at it professionally.

Anyway, I came out here and ran out of money real fast. I didn't get in my friend's band, but I joined another band playing country music. We spent all our time on the road, playing in the West in places like Wells, Nevada, and Rock Springs, Wyoming. It was really cool—I just took a flying leap and ended up in this bizarre situation. But then I got sick of it, 'cause it was a slog. The West is beautiful, but it was a dead end.

In the midst of that, I saw an ad in *Rolling Stone* magazine looking for Beatle lookalikes. I had read an article about *Beatlemania* in *Time* magazine and nearly puked. I was appalled, and I thought, "Everything in our culture is just a cheap imitation of something else. This is the worst." But six months later I was scuffling around and saw an opportunity there. People used to tell me I looked like John Lennon, and I knew I could sound like him. So I sent them a tape and boom! They came to Detroit and took me away. I haven't been back yet.

Bonzai: Besides looking like John, was he a personal inspiration to you?

Crenshaw: Absolutely. I loved John when I was a kid. The Beatles appeared shortly after the Kennedy assassination. I was only ten, but it really shook me up. I was disillusioned. I was a crank as a child, a real malcontent. I was into *Mad* magazine and anything that said the adult world was a joke. Then John came along, and he wore that attitude on his sleeve and expressed it excellently. Plus, I loved

the music. Then I got into *Beatlemania* and it became a somewhat negative experience. Force-feeding the Beatles. Weird environment, 'cause the interpretation of the Beatles was so twisted.

Bonzai: Living your hero in a bad light.

Crenshaw: I wasn't good at it either. I couldn't bring myself to give 100%, but I wanted to be a good sport about it. On the other hand, it was a fantastic break for me. It was my ticket out of Palookaville. I can't take that lightly.

Bonzai: You were never overtaken, possessed by an otherworldly force?

Crenshaw: No, I felt more like that before *Beatlemania*. Like millions of other kids, I was more into the Beatles in the '60s and early '70s. I felt so connected with the music, like there was a psychic link. Once I got in the show, it redefined my feelings and I kind of exorcised them. It was a good experience, though; I got to see the country.

Bonzai: What about your appearance in *La Bamba*?

Crenshaw: That one came to me. They called me, and at first I thought, "Oh, no, a replay of *Beatlemania*." I

was reluctant and said no at first. But I read the script, and I had enjoyed being in *Peggy Sue Got Married*. I like the creative atmosphere of making films. The story was good and I was drawn into it because it's about '50s rock, something I'm partial to. I knew if I didn't do it they would get somebody else, and I'd probably regret not being in the film. So I did and it worked out great, although there was a negative effect. My last album came out at the same time, and *La Bamba* was a huge hit and my album was totally overlooked. But that's a short-term thing.

Bonzai: How has it been working on the new album?

Crenshaw: Well, it's taken some time, and I've been out here awhile. I live in Woodstock, and it's a big change living here.

Bonzai: How does the songwriting break down?

Crenshaw: About half the songs are mine and half are cover tunes, a drastic change from my past albums. I've done a song that was first done by the Bobby Fuller Four, and one by the Isley Brothers, "Live It Up," which was an R&B hit in '73. There's a Richard

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Thompson song and two that have never been released, one by John Hiatt and another by a lady named Diane Warren.

Bonzai: How have David Kershenbaum and Paul McKenna helped bring out the true Marshall Crenshaw?

Crenshaw: By helping me to be comfortable and creating the optimum situation for me to do my work. Being supportive and sincere, good to work with, all that stuff.

Bonzai: How's the music business treating you? Are you making a good living? Are you happy?

Crenshaw: I've been doing great lately. I've been at it a long while, and I've had lots of weird ups and downs. But for some reason, it's great now.

Bonzai: What happened to change things?

Crenshaw: I made a New Year's resolution in 1988 that I wasn't going to continue being so single-minded about my own records and my songs. For two or three years previously, I was focusing 100% on that stuff, and it was kind of a waste. I can do lots of things, so I decided to branch out and do more behind-the-scenes things. Be more adventurous about music. It's worked out well, because I played on

a number of sessions, produced some records and wrote some songs for other people. I played on a record out of Nashville with Foster & Lloyd, a hit country act. I played on a record by Syd Straw. I wrote the next New Grass Revival single. I produced The Thieves and a record on Bug Records: *Hillbilly Music... Thank God, Volume 1*, a compilation album from the Capitol vaults, digitally remastered and presented for your listening enjoyment. And I wrote a song for the Was (Not Was) album.

Bonzai: How was it working with T-Bone Burnett?

Crenshaw: He's talented, smart and worked very hard on my last record. I learned a lot from him. He's a high-quality dude.

Bonzai: Do you know any good business tricks?

Crenshaw: No, I don't know anything about business. I've had several tricks pulled on me, but I'd rather not describe the times that people have stolen from me, or taken advantage of my naivete. It has happened, though. It *is* a jungle out there.

Bonzai: What music would you like played at your funeral when all your friends gather around the corpse and hoist a few in your memory?

Crenshaw: How about "Born Free"? At my wedding we brought in a record player and played "Pledging My Love" by Johnny Ace for the professional, and "You Send Me" by Sam Cooke at the recession. Maybe one of those would be good at my funeral.

Bonzai: Do you ever think about what you might have been in a past life?

Crenshaw: I think in a recent past life I was probably a bandleader, maybe Shep Fields. Shep & His Rippling Rhythms. They were a big-band pop orchestra with a lot of silly gimmicks in their presentation, like blowing bubbles into the microphone. I'm sure I was involved in music some way in the past. I can't imagine my life as apart from music.

Bonzai: Have you met any people in this business who have really impressed you?

Crenshaw: I really liked meeting Carl Perkins. He's a nice guy and he sets a good example for young guys like me in the rock and roll business. We were backstage at a show and there was another group on stage. All of us young guys were talking about them, dishing on them. Carl wasn't willing to join in and steered the conversa-

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tion to another tack. I thought that was good; it was honorable. Why talk nasty about fellow rock artisans? I was struck by that. He's still good, too—one of the few. It's a pretty hard business, and a lot of people die, or go nuts. I can't think of a better encounter with a famous person. Meeting him was the most pleasant.

Bonzai: Once again, what is this new record all about?

Crenshaw: I've tried to make a great pop record. I feel a connection with '50s rock and identify with it. My last record was a stinking flop; nobody bought it. Everyone benefitted from *La Bamba*, and it was a good experience, but my record got completely buried. I tried to reach deep inside myself and figure out if I can make a pop record or not. It's time to do things that maybe I've been afraid to try in the past.

Bonzai: Can a pop record be a great work of art?

Crenshaw: Certainly. But I'm not deliberately trying to produce great works of art. I don't think that's the way to proceed in this field. If you try to make a pop record that is a great work of art, you'll probably stink up the joint. People will listen and make their own decisions about my music.

Bonzai: Somebody is reading this. They've got a little cash and are thinking about buying a record. Why should they lay down those dollars for Marshall Crenshaw?

Crenshaw: Because I'm just great, you know? [Laughs] What else can I say? I don't know. Hopefully, people will hear the record. That's the thing about pop music. If it's not on the radio, it's not pop music. To become what it is, to reach its potential, it has to be on the radio. This was the nut I had to crack with this record. I wanted a record that would sound good on the radio. What may sound good on a Walkman in a hotel room at 3 a.m. doesn't always come across on the airwaves. This is what we've been doing here: making something that has clarity and punch and still sounds like a Marshall Crenshaw record.

I can't say anything compelling that will convince anyone. I'm not good at hyping my stuff. I just hope people hear it. ■

Mr. Bonzai is Mix's editor-at-large, interviewing interesting personalities and getting a few lunches out of the deal.

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NEWS

FROM AROUND THE WORLD

SONY REPORTS ENTHUSIASTIC GLOBAL REACTION TO DIGITAL MACHINE

Worldwide reaction to Sony's new PCM-3348 digital multitrack recorder has been noteworthy. By mid-January, only two months following the preview of the recorder at the Los Angeles AES Convention, more than 115 machines had been ordered.

Japan heads the international customer list with orders for a staggering 69 recorders, followed by Europe with 25 and North America with 20. Major Japanese studios include Toshiba-EMI's Studio Terra, Onkio Haus, JVC Aoyama, Laserdisc (Pioneer) and Yamaha AV Studio. European studios now taking delivery include Virgin Studios, Advision, Goldcrest Facilities, Tent Records (UK) and Studio De La Bleque (France), as well as the Continent's two biggest hire specialists, Hilton Sound and Audio FX.

FARMYARD CELEBRATES TENTH ANNIVERSARY

Farmyard Recording Studio in Little Chalfont, Buckinghamshire, one of the UK's leading residential facilities, is celebrating its tenth successful year with a series of major reorganizations.

The first change took place at the end of January with the acquisition of the studio by Jetta Studios Ltd., a new company headed by Tolga Kashif. Kashif, a classical music conductor and composer, is a relative of Atlantic Records founder Ahmet Ertegun. Trevor Morais and Rupert Hine, who were previously Farmyard's only directors, have been appointed to the board of directors of Jetta. There have been no other staff changes, and clients can expect business as usual.

Plans are under way to revitalize the facility later this year to include a renovated, 800-square-foot playing



Sony's PCM-3348 digital recorder

area and an additional live room. A larger console will replace the existing 40-channel SSL board to accommodate the increased demand for 48-track work at Farmyard. The improved studio will also be capable of handling film soundtrack production, a Kashif specialty.

ON THE ROAD WITH EUROSOUND

The Herveld, Netherlands-based Euro-

sound mobile recording company has spent the last six months in almost constant demand by international recording acts at a number of major European venues. The company's 11-ton truck has been on-hand for such acts as: George Michael in Paris; Sting in Paris, Dortmund, Turhout and Werchter; Prince in Dortmund; Paolo Conte in Amsterdam; Duran Duran in Milan; and Bon Jovi in Paris, Birmingham and London.

According to the owner of the Euro-sound truck, Jan de Groot, one of the key benefits of the mobile facility is its versatility. Thanks to careful design by Burnie Productions and Master Blaster, recording systems can be replaced in a matter of hours. The unit is equipped with a Sony MXP-3036, which has been customized for 48-channel recording. The vehicle normally carries two Sony 24-track analog machines, but is frequently equipped with Sony PCM-3324 digital multitracks set up as a synchronized pair.



Jo Julian of London's Music Works. (See International Studio News.)

Consequently, a number of recent concerts were recorded and mastered digitally.

INTERNATIONAL STUDIO NEWS

WaveFrame Corporation announced installation of eight AudioFrame digital audio workstations in Europe and Asia. Three systems have been installed at **Danish Radio** in Copenhagen, and single systems have been set up for **Billy Cobham** and **Patrick Mimram**, both in Switzerland, **Chris Evans** in W. Germany, **Jonason Kuei** in Taiwan and **Stefano Costantini** in Italy. In addition, WaveFrame has announced the establishment of a European service and support facility in Copenhagen. . . Ten Amek BCII mix-

ing console systems were purchased recently by the **BBC** for use in broadcast and recording situations requiring portability. Other recent equipment acquisitions include three Lynx Keyboard Control Units, 13 Lynx VSI Modules and two Lynx Film Modules for use in the new film sound dubbing facilities in Cardiff and Southampton. . . DAR SoundStation IIs were bought recently by Italian post-production studio **Multivideo**, which purchased a 4-channel system for TV work, and **IRT** in W. Germany, for post-production in TV and radio. . . GML Moving Fader Automation Systems are being installed in several international studios, including **Man-ta Sound** in Toronto and **Master**

Rock in London, for use with Focusrite consoles, and **Power Plant** in London, to be used with a Neve 8078. . . **Moles Studio** in Bath, England, has upgraded its facility to include an Otari MTR-II and an Otari MTRE-12 1/4-inch mastering machine. Other additions are an Optifile II HD 64-channel automation system for its DDA console and an Akai digital patch bay. . . **Spot Shop Studios** in Vancouver, BC, is the first Canadian facility to acquire the new Mitsubishi X-880 32-channel digital audio recorder. . . Another Canadian studio, **Sound Ideas** of Toronto, has ordered a Mitsubishi Westar 36-input automated console for its newly completed, 6,000-square-foot expanded complex. . . **ICC Stu-**

Studio Spotlight: Windmill Lane

Twenty years ago, the Irish Minister of Finance introduced legislation calling for exemption of composer royalties from income tax. Today there is a continued commitment on the part of the Irish government to the arts and entertainment industry, one that has helped foster the emergence of many world-class recording studios.

Ireland's leading music journal, *Hot Press*, recently observed that whereas the phrase "recorded in Ireland" was once a stigma, "we have progressed to a state where Ireland is seen as a center of recording quality and excellence. Artists of the caliber of U2, Steve Winwood, Paul Brady, Terence Trent D'Arby, Kate Bush, Van Morrison and Def Leppard—to select just a few of the big names who've recorded in Irish studios recently—do not use anything other than the very best facilities. In Ireland we have the very best."

Nowhere in Ireland is the industry more thriving than in Dublin, one of Europe's oldest capitals. Facilities like Windmill Lane, Lansdowne Studios, Midi-Trax and Rope-walk Studios (a fully digital 32-track

complex) attract artists from Europe, the U.S. and Japan.

Windmill Lane Studios was designed by John Storyk and has hosted five album projects by U2. Other artists and producers who have sought out this facility include Def Leppard, Howard Jones, Brian Eno and Arif Mardin.

The large studio area includes an isolated, custom-built live room designed by Andy Munro, who also designed the control room's three-way, active monitor system. The

control room measures 440 square feet and uses a 48-input SSL 4000E console with Total Recall™ and a Studer 24-track recorder. Adjacent to the main studio is a self-contained MIDI studio equipped with a Fairlight Series III, an Emulator II and an array of other Macintosh-controlled gear.

Recent artists recording at Windmill are Nashville country singer Nanci Griffith and the Japanese band Sennen.

—Des Cryan



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INTERNATIONAL · UPDATE

dios in Eastbourne, England, recently installed a Soundtracs 36/32 In Line console fitted with Tracmix Automation and a Saturn 24-track recorder fitted with Auto Alignment. The complex now houses two multitrack studios and a radio production facility to make Christian programs for broadcasting all over Europe. ICC's other activities include cassette duplication services, cassette manufacture and commercial packaging. . . Also adding a Soundtracs IL4832 console with Tracmix Automation was London's **Music Works**. Sale and installation of units at both facilities was conducted by Larking Audio Sales of Hitchin, Herts . . . In W. Germany, the television group of the **West German Army** has purchased a Synclavier 9600 workstation and an 8-track Direct-to-Disk™ multitrack recording and editing system for post-production work. Also in W. Germany, independent music producer **Ralf Siegel** has purchased a similar New England Digital system for use in his private music production studio in Munich. . . **Medicine S.R.L.** in Bologna, Italy, is also upgrading its facility to include a Synclavier 9600, an Optical Disk storage/retrieval system and a Direct-to-Disk/PostPro workstation. . . Back in the U.S.S.R., Neve reports the planned installation of a DSP digital audio system in Moscow's **Gostelradio Concert Hall**. It will be used for both live broadcasting and multitrack recording, using a 24-track Sony 3324 digital recorder. . . **Olympic Studios** in London has installed eight Lynx Time Code Modules to run with Studer A820 recorders as part of its recent upgrade. . . The songwriting/production team of **Tony Swain** and **Steve Jolley** has hired **Harman Studio Systems** to equip their private-use twin studios in Ongar and Harpenden, UK. The shopping list includes Otari MX-80s and Fostex E22 tape machines, UREI 813C monitors and amplifiers, UREI limiters and Fostex synchronization packages. AMS reports orders for its AudioFile system from **Intersonic** in Holland; **EXA Studios** in Spain; **Audiophase**, **GLPP** and **Point 12** in France; **Digimix** in Finland; and **Hilton Sound**, **Square One Studios** and **Hillside Studios** in England. Hillside has also ordered an AMS/Calrec M Series audio console. ■



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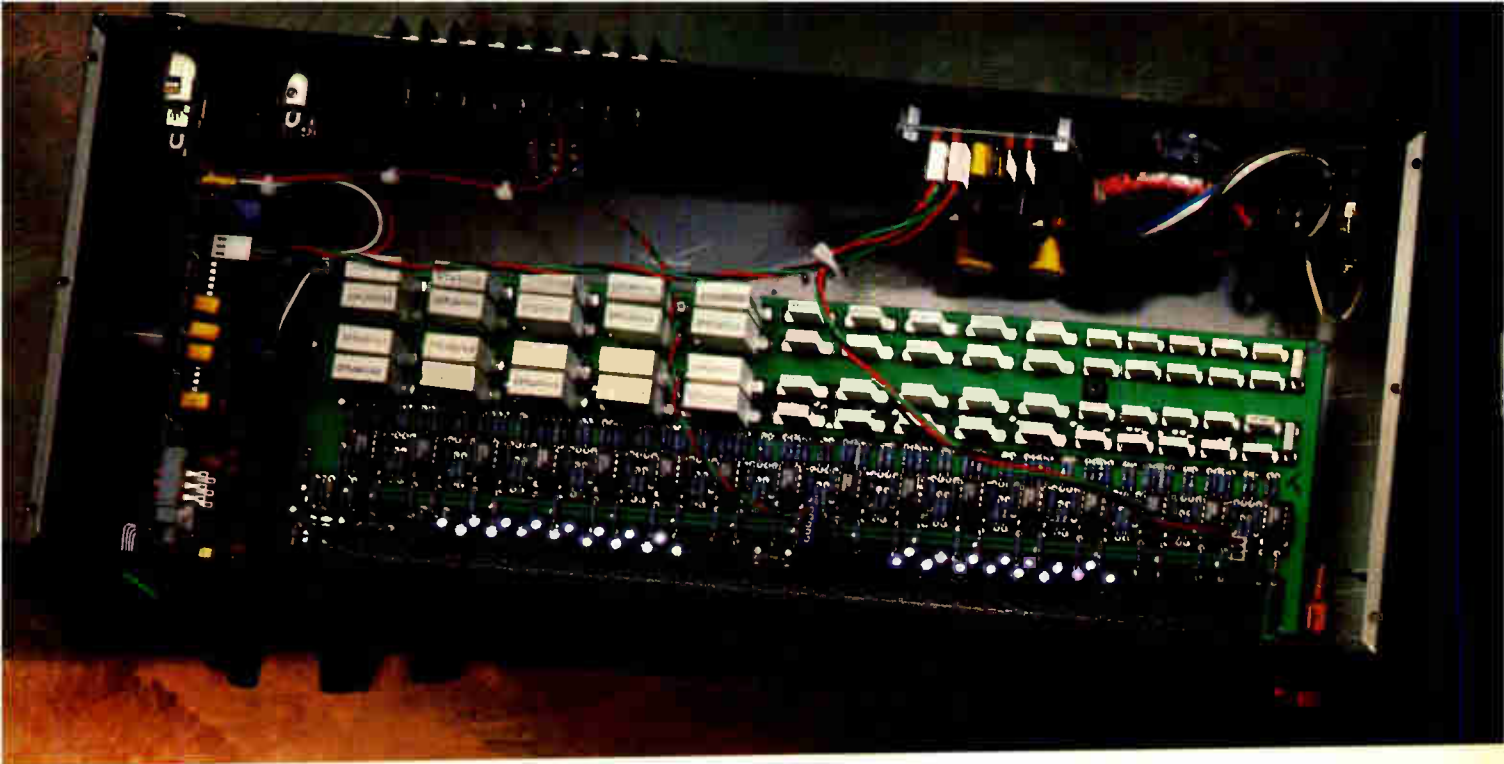
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by Thomas E. Miller

MIXING FOR

POST · SCRIPT

of power amps (20,000 watts at the museum) and can generate a wide dynamic range. Three front speakers are spread across the lower half of the screen (left, center, right), and two speakers are in back (left surround, right surround). The sixth channel is near the center of the screen, which is fairly high above the viewer (see Fig. 1).

SETUP

We considered trying to re-create the speaker arrangement in one of our film theaters, but decided to move our mixing equipment to the museum. This let us hear the full effect of the complex speaker arrangement and the unusual acoustics of the dome-shaped room. As far as we know, this was to be the first Omnimax movie actually mixed in an Omnimax theater.

The first challenge was to devise a way to take a complete film-mixing system on location. Since it was not practical to move our film dubbers, we used a 32-track Mitsubishi X-850 digital recorder to supply the mix elements and to record the final mix. It would have been nice to mix while

watching the full-sized Omnimax picture, but it was not practical. The projection system was not designed to back up, so we would have had to mix from beginning to end, with no chance to fix mistakes until the film was unthreaded and rewound.

Another complication was that the 70mm film was still being cut to match the 35mm edited workprint during the time scheduled for mixing. So we used a ¾-inch videocassette copy of the film, made from the editor's 35mm black-and-white workprint. We used SMPTE time code to interlock the 32-track recorder and the videocassette deck.

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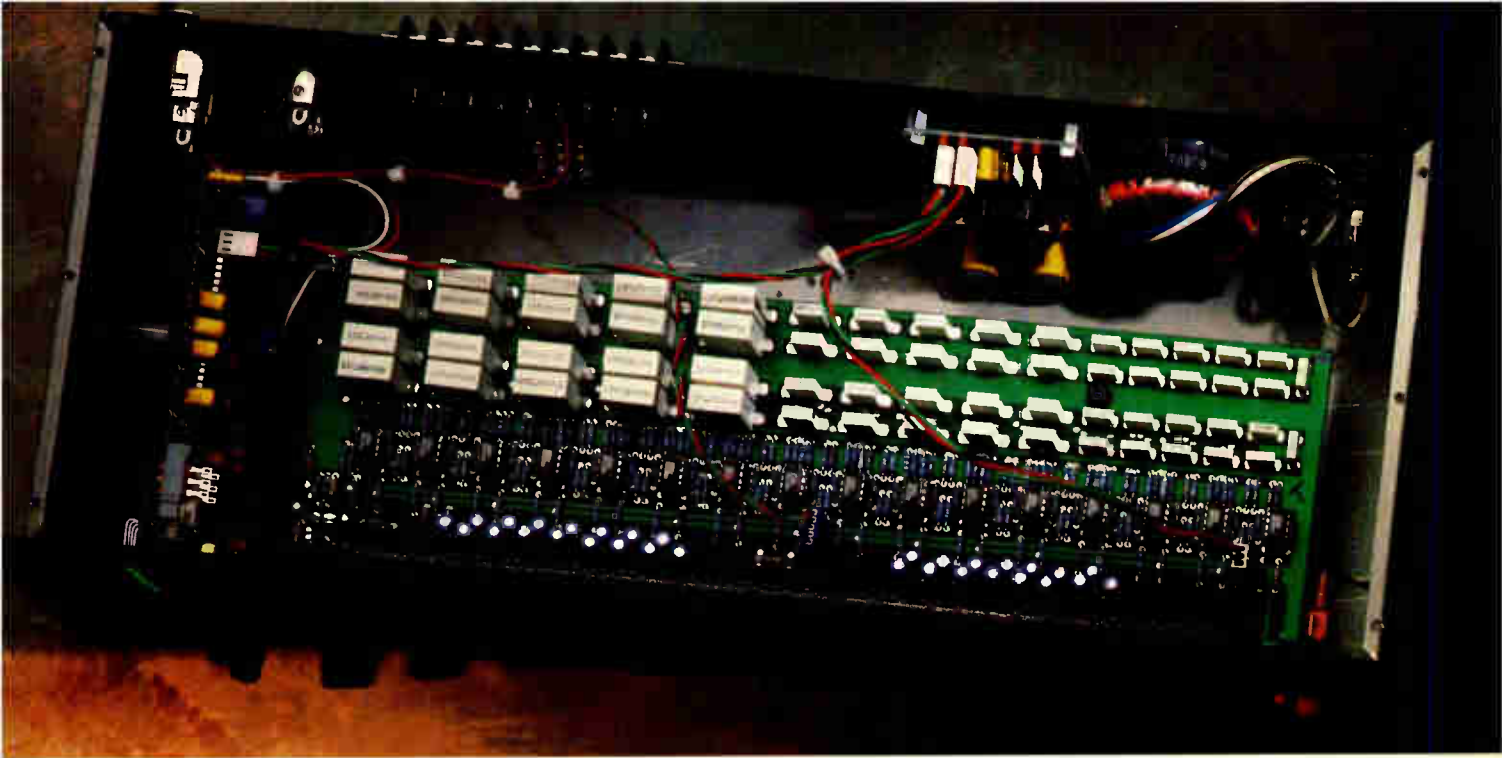
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by Thomas E. Miller

MIXING FOR OMNIMAX ON LOCATION IN CHICAGO

Hey, do you guys have a 6-track film recorder? The Science and Industry Museum wants to record a new voice track for a movie." This first phone call to our facility—Universal Recording—ultimately turned into a much larger project. After some discussion and a visit to the museum, it was decided that the Chicago Museum of Science and Industry would prefer to completely remix *The Great Barrier Reef*, a feature-length film, for their 2-year-old Omnimax theater. We assured them that we were thoroughly up-to-date in film technology, but alas,

we did not have an Omnimax theater on our premises.

Omnimax is a giant projection format. The screen is hemispherical and completely fills one's field of vision. The picture is on 70mm film running sideways, so it has ten times the picture area of standard 35mm film. The 6-channel sound plays back on a separate 35mm magnetic film reproducer interlocked with the projector. Along with the six discrete speaker channels is a seventh channel, consisting of a subwoofer array derived from the first six. The sound system uses a hefty set

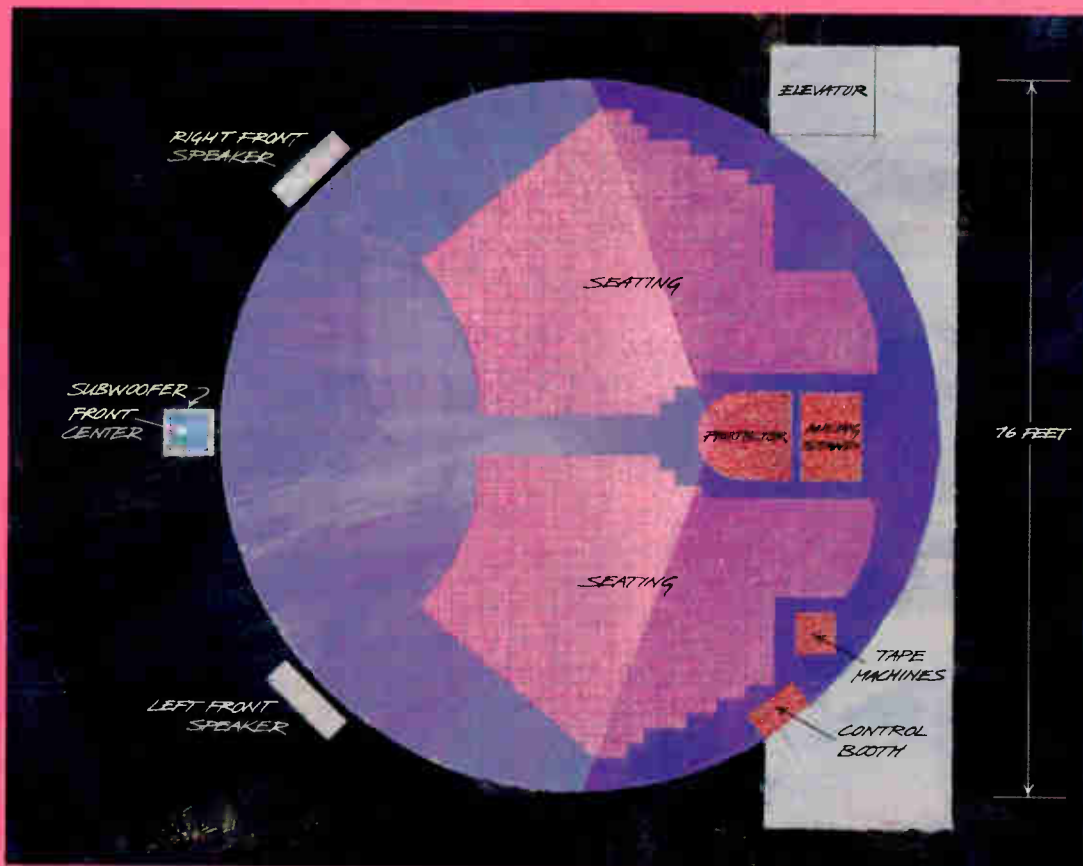
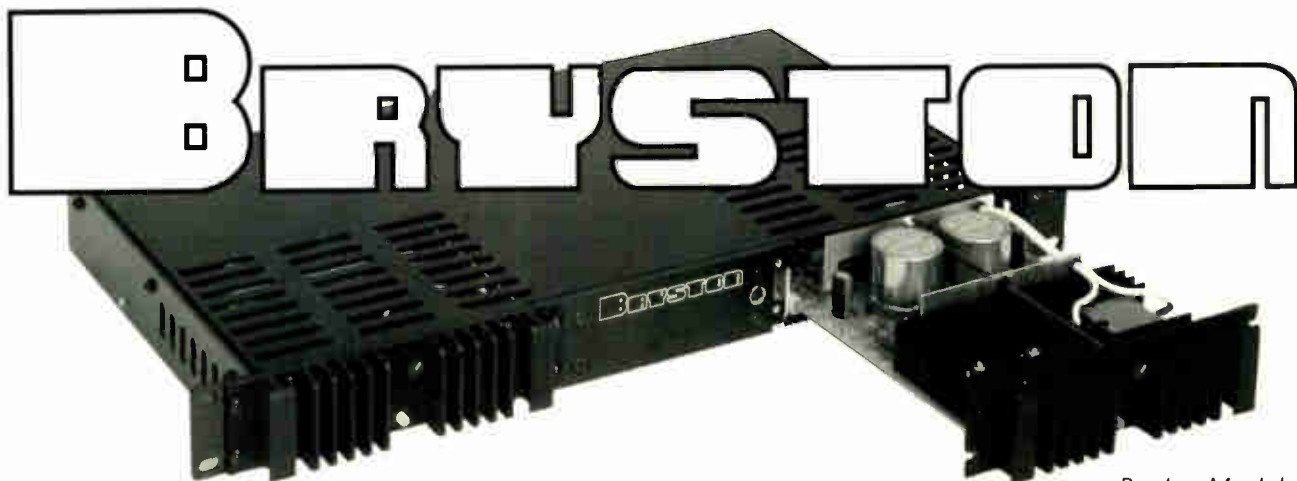


Figure 1: Floor plan for the Omnimax theater at Chicago's Museum of Science and Industry. Note the position of the control booth relative to the mixing stand, and the wide coverage of the screen.



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of power amps (20,000 watts at the museum) and can generate a wide dynamic range. Three front speakers are spread across the lower half of the screen (left, center, right), and two speakers are in back (left surround, right surround). The sixth channel is near the center of the screen, which is fairly high above the viewer (see Fig. 1).

SETUP

We considered trying to re-create the speaker arrangement in one of our film theaters, but decided to move our mixing equipment to the museum. This let us hear the full effect of the complex speaker arrangement and the unusual acoustics of the dome-shaped room. As far as we know, this was to be the first Omnimax movie actually mixed in an Omnimax theater.

The first challenge was to devise a way to take a complete film-mixing system on location. Since it was not practical to move our film dubbers, we used a 32-track Mitsubishi X-850 digital recorder to supply the mix elements and to record the final mix. It would have been nice to mix while

watching the full-sized Omnimax picture, but it was not practical. The projection system was not designed to back up, so we would have had to mix from beginning to end, with no chance to fix mistakes until the film was unthreaded and rewound.

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versal's film theaters. The picture edits were not that hard to spot, since the videocassette was a copy of the editor's workprint. We also had the 35mm workprint, used strictly to confirm the accuracy of the videocassette copy. Conventional films are usually broken down into 10- or 20-minute segments during post-production. Since Omnimax films are shown as one continuous reel, we decided to treat the film in the same way while mixing it. This resulted in very large rolls of film, but since most of our work involved tape, this did not pose a problem.

When we found the picture cuts, we decided how to cut the film sound elements to match the picture. Then we transferred the appropriate pieces to the digital 16-track. We never physically recut the film elements. Since there were to be new music and narration tracks, the only elements we transferred this way consisted of two stereo effects pairs, two mono effects and stereo surround effects pairs, all premixed to four channels during the layup process.

Next, we made a rough mix and copied it to the videocassette, which was used to determine additional effects requirements. We created all the effects with our Synclavier. Various ambience tracks and a few specific effects were chosen by the Foley operator for the film. These were taken mostly from our own tape library and transferred to the Synclavier.

For example, we wanted to have the sound of flying while inside a helicopter. The scenes in the film were longer than our helicopter recording, so we looped our copter sound in the Synclavier. We chose points near the beginning and end of our helicopter recording that nearly matched each other, then electronically joined them to create an endless loop. For greater realism, at each dissolve in the picture the effect crossfaded into another one at a slightly different pitch. All crossfades were programmed into the Synclavier, relieving the mixer of this task. This gave the feeling of a location recording, where the helicopter engine speed would naturally be slightly different as each scene was photographed.


The new narration was written and performed by Bill Kurtis, a Chicago television news anchor, and recorded directly to 16-track digital. The digital recorder ran in sync with the videocassette copy, so Kurtis could narrate

while viewing the film. Since we used only one track, and the narration was performed in sync with the picture, no further editing or preparation was required before mixing.

The music was created by David Huizenga in his studio on an 8-track, 1/4-inch deck. The recording consisted of stereo music, stereo drums and various solo instruments and effects on another two channels. The eighth track held time code. Huizenga brought his machine into Universal for the layup to 16-track digital. First, we transferred the music and code to our 8-channel NED Direct-to-Disk™ system. Why? It was simpler to go an

extra generation of digital recording than to hook the 8-track deck to one of our synchronizers. Also, we could quickly slide individual musical selections to better match the picture. But no such adjustments were needed. From the Direct-to-Disk the music was transferred in sync to the 16-track.

All the elements for the film were now on one tape, synchronized to the picture. As expected, there were no tracks left on which to record the final mix. So we made a direct digital dub from the 16-track to the 32-track recorder. (A digital dub is a numerical copy of the original audio data, with no degradation of the audio signal.)



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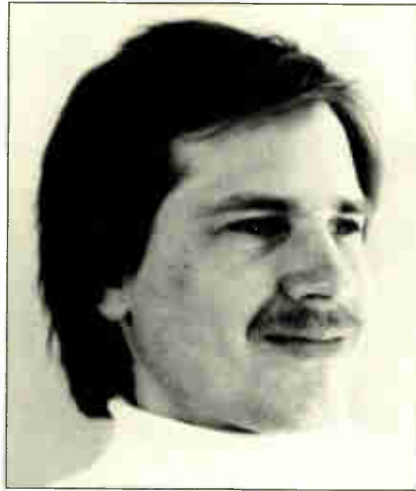
This gave us enough tracks to record music and effects premixes, as well as the final mix.

MIXING

Mixing in the Omnimax theater was quite different from mixing in a traditional stereo theater. The obvious difference is the availability of six discrete channels at widely spaced points in the room. When something is panned left, it is really far left! And the ability to pan vertically opens up many possibilities.

One must get accustomed to the tremendous image size in this theater. The screen fills half the room, including the ceiling and some walls. The sound images need to be enormous just to match the visual images.

Another difference is the way sound behaves in a large, dome-shaped room. Although Omnimax theaters are designed to be dead (reverb time is 0.7 to one second), there is a noticeable slap echo off the dome-shaped, aluminum screen. This usually adds a nice ambient effect, but can sometimes add clutter if there is a lot happening in the mix. Since it's five sto-



Tom Miller

ries high, the theater is large enough to support full, deep bass sounds. It also contains a substantial subwoofer system (12,000 watts).

As this was the first time our engineer Ed Golya had mixed an Omnimax film, he requested that the lights illuminating the speakers be left on while he mixed. This caused the speaker positions to be visible through the screen, and helped show the size of the audio image that could be created as channel assignments and pans were

set up. All placement had to be done with a pot panning between odd and even channels and with four stereo bus assign switches. Complex, multi-speaker pans were achieved by routing the signal through a couple of faders, while using the odd/even pans on each fader. This allowed interesting pans, such as having the sound of a boat drive overhead from back right, over the top and to the front left speaker, or bubbles floating *up* from a diver.

Since we were restricted by the size of the portable console, the music and effects were premixed. The effects premix went onto five channels of the digital recorder, each channel representing one speaker in the room. The sixth channel was reserved for dialog. The music was premixed onto four channels, panned to the four "corner" speakers. At this point all pans were made, and levels set close to their ultimate positions. All EQ, echo and reverb were added during the pre-mixes. The final mix then consisted of balancing music, effects and voice, and establishing the vocal treatment and panning.

This style of premixing effectively multiplied the power and size of the console and outboard gear by a factor of three. During the pre-mixes, we played (but didn't record) the narration through the center speaker to help keep perspective on the final mix. It was important that the music and effects set the stage for—but never interfered with—the narration and dialog.

Along with enjoying the audible benefits of using a digital multitrack, we were able to avoid the analog dilemma of choosing between using the sync head to preserve lip-sync but having poorer sound, or using the reproduce head for better fidelity and no lip-sync. When mixing digital tracks and recording the mix back onto the same machine, there is no accumulated delay or loss of sync. Full quality audio is available in perfect sync.

Mixing back onto the same machine that holds the elements makes it easy to fix mistakes. One can just roll back before the mistake, put the faders back where they were (or as close as possible), then roll and record over the mistake. On a digital recorder punch-ins are completely hidden, regardless of what is going on in the mix. The recorder simply crossfades



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from the old audio to the new during a punch-in. In contrast, an analog recorder often shows punch-ins, and punches must be done when no continuous sounds are going on in the mix.

Problems occur in an analog recorder because it must first ramp up the erase current, then ramp up the record current. If the two ramps aren't timed perfectly, a gap will exist between the old audio and the new, or there may be an overlap. Even with perfect ramp timing, while the erase and bias currents are being ramped up to the proper level, the old audio is partially erased and muffled, while the new audio is under-biased. This makes it bright and slightly distorted.

Film machines have a floating-loop film path that reduces flutter. Unfortunately, it also allows the film elements' sync to float, give or take a half-frame relative to the recorder. When an old mix is punched-in on, the elements might not have the same sync relative to the recorder they had on the last pass, thus revealing the punch-in.

The music for this film was gener-



Ed Golya on location

ated entirely on synthesizers. To create a large, full sound appropriate for the film, digital reverb and delays were used. Since the unmixed music consisted mainly of stereo pairs, it was fed to the front left and right speakers along with additional reverb. Ed Golya set the reverberator for dual mono mode, because he wanted two uncorrelated reverb sounds to get more separation, hence a larger image. The signal to the front channel was also fed to the rear left and right channels

through crossed delay lines. The delays were set long enough to enhance spaciousness, but not so long as to create distracting echoes. These tricks only work when you're mixing for a discrete multitrack format like Omnimax. The traditional stereo matrix used with 35mm film would never be able to decode such a wild combination of phases. Golya also was able to EQ a lot of low end into the music when appropriate, since the room and the sound system could take it.

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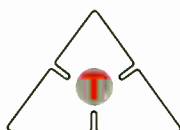
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Many Omnimax movies place the dialog and narration strictly in the front center speaker. Golya felt this procluced a forward sound that lacked warmth. In addition, the front center speaker was placed fairly low on the screen, which put it low relative to the picture, but also tended to blast the people in the center seats. The solution was to blend the narration at a reduced level into the three speakers surrounding the center speaker. This helped diffuse the sound source without any noticeable phasing problems.

**The sound images
need to be
enormous just to
match the visual
images.**

Because much preparation work had been done in putting the elements on the 32-track, mixing the film at the theater took only two nights. The film was mixed in the place where it would be shown, so no time was spent traveling across town to check the mix sound. The relative degree of standardization between Omnimax theaters made us confident that this mix would play well in other theaters.

DUPLICATION

With digital mix in hand, it was time to make the release copies. The 32-track machine was needed again in our music studios, while the 16-track lives in our film department. Therefore a 16-track digital copy was made of the mix and premix tracks. Just as with the earlier 16- to 32-track transfer, this was a straight-across transfer of the data, creating an identical copy of the master. This tape became the duplicating master for the 6-track, 35mm magnetic film used in Omnimax theaters.

As mentioned before, when an Omnimax film is presented there are no reel changeovers. The release print is

one continuous reel. While a roll of digital tape easily held the entire program, we could not find rolls of 35mm film stock long enough for the 40-minute program we had to duplicate (the maximum standard length is 3,000 feet; we needed 3,600). So we spliced together two rolls and concealed the splice in the middle of the program for each copy. We discovered that the splice would be hidden best if the film was spliced first, and then the audio was recorded across the splice, rather than the other way around. By interlocking the film recorder with the 16-track, we could find where a splice in the film would be at a quiet point in the mix. We used this footage number to prepare each roll of blank stock. Each roll was also given a start mark to ensure that the splice occurred at exactly the right point in the mix.

The film and 16-track recorders were interlocked, and one-to-one copies made. This was the first (and only) analog generation for many of the elements in this movie. It was like sending a 35mm master to each theater. Although the first duplication run didn't involve many copies, there are 60 Omnimax and Imax (a similar film format) theaters worldwide, half of which might be interested in showing a science film such as *The Great Barrier Reef*. This number is not so great as to pose a problem in providing first-generation analog copies of the soundtrack to each theater.

As a result of mixing this film, we have become enthused about the idea of mixing "on location." With the help of good preparation and digital recording, good results can be had with a minimum of trouble. Considering the unusual nature of Omnimax theaters, it was the only way we could have made an appropriate mix. The Museum of Science and Industry people were happy with the process and results. The success of *The Great Barrier Reef* has encouraged them to pursue making a new Omnimax film, *To the Limit*. This will be produced with the cooperation of the Museum Film Network, an 11-member consortium of science museums that recognizes the need for educational Omnimax and Imax films. We are looking forward to working on this film as well. ■

Thomas E. Miller works for Universal Recording in Chicago.



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by Mark Herman

SOUND REINFORCEMENT NEWS

I think it's about time to highlight a sound reinforcement company from the United Kingdom. **Capital Entertainment**, London, is a relatively new company that is rapidly climbing toward big-time sound reinforcement status and becoming serious competition for both American and British sound companies. According to managing director **Keith Davis**, "We have been around for nearly five years and have already worked with many known groups. Last year we did **Sade's** tour. In England we work with a lot of English acts that are unknown in America. Recently, we started to aim toward working with more international acts; **Simple Minds** is a new account for us. They're very big in Europe—much bigger than in the U.S.—and many large, well-known American companies put bids in for this prestigious tour." According to Davis, the act is very receptive to the company's Martin F2 system. **Nick Baker** is the band's house mixer and **Dick Hayes** (former Who monitor engineer) handles the stage mix. Capital Entertainment often works closely with **Delicate Productions** (Camarillo, CA), servicing each other's sound reinforcement clients in their respective countries.

Capital can field three full touring systems at a time. Much of its business is providing concert sound for MOR (middle of the road) acts, although it also does some theater sound. The company works about 40 weeks a year, with the slow period around January and February. "The slow time for sound companies is now in the winter. It used to be the

other way around in England. It could be that more gigs are going outdoors," Davis says.

Equipment-wise, Capital uses Martin Audio P.A. and monitor cabinets powered by Crown amplifiers, and Midas Pro 40s, along with several Soundcraft 800Bs, for house and monitor consoles. Capital worked a three-week European tour in April with the **Blow Monkeys**; **Johnny Mathis** toured England in April with Capital; now the company is in the process of completing an **Everly Brothers** tour, which runs May 11 through June 6.

Count the S-4s on tour. . . **Bon Jovi** (see "On the Road," May '89) continues to be a hot box office draw, scattering June outdoor stadium shows with a 72-box system. . . **R.E.M.** is carrying a 24-box S-4 system across Europe in June. . . **Elton John**, with 40 S-4s, will finish touring Europe in July. His U.S. travels will last from mid-July until the end of September. . . **Julio Iglesias**, one of this planet's true international stars, remains on tour as usual. . . Hard-working **Amy Grant** (see "On the Road") is working another leg of her U.S. tour with a 48-box S-4 system. . . **Big Country** continues touring in Europe with a 16-cabinet S-4 rig. . . Right now some of you might be asking, "What's an S-4?" S-4s are **Clair Brothers'** (Lititz, PA) proprietary, full-range speaker cabinets.

Schubert Systems Group (North Hollywood, CA) has tours booked with top names through the summer, keeping nearly all of its equipment on the road. SSG can now field four complete P.A. systems at once, and with just a

little equipment support, five systems are possible. Considering the way things are going, owner **Dirk Schubert** might need additional P.A. rigs. . . **The Doobies** (see "On the Road") began rehearsals in mid-May and plan to kick off their latest reunion tour (and album) with a June 9 show at **Red Rocks**, near Denver. . . **Al Jarreau** went back into the rehearsal studio at **Power Plant** for two weeks after returning in late April from a successful European tour. He starts another tour leg June 15 and will be out until mid-August. Jarreau usually performs at sheds, small arenas and convention centers. . . **David Sanborn**, another artist who typically works sheds and smaller theaters, will be touring through September. . . **Wendy & Lisa**, the successful duo who formerly backed Prince, carried a full SSG system around Europe from mid-April to mid-May. . . SSG is now gearing up for summer tours with **Ziggy Marley & the Melody Makers** and **George Thorogood**. . . SSG has added more monitor speakers to its inventory. The new enclosures are loaded with the hot new JBL 2450J drivers and JBL 2204 cones. The company is also increasing its main P.A. capacity by building more proprietary Steradian cabinets.

Schubert Systems Group's Power Plant rehearsal studio in North Hollywood recently added a much-needed third rehearsal studio. The practice facility has been active since its inception last year and has already seen a wide variety of clientele, including recent visits from the **Starship**, the **River Dogs** (featuring ex-

Whitesnake lead guitarist, **Vivian Campbell**), Wendy & Lisa, **Kingdom Come**, **Julian Lennon** and Al Jarreau. **Don Henley** and **Little Feat** are scheduled to use the facility in June.

Showco Shorts... Showco (Dallas, TX) reports that **Edie**

Brickell & New Bohemians, **Mike & The Mechanics** and **Diana Ross** will all be touring steadily through the summer using Showco's Prism P.A. system... **Carlos Santana** carried full P.A. for his European tour that started in May... The **Bee Gees**

(see "On the Road") are doing a large European tour through July 4, featuring several stadium dates... One of the hardest working entertainers in the business is **Willie Nelson**; it seems he is always on tour and this season is no exception... Little Feat has been

ON THE ROAD

SOUND COMPANIES, EQUIPMENT, ARTISTS & PERSONNEL ON TOUR

Artist Sound Company Tour Dates & Region	House Console #1 House Console #2 Monitor Console #1 Monitor Console #2 House Crossover	Main Speakers Main Speakers Subwoofers Monitor Speakers Monitor Speakers	Main Amplifiers Main Amplifiers Sub Amplifiers Monitor Amplifiers Monitor Amplifiers	Engineers: (B) = band eng. (H) = house eng. (M) = monitor eng. (T) = technician (a) = assistant
Bee Gees Showco April - July Europe	Harrison HM-5 32x16x2 (w/16-channel extender) Harrison SM-5 32x16 — Showco	(64) Prism — 16 Prism Sub Showco 100, 600	Crown PSA-2, MT1200 — Crown MA2400 Crown MT1200	M.L. Procise (H) J.W. Roberts (M) TBA
Jimmy Buffett Sound Image June - September U.S.	Yamaha PM3000 40x8x2 — Ramsa WR-S840 40x8x2 TAC Scorpion 40x12 BSS FDS 360	(32) Phase Loc Series 4 — (8) Phase Loc Series 3 Phase Loc 2x15	QSC 3800 — QSC 3800 QSC MX2000	Don Jarvis (H) Ross Ritto (M) Rob Mailman
Neil Diamond Maryland Sound Ind. April - July U.S.	Ramsa WR-S840 40x8x2 — Ramsa WR-S840 40x8x2 — JBL 5235	(64) JBL 4870, (24) JBL 4866 (24) JBL 4847 (8) JBL 4842 JBL Concert Series	Crest 8001, 7001 Crown MA2400 Crest 8001 Crest 3501, 4001	Stan Miller (B, H) Anthony Stabile (M) Jeff Bobbin (aH) John Mucciardi (T) Greg Lopez (aM) Carl Hartzler (T)
Doobie Brothers Schubert Systems May - October U.S. October - December Europe and Japan	Gamble Series EX 56x16x2 — Gamble SC 40x16 — SSG	(52) Steradian — (20) Steradian Sub SSG 2x12, 1x12	Crest 8001, 7001 — Crest 8001 Crest 7001	Dirk Schubert (H) Mike Kelly (B, M) Alan Bonomo Mark Drale (T) Gary Whitelock
Amy Grant Clair Brothers Ongoing N. America	Clair Custom 32x8x6 — Harrison SM-5 32x16 — Clair Custom	(48) Clair S-4 — — Clair Custom, 12AM	Carver/Clair 2.0 — — Carver/Clair 2.0	Chris Taylor (B,H) C.J. Patterson (M) Steve Helm (aH) Jim Bang (T)
Grateful Dead Ultra Sound June - July U.S.	Gamble Series EX 56x16x2 — Gamble SC 40x16 — Meyer	(64) Meyer MSL-3 — (16) Meyer 650-R2 Meyer UM-1, UPA-1	Crest 4001, 3501 — Crest 5000 Crest 3501	Dan Healy (B,H) Harry Popick (B,M) Don Pearson (aH,T) Mike Brady, Chub Carrier Howard Danchik Uwe Willenbacher
Engelbert Humperdinck Sound On Stage Ongoing International	Gamble HC 40x16x2 — Soundcraft 8000 40x8x2 — SOS	(12) Power Physics 422 (8) Power Physics 442 — Power Physics KB2 Power Physics 422 sidefill	Crest 4001, 2501 Crest 4001 — Crest 4001, 2501 Crest 4001, 2501	Louis Barrere (H) Mike Benedetti (M) Rick Fantl Mike Jordan
Simple Minds Capital Entertainment Europe	Yamaha PM3000 40x8x2 Yamaha PM3000 40x8x2 Custom Midas Pro 40 40x22 — Martin MTX-4	(60) Martin F2 (74) Martin F2B (22) Martin BSX Sub Martin LE600	Crown PSA-2 Crown MA2400 Crown MA2400 Crown MA1200	Nick Baker (B, H) Dick Hayes (B, M) TBA

LIVE · SOUND

touring with a full calendar. . . Showco's **Creative Services**—the division that handles corporate sound—is gearing up to work with several big-name clients. . . On the equipment front, Showco continues to build more Prism P.A. cabinets as needed. The company is also constantly working on R&D projects, and is reportedly getting close to introducing several new proprietary products.

MSI Briefs. . . A quick run-

down on **Maryland Sound Industries** (Baltimore, MD) tour clients shows that this sound reinforcement company has no problem landing clients and keeping them. . . Box office biggie **Neil Diamond** (see "On the Road") continues his tour of the U.S. This tour leg started in April and is due to end in July. After a brief break, Diamond is scheduled to pick up again through the end of the year. The main P.A. is comprised of JBL Concert Series loudspeakers that came to MSI via the sale of **Stanal**

Sound earlier this year. MSI house electronic packages, Crest-powered amplifier racks and an MSI-style power distribution setup have been added to the Diamond P.A. system previously used by **Stanal**.

The **Pointer Sisters** are out on the road. . . **Neil Young** was in Australia using MSI personnel. . . **Anne Murray** continues working. . . **David Crosby** is out doing his own U.S. tour. . .

Tommy Conwell and the Young Rumlbers were on tour. . . MSI had two industrials out, one with Texas Instruments and the other with AFL. . . MSI is also supplying P.A. equipment support for **Chicago**. The sound reinforcement contractor for the Chicago tour remains **Audio Techniques** (Calabasas, CA). . . **Pink Floyd** started rehearsals May 1, and on May 13 performed the first show of a new tour, traveling throughout Western Europe and the Soviet Bloc nations. They are scheduled to continue until July 18. . . **Paul Simon** plans to perform at outdoor venues from June 12 to July 8. . . At the beginning of May, MSI provided sound for **This Country's Rocking**, a cable TV video shoot at the **Pontiac Silverdome**, located just outside Detroit. The TV special, scheduled to air sometime later this summer, featured multiple national acts. . . MSI is also working the **Nashville Country Music Fanfair**, featuring 125 acts in five days. Twenty-thousand people each day watch two stages at this event scheduled in the beginning of June. . . This year's **Hampton Jazz Festival** in Hampton, VA, is scheduled for the end of June.

MSI's **Ronnie Smith** comments, "The summer is looking very good. And there is an entire roster of other clients that we're talking to and placing bids with. We expect this to be one of our busiest seasons yet." New equipment purchases have consisted primarily of electronic packages ordered to satisfy engineers' requests for new and better effects. . . MSI would like to welcome **Mike Stahl**, formerly with Clair Brothers, as general manager

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*Presented by Dr. E. R. Geddes at the 83rd AES Convention, Oct. 1987.



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TRUTH...

OR
CONSEQUENCES.

If you haven't heard JBL's new generation of Studio Monitors, you haven't heard the "truth" about your sound.

TRUTH: A lot of monitors "color" their sound. They don't deliver truly flat response. Their technology is full of compromises. Their components are from a variety of sources, and not designed to precisely integrate with each other.

CONSEQUENCES: Bad mixes. Re-mixes. Having to "trash" an entire session. Or worst of all, no mixes because clients simply don't come back.

TRUTH: JBL eliminates these consequences by achieving a new "truth" in sound: JBL's remarkable new 4400 Series. The design, size, and materials have been specifically tailored to each monitor's function. For example, the 2-way 4406 6" Monitor is ideally designed for console or close-in listening. While the 2-way 8" 4408 is ideal for broadcast applications. The 3-way 10" 4410 Monitor captures maximum spatial detail at greater listening distances. And the 3-way 12" 4412 Monitor is mounted with a tight-cluster arrangement for close-in monitoring.

CONSEQUENCES: "Universal" monitors, those not specifically designed for a precise application or environment, invariably compromise technology, with inferior sound the result.

TRUTH: JBL's 4400 Series Studio Monitors achieve a new "truth" in sound with

an extended high frequency response that remains effortlessly smooth through the critical 3,000 to 20,000 Hz range. And even extends beyond audibility to 27 kHz, reducing phase shift within the audible band for a more open and natural sound. The 4400 Series' incomparable high end clarity is the result of JBL's use of pure titanium for its unique ribbed-dome tweeter and diamond surround, capable of withstanding forces surpassing a phenomenal 1000 G's.

CONSEQUENCES: When pushed hard, most tweeters simply fail. Transient detail blurs, and the material itself deforms and breaks down. Other materials can't take the stress, and crack under pressure.

TRUTH: The Frequency Dividing Network in each 4400 Series monitor allows optimum transitions between drivers in both amplitude and phase. The precisely calibrated reference controls let you adjust for personal preferences, room variations, and specific equalization.

CONSEQUENCES: When the interaction between drivers is not carefully orchestrated, the results can be edgy, indistinctive, or simply "false" sound.

TRUTH: All 4400 Studio Monitors feature JBL's exclusive Symmetrical Field Geometry magnetic structure, which dramatically reduces second harmonic

distortion, and is key in producing the 4400's deep, powerful, clean bass.

CONSEQUENCES: Conventional magnetic structures utilize non-symmetrical magnetic fields, which add significantly to distortion due to a nonlinear pull on the voice coil.

TRUTH: 4400 Series monitors also feature special low diffraction grill frame designs, which reduce time delay distortion. Extra-large voice coils and ultra-rigid cast frames result in both mechanical and thermal stability under heavy professional use.

CONSEQUENCES: For reasons of economics, monitors will often use stamped rather than cast frames, resulting in both mechanical distortion and power compression.

TRUTH: The JBL 4400 Studio Monitor Series captures the full dynamic range, extended high frequency, and precise character of your sound as no other monitors in the business. Experience the 4400 Series Studio Monitors at your JBL dealer's today.

CONSEQUENCES: You'll never know the "truth" until you do.



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LIVE · SOUND

of the new **MSI West** operation in North Hollywood, CA. **Steve Zelenka**, who formerly worked at Stanal Sound, is also handling some of the operational duties.

Sound Image (San Marcos, CA) has several national tours out for the summer. Its Phase Loc cabinets, powered by QSC amplifiers, will be seeing action across the country. . . **Jimmy Buffett** (see "On the Road") embarks on a U.S. tour from June until September. Buffett is a longtime

Sound Image account. This time he is taking a 40-cabinet main P.A. rig. . . **Jackson Browne** starts his U.S. summer tour in early June and will be out until the end of August with 32 Phase Loc System 45 cabinets. There will be 20 high boxes and 12 low frequency 4x18-inch boxes. All power amplifiers are QSC, including monitors. . . Sound Image can also be found at the **Miller Highlife Sound Express** festival, which showcases various artists. More than 50,000 people per show are expected for the five outdoor dates

in Southern California. . . A major Phase Loc system is being installed in **Faces**, a large disco in Tijuana, Mexico. . . Sound Image finally moved into its new 15,000-square-foot facility in San Marcos. . . Equipment developments include a new, compact Phase Loc 212 wedge-shaped monitor enclosure that includes a TAD 4001 for the high end.

Sound On Stage (Brisbane, CA) reports a strong market for the upcoming summer season in concert and industrial sound reinforcement. Business was excellent this past winter and spring as well. . . **Engelbert Humperdinck** is out on a January-through-

November world tour that plays mainly 3,000-seat venues. A Gamble HC 40-channel is used in the house, and a Soundcraft 8000 w/matrix house console is being used as a monitor console because the stage engineer prefers faders. . . SOS had a small U.S. club tour with the **Cowboy Junkies**. **Ricardo Caltagirone** (house) and **Bill Fuquay** (monitor) mixed the Toronto-based band's tour. . . Country star **Ronnie Milsap** has been on a small-venue tour in the U.S. and Canada. . . At the end of May, Sound On Stage was scheduled to work a large special event in conjunction with neighboring sound company **Ultra Sound**. The **Grateful Dead**, **Los Lobos**, **Tower of Power**, **Tracy Chapman** and **Joe Satriani** performed at an AIDS benefit at Oakland Stadium on May 27. Ultra Sound provided the main P.A., and SOS furnished supplemental P.A. support as well as stage and house mixing consoles for the opening acts. As always, the Dead used Ultra.

"This was a really surprising winter and early spring season," comments Bob Walker of SOS. ■

Readers: Keep in mind that some of the data in this column and the "On the Road" chart is based on information provided by the companies.

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HANDS - ON SOUND



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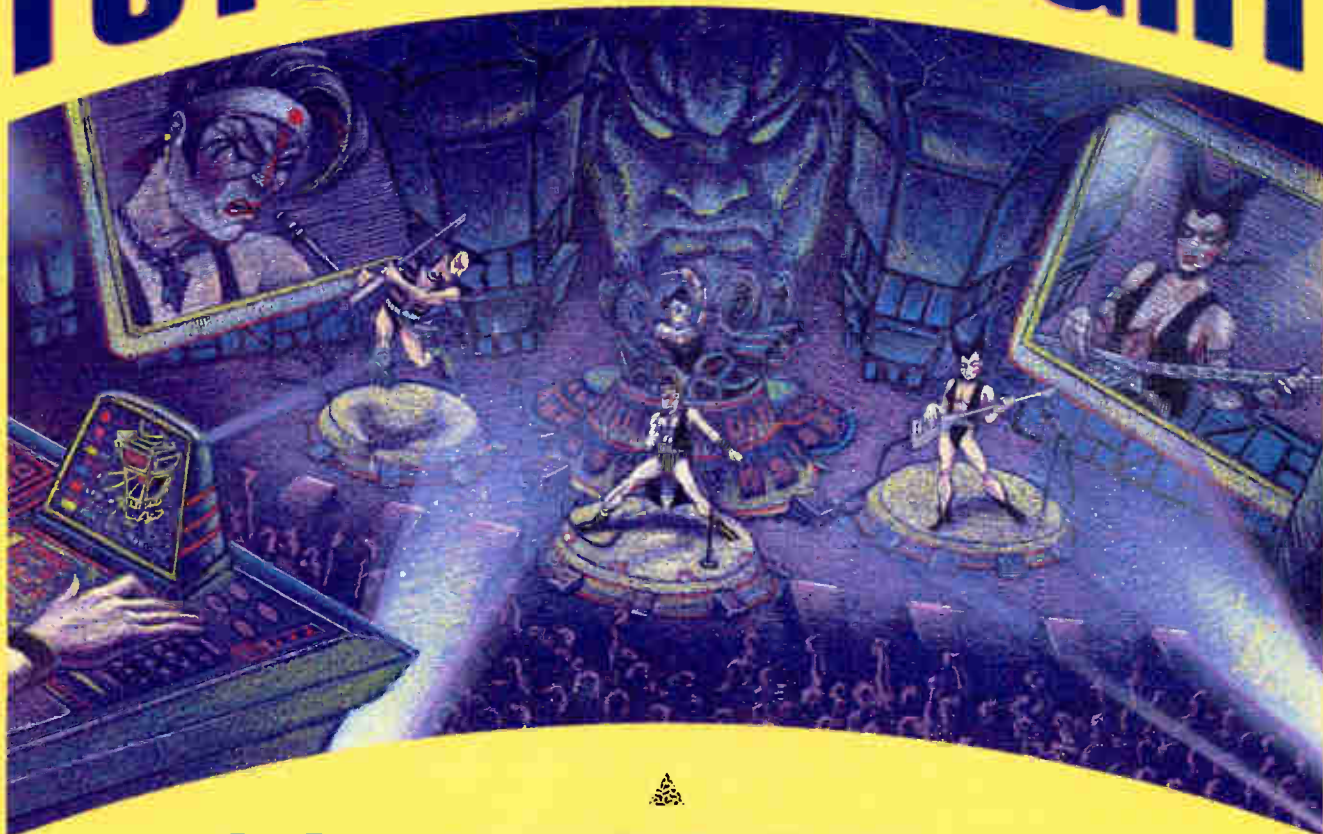
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FUTURE THOUGHT



CONCERT SOUND OF TOMORROW

BY MIKE JOSEPH

Attentive as we are to everyday details, it's often difficult to take the time to step aside and imagine what kind of live production universe will surround us five or ten years down the road. Take a moment and ask yourself: What will equipment be like? How will techniques change to cover the revolutions in technology, and in music, that the future portends?

Let's be creative. Starting with modern, commonplace technology, let's paint a not-so-impossible scenario of the future—a future filled with tools as indispensable as digital effects, third-octave EQs and real-time analyz-

ers are today.

ON THE ROAD, TOMORROW . . .

Imagine you're out on tour as chief engineer for Cyber/Sound, a large-venue rental sound company founded in 1992. The band you're supporting is Hi-Tease, a Japanese neo-wave glam band.

Tonight's hall is a nightmare: concrete slab floor, slap-back rear wall, mono-block scoreboard dead center. Stage at one end with tilt-up, Sony JumboTron screens flanking it. Eighteen-thousand seats. You're installing surround backfill, flying stereo mains.

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Sound reinforcement systems use multiple loudspeakers to increase the power of sounds, so that artists can communicate with large audiences.

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Theory & Practice

Every audio professional knows the difference between promotion and real-world performance. With so

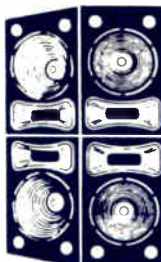
many manufacturers claiming arrayability, how do you judge the truth of our claims? The same way that you should judge everyone else's: with your trained ears. When you walk across the hall, does the sound of the loudspeaker system change? Do you hear phasing, flanging or comb filtering? Does the sonic image shift dramatically? Are the lyrics drowned in a sea of reverberation? If so, then the array is not functioning as a coherent point source.

Meyer Sound's proven loudspeaker arraying techniques have resulted from the most thorough research and analysis in the industry. They produce dependable point-source arrays in environments ranging from free-field to the most difficult performance venues.

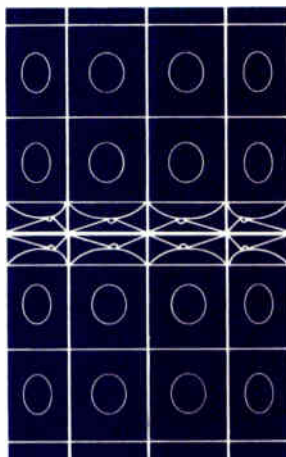
So set your stage with confidence. Meyer Sound loudspeaker systems are built from the ground up to preserve coherent propagation of sonic energy.

And the proof is in the sound: clear and consistent. Everywhere you need it.

Both the UPA-1A and MSL-3 deliver high sound pressure levels with ultra-low distortion, for maximum intelligibility and fidelity. Efficient, high-powered, rugged and reliable, their specifications meet the most demanding professional needs.



The compact UPA-1A allows controlled coverage of wide areas in theaters, clubs and concerts.

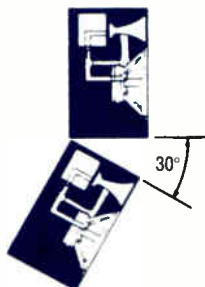


The MSL-3 covers a broad range of large-scale reinforcement applications.



Carnegie Hall A coherent array of UPA-1A loudspeakers, supplemented by MSL-3s and 650-R2 subwoofers (not pictured), is permanently installed for live performance reinforcement.

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UPA-1A in typical vertical configuration.



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Yesterday the room ran motocross mud-bogs, and the dust is still settling as the last of the Bobcats pushes dirt into a front-end loader.

In the hotel room earlier you went over the stage setup on your laptop Mac—the "Lapple"—pulling info from the files at the home office: a comedian is appearing in place of the opening band; signal splits to a video truck shooting live for Australian cable via uplink and bird (satellite); audio/video roll-ins to P.A. and Jumbos from the truck at 20:00:00 (exactly!) to kick off the show.

On your way to the arena, your road manager calls your Mac with an update: second show at 11; possible second day to be added; mix platform shrinks to 6x12 feet from 8x16, adding eight seats. (The Mac, by the way, has its own cellular number and a telco jack on the side to plug in a phone. Optional.)

As you walk into the hall, security scans your ID/tour pass and its computer spits out a fluorescent red stickum decal for access. The screen also flashes a message—you're wanted in the promoter's office. On stage you see the crew walking around the road cases, scanning bar code decals on each

crate to see what's inside, correlating what it is to where it goes: house, stage and monitor mix positions.

Arriving upstairs in the promoter's office, you sit down to discuss the big problem of the day: sight lines. It seems the primary cluster hang points interfere with the long-shot camera angles from the catwalk and spot tower. Hang location #2 is view-clear, but shoots the main speaker lobe straight at the scoreboard, which is a huge, non-folding, reflective monstrosity installed in the mid-'80s, virtually an antique. You go to the Mac, auto-dial out and retrieve a spec sheet from the home office. Bingo—the main drive rack's new processor has a Pattern Optimizer mode with a setting that'll tilt the main lobe on the speaker array down 18 degrees (250 Hz to 15 kHz) without re-aiming the boxes, enough to go to location option #2 with the existing hang points and avoid the scoreboard. Next?

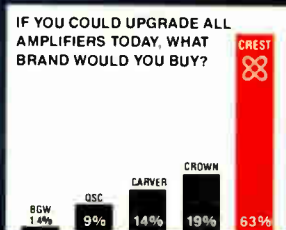
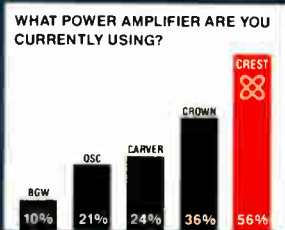
Back in the hall, you walk the system, checking the crew's handiwork. They taped the 1/8-inch, 300-meter, fiber optic "Light-Line" mic snake to the kick-rail around the side of the arena, keeping it off the floor. Fifty-six inputs, 12 returns. Power distro is up

and running, although the auto ground had to be bypassed and an old-fashioned copper rod driven, due to faulty building grounds (PVC pipe in the cold-water plumbing). Some things never change. The console is feeding signal to the stage, allowing Crash and Wink (top members of your stellar sound crew) to check the amp-to-cabinet connections. Cyber/Sound still uses separate amp rack/speaker cabinet hard-wire runs to feed the boxes. Several companies have switched to amps inside the speaker enclosures, looping the boxes with Light-Line fiber optics. Your amps have Macro-Mac version 2.01 microprocessor front ends installed, allowing remote sequential turn-on, polarity change and signal delay alignment from the Mac at the console.

You tell Crash that the speakers will be rigged off-center, stereo field, and describe the splay and tilt you want on the screen, flipping between speaker-in-room graphics and cluster close-ups. The 3-D software lets you move the cluster around and read angles from vertical and horizontal alignments. Wink walks up with the Mac-Sensor, a plug-in, tilt-alignment tool that attaches to the back of a speaker

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enclosure and reads the tilt angle directly into the cluster-setup application on screen. Identify the cabinet and it beeps for you when reality matches picture. Life is simple.

The next step is tubing-up the system, installing the expandable ASC acoustic absorbers behind, between and at the edges of the speaker cabinets and scoreboard to control refraction and low-frequency buildup around the enclosures (and reflection off the scoreboard).

The boxes rig fast. You flash back ten years, when those old, wooden speaker cabs used to be heavy; the new composite enclosures and lightweight components are so easy to deal with that one person can set up the entire array with gloves and a hand truck. Leaving Crash to hook up the 20-pound, neodymium-magnetted, two-ton Mini-Star chain motors, you drag Wink off to talk stage splits.

The video truck will need all 52 stage signals, plus stereo house returns and surround FX. Even though they will run a synched 48-track digital audio master, they want to drop your bit-streamed stereo outs onto the digital VTRs for cue. You show Wink how to install the fiber optic booster/splitter.

Over by the mix platform, two multi-window screens glow in the rack beside the board: one for the processor and one for the console readout. Before the tour, you decided that the PM-6000 console would spin in virtual mode, leaving the 24 "real" DCA (Digital Controlled Amplifier) input modules for solo instruments, FX feeds and lead vocals. Drum mics and samples were preset on page 4, effectively a "hidden" board, ready to be called up to screen view or active modules. Page 3 contains the two keyboard presets—42 voices total, depending on the patch. Levels and panning are altered according to MIDI signal instructions from the keyboards. Page 2 consists of percussion and backup vocals, preset and programmed for "bump" level changes when the band's Mix-Master Ninja nudges the walk-along button for cue changes on any hidden page (the programming was written offline weeks earlier, during rehearsals, and saved to the console's onboard read/write optical disk). Page 1 holds FX returns, controlled by both MIDI feed and the bump cue buttons.

Plugging the Mac into the drive-rack link, you dial in the array pattern tilt determined previously, angling the

main beam electronically by introducing slightly delayed signal at varying levels to specified speakers, via the digital front ends on selected amp channels. When their altered-phase outputs combine acoustically, the pattern lobe offsets. Kid stuff.

Punching up track 9-recycle on the latest Little Feat CD, you pot-up the system. Slinky music fills the room. The drive processor screen immediately displays two windows: a large one with color overlays for signal input, room response from measurement mics and Auto EQ (difference make-up); and a smaller window below it, filled with icons. Operational mode choices are displayed along the roll-down menu bar: File, Edit, Commands, Format, Store and Special. The icons are labeled RTA, TEF,[®] Digital Effects, Dynamic Processing, Cross-over, Routing, Signal Delay/Alignment, Pattern Optimization, Amp Drive, Auto EQ and Custom. Opening an application and scrolling down or clicking on any icon will change presets, alter parameters, access storage registers or display the various simultaneous outputs.

As the music plays, you watch the gradual blending of lines as room EQ is integrated into the signal path, modifying average room response to match the stored "ideal" curves collected from good rooms played on the tour. During the show, you'll let the preset EQ be updated, via 15-minute samples, to compensate for audience absorption coefficients, ambient temperature and humidity.

Your work done for the moment, you wonder how late the band will be for *tonight's* soundcheck. Maybe it's time to break for lunch, have a nice cold Tsing Tao beer, mellow out. . .

HOME AGAIN

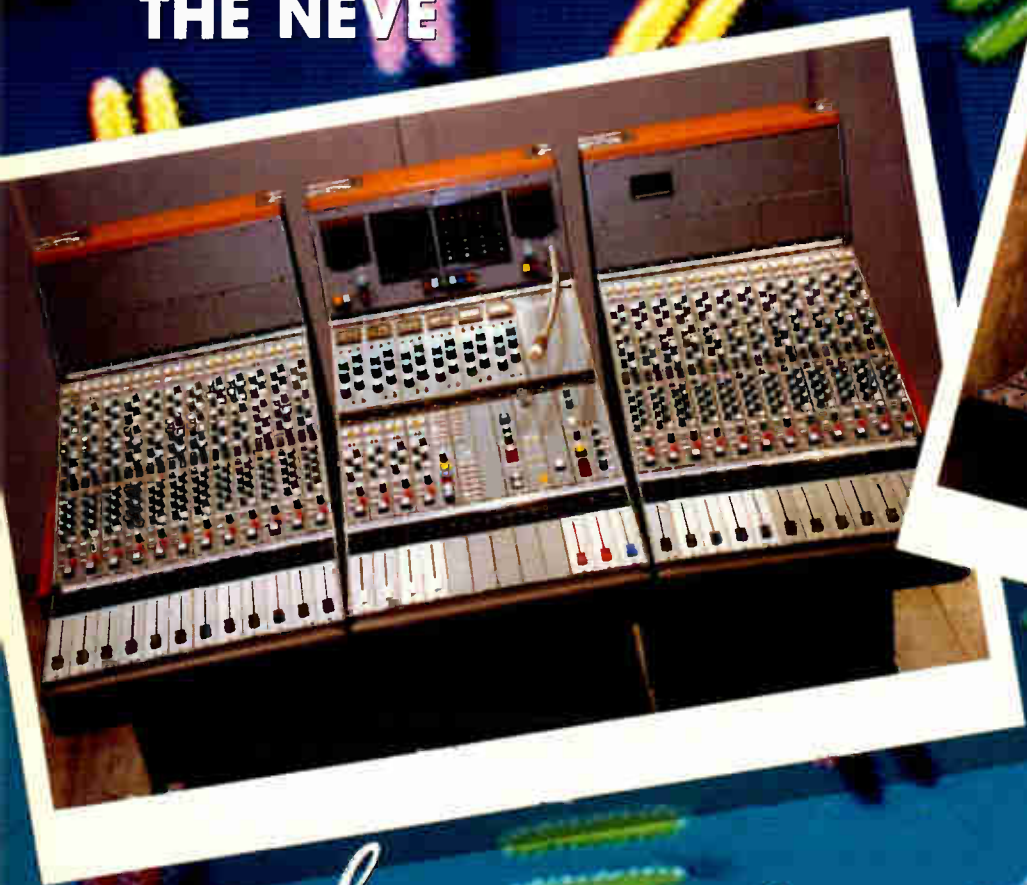
Too imaginative? Everything mentioned above is in the works—or even completed—right this minute. In fact, it's surprising to note just *how many* companies today are currently knee deep in future design. These products include next-generation automatic EQs, user-programmable, *HyperCard*-based, bar code scanning systems, and software that electronically configures loudspeaker projection patterns via phase interaction from signal delay. It's tomorrow today in Audioland.

THE PLAYERS

A front-runner in computer applica-

—CONTINUED ON PAGE 110

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One of the best and most widely accepted consoles ever manufactured was the Neve 8068 MKII. It set standards in audio consoles that manufacturers are still trying to duplicate. So when we needed a console for our remote audio truck, the choice was fairly easy... we chose a Neve. Likewise, when it came time to purchase a portable console for live to 2 track digital, we also chose a Neve 5104.

If you would like to record your next project on one of the best consoles ever manufactured, give us a call... we'll even deliver it.

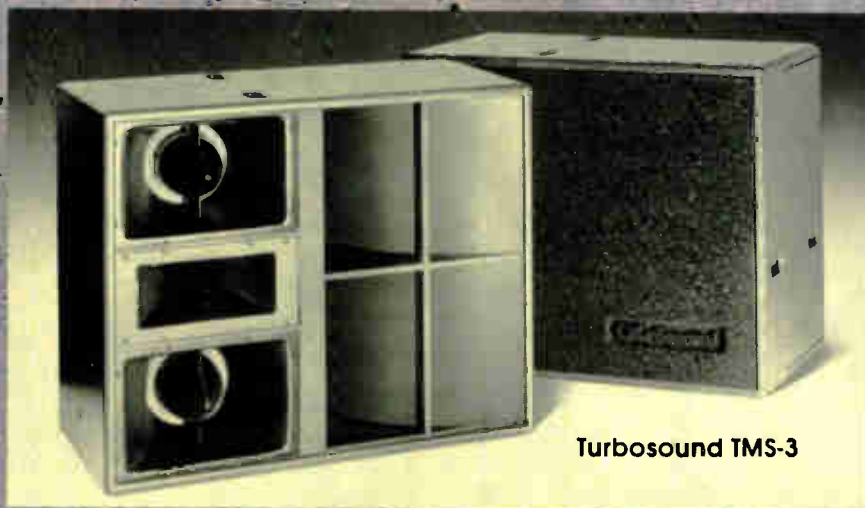
BUYER'S GUIDE

TO MAIN

LOUDSPEAKERS

One of the most difficult and crucial decisions that faces sound company owners is the choice of a main loudspeaker system. Making the customary A-B comparisons between full systems can be tough, if not impossible, and collecting data on as many systems as possible is a vital part in the selection process. With this in mind, we offer this guide (presented in alphabetical order) to help you make that first step toward finding a system to fit your company's present and future needs.

Adamson Acoustic Design Corp., located in Pickering, Ontario (near Toronto), has made a big splash up north and is just now entering the U.S. market. Its compact, two-box system employs new technology incorporating the Acoustic Waveguide theory, derived from the research of Dr. Earl R. Geddes of the Ford Motor Co. and Eastern Michigan University. Dr. Geddes' research shows that the foundation of current horn design theory—Webster's horn equation—is based on limiting assumptions resulting in



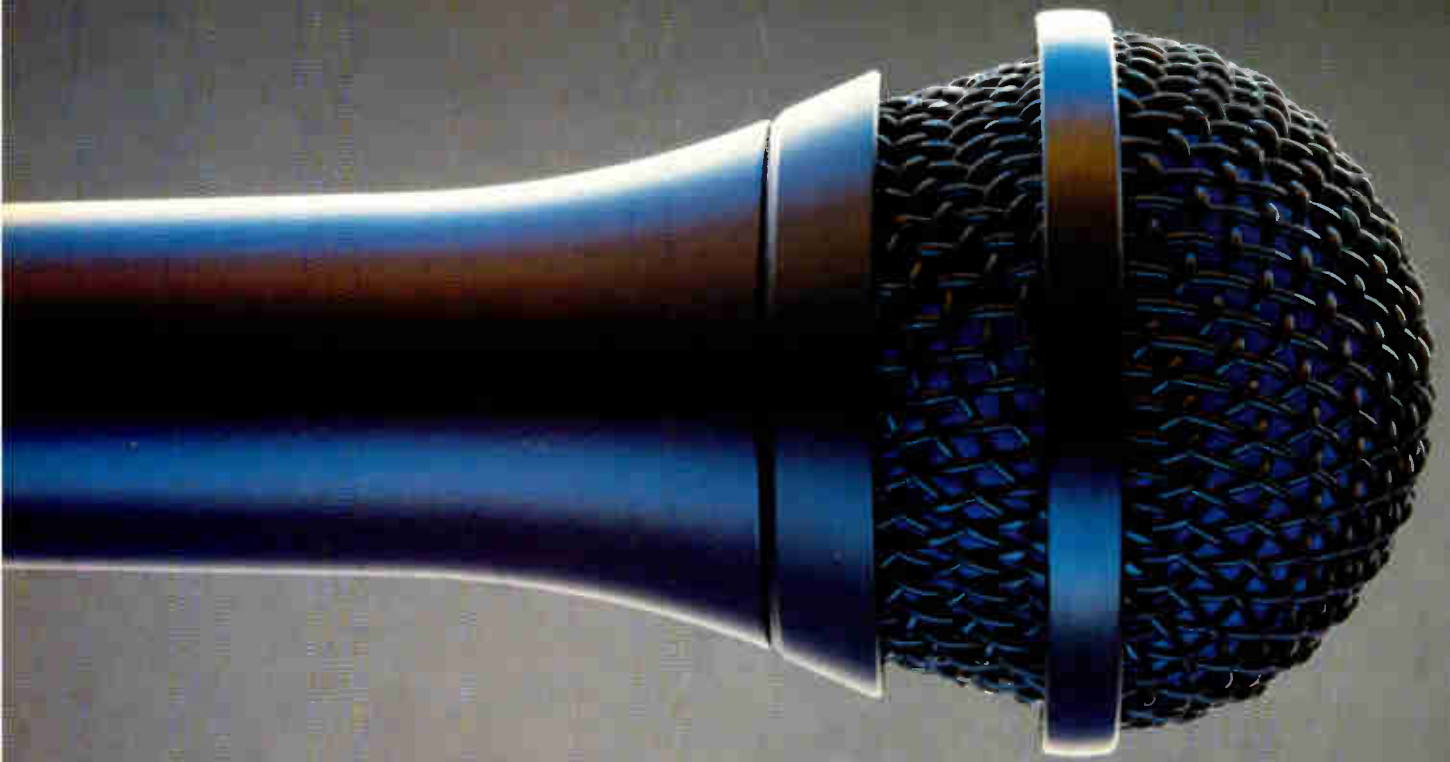
Turbosound TMS-3

BY MARK HERMAN



(From top left, clockwise): JBL Concert Series 4870, Electro-Voice MT-4 System, MacPherson Loudspeaker and Meyer MSL-3.





Crown CM-310 Differoid®

Wondering what kind of shape microphone technology is in?

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Bringing vocals out of extensive background noise has been one of the most difficult and often nearly impossible tasks in the sound reinforcement business. The **CM-310** solves this problem – as well as others, with the kind of reliability you've come to expect from Crown.

Excellent Gain-Before-Feedback and impressive distant sound rejection for greater microphone isolation – better control of the mix, even under extremely high monitor levels.

To fully appreciate the unique capabilities of the **CM-310** visit your Crown dealer for a demonstration.



The **CM-200 Cardioid**. Smooth and articulate sound - versatile in application. For vocals or instruments it's a rugged performer with capabilities unique to the CM Series line. The bottom line: the **CM-200** just sounds great.



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CM Series microphones are designed for studio or sound reinforcement use. Each has pop filtering to suppress breath noises, the ability to handle incredibly high SPLs without distortion and a balanced, low impedance output - allowing long cable runs without hum or high frequency signal loss.

Equally important to how well they work is how long they work: built to withstand hard use and backed by the best warranty in the industry.

Taking innovation one step further Crown introduces the **CM SELECT Series** – combining all the performance characteristics of the CM Series with the special feel and elegance of a solid wood handle. Red Oak, Claro Walnut, Ziricoté, Russian Birch, Coco Bola.

It's obvious microphone technology is in great shape at Crown.



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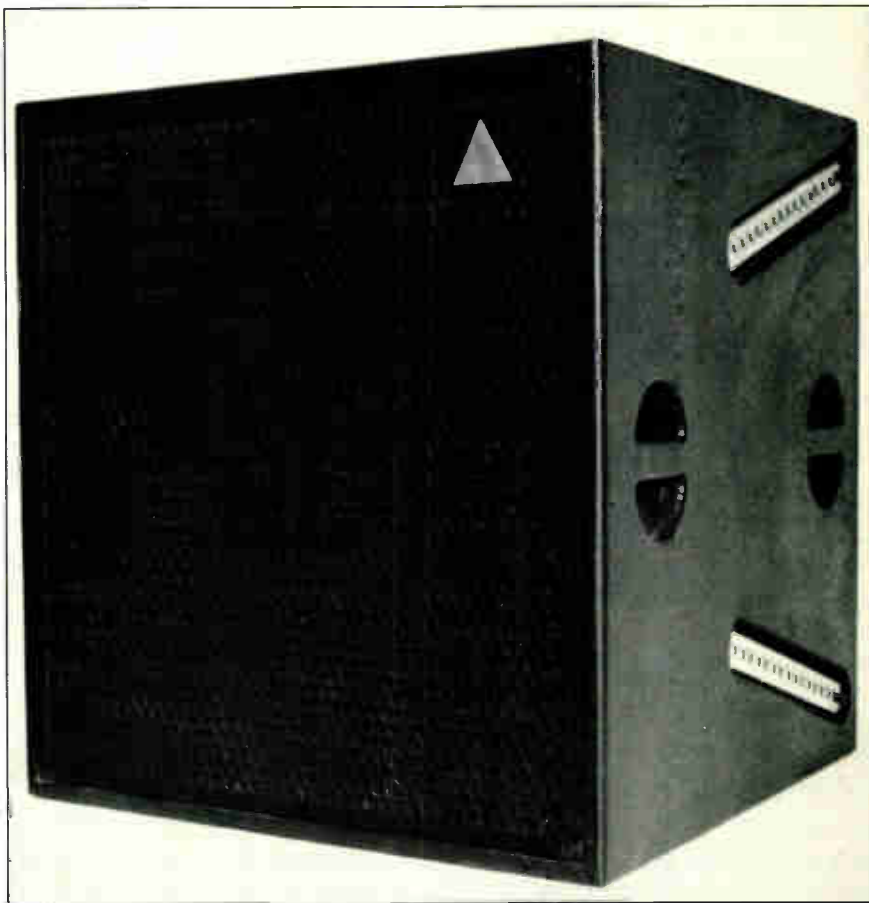
Circle #146 on Reader Service Card

many problems associated with horn loading. Vast number-crunching calculations made possible by large-scale industrial computers helped Geddes search for a better horn. He says that Acoustic Waveguide horns developed from his mathematical theory (based on the oblate, spheroidal coordinate system) provide optimum means of producing constant directivity from a diaphragm.

Adamson Acoustic Design worked on developing practical sound reinforcement uses for Acoustic Waveguide technology and came up with the MH225 cabinet. Company president Brock Adamson states, "The Acoustic Waveguide horns have more uniform coverage. A set of these high-frequency and mid-range horns joins up and matches better than other types that have variations of the crossover point, and they load better, so you can make smaller horn systems. They also produce a little less harmonic distortion and have no reflections in the horn throat."

The company spent more than \$250,000 developing a mid-range compression driver that uses an unconventional diaphragm assembly. Adamson comments, "Our research enabled us to produce a lightweight diaphragm made from stiff, high-modulus, composite material with no ring—there is no metal. It is tough, though, and because it is lightweight, it is a high-efficiency unit capable of delivering peak levels of 140 dB at one meter." This driver technology and the Acoustic Waveguide theory make for a small, high-output system that seems well-suited for the sound reinforcement industry. "As a result of the compact size," adds Adamson, "50k [watts] worth of P.A. gear can fit into ten feet of truck space." The companion cabinet to the MH225 is the low-frequency B218F, with dual 18-inch woofers in a vented manifold enclosure.

In the past, **Apogee Sound** (Petaluma, Calif.) has been confused with Apogee Electronics, a company that manufactures digital filter devices for recording. With Apogee Sound's rapidly growing reputation as a producer of professional processor-based loudspeakers, the confusion will likely lessen. Ken DeLoria, head of Apogee Sound, describes his company's philosophy: "The thrust of our design work is centered around keeping the speakers sounding smooth, linear and low in distortion in the upper third of



Adamson Acoustic Design Corp. mid-high MH225



The lightweight Klipsch KP-600 system

the output range. It is difficult to make the cabinet sound good when it's pushed to the output limits."

Apogee's AE-5, with its A-5 dual-channel processor, is a trapezoidal 2-way, bi-amped, electronically coupled system. It is Apogee's best-selling model and is earning a reputation as powerful, easily arrayable and venue-versatile. The AE-5 has a 12-inch direct

radiating cone, and a 1-inch throat compression driver coupled to a ura-lite 90-degree horn. This fluid-cooled compression driver uses a nonmetallic diaphragm. DeLoria explains, "It is a compression driver with a composite diaphragm rather than titanium, beryllium or aluminum, made from a phenolic-based material impregnated in linen. We found a way to make it

operate flat and with low distortion all the way out to the 18kHz range."

Designed for concerts, stadiums and other high-SPL spaces, the tri-amped 3x3 is a processor-based, fully horn-loaded enclosure with dual 15-inch cone drivers joined at the horn mouth, a fluid-cooled, 2-inch-throat titanium diaphragm compression driver on a constant-directivity 60x40

BUYER'S GUIDE TO MAIN LOUDSPEAKERS

Manufacturer	Model	Companion Cabinet	Fly	Addl. Cost to Fly	Type	RMS Method (Watts)	Box Description	Dimensions HxWxD (in.)	Wt. (lbs.)	Composition
Adamson Acoustic	MH225	B218F	Std	-	2-way	MF/300, HF/75	Acous Wavgdes HL	28x28x29.5	175	13 ply 3/4" Russian birch
Adamson Acoustic	B218F	MH225	Opt	175	1-way	900	Vented manifold	28x28x29.5	155	13 ply 3/4" Russian birch
Apogee Sound	3x3	AE-12	Std	-	3-way	1100	HL	45x29x30	255	18 ply/in. Finland birch
Apogee Sound	AE-12 Sub	3x3, AE-5	Std	-	1-way	800	Vented bass	30x44.75x22.5	160	18 ply/in. Finland birch
Apogee Sound	AE-5	AE-10, AE-12	Std	-	2-way	400	HF/HL, LF/DR	23x14x16	78	18 ply/in. Finland birch
Apogee Sound	AE-10 Sub	AE-5	Std	-	1-way	800	Vented bass	22.5x32x24	138	18 ply/in. Finland birch
Community	RS880	VBS415	Opt	149	3-way	400	HL	48.5x30x22.5	170	7 ply poplar w/birch facing
Community	VBS415 Sub	RS880	Opt	149	1-way	800	DR	33x33x30	200	7 ply poplar w/birch facing
EAW	KF850-FD3	SB850-RD2	Std	-	3-way	500, 300, 200	HL	42x26.4x29.5	236	18 ply/in. Baltic birch
EAW	SB850-RD2	KF850-FD3	No	*	1-way	1600	DR	42x26.4x23.75	185	18 ply/in. Baltic birch
EAW	KF600R	SB600-RD2	Std	-	3-way	500, 300, 200	HL, dual vent ch.	33.25x20x19.75	145	18 ply/in. Baltic birch
EAW	SB600-RD2	KF600R	No	-	1-way	1600	DR	33.25x20x19.75	110	18 ply/in. Baltic birch
Electro-Voice	DML-1152	DML-2181	Opt	290	2-way	LF/400, HF/75	DR	30x17.8x16.3	96	14 ply Finland birch
Electro-Voice	DML-2181 S	DML-1152	Opt	360	1-way	800	Manifold	36x22.5x30	164	14 ply Finland birch
Electro-Voice	MTH-4	MTL-4	Opt	500	3-way	1200, 240, 100	HL Manifold	36x36x30	367	14 ply Finland birch
Electro-Voice	MTL-4	MTH-4	Opt	500	1-way	1600	Manifold	36x36x30	263	14 ply Finland birch
Intersonics	SDL-5 Sub	None	No	-	1-way	400	HL w/servo	45x22.5x45	270	14 & 20 ply hardwood
Intersonics	SDL-4 Sub	None	No	-	1-way	400	HL w/servo	41x22.5x30	190	14 & 20 ply hardwood
JBL Professional	4870	4842, 4845	Std	-	2/3way	800	DR	49.5x29.5x18.75	214	Void-free birch plywood
JBL Professional	4850	4842, 4845	Std	-	2/3way	600	DR	39x25x17.25	134	Void-free birch plywood
JBL Professional	4842 Sub	4870, 4850	Std	-	1-way	1200	DR	49.5x29.5x24.5	285	Void-free birch plywood
JBL Professional	4825	4842, 4845	Std	-	2-way	300	DR	25x14.25x14	65	Void-free birch plywood
Klipsch & Assoc.	KP-650-HF	650-LF, 680-SW	Opt	800	3-way	150, 85	HL	25.5x48x30	175	Fiberglass laminate w/wood
Klipsch & Assoc.	KP-650-LF	650-HF, 680-SW	Opt	645	1-way	600	HL	25.5x48x30	190	Fiberglass laminate w/wood
Klipsch & Assoc.	KP-680-SW	650-LF, 650-HF	Opt	645	1-way	600	DR	25.5x48x30	160	Fiberglass laminate w/wood
MacPherson	M1	-	Opt	144	3-way	500	LF&HF/HL, MF/DR	48x17.5x29.75	125	9 ply birch
MacPherson	M2	-	Opt	96	2-way	400	HF/HL, LF/DR	24.5x17.5x16.5	60	9 ply birch
MacPherson	B1 Low	-	Opt	144	1-way	400	Rear HL	48x17.5x29.75	90	9 ply birch
Marlin Audio	F2	F2B, BSX Sub	Std	-	Multi	*	HL	42x22.5x25	250	Finland birch, finest grade
Marlin Audio	F2B	F2	Std	-	1-way	1000	HL	42x22.5x30	250	Finland birch, finest grade
Marlin Audio	VRS1000	BSX Sub	Std	-	3-way	1000	HL	51x22.5x27	240	18mmFinland birch, finest grade
Marlin Audio	BSX Sub	F2,VRS1000/800	No	-	1-way	1000	DR	22.5x45x30	180	18mmFinland birch, finest grade
McCauley Sound	840	814	No	-	1-way	800	DR	24x33.3x24	130	9 ply 3/4" domestic birch
McCauley Sound	814	840, 850	No	-	2-way	750	HF/HL, MF/DR	24x33.3x16	140	9 ply 3/4" domestic birch
McCauley Sound	850	814	No	-	1-way	450	DR	24x33.3x24	110	9 ply 3/4" domestic birch
McCauley Sound	824	None	No	-	2-way	500	HF/HL, MF/DR	33.3x20x24	123	9 ply 3/4" domestic birch
Meyer Sound Lab.	MSL-3	650-R2, USW-1	Opt	150	3-way	N/A	HL	56.75x21.25x30	265	13 ply 5/8" Finland birch
Meyer Sound Lab.	650-R2 Sub	MSL-3	No	-	1-way	N/A	DR	45x30x22.5	180	13 ply 5/8" Finland birch
Meyer Sound Lab.	USW-1 Sub	MSL-3, UPA-1	Opt	75	1-way	N/A	DR	31x21.5x21.25	115	13 ply 5/8" Finland birch
Renkus-Heinz	MR-1A	LR-2MA	Opt	316	2-way	MF/400, HF/400	HL	27x48x24	178	13 ply plywood
Renkus-Heinz	LR-2MA	MR-1A, SR	Opt	316	1-way	600	DR	27x48x24	175	13 ply plywood
Renkus-Heinz	SR-2A	-	Opt	224	2-way	LF/400, HF/200	DR	51x23.75x17	128	13 ply plywood
Turbosound	TMS-3	-	Std	-	3-way	800	Turbosound HL	33x40x22.5	298	Finland birch 5/8" marine grade
Turbosound	TMS-4	-	Opt	69	3-way	450	Turbosound HL	45x19.75x28	165	Finland birch 5/8" marine grade
Turbosound	TSE-218	TMS-4	No	-	1-way	600	TurboBass HL	27x34x28	187	Finland birch 5/8" marine grade
Turbosound	TSW-124 Sub	TMS-3	No	-	1-way	600	TurboBass HL	26x40x39	250	Finland birch 5/8" marine grade

*Variable according to configuration

horn, and an array of four 1-inch compression drivers.

The AE-10 Theatre Series subwoofer is designed for clubs, theaters and other venues with limited stage space. It is a vented, flyable, processor-based enclosure with dual 15-inch, long-excursion cone drivers. The AE-12 Concert Series subwoofer, for large-scale applications, contains dual 18-

inch cone drivers in a flyable, vented enclosure and must be used with the A-12 processor. Two to four AE-5s are recommended to complement each subwoofer model, and Apogee suggests that the 3x3 be used with the AE-12.

The AE-5 and 3x3 are trapezoidal to minimize internal cabinet reflections; the radiating cone and horn surfaces

can be as close to the adjacent speaker enclosure as possible, to simulate a single point source when arrayed.

Every Apogee RV (road version) processor provides front panel, line-level inputs, a looping output, and speaker-level outputs that eliminate the need for termination panels in the rack. The processors provide frequency dividing, fixed EQ points, correc-

Input Connectors	Con. Opt. Avail.	Components	Signal Processing Device	Crossover & Slope	List Price
Cannon EP-4	No	1x10" AAD M200, 1x2" EV DH1A	AX300 mono 3x	200Hz, 2kHz 48dB/oct	\$2,725
Cannon EP-4	No	2x18" McCauley 6256	AX300 mono 3x	200Hz 48dB/oct	\$2,275
Neutrik NL8MP/EP 8	Yes	2x15" D15X, 1x2" EV DH1A	A-3 PV dual	1.04kHz, 7.6kHz 24dB/oct	\$4,400
Neutrik NL4MPR	Yes	2x18" D-18X	A-12 PV dual	100Hz 24dB/oct	\$2,110
Neutrik NL4MPR	Yes	1x12" D12X, 1x1" HP-1	A-5 PV dual	1.04kHz 24dB/oct	\$2,150
Neutrik NL4MPR	Yes	2x15" D-15W	A-10 PV dual	100Hz 24dB/oct	\$1,785
Neutrik NL4	Yes	2x15", 1x2" M200, 1x1" JBL2426	880EQ mono 2x	450Hz, 3kHz 12, 18, 24dB/oct	\$1,999
Neutrik NL4	Yes	4x15" Community	880EQ mono 2x	50Hz 12, 18, 24dB/oct	\$1,399
EP-6, Banana test	Yes	1x15" RCF L15554K, 1x10" RCF L10750K, 1x2" AD4001	MX800-8T CCEP dual 4x	250, 1.8kHz 24dB/oct	\$5,300
EP-6, Banana test	Yes	2x18" RCF L18P200	MX800-8T CCEP dual 4x	90Hz 24dB/oct	\$1,915
EP-6, Banana test	Yes	1x15" RCF L15554K, 1x10" RCF L10750K, 1x1" RCF N681	MX800-6 CCEP dual 4x	250, 1.8kHz 24dB/oct	\$2,450
EP-6, Banana test	Yes	2x15" RCF L15P200	MX800-6 CCEP dual 4x	90Hz 24dB/oct	\$1,425
Cannon EP-4-14, 13	No	1x15" DL15X, 1x2" DH1A, HP64 60x40	DMC1152DeltaMax mono 1x	1.25kHz 24dB/oct	\$1,820
Cannon EP-4-14, 13	No	1x18" DL18MT	DMC2181DeltaMax mono 1x	100Hz 24dB/oct	\$1,940
Cannon EP-8-14	No	4x10" DL10X, 4x2" DH2MT, 4x1" DH3 w/MTA-42	MTX-4 mono 4x	160Hz, 1.6kHz, 8kHz 24dB/oct	\$4,675
Cannon EP-4-14	No	4x18" DL18MT	MTX-4 mono 4x	160Hz 24dB/oct	\$2,825
Dual Banana	Yes	2x15" w/servomotor	-	80Hz-100Hz 18-24dB/oct	\$2,450
Dual Banana	Yes	2x15" w/servomotor	-	80Hz-100Hz 18-24dB/oct	\$2,200
Cannon EP-8	No	2x15" 2225H, 2445J, 2404H	-	800Hz, 7kHz	\$2,625
Cannon EP-8	No	2x12" 2204H, 2445J, 2404H	-	800Hz, 7kHz	\$2,575
Cannon EP-8	No	2x18" 2245H	-	80Hz	\$2,450
Cannon EP-8	No	1x12" 2204H, 1x?" 2425J, 2344A	-	800Hz	\$1,795
Cannon EP-4, EP-8	No	1x10" K41M, 2x2" K60M, 2x1" K78M	KP-600-EC mono 3x	350, 425, 500, 1k, 1.25k, 1.5k Hz 24dB/oct	\$2,645
Cannon EP-4, EP-8	No	2x15" K46E	KP-600-EC mono 3x	70, 90, 110, 130, 350, 425, 500 Hz 24dB/oct	\$1,750
Cannon EP-4	No	2x18" K47E	KP-600-EC mono 3x	70, 90, 100, 130 Hz 24dB/oct	\$1,750
Cannon XLR	Yes	2x 7", 1x15", 1x1", 100x40 or 60x40	-	250Hz 24 dB/oct	\$1,595
Cannon XLR	Yes	1x15", 1x1", 90x50	-	1.5kHz 24dB/oct	\$995
Cannon XLR	Yes	1x15"	-	250Hz 24dB/oct	\$995
Cannon XLR-3, EP-8	Yes	1x12" Martin, 5x5", 1x2", 1x4" diaph	MX4 stereo 2x, mono 4x	220Hz, 1.5kHz, 8kHz 24dB/oct	*
Cannon XLR-3, EP-8	Yes	1x15" Martin L1540	MX4 stereo 2x, mono 4x	80Hz 24 dB/octave	\$3,375
Cannon XLR-3	Yes	1x18" Martin L1842, 5x5", 1x4" diaph	MX4 stereo 2x, mono 4x	220Hz, 1.5kHz, 80Hz 24dB/oct	\$4,275
Cannon XLR-3	Yes	2x18" Martin L1842	MX4 stereo 2x, mono 4x	80Hz, 24dB/oct	\$2,400
Cannon XLR, 1/4"	Yes	2x15" McCauley 6244	-	125Hz-800Hz 12dB/oct	\$841
Cannon XLR, 1/4"	Yes	2x12" 6334, 2x2" 6520 or 1x1" 6510, 1x2" 472 or 1x1" 471	-	1.2Hz-2.5kHz 12dB/oct	\$1,266
Cannon XLR, 1/4"	Yes	1x18" McCauley 6256	-	80Hz-400Hz 12dB/oct	\$747
Cannon XLR, 1/4"	Yes	1x15" 6244, 1x2" 6520 or 1x1" 6510, 1x2" 472 or 1x1" 471	-	1.2kHz-2.5kHz 12dB/oct	\$964
Cannon EP-4	Yes	2x12" MS-12, 1x2" MS2001, Piezo array MS-P4	MS mono 1x	800Hz, 8kHz 18dB/oct	\$4,670
Cannon EP-4	**	2x18" MS-18	B-2A mono 1x	95Hz 18dB/oct	\$2,110
Cannon EP-4	**	2x15" MS-15	B-2A mono 1x	95Hz 18dB/oct	\$1,549
Hubbell NEMA L14-20	Yes	1x2.4" SSD5600-8, 2x2" SSD3301-8	X-31 w/PM31-M mono 3x	285Hz, 2.2kHz 18 dB/oct	\$4,820
Hubbell NEMA L14-20	Yes	2x18" SSL18-1P	X-31 w/PM31 M mono 3x	285Hz/MR-1A, 100Hz/SR18dB/oct	\$2,590
Hubbell NEMA L14-20	Yes	2x15" SSL15-1, 1x2" SSD3301-8	X-22 dual ch.w/PM22-15	1kHz 18dB/oct	\$2,890
Cannon EP-6	No	2x15" LS-1507, 2x10" LS-1004, 2x1" Turbosound w/2	-	250Hz, 4kHz 24dB/oct	\$4,797
Cannon XLR	Yes	1x18" LS-1802, 1x10" LS-1004, 1x1" Turbosound on 1"	-	250Hz 24dB/oct, 3.7kHz 18dB/oct	\$2,354
Cannon XLR	No	2x18" LS-1802	-	250Hz 24dB/oct	\$2,240
Cannon XLR	Yes	1x24" LS-2403	-	80Hz 24 dB/oct	\$2,974

**Available in Europe only

tive EQ, all-pass filters for phase alignment, and driver protection. Power amp output-sensing circuits use low-distortion limiters to provide driver protection when safe operating levels are exceeded.

Community Light & Sound (Chester, Pa.) recently introduced two relatively low-cost loudspeakers, its first major entry into the arena P.A. market; in the past the company built and sold loudspeaker components and smaller professional systems. The trapezoidal, 3-way, arrayable RS880 full-range cabinet and the VBS415 subwoofer both incorporate Community's 880EQ active EQ signal control unit. Company president Bruce Howze comments, "The RS880 is meant to stand by itself, and the VBS415 is an addition but not a necessity. The VBS415 adds an octave below 50 Hz. It is a relatively compact, bass reflex cabinet featuring long-excursion woofers and high power capacity."

The RS880 is a fully horn-loaded enclosure using two 15s, the lows passively crossed over at 450 Hz. The mid-range has Community's 2-inch compression driver with an exponential-type horn. Rounding out the cabinet is a high-frequency 60x40 pattern

control horn with a 1-inch JBL 2426, coaxially mounted in the upper low-frequency horn. Howze explains, "With that configuration we achieve good alignment of the drivers, because there is virtually no time offset."

Although not required, Community's 880EQ signal control unit is recommended when operating the RS880. The 880EQ uses dynamic equalization controlled by the power amplifier, and it provides the 50Hz crossover point from the sub to the RS880.

In the last few years, **Eastern Acoustic Works** has become a major professional loudspeaker manufacturer. Its 850 Series is one of the hot-selling systems in today's concert sound industry. Primarily designed for touring sound, the KF850 has three horn-loaded subassemblies in a trapezoidal enclosure. The SB850 has dual 18-inch cone drivers in a vented enclosure. EAW's other large-scale P.A. series is comprised of the KF600R 3-way main cabinet and SB600-RD2 subwoofer. The 600 sacrifices 3 dB in output compared to the 850, but is 33% smaller.

Both the 850 and 650 Series use the same dual-channel, 4-way stereo control unit, the difference being the

internal programming cards. Only one unit is necessary for an entire system. Berger describes his MX800 electronic controller as a "closely coupled crossover unit, but not a processor. It does not use dynamic effects that change the tonal balance or response characteristics with power levels. It purely protects against gross overdriving of the power amps. The MX800 uses asymmetrical, sloped filters to equalize the system, provides phase compensation at the crossover points, and has limiter protection circuits. It also provides high-frequency power response EQ and step-down, low-frequency alignment equalization to the subwoofer."

For cabinets, EAW uses 18-ply-per-inch Baltic birch, each piece a shade less than 3/4-inch thick. According to EAW, the thickness varies at different places, and in many instances on the 850 is two layers thick. As for flying and cabinet design, Berger talks of EAW's Virtual Array system. "We have closely matched the coverage angles to the cabinet's trapezoidal shape so they combine rather than interfere with each other. In the case of the 850, it is from 250 to 18k Hz. For the 600 it's from 450 to 18k Hz. That is

"Moving a large mass of air accurately is what I expect from a subwoofer system. It's obvious to me Intersonics designs their subwoofers with that very thought in mind. With a band the caliber of Def Leppard, nothing but ServoDrive would cut it."

— Robert Scovill, Sound Engineer/Mixer

DEF LEPPARD

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The servomotor permits a linear excursion limited only by the radiator suspension, and delivers forces far exceeding those of a voice coil. As a result the SDL's can produce more acoustic power, to lower frequencies, than would be possible for a similar sized voice coil subwoofer system. Further, the SDL's produce less harmonic distortion at twice rated power than most conventional systems do at a small fraction of their rated power!

When operated at full rated power, voice coil speakers typically lose 50% to 75% of their acoustic output and have a significantly altered frequency response due to the effects of power compression. The SDL's incorporate a patented power cooling system which virtually (less than 1 dB) eliminates power compression and provides significant thermal "headroom." This permits large peak powers to be handled without sonic compromise. The SDL's are horn-loaded and use computer-assisted cabinet designs. Thus they have better directivity than vented boxes, especially when multiple units are close-coupled.

The result of these developments is a truly outstanding pro subwoofer system.

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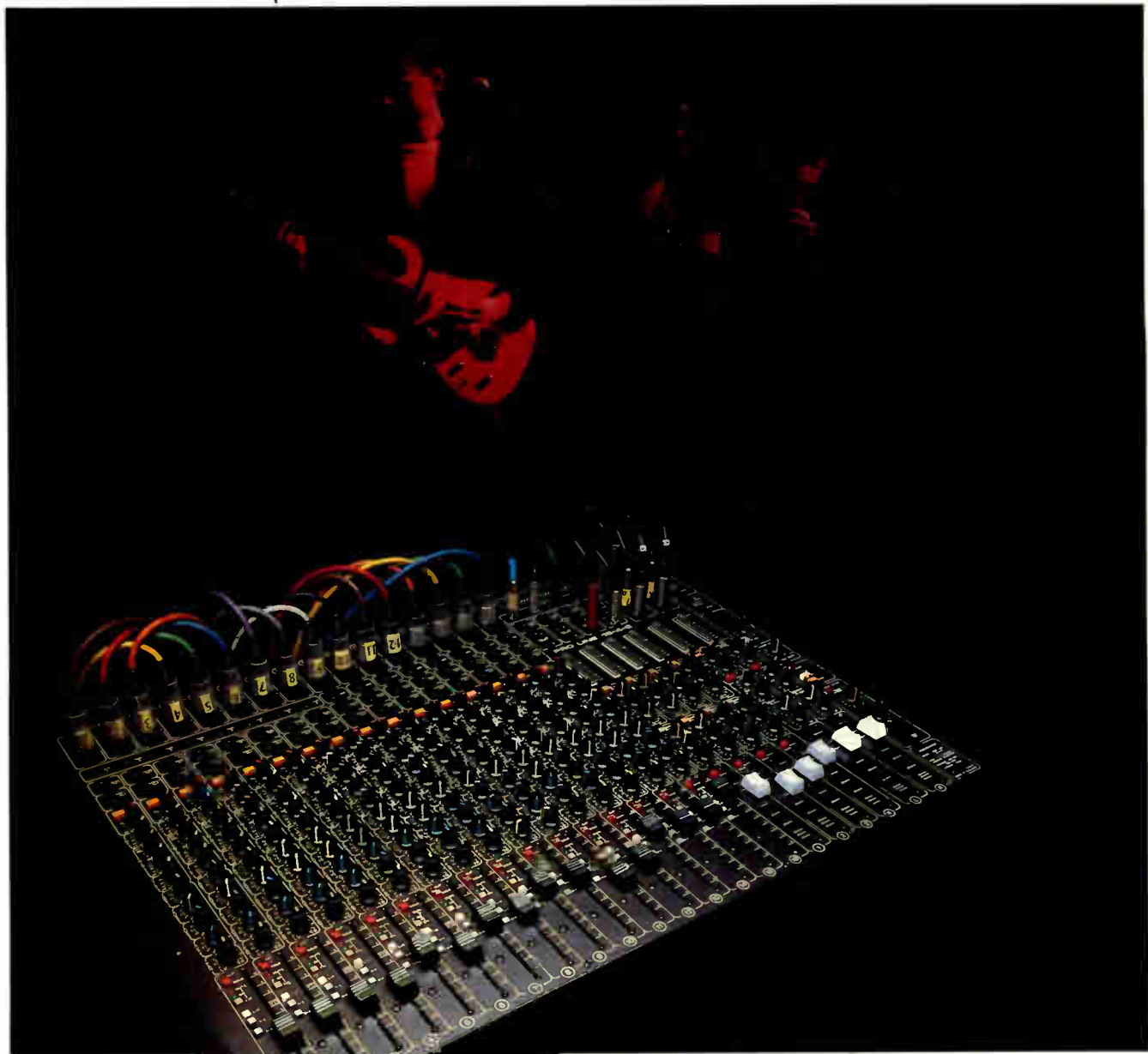
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what makes them unique."

Electro-Voice of Buchanan, Mich., the longtime manufacturer of speaker components and enclosures, recently introduced the MT-4 Manifold Technology system, primarily suited for concert touring and high-SPL installations. ("Manifold" refers to the technique of summing the output of several loudspeakers into a single coherent source.) The MTH-4 and MTL-4 models work together in a two-box, 4-way system. With their square-front design, the identical-looking enclosures may be flown or stacked for a horizontal or vertical 60x40 coverage pattern. The enclosure dimensions facilitate high-density arraying and efficient truck packing.

The MTH-4 is a 3-way, active, horn-loaded cabinet with *four* drivers in each frequency band. On the mid-bass section, four 10-inch drivers are manifolded into a 60x40 constant-directivity horn. The mid-range section's four 2-inch drivers feed one 60x40 constant-directivity horn, and for the high frequencies, four 1-inch HF drivers are mounted on a manifold and horn. Filling out the low end, the companion MTL-4 enclosure contains four high-excursion, 18-inch woofers in a mani-

fold arrangement. The front of each cone exits in a tuned chamber, with porting at the corners of the enclosure. Signal control for the MT-4 is provided by the MTX-4 control unit—not a true processor, but a mono, 4-way crossover with built-in EQ that uses Linkwitz-Riley, 24dB/octave filters with fixed crossover points.

E-V's Delta Max system is designed for smaller applications and venues. It is a true processor-controlled system comprised of the DML-1152, a full-range, direct-radiator cabinet that is fairly traditional except for its mono DMC-1152 processor. The DML-2181 is the companion subwoofer used along with the DMC-2181 processor.

Intersonics (Northbrook, Ill.) offers the high-performance SDL-4 and SDL-5 servomotor-driven subwoofers. They operate primarily below 100 Hz or 80 Hz in permanent and portable applications. In tour situations, servomotor-driven loudspeakers add acoustic output below 50 Hz and are used typically to fill in where normal vented boxes cut off.

Intersonics' unconventional design employs servomotors to convert audio signals into sound. Amplified signals cause the servomotor output shaft to

rotate back and forth. The polarity controls the direction of rotation, the speed is proportional to voltage, and the force is proportional to current. Shaft rotations are converted to linear motion by a push-pull, belt-drive system that transfers the motion to the compression-loaded speakers. Intersonics acoustical engineer Thomas Danley says they replaced the voice coil and magnet portion of a loudspeaker with a low-inertia DC servomotor and rotary-to-linear converter, because "in applications where a large excursion is required, a voice coil has shortcomings. The servomotor allows a linear excursion that is limited only by the piston mechanism involved, rather than the limited linearity of a normal loudspeaker.

For many years a leading supplier of loudspeaker components for sound reinforcement applications, **JBL Professional** (Northridge, Calif.) now offers its own professional line of large-scale P.A. cabinets. The Concert Series centers around a flyable, two-box system comprised of a full-range, direct-radiating box and subwoofer. Three full-range cabinets are available: the 4870 has two 15-inch bass drivers and is offered with a 60- or



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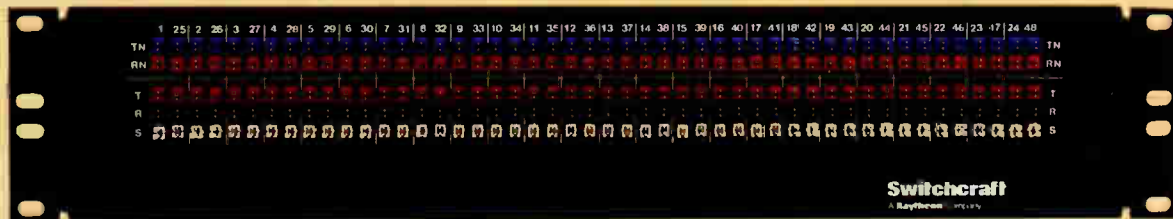
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90-degree horn, with or without tweeters (the 60-degree horn is recommended for large-array systems); the 4850, similar except for its 15-inch bass drivers; and the compact but powerful 4825 for smaller applications.

Two subwoofers—the 4845 single 18-inch and the 4842 dual 18-inch—provide low-end reinforcement. Supplemental flying cabinets round out the Concert Series. The 4866 long-throw box (two 40-degree horns in a small, trapezoidal enclosure) concentrates sound in a narrow beam. For compact down-throw in an arced array, the 4860 mid/high box with a 2-inch compression driver and 60- or 90-degree horn, or the low-frequency 4847 with a 15-inch driver, can provide close-proximity seating coverage. JBL's Hector Martinez states, "People tend to forget there are a variety of trouble spots in venues that a main array will not fill. These specialized cabinets address this. All Concert Series enclosures can array with each other, no matter which cabinets are used.

"Our company believes the quality sound system is based on its components, not the magic of a processor," Martinez continues. "Our crossovers do the extent of the signal processing up front. The rest we leave to the user." The JBL/UREI 5235 dual-channel electronic crossover unit (stereo 2-way and mono 3-way) is programmable with plug-in cards.

Klipsch & Associates (Hope, Ark.), the well-known manufacturer of high-tech home loudspeakers, now offers the professional KP-600 system. Designed for high-output, high power handling applications, the KP-600 is a modular, 5-way, three-box system. It is extremely lightweight due to its fiberglass laminate and softwood core construction, and an internal aluminum skeleton provides added strength. For flying applications, the cabinets connect via the skeleton, which distributes the weight evenly throughout the stack.

The KP-650-HF modular high-frequency cabinet has a mid-range/tweeter (MT) and a mid-bass module on opposite ends of the enclosure. These modules can be interchanged or rotated to fit the application. The MT module uses two 2-inch compression drivers on a two-barrel horn, and two 1-inch compression drivers on another two-barrel horn; the mid-bass module contains a 10-inch driver cou-

pled to a horn. The KP-650-LF low-frequency cabinet couples two 15-inch drivers to a single horn, while the KP-650-SW subwoofer has dual 18-inch drivers in a vented enclosure.

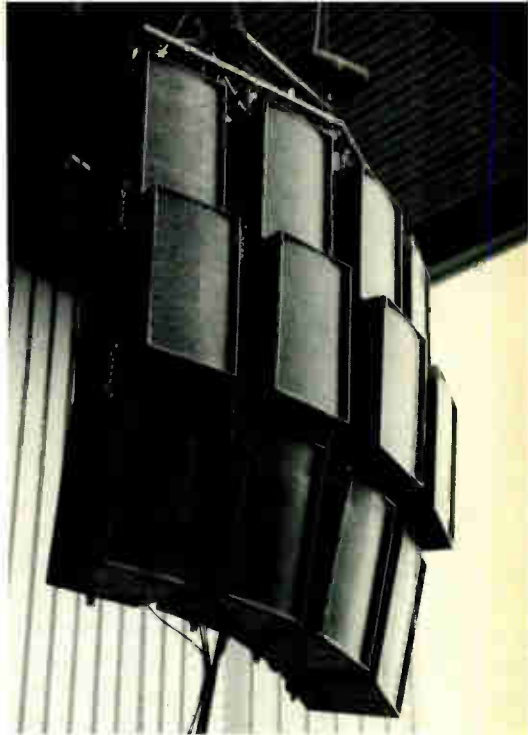
Running the KP-600 system does not require a control unit, but Klipsch recommends using its KP-600-EC electronic crossover/processor. It provides EQ, compensates for sensitivity differences in the drive modules and has a frequency-selectable highpass filter. The subwoofer's upper roll-off and the woofer's lower roll-off are independently selectable.

MacPherson Loudspeakers (Lansing, Mich.) is a relatively new manufacturer on the scene. Its first and core product, the M1 full-range cabinet, is designed for auditoriums and clubs. Owner David MacPherson states, "We went for wider horizontal dispersion, more than most arena system boxes." The radial horn can be rotated within the box to adjust the cabinet's dispersion to be predominantly horizontal or vertical. "As you rotate the horn, you can also rotate the box," MacPherson continues. "That lets you stack the cabinet in different fashions to achieve different types of coupling and alignment of the drivers." The supplemental B1 bass cabinet (for those bass-hungry situations) is essentially an M1 without the mid and high components.

MacPherson's newest product, the M2 trapezoidal enclosure (and another non-processed box), "uses a lot of passive notch filtering internally to adjust the response to flat. We want to avoid processors," MacPherson says.

When **Martin Audio** of London (distributed in the U.S. by Martin America of Chatsworth, Calif.) started designing the F2 system, it considered the options of building a one- or two-box system. Owner David Martin comments, "The trouble with one-box systems is that the cabinet's ability to project over distances and sound clean at high levels is limited by the fact that the horns will not couple."

Martin also felt a cabinet was needed that would pack efficiently in a truck in the U.S. or Europe, so much design work went into reducing the overall depth of a low-frequency, horn-loaded cabinet to make it a maximum of 30 inches without sacrificing performance. The company selected 22.5 inches as the width for the F2 system, which was designed for vertical stacking. The top F2 box is variably configured in a rack-mount



Martin Audio F2

unit into which you can load a combination of horns and drivers. (This is why the Buyer's Guide chart doesn't provide a set price for the F2 cabinet.) The rack-mount concept offers flexibility and protects from the obsolescence factor found in fixed-format systems. Quick loading of any combination is possible, although three configurations are widely used. The first, the "combi box," holds a mid, a 2-inch entry horn and a super-tweeter that usually uses JBL 2402 bullets in a triple array. The second configuration uses a 1-inch horn for highs, while the third is a fully loaded rack with three mids, along with three highs and two triple-packs of tweeters in another rack.

The companion F2B is a dual 15-inch driver, compact, bass horn enclosure. Two other Martin models are the VRS1000, a vertical one-box with in-line horn intended for 5,000-seat venues and ideal for fixed installations, and the BSX sub-bass with two 18-inch drivers, a model quite popular with English clubs and discos.

Electronic control units are needed for all models listed. Martin notes, "We use processing by introducing soft limiting. Our MTX-4 controller is designed to avoid the 'crunch' factor and give a sweeter sound at a high level. Our philosophy is that the system should sound exactly the same when driven flat out as at lower levels. If you condense a large bass cabinet into a small box, you have to use



Renkus-Heinz mid-high MR-1A

every trick to get the maximum acoustic output. The driver requires more power to compensate for the small box. So I regard a controlled system important for a small loudspeaker system. The secret to processors is to know how much—or how little—to use.”

McCauley Sound, founded in 1979 by Tom and Pete McCauley, produces assembled professional loudspeaker enclosures and sells a line of complementary horns, cones and drivers, building almost every part at their Puyallup, Wash., facility. Tom McCauley comments, “The key to our system is the components in the enclosures. We stress this because of the considerable time spent designing and actually making the parts ourselves. The reason we have such a small failure rate is because few things are built outside our shop.”

McCauley sells a cost-effective main P.A. and subwoofer system for medium-sized reinforcement applications. The three-box system, designed for small arenas, auditoriums and large clubs, is composed of the 814 box housing two 12-inch speakers and an HF section with a 1- or 2-inch driver, the 840 dual 15-inch bass bin, and the 850 with a single 18-inch. Most systems sold by McCauley are tri-amped, the 814 matched with a pair of either low-end cabinets. The 824 2-way box holds a 15-inch and a horn driver.

The MSL-3 cabinet built by **Meyer Sound Laboratories** in Berkeley, Calif., is a high-power, arrayable loudspeaker that has become a leading concert cabinet. This bi-amped, horn-loaded, vented enclosure holds two 12-inch cone drivers, a 70-degree horn with a high-frequency driver, and an array of tweeters. The philosophy behind building the cabinet was to create a high-powered box that would go below 100 Hz and couple with a subwoofer located away from the main system.

Meyer’s mono control unit required for the MSL-3 uses electronic crossover and EQ circuitry, delay for the phase alignment of the high-frequency driver, sliding filters that automatically activate under high power conditions, and RMS limiters that protect the speakers from overheating. John Meyer states, “The system is linear when not driven to the limit, and there is no active processing or frequency modification going on unless the system is being driven into overload.”

The 650-R2 subwoofer works with the MSL-3 and consists of dual 18-inch cone drivers in a bass reflex enclosure. It is not flyable and requires its own control unit. Meyer’s other subwoofer is the USW-1, a compact, flyable cabinet with two 15-inch cone drivers. It doesn’t go quite so low as the 650-R2. This subwoofer is usually found in clubs, bass player’s rigs, theaters and A/V installations, and requires an electronic control unit.

Renkus-Heinz (Irvine, Calif.) makes the Smart System of main P.A. loudspeaker enclosures, widely used in the industrial and A/V markets. The MR-1A/LR-2MA is a full-range, processor-controlled arena system, and the SR-2A flyable, full-range cabinet handles medium- and long-throw applications. The MR-1A and LR-2MA enclosures are the same size and weight; two LR-2MAs are recommended for each MR-1A. They are crossed over at a relatively high point. Russ Farrell of Renkus-Heinz states, “We use a light cone assembly to give excellent high-frequency response. This is necessary because of the 285Hz crossover point, and in order to work with the X-31 Smart Processor’s sliding frequency circuit, which protects the mid-range driver from excursion damage.”

When excessive excursion is detected, the crossover frequency point shifts upward instantly. In addition to protecting the speakers from damage,

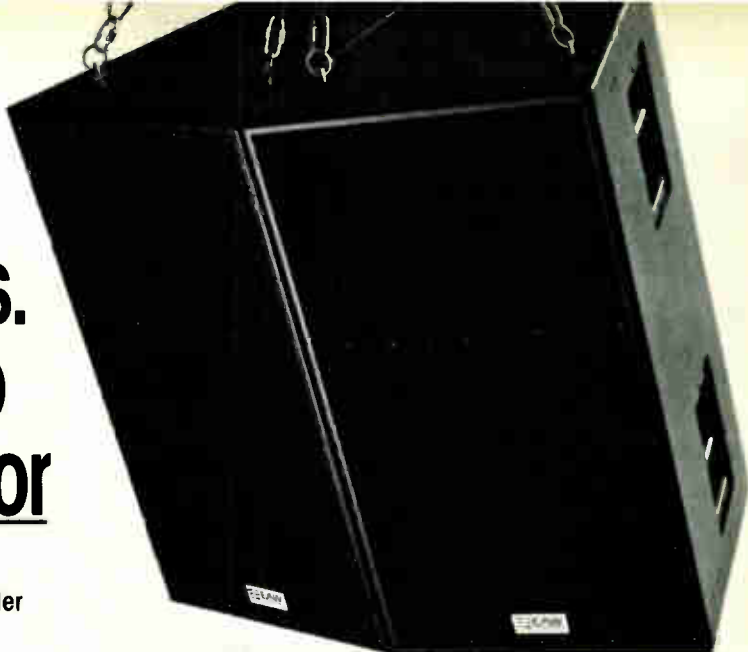
the mono-switchable, 3-way or 2-way processor features active high and low EQ, time delay correction and switchable, automatic loudness compensation. Independent “sense lines” monitor the amount of power sent to each frequency band; if long-term excess levels are present, the affected band goes into easy compression. To achieve flat power response in a room, R-H uses 18dB/octave slopes rather than the 24dB/octave slopes favored by others. Removable program cards match individual models and eliminate the need to purchase additional processors.

Turbosound (distributed in the U.S. by Edge Distribution Corp., Millbrook, N.Y.) was one of the largest sound reinforcement companies in Europe before selling its live sound division in 1985. Turbosound developed two worldwide patented principles for use in its TMS-3 cabinet. Dan Abelson of Turbosound says, “The patents are for methods of loading cone loudspeakers. We put even, high compression on both sides of the cone to reduce excursion. This increases the enclosure’s transient response. At the same time, the horn loading gets extremely efficient. We get natural excursion control, so we don’t require artificial compensation. Turbosound believes that a system can have good power and frequency response handling without needing artificial, external compensating electronics that add noise to the signal path. The single most important thing about our horn-loaded boxes is that the mid-range device goes 250 to 4,000 Hz without a crossover point. This eliminates a considerable amount of harshness and third-harmonic distortion present in most systems that cross their compression driver somewhere between 1 kHz to 2 kHz.”

The TMS-3 is a full-range, tri-amped cabinet for high-level applications. Two 15-inch bass drivers and two 10-inch mid-range drivers are loaded with Turbosound’s patented devices, along with a 2-inch, high-frequency driver. The TMS-4 is a full-range, bi-amped cabinet with an 18-inch bass driver, 10-inch driver and 1-inch tweeter. The phase plug-loaded mid driver is the same for all Turbosound mid-range units. The TSE-218 is a dual 18-inch driver bass enclosure, while the TSW-124 is a low subwoofer enclosure featuring a 24-inch drive unit that incorporates a 6-inch voice coil. ■

“No one can repeal the laws of physics. The challenge is to make them work for you.”

KENTON FORSYTHE
Director of Engineering; Co-Founder



Case in point: The KF600, EAW's newest system for performance applications. It measures just 33" high and 19 3/4" on a side. Yet KF600s produce 130 dB, averaged from 65 Hz — 20 kHz.

A principal factor behind that small miracle is our unique Transverse Geometry™ low frequency

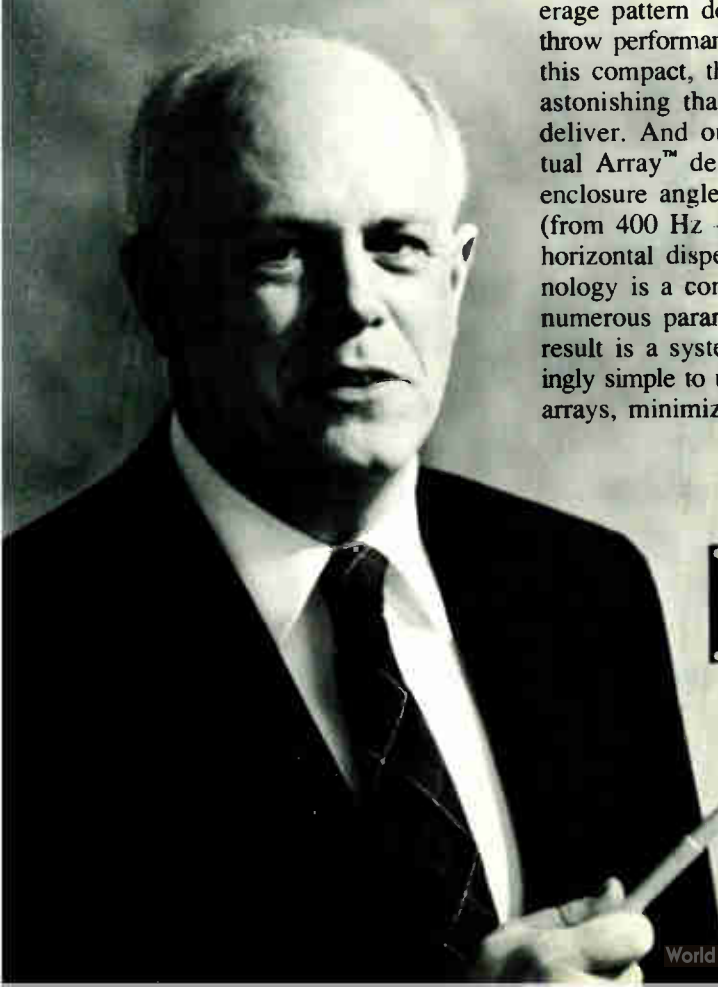
subsection. In this ingenious example of physics at work, the woofer faces *sideways*. Yet its entire output is frontally focused. The design uses dual chambers (one tuned, the other acoustically open) to accomplish this acoustic rotation while maintaining high woofer efficiency.

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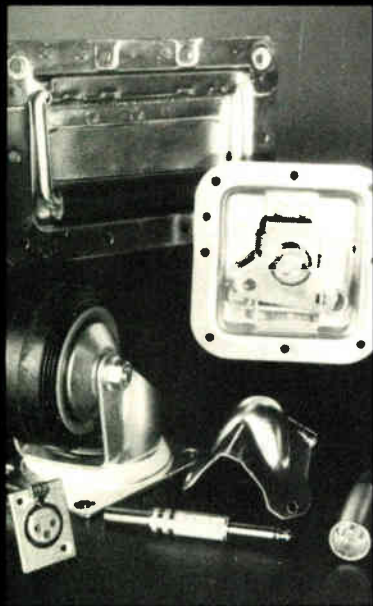
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Circle #053 on Reader Service Card

—FROM PAGE 94, FUTURE SOUND

tions for the sound rental business is Chicago's dB Sound. Chief engineer Harry Witz has designed an Apple Macintosh HyperCard routine that allows bar code scanning, cataloging and graphic tracking of dozens of constantly changing equipment racks loaded and received monthly off tour. The application (Fig. 1) simplifies the monumental task of counting racks and mounting components coming off the road (tracking component load to rack number to system color). It also eases the assembly of systems "on paper" before actual prep and load-up. Pictures and descriptions of components can be called up from "Art" cards and, by clicking the appropriate button, inserted into a given rack and system assignment, automatically updating all pertinent system cards and tracking info.

A second series of dB Sound programs provides three-dimensional layout and scaling of speaker stacks and arrays (Fig. 2), complete with angles and dimensions. What once took hours now takes minutes. For Witz and dB Sound, this is only the beginning of computer-related projects designed to dramatically simplify the work load.

Another innovator is Montreal's Audio Analysts, whose vice president of engineering, Albert Lecesse, has in the past used computers in TEF analysis, speaker enclosure layout and horn design. The company's current cooperative project (Fig. 3) involves interfacing Crown power amplifiers with Macintosh computers and proprietary software. The not-yet-released hardware uses microprocessor front ends and information feedback circuitry to provide remote control and screen readout of such parameters as sequential power-up, level, signal polarity, status, temperature and signal headroom sensing. Future designs could incorporate active delay circuitry in each channel, allowing remote speaker component time/space alignment and electronic aiming of speaker arrays.

Audio Analysts' research/manufacturing affiliate, CADD, already offers a stereo, 3-way, fully digital crossover with variable parameter compression/limiting on each output, 60 dB/octave crossover slopes, switchable constant-directivity horn EQ compensation, and multiple signal delays for component alignment. This all-in-one, fully digital-drive rack processor will soon

be standard fare for working sound companies.

The San Francisco-based Monster Cable has already released its first fiber optic mic snake. Dubbed the LS-12 (for Light Speed 12-channel), the Monster OptoDigital Systems product is described as a high-clarity, digitally multiplexed fiber optic microphone distribution system, capable of running 12 mic- or line-level signals down a toothpick-sized cable up to 3,000 feet, without any signal degradation. In addition to weight and size reduction (pounds vs. hundreds of pounds), advantages include the extreme preservation of audio fidelity, simplified routing/splitting and freedom from RF, static interference or ground-related hums and buzzes.

In Eugene, Oregon, Acoustic Sciences Corporation (ASC, makers of the Tube Trap) is experimenting with large-scale, expandable, absorptive screens for reflection control in acoustically difficult situations. On a smaller scale, ASC is applying Tube Trap technology to controlling low-frequency buildup around speaker stacks and arrays. In conjunction with Rellis Sound Reinforcement, numerous shows have had their systems "tubed-up," vastly improving onstage, low-frequency accumulation due to back-lobing off main speakers, bass guitar amps and keyboard cabinets. Clients such as B.B. King have raved about the vast improvement in stage monitor clarity after being tubed.

TOMORROW

We could go on, of course; this has only been the most random of samplings. Dozens of companies are equally innovative in designing for a technological tomorrow. There have been demonstrations of fully digital systems (everything except mics and speakers), workstation-type audio consoles, interactive processors and high-power speaker systems of greatly reduced proportions.

What is to come? It is you, the professional, who will determine that. Only your imagination is the limit. In the meantime... see you in the future. And keep up the good work! ■

Mike Joseph is a long-time prognosticator of future socio-techno possibilities, an audio mixing engineer and sound system designer based in the San Francisco Bay Area. He recently assisted Electro-Voice in launching its Concert Sound Marketing division.

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SOUND ON STAGE

SOUNDS LIKE JAZZ

FESTIVAL REINFORCEMENT FROM CHICAGO TO SWITZERLAND

by Bill Milkowski

Big summer festivals are all the rage, from Nice to New Orleans, Montreal to Mount Fuji and all points in between. Each sound engineer at these various venues inherits a unique set of problems—acoustic and otherwise—and sometimes it takes ingenuity and intuitive cunning to make the best of trying circumstances. Two cases in point: the Chicago Jazz Festival, held outdoors in Grant Park near the shores of Lake Michigan, and the Montreux Jazz Festival in Montreux, Switzerland, located along picturesque Lake Geneva in the heart of Swiss Alps country.

Above, Grant Park offers enough room for Chicago Jazz Festival seating of 15,000, with an additional 125,000 people on the grounds. Below, downtown skyscrapers loom above the main stage.



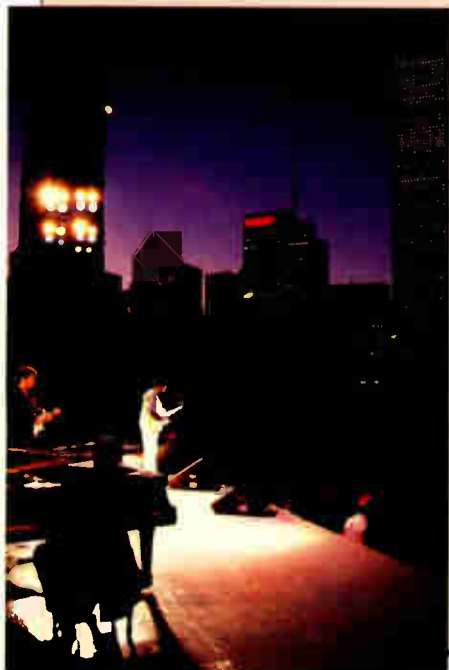
COPING IN CHICAGO

Because the Chicago Jazz Festival occurs at the Petrillo Bandshell in Grant Park, just a few blocks from five major radio transmission facilities in Chicago's Loop, RF presents a major problem. "As a result of all the RF filtering into the area, we don't use any radio mics," says chief engineer Gary Cobb. "They've been found to be consistently worthless, especially the wireless instruments, which don't seem to have the quality of the high-end, wireless vocal mics. We've had some performers who bring their wireless horns in, like Miles Davis and Eddie Harris. Sometimes it works, sometimes it doesn't."

One memorable episode with wireless microphones occurred at a gospel festival held there earlier in the year. "We had a group in from London that brought in all wireless guitars and basses, and we couldn't use them. They were picking up an Hispanic radio station real loud. So it seems like

connectors and transformer isolation make the biggest difference down here in eliminating RF."

Another problem Jazz Festival organizers have faced is complaints from residents about the noise levels at night. As stage manager Keith Fort puts it, "Two years ago the Department of Consumer Services' environmental protection division came out at the request of the residents in those high-rises across the way—that's some expensive real estate, and those residents have powerful friends—and they took dB readings. They discovered that on the top floor of the building, which is maybe 20 stories tall, the levels were 12 dB higher than they were at ground level. And we tried to figure out what that was. Best thing we could come up with was the sound must be bouncing off a thermocline in the air. It doesn't seem to be bouncing off the ground. So we tried to solve that by raising the height of the delay towers out on the grounds to



increase the angle between the long-throws, which was apparently causing the problem since they weren't complaining about bass sounds; they were complaining about the upper register instruments.

"So the towers have now gotten to a pretty scary height of 40 feet, and I won't go any higher with them, just for the safety of the people who load them. But I haven't had any complaints this year, so maybe we've alleviated the problem."

Two huge towers of sound gear on either side of the stage cover the main seating area of 15,000. Each is equipped with Electro-Voice speakers, with a few exceptions. Chief engineer Cobb runs it down: "We're using four E-V single 15-inch bass boxes per side, three dB Sound mid-range horns loaded with E-V 12-inch drivers, and four JBL double 12-inch cabaret boxes or eight JBL 12-inch E-120s per side. Then we go up with a single 60-40 crossing in from each side to cover the front. We baffle it off with Sonex so it doesn't fall onto the stage at all. After the 60-40s we've got E-V 90-40s, then above that the 40-20s, which we call White Whales. Those cover almost to the end of the seats, just before the grassy area begins. To cover beyond that, we have double 40-20s coupled together to give us 40-10s. Those are going from the house position out to the first set of delay towers, some 300 feet from the stage. That's everything from 1200 cycles on up. The amplification is all Crown MT-1000s, except for the high frequencies, which use Crown PSAs. I found that amp to be a little faster than the MT-1000s. Those MT-1000s are all strapped in mono for the lows and mids, and we're using the PSAs in stereo configuration for the top end. We're using EV's recommended crossover, the three-way XEQ-3. It's got time-shift points, gain and certain EQ compensation for the high-frequency horns. And we use dbx limiters on the overall system."

The five delay towers in the grassy knoll beyond the seating area are designed to cover crowds

of up to 125,000 for this free outdoor festival, now entering its 11th year. The first set of three towers is spread out across the field 300 feet from the stage. The next set of two towers sits about 500 feet from the stage. Each tower is a self-contained mono unit equipped with full-range JBL cabinets, using Crown amplification with E-V XEQ-2 crossovers.

"The delay towers are timed a little bit later than the actual time delay," explains Cobb. "We're using Lexicon PCM-42s to delay it 20 to 30 milliseconds later than the actual ETC, the arrival time of the sound. The idea is to distract the people from noticing the cabinets up there in the delay towers. It's a subtle difference. Several times people have asked us, 'Are these things really on?' If we turned them off, they'd notice a level difference real quick. The whole idea is that they don't sit out there on the grass and think, 'Yeah, the sound is coming from these towers.' You want them to focus on the stage and the stage system. And by delaying it slightly later, it does take the focus away from the towers."

Cobb operates the house mix from a tower nearly 220 feet from the stage. His only complaint, he says, is that the mixing tower is located just slightly off center, which poses a problem in mixing stereo. "So I have to deal with hearing more of the right tower than the left tower, and then imagine that it's even," he says. "So next year we're going to push for building the sound tower on top of the center position."

Other natural problems Cobb deals with each year are heat (makes the high frequencies float away), wind (scatters them) and humidity (further confounds the mix). He sits at a 32-channel Soundcraft 500 console and uses dbx 160X and 166 compressors on the system.

One other problem that Cobb helped solve in the festival's early years was perpetual ringing at 160 Hz. "Being constructed of wood and designed for acoustic music, the bandshell tends to have a problem at 160 cycles. Consequently, any bass cabinets sitting

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on the stage tend to make the stage ring very seriously at 160. The first couple of years we'd have to keep notching 160 out, just so the system could come on. We weren't having any high-frequency problems, just that 160 area. So after three or four years of this, we suggested to Bridgewater Sound [sole supplier of sound reinforcement equipment since the festival's inception] that we incorporate kinetic shock-mounts. So we purchased several spring shock-mounts, or decouplers. Now, all the low-frequency cabinets sit on the first deck above the stage, and they're all floated, which allowed us to bring 160 back into the picture."

Yet another challenge is the acoustic nature of the bandshell itself. Monitors feeding back into the shell presented an ongoing problem, but the sound crew solved that one by hanging curtains behind the bands to cancel out the shell's natural acoustic

properties.

"In this situation, we don't need the shell's reinforcement, so each year we've been adding more drapes. There used to be just one back drape, now they've added the two sides and two inner sidewalls, and it seems to have made a big difference. I used to get monitors coming back at me very hot; now I get very little of that."

Given the eclectic nature of the Chicago Jazz Festival, Cobb must deal with a wide range of mixing variables. Though generally a straight-ahead jazz festival featuring mainly horn players, pianists, drummers and upright bassists, there is the occasional electric ensemble. And a large group like Sun Ra's Arkestra always presents a problem.

"There's 20 musicians on stage and they're constantly moving around. They have three drum kits and several hand percussion instruments. And the problem comes when they march around stage and trade mics—trumpeter

to vocalist, flutist to vocalist. So you're constantly watching them shift positions and hoping that someone on stage can call you some cues if they see something strange coming. Because sometimes it takes a little time searching through 32 inputs to find out which one the guy is on when he starts soloing. It's sort of like musical chairs with microphones."

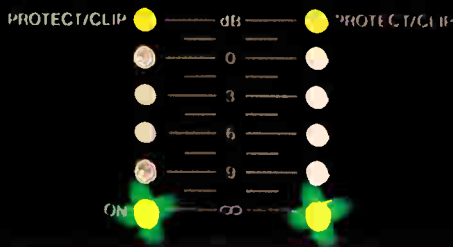
The Art Ensemble of Chicago, notorious for group improvisation, presents another kind of problem. "With that type of music, it's so subjective as to where things should really go. With a traditional trio or quartet, you get a good balance and try to keep some acoustic-type feel. The challenge with The Art Ensemble is where to place things and at what level. And deciding who is actually taking a solo, since they often solo simultaneously. It's a little rough, and in fact you become kind of a sixth member of the band in making the decision about where to place each sound in the mix.

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"I occasionally get some feedback from members of the Jazz Institute who are familiar with their music, or from a group or individual in the audience. You always get, 'Turn this up, turn that down. What's the matter, can't you hear?' Then the next person walks by and says, 'Hey, that's a fantastic mix, you've got it just where it's supposed to be.' So I take a lot of those comments with a grain of salt and try to make the decision myself."

Cobb has owned a local P.A. company in Chicago for the past ten years and recently opened a 24-track automated room, ARS Recording Studio & Tape Duplication in Alsip, Illinois. He will continue to mix the sound at the Chicago Jazz Festival each summer. "This is a good gig," he says. "You're here for five days, you kind of make an apartment out of the mixing tower here. The daily routine is 10 a.m. 'til midnight with two days' setup prior to the festival. And it's not like a rock and roll system that can roll in and be up and running in a couple of hours, because it's all components. There's a lot involved in fine-tuning this system, angling and pointing each cabinet to get the widest coverage with the least amount of overlap. Everything is aimed in strategic ways and that all takes time. And I love it. For me, it's a kind of break from being locked up in the studio day after day, so I look forward to it each summer."

MANAGING IN MONTREUX

Chris Ridgway has been the house sound engineer at the Montreux Jazz Festival for the past four years. Originally a musician from Manchester, England, he broke into the sound business in 1979 when he went to London and started knocking on doors, eventually landing a job with a company called Muscle Music that handled sound and lights for The Jam. He went through a series of other gigs before ending up at Montreux. "That's the way the business works," he says. "You make one contact and if you do a

good job, the phone rings. One thing leads to the next. It's word-of-mouth reputation, and you're only as good as your last gig."

The Montreux Festival, now in its 23rd year, is held indoors at The Casino in a sprawling space comprised of three rooms. The original, historic Montreux Casino caught fire and burned to the ground one night in December 1971, in the middle of a concert by Frank Zappa (an event immortalized by Deep Purple's classic "Smoke On The Water"). The new Casino with its three-way room setup had plagued sound engineers, but Ridgway solved the inherent acoustical problems by radically altering the sound reinforcement design.

"The year I came here, the mixing position was up in the gallery, some 20 feet above the audience's heads and far off to the left of center. It was ludicrous. When they offered me the job I said, 'If you want me to do the job, then we must take the whole setup to a professional level... put the mixing board down on the floor in the center of the house, and get some outboard effects, not just one reverb and a tape machine. We simply have to take it to another stage and look at the system from a new perspective.'"

The sound system previously consisted of various Electro-Voice cabinets and some free-range horns positioned around two columns on either side of the stage. In Ridgway's opinion, "It was not a full system. It was more like vocal reinforcement, so it was inadequate."

Ridgway's first move was to take the house mixing board, a 32-channel Yamaha PM2000, down from the gallery. He added a bunch of Electro-Voice speakers around the stage pointing at the two adjacent rooms on either side. And he brought in a Lexicon 224 digital reverb and a Roland SDE-1000 digital delay, along with dbx compressors and 27-band Klark-Teknik parametric equalizers across the system. It was a vast improvement.

Last year, the Montreux Festival entered into an agreement with Meyer Sound Labs, which now

supplies all the speakers for the house sound and monitors. "With our full-range Meyer system we seem to be getting sound to all areas of the venue, which is very difficult to achieve, given the three-way nature of the space," says Ridgway.

"To look at it," he continues, "you've got to take into account the sight-line aspect. It has to be free from all these different perspectives—stage left, stage right, the front and the galleries. And we can't have a system that stands on the floor since that would obstruct sight lines and television cameras [each night's program of the 16-day festival is filmed for broadcast on Swiss television and for commercial distribution around Europe]. So we have to consider a system that would be flown."

Ridgway hung the main system in stereo with two Meyer MSL-3 units, one per side, and a 650-R2 subwoofer per side for bass and kick drums. That took care of the main concert area. A matched set of two MSL-3s and one 650-R2 took care of each of the adjacent rooms. Initially, the bass units had been flown, but Ridgway changed that when the Meyer system came in.

"Sometimes it's absolutely necessary to fly the bass units, but from an engineering perspective I don't think it ever works. Having the kick drum coming from 20 feet in the air can be disorienting. And we found that it would cause problems across the mic lines to fly bass across the front. So instead I insisted that we have the bass standing on the floor."

To deal with the three hexagonal-shaped rooms, Ridgway runs three matrix sends off the board—left and right stereo for the main concert area, and a third feeding a mono line for the side systems. Though he is currently working with the Yamaha PM2000 board with an 8-channel Peavey sub-board, he hopes to upgrade to Yamaha's 40-channel PM3000.

Ridgway's current outboard gear includes a Yamaha SPX90, Yamaha REV7, Lexicon PCM-70, Lexicon 480, Roland SDE-3000

digital delay and a combination of dbx and Boss compressors. He uses Meyer CP-10 parametric equalizers across the system, "which really is a quantum leap in EQ, because it works like a finite filtering situation. You can instantly find those frequencies you want removed and just take them out, unlike the 27-band aspect where you are pulling out maybe three times what you require in trying to solve a problem area. It's a whole different ballgame, as you Americans would say."

There are occasions, however, when Ridgway's setup just won't do. Groups like the Carlos Santana/Wayne Shorter band or the Pat Metheny Group are accustomed to 64-channel boards with substantial outboard effects. In those cases, he explains, "They'll bring in all their control gear and set up next to mine. They give me two feeds, stereo left and right, which I feed into my board, which then hits the system. It's really an attempt to compromise from 64 channels down to 30, and it is a bit difficult, but it works."

The monitor system, which is handled by Ridgway's partner, Nigel Pinhay, is also all-Meyer, which he describes as "active, very directional, very efficient." He runs a series of 12 UPA-1A loudspeakers across the stage and mixes with a 32-channel Soundcraft 500 board. His outboard gear includes a Yamaha REV7, a Yamaha SPX90 and Klark-Teknik TN360 graphic equalizers. The system is powered by BGW amps.

Besides mixing the house sound, Ridgway is also marginally involved in all the live recording that goes on at the Montreux Jazz Festival. The in-house recording facility, Mountain Studios, has been documenting the festival since 1975, resulting in more than 200 *Live at Montreux* albums. Ridgway says, "They [Mountain] have 30 tielines to the stage, which are split. So one microphone goes to them and simultaneously goes live here on every single line."

Mountain's recording engineer, Dave Richards, says, "We've still got the same old Neve 8042 we

had back in 1975. I keep replacing switches and putting in new meters, things like that, but we haven't done many things to update compared to other studios. People seem to really like the sound of this old Neve. It's like a great old car. We don't have all the gadgets and facilities, but we have a good, warm sound, something we've always been known for."

Last year, Mountain tested out Sony's PCM-3324 digital multitrack at the Jazz Festival. The jury is not in, but Richards hinted that it may be the way of the future at Mountain. ■

Bill Milkowski is a New York-based freelancer whose work appears in many different magazines.

Cities Sound Off About Loud Music

High Court to Decide NY Noise Case

by Randy Savicky

Summer truly is the time for dancin' in the streets—and at a variety of other outdoor settings, like parks, piers, fields, meadows and outdoor stadiums. Yet, while concertgoers and touring sound personnel both look forward to a lively summer music season, never before has the issue of noise levels at outdoor concerts been such a publicly debated issue from coast to coast.

For example, in Southern California, the Pacific Amphitheatre and residents of Costa Mesa are arguing about whether concert performances at that arena have broken the county noise ordinance.

Across the country in New York City, another dispute about controlling the level of noise at concerts—Ward vs. Rock Against Racism—has progressed from a local dispute to the U.S. Supreme Court.

The question the Supreme Court must decide in this case is the constitutionality of a New York City noise-control regulation that requires use of a city-supplied sound

—CONTINUED ON PAGE 170

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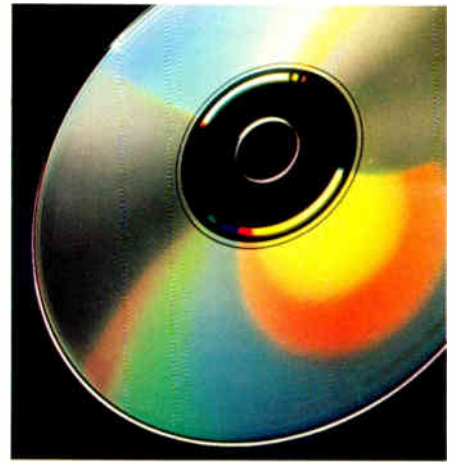
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Future Disc Systems provides full digital and analog mastering and complete digital editing for compact disc, record, R-DAT and cassette. **Facility Managers:** Gary Rice and Kim Hahn. **Receptionist:** Laura Gonzales. **Engineers:** Steve Hall, Tom Baker, David Hernandez and Gary McGachan.

Future Disc is comprised of two custom mastering suites. Analog consoles are equipped with Sontec equalizers and compressor/limiters. There are Studer and Ampex tape machines. Cutting lathes are Ortofon and Neumann. The Harmonia Mundi digital console

contains digital equalization, limiting and digital level controls. A full compliment of Sony and Harmonia Mundi digital gear can be used to keep your digital product within the digital domain while being processed. We also specialize in digital editing, allowing for creative and exact edits and assembly for your compact disc masters.

We are proud to be involved in the mastering of many major projects, including: *Bobby Brown, Traveling Wilburys, Paula Abdul, Sheena Easton, Karyn White, Tom Petty, and the Jacksons.*



MUSE PRODUCTIONS

PO Box 43, Auburn, AL 36830 (205) 821-0088 FAX: (205) 821-0088

Muse Productions, one of the Southeast's fastest growing sound reinforcement and lighting companies, is now proud to offer APOGEE Sound Inc. speaker systems for mains and monitors.

The APOGEE 3X3 concert loudspeaker and its attendant 3X3 Dual Channel Processor are an expertly engineered, three-way, tri-amped, electronically coupled speaker system. Designed for very high-power linear output, tight pattern control, warm, musical response and maximum versatility, the 3X3 provides state-of-the-art sound for demanding applications.

The wide range, low-distortion response (53-19 kHz), coupled with high-power handling capability, allows the speaker to perform superbly as a stand alone unit. Its trapezoidal-shaped enclosure lets it combine smoothly with additional 3X3s to form large arrays

from modular building blocks.

Designed for linear, high-power output, the AE-5 and the AE-6 are capable of handling the most demanding of stage monitor applications. The smooth phase and frequency response enable very high gain-before-feedback levels. The excellent low-frequency output handles drum kits and bass guitar requirements with ease.

The AE-12 Concert Series Subwoofer, designed for large-scale sound reinforcement, perfectly complements and extends the low-frequency range of the APOGEE 3X3s and the AE-5s, without coloring the sonic output.

Muse tailors each system to the client's individual needs and staffs them with expert personnel to ensure the best possible performance — show after show.

PRODUCERS COLOR SERVICE

24242 Northwestern Hwy., Southfield, MI 48075 (313) 352-5353 (800) PCS-8700

Producers Color Service audio post rooms offer clients 24-track mixing to 1" video. We specialize in TV commercials and industrial programs. Both SSL rooms can accommodate the AMS AudioFile for editing, track building and layback to 3/4", 1" or D2.

Producers Color Service clients utilize our stages, film-to-tape, editing, graphics and audio post to complete quality projects under one roof.

Services & Equipment Offered:

Audio Post — Consoles: SSL 6000E 32-channel, SSL 4000B 24-channel. Audio Recorders: Otari 24-

track (2), 4-track (2), 2-track w/CTTC, AMS AudioFile, TimeLine synchronizers (8), Sony BVH-2000 VTR. Outboard Equipment: Lexicon 224, PCM70, Yamaha REV7, REV5, SPX90II (2), Klark-Teknik, Roland DEP 5, Dolby A & dbx noise reduction. **Video Production/Post-Production** — Five online edit suites w/CMX 3600, Sony BVH-2000, Sony BVH-1100, Sony DVR-10. One offline edit suite w/CMX 330. Two film-to-tape transfer w/Bosch FDL-60. Three soundstages: 100' X 150', 50' X 60', 40' X 40'. **Other major equipment:** ADO 3000 (3), Abekas A62, Quantel Harry. **Specialization:** NTSC/PAL standards conversion, all formats, mass quantity helical duplication, teleconferencing uplink (stationary), remote video production, motion picture film lab services, videodisc mastering and replication, compact audio disc replication.



BusinessPages! ads are available in both 1/4 - and 1/2 - page units; all production costs for ad preparation are included in the low ad rates (including color separations from supplied photo or logo).

For complete information on how your facility can have a low-cost, four-color BusinessPages! ad, contact Mix Directories toll-free: (800) 344-LIST.

All space reservations and materials are required by the 7th of the month, two months prior to publication.

BUSINESSPAGES!

World Radio History

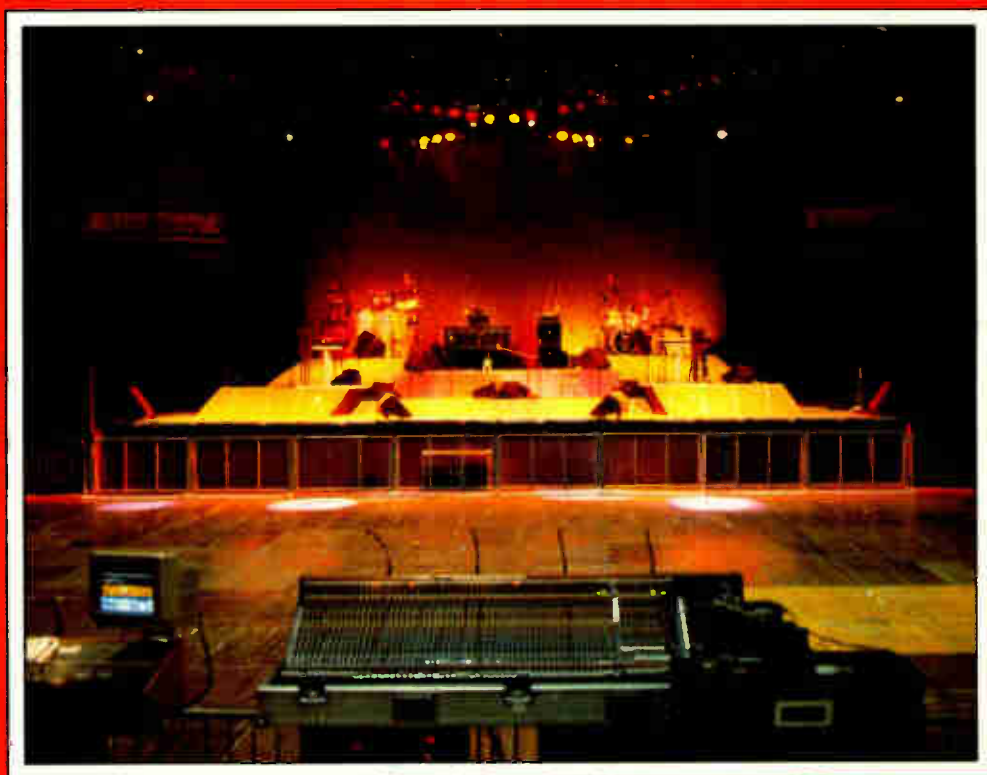
1989 MIX DIRECTORY

REMOTE RECORDING & SOUND REINFORCEMENT

Information in the following directory section is based on questionnaires 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.



Sound reinforcement for the Ar Jansetu Spring 1989 tour consisted of a Sheridan system designed by the Schubert Systems Group. It features a total of 396 4-way active JBL components powered by Crest amplifiers. Pictured here is the Halenstadion in Zurich, with a Jim Gambia EX-50 mixing board in the foreground. To the left is the automated Morpheus lighting console. Photo: Blue Johnson.

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Mix listings procedure: Every month, Mix mails questionnaires 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 an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a Mix Directory, write or call the Mix Directories Department, 6430 Hollis Street #12, Emeryville, CA 94608, toll free 800-344-LIST.

Upcoming Directory Deadlines:

Southern California/Hawaii Studios: **June 16, 1989**

Far East Production Companies: **June 16, 1989**

New Products/AES Issue: **July 17, 1989**

North Central U.S./Canadian Studios: **August 16, 1989**

NORTHEAST

REMOTE RECORDING & SOUND REINFORCEMENT

Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Washington, DC

ACOUSTICAL ILLUSIONS, *Sound Reinf., Lighting*; 9 Baldwin Rd., Chelmsford, MA 01824; (508) 250-1453. Contact: Steven M Hubbard

A.D.R. STUDIOS, INC., *Sound Reinf., Rental, Audio Recording*; Skylight Run; Irvington, NY 10533; (212) 486-0856. Contact: Jack Davis

ANDREWS AUDIO TOURS, *Sound Reinf., Rental, Audio Recording*; 347 W. 39th St.; New York, NY 10018; (212) 736-9570; (718) 729-6007. Contact: David M. Andrews, Mike Sinclair **SOUND REINFORCEMENT** Touring Radius: National. Maximum Venue Size: Stadium and arena. House Loudspeakers: Meyer MSL3 Flying System Available; Yes: Monitor Loudspeakers: Meyer UPAL, UMI, 500, custom 2 x 15, custom 2 x 12 House Consoles: Yamaha PM3000-40, (3) Audioarts 40/32-channel. Monitor Consoles: Audioarts M16-40 x 16, TAC Scorpion 30 x 12, Ramco WRS 840F 40 x 18. **Outboard Equipment:** Lexicon PCM70, Yamaha SPX90II, dbx 900 series, dbx 160X, dbx 166, UREI 539, Klark-Teknik DN360B, BSS FDS-320, Meyer CP-10. **Power Amplifiers:** Crown M-1200. **Microphones:** Teleflex Vega RF, Shure SM57, Shure SM58, Shure SM87, E-V NDVME, AKG 451, PZM all models, Sennheiser 421, Countryman direct boxes. **Other Equipment:** Technon TEF, Meyer SIM, Iwe 30, Vega RF headset systems

APOLLO THEATER RECORDING STUDIOS, *Audio and Video Recording*; 253 W. 125th; New York, NY 10027; (212) 222-0992. Contact: Jerry Kupler



ASL MOBILE AUDIO
Flushing, NY

ASL MOBILE AUDIO, *Audio and Video Recording*; PO Box 791, Flushing, NY 11352; (718) 886-6500; FAX: (718) 886-7214. Contact: Steven Remote **REMOTE RECORDING** Vehicles: 1987 International turbo diesel w/4-door travel—crew cab dual fuel tanks and air-ride suspension. Control Room Dimensions: 16'10" x 7'6" x 7'10"; truck length is approx. 31'5" long. **Mixing Consoles:** Harrison MR-4 36 w/ARMS automation, Hill multitrack 16 x 4 x 2, Roland M-160 16 x 2 submixers, additional submixers available, 76 mc/lines total. **Audio Recorders:** (2) Otari MTR-90 24-track, Otari MTR-10 2-track, (2) Otari 5050BII 2-track, (2) Akai GX-912 cassette deck, (2) Sony TCWR-900 dual cassettes, Nakamichi DMP-100 digital processor w/(2) Sony SL-HF900 Super Beta Hi-Fi, (2) Sony DTC 1000-ES DAT Noise Reduction Systems: All types available upon request. **Synchronization Systems:** TimeLine Lynx, Fostex 4010 reader/generator. **Outboard Equipment:** (3) Yamaha SPX90, Yamaha REV7, Klark-Teknik DN780, Barcus-Berry 802 processor, Ursula Major Space Sta-

tion, MXR-01, (2) Brooke-Siren DPR-402 comp/peak limiter/de-esser, (2) dbx 160X, (2) dbx 160, (2) UREI 1176LN, (24) noise gates by Rebs, Valley People, BSS and Drawmer, Eventide 910, Klark-Teknik DN700, (4) Korg SDD-2000, (2) Korg SDD-3000, Lexicon PCM41, Lexicon Prime Time, (14) various EQs by Klark-Teknik and Orban, plus additional de-essers, EQs, comp/line too numerous to list, but available on board the mobile unit. **Microphones:** Over 100 microphones and direct boxes by Sennheiser, Shure, Sony, E-V, AKG, Beyer, Neumann, Crown, Realistic, Brooke-Siren, ASL and Whirlwind. **Monitor Speakers:** (2) UREI 813, (2) K&H 092 (tri-amped, self-powered), (4) Yamaha NS-10M, (4) E-V Sentry 100A Klark-Acoustic/Jade (self-powered), Auralones. **Power Amplifiers:** (2) Yamaha P2200, Crown D-60 (headphone amp in control room). **Video Recorders:** (2) Sony SL-HF900 Super Beta Hi-Fi, Akai VS-6035 VHS Hi-Fi, call for full video production packages. **Video Monitors:** (3) 13" color, (2) RCA B&W 9", (2) Panasonic 3" color. **Switchers:** Dynair 12-channel video. **Cameras:** Panasonic color (remote zoom, focus, pan and tilt), (2) RCA CCTV B&W, broadcast quality cameras available. **Other Major Equipment:** (76) audio mic/lines (via 4 x 19 pair audio snakes), individual XL connectors also available, (4) individual communication lines to mobile unit, (8) video sends and returns to mobile unit, (5) incoming Telco lines, (2) stereo signal feeds for Telco and satellite links (additional feeds available), (2) portable mobile cellular telephones (incoming/outgoing service), 1,500-point Bantam jackfield/48-point video jackfield, 40-channel, 4-way Brooke-Siren splitter system, 26-channel, 2-way splitter, (20) isolated 600 tie-line. **Rates:** Available upon request. Daily, weekly and/or monthly lock-out welcomed. **Specialization & Credits:** Aura Sonic Ltd. (ASL Mobile A/V), established in 1977, is a full-service audio/video facility handling a variety of mobile productions. From television and radio broadcasting (via satellite uplinks and Telco feeds) to dual analog or digital multitrack recording! Our philosophy is to bring the multimedia, multitrack control room to the concert hall, video facility, MIDI studio, rehearsal space, home and/or anywhere else desired, to develop the sounds and visions needed. The ASL Mobile Unit offers complete basic track, mixdown and pre/post audio-for-video to clients ranging from top audio and video backgrounds to local artists and bands. Here is a selected list of clients and artists who have used our mobile production facilities: Pat Benatar, Thomas Dolby, Living Colour, Southside Johnny, Public Enemy, Jazzy Jeff and Fresh Prince, Asylum, A&M, Arista, BBC-TV, Turner Broadcasting, Squeeze, the Neville Bros., Clarence Clemons, Nona Hendryx, Dr. John, Allen Toussaint, Black Uhuru, Blasters, Boggs/Baker, Boy George, CBS, Duke Ellington Orchestra, FM Tokyo, Frank Zappa, Geffen, Gene Simmons, Howard Jones, James Brown, Jimmy Iovine, Le Tigre, Lena Lovich, Lloyd Cole, MTV, NY String Orchestra, PBS-TV, PMC, The Police, The Ramones, Simple Minds, SoundWorks, Stevie Wonder, Talking Heads, WBCN-FM, WLJR-FM, WNEW-FM, WPIX-TV and XTC to name a few.

AUDIO RADIANCE, *Sound Reinf., Lighting, Rental, Audio Recording*; 34 Hockanum Rd.; Hadley, MA 01035; (413) 584-1272. Contact: Chris Dixon **REMOTE RECORDING**. **Specialization & Credits:** High-quality sound reinforcement for clubs, halls and outdoors. 24- and 16-channel stereo, 2-, 3- and 4-way systems. Monitor systems up to 24 x 8. All top-quality equipment. Various lighting packages, instrument rentals and remote 4- and 8-track recording. One-nighters and regional tours with truck and crew. Shows in the past year include: Fishbone, The Ventures, Hot Tuna, Jane's Addiction, Albert Collins, Tito Puente, John Lee Hooker, Neville Bros., Radiators, Toots & The Maytals.

AUDIO 300, INC., *Sound Reinf., Rental*; 60 Dott Ave., Albany, NY 12205; (518) 489-5848. Contact: Dave Elliott

BACKTRACKS LOCATION DIGITAL, *Audio Recording*; 5 School Ave., Montpelier, VT 05602; (802) 223-2551. Contact: Mike Billingsley. Geoff Brumbaugh **REMOTE RECORDING**. **Specialization & Credits:** Location and remote digital (SMPT lock-to-video if desired) either direct-to-digital stereo or live mix-to-digital, or to hi-fi tracks with two digital tracks (post-edit/mix-to-digital master). Extended portability with special DC package. Patented Stereo Ambient Sampling System (SASS™) for faithful reproduction of acoustic spaces and events. Specialized in highly realistic stereo reproduction, with low-noise components and especially modified equipment. We record acoustic ensembles (ethnic, folk, classical), location sound effects, environmental ambience and live performances, using specially developed techniques for convincing spatial realism. House label (Straight Arrow Recordings) releases SASS-recorded music and effects. We also create auditory environment recordings and event loops for audience works, museum environments and stereo sampling digital synthesizers. Artist commissions are welcomed.

BIG MO RECORDING; 12255 Veirs Mill Rd., Wheaton, MD 20902-4636; (301) 946-7364. Contact: Ed Eastridge. **REMOTE RECORDING**. **Vehicles:** 1978 Ford C-700 w/air-bag suspension. **Control Room Dimensions:** 8 x 24. **Mixing Consoles:** ESP custom console 40 x 24, Soundcraft 16 x 4 sub-mixer. **Audio Recorders:** Sony PCM-501 digital processor, MCI JH-114 24-track, Sony 5003 2-track, MCI JH-24 24-track, Revox PR99 2-track, Nakamichi and Sony cassette decks. **Noise Reduction Systems:** Dolby A (32 channels), dbx 180. **Outboard Equipment:** Lexicon 200, Lexicon PCM70, Klark-Teknik DN-780, Lexicon PCM60, Yamaha REV7, (3)



BIG MO RECORDING
Wheaton, MD

Yamaha SPX90, Lexicon Prime Time, (4) Gain Brain II, (5) Kepex II, ADR Compe, dbx 900 rack w/compressor, gates, de-esser and EQ, Akai S100D sampler, (2) Akai S900 digital sampler, Audioarts 4200-A parametric EQ, UREI 30 graphic EQ, Klark-Teknik 360 EQ, (5) dbx 160 compressor, (2) dbx 160X compressor, dbx 166 compressor/gate, Roland DEP-5, Atari 1040ST computer w/SMPT time code, Yamaha 802 synth, Yamaha TX812 synth, Yamaha KX75 keyboard controller, Roland synth guitar w/GM20 MIDI converter, Korg DDD-1 drum machine, Biamp 683B mixer, Rane HC6 headphone amp, Fender Vibroverb w/15" JBL. **Microphones:** (4) Neumann U87 and U89, (2) AKG 414, (6) AKG 451, (6) Sennheiser 421, (4) AKG 535, (2) E-V RE20, AKG D-12E, (4) Crown PZM, (8) Shure SM57, (6) Shure SM58, Sennheiser 431, (2) E-V PL20, Neumann KM84. **Monitor Speakers:** UREI 811B, Yamaha NS-10M, JBL. **Power Amplifiers:** Bryston, OSC Crown DC-300A, Crown D-150A, Crown D-75A, Marshall JMP100 w/4" and 12" speakers, Roland JC-20 amp. **Specialization & Credits:** We specialize in on location recording. Credits for the past year include Richard Thompson, Cowboy Junkies, Millie Jackson and New Potato Caboose. **Other credits include:** Linda Ronstadt, Emmylou Harris, Ricky Skaggs, Tony Rice, The Seldom Scene, Carl Anderson, Gloria Loring, Danny Gatton, The Nightwings, John Hammond Jr., Pinetop Perkins. We also provide complete music production coordination, i.e., rentals, video, lighting, musicians, hotels and limos. We will gladly provide references and a sample cassette upon request.

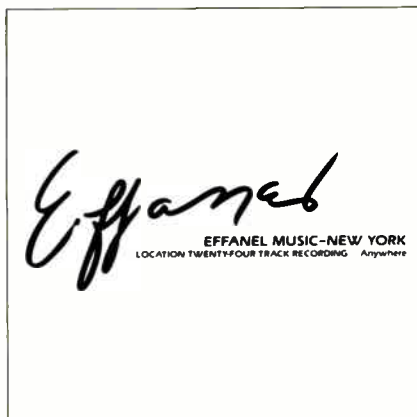
CARRAIG PRODUCTIONS, *Audio Recording*; 69-40 108th St., Forest Hills, NY 11375; (718) 575-8939; Contact: James S. Mageras. **REMOTE RECORDING**. **Specialization & Credits:** Carraig Productions specializes in audiophile location recording. Recent clients have included: *Opera Nine Songs* by Tan Dun at Shimmel Hall, NYC; Bion Tsang and Richard Bishop at RCA Studios, NYC; CIT-TV and BBC-TV, England; Asian Cinevision; Oberlin Orchestra at Avery Fisher Hall, Lincoln Center, NYC; Nai-Yuan Hu and Angela Cheng at Alice Tully Hall, Lincoln Center, NYC; ABC-TV, NBC-TV, CBS-TV, PBS-TV. *The Slowest Clock* at Windmill Lane Studios, Dublin, Ireland; New York City Symphony at Lincoln Center, NYC. As with all our projects, the greatest attention is given to detail. Venues available upon request. Our portable system includes many of the finest Class A discrete components available. Carraig Productions travels worldwide. Whether it is vocals on your next album or a digital live recording, call us regarding your next project.

CLAIR BROTHERS AUDIO, INC., *Sound Reinf.*; PO Box 396, Lititz, PA 17543; (717) 665-4000; FAX: (717) 665-2564; E-Mail: IMC072. Contact: Gregory Hall

COLLEGIUM SOUND, INC., *Sound Reinf., Rental, Audio Recording*; 35-41 72nd St.; Jackson Heights, NY 11372; (718) 426-8555. Contact: Don Wade

DUTCHMAN SOUND LABS, *Sound Reinf., Lighting, Staging, Rental*; 52 Frederic St.; Springfield, MA 01119. (413) 783-3765. Contact: Marcel Bissonnette. **SOUND REINFORCEMENT**. **Specialization & Credits:** Currently operating the weekend and full-time bar and club circuits. Arena sound systems in the works. Experienced sound techs; state-of-the-art equipment, awesome sound. **Credits:** James Montgomery, Ivory, The Radiators, Cheyenne, Jealous Lover, High Risk, Mass Attack, Tantrum, Tyrant, Pandora, Caught In The Act, Cruise Control, some festivals and jamborees. Live recording services also available (audio and video).

EFFANEL MUSIC, INC., *Audio Recording*; 340 W. 22nd St.; New York, NY 10011; (212) 807-1100. Contact: Randy Ezratty, Mark Shane. **REMOTE RECORDING**. **Vehicles:** 45' Mallico air-ride mobile recording studio, 18' Grumman mobile control room. **Mixing Consoles:** Sound Workshop Series 34 40-channel Sound Workshop Series 34 64-channel custom (portable) **Audio Recorders:** (2) Otari MTR-90/2 24-track, (2) Stephers 821-B 24-track (portable), (2) Otari MTR-2 4/2-



EFFANEL MUSIC, INC.
New York, NY

track, (2) Studer B-67, Noise Reduction Systems: Dolby SR 48-channel. Synchronization Systems: Lynx. Outboard Equipment: (2) Lexicon digital reverb system, (10) dbx limiter, (4) UREI limiter, (6) dbx gate, (4) Drawmer gate, TC Electronic 2290 sampler/delay, (16) Hardy M-1 mic pre, Wendel drum computer, (4) API 5502 equalizer. Microphones: AKG, Neumann, Beyer, Milab, Shure, E-V, Countryman, Crown, Sennheiser. Monitor Speakers: (2) Gauss 3588, (4) Rogers LS35A, (2) Spondor SP1, (2) Yamaha NS-10. Power Amplifiers: (4) Hafler 500, (4) Quad 405. Video Recorders: Sony HBD80. Video Monitors: (4) Panasonic color. Cameras: (2) Panasonic color. Other Major Equipment: Jensen 500' 52-channel transformer isolated input splitter system, complete stereo headphone system for location tracking projects. Rates: Variable—per project and system configuration. Specialization & Credits: Effanel is unique among remote recording companies in that we provide systems ranging from our new Manhattan-based 45' mobile control room to our completely portable multitrack system for worldwide coverage. Credits and clients include: "Human Rights, Now" live from Buenos Aires, Paul Simon's "Graceland Live-Zimbabwe '87," U2 *Under a Blood Red Sky* and *The Unforgettable Fire*, Pat Metheny's Grammy-winning *Travels, Bryan Ferry's Boys And Girls*, Bob Dylan, Bruce Hornsby, Bron Jovi, Bryan Adams, Peter Gabriel, Paul Winter, Robert Fripp, MTV, DIR Broadcasting, ABC, NBC, Westwood One, HBO and Showtime. Digital multitrack and stereo systems available. 1986/88 *Mix* magazine TEC Award Nominee.

EIGER ENGINEERING; Sound Reinf., Lighting, Staging, Audio and Video Recording; 203 Waverly Ave.; Watertown, MA 02172; (617) 924-6514. Contact: Thomas P. Scheuzger.

ENTERTAINMENT SYSTEMS CORP.; *Sound Reinf., Lighting, Staging, Rental;* RD. 2 Box 388; Newton, NJ 07860; (201) 579-6166. Contact: Bill Cronheim.

F.C. SOUND; *Sound Reinf., Audio Recording;* 351 Carlsam Rd.; Rochester, NY 14609; (716) 467-6238. Contact: Frank A Cataldo.

FRONTIER AUDIO; *Sound Reinf.;* 580 Henry St.; Brooklyn, NY 11231; (718) 403-0413. Contact: Bob Edwards.

GALAXY AUDIO & ENTERTAINMENT SERVICES; *Sound Reinf., Lighting;* 703 Grant Ave.; Altoona, PA 16602; (814) 944-4596. Contact: Michael A. Riling.

CHRIS GATELY AUDIO SERVICES; *Audio Recording;* PO Box 526; Bryn Mawr, PA 19010; (215) 525-3605. Contact: Chris Gately.

GOIN' MOBILE; *Audio Recording;* 304 Newbury St. #110; Boston, MA 02115; (617) 232-7969. Contact: Lonnie Bedell.

GUSSOUND; *Sound Reinf., Lighting;* 2809 Lakehurst Ave.; Forestville, MD 20747; (301) 967-7267. Contact: Shawn (Gus) Vitale.

TERRY HANLEY AUDIO SYSTEMS, INC.; *Sound Reinf., Staging, Rental, Audio Recording;* 329 Elm St.; Cambridge, MA 02139; (617) 661-1520. Contact: Terry Hanley, Dan Kidwell, John Doerschuk.

HOLLOWOOD SOUND; *Sound Reinf., Rental;* 601 Charters Ave.; McKees Rocks, PA 15136; (412) 771-3060; (412) 771-3095; FAX: (412) 771-1144. Contact: Gary Hollowood, Ross Hindman. SOUND REINFORCEMENT. Touring Radius: Regional, national, international. Maximum Venue Size: 75,000. House Loudspeakers: Turbosound TMS-3, PAS 2-18BM, PAS MRS-2. Flying System Available: No. Monitor Loudspeakers: Custom bi-amped wedges w/JBL custom tri-amped drum and sidefill cabinets. House Consoles: Yamaha PM3000-40, Yamaha PM1800-40, Yamaha PM2000, Yamaha 2404. Monitor Consoles: Soundcraft 400B 32 x 8. Outboard Equipment: Yamaha REV7, Yamaha SPX90, Yamaha SPX90iI, Roland

SDE-2500, Furman QN-4 noise gate, Yamaha GC2020B comp/limiter, Klark-Teknik DN30/30, Yamaha Q2031 EQ, others available upon request. Power Amplifiers: Crest 4001, Crest 5000, Carver PM-1 5, Carver PM-350, BGW 750, Phase Linear 400 (modified). Microphones: Shure, Sennheiser, AKG, Yamaha, others available upon request. Rates: Upon request, per job and location, please call. Specialization & Credits: 1989 Jimmy Cliff African Tour, Yellow Jackets, Steve Morse & The Dreggs, John Prine, Malisa, Tommy James and The Shondells, The Rascals, The Turtles, Eddie Rabbitt, Tools & The Maytals, Young Fresh Fellows, Peter, Paul and Mary, Cinderella, KIX, Fishbone, Smithereens, Paul Kelly & The Messengers, Aswad, Bad Company, Winger, Spyro Gyra, Joe Piscopo, Morton Downey, DJ Jazzy Jeff and The Fresh Prince, Tonloc, Bullet Boys, Wolfgang Press, New Kids on the Block, Will to Power, Paul Stanley, B.B. King, Flock of Seagulls, The Fixx, BeBe and CeCe Winnan, Jon Butcher, Donni Iris, Del Fuegos, Jay Leno, Third World and Garrison Keillor, etc. We are a company dedicated to excellence in the sound reinforcement field with a total technical experience of over fifty years.

IN PHASE AUDIO; *Sound Reinf., Lighting, Rental;* 158 Alton Rd.; Stamford, CT 06906; (203) 348-6052. Contact: Jim Durkin.

ROBERT LANCEFIELD RECORDING; *Audio Recording;* 400 Plaza Middlesex; Middletown, CT 06457; (203) 347-1634. Contact: Rob Lancefield.

LLOYD SOUND SYSTEMS/WIZARD LIGHTING AND SOUND EQUIPMENT; *Sound Reinf., Lighting, Rental;* 62 Scammell St.; Cortland, NY 13045; (607) 753-1586; (607) 756-7467; FAX: (607) 849-3119. Contact: John Lloyd, Chris Seyerle. SOUND REINFORCEMENT. Touring Radius: National. Maximum Venue Size: 5,000 seat indoors, 3,500 outdoors. Vehicles: Leased. House Loudspeakers: (8) Klipsch M.W.M., (4) TL 50/50 cabinet, (4) HR-6040 horn, (4) Renkus-Heinz horn. Flying System Available: No. Monitor Loudspeakers: (9) 2-12" w/JBL 2370 horn w/2425 drivers, (2) JBL loaded KF-400. House Consoles: Soundcraft Series 400 24 x 4. Monitor Consoles: Soundcraft Series 400 16 x 8, Soundcraft Series 500 40 x 12. Outboard Equipment: Brooke-Siren DPR-402 comp/limiter, (2) Yamaha REV7, Yamaha SPX90, DeltaLab DL4 digital delay, Yamaha D-1500 digital delay, Goldline 1/3-octave analyzer, (4) Klark-Teknik DN360 equalizer (monitor), Klark-Teknik DN300 equalizer (house), PB-40 patch bay (monitor), PB-40 patch bay (house), Aiwa cassette deck (house), Sony D-5 CD player, (2) Rane AC23 crossover (house), (5) Rane AC22 crossover (monitor). Power Amplifiers: (3) Crown MT-1200, (15) Crown MT-600. Microphones: Shure SM58, Shure SM59, Shure SM57, Electro-Voice RE10, Electro-Voice RE15, Electro-Voice PE20, Electro-Voice 1776, AKG D-112, C-Tape, PZM, Dis (7) passive (2) active. Lighting: 120k 2 truss (similar to Thomas), Genie Super Tower, CAE 2.4 dimmers, CAE LP-1000 control desk, Altman Orbiters (long throw), Rosco 1500 fog machine w/remote. Rates: Available upon request.

MACK SOUND SYSTEMS; *Sound Reinf., Rental;* 12551 Roscoevelt Hwy.; Lyndonville, NY 14098; (716) 765-2852. Contact: Edward J. Mack, Jr.

MARYLAND SOUND INDUSTRIES, INC.; *Sound Reinf., Rental;* 4900 Wetheredsville Rd.; Baltimore, MD 21207; (301) 448-1400. Contact: Ronnie Smith

MASQUE SOUND; 630-9th Ave., Ste. #7N; New York, NY 10036; (212) 245-4623. Contact: Bob Bender, Tom Sorce. SOUND REINFORCEMENT. Touring Radius: National. House Loudspeakers: (20) Meyer MSL3, (250) Meyer UPA1, (40) ATD CFR-180. Flying System Available: Yes. House Consoles: (7) Yamaha PM3000 40-input, (6) Cadac 56 x 10, (4) Yamaha PM2000 32-input. Monitor Consoles: (3) Yamaha PM3000, (2) Yamaha PM2000, 800B. Outboard Equipment: dbx, Lexicon, UREI, JBL, Klark-Teknik, Yamaha, Brooke-Siren. Power Amplifiers: Yamaha PC2002M, Yamaha PC1002M, Crown DC-300, Crown D-150, Crown PSA-2, UREI 6300. Microphones: Shure, Sennheiser, AKG, Beyer, Neumann, E-V

MAX SOUND; *Sound Reinf., Staging, Rental, Audio Recording;* 126 N. Broadway; Tarrytown, NY 10591; (914) 631-9420. Contact: Christopher Greco

METROSOUND; *Sound Reinf., Lighting, Staging, Rental;* 2647 Broadway; New York, NY 10025-5063; (212) 316-0426. Contact: Alan Thompson

MHA AUDIO, INC.; *Sound Reinf.;* 20 N. Mulberry St.; Hagerstown, MD 21740; (301) 733-9337. Contact: Mike Scarte

MICROSOUND; *Sound Reinf., Audio and Video Recording;* 702 Hudson Harbour Dr.; Poughkeepsie, NY 12601; (914) 473-0243. Contact: Mike Roam

MODULAR SOUND REINFORCEMENT; *Sound Reinf., Lighting, Staging, Rental;* Box 388; Princeton Jct., NJ 08550; (215) 736-8727. Contact: Robyn Gately

NEW ENGLAND MOBILE RECORDING; *Audio Recording;* PO Box 409; Stow, MA 01775; (508) 562-2111. Contact: Jay W. Goodrich. REMOTE RECORDING. Specialization & Cred-

its: New England Mobile Recording is a complete 24-track location recording studio. It is ideal for large concerts, albums and radio broadcast work. The facility has an attractive and spacious interior that can accommodate an entire band as easily as a stationary studio would. 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 inputs and 40 interior inputs. We presently use equipment by: MCI, Tascam, DOD, JBL/Augsburger monitors, Shure, AKG, Audio-Technica, Sennheiser, Dolby Labs, Countryman Assoc., Sescor, custom-made snake (200') and splitter (52 x 2), Crown, Phase Linear, Beyer, Roland, Auratone, E-V, Yamaha, Lexicon, Mesa/Boogie and Neumann. Additional audio and video equipment can be brought in as required. Our friendly and knowledgeable staff would like to confer with you about your recording needs. Call for further information.

NORTHEASTERN DIGITAL RECORDING, INC.; *Audio Recording;* 12 Sadler Ave.; Shrewsbury, MA 01545; (508) 753-1192. Contact: Toby Mountain. REMOTE RECORDING. Specialization & Credits: We specialize in live-to-2-track digital, using the Sony PCM-1610/30 system (PCM-F1, DAT also available). We also have full digital editing and compact disc services available. Credits: Frank Zappa, Arto Guthrie, Fichie Havens, The Fringe, Kingston Trio, Shaw Brothers, Matt Glaser, Rykodisc, Rounder, Chrysalis, A&M, Folk Era.

OFF THE WALL SOUND; *Sound Reinf., Lighting, Rental, Audio Recording;* 10 Howland Cir.; West Caldwell, NJ 07006; (201) 228-4099. Contact: Dennis Wall.

ONE HAND CLAPPING; *Sound Reinf.;* 58A Phelps Ave.; New Brunswick, NJ 08901; (201) 545-6533. Contact: Terry Richards. SOUND REINFORCEMENT. Specialization & Credits: One Hand Clapping is a rapidly growing regional sound company that is developing an admirable reputation for providing high-quality sound reinforcement. We offer Turbosound PA systems whose only emphasis is on signal quality. This concern for musical accuracy is reflected in the growing number of national acts from all fields of music that are using our systems. Regardless of the size of the system that you need, you will find the same factors distinguish our systems from those of our competitors—audiophile power amplifiers, oversized power distribution, an absolute minimum of processing in the main audio path, full distributed grounding, separate send and return snakes, etc.—because we know that a series of "close enoughs" quickly add up to a noisy, muddy system.

OVERLAND SOUND CO.; *Sound Reinf.;* 3821 Macomb St. N.W.; Washington, DC 20008; (202) 363-2229. Contact: Bill Mills, Owen Orzack

PMA ENGINEERING; *Sound Reinf., Lighting, Staging, Rental;* 681 Killingly St.; Johnston, RI 02919; (401) 421-6221. Contact: Kevin M. Delaney

TOM POHORILLA AUDIO SYSTEMS; *Sound Reinf.;* PO Box 31; Devon, PA 19333; (215) 647-1570. Contact: Tom Pohorilla

POWER PLAY RECORDS, INC.; *Lighting, Rental, Audio and Video Recording;* 223 Washington St.; Newark, NJ 07101; (201) 642-5747. Contact: Greg Furgason

PRAGMATECH SOUND; *Sound Reinf., Lighting;* 4516 Byron Ave.; Bronx, NY 10466; (212) 325-8888. Contact: Jim Salta

PRODUCTIONS BY DESIGN; *Sound Reinf., Lighting, Staging, Rental, Audio and Video Recording;* 351 Main St.; Wakefield, MA 01880; (617) 245-5553. Contact: Jeff Peach

PROMIX INC.; *Sound Reinf.;* 111 Cedar St.; New Rochelle, NY 10801; (914) 633-3233; FAX: (914) 633-0347. Contact: Simon Nathan

RCI SOUND SYSTEMS; *Sound Reinf.;* 8550 Second Ave.; Silver Spring, MD 20912; (301) 587-1800. Contact: Carl Trost

RECORD PLANT STUDIOS; *Audio Recording;* 321 W. 44th St.; New York, NY 10036; (212) 581-6505. Contact: Kooster McAllister. REMOTE RECORDING. Control Room Dimensions: 7 x 17. Mixing Consoles: Trident Series 80 custom 48-input 32-bus, API 16-input 8-bus, (4) Yamaha 406 mixer. Audio Recorders: (2) Sony 3324 24-track w/V-clock boards, (2) Ampex MM1200, Synchronizer Direct-to-Disk, (2) Ampex ATR-102 2/4-track, Sony 1630 w/DMR-4000, Sony PCM-501. Noise Reduction Systems: Dolby B16, Dolby M16, 24/2-track Synchronization Systems: TimeLine Lynx, BTX Shadow Outboard Equipment: (1) API 560 graphic equalizer, (2) UREI 1176 limiter, (4) dbx 160 limiter, (2) dbx 160X limiter, Lexicon PCM60, Yamaha REV7, (1) API 325 line amp, transformer-isolated w/individual gain and selectable 600-ohm termination. Microphones: Shure, Neumann, AKG, Sennheiser, E-V, Beyer, Sony, RCA Monitor Speakers: UREI 813, B&W DM100, Yamaha NS-10, ROR. Power Amplifiers: (2) Bryston 4B, Crown DC-300, Crown 300A, Crown 150. Video Recorders: Sony Beta, NEC VHS, JVC 1/4" U-matic. Video Monitors: NEC 20" color, Sony 20" B&W. Video Effects Devices: Humbuck coil, patch bay. Cameras: Panasonic color.

—CONTINUED ON NEXT PAGE

NORTHEAST

REMOTE RECORDING & SOUND REINFORCEMENT

—CONTINUED FROM PREVIOUS PAGE



RECORD PLANT STUDIOS
NEW YORK CITY

REMOTE RECORDING

321 W. 44th STREET, NEW YORK, NY 10036
Contact: KOOSTER McALLISTER (212) 581-6505

RECORD PLANT STUDIOS
New York, NY

Sony AVC-1400 Other Major Equipment: Synclavier Direct-to-Disk, input box 54 3-way splitter w/Jensen JE-MB-D transformers, (3) 12-channel line-level boxes w/three video lines, main snake 600' Belden 54 mic/12 line/3 video, wide assortment of mic stands, 6- and 12-channel sub snakes, Chaos Audio intercom Rates: Available upon request Specialization & Credits: In the past, this truck has provided audio for the 1988 Grammy Awards, "The David Letterman Anniversary Special," Howard Jones, Bon Jovi, James Taylor, Joe Walsh, Nancy Wilson and Billy Joel, to name a few From video and film, to live satellite broadcasts, all can be handled with ease. With four independent auxiliary snake systems and a comprehensive video and code/sync patch bay, combined with our custom API line distribution network, signal quality is kept at the highest possible standards throughout



REMOTE RECORDING SERVICES, INC.
Lahaska, PA

REMOTE RECORDING SERVICES, INC., Audio Recording, PO Box 334; Lahaska, PA 18931; (215) 794-5005. Contact: David Hewitt, Phil Gitomer REMOTE RECORDING Vehicles: 36' custom Peterbilt tractor van, tandem axle air-ride w/onboard generator. Control Room Dimensions: 8 x 9 x 24. Mixing Consoles: API 44 x 32/96 mic, Studer 962 14 x 4, Studer 961 10 x 2, (3) Yamaha PM160 6 x 2 rack-mount mixer Audio Recorders: (2) Ampex MM1200 24-track, (2) Sony 3324 24-track digital (available), (2) Studer A810 2-track w/time code, Sony PCM-1610 digital w/Apogee filters and BVU-820 available, Sony PCM-701 digital w/Beta SLHF-900, Sony TC-WR11ES double cassette recorders. Synchroni-

zation Systems: TimeLine Lynx modules available for each recorder. Outboard Equipment: Aphex Compellor, (4) UREI LA-3A limiter, (4) UREI 1176 limiter, (8) dbx 903 compressor, (4) Valley People Dyna-Mite gate, (2) Dynaflex noise filter, Yamaha REV7 reverb, Lexicon PCM60 reverb, Ursa Major 8 x 32 reverb rack of API equalizers and limiters. Microphones: AKG D-12, AKG 414EB, AKG 451 Systems (CK-1/CK-5/CK-8/CK-9/VR-1/A5), Beyers 88, Beyers 160, Beyers 500, Countryman Type 85 DI, Crown PCC-160, E-VRE15, E-VRE16, E-VRE20, Neumann U87, Sennheiser 421, Sennheiser 441, Sennheiser 431, Shure SM17, Shure SM53, Shure SM54, Shure SM57, Shure SM58, Shure SM59, Shure SM77, Shure SM81, Shure SM85, Sony 535, Sony 536, Sony C-48, Sony ECM-50, Wahnbrock PZM, plate and LAV Monitor Speakers: (2) Westlake w/TAD drivers, (2) CSI MDM-4, (2) Yamaha NS-10, (2) Auratone, (2) Harke M-18 Power Amplifiers: (2) Bryston 4B on Westlakes, Bryston 4B or Crown D-150 on small speakers. Video Recorders: (2) Sony HF-900 Beta VCR, (2) Sony BVU-820 3/4" VCR available. Video Monitors: (2) Sony 19", (3) Panasonic 5", complete video patch bay with iso transformers plus Humbuck coils, (2) 6 x 1 switcher, separate distribution amps for video, sync and SMPTE code. Cameras: (3) CCTV camera for stage use. Other Major Equipment: Extensive cable and splitters available for the really big remotes, API distribution amps with extensive patching for television, radio and satellite. Rates: Call for quote. Specialization & Credits: Our 24 inputs of Studer console are available in road cases with a 24-input Jensen splitter system, MDM-4 speakers and any level of support gear necessary for the live stereo recording. The Studer 810, Sony PCM-1610 or PCM-701 digital systems are available as recorders. Any of these items may be rented individually. We are pleased to announce the opening of our new facility in Bucks County, PA, centrally located between New York and Philadelphia. New remote truck coming in the fall of 1989!

RTM AUDIO, Sound Reinf., Lighting, Staging, Rental; 710 North Ave., Garwood, NJ 07027; (201) 789-9352. Contact: Tom Mathews.

SAPSIS RIGGING, INC., Lighting, Staging, Rental; 233 N. Lansdowne Ave.; Lansdowne, PA 19050; (215) 849-6660. Contact: Bill Sapsis.

SCAVENGER SOUND, INC., Sound Reinf., Lighting, Staging, Rental; 318 Main Ave. SW; Glen Bernie, MD 21061; (301) 760-2135. Contact: J.J. Harding

SCORPIO SOUND SYSTEMS, Sound Reinf.; 56 Manley St.; West Bridgewater, MA 02379; (508) 584-0080. Contact: Gary King.

SEE FACTOR INDUSTRY, INC., Sound Reinf., Lighting, Staging, Rental; 37-11 30th St.; Long Island, NY 11101; (718) 784-4200. SOUND REINFORCEMENT Touring Radius: National. Maximum Venue Size: Unlimited. Vehicles: Air-ride tractor trailers. House Loudspeakers: Meyer MSL-3, Meyer 650-R2 subs, Meyer UPA-1A, Meyer USW subs, Martin 4-way (JBL components) Flying System Available: Yes Monitor Loudspeakers: Meyer UM1-A, Meyer USW subs, Meyer MSL-3 fills, Martin LE200 (JBL 15" JBL 2" driver), McCauley 2 x 12 w/2" driver, JBL SFI 3-way fills. House Consoles: Midas Pro-40 split 48-channel, Midas Pro-40 34-channel, Midas Pro-5 split 36-channel, Midas Pro-5 32-channel, Yamaha PM3000. Monitor Consoles: Midas Pro-40 32 x 12, Midas Pro-40 32 x 16, Ramsa WR-5840 40 x 18, Soundcraft 400B 24 x 10, Soundcraft 200B 16 x 4, Audioarts 24 x 10. Outboard Equipment: Klark-Teknik EQs, Brooke-Siren crossovers, custom time-aligned 4-way and 2-way crossovers, Audioarts crossovers, dbx 900 racks w/assorted comp/lim/gate and parametric EQ, Lexicon 224XL, Lexicon Prime Time, Lexicon Super Prime Time, Eventide 949 Harmonizers, Roland SDE-3000, Roland 555, Yamaha SPX90, Yamaha REV7, Yamaha REV5, UREI, Klark-Teknik analyzers, White analyzers, Tascam 122, Tascam 44. Power Amplifiers: Crest 4001, Crest 8001, Crest 3500, Crest 2500 Microphones: Shure SM57, Shure SM58, Shure SM77, Shure SM78, Shure SM81, Shure SM85, Shure SM87, Beyers M88, AKG 414, AKG 451, AKG D-2, Sennheiser 421, Sennheiser 441, E-VRE20, E-V PZM, Countryman DI. Lighting: Strand automated units/controls, Avolites 60-96 channel, Avo QM500 90 and 180 channels, Avolacue controllers, Kliegl Performers, Strand Light Palettes, LMI dimmers 1K/2 4K/12K modules, unlimited trussing in box, triangle and custom designs. Other Equipment: Complete line of rigging accessories and controls, CM Loadstar 1- and 2-ton hoists w/up to 120' of lift available in single- or 3-phase power; Bergen Xenon projectors, Miniac 16mm projectors, assorted lenses, AVL Genesis II computer controls, AVL Eagle, AVL Dove, Sony 13" 19"/25" color monitors, Sony 3/4" Beta decks w/editors, Kodak E2 on Chief stackers, rear projection screens Rates: Call

SHEFFIELD AUDIO/VIDEO PRODUCTIONS, Audio and Video Recording; 13816 Sunnybrook Rd., Phoenix, MD 21131; (301) 628-7260; FAX: (301) 628-1977. Contact: Richard Van Horn, Nancy Riskin. REMOTE RECORDING Vehicles: 30' custom-built diesel Mack truck with heated and air-conditioned control room (audio), 22' Isuzu (video) Control Room Dimensions: Spacious oak and carpeted control room, heated and air conditioned. Mixing Consoles: Neve 8068 MkII 32-input, Neve 5104 24-input, Amek 16-input Audio Recorders: (2) Sony 3324 digital multitrack, (20) Otari



SHEFFIELD AUDIO/VIDEO PRODUCTIONS
Phoenix, MD

MTR-90II multitrack analog, (2) Sony 3202 2-track digital, Sony DMR-4000 digital master, Sony PCM-1630 digital processor, Sony PCM-2500 DAT Noise Reduction Systems: Dolby A 24 channels Synchronization Systems: BTX Cypher time code generator/reader/insener Outboard Equipment: (2) UREI 1176, UREI LA-3A, Ashly stereo gates, (2) dbx 160X, dbx 162, Lexicon 200, (4) Neve limiter/compressor, Tascam 122 MkII cassette decks, Otari time code reader, additional gear available upon request. Microphones: Shure, Sony, Beyers, AKG, Crown PZM, Sennheiser, Neumann Monitor Speakers: UREI 811B, Yamaha NS-10 Power Amplifiers: Crest, BGW Video Recorders: (2) 1" VTR, Betacam SP Video Monitors: Sony Switchers: Grass Valley 1600 Cameras: Sony BVP-30, (2) Thompson 601A. Other Major Equipment: 350' of 52-pair audio cable w/Jensen 48-channel transformers, isolated mic splits, 500' of power cable, Liebert computer power regulator. Rates: Upon request. Specialization & Credits: We specialize in digital multitrack and digital 2-track recording for album projects and audio-for-video. Our trucks are housed indoors at our facility in Maryland. All equipment including the dual multitrack digital recorders are owned by Sheffield and kept in excellent condition. We can also offer you video-interlocked studio mixing packages using our Solid State Logic 4000E console. Credits include Luciano Pavarotti, Yo Yo Ma and Leonard Bernstein for Deutsche Grammophon, Jean Michel Jarre Rendezvous concert in Houston for PolyGram, Harry Chapin Tribute featuring Pat Benatar, Paul Simon, The Hooters, Graham Nash and Bruce Springsteen (live at Carnegie Hall), PBS-On Stage at Wolftrap series and live New Year's Eve broadcast and much more. We can also offer you portable packages using our custom-manufactured Neve in-road cases

SHOWTIME SOUND SERVICES, Sound Reinf., PO Box 3372; Westport, MA 02790; (617) 636-6040. Contact: Lloyd Jacobsen SOUND REINFORCEMENT Touring Radius: Regional Maximum Venue Size: 15,000 seats. House Loudspeakers: 32 units SFS modular 2-Box System, 4-way active Monitor Loudspeakers: JBL 15", Renkus-Heinz 2" floor wedges, EVM 12", EAW, Inc 1" floor wedges House Consoles: SFS 32 x 8 x 2, Biamp, Matrix custom console 24 x 8 x 6, Allen and Heath, Tangent, Kelsey Monitor Consoles: Allen and Heath, Kelsey Outboard Equipment: Lexicon reverbs, UREI compressors, dbx compressors, Loft compressors, Loft noise gates, Yamaha EQs, Ashly EQs, Ursa Major reverbs, Yamaha reverbs, ART reverbs, DeltaLab DDLs, ADA DDLs, Korg DDLs, Loft crossovers, Crown crossovers Power Amplifiers: Crown, QSC Microphones: Crown, AKG, A.T., Beyers, Shure, E-V, Sennheiser

SIGNET SOUND, Sound Reinf., Rental; 115 E. 87th St., Ste. 10A; New York, NY 10128; (212) 860-0010. Contact: D.B Weiss

SK SOUND, Sound Reinf., Lighting, Staging; PO Box 204; Southold, L.I., NY 11971; (516) 765-3769. Contact: Tom Heinisch

SNOW SOUND, Sound Reinf., Lighting, Staging, Rental; 441 Baileyville Rd.; Middlefield, CT 06455; (203) 349-8211. Contact: Bob Russo

SOLO SOUND, Sound Reinf.; 82-60 116th St.; Kew Gardens, NY 11418; (718) 805-2840. Contact: Lenny Kotke

SOUND CONTROL, Sound Reinf., Rental; 1528-80 St.; Brooklyn, NY 11228; (718) 837-6237. Contact: Dan Prosseda

SOUNDPORTEAST, Sound Reinf., Lighting, Staging, Rental; 31 #A Spar Dr.; Erial, NJ 08081; (609) 228-9535. Contact: Ken

SPENCE SOUND & STAGE, Sound Reinf., Lighting, Rental, Audio Recording; 228 Wheeler Rd.; Monroe, CT 06468; (203) 268-5621. Contact: Dave Spence.

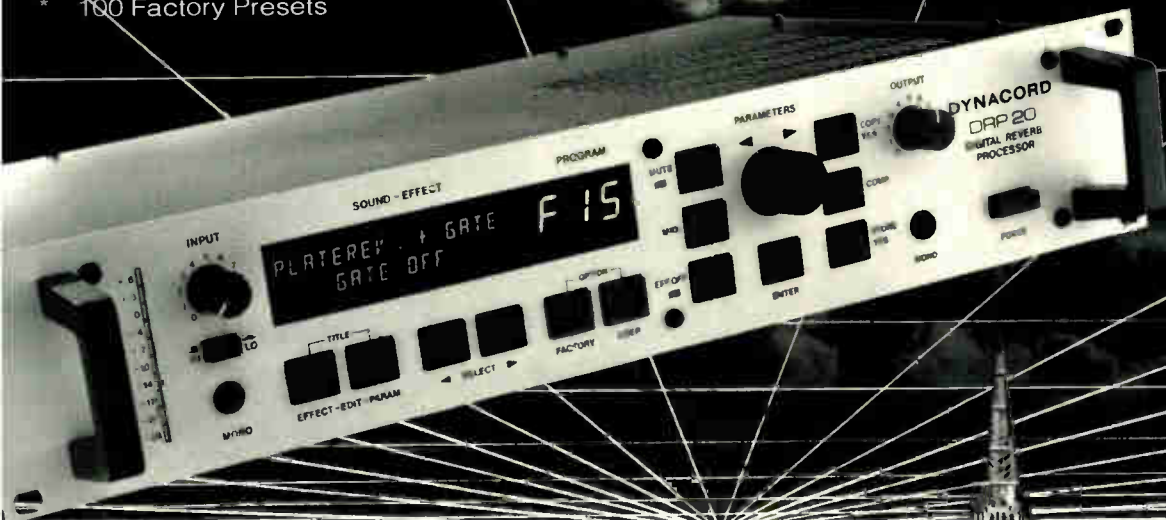
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REMOTE RECORDING & SOUND REINFORCEMENT

SPL SOUND, INC.: *Sound Reinf.:* 1177 Woodcrest Dr., Vine-land, NJ 08360; (609) 691-6690. Contact: Steve Ponzetto.

STARR SOUND SYSTEMS UNLTD.: *Sound Reinf., Light- ing, Rental;* PO Box 6887, Syracuse, NY 13217; (315) 446-8785. Contact: Christopher Starr **SOUND REINFORCE- MENT** Touring Radius: National. Maximum Venue Size: 6,000 seat Vehicles: 24' Mack, 18' GMC House Loud- speakers: (24) SS-33 way proprietary mid-high cabinet, (10) SS-B proprietary subwoofer enclosure. Flying System Avail- able: No. Monitor Loudspeakers: (10) SSM-2 1 x 15 propri- etary bi-amped floor wedge, (4) SS-3 w/SS-B 4-way fill. House Consoles: Kelsey Pro Tour 8/4 36 x 8 custom modified, Pulsar 80 Series 32 x 8, Soundcraft Series 500 40 input. Monitor Consoles: Yamaha MC3208M 32 x 10. Outboard Equipment: BSS FDS360, dbx 160X, (4) dbx 166, (4) Ashly Audio CL52, (2) Barcus-Berry Electronics 402, (3) Yamaha REV7, MXR pitch transposer, (2) Roland SDE-1000, (4) Ashly Audio GQ231, (4) Ashly Audio GQ131, EXR SP11, (2) TDM cross- over, (4) Furman PL-8. Power Amplifiers: (12) QSC MX1500, (12) QSC 1400, (4) QSC MX2000. Microphones: Beyer M88, Beyer M69, Shure SM81, Sennheiser MD-421, E-V ND757, E-V DS35, AKG D-112, E-V RE20, Crown PZM, Beyer M300, E-V ND257. Lighting: (80) PAR 56, (20) PAR 64, (2) 40' trian- gular truss w/Genie lifts and backdrop, 48-channel Leprecon 2.4 dimming, Celco 60 Series II planned for spring '89. Other Equipment: Sony CD player, Nakamichi MR-1 cassette player, scaffolding for house position and speaker stacks. Rates: Please call for quotation

STEED AUDIO, INC.: *Sound Reinf.:* 1438 Pennsylvania Ave., Monaca, PA 15061; (412) 728-1234. Contact: Tom Eeck



PRICE STEVENSON ACOUSTIC RESEARCH
Downingtown, PA

PRICE STEVENSON ACOUSTIC RESEARCH: *Sound Reinf., Rental;* 1591 Broad Run Rd., Downingtown, PA 19335; (215) 383-1083. Contact: Price Stevenson **SOUND REIN- FORCEMENT** Touring Radius: Regional. Maximum Venue Size: 12,000 seats. Vehicles: Step van, 18' box w/LG, 40' trailer. House Loudspeakers: (20) Woodwox/Roadwox full- range, (8) Woodwox Roadwox subs, (8) Community Light & Sound MB6G, (16) Community Light & Sound RH60, (4) JBL 4550, all JBL- and TAD-loaded. Monitor Loudspeakers: (16) Woodwox/Roadwox, (4) Community Light & Sound, (4) E-V, (8) custom. House Consoles: TAC 32, Soundcraft 16, (2) Senn, (2) Yamaha Monitor Consoles: Yamaha 2408, Troupier 20 x 4. Outboard Equipment: Roland 101, Roland 1000, (2) Roland 2000. Lexicon PCM60, Yamaha SPX90, (2) Ibanez 2000. Power Amplifiers: (12) Crest 4000, (6) Crest 800, (4) Crown Micro-Tech 300, (4) JBL 6290, (4) BGW 750, (4) Peavey 800. Microphones: (8) Sennheiser 421, (30) Shure SM58, Shure SM57, (1) E-V RE11, (2) AKG D-12, (2) Senn- heiser 441. Other Equipment: Hammond B-3, Marshall,

Ampeg, wide variety of PA equipment available, Yamaha drum kits, Ludwig drum kits. Rates: Single piece to full system, call for info. **REMOTE RECORDING** Specialization & Credits: Chubby Checker, Bobby Rydell, Dovells, Marvellettes, Joey Dee, Charlie Gracie, Carmen Dee Orchs, Dead End Kids, Money, Puzzle, Numbers, Little Buddy, Chill Factor, Secrets, Stand, Turnstyles, John Eddie, Portrait, Thin Ice, Sovereign, Uptown Swing Band, Pin Ups, Ken Kueter, Psycho- path, Crank, Steel, Desoto, Redtones, Sleeper, White Fox, Ambush, Position, China Club, Copacabana, NY Marriott Marquee, Heebegeebees, Max's Kansas City, Vets Stadium pregame show, The Stage, Koloa Church, Kauai, Hawaii, Kenny Marks & The Remarkables, Dave Meese, Pulsations (M.S.O.E., R.I.A., Syn-Aud-Con, A.E.S., D.V.A.S.A.), Phila Civic Center, Trump Castle, NJ, Bally's Casino, Keith Whitley, Tari Hensley, Smothers Brothers.

STIRLING AUDIO SERVICES: *Sound Reinf., Light- ing, Rental, Audio and Video Recording;* 239 Main Ave., Stirling, NJ 07980; (201) 647-0327. Contact: Jim Ferrante **SOUND REINFORCEMENT** Touring Radius: Local, regional, national. Maximum Venue Size: 30,000 to 40,000. Vehicles: Vans, 14'/18'/22' trucks, tractor/trailer. House Loudspeakers: EAW, Inc. KF850, EAW, Inc. BH800, EAW, Inc. KF550 Flying System Available: Yes. Monitor Loudspeakers: Yamaha mod- ified bi-amped floor wedges, EAW, Inc. 3- and 4-way sidefill, E-V 3- and 4-way drum fill near-field. House Consoles: Midas 36 x 16 x 2, Soundcraft 800B 32 x 8, Yamaha 24 x 8, Yamaha 32 x 4. Monitor Consoles: Audioarts 24 x 10, Yamaha 24 x 8, Peavey 24 x 8. Outboard Equipment: Klark-Teknik EQ, White EQ, dbx comp, EAW, Inc. MX800 processor/crossover, Lex- icon PCM70, Lexicon PCM42, Lexicon PCM41, Lexicon Prime Time, Yamaha REV5, Yamaha REV7, Yamaha SPX90. Scamp gates/comps, Aphex Aural Exciter, Yamaha EQ, Biamp comp, Rane time alignment crossovers. Power Amplifiers: Crest 8001 (house), Crest FA800 (monitor), Crest 8001 (monitor). Microphones: Neumann, Sennheiser, Beyer, AKG, E-V, Crown, Countryman. Staging: 3' x 6' x 32" folding leg plat- forms. Lighting: Penn Truss box and triangular, TTI, Nova, LMI dimmers/satellite/orbiter spot, Vermete, Genie lifts/fog smoke machines/strobes. Other Equipment: RTA/Pink Noise. Rates: Call Jim Ferrante for the lowest rates on the East Coast. **REMOTE RECORDING** Vehicles: Van or 14' truck. Mixing Consoles: Midas, Yamaha, Tascam. Audio Recorders: Otari, Tascam. Noise Reduction Systems: dbx. Synchronization Systems: Adams-Smith. Outboard Equipment: Lexicon PCM70, Lexicon PCM42, Lexicon PCM41, Lexicon Prime Time, Yamaha REV5, Yamaha REV7, Yamaha SPX90, comp and gates, Scamp comp and gates. Microphones: Neumann,



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- MXP 3000 AUTOMATED MIXING CONSOLE
- Microphones

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Sennheiser, Beyer, AKG, E-V, Shure, Crown, Countryman. Monitor Speakers: EAW, Inc. MS100, Auratone. Power Amplifiers: Sansui B1, Crown. Video Recorders: Sony 3/4" and Betacam. Video Monitors: Sony, JVC. Switchers: JVC 1200. Video Effects Devices: ADO effects. Cameras: Ikegami, Sony Betacam. Other Major Equipment: Full lighting package, multicamera, full field production w/headsets. Rates: On request.

TECHNICAL SUPPORT SERVICES: *Sound Reinf., Lighting, Staging, Rental*; 275 Middle St.; Middletown, CT 06457; (203) 347-5314. Contact: Doug Fay

ULTRA SOUND EAST: *Sound Reinf.*; Trent Bldg., Irvington, NY 10533; (914) 591-6667 (IMC 1435); FAX: (914) 591-6832. Contact: Sean McCormick, David Robb.

WARM BROWN SOUND: *Sound Reinf., Rental, Audio Recording*; PO Box 4; West Dummerston, VT 05357; (802) 254-4283. Contact: Chris Kelly.

ZEO BROTHERS PRODUCTIONS, INC.: *Sound Reinf., Rental*; 429 Lincoln Ave.; Hatboro, PA 19040; (215) 956-0328. Contact: George Zeo. **SOUND REINFORCEMENT.** Touring Radius: Local, regional, national. Vehicles: Company owned. House Loudspeakers: (52) MSE-3 proprietary cabinets full-range, (28) MSE-5 proprietary cabinets subs. Flying System Available: Yes. Monitor Loudspeakers: MSE-M proprietary bi-amped, McCauley 840 and 814 tri-amped. House Consoles: Ramsa S-852 52 x 8 x 2, Soundtracs 32 x 8 x 2. Monitor Consoles: TAC Scorpion 40 x 12, Soundtracs 32 x 12. Outboard Equipment: Yamaha, Roland, Klark-Teknik, White Instruments, BBE, dbx, Loft. **Power Amplifiers:** Crest Audio 8001, Crest Audio 7001, Crest Audio PL-400, Crest Audio PL-300, Crown Macro-Tech 2400, Crown 1200, Crown 600. **Microphones:** N/Dyn 757, 457, 408, 357, 308, 257, RE20, Sennheiser 421, Shure SM58, Shure SM57, AKG D-112, AKG 747

SOUTHEAST

Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia

AEA PRODUCTION SERVICES: *Sound Reinf., Lighting, Staging, Rental, Audio Recording*; 392 Meeting St.; Charleston, SC 29403; (803) 722-6855. Contact: David Swain-audio, Dana Whitehair-recording, Jack Gilchrist-lights.

AIRSHOW, INC.: *Audio Recording*; 7021 Woodland Dr.; Springfield, VA 22151; (703) 642-9035. Contact: David Glasser. **REMOTE RECORDING** Specialization & Credits: Specializing in location recording, engineering coordination, technical direction and consulting for remote recording and broadcast. Recent projects and clients have included: Grammy nominated *Sweet Honey in the Rock at Carnegie Hall* (Flying Fish Records), *New Orleans Jazz and Heritage Festival*, *Happy New Year USA!* (live PBS special w/Mel Torme and the Baltimore Symphony Orchestra), Pennsylvania Radio Theatre, *Tribute to Thelonious Monk* (PBS special w/Dizzy Gillespie, Herbie Hancock, Wynton Marsalis), *New Music America Festival*, *The Bob and Ray Radio Show*, Paul Winter Consort, Billy Taylor, *First World Cello Congress*, WETA, WBUR, WJHU, WGBH, WPFW, NPR, Radio Smithsonian, Maryland Public TV. We can supply a portable recording system featuring AMS/Cairec console, Sony digital recorders, KEF/Bryston monitoring and API audio distribution, all packaged for efficient on-site setup and transport. SPARS member. Please give us a call to discuss your next remote recording or broadcast project.

AUDIO & LIGHT RENTALS: *Sound Reinf., Lighting, Rental*; 1227 W. Lee St.; Greensboro, NC 27403; (919) 370-1234. Contact: Jim Reece

BERTY'S AUDIO CORP.: *Sound Reinf.*; PO Box 3928; Hato Rey, PR 00919; (809) 795-8731. Contact: Jose A. Rodriguez

BRANTLEY SOUND ASSOCIATES, INC.: *Sound Reinf., Lighting, Staging, Rental, Audio Recording*; 204 Third Ave. S.; Nashville, TN 37201; (615) 256-6260. Contact: Lee Brantley

CESAR SIERRA SOUND #1: *Sound Reinf., Lighting, Staging, Rental*; Box 6848, Santa Rosa Unit; Bayamon, PR 00621-9008; (809) 759-8001; FAX: (809) 740-7780. Contact: Cesar Sierra, Victor Sud. **SOUND REINFORCEMENT.** Touring Radius: Regional. Maximum Venue Size: 200,000. Vehicles: Ford 7000 40' box, Isuzu NPR 20' box, (3) Ford 350 Super Van. House Loudspeakers: (32) modular-type w/single JBL 18", (2) JBL 15", JBL 2380/2445, (2) Yamaha JA4281B, (16) Meyer Sound UPA-1A, (8) Meyer Sound USW. Flying System Available: Yes. Monitor Loudspeakers: (16) Meyer Sound UM-1A, (4) JBL 4602, (12) Yamaha 2115H. House

—CONTINUED ON NEXT PAGE

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SOUTHEAST

REMOTE RECORDING & SOUND REINFORCEMENT

—CONTINUED FROM PREVIOUS PAGE

Consoles: Soundcraft 8000 32-channel w/matrix, Soundcraft 500 32-channel w/matrix, Dynamix 32-channel 16 subs, (3) Yamaha 2404 24-channel. **Outboard Equipment:** (2) Klark-Teknik DN360 EQ, Klark-Teknik DN60 analyzer, Klark-Teknik 701 digital line delay, (2) Yamaha REV5, (2) Yamaha SPX90II, (10) Yamaha Q2031 EQ, (4) BSS FDS-4430 crossover, (2) UREI 525 crossover, Lexicon PCM42, Lexicon PCM70, (2) USAudio Gatex, White Instruments 140 analyzer, (10) Meyer Sound Labs M-1A, (4) Meyer Sound Labs B-2A, (2) Meyer Sound CP-10. **Power Amplifiers:** (12) Meyer Sound Labs MS-1000, (12) Crown MT-1200, (12) Crown MT-1000, (12) Crown MT-600, (12) Crown PSA-2, (6) Yamaha P2200. **Microphones:** (16) Shure SM58, (16) Shure SM57, (8) Sennheiser 421, (6) Sennheiser 441, (2) E-V RE20, (16) Audio-Technica, (8) Shure SM81, (2) AKG 451, (16) Countryman Type 85 DB.

DAVIS PRODUCTIONS; Sound Reinf., Audio and Video Recording; 1208 Elm Ave., Americus, GA 31709-4503; (912) 924-2521. Contact: King C. Davis.

DESIGN RECORDING; Audio and Video Recording; 2576 Liberty Hill Rd.; Powhatan, VA 23139; (804) 598-3169. Contact: Carroll Boiling.

DOVE SOUNDS; Sound Reinf., Lighting, Audio Recording; 1305 Glen Eden Dr.; Raleigh, NC 27612; (919) 782-1095. Contact: Christopher Drossler.

GARRETT SOUND & LIGHTING, INC.; Sound Reinf., Lighting, Staging; 5967 NW 31st Ave.; Ft. Lauderdale, FL 33309; (305) 975-8745. Contact: Wally or Ron Watkvs. **SOUND REINFORCEMENT.** Touring Radius: Regional. Maximum Venue Size: 75,000 - 100,000. Vehicles: (4) 30' box trucks. House Loudspeakers: JBL 4871 concert series, JBL 4842 subwoofer system. Flying System Available: Yes. Monitor Loudspeakers: JBL 4604 floor wedge, JBL 4602, JBL 4871. House Consoles: Soundcraft 800B, Soundcraft 8000 40-channel, Sony MXP-2000. Monitor Consoles: Soundcraft 800B, Sony MXP-2000, MCI. **Outboard Equipment:** Yamaha REV7, Yamaha SPX90, Klark-Teknik, dbx, Biamp, MXR, DOD Electronics. **Power Amplifiers:** Carver 1.5, Carver 2.0. **Microphones:** Shure, Sennheiser, AKG, E-V. **Staging:** Multi-staging w/lly tops, major concert staging w/lly tops. **Lighting:** 250kW of Thomas Truss, Leprecon dimmers. **Other Equipment:** Loadstars rigging, camera towers.

GHL GARY HEDDEN LIMITED

2807 Azalea Place ■ Nashville, Tennessee 37204

GHL AUDIO ENGINEERING
Nashville, TN

GHL AUDIO ENGINEERING; Audio Recording; 2807 Azalea Pl.; Nashville, TN 37204; (615) 269-5183. Contact: Gary Hedden, Jim Kaiser. **REMOTE RECORDING.** Vehicles: 40' custom-built Great Dane facility. **Control Room Dimensions:** 8 x 8.5 x 22. **Mixing Consoles:** Harrison MR-4 36 x 24 w/automation and grouping, Harrison Pro-7 12 x 6. **Audio Recorders:** (2) Otari MTR-90 MkII, Otari MTR-12 2/4-channel 1/2", (2) Otari MX-5050BI 1/4", (2) Nakamichi MR-1 B cassette recorder, Sony 2500 Pro DAT. **Noise Reduction Systems:** (8) Dolby 361

w/Type A cards, dbx 180 stereo Type I, M16/M8 24-channel Dolby A rack available. **Synchronization Systems:** BTX Soft-touch, (2) Shadow II, Cypher generator. **Outboard Equipment:** (2) Lexicon 200 V 1.3, (2) Lexicon PCM42, Marshall 5402 Time Modulator, Quantec room simulator, Eventide 910 Harmonizer, (2) UREI LA-3A compressor, (5) dbx 903 compressor, (2) dbx 902 de-esser, dbx 906 flanger, (6) Valley People Dyna-Mite, (4) Aphex EQF-2 parametric EQ, (6) Aphex CX-1 compressor/expander, Alesis MIDiverb II, (6) Jensen mic preamp. **Microphones:** (2) AKG 414, (4) AKG 460 cardioid, (2) AKG 460 shotgun, (4) Neumann U89, (8) Neumann KM84, Neumann SM2, (3) Beyer M500, (8) Sennheiser 421, (4) Shure SM58, (2) Shure SM57, E-V RE20, E-V PL10, (2) Altec M-49, (2) Crown PZM-6S, Sony C-38. **Monitor Speakers:** (2) Fostex LS-3 modified, (2) Fostex RM-765, (2) Fostex G-7000, (2) Realistic Minimus-7, (2) Auratone, (2) CSI MDM-4, (2) Yamaha NS-10. **Power Amplifiers:** (2) Halfer P-500, (3) Halfer 220. **Video Recorders:** JVC CR-6650 3/4" U-Matic. **Video Monitors:** Panasonic 19" broadcast, RCA B&W 15". **Cameras:** (2) RCA remote-controlled B&W for surveillance. **Other Major Equipment:** dbx 700 digital processor, Sharp photocopy machine, microwave, coffee pot, fridge. **Rates:** Call for quotes. **Specialization & Credits:** GHL is highly regarded in the Nashville music community. Along with our full-scale truck, we operate a small but sophisticated studio for overdubs and mixing. Our crew has extensive experience in all areas of music production and audio-for-video. We now feature digital production on our Soundstation II 8-channel hard disk editor.

INTEGRATED SOUND & LIGHT; Sound Reinf., Lighting; 13218 Pleasantview Ln.; Fairfax, VA 22033; (703) 378-5409. Contact: Ivan Beaver.

JC SOUND & LIGHTING; Sound Reinf., Lighting, Staging, Rental; 9319 NW 102nd St.; Miami, FL 33178; (305) 884-8325. Contact: Kevin Dillon, David A. Cramer. (See Turn of the Century Productions.)

LEE'S ARTIST SERVICES; Sound Reinf., Rental, Audio Recording; 2078 LaSalle Pl.; Memphis, TN 38104; (901) 726-9533. Contact: Lee Moore.

MAGNETIC MEMORIES, INC.; Audio Recording; PO Box 3373; Kingsport, TN 37664; (615) 246-3452 (after 6 p.m.). Contact: Lawrence Morris.

MARTIN AUDIO; Audio Recording; 1205 Martin St.; Winston-Salem, NC 27103; (919) 721-1729. Contact: Frank Martin.

MR. O AUDIO; Sound Reinf., Lighting, Rental, Audio Recording; 2035 S. Lumpkin Rd.; Columbus, GA 31903; (404) 687-6221. Contact: Maurice Owens. **SOUND REINFORCEMENT.** Touring Radius: Local, regional. Maximum Venue Size: 8,000 Vehicles; Rental trucks for dependability. House Loudspeakers: (16) OAP DP-118, JBL 18"/15"/12"/2" comp driver w/biradial, OAP FH-118 subs, Mr. O W25H (2 15"/1" JBL comp driver w/biradial EQ), Mr. O 52Ts (15"/1" JBL comp driver w/60-degree horn). **Flying System Available:** Yes. **Monitor Loudspeakers:** (16) OAP 2-way Biamp wedges (15"/1" comp driver w/90-degree horn), Mr. O 52T (sidefills), Mr. O KA1 drum monitor (2 15"/1" comp driver w/90-degree horn). **House Consoles:** Soundcraft 500 32 x 8, Studiomaster 20 x 4, Yamaha EM300 12 x 4. **Monitor Consoles:** Studiomaster 20 x 8, Yamaha 2408, Yamaha 2404. **Outboard Equipment:** Brooke-Siren EQS-360, (2) Klark-Teknik DN360, 1/5-octave graphic EQ, (8) dbx 166 comp/limiter, Lexicon 95 Prime Time II, Yamaha REV7, Yamaha SPX90, Yamaha SPX90II, Effectron III, Roland Space Echo, Ibanez HD-1500, UREI 539 1/5-octave EQs, Yamaha 2031 1/5-octave EQs, Valley People Dyna-Mite (comp/lim/gate/de-esser), UREI 525 crossover, Furman TX4 crossovers, Furman TX3 crossovers, dbx 160X compressors, Symetrix 501 comp/limiters, Crown VFX-2A crossovers, Eventide H910 Harmonizer. **Power Amplifiers:** (4) Crown PSA-2, (2) Crown DC-300A, Yamaha P2200, BGW 750, Crown D-75, QSC 1400. **Microphones:** Shure SM58, Shure SM57, PE56, Sennheiser 421, AKG 414. **Lighting:** (108) PAR 64 w/(2) 40' truss, 24 channels of Leprecon (2.4k) and Scrimmer (4.8k) dimming, 10 channels of non-dim 30-amp circuits. **Other Equipment:** Oberheim DX drum machine, Korg Poly-61M, Moog Minimoog Model D, Akai AX-73 MIDI keyboard, Akai 612 sampler, Roland TR-505 drum machine, Acoustic 370 bass head and Ampeg B-25 cab, (2) JBL 2225, Fender Twin w/JBLs, Ampeg V-4 amp and cab., Rane HC-6 headphone amp, Conn Strobotuner. **Rates:** Call for rates. **REMOTE RECORDING.** Vehicles: Modified Ford E-100 van (mixdown in studio). **Mixing Consoles:** Same. **Audio Recorders:** Tascam MS-16, Nikko tape decks, Tascam 38 8-track, Tascam 234 4-track, TEAC 3300 2-track, Tascam 32 2-track, Nikko 350 cassette decks, TEAC V-385 cassette deck. **Noise Reduction Systems:** DX-4D Type I. **Outboard Equipment:** Same. **Microphones:** Same. **Monitor Speakers:** JBL 4312, JBL L-36, Auratone 5C. **Power Amplifiers:** Crown D-75, Crown DC-300A. **Rates:** Call for rates.

MOBILE SOUND SERVICE; Sound Reinf., Audio Recording; 1010A Dorothea Dr.; Raleigh, NC 27603; (919) 834-3158. Contact: Ted E. Bisette.

MODERN METHOD PRODUCTIONS, INC.; Sound Reinf., Lighting, Staging, Rental; 2707 University Dr., Ste. M; Huntsville, AL 35816; (205) 536-8025. Contact: David Hendricks.



MUSE PRODUCTIONS
Auburn, AL

MUSE PRODUCTIONS; Sound Reinf., Lighting, Staging, Rental, Audio and Video Recording; PO Box 43; Auburn, AL 36830; (205) 821-0088; (205) 826-6302. See Our Ad in the BusinessPages! Contact: Robert Hawthorne, Russ Thatcher. **SOUND REINFORCEMENT.** Touring Radius: National. Maximum Venue Size: 20,000. Vehicles: Varies available House Loudspeakers: Professional Audio Systems MRS-2s. Professional Audio Systems 218BM subwoofers. Flying System Available: Yes. Monitor Loudspeakers: Renkus-Heinz W-1As bi-amped, Turbosound TFM-2s bi-amped, E-V SH-1810s bi-amped. PAS MRS1s tri-amped. House Consoles: Soundcraft 500 40 x 8 x 2, Soundcraft 200 24 x 4 x 2. Monitor Consoles: Soundcraft 500 32 x 12, Allen and Heath Brenell 24 x 8, Yamaha 1608 16 x 8. Outboard Equipment: Lexicon PCM70, Lexicon PCM60, Lexicon PCM42, Lexicon PCM41, TC Electronic 2290 w/sampling, Eventide H3000, Yamaha SPX90II, dbx 160, dbx 166, Klark-Teknik DN360, Klark-Teknik DN60, White Instruments 4650, Brooke-Siren FS360, Valley International Kepex II, Commander, Maxi-O Power Amplifiers: QSC 3800, QSC 2000, QSC 1500, QSC 1400. Microphones: Shure SM57, Shure SM58, Shure SM81, Shure SM85, Beyer M69, Beyer M88TG, Beyer M201, E-V RE20, Sennheiser MD-421,

Sennheiser MD-431U, Sennheiser MD-441, AKG 330BT, AKG 414, AKG 451, AKG 535EB, AKG D-12E, AKG 747, PZM, HM Electronics wireless systems w/SM85, Countryman DI, Stewart DI, Whirlwind DI. Staging: 20 x 30. Lighting: Duncan OF-91 open-face box truss, Duncan DB-91 full-box truss. Genie Super Towers, CAE/Leprecon consoles and dimmer racks, follow spots, ETA packages. Other Equipment: Entire system multipinned for reliability, speed and ease of setup and tear-down. Any outboard equipment or microphone not specifically listed is available upon request. HME Intercom Systems, Nakamichi cassette decks and backline rentals. Also available: remote audio/video recording. Rates: Available upon request. Specialization & Credits: Muse caters to a variety of music including new age, rock, jazz, country, gospel and more. Muse's credits include: Night Ranger, Cheap Trick, Richard Marx, The Romantics, The Georgia Satellites, The Hoodoo Gurus, Bad Company, B.T.O., Steppenwolf, Guadalcanal Diary, Jason and the Scorchers, The Tubes, A.R.S., Love Tractor, Drivin' & Cryin', Marshall Tucker, Tammy Wynette, John Anderson, Run-D.M.C., The Fat Boys, Force MD, Jerry Clower, Rosey Gear, Truth, and performers appearing at the W.C. Handy Jazz and Heritage Festival. These are only a few of the artists Muse has served at festivals, one-night events and on tour. Muse Productions can supply professional sound reinforcement and lighting for all of your sound and lighting needs at a price that is just right for you! We would be honored to add you to our list of satisfied customers. For further information, please contact Robert Hawthorne or Russ Thatcher.

PLATINUM RECORDERS MOBILE SERVICES; Audio Recording; 3300 University Blvd., Ste. #160; Winter Park, FL 32792; (407) 679-6333. Contact: Isis Jones—studio manager, Gary Platt—vp. **REMOTE RECORDING.** Vehicles: 26' GMC coach. Control Room Dimensions: 8 x 15. Mixing Consoles: (8) super graphic EQ, (16) fully parametric EQ, mod. to include 10 aux sends, Sony 3036 w/hard drive automation Sphere 16/4 outboard mixer full parametric EQ. **Audio Recorders:** (2) Otari MX-80 or MTR-100 24-track w/CB120 remote, Otari MTR-12 2-track w/1/2" and 1/4" headstacs, Otari MTR-10 2-track. **Noise Reduction Systems:** HX-Pro on 24-track recorders, many others available. **Synchronization Systems:** (2) Adams-Smith Zeta-3. **Outboard Equipment:** TC Electronic 2290 sampling delay, dbx 900 series racks w/(5) dbx 903 comp, (3) dbx 904 gate, (4) dbx 905 EQ, (4) dbx 902 de-esser, (6) UREI LA-4 comp, UREI LA-2 comp, Aphex Dominator stereo multiband comp/limiter, (2) Aphex comp/gate, (2) Omni Craft GT-4 gate, (3) Drawer gate, (2) Aphex EQ, (2) Lexicon 480XL, Yamaha SPX90, Lexicon PCM70, Aphex Type B Aural

Exciter, Barcus-Berry Electronics phase aligner, (2) Lexicon PCM41, (2) Roland SDE-3000, (3) Roland SDE-2000, DeltaLab 1700 CompuEffectron, ADA stereo tape delay. **Microphones:** (2) AKG 414FE, AKG C-24 stereo, (6) Sennheiser MD-421, (8) Shure SM57, (5) Neumann KM84, Neumann U87, (2) Audio-Technica ATM31R, (2) Audio-Technica ATS-15R, (2) AKG 451E, E-V RE20, Sony EMC-50, (2) Crown PZM, Sony lavaliers, (6) Axe active DI. **Monitor Speakers:** Fostex LS3, Fostex RM-780, Auratone, Yamaha NS-10M, DeltaLab Mini M1, AKG headphones, Fostex headphones. **Power Amplifiers:** (2) Hafler DH-500, (3) Hafler DH-200, Phase Linear 300 aux. **Video Recorders:** Sony 5800 1/4" Video Monitors: (2) RCA TC-2011, Panasonic 19" RTS 1900 color.



PARADISE SOUND
Winter Park (Orlando), FL

PARADISE SOUND; Sound Reinf., Lighting, Staging, Rental; 2721 Forsyth Rd., Ste. 256; Winter Park (Orlando), FL 32792; (407) 657-0333. Contact: Larry Epstein

PRO-AUDIO INC.; Sound Reinf., Rental, Audio Recording; 2012 Madison Ave.; Memphis, TN 38104; (901) 278-6000. Contact: Dave Smith

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SOUTHEAST

REMOTE RECORDING & SOUND REINFORCEMENT

PRO MIX: *Sound Reinf.*, 1713 Acme St., Orlando, FL 32805; (407) 843-3172; FAX: (407) 843-3329. Contact: Bill Barnes

RAM SOUND: *Sound Reinf., Rental*, 10 Arlington Dr., Tuscaloosa, AL 35401; (205) 759-5284. Contact: Bob McTyre.

RM AUDIO: *Sound Reinf., Rental, Audio and Video Recording*; 3586 Pierce Dr., Atlanta, GA 30341; (404) 458-6000. Contact: John Tyler.

ROADWORX AUDIO & LIGHTING SPECIALISTS: *Sound Reinf., Lighting, Staging, Rental*; 913 S. Chapman St.; Greensboro, NC 27409; (919) 378-0650. Contact: Vickie Edwards, Hugh Sarvis. **SOUND REINFORCEMENT:** Touring Radius: National. Maximum Venue Size: 24,000. Vehicles: Tractor trailer and Chevrolet Tiltmaster. House Loudspeakers: (16) Woodworx FR-3 direct radiating full-range enclosures w/TAD components, (60) Woodworx SR-1 direct radiating full-range enclosures w/proprietary JBL components, (16) Woodworx SUB enclosures w/JBL 2245H 18" components. Flying System Available: Yes. **Monitor Loudspeakers:** (32) Woodworx MAX-1 enclosures w/Woodworx controller electronics loaded w/proprietary JBL 12" and 1"; (12) Woodworx MAX-2 enclosures w/Woodworx controller electronics loaded w/proprietary JBL dual 12" and 2". Assorted sidetail, drum and keyboard monitors available. **House Consoles:** Yamaha PM3000 40-channel, Soundcraft 8000 40-channel, Soundcraft 500 40-channel, Soundcraft 500 32-channel. **Moni-**



ROADWORX AUDIO & LIGHTING SPECIALISTS
Greensboro, NC

Consoles: Soundcraft 500 40 x 12, Soundcraft 500 32 x 12, TAC Scorpion 30 x 12. **Outboard Equipment:** TC Electronic equalizers and analyzers, White Instruments 4400, White Instruments 4650, dbx noise gates and limiters, Valley People 440 limiters, Klark-Teknik DN60 analyzer, Yamaha REV7, Yamaha SPX90, Lexicon PCM42, Lexicon PCM70, Lexicon LXP-1, Lexicon MRC controller, Brooke-Siren crossovers, (3) proprietary power distribution system, (3) Whirlwind 40-channel splitter w/mass connectors and transformer-isolated multipin stage boxes. **Power Amplifiers:** Crest 8001s, Crest 7001s, AB Systems 1100A, AB Systems 900A. **Microphones:** AKG, Shure, Beyer, Sennheiser, Neumann, Samson wireless. **Staging:** Concert staging available in various sizes w/top. **Lighting:** (20) Thomas Truss sections pre-rigged w/240k and Genie Supertowers, Leprecon LP-1000 24-channel console, Leprecon LP-2000 48-channel console, Leprecon LD-2400 dimmers in racks w/patch bays. **Other Equipment:** TE 12 system, dbx analyzer, various stage gear/band equipment available upon request.

SERIOUSLY SOUND, INC.: *Sound Reinf., Lighting, Staging, Rental*; 550-C Amsterdam Ave.; Atlanta, GA 30306; (404) 872-0346. Contact: David Lowell, Garry Sharp. **SOUND RE-**

Seriously Sound INCORPORATED

SERIOUSLY SOUND, INC.
Atlanta, GA

REINFORCEMENT: Touring Radius: National. **Maximum Venue Size:** 20,000. **Vehicles:** Variety available. **House Loudspeakers:** Renkus-Heinz SR-2, Renkus-Heinz SR-1, Renkus-Heinz LR-2, Renkus-Heinz LR-1, Renkus-Heinz processors, Renkus-Heinz Smart System. **Flying System Available:** Yes. **Monitor Loudspeakers:** Woodworx 2 x 12"; (14) SSI 2 x 12" JBL speakers and 2" JBL horn bi-amp, 3-way JBL/TAD sidetails. **House Consoles:** Yamaha PM3000, Yamaha PM2000. **Monitor Consoles:** Soundcraft 500B 40 x 12, Maryland Sound Industries 30 x 12. **Outboard Equipment:** Yamaha REV7, Yamaha SPX90, Lexicon PCM70, dbx 166, (2) JBL/UREI 5547 equalizer, Audio Logic, Goldline RTA, dbx CD, Nikko CD, Roland SDE-3000 dtd. **Power Amplifiers:** Renkus-Heinz P-1500, Crest, Carver. **Microphones:** Complete selection available. **Staging:** Full staging available. **Lighting:** Complete lighting systems available, including spots and communication. **Other Equipment:** Largest inventory of stage equipment in the Southeast, complete audio/visual rental inventory. **Rates:** Upon request.

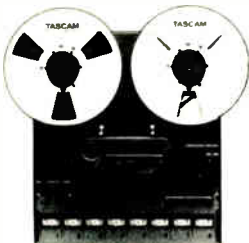
SHOWBIZ PRODUCTION SERVICES, INC.: *Sound Reinf., Lighting, Staging, Rental*; PO Box 39749; Charleston, SC 29407; (803) 795-2577. Contact: Jim Elliott. **SOUND REINFORCEMENT. Specialization & Credits:** Complete production company. Founded 1968. National and international tours with Jacksons, Stevie, Alabama, Cameo, Dolly, Crystal, Anne and many other top stars. Major fairs and festivals throughout the Southeast. Network TV productions, work for the last five U.S. Presidents and major sporting events including World 600. All JBL sound systems including compact 4-way, full-range, flying systems for coliseums; large, horn-loaded, outdoor systems for up to 250,000. Soundcraft, Trident and Yamaha consoles. Microtec, QSC and BGW amps. All popular effects. Bi- and tri-amped monitors up to 14 mixes. Special M-4 system for large sporting events, fairs, races, etc., hangs from a crane and sets up in two hours. Makes great delay tower without blocking sight lines. Box trusses and a complete assortment of specials and soft goods. CAE consoles and EDI dimmers. Ultra Arcs. Trees. Stage tops of various sizes plus power distribution, rigging, effects and musical instruments. Let us show you our first-class service.

TENNESSEE CONCERT SOUND: *Sound Reinf., Lighting, Rental, Audio Recording*; Hwy. 70 E., Box 654, Brownsville, TN 38012; (901) 772-2292. Contact: Bernie Bernil, Stewart Tritt.

TURN OF THE CENTURY PRODUCTIONS: *Sound Reinf., Lighting, Staging, Rental*; 2629 24th St. N.; St. Petersburg, FL 33713; (813) 327-2496 (St. Petersburg); (305) 884-8325 (Miami). Contact: Rick Baynard, Jeff Heiler, Kevin Dillon, David A. Cramer. **SOUND REINFORCEMENT:** Touring Radius: National. **Maximum Venue Size:** Unlimited indoors or outdoors. **Vehicles:** 48' x 102" air-ride trailers w/late-model air-ride International 9700 tractors, Peterbilt 26' air-ride straight truck w/crow sleeper, International straight trucks. **House Loudspeakers:** Turn of the Century Productions' "Overture System" proprietary, full-range flying cabinets w/JBL components, (2) 18", (2) 12", (2) bi-radial, the "W" system w/40JC-W, (2) 15" low-frequency enclosures, 40 JC-C3, (2) 12", (2) bi-radial, (4) tweets mid-high-frequency enclosures. **Flying System Available:** Yes. **Monitor Loudspeakers:** 2225-2425 bi-amped floor wedges, (2) 2202 2" floor wedge, tri-amped drum fill, tri-amped stereo sidetails. **House Consoles:** Yamaha PM-3000/40C, Ramsa WR-S840, Soundcraft 800B 40 x 8, Soundcraft 800B 32 x 8, Midas Pro40-Pro4 36 x 8, all w/spare power supplies. **Monitor Consoles:** Amek-TAC Scorpion 40 x 12 w/balancing update, Soundcraft 40 x 12, Midas Pro4 30 x 10, Audioarts 24 x 8, Yamaha 2408. **Outboard Equipment:** Klark-Teknik DN60 real-time analyzer, Crown RTA-2 real-time analyzer, Klark-Teknik DN300 1/3-octave EQ, Klark-Teknik DN360 1/3-octave EQ (monitors), UREI, Yamaha, NEI, Biamp 1/3-octave EQs also available, UREI LA-4 compressor/limiter (mains), BSS FDS-360 crossover, BSS FDS-310 crossover, UREI 525, Loft 602, Loft 603, Ashley SC22, Biamp crossover, SGE crossover, dbx F900 mainframes w/902, 902, 904

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WOODY'S PRO SOUND & MUSIC; Sound Reinf., Lighting, Staging, Rental, Audio Recording; Hwy. 11 W., PO Box 1428; Chilhowie, VA 24319; (703) 646-3392. Contact: Woody Routh.

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AERIAL ENTERPRISES, INC.; Sound Reinf., Staging, Rental, Audio Recording; 10106 Industrial Dr.; Whitmore Lake, MI 48189; (313) 231-2500. Contact: Steve Fisher, Ed Learned, Jim Lillie, Don Balcum.

ALLIANCE RECORDING CO.; Sound Reinf., Audio Recording; 8449 Parshallville Rd.; Fenton, MI 48430; (313) 632-5653. Contact: Al Hurschman.

ARROW AUDIO, INC.; Sound Reinf., Lighting, Staging, Rental; 101 W. Edison Ave.; Appleton, WI 54915; (414) 731-4888. Contact: Curt Maas.

AUDIO ENGINEERS; Sound Reinf., Lighting, Staging, Rental; 6303 Johnson Rd.; Galloway, OH 43119; (614) 870-9500. Contact: Greg Belger.

AUDIO VISIONS PRO SOUND; Sound Reinf., Rental; 13411 B St.; Omaha, NE 68144; (402) 330-3064. Contact: Mike Murphy, Rick Curzon. SOUND REINFORCEMENT Touring Radius: National. Maximum Venue Size: As required. Vehi-

cles: 24' straight trucks, 45' trailers, tractors leased as needed House Loudspeakers: EAW KF550, EAW BH800, Rainbow Systems MB1510. Flying System Available: Yes Monitor Loudspeakers: EAW SM222 wedges, AV 2121 wedges, Rainbow Systems 1202 wedges, EAW JF500 and SB528 sidefill/subs. House Consoles: Yamaha PM1800 40 x 8 x 2, Soundcraft 500 40 x 8 x 2. Monitor Consoles: Soundcraft 400B 32 x 10 and 24 x 10, Studiomaster 12M 32 x 12, Interface 24 x 10. Outboard Equipment: Yamaha REV7, Yamaha SPX90, Lexicon PCM41, Lexicon PCM42, Lexicon Super Prime Time, dbx 903, dbx 904, dbx 166, dbx 160X, Klark-Teknik EQ, White Instruments EQ. BSS crossover. E-V crossover. Power Amplifiers: Crown MA-2400, Crown 1200, Crown MT-1200, Crown 600, Crest 3001, Crest 8001, QSC 1400, QSC 1500, QSC 2000, QSC 3500, Yamaha 2250, Yamaha 2500. Microphones: AKG D-12, AKG D-112, AKG 451, AKG D-321, AKG 460, Shure 57, Shure 58, Sennheiser 421, Sennheiser 431, E-V RE20, E-V PL10, E-V PL20, E-V ND757, E-V PL77, Crown GLM, Crown PZM. Other Equipment: Full selection of backline gear for rent.

CHICAGO MUSIC COMPANY; Sound Reinf., Rental; 3530 N. Lincoln; Chicago, IL 60614; (312) 477-3900. Contact: Jack Alexander, Ken Stevens. SOUND REINFORCEMENT Touring Radius: Regional. Maximum Venue Size: 20,000. House Loudspeakers: (20) Hill M4, (28) Celestion SR, (4) Turbo, (4) Apogee. Flying System Available: Yes. Monitor Loudspeakers: (24) JBL custom wedge, (2) Apogee wedge. House Consoles: Midas PR4 32-channel, Hill J3 32-channel. Soundcraft 200B Seq 24 x 4. Monitor Consoles: (3) Hill 24 x 8, Yamaha 24 x 8. Outboard Equipment: (2) dbx 900 rack (8 limiters/8 gates/2 parametrics), Yamaha REV7, Yamaha SPX90, Roland, Eventide 949, White 4400, White 4200, (10) Rane GE27 EQ, (4) dbx 160X, (2) dbx 166. Power Amplifiers: (20) Hill TX1000, (8) Carver PM 1.5, (4) Crown PSA-2, (8) Crown DC-300. Microphones: Beyer 12-channel custom wireless rig (8) handheld, (4) bodypack w/splitters and custom antennas, (10) Beyer 737 Shotgun, assorted Beyer, Shure, Sennheiser, Audio-Technica. Other Equipment: Full instrument rental division, full line bass/guitar amps, (30) digital keyboards in stock, (8) drum kits (Yamaha, Pearl, Sonor, Rogers), percussion (LP and Gon Bop) and orchestra gear, repair department for pro audio gear and stage gear (contact Dave Levit). Rates: Call for rates.

DODD TECHNOLOGIES, INC.; Sound Reinf., Lighting, Staging, Rental; 10888 Allisonville Rd.; Fishers, IN 46038; (317) 842-4905. Contact: Mark Dodd.

DYNA-MIGHT SOUND & LIGHTING; Sound Reinf., Lighting, Rental; 3119 S. Scenic; Springfield, MO 65807; (417) 883-4549. Contact: John Gott, John Pitts.

EALING MOBILE RECORDING, LTD.; Audio Recording; 4906 N. Talman Ave.; Chicago, IL 60625-2722; (312) 784-1558. Contact: Hudson Fair. REMOTE RECORDING. Vehicles: We set up in the auditorium, concert hall or opera house. Control Room Dimensions: Various. Mixing Consoles: (2) Neve 5442 8 x 2—total 16 x 2, (2) Focusrite ISA 110 module. Audio Recorders: Nagra T-Audio 1/4" mastering machine, Nagra IV-S 1/4", Sony PCM-2500 DAT w/Apogee filters (modified), Sony DTC-500 DAT, Sony PCM-601 digital processor (F1 format). Noise Reduction Systems: (2) Dolby SR in 361 frames. Outboard Equipment: Lexicon PCM70 reverb, Drawmer 500 effects processor, (2) Focusrite ISA 110 module, Lexicon LXP-1 reverb, MAP mic preamp, Revox B-215 cassette deck. Microphones: (4) Schoeps CMC54, (2) Bruel & Kjaer 4006, (2) Neumann KM140, (2) Neumann KM53, Neumann U89, (2) Bruel & Kjaer 4011. Monitor Speakers: (2) Quad ESL-63 electrostatic, (2) Norberg BCS-16 near-field, (2) KEF 101 minmonitor. Power Amplifiers: Ramsa 9055, Revox 285. Other Major Equipment: Sony 1630 digital w/Sony DAE-1100 digital editor is available. Rates: Rate card available upon request.

ENTERTAINMENT TECHNOLOGY; Sound Reinf.; 1914 Heriford Rd.; Columbia, MO 65202; (314) 474-6788. Contact: David Bartlett.

EVERYTHING A/V; 30 Frank Lloyd Wright Dr.; Ann Arbor, MI 48106-0970; (313) 930-3728. Contact: Christopher Evans.

FIDDLESTRING PRODUCTIONS; Audio Recording, HCR-89, Box 46; Hermosa, SD 57744; (605) 255-4235. Contact: "String Bean" Svenson.

FRIENDSHIP ENTERTAINMENT SERVICE; Sound Reinf., Lighting, Rental; 299 Hill Ave.; Bartlett, IL 60103; (312) 830-1178 (Chicago); (615) 754-0059 (Nashville). Contact: Bob Nietzold, Matt Swanson.

GREAT LAKES SOUND, INC.; Sound Reinf., Lighting, Staging, Rental; 3932 Secor Rd.; Toledo, OH 43623; (419) 472-0338. Contact: Bill Robison. SOUND REINFORCEMENT Touring Radius: Regional. Maximum Venue Size: Indoor 10,000, outdoor 25,000. Vehicles: 24' truck, assorted vans. House Loudspeakers: (12) JBL loaded 3-way (15", 10", 2" horn) custom design, (8) JBL loaded subwoofer 2-15", (14) Bose 802-II, (7) Bose 302 subs. Flying System Available: No. Monitor Loudspeakers: (12) JBL 4604 wedge, (4) JBL loaded sidefill bi-amped 2-15", 1-1" horn, JBL drum monitor w/2-
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—CONTINUED FROM PREVIOUS PAGE

15", 1-15", 1-1" horn. House Consoles: Soundcraft 500-32, Soundcraft 400-26, Soundcraft 200B-24. Monitor Consoles: Soundcraft 400B-32. Outboard Equipment: dbx 900 rack, (10) dbx 160X, dbx 165, (2) Yamaha SPX90II, Brooke-Siren FDS-360, (2) Rane AC22 crossover, Rane AC23 crossover, (4) Rane GE14 EQ, (4) Rane GE27 EQ, UREI P.A. processor, UREI dual parametric EQ, (2) Nakamichi MR-2 cassette, Ibanez DM-2000 delay, (2) Alesis MIDiverb II. Power Amplifiers: (6) Crest 8001, (16) Carver PM 1.5, (4) SCS 2350. Microphones: (40) Shure SM57, (24) Shure SM58, (6) Sennheiser MD-421U, (6) AKG C-451, (5) Crown PCC-160, (2) Crown PZM, (3) Shure SM54, (4) Beyer M500, (3) E-V RE20, Shure SM7. Staging: Assorted types available including tops. Lighting: (48) 1k PAR-64 aluminum, (24) PAR-56 500, (16) PAR-38 150, (8) banks of 5 PAR-46 ACL. Other Equipment: Clear-Com System 7 station, (2) Rosco 1500 fogger, (5) wireless mic system—diversity both body and H.H., (4) D.J. systems w/Technics 1200 tables.

HALF STREET PRODUCTIONS; Sound Reinf., Lighting, Rental, Audio Recording; 5835 Victoria Ave., St. Louis, MO 63110; (314) 644-0992. Contact: Ken Bohannan.

C.V. LLOYDE; Sound Reinf., Rental; 102 S. Neil St., Champaign, IL 61820; (309) 452-6927. Contact: Charles Fudge. SOUND REINFORCEMENT Touring Radius: Local, regional and national. Maximum Venue Size: 15,000. Vehicles: Rent, lease Ryder. House Loudspeakers: (32) CVL (C.V. Lloyd custom) cabinet, (8) CVL sub-system cabinet. Flying System Available: Yes. Monitor Loudspeakers: (14) CVL CX1526 bi-amplified wedge, (4) CVL C-1 sidefill, CVL sub drum fill, (2) CVL CX1526 drum fill. House Consoles: Yamaha 1532, other consoles available upon request. Monitor Consoles: Yamaha MC2408, other consoles available upon request. Outboard Equipment: Yamaha REV5, (2) Yamaha SPX90II, other processing available upon request (dbx, Furman, Yamaha, Alesis, BBE), dbx 166, Yamaha 2031, Alesis MIDiverb II, Furman QN4 quad noise gate, complete patch bay. Power Amplifiers: Crown MT-1200 (main), Crown MA-2400 (main), Crown MT-600 (main), Crown MT-1200 (monitor), Crown MT-600 (monitor), Crown MA-1200 (monitor). Microphones: More than adequate microphone and stand complement including DIs, PZMs, PCCs, condenser mics, lavaliers and wireless. Microphone systems from Shure, Audio-Technica, AKG, Stewart, Crown, Samsen, Electro-Voice, Sennheiser, Yamaha. Lighting: Upon request. Other Equipment: Complete AC distribution system, Clear-Com communication system, backbone gear, 250' 52-channel snake system w/subsnakes and transformer-isolated monitor split. Rates: Upon request.

MIRAGESOUND & LIGHT; Sound Reinf., Lighting, Staging, Rental; 155 N. Elmwood; Oak Park, IL 60302; (312) 383-6455. Contact: Robert Berggren. SOUND REINFORCEMENT Specialization & Credits: With our "top of the line" equipment (JBL, Soundcraft, BSS, Klark-Teknik, etc.) and excellent prices, we have been able to please hundreds of acts each year. The following is a partial list, but not a legal endorsement, of customers who have used Mirage Sound and Light equipment and/or services: Thompson Twins, Billy Idol, Chubby Checker, Public Image Ltd., Tanya Tucker, The Bangles, Badfinger, Steve Dahl, Dick Clark, Phyllis Diller, James Brown, Hyatt and Hilton Hotels, cities of Chicago, Aurora and Glenview, along with live TV and radio. Let us know how we can serve you.

NORTH SHORE AUDIO & ENTERTAINMENT SERVICES; Sound Reinf., Lighting, Staging, Audio Recording; 2255 Par Ln. #722; Willoughby Hills, OH 44094; (216) 944-8013. Contact: Jim Borton.

ON STAGE AUDIO; Sound Reinf., Staging, Rental; 2380 Brickvale Dr.; Elk Grove Village, IL 60007; (312) 595-4941. Contact: Mario Educate, Tom Nicks, Greg Smith. SOUND REINFORCEMENT Touring Radius: National. Maximum Venue Size: 15,000. Vehicles: (2) 45' trailers w/tractors, 24' truck, van. House Loudspeakers: (16) Turbosound TMS-4, (4) Turbosound TMS-1, (38) Ramsa WS-A200, (6) Ramsa subs, (4) Klipsch LaScala, (2) Meyers subs. Flying System Available: Yes. Monitor Loudspeakers: (2) JBL 4698, (8) EAW, Inc. SM155P, (4) EAW, Inc. 202P, (4) Turbosound TMW-212. House Consoles: (2) Yamaha PM3000, Soundcraft Series 200 (24-channel), Ramsa WR-8716, Ramsa 8-channel, (2)



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Tapco Series 100 8-channel. Monitor Consoles: Yamaha 2408, (2) Ramsa WR-S840. Outboard Equipment: Klark-Teknik, Yamaha REV5, Klark-Teknik delays, Klark-Teknik parametric EQ, Yamaha 2031 1/2-octave EQs, dbx 166X, dbx 160X, Aphex Aural Exciter, Yamaha D1500 delays, Yamaha SPX90, Brooke-Siren FDS-360 crossovers. Power Amplifiers: Crest 8001, Crest 4001, Crest 2501, Crest 7001. Microphones: Beyer M88, C-Tape, Shure SM57, Shure SM58, Shure SM81, AKG D-12E, Crown PZM, AKG 451, Sennheiser 421, Shure SM11, Audio-Technica AT853, Sennheiser 441, Audio-Technica AT857, (11) Vega wireless systems (hand-held and belt-pack). Staging: (130) 4' x 6' platforms 32" high. Lighting: Upon request. Other Equipment: Clear-Com 4-channel intercom, (2) Clear-Com 2-channel intercom, (40) Clear-Com 2-channel intercom belt-packs w/Beyer DT-108 dynamic headsets, (4) Clear-Com intercom 2-channel speaker stations, (2) Otari MX-5050B reel-to-reel tape machines, cassette decks, dbx noise reduction system, 37-channel, 5-way splitter rack. Rates: Upon request. Specialization & Credits: On Stage Audio was formed in 1984 with the sole purpose of providing high-quality audio for corporate industrial theater. We have the resources to handle both industrial theater and corporate entertainment without having to bring in costly extra equipment. Since image is such an important factor in corporate theater, the appearance of the equipment is maintained to look like new, and the operating condition is kept at an optimum level. With over 50 years of combined experience in the industrial market, On Stage Audio will meet any of your sound needs.



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PRO-AUDIO INC.; Sound Reinf., Lighting, Audio Recording; 2825 Dormax St.; Grandville, MI 49418; (616) 538-8585. Contact: Ken Reinecke

PRO-TEK; Sound Reinf., Lighting, Staging, 3014 S. 44th St.; Kansas City, KS 66106; (913) 677-0616; FAX: (913) 722-1379. Contact: Joe Thoennes, Marti Dolinar. SOUND REINFORCEMENT Touring Radius: National. Maximum Venue Size: Any size. Vehicles: Cube van, 18' straight truck, leased tractors, flatbeds, trailers. House Loudspeakers: Unlimited quantities of: E-V 4025 bass bins, E-V 1225 mid bins, Community 264 w/Renkus-Heinz 3301, Community RH90 w/Renkus-Heinz 1801, (12) PTA Series I 3-way composite. Flying System Available: Yes. Monitor Loudspeakers: Unlimited quantities of: E-V and Renkus-Heinz 15" and 1", E-V and Renkus-Heinz 15" and 2", E-V and Renkus-Heinz 2 x 12" and 2", PTA Series I 3-way composite. House Consoles: Soundcraft 8000 40 x 8, Sunn SPL 3424 24 x 4. Monitor Consoles: Soundcraft 500 40 x 12, Yamaha 2408 24 x 10. Outboard

Equipment; Klark-Teknik DN30/60, Yamaha Q2031, dbx 160, dbx 166, dbx 900, Yamaha REV7, Yamaha REV5 Rates: Higher Fr at a lower fee

REELS ON WHEELS; *Sound Reinf., Audio and Video Recording;* 2824 W. Sherwin, Chicago, IL 60645; (312) 338-1907. Contact: John W. Burke.

RIVER CITIES SOUND & LIGHTS; *Sound Reinf., Lighting, Staging, Rental;* 1025 W. 4th St.; Davenport, IA 52802; (319) 323-7398. Contact: Marsha or Frank.

R/J RECORDING & SOUND; *Sound Reinf., Lighting, Staging, Rental, Audio and Video Recording;* PO Box 302, 530-C Lark St.; Geneva, IL 60134; (312) 232-1932. Contact: Richard J. Peck **SOUND REINFORCEMENT** Specialization & Credits: We at R/J Recording & Sound pride ourselves in providing the highest quality in every facet of our business: sound reinforcement for corporate shows, educational seminars, theaters, local entertainment and national touring groups. Also sound for many major festivals, county fairs, concerts and nightclubs. Credits: Tom T. Hall, Ray Charles, Judy Collins, Tony Bennett, Johnny Lee, Mel Torme, Jack Jones, Bandana, New Seekers, Association, Rare Earth, Derek St. Holmes, Mel Tillis, Driters, Shirelles, Tanya Tucker, Beatlemania, Mickey & The Memories, Woody Herman Orchestra, Ross Thomkins, Ernie Watts, Bobby Shew, Dennis Dibiasio. Specialization: Our regular customers call us "the most consistent high-quality sound company in Chicagoland." We have moved our way one step closer to the number one position in the Midwest with competent sound engineers and people who care about your events. We'll promise you a worry-free production and the best quality job in the Midwest. Call us first and let us prove it to you!

ROCK CENTRAL, INC.; *Sound Reinf., Lighting, Staging, Rental;* 300 E.S. Owasso Blvd.; St. Paul, MN 55117; (612) 482-9075. Contact: Tony Domagall

SILK PURSE SOUND; *Sound Reinf.;* PO Box 4273; Ann Arbor, MI 48106-4273; (313) 662-7597. Contact: David Faber

SOUND OF AUTHORITY, INC.; *Sound Reinf.;* 8118 S. Eberhart Ave.; Chicago, IL 60619; (312) 846-8200. Contact: Ernest A. Greene **SOUND REINFORCEMENT** Touring Radius: Regional. Maximum Venue Size: 10,000 seats. House Loudspeakers: Low frequency: R&R H&B bass bin, JBL 2225 drivers, Vega L36 bass bin; mid frequency: R&R CDL, JBL

E130 drivers, high frequency: Emilar EH820, JBL 2441 and 2445 drivers. Flying System Available: Yes. Monitor Loudspeakers: R&R dual angle slant, Biamp, JBL 2225, JBL E140, JBL 2425 drivers, Yamaha S2115H II. House Consoles: Soundcraft 500 32 x 8, Yamaha PM1800 40 x 8. Monitor Consoles: (2) Yamaha 1608 16 x 10, 32 x 10 configuration. Outboard Equipment: dbx 160X limiters, White 4003 EQs, Brooke-Siren crossovers, Lexicon PCM60 and PCM70, Yamaha REV7, Yamaha SPX90. Gate noise gates, dbx 166 limiter/gate, Lexicon PCM41 and PCM42 delays and other misc effects. Power Amplifiers: Crown PSA-2, Carver PM 1.5, Crest 4000, Crest 3500. Microphones: Shure E-V, Sennheiser, Beyer, Crown PZM, C. ducer, Countryman DI, Whirlwind DI. Staging: Subcontracted. Lighting: Subcontracted. Rates: Available upon request

SOUNDS GOOD AUDIO; *Sound Reinf., Lighting, Staging, Rental;* 2222 Spikes Ln.; Lansing, MI 48906; (517) 372-5278; FAX: (517) 372-1871. Contact: Mark Reed, Keith Menne

SOUTHERN THUNDER SOUND, INC.; *Sound Reinf., Lighting, Staging, Rental, Audio Recording;* 212 Third Ave. N.; Minneapolis, MN 55401; (612) 339-6303. Contact: Art Weller, Kurt Craig

STAGEPRO LTD.; *Sound Reinf., Lighting, Staging, Rental;* 953 E. 23rd St.; Lawrence, KS 66044; (913) 841-1340. Contact: Robert Schmitt

TRIAD PRODUCTIONS, INC.; *Rental, Audio Recording;* 1910 Ingersoll Ave.; Des Moines, IA 50309; (515) 243-2125. Contact: Jeff Niedermayer

VIKING SOUND AND RECORDING; *Sound Reinf., Audio Recording;* PO Box 349, 124 Pine St.; Edna, KS 67342; (316) 922-3827. Contact: Richard Erickson

VOICE OF PRAISE REMOTE STUDIO; *Audio Recording;* Box 202, Prairie du Rocher, IL 62277; (618) 284-3322. Contact: James P. Doiron

WAVELENGTH PRODUCTIONS; *Sound Reinf.;* 7105 N. Paulina, Ste. #3; Chicago, IL 60626; (312) 973-2477. Contact: Marcy J. Hochberg

WBC DIGITAL RECORDING CO.; *Audio Recording;* 13552 McDougall; Detroit, MI 48212; (313) 366-4281. Contact: Walt Carneke

WILLIAMS SYSTEMS; *Sound Reinf., Lighting, Rental, Audio Recording;* PO Box 5901; Lafayette, IN 47903; (317) 447-2435; FAX: (317) 448-6383. Contact: Mark Williams. **SOUND REINFORCEMENT** Touring Radius: Regional 400 mi. Maximum Venue Size: 7,000. Vehicles: 22' van, others as needed. House Loudspeakers: Systems dynamically reconfigurable in blocks, using EAW KF550Cs and BH800Ls, loaded w/TAD TD-4001s and RCF lab-series drivers, EAW MH101 and EAW BH500L systems for small venues. Monitor Loudspeakers: Eastern Acoustic Works FR253, E-V FM-1202 wedge, Eastern Acoustic Works SM120B (bi-amped) wedge, custom wedges JBL loaded. House Consoles: Soundcraft 500 32 x 8 x 2, Yamaha MC2404 24 x 4 x 2, others w/advance notice. Monitor Consoles: Yamaha MC2408M 24 x 8, others w/advance notice. Outboard Equipment: Yamaha REV5, (6) White 4660 EQ, (4) Yamaha SPX90, Lexicon PCM60, (4) Valley People Dyna-Mite, (2) dbx 166, (2) Ashly GQ-231 1/2-octave EQ, (5) Sundholm 3104 1/2-octave EQ, (2) Symetrix SE400 stereo 4-band parametric EQ, dbx 163 compressor, (2) Brooke-Siren FDS340, Brooke-Siren 8-channel line balancing unit, (2) Rane AC22 stereo 2-way crossovers, much more. Power Amplifiers: Carver, Crest. Microphones: (2) Beyer M88, (2) AKG D-12E, (2) AKG D-112, (2) Shure SM81, (2) AKG C-451E, (12) E-V ND457, (12) Sennheiser 421, (15) Shure SM57, (3) Shure SM58, Shure SM10, (10) Brooke-Siren AR116 direct box, Sennheiser 431, Telex PH-20, (3) Nady 1200 w/E-V 757. Lighting: PAR 64 aluminum pre-rigged Thomas/Socapex, PAR 56, PAR 46, PAR 38, Leprecon controls, tree and racked dimming. Other Equipment: (2) Whirlwind 24 x 3 transformer-isolated splitting system (700' cable), custom 12-channel matrix and cabling for monitors and mains, power distribution systems. Rates: Call **REMOTE RECORDING**. Mixing Consoles: Soundcraft 500 32 x 8 x 2. Audio Recorders: Tascam MS-16 w/remotes/patch bay/20' cabling snake packaged in two flight cases. Noise Reduction Systems: dbx Type I 16 channels. Outboard Equipment: Rane HC6 headphone amp, see reinforcement equipment lists. Monitor Speakers: (2) UREI 809. Power Amplifiers: Carver, Crest. Rates: Call **Specialization & Credits:** As we enter our third year we are proud to announce our entrance into equipment sales and the continuation of our equipment rental program. Our commitment to provide excellence in equipment and services in many cases has forced us to develop our own technology in several areas, particularly power and audio cabling/distribution. Our monitor switching matrix allows a complete reconfiguration of a system in seconds, any mix can be assigned to any cabinet by pushing a button.

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REMOTE RECORDING & SOUND REINFORCEMENT

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ADVANCED PRODUCTION SERVICES, INC.; *Sound Reinf., Rental;* 1035 S. Tyndall; Tucson, AZ 85719; (602) 884-8550. Contact: Mark Cowburn, Mark Micali. **SOUND REINFORCEMENT** Touring Radius: National. Maximum Venue Size: 15,000. Vehicles: Local 5-ton bobtail, (2) delivery vans. House Loudspeakers: (16) APS mid-high, (16) APS 18" subwoofer, (16) McCaulley APS-1 (12" driver, 1" driver, HF drivers bi-amped). Flying System Available: Yes. Monitor Loudspeakers: (9) JBL bi-amped wedge monitor, (4) JBL tri-amped sidefill, (2) JBL bi-amped drum fill, (8) Community L&S passive wedge monitor. House Consoles: Yamaha PM2000 32 x 8, Yamaha PM1000 16 x 4, Yamaha MC2404, E-V 16 x 4. Monitor Consoles: Yamaha 24 x 8. Outboard Equipment: (6) White Instruments 1/2-octave EQ, (6) UREI 1/2-octave EQ, (8) Rane 1/2-octave EQ, (4) dbx 160, (4) dbx 160X, Yamaha DL1500 digital delay, Yamaha REV7, Yamaha SPX90, (2) Rane AD13 delay unit, (2) Brooke-Siren 4-way crossover. Power Amplifiers: (12) Crown Micro-Tech 1200, (2) Crown Macro-Tech 2400, (4) Crown DC-300A, (3) Rane MA6, Crown PSA-11. Microphones: (16) Shure SM58, (12) Shure SM57, (8) E-V DS35, (8) AKG 451, (2) Shure SM81, (8) Crown PCC-160, (4) Sennheiser 421, (2) stereo C-ducer, (10) Samsun PPS50 wireless, (20) Sennheiser MKE-11, (16) Sony ECM-44. Lighting: Complete lighting system available for tours and clubs. Other Equipment: IBM PC 1/2-octave analyzer, Irie IE-30 1/2-octave analyzer, Crown System 12 TEF* analyzer, (3) 100

amp distros, (4) C+M chain motor, (3) 10' truss, Panasonic video camera, (2) 9" monitor.

BERNHARD BROWN, INC.; *Sound Reinf., Lighting, Staging, Rental;* 11311 Indian Trail, Dallas, TX 75229; (214) 241-4334; FAX: (214) 241-2841. Contact: Bill Millet. **SOUND REINFORCEMENT** Touring Radius: National. Maximum Venue Size: Stadiums. Vehicles: Peterbilt 359 air-ride conventional tractor 400 HP, Caterpillar 48 x 102 drop-frame electronics vans, Mercedes Benz 1316 bobtail w/20' box. House Loudspeakers: (104) Turbosound TMS-3 full range 3-way, (20) Turbosound TSW-124 subwoofer, (16) JBL folded ported bass bin w/Gauss 4882 18" speakers, (30) SS-style mid/high cab w/JBL 2220 15" speaker and JBL 2445 2" driver on JBL 2385 horn. Flying System Available: Yes. Monitor Loudspeakers: (14) Turbosound TFM floor monitor w/2 x 15" speakers and 2" driver, (9) EAW 2 x 12 w/2" JBL 2404 12" speaker and JBL 2445 2" driver on EAW horn, (12) Bernhard Brown 2 x 12 w/JBL 2404 12" speaker and 2425 1" driver on JBL 2375 horn, SS-style cabs for sidefills and drum monitors. House Consoles: (2) Yamaha PM3000 40 x 2, Yamaha PM2000 32 x 8 x 2 w/Matrix (updated 1987 by John Windt), (2) Yamaha 2404 24 x 4 x 2, Soundcraft 200SR 24 x 4 x 2. Monitor Consoles: TAC Scorpion 40 x 12, (2) Yamaha PM2800 40 x 14, Soundcraft 400B 32 x 10. Outboard Equipment: Lexicon, AMS, Yamaha, Klark-Teknik, Brooke-Siren, dbx, Drawmer, Roland, many more, loaded to artist specs. Power Amplifiers: (52) Crest 8001, (16) QSC Series 3 3800, (20) QSC Series 3 3500, (6) QSC MX-1500, (10) Canver PM 2.0, other types available. Microphones: Sennheiser, Beyer Dynamic, Neumann, AKG, Electro-Voice, Shure, Szwitek and many others. Staging: Staging and roofs (load-bearing) available to fit any size production. Lighting: James Thomas Engineering Ltd. pre-rigged truss system, AVAB Designer Series soft patch digital consoles/AVAB DDII digital dimming, Avolites consoles and dimming available, rigging, etc. Other Equipment: Backline rental.

CROSSROADS AUDIO, INC.; *Sound Reinf., Lighting, Staging, Rental, Audio Recording;* 2623 Myrtle Springs Ave.; Dallas, TX 75209; (214) 358-2623; FAX: (214) 358-0185. Contact: Blake Dewberry, Chuck Conrad. **SOUND REINFORCEMENT** Touring Radius: Regional. Maximum Venue Size: 20,000 inside/60,000 outdoor. Vehicles: Volvo F6 24' bobtail, Isuzu 16' bobtail, 45' air-ride tractor trailer available on contract, GMC/Greyhound bus conversion mobile recording/crew vehicle. House Loudspeakers: (64) C-48 3-way flying proprietary spkrs, (12) C-52 dual subwoofer cabinets, (12) Bose 802, (12) Peavey 3020HT, (2) Turbosound TMS3. Flying

System Available: Yes. Monitor Loudspeakers: (20) Crossroads bi-amp 15" slant w/JBL hi-fi, (12) Crossroads 12" 3-way, (2) Turbosound TMS4, (4) Crossroads C-1502 drum monitors. House Consoles: Yamaha PM3000 40-channel, Soundtracs M8 32-channel, Yamaha 2404, Yamaha 12- to 16-channel mixers, Soundtracs 12/16-channel mixers, Peavey 12- to 16-channel mixers, Ramsa 12- to 16-channel mixers. Monitor Consoles: Midas Pro 4 24 x 8, Soundtracs "M" 32 x 12, Peavey MkIV 24 x 8, Walker 32 x 12, Yamaha MC2408. Outboard Equipment: (5) Yamaha SPX90, Yamaha REV7, Lexicon PCM41, Lexicon Prime Time, dbx 900 rack w/(4) noise gates, (4) limiters and de-esser, (3) Brooke-Siren FDS360 crossover, (4) Klark-Teknik DN300B EQ, (6) dbx 160X limiter, (2) Loft 3-way crossovers, (2) Audio Logic stereo 4-way crossovers, (12) QSC 2-way crossover, (4) Technics cassette recorder, (2) Technics compact disc player, ART DR2 digital reverb, (2) Audio Logic quad noise gates, (50) Clear-Com belt packs and main stations, (8) Yamaha Q2031 dual channel equalizers, (12) Motorola HT90 UHF walkie-talkies. Power Amplifiers: (30) QSC MX1500, (34) QSC 1400, (15) Peavey Deca 700, (2) Peavey Deca 1200. Microphones: (38) assorted wireless mics from HME, Ceteq Vega, Nady, Sennheiser, (30) Shure SM58, (40) Shure SM57, (12) Audio-Technica ATM41, (12) Audio-Technica AT857 unipoint, (10) Sennheiser 421, (10) AKG 451E, (8) Beyer M88, (6) Crown PZM, (60) Audio-Technica Pro 4L, others in stock. Staging: 20' x 30' sectional platform 2' high. Lighting: (2) 40' truss w/72kW PAR64, (Lecos available), (2) Genie air trees w/24kW PAR64, (2) Ultra Arc spotlights. Other Equipment: (8) CM Lodestar 1-ton chain hoists, (6) Genie "Super Lift", 200-ampere isolation transformer, (2) 200-amp audio power dist systems, (2) 100-amp audio power dist systems. Rates: Upon request. **REMOTE RECORDING** Vehicles: GMC coach/Greyhound bus conversion w/7.5kW generator, A.C. kitchen, lounge, video, etc. Control Room Dimensions: 14' x 18'. Mixing Consoles: Yamaha PM3000 40-channel, Soundtracs FMX 8-channel. Audio Recorders: Tascam 3300, Tascam A3440, Sony Beta w/PCM encoder. Noise Reduction Systems: (2) dbx 150. Outboard Equipment: Yamaha REV7, (2) Yamaha SPX90, Lexicon PCM41, Lexicon Prime Time, (2) dbx 160X. Monitor Speakers: (2) JBL 4311, (2) Minimus 7. Power Amplifiers: QSC 1400, Technics SA424. Video Monitors: Panasonic 9" monochrome, (2) JVC 13" color. Cameras: Sony Trinitron color surveillance.

CROSSWIND SOUND SYSTEMS, INC.; *Sound Reinf., Lighting, Staging, Rental;* 3501 Dime Circle #113; Austin, TX 78744; (512) 441-1631. Contact: John Nelson.

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DALLAS BACKUP, INC.: *Sound Reinf., Lighting, Rental;* 12589 Perimeter Dr.; Dallas, TX 75228; (214) 686-4488. Contact: Charles Belcher.

DIGITAL SERVICES: *Audio and Video Recording;* 5805 Chimney Rock, Ste. E, Houston, TX 77081; (713) 664-5258. **REMOTE RECORDING:** Vehicles: Chevrolet C-50 35' truck. Control Room Dimensions: 20L x 9H x 8W. Mixing Consoles: MCI 636 40 x 24 w/grouping and automation, Neve 5442 10 x 4. Audio Recorders: Sony PCM3324 24-track digital, Otari MTR-90II 24-track analog, Otari MTR-12 2/4-track analog, Sony F-1 2-track digital, Sony PCM-1610 2-track digital, Nakamichi cassette. Synchronization Systems: TimeLine Lynx module. **Outboard Equipment:** Lexicon PCM70 digital effects processor, dbx 160X compressors, dbx 166 stereo compressor/expanders, Audio & Design compressors, Audio & Design noise gates, DeltaLab 1020 digital delay, Lexicon LXP-1 digital reverb, Audio & Design EQ. **Microphones:** Shure, AKG, Sennheiser, Neumann, Countryman, Electro-Voice, Crown, Jensen 3-way transformer mic splitter 54 inputs w/ground lifts. **Monitor Speakers:** JBL 4411, Yamaha NS-10, Auratone. **Power Amplifiers:** QSC 3500, White Instruments room EQ. **Video Monitors:** (2) Panasonic color. **Other Major Equipment:** Toys are us.

ELECTRIC EAR PRODUCTIONS: *Sound Reinf., Lighting, Staging;* 1616 Ave. F, Lubbock, TX 79401; (806) 763-9794. Contact: Tom Prather. **SOUND REINFORCEMENT.** Touring Radius: Regional, national. **Maximum Venue Size:** 18,000. **Vehicles:** Peterbilt air-ride tractors, 48' Great Dane trailer air-ride, Ford L8000 bobtail. **House Loudspeakers:** (18) Meyer Sound Labs MSL-3, (8) Meyer Sound Labs 650 subwoofer, (8) Electro-Voice MTH, (8) Electro-Voice MTL subwoofer. **Flying System Available:** Yes. **Monitor Loudspeakers:** (20) Meyer Sound Labs UM-1 and UPA-1, (14) E-V Delta Max. **House Consoles:** Yamaha PM3000 40-channel, Soundcraft 800B 32-channel. **Monitor Consoles:** Ramsa 40-channel, Soundcraft 28-channel, Pulsar 800 32-channel. **Outboard Equipment:** dbx 900, Yamaha REV7, Lexicon PM1700, White Instruments 1/3-octave EQ. **Power Amplifiers:** Crest 4000, Crest 8000, Carver 1.5, Carver 2.0. **Microphones:** Shure, E-V, Sennheiser, Beyer, Crown. **Staging:** 40 x 40 custom staging, Tom Cat roof. **Lighting:** AUO QM500, Celco Baby, AUO dimmers, Celco dimmers, Thomas and Tomcat drop frame. **Other Equipment:** Backline rentals. Rates: On request.

FITZCO SOUND, INC.: *Sound Reinf., Lighting, Rental;* 912 N. Midkiff, Midland, TX 79701; (915) 684-0861; FAX: (915) 689-8878. Contact: Mark Eichert, Mill Hathaway. **SOUND REINFORCEMENT.** Touring Radius: Regional. **Maximum Venue Size:** 10,000 seat. **Vehicles:** GMC 14' box, Ford 24' box. **House Loudspeakers:** (2) Renkus-Heinz MR-1, (4) Renkus-Heinz LR-2M, (4) Renkus-Heinz SR-1, (2) Intersonics SDL-5 w/TPE lenses. **Flying System Available:** No. **Monitor Loudspeakers:** (13) Renkus-Heinz SMS-1580L, (2) Renkus-Heinz SR-2. **House Consoles:** Audioarts/Wheatstone LM-80 24-channel, Audioarts/Wheatstone MTX-80 40-channel, Audioarts/Wheatstone M-44 16-channel. **Monitor Consoles:** Audioarts/Wheatstone M16 32 x 16. **Outboard Equipment:** (10) Audioarts 2700B graphic EQ, (10) Audioarts 1500 notch filter, (5) Audioarts 1200 and 1202 compressors, (2) Lexicon PCM60, Alesis MIDiverb II, DeltaLab Effectron III, Nakamichi MR-1, (10) Renkus-Heinz Smart Processor (modified). **Power Amplifiers:** (14) BGW 750, (9) BGW 8000, BGW GTA. **Microphones:** (16) AKG, (3) Crown, (2) RCA, (14) Sennheiser, (11) Shure, (2) Vega wireless. **Lighting:** (152) Tomcat PAR 64 fixture, (10) Tomcat pre-rigged truss section, (60) Leprecon 2.4kW dimmer channel, Leprecon LP-2000 48-channel console, (4) Genie ST-24 Super Tower. Rates: Available upon request.

THE GUITAR SHOP LTD.: *Sound Reinf., Lighting, Staging;* 6830 5th Ave., Scottsdale, AZ 85251; (602) 994-8749. Contact: Neil Krownthal.

L.D. SYSTEMS: *Sound Reinf., Lighting;* 467 W. 38th St.; Houston, TX 77018; (713) 695-9400. Contact: Rob McKinley. **SOUND REINFORCEMENT.** Touring Radius: Local, regional, national. **House Loudspeakers:** LD Systems 2 x 4 (2-box 4-way system), LD Systems 1 x 3 (1-box 3-way system), Meyer UPA-1/US-W speaker system, Turbosound TMS-3 system. **Flying System Available:** Yes. **Monitor Loudspeakers:** LD Systems bi-amp wedges, LD Systems 3-way sidefills, Turbosound TMS-3 sidefills, LD Systems 3-way drum fills. **House Consoles:** Soundcraft, Yamaha, Ramsa. **Monitor Consoles:** Soundcraft, Interface. **Outboard Equipment:** Lexicon, Eventide, dbx, Yamaha. **Power Amplifiers:** QSC, Crest. **Microphones:** Shure, Beyer, AKG, Sennheiser, E-V. **Lighting:** Thomas trussing, upright trussing, interlock trussing, Celco, CAE, Spectrum, Digital. **Other Equipment:** CM Lodestar chain motors, Genie super towers, Vermette lifts. Rates: Negotiable. **Specialization & Credits:** Professional sound reinforcement and lighting systems available for local, regional and national touring. Systems capabilities include showcase venues, rock and roll arenas, outdoor events and conventions. Services range from direct equipment rental to full systems with crews. Staff are experienced sound and lighting engineers. All services are supported by LD Systems' pro audio sales and manufacturing divisions, which are involved with full sound

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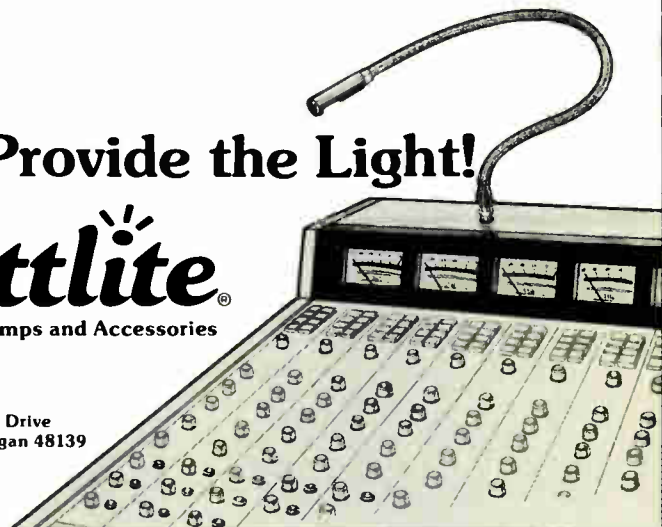
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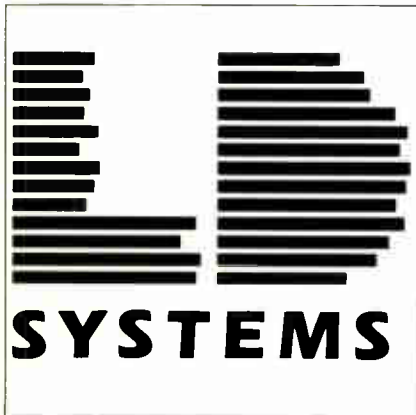
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REMOTE RECORDING & SOUND REINFORCEMENT

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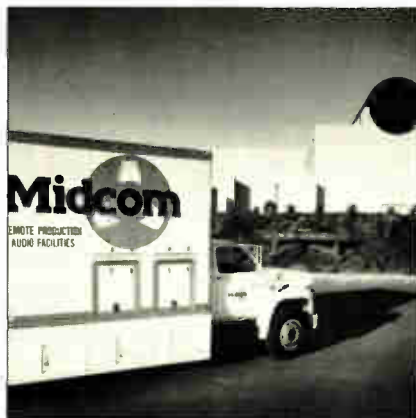


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LEO SOUND; Sound Reinf., Lighting; 121 Irene; Elgin, TX 78621; (512) 285-2214. Contact: Harold Hasler. **SOUND REINFORCEMENT** Touring Radius: Local. Vehicles: 1987 Ford F800 tractor w/28 x 8 cargo trailer. House Loudspeakers: (6) Dietz 215BPA, (4) Dietz 112MB, (2) Altec Manary horn/Altec 29/driver, (2) E-V HR60-40 horn/Altec 29/driver, (2) Renkus-Heinz ST-1/800 driver, (4) Dietz 118B PA. Flying System Available: No. Monitor Loudspeakers: (11) Dietz 112HM, (4) Dietz 115H House Consoles: Ramsa 8724 24 x 4, Sunn 2216 16 x 2. Monitor Consoles: TAC Scorpion 30 x 12, Kelsey Stagemix 16 x 4. Outboard Equipment: (2) Biamp 230 2/3 EQ, Biamp 210 octave EQ, ART 171 2/3 EQ, (3) ART 172 1/2 EQ, UREI 527 1/2 EQ, (3) Dietz 6-band parametric EQ, Roland SRE-2000 digital reverb, Vesta Fire RVD1 digital reverb, Roland SDE-3000 digital delay, Roland 555 tape delay, (2) Omni Craft 4-channel noise gate, (2) dbx 160X compressor/limiter, Ashly CL50 compressor/limiter, Aphex Type C Aural Exciter, TEAC 122 cassette tape machine, BBE 822 audio processor. Power Amplifiers: (2) Crest 3501, (4) Peavey CS-800, Peavey CS-400, (4) QSC MX-2000, (2) QSC MX-1500, (2) QSC 1400 Microphones: (4) Sennheiser 421, (2) Sennheiser 431, (6) Fender P1, Shure SM81, (8) Shure SM57, (2) AKG C-535EB, AKG D-1000E, AKG D-112, (2) Countryman EM101, (2) E-V PL9, (5) E-V DS35, (5) E-V PL76, (6) Countryman DI, (6) Dietz DI, Beyer M88. Lighting: Mirage 1,000-watt follow spot, Sunn PLC816 controller w/(2) PS600 dimmer and (2) PS1200 dimmer, (16) PAR 56 can. Other Equipment: HM Electronics RP732 2-circuit communication station, (2) HM Electronics BH720 single-channel belt station, (2) Clear-Com RS501 single-channel belt station, (4) Beyer DT108 single muftheadset, Dietz 32 x 3 200' transformer isolated splitter snake, Dietz 16 x 2 100' transformer isolated splitter snake, Yamaha CP70, Yamaha CP70.

MIDCOM REMOTE SERVICES; Audio Recording; 3 Dallas Comm. Complex, Ste. 108; 6311 N. O'Connor Rd., LB-50; Irving, TX 75039; (214) 869-2144. Contact: Mike Simpson. **REMOTE RECORDING** Vehicles: 1982 GMC 24' straight truck. Control Room Dimensions: 8 x 20. Mixing Consoles: Soundcraft TS-24 32-channel console w/2 custom, 8 stereo/16 mono submaster routing system, 32 x 24 x 16 x 2 x 1, Soundcraft Series 200B 16 x 4 x 2. Audio Recorders: (2) Otari MTR-90II 24-track, Studer A810 2-track w/center time code track, Nakamichi MR-18. Noise Reduction Systems: TTM 24-channel noise reduction will accept Dolby, dbx, Telcom. Synchronization Systems: Cipher Digital Shadow II w/Shadowpad, Cipher Digital "Cypher" Time Code generator/reader. Outboard Equipment: Lexicon 224XL digital reverb, Lexicon 480L digital effects processor, Lexicon Model 95 Prime Time II, Eventide H910 Harmonizer, dbx Series 900 frames w/903 comp/limiters, 904 phase gates, MICMIX dymalex/exciter cards, Lexicon PCM70 digital reverb, (2) dbx 160X compres-



MIDCOM REMOTE SERVICES
Irving, TX

sor/limiter, Aphex stereo Compellor. Microphones: Neumann U89, Neumann TLM170, Neumann KM84, AKG C-414, AKG EBP-48, Schoeps CMC5, Schoeps MK5, 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 PZM GPM30, (2) Crown 2LV, Cetec Vega R42 handheld and lavalier wireless microphone systems available at extra charge. Monitor Speakers: JBL 4430 bi-radial monitors w/White 1/8-octave EQ. Westlake BBSM-6, Auratone 5C, Tannoy FMN8 near field. Power Amplifiers: Hafler P-505, Hafler P-230 in a bi-amped mode, Hafler P-505 for 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 12 x 1 routing switcher, (3) ADC "Humbuckers," (8) external inputs. Other Major Equipment: Communications systems: RTS 3-channel dual listen intercom, Clear-Com 2-channel intercom, both interfaced to full duplex FM onboard repeater system w/business band and motion picture service frequency synthesized remote radios 10-line key telephone system. RCC and cellular mobile telephones: RTS 414 and 416 distribution amplifiers, Primus distribution amplifiers, custom 1 x 1 buffer/distribution amplifier capable of driving at 28 dBm, Telco interface via 48 pair ADC Ullrapatch to dedicated patch panel, each pair w/separate resistive termination and/or capacitive coupling, (4) RDL on board for auto answer, stand-by program feeds, 400' power and 42-pair snake on DC motor-driven reels. Specialization & Credits: Past projects include: 1989 Miss USA Pageant Mobile, AL, for CBS TV, Aida, Nixon in China, The Naspers Papers, Great Performances Series for PBS, Dolly ABC-TV prime time, "The Texas Debates" presidential debates for American Public Radio; Metallica live broadcast for 2-Rock Radio Network; George Strait, MCA Home Video; 7th Van Cliburn Competition, American Public Radio; Benjamin Lees' Memorial Candles, American Public Radio, score for Texas, Dramalex production at Palo Duro Canyon; Fashion Hit Revue; Sanger Harris live TV special; Mary Kay Cosmetics 1985 and 1986 seminars; 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; Miss Texas USA Pageant, network special; Carman in Concert, Word Records/Word Home Video.

MP PRODUCTIONS, INC.; Sound Reinf., Lighting, Staging, Rental; 1601 Westpark Dr., Ste. 8, Little Rock, AR 72204; (501) 664-2183. Contact: Mike Pope. Scott Thompson. **SOUND REINFORCEMENT** Touring Radius: National. Maximum Venue Size: 80,000. Vehicles: 48' x 96" air-ride trailers w/Ryder air-ride tractors. House Loudspeakers: (60) cabinets of MP Production 2-box system, (30) low-frequency enclosure w/(4) JBL 15" front loaded and vented, (30) mid high-frequency enclosure w/(4) JBL 12" sealed, (2) JBL 2445 2" on JBL 2385 horn and JBL 2405 tweets. Flying System Available: Yes. Monitor Loudspeakers: Red System wedges, JBL 15", JBL 2", Gray System wedges, (2) JBL 12", JBL 2", sidefills and drum fill 2 per placement JBL 18", JBL 12", JBL 2". House Consoles: Soundcraft 8000 40 x 8 x 2 w/effects return, Soundcraft 800B 32 x 8 x 2 w/matrix, Yamaha PM3000, Midas, Gamble and others available on request. Monitor Consoles: Soundcraft 500 40 x 12. Outboard Equipment: White 4000 equalizers, Klark-Teknik equalizers, Brooke-Siren crossovers, UREI crossovers, Lexicon 480L, Lexicon 200, Yamaha REV5, Yamaha REV7, Yamaha SPX90II, Roland SRV-2000, Roland SDE-2500, Roland SDE-1000, Eventide 949H, Valley People Dyna-Mite gates, dbx 904 gates, dbx 903 compressors, dbx 905 para EQ, dbx 160X compressors. Power Amplifiers: Carver PM 15 house, Crown PSAII monitors. Microphones: Beyer M88, Beyer 201, Sennheiser 421, Sennheiser 441, Shure SM58, Shure SM57, Shure SM81, Shure SM85, E-V RE-20, C-ducer, Countryman Isoamx and DI. Lighting: Avolights, Celco, Thomas, L&E, Thomas clone and custom 9'

trussing. Other Equipment: (24) Loadstar 1-ton motors w/all wire and electrical, backline gear rental, Yamaha drums, Fender Twins, JC 120s, GK RB800, SVT, SVT400, Roland D-50, Yamaha DX7, JX-8P, Hammond B-3, CP-70. Rear fill and supplemental sound systems. Rates: Reasonable and competitive.



OMEGA AUDIO & PRODUCTIONS, INC.
Dallas, TX

OMEGA AUDIO & PRODUCTIONS, INC.; Audio Recording; 8036 Aviation Pl., Dallas, TX 75235; (214) 350-9066. Contact: Paul A. Christensen. **REMOTE RECORDING** Vehicles: 1978 GMC Loadstar 35' w/crew sleeper and power tailgate. Refueling travel range: 850 miles. Power requirements: 220 VAC, 100 amp. Power isolation transformers w/center tap neutral. Control Room Dimensions: 20 x 8 x 10. Mixing Consoles: API 32 x 32 mixing console w/API 550A EQ, Soundcrafts 24 x 24, Hill 16 x 8 x 4 x 2, program buses w/8 stereo VCA groups. Additional inputs available on request. Audio Recorders: (2) Otari MTR-90 24-track, (2) Otari MTR-10 4-track 2/4-track w/center stripe TC, Mitsubishi X-80 2-track digital, (2) Technics 2-track cassette, Sony PCM-F1 2-track digital. Noise Reduction Systems: TTM Dolby/dbx track 24 channels. Synchronization Systems: BTX 4700 Shadow. Outboard Equipment: Teltronix LA-2A limiter, dbx 165 limiter, (7) dbx 160 limiter, ADR Vocal Stresser, (2) UREI 1176LN limiter, Lexicon 224XL digital reverb, MXR O1a digital reverb, (2) Yamaha SPX90 special FX processor, (4) DeltaLab Super Time Line, (2) dbx 162 limiter, Kexpe gate, Barcus-Berry Electronics exciter, Aphex Compellor, Eventide 949 Harmonizer. Microphones: (2) AKG C-12A tube, (8) AKG C-414EB, (4) AKG C-451EB, AKG D-12E, (6) Beyer 201, (4) Neumann U47, (2) Neumann U87, (2) Neumann KM84, (4) Shure SM81, (12) Shure SM58, (12) Shure SM57, (4) Shure SM53, (6) Crown PZM315, (7) Sennheiser 421, (5) Sennheiser 441, (3) Sony ECM-22P, (2) Sony ECM-50, (3) E-V RE20, (7) Countryman DI box, (10) Heider DI box, Audio-Technica ATM-5R, Monitor Speakers: (2) JBL 4430, (2) Auratone, (2) Yamaha NS-10, (2) Visonik. Power Amplifiers: (2) Yamaha P2200, Yamaha P1000, Shure 250. Video Recorders: JVC 6600U Video Monitors: Sony Trinitron 14", RCA 26", Panasonic 19". Other Major Equipment: 600' 54-pair snake system w/54 stage splits, truck wired for 90 inputs, (3) wireless PL interfaces to RTS, RTS comm. system w/(3) belt packs/headsets. Rates: Call for rates. Varies with job requirements. 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. As a result of this vast and varied experience, Omega Audio is uniquely qualified to handle the challenging tasks that remote recording requires. Omega Audio has received one Platinum Record, four Gold Records, two Ampex Golden Reel Awards, two Grammy nominations and three Dove Awards. Partial credits include: U2, REM, Lynyrd Skynyrd, Amy Grant, B.B. King, Dizzy Gillespie, Joe Walsh, Fats Domino, Ray Charles, Paul Schaffer, Prince, Cameo, Johnny Cash, WNCT-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*, Fabulous Thunderbirds, Gladys Knight, Pope John Paul II.

PRODUCTION CONSULTANTS; Sound Reinf., Lighting, Rental; 642 W. Rhapsody, San Antonio, TX 78216; (512) 340-9591. Contact: Gregory Krocket, Robert Herrick, Gene Hartmann. **SOUND REINFORCEMENT** Touring Radius: Local, regional. Maximum Venue Size: Country/MOR: 10,000, Rock: 5,000. House Loudspeakers: Renkus-Heinz "Smart System" MR/LR System, JBL/Community horn-loaded system. Flying System Available: Yes. Monitor Loudspeakers: JBL custom foot, Modular Sound TA12 time-aligned, Renkus-Heinz "Smart System." House Consoles: Pulsar Matrix 80 Series 32 x 8 x 8, Soundcraft 400B 24. Monitor Consoles:

Pulsar M-8 32 x 8, Soundcraft 400B 24 x 8 x 2. Outboard Equipment: Yamaha SPX90, Ashly limiters and equalizers, Ashly noise gates, Lexicon effects, ART effects, DeltaLab effects, Minicube and Countryman direct boxes, Ashly parametric notch filter. Power Amplifiers: Crest, Crown. Microphones: Shure, AKG, Sennheiser, Crown PZM. Lighting: PAR 64, Fresnel, Scoop, Leko, Teatronics DPI 24- and 48-channel, Producer/console. Other Equipment: C-ducer piano pickup

Loudspeakers: (10) QSI 2 x 12, (2) JBL E120, JBL 2425/2370, (6) QSI 1 x 15, JBL 2225, JBL 2425/2370, (6) QSI 1 x 12, JBL E120, JBL 2202 passive. House Consoles: Soundcraft 800B 32 x 8, Yamaha 2404 24 x 4, Yamaha PM1000 16 x 4. Monitor Consoles: TAC Scorpion 40 x 12, Yamaha PM1000 32 x 6. Outboard Equipment: (2) Yamaha REV7, (4) dbx 902, (4) dbx 903, Lexicon PCM60, DeltaLab DL-4, Carver CD player, Optonica dual deck, (3) dbx 162, (2) Klark-Teknik DN27A, Barcus-Berry Electronics 802, UREI 625 (crossover), (5) Klark-Teknik DN300 (monitors), (5) Rane AC22 crossovers (monitors). Power Amplifiers: (26) Carver PM 1.5, (5) Carver PM 200. Microphones: (12) Shure SM58, (25) Shure SM57, (6) Sennheiser 421, (6) AKG 451, (4) Beyer M88, (6) Countryman DI box, many other mics, DI boxes and pickups. Lighting: 150 PAR wide/medium/narrow and ACL, (74) 24k dimmers (Teatronics/CAE), Celco Series II 60 channels. Other Equipment: BML pre-rig trussing, QSI power bars, multicable 6,000-watt "B" system, 24 channels, custom sound and light systems for extended rentals, intercom systems and Motorola radios. Rates: Available upon request. Specialization & Credits: 20,000-watt, 32 x 8 w/patch bay house, 9,000-watt, 40 x 12 monitors, 150 can, two-truss lighting system. All gear fits easily in 40' air-ride van. Complete systems with crew, truck and driver offered as one package for touring medium to large venues depending on artist's requirements. Most complete and versatile quality-oriented rigs available in the Rocky Mountain states. All main and monitor enclosures are designed and constructed in-house and individually tuned to maximum specs. Monitor system quality is unsurpassed and has received rave reviews from all artists who have used it. Systems flyable, sound in the round for medium-sized (12,000 seat) arena. Specializing in outdoor festivals: New Orleans Jazz and Heritage Festival, Telluride Jazz Festival, outdoor ski slope concerts at Vail, CO, numerous outdoor events throughout the Rockies and Southwest. Call for complete referral list. Stage lighting features completely patchable dimmer racks, Celco board w/manual backup, extremely fast and accurate design and focus. Backdrop and teasers. Credits include: live network telecasts for Miss Universe Inc. and NBC *The Today Show*, Showtime special, The Dirt Band, John Denver, Spyro Gyra, Lily Tomlin, New Mexico Symphony, New Mexico State Fair, Colorado State Fair and hundreds of other-nighters!

SOUND SOUTHWEST, Sound Reinf., Lighting, Staging, Rental; 2611 N. Bellline #117; Sunnyvale, TX 75182; (214) 226-3069. Contact: Richard Martinez

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Idaho, Montana, Nevada, Oregon, Utah,
Washington, Wyoming

ARMADILLO PRODUCTION SERVICES, Sound Reinf., Lighting, Staging, Rental; 24#6 S. Memphis Way; Aurora, CO 80013; (303) 755-5239. Contact: Waldo White

DJ MUSIC, Audio and Video Recording; 3691 Edgefield Dr.; Santa Clara, CA 95054; (408) 727-7108. Contact: David Jasak



PHIL EDWARDS RECORDING
Hayward, CA

PHIL EDWARDS RECORDING, Audio Recording; 1522 W. Winton Ave.; Hayward, CA 94545; (415) 784-4971. Contact: Phil Edwards. REMOTE RECORDING Vehicles: 31' GMC
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QUICKBEAM SYSTEMS, INC., Sound Reinf., Lighting; 3716 High St. NE, Albuquerque, NM 87107; (505) 345-9230. Contact: Gary Mathews. SOUND REINFORCEMENT. Touring Radius: Local, regional, national. Maximum Venue Size: 20,000 outdoors. Vehicles: Intl. Transtar, Fruehauf 40' w/air ride, Chevy C-60 18' bobtail, Ryder, Rollins, Gelco, Hertz/Penske, open accounts, (2) local vans. House Loudspeakers: (16) QSI H-1 bass w/JBL 2240 18" driver, (16) QSI H-1 mid-bass Pekins bin copy w/JBL D140, (16) QSI H-1 horn-pack w/JBL 2445, JBL 2385, (2) E-V ST35, (2) QSI BB 3-way JBL components. Flying System Available: Yes. Monitor

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NORTHWEST

REMOTE RECORDING & SOUND REINFORCEMENT

—CONTINUED FROM PREVIOUS PAGE

6500 bobtail w/lift gate, Ford van. Control Room Dimensions: Mobile II: 20 x 8 x 8. Mixing Consoles: API 40 x 24 x 24 w/550A EQ, API 1604 w/550A EQ. Audio Recorders: (2) 3M 79 24-track or 16-track, MCI 110-B 2-track, Ampex 440C 2-track, (2) Sony PCM-F1 system, (3) Sony cassette deck. Noise Reduction Systems: Dolby M24 A, (4) Dolby A361 A. Synchronization Systems: Adams-Smith 605B 3-machine. Outboard Equipment: (5) UREI 1176LN, (2) UREI LA-3A limiter, Orban dual parametric equalizers, Orban 3-channel de-esser, Lexicon PCM70 digital reverb, (2) Pultec MEQ-5 equalizer, Yamaha REV5 digital reverb, Yamaha SPX901. Microphones: (5) Neumann U87, (2) Neumann U47 FET, Neumann KM84, (2) AKG 414, (2) AKG 451, (6) Sennheiser 421, (2) Shure SM85, (2) Shure SM87, (32) Shure SM56, Shure SM58, (2) Shure SM53 stereo C tape, (4) E-V RE15, (2) E-V 1751, (2) Sony ECM-22P, (2) RCA 77-DX, (6) Countryman FET 85 DI. Monitor Speakers: (2) UREI 811A Time Align, (4) Auratone. Power Amplifiers: (2) McIntosh MC2100, Crown DC-300A. Video Recorders: (2) Sony SLO-323 Beta I, (2) Sony SLHF-1000 Beta, Panasonic PV-1363 VHS. Video Monitors: Sony KX-1901 Profeel color, Sony 12" B&W Cameras: Sony 1900 color. Other Major Equipment: (54) line isolated mic splits, (5) Clear-Corn stations, 200' 50-amp 220-volt line, 300' 27 pair snake, 19 pair snake, (100) individual mic cables. Rates: \$1,200-\$2,300 per day, mileage and expenses extra. Specialization & Credits: Complete packages for record production, video and radio broadcast taping, film and commercial production. Simultaneous record and broadcast packaging a specialty. Experienced crew. Recent credits include 1988 Calgary Winter Olympics (ABC), 1989 Bill Cosby Show theme and overture (Carsey/Werner), Mel Torme and George Shearing (Concord Records), Ray Brown Trio (Concord Records), Stanford Children's Hospital Benefit (KRON TV), Edwin Hawkins, Steven Banks on Showtime (Bonehead Productions), KFOG live broadcast, Bay Area Music Awards, Grateful Dead New Year's Eve 1987-88, San Francisco Blues Festival, Buster Poindexter, Tower of Power, Hot Tuna, Robert Cray, Ice House. Call for brochure.

ELECTRONIC SOUND PRODUCTS; Sound Reinf., Lighting, Staging, Rental; 3320 Chelton Loop S.; Colorado Springs, CO 80909; (719) 597-9350. Contact: Don Williams

FRONT LINE SOUND AND LIGHTING; Sound Reinf., Lighting, Rental; 529 River View Dr.; San Jose, CA 95111; (408) 972-0787. Contact: Phil Hobden, Lance Hahner

GATEWAY AUDIO; Sound Reinf.; 286 Greenhouse Mktpl. #356; San Leandro, CA 94579; (415) 568-8320. Contact: Mike Patrick

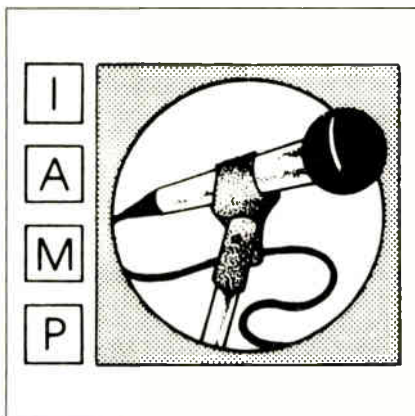
GOLDEN STATE SOUND, INC.; Sound Reinf., Lighting, Staging, Rental; 59A Maxwell Ct.; Santa Rosa, CA 95401; (707) 546-7540; (415) 243-8892. Contact: Don Lund, George Silvers. SOUND REINFORCEMENT. Touring Radius: Local, regional. Maximum Venue Size: 10,000 outdoors. Vehicles: 20' bobtail w/lift gate, 14' bobtail w/lift gate, Ryder. House Loudspeakers: JBL 36 x 36 x 24 4-way tri-amped, plus various "fill" boxes, Apogee processor-controlled system. Flying System Available: Yes. Monitor Loudspeakers: Bi-amped single 15" w/horn, single 12" w/horn, various drum monitors, JBL tri-amped sidefills. House Consoles: Soundcraft 8000 40 inputs, 8 aux, 8 subgroups, Soundcraft 400, 26 inputs; Soundcraft 800, 18 inputs. Monitor Consoles: Soundcraft 500 40 inputs, 12 mixes, (2) Studiomaster 20 x 8, 20 inputs, 8 mixes. Outboard Equipment: Lexicon digital reverb/delay/processors, Yamaha digital reverb/delay/processors, DOD Electronics digital reverb/delay/processors, Roland digital reverb/delay/processors, Yamaha 1/3-octave EQ, UREI 1/3-octave EQ, MXR 1/3-octave EQ, dbx comp/lim/gate, UREI comp/lim/gate, DOD Electronics comp/lim/gate, Symetrix comp/lim/gate, Brooke-Siren crossovers, Rane crossovers, BGW crossovers, JBL crossovers. Power Amplifiers: Carver PM 1.5, BGW 750, BGW 250, AB Systems monitor system. Microphones: Shure, Sennheiser, AKG, Audio-Technica, E-V. Staging: Stage risers, platforms. Lighting: (200) lamp systems using 40' alum. box trusses, Genie Super Towers, motors, various consoles (manual/computer), Orbitor follow spots. Other Equipment: Motorola walkie-talkies, club systems, business meeting systems, wireless mics, paging systems, electronic keyboards, stage amps, drums, drapery.



HI-TECH AUDIO SYSTEMS, INC.
Half Moon Bay, CA

HI-TECH AUDIO SYSTEMS, INC.; Rental; 260 Grove St.; Half Moon Bay, CA 94019; (415) 726-2428. Contact: Mark Herman. SOUND REINFORCEMENT. Specialization & Credits: Hi-Tech Audio Systems offers high-end live mixing consoles for long- or short-term rental. Gamble Series EX 56 x 16 x 2 with matrix, Gamble HC 40 x 16 x 2, Gamble SC 32 x 16 monitor, Yamaha PM3000, Ramsa WR-S 840 40 x 18 monitor, Yamaha 2408 24 x 8 monitor and Studiomaster RXD 24 x 8 monitor are independently available for national and regional tours and events.

HTS AUDIO AND CONCERT PRODUCTIONS; Sound Reinf., Lighting, Rental; 1025 Idylwood Dr. SW; Issaquah, WA 98027; (206) 392-6342. Contact: Steve Harris.



I.A.M.P.—INDEPENDENT AUDIO OF THE MONTEREY PENINSULA
Pacific Grove, CA

I.A.M.P.—INDEPENDENT AUDIO OF THE MONTEREY PENINSULA; Sound Reinf.; PO Box 1018; Pacific Grove, CA 93940; (408) 649-4135. Contact: A.J. Nocita. SOUND REINFORCEMENT. Touring Radius: Local. Vehicles: International bobtail. House Loudspeakers: Harbinger w/JBL and Gauss, JBL, E-V Flying System Available: No. Monitor Loudspeakers: Harbinger (JBL), E-V, IAMP 3-way drum monitors. House Consoles: Soundcraft, Yamaha. Monitor Consoles: Yamaha. Outboard Equipment: Klark-Teknik, dbx, Yamaha, Roland, Loft, Rane, UREI. Power Amplifiers: Carver, Yamaha, AB Systems. Microphones: Shure, E-V, Sennheiser. Specialization & Credits: IAMP has provided quality sound reinforcement for touring professionals ranging from traditional big band to hard rock, from acoustic folk to modern funk. Concert and club dates for contemporary rock, country, reggae, jazz, bluegrass and dixieland are handled by competent, experienced personnel. Civic and community special events and festivals, county fairs and musical productions are all within our expertise.

JACOBS AUDIO; Sound Reinf., Lighting, Staging, Rental; 26 Berthe Cir.; Colorado Springs, CO 80906; (719) 635-5335; (303) 442-1533; Contact: Chris Jacobs. SOUND REINFORCEMENT. Touring Radius: Local, regional, national. Maximum Venue Size: 25,000. Vehicles: Ford FRS-8000 24' diesel. House Loudspeakers: Jacobs Audio custom CAD Time Align, phase coherent, 4-way, hybrid flying system fully horn-loaded using Gauss 18"/15"/10" and JBL and Renkus-Heinz 2"/11" high freq horns/drivers, Martin F-2, Martin F-2 dual 15" bass cabinet, mid-high pack loaded w/Martin 12" and JBL 2", JBL 1" HF drivers. Flying System Available: Yes. Monitor Loudspeakers: System 1: (12) Renkus-Heinz processor-controlled 15" w/2" horn and driver; System 2: Martin Audio 15" and JBL

2" in a 35-degree box, sidefills/drum monitors: Gauss 18" w/separate Gauss 10" and 1" horn driver; dual 18" sub w/separate mid-high package; both 10-mix systems w/White 4650 1/3-octave EQ and stereo sidefills. House Consoles: Soundcraft, Yamaha, Panasonic, Ramsa 40 and 32 x 8 versions. Monitor Consoles: Soundcraft, Yamaha, Panasonic-Ramsa, 32 x 10, 32 x 12 and 24 x 8 versions available. Outboard Equipment: Yamaha REV5, (2) Eventide HL-3000, (2) Yamaha SPX901, (2) Lexicon PCM42 delay, (2) White LC-4400 1/3-octave EQ main, (4) Symetrix 522 dual channel comp/lim/gate, Audioarts 4-band parametric equalizer, Yamaha C300 cassette deck, Nakamichi MR-2 cassette deck, (3) Brooke-Siren crossover main, (3) Loft crossover (monitors), (2) TDM 4-out crossover w/limiter (monitors), dbx 900 rack, Orban parametric and parametric EQs, any outboard equipment available upon request. Power Amplifiers: (6) UREI 6290, (12) Panasonic 9220, Crown Macro-Tech 2400, Crest 8001. Microphones: (12) Sennheiser 421, (2) Sennheiser 441, (4) AKG 451e, AKG D-12E, AKG 112, (6) Beyer M88, (6) Beyer M700, (2) Shure SM81, (6) Shure SM58, Shure SM78, Shure SM10, Shure SM57, Shure SM77, (4) Shure SM85, (15) Countryman Isomax II, (5) Countryman DI, (4) Whirlwind DI, (2) C-ducer for piano, E-V RE20, (6) E-V 451 vocal. Staging: Upon request. Lighting: 150-250 light show w/Celco 60-channel board truss system. Other Equipment: 42-channel splitter snake, transformer-isolated w/Canon Mass connectors, XLR splits and ground lift switches, rack-mountable w/50 channels of sub-snakes ATA amp racks, multipin panels w/Jensen isolation transformers, ATA effects racks include Juice Goose RF, EMI filtered w/ground switches, single-phase 220-200 amp rack-mountable power distribution, 12-station, 3-channel intercom w/Beyer DT-109 and Beyer DT-108 headsets for sound, lights and stage. Rates: Reasonable rates are available upon calling.

JOHNSON DIGITAL AUDIO; Audio Recording; 467 Saratoga Ave., Ste. 627; San Jose, CA 95129; (408) 244-9772. Contact: Tom Johnson

KUSTOM SOUND SERVICES; Sound Reinf., Lighting, Audio Recording; PO Box 4902; Missoula, MT 59806; (406) 728-6655. Contact: John Campbell

LOCATION AUDIO, LTD.; Sound Reinf., Audio Recording; 1765 Braddock Ct.; San Jose, CA 95125; (408) 265-6475. Contact: Doug Berke, Thom Mechlin. SOUND REINFORCEMENT. Touring Radius: Local, regional. Maximum Venue Size: 10,000 seats. House Loudspeakers: E-V TL4025 bass cabinets, E-V TL1225 mid cabinets, JBL 2385A horns w/2445J drivers. Flying System Available: No. Monitor Loudspeakers: JBL 4604B. House Consoles: Soundcraft 800B 32 x 8 x 2, Tangent 3216 24 x 16 x 2. Monitor Consoles: Yamaha MC2408M. Outboard Equipment: dbx 160X comp/limiters, dbx 166 comp/limiter/gates, dbx 900 rack system, Orban 622B parametric EQs, Roland SDE-3000 digital delay, Roland SRV-2000 digital reverb, BBE 802 sonic enhancer, UREI LA-4 comp/limiters, most other goodies available. Power Amplifiers: Crown. Microphones: Condensers and dynamics from AKG, Audio-Technica, Beyer, E-V, Sennheiser, Shure, Sony, Crown PZMs, Countryman DIs, Nady 701 diversity wireless system. Staging: Subcontracted staging available. Lighting: Subcontracted lighting available. Other Equipment: RTS 2-channel intercom system, RCA CCTV 150 system, Otari MTR-90 16-track recorder, Technics 1520 2-track recorder, Yamaha K520 cassette recorder. Rates: Please call for daily and tour rates

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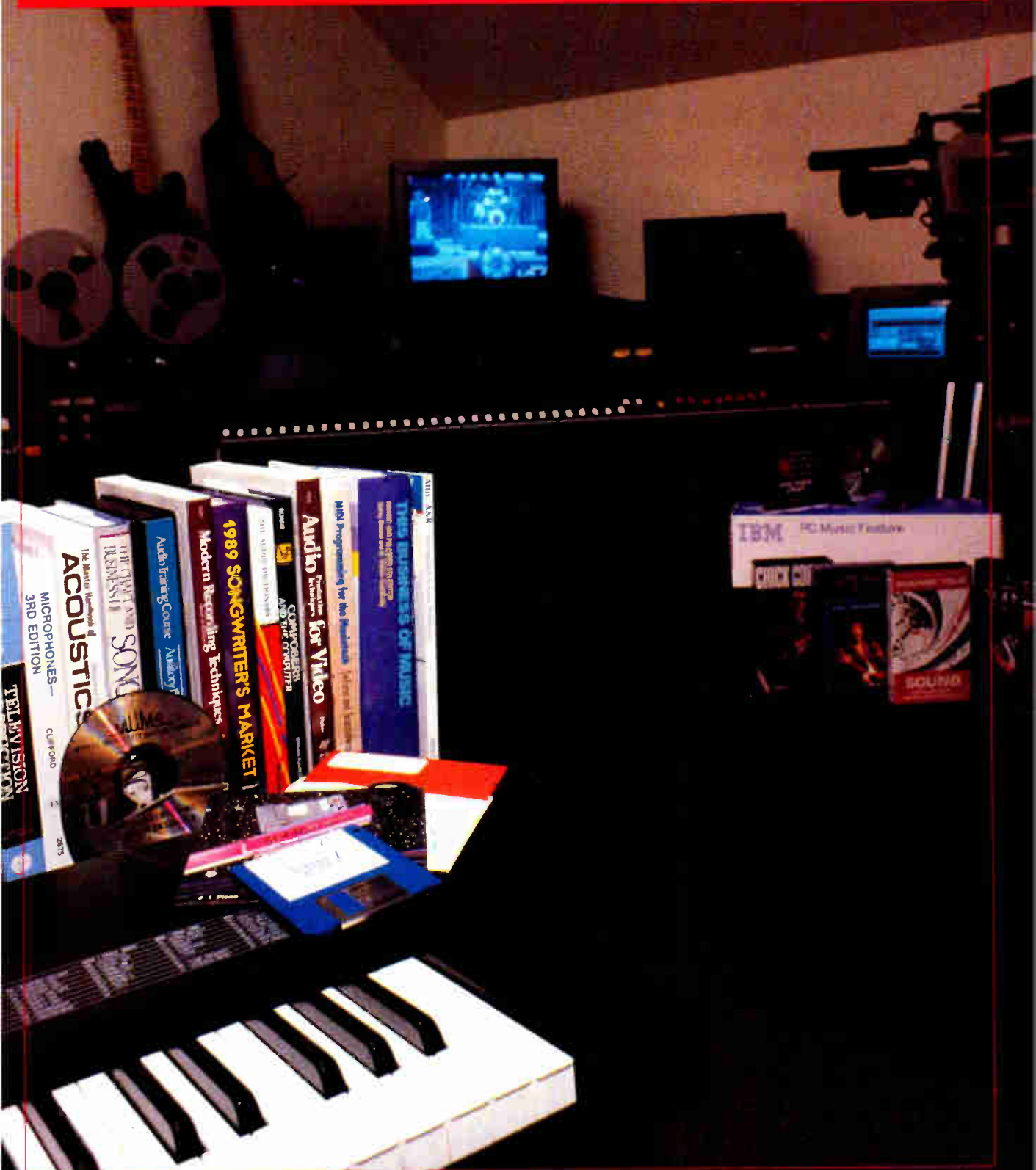
MOBILE FIDELITY PRODUCTIONS OF NEVADA; PO Box 8359; Incline Village, NV 89450; (702) 831-4458; (702) 831-4459. Contact: Brad S. Miller. REMOTE RECORDING. Specialization & Credits: Credits: founder, Mobile Fidelity Sound Lab, Mobile Fidelity Records and Productions; creator of The Mystic Moods Orchestra and producer/engineer of numerous special effects recordings. Principle in development of

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A practical guide to programming high quality sounds on the Casio CZ1, 101, 1000, 3000 & 5000 synthesizers by one of the foremost authorities on CZ programming. It provides an excellent understanding of how the CZ synthesizer generates sounds and the necessary information for creating effective patches. (3618C)

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PROFESSIONAL TECHNOLOGY FOR MUSICIANS . . . FROM ALFRED.

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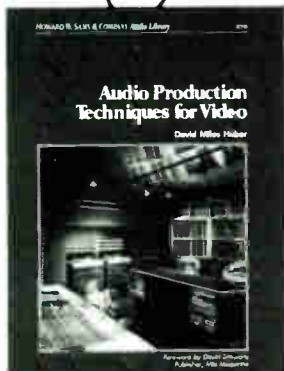
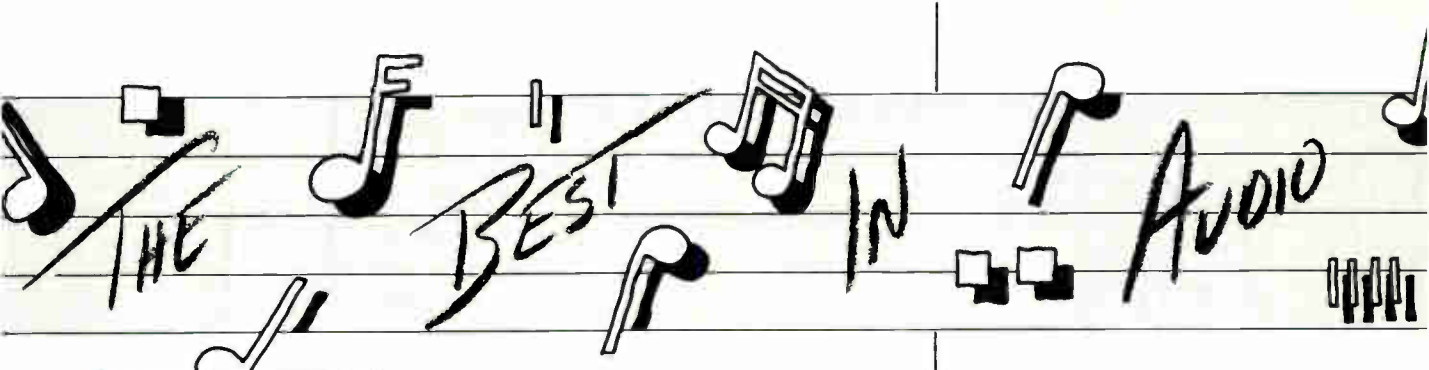
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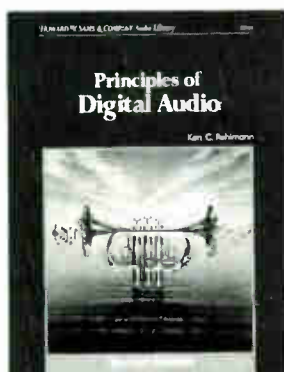


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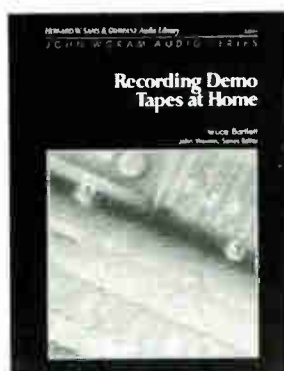


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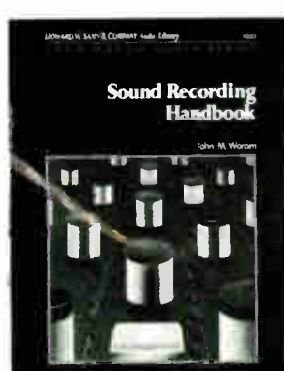


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2040D • TELEVISION OPERATIONS HANDBOOK, Robert Oringel This concise, nontechnical handbook by a respected media consultant includes extensive discussion of light and lenses, the video camera itself, television audio, cables and connectors, the videotape recorder, video editing and the studio cable TV program. 182 pp. (P) \$19.95

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2301D • THE BUSINESS OF NON-BROADCAST TELEVISION: Corporate and Institutional Video Budgets, Facilities and Applications, Judith Stokes This 1988 release surveys the non-broadcast industry, analyzes its market structure and size, and presents current and comparative data on key user activities. Data is presented on revenues, expenses, users, production facilities, manufacturers, video conferencing, interactive disc production and marketing activity. It includes numerous case studies highlighting the scope of activities among users in music, education, medical, utility, library and nonprofit sectors. 156 pp. (H) \$45.00

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2161D • THE POST-PRODUCTION PROCESS, Diana Weynand & Jeff Kuhn This excellent 1985 book gives a complete flow chart of the entire post-production process from the first stages of pre-production to the final stages of audio mixdown. It contains essential information and useful tips on how to best prepare and organize your projects for computerized editing. For producers, directors, management, production personnel or anyone involved with the process. 124 pp. (P) \$19.95

VIDEO TECHNOLOGY

2015E • ELECTRONIC CINEMATOGRAPHY, Harry Mathias & Richard Patterson This title explores the electronic potential of motion picture production on video. It analyzes the applications of new visual techniques that will be required by the improved picture quality of high-definition television. In addition to examining new technological developments, Mathias and Patterson recommend techniques that improve artistic and visual control over the present video technology. Includes detailed methods of controlling tone reproduction in a video image, determining exposure indices for video cameras, lighting for video and dealing with the limitations of image quality. 251 pp. (H) \$31.95

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2110D • THE PROFESSIONAL LIGHTING HANDBOOK, Verne & Sylvia Carlson A practical guide to setting up and using pro lighting equipment. Fully illustrated, this handbook provides useful information on every facet of equipment including lenses, housings, light sources, reflector boards, controllers, filters and applications. 224 pp. (H) \$26.95

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2137D • PROFESSIONAL VIDEO GRAPHIC DESIGN, The Art and Technology, Ben Blank & Mario Garcia This is an expert source to help video pros use space, type, art and color to convey a message quickly, simply and effectively. Featuring numerous examples, this lav-

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2138D • COMPUTER GRAPHICS FOR GRAPHIC DESIGNERS, John Vance Using everyday language, this book begins by explaining the principles of the computer, its hardware and software, codes, languages and operating systems. The bulk of the text focuses on the theory and practice of graphics systems, the coding of drawings, image manipulation, peripheral equipment such as digitizers and display terminals, drafting systems, 2-D and 3-D animation systems, paint systems, shading, color and more. 194 pp. (H) \$45.00

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2150D • CREATING SPECIAL EFFECTS FOR TV AND FILMS, Bernard Wilkie This is a book of ideas as well as instruction. Using easy-to-follow text and illustrations, it deals comprehensively with a wide range of techniques and effects, including gunshots, explosions, fire, weather and the use of miniatures and models. 158 pp. (P) \$18.95

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2170D • VIDEO EDITING AND POST-PRODUCTION, A Professional Guide, 2ND ED., Gary Anderson Fully updated to include the latest on videotape editing bays; edit decision-list cleaning; multi-format editing; film-to-video, offline editing systems; time code editing; digital video effects systems; electronic animation and graphics systems; component video signals; SMPTE time code; audio post-production equipment and aesthetics; and personal computers that function as edit controllers and edit-list management tools. Provides insight into the fundamental artistic principles that have guided editors for years, and functions as a "real world" guide to both technical and nontechnical aspects of post-production. 219 pp. (H) \$45.00

2180D • COMPUTERIZED VIDEOTAPE EDITING, Diana Weyand This book begins where most manufacturers' manuals leave off. Each chapter not only thoroughly covers the most current technology and techniques, but clearly defines the important concepts applicable to any computerized editing system. Specific keyboard and screen illustrations include the CMX 340x, ISC, Sony 5000, Commander

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2183D • TIME CODE HANDBOOK, Cypher Digital This excellent manual defines and demonstrates the uses and applications of SMPTE/EBU time code (the signal recorded on an audio channel of videotape for audio-video synchronizing). Excellent bit-by-bit explanation of the information conveyed by time code. Covers uses for production and post-production. Includes appendices and 11 illustrations. 128 pp. (P) \$14.95

2185D • ELECTRONIC POST-PRODUCTION, Gary Anderson Focuses on the latest film-to-video techniques, including an analysis of budgetary factors, time factors, etc. It also covers telecine systems, explains color correction theory and technique in nontechnical language and gives a thorough overview of new film-video edit systems, time-coding film during production, editing with videodisks and high-definition TV developments. 127 pp. (H) \$45.00

2250D • PORTABLE VIDEO: ENG & EFP, Norman Medoff & Tom Tanquary Electronic news-gathering (ENG) and electronic field production (EFP) have become indispensable skills in broadcasting, production houses and educational and corporate settings. This book introduces all elements necessary to produce quality video: style, technique, pricing, outlets, job opportunities, new technologies and more. 188 pp. (H) \$45.00

2260D • COMPUTERS IN VIDEO PRODUCTION, Lon McQuillin An overview of the use of computers in television and film production, this book begins by describing what computers can and cannot do, both for general business and specialized production applications. You'll learn how to make the most of a computer for scriptwriting, electronic mail, budget management, production scheduling, post-production, character generation, interactive video and more. 188 pp. (H) \$45.00

2345D • VIDEOTAPE OPERATIONS, Marcus Weise This is the most comprehensive book on the subject of videotape operations, useful for both the nonprofessional and the experienced engineer. Includes excellent coverage of all aspects of the television signal, reading and monitoring the signal, machine setup, editing, testing and timing, tips and careers. 204 pp. (P) \$32.95

2380E • TELEVISION ENGINEERING HANDBOOK, K. Blair Benson Engineers, technicians and other professionals involved in television equipment and systems design, maintenance and operation will find this massive, authoritative, practical handbook to be unparalleled by any other work in the field. From fundamentals to state-of-the-art, it covers TV signal generation, transmission and distribution, image generation and display, hardware, complete reference standards and data and much more. 1,478 pp. (H) \$98.50

2390E • TELEVISION: From Analog to Digital, Stan Prentiss Explores the full range of TV's present and future development, including the new and effective radiation of circularly polarized transmission and reception, the latest BTSC-dbx multichannel TV sound, wideband audio/video TV monitors, I and Q wideband chroma (2 MHz), audio/video processing at basebands exceeding 50 kHz and 4.5 MHz, ITT digital TV integrated circuits, analog/digital receiver troubleshooting and more. Current, comprehensive and practical. 343 pp. (H) \$25.00

✓ **2440C • MAINTAINING AND REPAIRING VIDEOCASSETTE RECORDERS, 2ND ED., Robert Goodman**
This updated volume contains practical, time-saving maintenance and repair data with full coverage of the mechanical systems and electronic circuits found in all popular brands and models of videocassette recorders. Includes new chapters on camcorders, test equipment, special effects circuitry and stereo TV. Approx. 400 pp. (P) \$17.95

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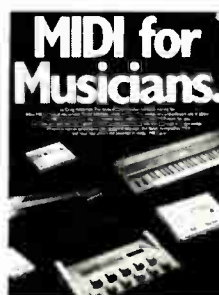
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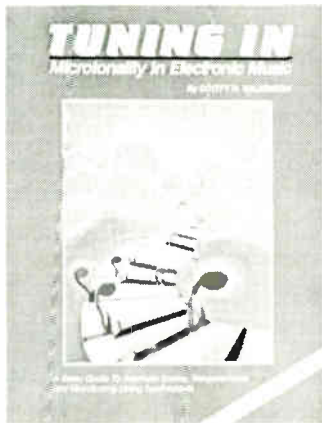
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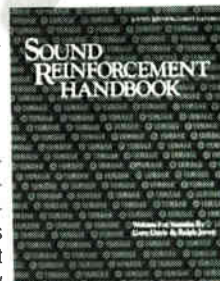


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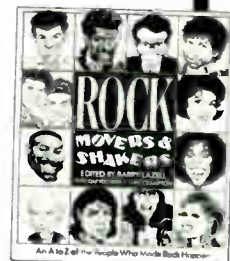
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3700D • THE RECORD PRODUCERS, John Tabler & Stuart Grundy Profiles based on exclusive interviews with 13 of the greatest hitmakers: Leiber & Stoller, Tom Dowd, Phil Spector, Richard Perry, Bill Szymczyk, Todd Rundgren, George Martin, Mickie Most, Glyn Johns, Tony Visconti, Chinn & Chapman, Roy Thomas Baker and Chris Thomas. 248 pp. (P) \$10.95

3730D • ALL YOU NEED IS EARS, George Martin The fascinating autobiography of the man who recorded and produced the Beatles from the start. He describes what it was like in the studio from the first audition of "Love Me Do" to the wild experimentation of *Sgt. Pepper*. 285 pp. (P) \$9.95

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5110D • NEGOTIATING SINGLE SONG CONTRACTS Entertainment attorney Neville Johnson covers performance rights societies, co-publishing, performance and mechanical income, "free goods" clause, "controlled composition" clauses, synchronization income, print income, advances, reversion, administration fees, division of royalties between co-writers, accounting period, foreign arrangements, registration of translations, infringement actions, changes in the lyrics, responsibility to pay royalties, demo costs, choice of law and choice of forum. 45 minutes \$10.00

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The title says it all, as Gambale demonstrates his incredible technique and shows you how to use it in various shapes and modes. He explains how to create shapes and picking patterns to get around the fretboard with lightning speed. For the intermediate/advanced player. Booklet included. 60 minutes \$39.95

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4309D • RICK EMMETT, Star Licks Video Super guitarist for Triumph, Emmett has attained worldwide gold- and platinum-record success. This two-hour tape starts off by addressing the basics of guitar, including tuning methods, simple finger picking, open and bar chords, rhythm patterns, scale forms and fingering. Emmett then goes on to a more detailed analysis of hard rock techniques, pull-off arpeggios, double-hand bar techniques, vibrato bar phrasing and legato scales. Highly recommended for beginning to intermediate players. 120 minutes \$44.95

4132D • JIMI HENDRIX, Legends, Star Licks Video You'll learn licks, tricks and special techniques that made Hendrix rock's first heavy guitar hero. Each lick is played once regularly and once slowly from "Voodoo Child," "All Along the Watchtower," "Red House," "Foxy Lady," "Little Wing" and more. Transcription booklet is included. 50 minutes \$44.95

4302D • LARRY CARLTON, SURE-FINGERED GUITARIST, Star Licks Video Voted NARAS' "Most Valuable Player" for three consecutive years and winner of a Grammy Award for "Best Pop Instrumental Performance," Carlton is truly a master of pop, rock and jazz music. In addition to seven solo albums, he has logged over 5,000 sessions with almost every notable name in the business. On this tape, he not only teaches technique, but imparts his attitude about playing, including self-editing and playing with taste and restraint. 40 minutes \$44.95

✓ **4131D • LEE RITENOUR, Star Licks Video** Acquire the traits of this master session player. Topics include the tasteful use of effects, proper warm-up techniques, use of diatonic scales, tips on sight-reading development, musical phrasing and creating the "right part." Also, a special in-session rehearsal shows you how this archetypal fusion performer prepares for a live performance. Booklet included. 52 minutes \$44.95

4211D • JOE PASS SOLO JAZZ GUITAR, Hot Licks Video Over the course of this one-hour lesson, you'll learn the best of Joe Pass, including chord melody, chord substitutions, leading tones, chromatic chords, voice movements and common tones. Learn to work within close voices and turnarounds; add substitution to your melodic playing, special licks, lines vs. scales, and create walking bass lines over chords with comping. 60 minutes \$49.95

4103D • JOHN SCOFIELD, ON IMPROVISATION, DCI Video This gifted jazz guitarist and Miles Davis sideman covers such topics as the use of 17 major modes and scales, chromatics, passing tones, melodic devices and picking techniques. A wealth of information for the serious guitarist. 60 minutes \$49.95

4401D • JAZZ GUITAR IMPROVISATION, Barney Kessel, Rumark Video This 90-minute tape and booklet features ten lessons, including playing what you hear, fills, turnarounds, the building blocks of improvisation and, of course, the blues. It is the perfect formula for the beginning improviser. 90 minutes \$69.95

4402D • JAZZ GUITAR IMPROVISATION, PROGRESSIVE CONCEPTS, Barney Kessel, Rumark Video Features 53 minutes of chord formations and sequence playing in six thoughtfully prepared lessons. Ideal for the intermediate to advanced guitarist who requires thorough concepts and ideas to work with. Includes a comprehensive booklet. Practice tracks and musical examples feature Kessel, with Dave Young on string bass. 53 minutes \$49.95

4403D • JAZZ GUITAR IMPROVISATION, CHORD-MELODY STYLE, Barney Kessel, Rumark Video Contains seven lessons of clear and precise instruction on developing ways to harmonize a melody. This course will ultimately lead to your own original harmonic style. It will appeal to guitarists who are developing their improvisational skills. Comes with a detailed booklet for in-depth study. Practice tracks and musical examples feature Kessel, with Dave Young on string bass. 45 minutes \$49.95

4212D • EFFORTLESS CLASSICAL GUITAR WITH WILLIAM KANENGISER, Hot Licks Video Here is your chance to learn true classical guitar. Develop perfect technique as you cover proper sitting positions, rest and free strokes, rasgueados, right- and left-hand synchronization and technique, slurs and stretching exercises. Musical pieces include Kanengiser's arrangements of "Rondo Alla Turca" (Turkish March) from Mozart's *Piano Sonata #11, for Study #9 in A Minor* and "The Miller's Dance" from *The Three-Cornered Hat*, by Manuel de Falla. Kanengiser served as actor Ralph Macchio's classical guitar coach on Columbia Pictures' film *Crossroads*. 60 minutes \$49.95

● BASS

4010D • CAROL KAYE'S ELECTRIC BASS COURSE, Carol Kaye Carol Kaye, a prominent studio bassist with an amazing track record of gold records, provides an easy-to-follow, logical program of simple starting techniques, tips on how to practice, and a "how to create" formula. Includes easy pop-jazz theory for interested rock and jazz pros and a step-by-step guidance program with over 90 exercises in all styles. 135 minutes \$59.95

✓ **4127D • BASS FUNDAMENTALS with Dave Spitz, Hot Licks Video** This new video delivers the solid foundation needed to develop your own style. Covers setting up your bass, tuning with harmonics, holding down the groove, chords, octaves, hammer-on and pull-off exercises, working with the drummer, warm-up drills and much more. 60 minutes \$49.95

4106D • JACO PASTORIUS, MODERN ELECTRIC BASS, DCI Video The definitive study of one of the world's most respected bassists. Interviewed by close friend and session bassist Jerry Jemmott, Pastorius discusses right- and left-hand technique, fretless bass, scales and arpeggios, study concepts, etc. Also included are solos and group performances with John Scofield and Kenwood Denard. 90 minutes \$59.95

4205D • BASS GUITAR MASTER CLASS WITH JOHN ENTWISTLE, Hot Licks Video This is your chance to learn with one of rock's all-time greats. You'll learn Entwistle's unique fingering, licks, octave style, chords, hammer-ons, pull-offs, picking techniques, harmonics, soloing concepts, walking bass lines, string-bending and phrasing. In addition, this video contains lots of useful tips and advice that will improve your style, technique and overall approach to bass playing. 60 minutes \$49.95



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4216D • SLAP, POP & TAP FOR THE BASS WITH STUART HAMM, Hot Licks Video Stuart Hamm is one of America's newest bass guitar talents. Here he demonstrates left-hand stretch exercises, major and minor arpeggios, playing chords, slapping and popping, funk, hammer-ons/slaps and triplets. Also includes right-hand, Flamenco strums; two-handed, polyphonic tapping techniques; contrapuntal playing; percussive tapping; playing a melody with the right hand while the left plays a bass pattern; and classical techniques and styles. 60 minutes \$49.95

4313D • JEFF BERLIN, Star Licks Video Jeff Berlin is one of the most respected and innovative bassists in contemporary music. His extensive live performance credits include stints with Allan Holdsworth, Bill Bruford and Pat Martino. On this tape, he begins with a discussion of his personal musical philosophy, then moves on to more specific techniques on harmonic practices, fretboard mastery, record transcriptions and more. Every bassist will come away from this tape a better player. 60 minutes \$44.95

• KEYBOARDS

4150D • THE SECRETS OF ANALOG AND DIGITAL SYNTHESIS, DCI Video A comprehensive overview of all aspects of the creation and performance of synthesizer sounds. A simple, no-nonsense guide to synthesizing any sound, with valuable insights into stage and studio performance techniques. Contains an in-depth tour of virtually every major manufacturer's synthesizer product line, including programming the Yamaha DX7. 120 minutes \$39.95

4207D • PROGRAMMING THE DX7, Ronnie Lawson, Hot Licks Video This video features Ronnie Lawson, player and programmer for Edgar Winter, Steve Forbert, Deodato, Al Kooper and others. This video teaches you to understand FM synthesis: algorithms, carriers, modulators, all DX7 parameters, programming sounds from scratch and envelope generators. Many of Lawson's original sounds are featured. Excellent. 60 minutes \$49.95

4208D • ADVANCED DX7 PROGRAMMING, Ronnie Lawson, Hot Licks Video This video, aimed at more advanced practitioners, discusses quick editing tips, provides understanding of DX7 keyboard-scaling feature, voice initialization, edit recall, programmingsplit keyboard sounds from scratch, DX7 performance features such as breath controllers, aftertouch, modulation wheel and modulation pedal. Includes many more of Lawson's DX7 sounds. Get the most out of your DX7. 60 minutes \$49.95

4108D • RICHARD TEE, CONTEMPORARY PIANO, DCI Video A veteran of thousands of records ranging from Aretha to Paul Simon, Tee covers topics like practicing, chord substitutions, left-hand technique, backing a vocalist and more. Also featured are several performances with Steve Gadd, in-

cluding Ellington's "Take the A Train." A must for the serious keyboard player. 60 minutes \$49.95

✓ **4113D • CHICK COREA, KEYBOARD WORKSHOP, DCI Video** Invaluable insights into developing technique, practicing and composing. Features John Patitucci (bass) and Tom Brechtlein (drums). Extensive booklet included. 60 minutes \$39.95

4120D • CHICK COREA, ELECTRIC WORKSHOP, DCI Video Corea goes into detail about creating sounds with synths and layering them to produce new textures. He also writes a new composition, which is then developed and performed by his trio. Booklet included. 60 minutes \$39.95

4114D • GEORGE DUKE KEYBOARD IMPROVISATION (Vol. 1), DCI Video A video seminar during which Duke discusses left-hand comping, phrasing techniques, soloing, chord constructions, voicing and various tricks of the trade. Booklet included. 60 minutes \$39.95

4115D • GEORGE DUKE, KEYBOARD/ VOCAL ACCOMPANIMENT, DCI Video Duke shares the benefit of his vast experience, gathered over years of working with artists such as Quincy Jones, Anita Baker

and Michael Jackson. He discusses concepts such as chord substitution, voice leading and phrasing. Booklet is included. 60 minutes \$39.95

✓ **4314D • STEVE PORCARO, Star Licks Video** Porcaro is on the cutting edge of music production. As one of the world's top session players, his recording credits are diverse and extensive. On this tape, Porcaro gives a detailed tour of his MIDI setup and shares his insights and hard-won knowledge, covering MIDI and computer use, analog and digital synthesis, programming, sequencing and signal processing. A great tape on the MIDI studio. 50 minutes \$44.95

✓ **4129D • DAVID BRYAN, How to Play Keyboards in a Rock and Roll Band, Hot Licks Video** This new release teaches classical technique, arpeggios, octave exercises and contrary motion, and has drills to develop your strength, speed and accuracy. Includes blues and rock licks, pentatonic improvisation, left-handed rhythms, cluster chords and illustrations on how to work with a drummer and guitarist. Both hands are shown close up. Booklet included. 60 minutes \$49.95

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Tolchin advocates theory and ear-training over note-reading. This video for beginners contains the equivalent of six to ten weeks of lessons, beginning with the names of the notes, scales, chords, rhythms and improvisation. Includes all the basics you'll need to get started on keyboard. 120 minutes \$49.95

4421D • Volume II, Beginner

Using the Beatles' song "With a Little Help from My Friends," Tolchin shows you how to learn a tune from a recording. You'll learn how to hear melody and chord changes, and how to voice and invert chords. You'll also gain hands-on experience of 60 three-note chords. 60 minutes \$49.95

4422D • Volume III, Beg/Intermediate

This tape is an introduction to the blues—its simplicity, variety and intricacy. You don't need years of study to jam with other musicians and have fun. All you need is three chords, the pentatonic scale and your creativity. Includes blues licks, progressions, rhythms and seventh chords. 60 minutes \$49.95

● DRUMS

✓ 4123D LATIN-AMERICAN PERCUSSION, DCI Video

Designed for both beginning and experienced players, this new video teaches basic techniques for playing congas, bongos, timbales and shakers and explains the differences among many key Afro-Cuban rhythms. Ensemble playing examples are featured. Booklet included. 45 minutes \$39.95

4101D • STEVE GADD, UP CLOSE, DCI Video

One of the most recorded drummers of all time, Gadd demonstrates practice techniques, applying rudiments to the set, chart reading, keeping time, bass drum technique, 4-stick drumming, sambas, solos and much more. 60 minutes \$49.95

4102D • STEVE GADD II, IN SESSION, DCI Video

Features Gadd in the studio with two all-star rhythm sections, including Will Lee, Richard Tee, Jorge Dalto and Eddie Gomez. Gadd works up tunes in a variety of styles, including funk, reggae, bebop and

several Latin feels. Also included are some of Gadd's most exciting recorded solos. 90 minutes \$59.95

4105D • ED THIGPEN, ON JAZZ DRUMMING, DCI Video

Covers the basics of jazz drumming, the importance of the bass drum in jazz, jazz ride patterns, phrasing in time and extensive brush technique. Includes several outstanding solos. 60 minutes \$49.95

4112D • BILL BRUFORD AND THE BEAT, DCI Video

This fine portrait of Bruford is entertaining as well as instructional. He demonstrates and discusses various aspects of his drum technique and his attitude toward music in general. Also featured is excellent footage of him with King Crimson and Yes, with special appearances by Robert Fripp and Steve Howe. 30 minutes \$39.95

4116D • STEVE SMITH, PART ONE, DCI Video

Features tips on rock and jazz drumming, double bass and timekeeping, plus a sizzling performance with Vital Information. Winner, Best Music Instructional Video, 1987, American Video Awards (*Billboard* magazine). Includes a 36-page study booklet. 60 minutes \$39.95

✓ 4122D • STEVE SMITH, PART TWO, DCI Video

Smith's class continues with double-bass drumming, developing creativity and building a drum part (using "Don't Stop Believing" as an example). Features additional performances by Vital Information. Also includes rare, in-concert footage of Step Ahead and an exercise/transcription booklet. 60 minutes \$39.95

✓ 4134D • CHET MCCrackEN AND CHESTER THOMPSON, Basic Drum Tuning and Techniques, Star Licks Video

Fine-tune your drum habits with two of today's finest and most versatile drummers. You'll hear and see tips on selecting, maintaining and tuning your drums properly to get the best and most compatible sound possible. Drum heads, muffling techniques and equipment are also covered. Thompson explains how to master the movement around the drums and McCracken demonstrates some simple groove patterns. A booklet contains charts and diagrams of their setups and notated examples. 50 minutes \$44.95

✓ 4121D • TERRY BOZZIO, SOLO DRUMS, DCI Video

Bozzio presents his overall approach to the drumset as an orchestra-in-itself. The tape opens with an incredible solo, which he breaks down section-by-section, explaining the various techniques used. Covers double-bass drumming, hand techniques and a study of his part for "U.S. Drag." He also outlines exercises to strengthen chops and independence. Transcription/exercise booklet included. 60 minutes \$39.95

✓ 4135D • DAVE WECKL, BACK TO BASICS, DCI Video

This video offers invaluable insights into the fundamentals of drumming. Topics include hand and foot technique, practice routines, and practical drum kit setup and approach. He also performs several tunes and solos with sequenced percussion and taped band accompaniment. Excellent overview of drum skills for any level drummer. 72 minutes \$39.95

✓ 4133D • JEFF PORCARO, Star Licks Video

Porcaro describes his approach to straight time, triplet and shuffle feels, and Latin grooves. He breaks down a variety of drum patterns from Toto's set list and discusses half-time shuffles, bass drum-pedal technique and timing techniques to achieve a variety of effects on the hi-hat. Porcaro demonstrates his style in a live set. Booklet included. 40 minutes \$44.95

✓ 4128D • TICO TORRES OF BON JOVI: Drumming Essentials, Hot Licks Video

This versatile veteran teaches you about rock, jazz and Latin styles, stick preparation, snare tuning, tuning the kit, equipment care, studio miking, cymbal technique, the "buzz" roll, crescendos and much more. Includes special exercises to help eliminate back problems. Also, you'll learn about his parts on some of Bon Jovi's biggest hits. For beginning through advanced players. 60 minutes \$49.95

4225D • TOMMY ALDRIDGE, ROCK DRUMS, Hot Licks Video

This thorough, hour-long presentation of Aldridge's best techniques teaches you double-bass balance, three- and five-note patterns for the feet, how to add double-bass to your licks and solos, substitution of bass drums for other parts and triplets. He also shows you how to add stick twirls to your solos and demonstrates cymbal "choking" and double-bass shuffles. Great workout for both beginning and advanced players. 60 minutes \$49.95

4206D • DRUM MASTER CLASS, Carmine Appice, Hot Licks Video

This tape features one of the most dynamic drummers and best teachers around. Appice discusses and demonstrates various rock patterns, hi-hat accents and patterns, fills, double-bass drum techniques and patterns, complex stick-twirling for added performance "flash," substitutions and much more. Examples are performed several times at different tempos and the patterns are shown on the split screen. 60 minutes \$49.95

FORTE PRODUCTIONS
PRESENTS

Here's what reviews
have said:

▶ "clear and useful for the
serious beginner...
highly recommended"
Billboard

▶ "If this tape meets with
the wide success that it
rightly deserves, he may
become the most familiar
piano instructor in the
country..." Nominee Best
How-to Video, Video Review

#4420-2C

LEARN THE ESSENTIALS
OF PIANO
with Talc Tolchin



● OTHER

4226D • ROCK AND ROLL SAXOPHONE WITH STEVE DOUGLAS, Hot Licks Video Douglas helps you work on "chicken sax," adding "growl" to your tone, "singing" with the sax, flutter tongue techniques, alternate fingerings, and the "great shake" armature exercises, rock and roll licks and scales, chromatic runs, false fingerings and other great rock and R&B techniques. 60 minutes \$49.95

✓ **4130D • VOCAL EASE: Care and Exercises for the Singing Voice with Pamela Pollard** Build your strength and confidence as a vocalist with a pro who has worked over 25 years with such luminaries as Kenny Loggins and Manhattan Transfer. Topics include eating/drinking habits, vowel shapings, posture, improving range, breathing, projection and mic technique. Equivalent to seven sessions with a vocal coach. Contains five warm-up exercises. 78 minutes \$39.95

✓ **4125D • FINGER FITNESS: The Art of Finger Control with Greg Irwin, Hot Licks Video** Working your fingers to the bone? These new exercises promote strength, flexibility and finger independence and can reduce stress and fatigue in the hands. The program can literally be practiced anywhere, anytime, at your own convenience. A great way to improve the coordination and dexterity of your hands. 30 minutes \$29.95

4311D • DOBRO VIDEO LESSON, Star Licks Video Includes detailed study of bar technique, pick technique, chimes, trills, bending strings, hammer-ons, pull-offs, slants, rhythm chops, slow songs, fast songs and much more. Solos taught: "Cripple Creek," "Great Speckled Bird," "Fireball Mail" and "Red-Haired Boy." Beginning/intermediate. 90 minutes \$39.95

4312D • BANJO VIDEO LESSON, Star Licks Video This easy, step-by-step video course is for the absolute beginner or the intermediate player. Includes learning to read tablature, right- and left-hand techniques, efficient practice habits and much more. Tunes include: "Cripple Creek," "Foggy Mountain Breakdown," "Will the Circle Be Unbroken," "Your Love Is Like a Flower," "Blackberry Blossom." 120 minutes \$39.95

SEQUENCING / PRINTING

● MACINTOSH

OPCODE SEQUENCER 2.6 from Opcode Here is a proven professional sequencer, priced for beginners. Create up to 26 sequences per file and chain them together to build complete compositions. Features include independent looping and quantization for each track; real-time recording of tempo changes; an "undo" feature; and editing functions like cut, copy, paste and merge of tracks and sequences. Powerful and simple. Files can be printed on *Deluxe Music Construction Set*.
11701 • for Macintosh \$149.00
What you need to run it: Macintosh with at least 512K RAM; MIDI interface; MIDI instrument(s).

MASTER TRACKS, JR., from Passport
See Apple/Commodore section for description.
14606 • for Macintosh \$149.95

DELUXE MUSIC CONSTRUCTION SET (DMCS) from Electronic Arts
Create eight-part scores with easy point-

and-click operation. Input notes in step-time from any MIDI keyboard or transcribe *Opcode Sequencer 2.6* files. Notate in any key signature, with a variety of timing options, in the treble, bass, alto and tenor clefs. Mouse-driven note editing is fast and intuitive. Playback through any MIDI instrument(s) or your computer's speaker. Notes flash on screen during playback. Laser print-out available with Sonata music font from Adobe.

14640 • for Macintosh \$129.00

14216 • for Amiga \$99.00

What you need to run it: any Macintosh or Amiga. Optional: MIDI interface; one or more MIDI instruments; printer.

MACDRUMS from Coda Go beat-crazy with this self-contained, fully programmable, 4-voice polyphonic drum synthesizer and sequencer. You can choose among the designed instrument "sets" or create some of your own using 35 onboard instruments. Each sound is a digital sample. Also, you can trigger these sounds with your drum machine or MIDI-equipped instrument for some spicy collaborations.

14970 • for Macintosh \$59.95

What you need to run it: Macintosh with at least 512K RAM. Optional: external speakers; MIDI interface; MIDI instrument.

ZERO • ONE

The power to be the best.

Macintosh users prefer the Zero One editor/librarians over all other brands. **Here's why?**

- **The best user interface** (numeric and graphic).
- **The best real time control.** (D/A application)
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- **The only 100 event step-recorder.**
- **The most intelligent patch generator, ever.**
- **The best memory management.**
- **The best reviews** E.M. Jan. 89.

Simply the best.



Item#	Product &	Retail Price
#001	D50/550 Editor/Librarian	\$199.
#002	D50/550 Librarian	\$ 99.
#003	D10/110/20 Editor/Lib. w/Orchestrator	\$199.
#004	D10/110/20 Lib. w/Orchestrator	\$149.
#005	MT32 Editor/Lib. w/Orchestrator	\$179.
#006	MT32 Librarian w/Orchestrator	\$139.

Order now from Mix Bookshelf 1-800-233-9604 & Save!



Zero One Research exclusively marketed by:
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6522 Winnetka Ave., Woodland Hills, CA 91367 USA

MASTER TRACKS PRO 3.0 from Passport This award-winning sequencer gives you 64 tracks, has graphic, step-time editing capabilities, allows you to sync to SMPTE time code via MTC and provides numerous enhancements for working on film or video soundtracks. The program displays the SMPTE location in the Transport window. Fit Time adjusts stored tempos to make a given section fit a particular length. Markers can be locked to SMPTE locations for playback. *MTP 3.0* automatically chases external clocks and responds to program changes. Combined with Passport's powerful sequencing and editing capabilities, this program delivers a total MIDI-control station.

14630 • for Macintosh \$395.00

14438 • for IBM \$395.00

14025 • for Atari ST \$395.00

16075 • for Apple IIGS \$395.00

What you need to run it: Macintosh with at least 512K RAM, IBM or compatible with 640K RAM, Atari ST, or Apple IIGS with 1.25 MB RAM; one or more MIDI instruments; MIDI interface.

✓ **ENCORE from Passport** A desktop composing solution with a variety of input options, MIDI playback and publishing-quality output. *Encore* transcribes Standard MIDI Files, *Master Tracks Pro* and *Jr.* sequences, live MIDI performances in real time or step time, or data input with mouse. Notate up to 64 parts with multiple key signatures, meters, clefs, smooth slurs and slanted beams. Cut-and-paste functions are complemented by MIDI event editing, layout control and intelligent handling of text and lyrics. Supports the Sonata music font and PostScript. Save compositions as scores, MIDI Files or *Master Tracks Pro* sequences.

16010 • for Macintosh \$495.00

What you need to run it: Macintosh with at least 512K RAM; ImageWriter, LaserWriter, PostScript or compatible printer. MIDI interface and one or more MIDI instruments recommended.

✓ **VISION from Opcode** Opcode's new professional sequencer features simultaneous access to 26 sequences, up to 99 tracks per sequence, with full chaining and looping. Do easy graphic editing on the "piano roll" screen or get down to individual MIDI events in the List Editing mode. Along with thorough cut-and-paste, merge and unmerge features, *Vision* offers flexibility in selecting events, isolating melodies from chords and transposing events with user-definable maps, all documented with plenty of online help. Thirty-two assignable faders provide automated control of any MIDI device, from mixers to lights. Includes full SMPTE support, 480 pppn resolution, multichannel recording capability and Standard MIDI File compatibility.

16015 • for Macintosh \$495.00

What you need to run it: Macintosh 512K, Plus, SE or II; MIDI interface (Opcode Studio 3 recommended); one or more MIDI instruments.

PERFORMER V. 2.4 from Mark of the Unicorn The studio standard for pro sequencing. Just record in real time, then use one of *Performer's* error-correction commands to clean things up. Do more delicate editing in the step-record window. Rearrange and repeat sections with cut, copy and paste; add smooth crescendos; change rhythm, duration or velocity; loop tracks or fragments independently; transpose, quantize, deflag, invert pitch, reverse time and split notes until you get it right! Sync to SMPTE using two different time-lock modes. Version 2.4 features quick playback of selected notes from the event list, a conductor track for visual editing of tempo, meter and key changes, a new system exclusive editing window and Standard MIDI Files. Convert your sequences to sheet music with Mark of the Unicorn's *Professional Composer*.

12123 • Version 2.4 for Macintosh \$395.00
What you need to run it: any Macintosh with at least 512K RAM; a MIDI interface; one or more MIDI instruments.

PROFESSIONAL COMPOSER V. 2.3 from Mark of the Unicorn

Professional Composer transcribes *Performer* sequences and so much more! Create score paper; enter and delete symbols from computer keyboard or MIDI instrument; group notes and phrases with beams, measure lines, slurs and ties. Switch to fast-input mode and use the editing menus to move and copy passages, transpose parts, change rhythms, merge voices and insert lyrics. Advanced features let you validate instrument ranges, designate measure numbers and rehearsal markings, and create piano reductions. Automatically extract transposed parts from your score and check for out-of-range notes with a single command, rebar a selected region, combine several staves into one (while adjusting stem direction for different parts) and double or halve all note durations. Print up to 20,000-symbol symphonies in a variety of formats and text styles, complete with full or abbreviated part names or instrument names; lyrics; a full range of expression, tempo and dynamic markings; even a specially formatted title page. Version 2.3 features two new fonts and improved dot matrix printing. Compatible with Adobe Sonata Font.

1180 • Version 2.3 for Macintosh \$495.00

What you need to run it: any Macintosh with at least 512K RAM; any Mac-compatible laser or dot matrix printer. MIDI interface and MIDI keyboard supported as input device.

✓ SCORING AND SOUNDTRACK WITH MACINTOSH from Opcode

Professional film and video scoring requires a rigorous approach, and this hardware/software combination from Opcode Systems is up to the task! *The Timecode Machine* is a compact and inexpensive way to implement SMPTE time code with your MIDI setup. It reads and writes all varieties of SMPTE time code and converts SMPTE to either MIDI Time Code or the "direct time lock"

format used by Mark of the Unicorn's *Performer*. It easily stripes time code on tape, will regenerate faulty time code and has a high tolerance for drop-outs and other anomalies.

The box really shines when used with *CUE—The Film Music System*. Version 2.0. *CUE* is a software support system for soundtrack composers and editors. It automates each paperwork task and calculation necessary to sync music to picture. The cue sheet displays all you need to know: absolute and relative time, timings before a cue begins, tempo and meter changes, cue point descriptions and lots more. The MIDI events window allows you to describe up to 40 MIDI events of up to five channels each, which trigger at specific SMPTE numbers and play back locked to SMPTE. Tempo Search searches up to 36 tempos at once and automatically calculates accelerandos and ritards to hit cue points exactly. *CUE* will print out custom scores; includes real-time features such as a click track locked to SMPTE; and allows entry of timings in feet and frames, all varieties of SMPTE, minutes and seconds, or measures and beats. A new revision of *CUE* for the Mac II should be available in late spring. **16085 • Cue 2.0 and Timecode Machine from Opcode \$895.00**

What you need to run it: a Macintosh computer with at least 512K RAM; MIDI interface (Opcode's Studio Plus Two recommended, also available from Bookshelf); one or more samplers or other MIDI instruments.

✓ ARCHIE: STUDIO MANAGEMENT SYSTEM FOR THE MACINTOSH

- Creates session tracksheets covering setup, mics, track allocation, cue points, outboard equipment and personnel. *Archie* even computes rhythm-compatible, digital delay options from beats per minute.
 - Prepares session timesheets including hours worked, titles recorded, materials used, breaks and downtime.
 - Manages your master tape library.
 - Prepares invoices with computed totals, automatically using negotiated or book rates. Includes user-definable sales tax calculations.
 - Generates statements, reports totals of outstanding billing and tracks delinquent accounts.
 - Maintains payable and receivable ledgers and handles the checkbook.
 - Manages inventory of equipment and supplies.
 - Maintains and sorts mailing lists of clients, producers and vendors. Prints mailing labels and Rolodex cards.
 - Comes with online help, a 24-hour bulletin board and telephone tech support.
- 16080 • \$795.00**
What you need to run it: Mac 512KE, Plus, SE or II with at least one megabyte RAM and a hard disk; ImageWriter, LaserWriter or compatible printer.

IBM[®] PC MUSIC FEATURE CARD

THE IBM PC MUSIC FEATURE This revolutionary, plug-in option card turns a personal computer system into a musical instrument suitable for use in schools and universities, at home and among professional musicians. Once it's plugged into an expansion port, the IBM PC Music Feature puts a Yamaha FM synthesizer under the hood of your IBM PC. Now musicians can compose, perform, record and play back music directly from their PCs. Eight notes at a time can be played from 336 available preset sounds. You can emulate the sounds of a guitar or piano, or even of ensembles by mixing in a flute, trumpet or zither. Add a second card to your system, and you can orchestrate as many as 16 different instruments on your computer. Also included in the IBM PC Music Feature is a MIDI in/out/thru interface that allows you to connect all other MIDI instruments to your setup. The software listed below affords you different ways to create and learn about music. The programs are available individually or as part of an application package that includes an IBM PC Music Feature card.

IBM PC MUSIC FEATURE from IBM

This full-length expansion card is a combination MIDI interface and Yamaha FB-01 8-voice multitimbral, FM synthesizer, with 240 quality preset voices and 96 programmable sounds on board. Other features include a mini-stereo (Walkman-type) headphone output and two RCA stereo outputs for monitoring through an amp or hi-fi. A MIDI in/out/thru interface is included to provide connection to other MIDI instruments.

14540 • for IBM \$495.00
Sale Price \$425.00

What you need to run it: IBM PS/2 Model 25 or 30, PC, XT, AT or true compatible.

COMPOSE from Yamaha

This interactive music composition program is fully compatible with the IBM PC Music Feature card. It's simple enough for beginners, yet at the same time, powerful capabilities are available for more demanding musicians to create multipart compositions for playback and printing. With *Compose* and the Music Feature card you can create up to eight parts, access up to 336 voices, print or play any subset of a composition and capture real-time performances for composition data. Implementation of external MIDI devices, such as drum machines, is available to support any MIDI setup.

14459 • for IBM MFC \$109.00
What you need to run it: an IBM PC or compatible, IBM PC Music Feature card. Optional: MIDI instruments, Playrec sequencing program, printer.

PLAYREC from Yamaha

The *Playrec* is an interactive music performance, recording and playback program for the IBM PC Music Feature card. With *Playrec*, you can lay down tracks playing the Music Feature's multitimbral FM voices and/or other MIDI synths. As the recorded tracks are replayed, you can overdub additional parts (16 tracks are available). Divided into two programs, *Playrec* provides easy composition for starters; a more advanced option that allows simple voice editing (no punch-in), allocation of 336 voices, volume, tempo and meter. This program is flexible enough to involve and educate the musical semiliterate, as well as provide an inexpensive intro to MIDI sequencing for someone with real chops.

14400 • for IBM \$77.00
What you need to run it: IBM PC or compatible, IBM PC Music Feature card, one or more MIDI instruments.

TEXTURE CLASSIC from Magnetic Music

Now in its third revision, *Texture* has endured because of its modular architecture, speed and musician-oriented design. You can create as many as 96 patterns, each containing 24 tracks, with each track assignable to any MIDI channel. It has simple keystroke commands and pop-up dialog windows for fast operation. In addition to the standard record, play, punch-in, overdub and tape sync features, it also includes note-by-note editing that allows global creation of crescendos and ri-

tards. If your IBM has 640K RAM, *Texture* can record and playback about 72,000 notes. A great mix of features and reliability at a new price

12304 • for IBM \$199.00

What you need to run it: IBM or compatible with at least 256k RAM; one or more MIDI instruments; IBM Music Feature Card or MPU-compatible MIDI interface card.

✓ MUSIC PRINTER PLUS VERSION 2.0 from Temporal Acuity Products

Need a fast, easy method for notation entry without compromising quality? This new version offers single key selection of all music characters. Prepare publication-quality printouts of any size. Listen to the score on the Music Feature card, then extract parts automatically. Features include control of stem directions, beams, ties, slurs and key signatures, and transposition of an entire score. Prints lyrics and accepts real- and step-time entry from a MIDI instrument. Printing capabilities include high-resolution dot matrix (both 9-pin and 24-pin); supports wide carriage printers and laser printout (Bubble Jet-130). Accommodates specific customizations.

16055 • for IBM \$395.00
What you need to run it: IBM PC, AT, XT, PS/2 Models 25/30 or compatible with 640K RAM; monochrome or CGA, EGA, Hercules, PS/2 color monitor. Optional: IBM Music Feature card or MPU-compatible interface; MIDI instrument.

PERSONAL COMPOSER SYSTEM / 2 (V. 2.0) from Jim Miller

Here is the popular IBM sequencing/scoring integrated program. Do the composing yourself with your IBM keyboard or a mouse, or record a keyboard performance via MIDI and have the program convert it into notation for you. Then edit your score with short, simple commands, play it back, transpose it, automatically verify rhythms and/or synchronize it to external programs. *Personal Composer's* printed score output is still the industry standard for quality notation on IBM. Shift to Recorder Mode and the program becomes a 32-track sequencer. Through MIDI event-editing, each track can be erased, looped, bounced, cut-and-pasted and quantized. Customize the program by saving a repeated series of keystrokes into a single function (macro). A nice extra for IBM Music Feature card users is the ability to configure the onboard

FB-01 sounds from a simulated, onscreen front panel. Print out with Epson/IBM-compatible dot matrix or PostScript printers such as Apple LaserWriter with Sonata music font. This program offers the most punch under one title.

12400 • for IBM (5.25" disk) \$495.00

14440 • for IBM (3.5" disk) \$495.00

What you need to run it: IBM PC, XT, AT, PS/2 Model 25/30 or compatible with at least 640K RAM (hard disk recommended); Hercules-compatible graphics card; IBM PC Music Feature card or MPU-compatible interface; MIDI instrument(s). Optional: printer; Microsoft mouse.

STARTER SERIES #1

IBM PC Music Feature, Yamaha Playrec; *MIDI for Musicians*, by Craig Anderton
ISS20 • for IBM \$469.00

STARTER SERIES #2

IBM PC Music Feature, Yamaha Playrec and Compose; *ICSEditor/Librarian; MIDI for Musicians*, by Craig Anderton
ISS28 • for IBM \$499.00

ADVANCED SERIES #1

IBM PC Music Feature; Magnetic Music Texture; *ICSEditor/Librarian; MIDI Home Studio*, by Howard Massey
IAS30 • for IBM \$579.00

ADVANCED SERIES #2

IBM PC Music Feature, TAP Music Printer Plus; *Music Through MIDI*, by Michael Boom
IAS35 • for IBM \$699.00

MASTER SERIES

IBM PC Music Feature; Jim Miller Personal Composer; *ICS Editor/Librarian; MIDI Home Studio*, by Howard Massey
IMS40 • for IBM \$859.00

14540M • IBM PC MUSIC FEATURE TECHNICAL REFERENCE

Documents the functions and operations of the IBM PC Music Feature card. Manual is shrink-wrapped, unbound for insertion in 3-ring binder. Crucial resource for programmers or advanced users. \$29.95

• **IBM**
(MPU-401 INTERFACE STANDARD)

SONGWRIGHT IV from SongWright

Notes entered from the computer keyboard or lines played on a MIDI keyboard are automatically transcribed into notation. Play back individual parts with synched lyrics or hear full orchestrations with optional use of MIDI. Transpose compositions into any key. *SongWright* prints quality manuscripts, lead sheets, piano/vocal and ensemble scores, including text, chords and dynamics. Laser printer support now available.

12402 • for IBM \$89.95

16000 • Laser Print Drive \$39.95

What you need to run it: IBM PC, XT, AT, PS/2 Models 25/30 or compatible with at least 256K RAM; CGA or Hercules graphics board; IBM/Star/Epson-compatible printer. Optional: MPU-compatible MIDI interface; MIDI instrument.

CAKEWALK V. 2.0 from Twelve

Tone Systems This hip, powerful and affordable program has 256 tracks available, with independent names, play/mute switches, and pitch and velocity transpositions. You can use a mouse with pull-down menus or shortcut keystrokes to execute common operations quickly. Other features include aural

editing, flexible transport (auto rewind/stop), cut-and-paste editing, quantization down to 32nd-note triplets, and synchronization to MIDI clock with Song Position Pointer or FSK. You can print files with *The Copyist*.

14405 • for IBM \$150.00

What you need to run it: IBM PC, XT, AT, PS/2 Models 25/30 or compatible with at least 256K RAM; MPU-compatible MIDI interface; MIDI instrument(s).

SEQUENCER PLUS (V. 2.0) from

Voyetra This program is organized into screens that give access to the information you need, when you need it. The Main Track menu displays and controls available MIDI recording tracks. You can name them, assign MIDI channels, embed initial program numbers or transpose. The Note Edit screen uses a "piano-roll" metaphor; as each note is highlighted, all its attributes are shown. The View Screen's dynamic track sheet makes arranging and punch-in overdubs a breeze and offers cut-and-paste editing. The Song Files menu displays all recorded files (up to 28 per screen) and keeps complete records for each. The Options menu displays and controls metronome on/off, lead-in, clock source, time signature and more. The program's unique Transforms allow you to mark off a section of your song and treat it with any one of the available transform algo-

rithms for manipulating pitch, time, velocity and split. Dozens of system commands put you in the driver's seat, while an excellent manual helps you navigate. All three levels (Mark I, II and III) have identical displays; they vary in the numbers of recording tracks, extensiveness of the editing features and SMPTE implementation. Upgrades are available. You can print files with *The Copyist*.

14436 • Demo \$10.00

14420 • Mark I for IBM \$129 (16 tracks)

14435 • Mark II for IBM \$295 (32 tracks)

12303 • Mark III for IBM \$495 (64 tracks)

What you need to run it: IBM PC, XT, AT or compatible, or IBM System/2 models 25/30; at least 640K RAM; DOS 2.0 or later; Roland/Voyetra or compatible MIDI interface; one or more MIDI instruments.

✓ **PC/MUSICPAK from Voyetra**

Complete MIDI starter package for the PC and MIDI synth (see advertisement). Includes *Sequencer Plus Mark I* Version 2.0, V-4001 MIDI interface, demo disks and P.A.N. membership.

14432 • for IBM \$249.00

What you need to run it: IBM PC, XT, AT or compatible with at least 512K RAM; one or more MIDI instruments.

THE COPYIST from Dr. T's

This popular notation software is available in three levels. All levels include a full selection of musical symbols, six clefs (including percussion), guitar fret symbols, all key and time signatures, and mouse-controlled cut, copy, paste and move functions. You can quantize timing and duration independently, each track independently, and sections of score or individual tracks differently. *The Copyist* supports MIDI files, features extremely flexible note placement and editing functions, and transcribes many popular sequencers, including (Atari version) *KCS*, *MRS*, *Steinberg Pro-24*; (IBM) *Texture*, *Sequencer Plus* and *Master Tracks*. Level Two has all that, plus a symbol editor that allows ten user-created symbols, converts any supported sequencer format to any other, extends score length to 50 pages and supports Atari laser printer (ST version), HP LaserJet Plus and HP plotters. Level Three has all of the above and supports PostScript-compatible laser printers, includes Adobe Sonata fonts, extends score lengths to 100 pages, converts *Copyist* files to TIFF and EPS formats, and interfaces with *PageMaker*, *Ventura* and *Publishing Partner Pro*. All three levels are fully file-compatible and upgradable.

LEVEL I

14040 • for Atari ST \$99.00

14450 • for IBM \$99.00

LEVEL II

13027 • for Atari ST \$275.00

12403 • for IBM \$275.00

LEVEL III

14045 • for Atari ST \$399.00

14455 • for IBM \$399.00

What you need to run it: an Atari ST computer (1 Megabyte RAM recommended); printer. What you need to run it: IBM or compatible with at least 512K RAM; two disk drives; CGA or Hercules monitor. Optional: printer.

MUSICPRINTER PLUS

THE ULTIMATE INSTRUMENT FOR DESKTOP COMPOSING

Elegance in composing, printing and performing music.

- Compose/arrange directly on the screen—WYSIWYG
- Print scores in pro-quality hi-res dot matrix—9 or 24 pin & BJ 130
- Play MIDI out with studio musician precision

MusicPrinter Plus is the most comprehensive, friendly, easy-to-learn composition package on the market today. This award-winning program was developed by composers, educators and is published and backed by the nation's leading music education software company. Version 3.0 (6-89) update will add real-time MIDI input & laser/ink-jet printing.

SUPPORTS

IBM PC, PC AT, PS 2, or compatibles with 640K RAM. CGA, EGA, VGA, or Hercules. IBM Music Feature, MPU-401 or Yamaha C-1. Call or write for information.

Temporal Acuity Products, Inc.

#16055



● APPLE/COMMODORE

GLASS TRACKS from Sonus

This easy-to-use, powerful sequencer features tape recorder-type controls and extensive editing capabilities. Features eight sequences/eight tracks, meter adjustment by bpm, nondestructive bounce (retains original track if "bounced" track isn't what you wanted), transposition and autocorrection to nearest 32nd. *Glass Tracks* includes several demo songs from classical, rock and popular styles.

14200 • for Commodore \$69.95

What you need to run it: Commodore 64/128 computer; MIDI interface; one or more MIDI instruments.

14600 • for Apple \$99.95

What you need to run it: An Apple IIe, II+ or IIGS computer; MIDI interface; one or more MIDI instruments.

THE MUSIC SHOP FOR MIDI from Passport

Here is a Commodore user's "musical word processor." This program lets you create, store and edit compositions and print out sheet music in piano, single staff or quartet formats. Enter music from any MIDI keyboard in step time or input and edit under joystick control. Supports all key signatures and can hold up to 20 pages of music in memory.

10915 • for Commodore \$149.95

What you need to run it: Commodore 64/128 with disk drive; MIDI keyboard; MIDI interface card; printer. Optional: joystick.

MASTER TRACKS JR. from Passport

This entry-level sequencing program offers 64 tracks with easy, onscreen controls. Build large works by repeating sections and adding phrases from other sequences. Editing features include cut, copy, paste, clear and mix, as well as regional editing, automated punch-in and step-time recording. Fully compatible with *Master Tracks Pro* files and Standard MIDI Files. Sequences can be transcribed into notation and printed as sheet music with *Pyware MIDI Translator* and *Pyware Music Writer*.

14602 • for Apple IIGS \$149.95

14020 • for Atari ST \$129.95

14606 • for Macintosh \$149.95

What you need to run it: Atari ST, Macintosh or Apple IIGS with at least 512K RAM; MIDI interface; one or more MIDI instruments.

✓ PYWARE MIDI TRANSLATOR from Pygraphics

Convert your *Master Tracks Jr.* sequencer files into *Pyware MusicWriter* notation files to create a complete music-processing workstation.

16050 • for Apple IIGS \$79.00

What you need to run it: Apple IIGS with 768K; Passport Master Tracks Jr.; any level of Pyware Music Writer.

✓ PYWARE MUSIC WRITER from Pygraphics

A notation and composition tool that maximizes the enhanced features in the Apple IIGS. The user interface implements a mouse and pull-down menus. Check your score with full MIDI playback or listen to the IIGS'

internal Ensoniq sound chip. Record tracks in real time or step time from any MIDI instrument for immediate transcription or enter notation with the mouse from eight palettes of musical symbols. The Professional Edition supports up to 32 tracks or staves; the Special Edition accommodates six staves. Output your entire score or extracted parts. Features a variety of word processor-style functions for editing scores and formatting the layout and includes alternate note heads for percussion. We give you full trade-in value when upgrading from Special Edition to Professional Edition.

10632 • Special Edition for Apple IIGS \$295.00

10634 • Special Edition for Apple IIe \$295.00

10636 • Professional Edition for Apple IIGS \$595.00

10638 • Professional Edition for Apple IIe \$595.00

What you need to run it: Apple IIGS with at least 768K RAM (1.25 MB recommended) or Apple IIe with 128K; mouse; ImageWriter or LaserWriter printer. MIDI interface and one or more MIDI instruments suggested.

MASTER TRACKS from Passport

Simple and powerful, this popular program lets you compose, arrange, orchestrate and record an unlimited number of tracks, assignable to 16 MIDI channels. Aside from all the standard features, *Master Tracks* offers real-time sync with other MIDI sequencers and drum machines; auto-correction to 32nd note triplets; recording of all MIDI controllers, including pitch bend, velocity and aftertouch; and independent track looping. With Song Mode, you can step-assemble songs using 16-channel sequences created in step or real time and play back sequences in any order, tempo or transposition. Visually assemble up to 256 different sequences. Over 8,000-note recording capability.

10402 • for Apple \$249.95

10625 • for Apple IIGS \$249.95

10900 • for Commodore \$249.95

What you need to run it: Apple IIe or IIGS or Commodore 64/128 with disk drive; one or more MIDI instruments; MIDI interface.

MASTER TRACKS PRO from Passport

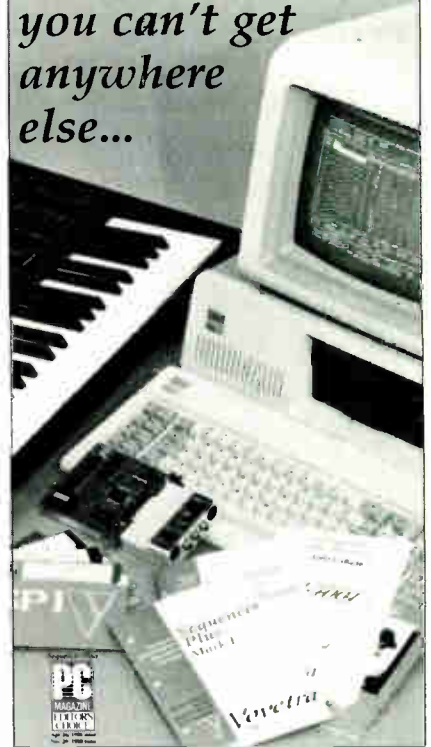
This is an enhanced version of the *Master Tracks* sequencer (see above). Expanded memory up to 325,000 notes allows you to create multitrack songs in sections or as continuous works. *Master Tracks Pro* sends and receives MIDI Song Pointer for SMPTE sync applications.

10412 • for Apple IIe \$299.95

14205 • for Commodore \$299.95

What you need to run it: Apple IIe with at least 128K RAM or Commodore 128; one or more MIDI instruments; MIDI interface.

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has something
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Any product is only as good as the reputation of the company that stands behind it.

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- **Demo disks** for our full-line of music software (\$20 value).
- **Sign-up fee waiver** to the P.A.N. MIDI bulletin board (\$150 value).

And best of all, it's backed by the same reputation for *quality* that made *Voyetra* the most respected name in PC music software.

So why take a chance on products that may only look good on *paper*? With *PC/Musicpak™*, you can invest in ones that have proven themselves in the *real world*.

Voyetra

#14432

● **ATARI ST**

✓ **TWELVE from Steinberg/Jones** This budget-priced, entry-level sequencer has professional features without the steep learning curve. Record in real time or step time using either the linear, tape recorder metaphor or pattern-based, drumbox-style sequence mode. The score-edit page displays your song in standard music notation for intuitive, mouse-driven editing. Sync features implement song position pointer. *Twelve* also has extensive MIDI filtering and VU-style MIDI activity meters. Upwardly compatible with *PRO-24* and *The Copyist*.

16020 • for Atari \$69.00
What you need to run it: Atari 520 or 1040 ST; one or more MIDI instruments.

MASTER TRACKS JR., from Passport See Apple/Commodore section for description.

14020 • for Atari ST \$149.95

MIDISOFTSTUDIO-Advanced Edition from Midisoft Beginners who need room to grow will enjoy this full-featured, 64-track program. Onscreen, tape-style "transport" controls let you move through the piece, recording or playing from any point. Mouse-controlled commands include programmable tempo changes and velocity scaling. Has regional editing capabilities and records/

plays sys ex info to control your entire MIDI setup from a single screen. Full MIDI sync capabilities and Standard MIDI File support.

14007 • for Atari ST \$149.00
14008 • demo for Atari ST \$10.00
What you need to run it: an Atari ST; one or more MIDI instruments.
16045 • for IBM \$199.00
16050 • demo for IBM \$10.00
What you need to run it: an IBM PC, AT, XT, PS/2 Models 25/50 or compatibles with 640K RAM; MPU-compatible interface card; MIDI instrument(s). A mouse is recommended.

PRO-24 III from Steinberg/Jones Here's the popular 24-track sequencing program for ST users. Features include real-time editing, logical user interface and a wide range of utilities. In recording mode, you can use up to four tracks simultaneously. The main options are rewind/fast rewind, quantize to 64th note triplets, transpose, punch-in/out, loop, copy, edit, solo/mute, auto-record, auto-locate, insert, delete and assign names. Functions can be remotely controlled from your MIDI keyboard. There are three visual edit screens: grid edit, score edit and the exceptional drum edit. Drum edit allows both real-time and step-time input for creation of rhythms, which may be enhanced with intelligent variations created by the computer. *PRO-24* implements Standard MIDI

Files and can be scored out on *The Copyist* (see IBM section).

13023 • for Atari ST \$350.00
What you need to run it: any Atari ST with at least one megabyte of RAM; one or more MIDI instruments.

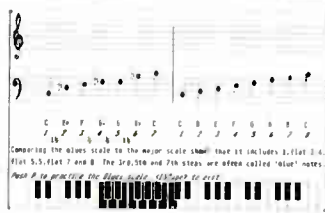
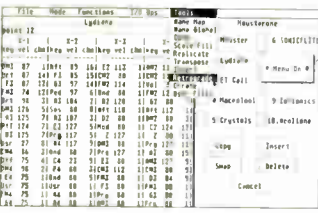
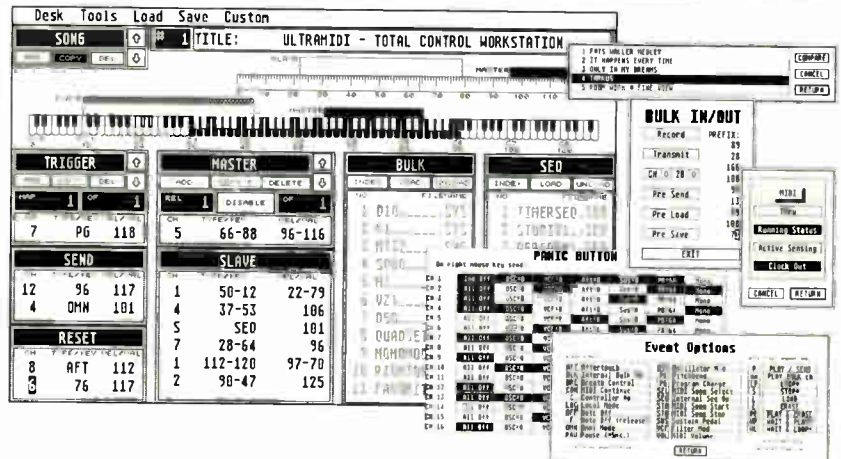
✓ **ULTRAMIDI Total Control Workstation from MIDImouse Music** Use your Atari ST as the front end of a flexible, performance-oriented MIDI workstation, with all sequencing and bulk operations driven remotely from any MIDI controller. *ULTRAMIDI* will load and play back Standard MIDI Files from your regular sequencer, handle bulk dumps of system exclusive data with its built-in generic librarian and has flexible MIDI routing maps for automatic reconfiguration of your system. You can loop a section of your sequence, transmit program changes and switch synth configurations all from a single key on your master controller. Allows global transformations, inversions and scaling on almost any MIDI message, features an "all notes off" panic button and includes a module that communicates with your keyboard's LCD, so you can leave your computer monitor at home!

14026 • for Atari \$229.95/Manufacturer's special price: \$199.95
What you need to run it: Atari ST 520, 1040 or Mega; one or more MIDI

ULTRAMIDI™

TOTAL CONTROL WORKSTATION

- Load/Play Standard MIDI Files from your sequencer
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- 255 Slaves per Master
- 255 Masters per Map
- 255 Maps per Song
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- Active Sensing control
- Linear Range Scaling/Inversions
- Definable PANIC Button
- GEM allows use of Desk Accessories
- Special Prefix Section for Custom Writing SYSEX Requests
- Channel Info Program Included ensures SYSEX compatibility with new MIDI devices
- Atari ST 520, 1040, Mega • Color or Mono



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MIDImouse Music
 Dept. MB • Box 877 • Welches, OR 97067

instruments; sequencing software recommended.

✓ **MOUSTERPIECE from MIDImouse**

Music This software lets you use your Atari ST as a unique MIDI controller and compositional tool. It combines a real-time recorder and step-sequencer with mouse control of note events, one-touch access to MIDI controller messages and powerful template and mapping functions. Play back sequences while doing augmented improvising from the computer in real time. Events can be controlled across all 16 channels; maps consist of X, Y and Z axes. Works with any and all MIDI devices, from synths to lights.

14027 • for Atari ST \$229.95

What you need to run it: Atari ST 520, 1040 or Mega; any MIDI instrument.

● **AMIGA**

MIDI RECORDING STUDIO (V 1.1) from Dr. T's

This introduction to the Dr. T's approach features a simplified version of Track mode (a mouse-operated control panel that directly emulates the corresponding tape recorder functions), eight tracks, cue recording and many edit features. MRS is compatible with advanced Dr. T's programs

and can be printed with *The Copyist* scoring software (see IBM section). If you wish to upgrade, we offer a full trade-in allowance on the KCS V 1.6A.

A great place to get started in MIDI.
14003 • for Amiga \$69.00

What you need to run it: an Amiga computer; MIDI interface; one or more MIDI instruments.

KEYBOARD CONTROLLED SEQUENCER V 1.6A (KCS) from Dr. T's

Start with Track mode, with its "tape deck" screen, where recording on any of 48 tracks begins with a touch on your MIDI keyboard. Click over to the track edit screen, where all parameters in the event list can be tweaked individually, edited in blocks with cut-and-paste commands or transformed regionally. Arrange your tracks into sequences and dive into Open Mode, where up to 126 sequences can be freely altered, chained, looped and nested, even triggered by other sequences. For straight-forward song assembly, pull together your parts in Track Mode. Want to overdub the whole piece with a screaming MIDI guitar solo? How about deleting all the pitch bend and adding real-time volume changes? Need SMPTE sync? KCS lets you do it all. Our tests found this program has rock-solid timing and is nearly crash proof. The right choice for a professional Amiga sequencer.

14210 • for Amiga \$249.00

What you need to run it: an Amiga 500, 1000 or 2000 with at least 512K RAM; MIDI interface; one or more MIDI instruments.

EDUCATION AND EAR-TRAINING

PRACTICAL MUSIC THEORY, Sandy Feldstein

Practical Music Theory is a three-volume music curriculum. A variety of computer interactions guarantee that all materials are understood. Units include random drills of music materials and variations in content material. Competency levels are established for each lesson sequence, with aural examples played by the computer. Each lesson is reinforced with a review section.

The program has a total of 84 topics. Vol. 1 lessons include the staff, clefs, measures, time signatures, notes and rests. Vol. 2 reinforces the first segment with further instruction in time signatures, notes and rests, ties and slurs, repeats and endings, and flats, sharps and naturals. Vol. 3 covers scales and key signatures, sharps and flats,

Fundamental and Fun.

Educational Music Software from Alfred.

by Sandy Feldstein

MUSIC MADE EASY

Apple II (8281)
Commodore 64 (8282)

A fun, self-teaching program that teaches the basics of music in a step-by-step approach. Lessons include The Staff, Clef, Measures, Time Signatures, Notes and Rests, Ties and Slurs, Flats, Sharps, Naturals, Scales, Key Signatures, Dynamics, Chords, Inversions, Harmonizing and Creating Melodies and more! Each lesson is reinforced with drills and quizzes. Includes one diskette and a reference manual. In full color.

PRACTICAL MUSIC THEORY COMPLETE

Apple II/Commodore 64 (2404)

IBM 5-1/4" (3500)

IBM 3-1/2" (3535)

Atari (3510)

Practical Theory utilizes a drill and practice approach to music theory instruction, beginning with the basics of music notation and ending with chord inversions and smooth voice leading. Ideal for reinforcing new concepts presented at the theory lesson. Use it in the school software lab, music classroom, or private teaching studio. Includes 6 diskettes and a complete spiral-bound workbook. MIDI compatible.

MUSIC ACHIEVEMENT SERIES

Apple II/Commodore 64 (7225)

IBM 5-1/4" (7234)

IBM 3-1/2" (7235)

Atari (3511)

An effective test series in three levels that correlates with Volumes 1, 2 and 3 of the popular *Practical Theory* series.

It may also be used with other theory materials or used as a placement test.

A new, randomized series of items is presented in each section each time the test series is used. Includes a password system for students and the instructor. Up to 50 students' scores can be stored on each diskette.

Includes 3 diskettes, a *Practical Theory* workbook and a Teacher's Manual. MIDI compatible.

ALFRED'S BASIC PIANO THEORY SOFTWARE

Levels 1A, 1B & 2

Apple II/Commodore 64 (2102)

IBM 5-1/4" (2107)

IBM 3-1/2" (3149)

Atari (3512)

Levels 3, 4 & 5

Apple II/Commodore 64 (3148)

IBM 5-1/4" (3147)

IBM 3-1/2" (3146)

Atari (3513)

Designed for piano students, age 7 and up. Contains entertaining games and theory drills—great to use at home or in the teaching studio. Each diskette correlates with three levels of piano instruction, as presented in Alfred's best-selling piano method *Alfred's Basic Piano Library*. Each package includes one diskette and a reference manual. MIDI compatible. In full color.

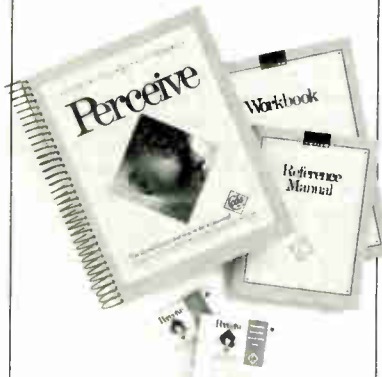
IBM versions require color monitor, color graphics card and IBM-DOS/MS-DOS of 2.1 or above. All Alfred software is copyprotected



Easy-to-use, Well-Paced, Challenging, Logically Organized—and Affordable.

ALFRED PUBLISHING COMPANY

You should hear the music you've been missing."



Pitches, scales, chords, and inversions. Timbres and temperaments. Overtones and other good vibrations. They're all there, in all the music you hear, when you know *how* to hear.

Perceive, your personal ear training program, teaches you how. It combines *listening, reading, and writing* for effective learning with staying power. Instead of memorizing for the moment, you'll develop an ear for music that will last a lifetime.

Six interactive software programs lead you from drill-and-practice, to melodic exercises, to designing your own sound waves. Customize any sessions; work only on the areas you choose. Use your computer's 4-voice synthesizer or your MIDI keyboard.

The 120-page textbook gives you a comprehensive introduction to music theory. And the 55-page workbook tests your new knowledge with questions and exercises.

Perceive takes you behind the sounds to a thorough understanding of the musical language.

Isn't it time to hear what you've been missing?

#16030

Perceive: For the 512K Macintosh®, Macintosh Plus™, or Macintosh SE™. Hard disk ready.

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and dynamics. In addition, Vol. 3 includes advanced concepts of listed topics plus lessons on tempo, chords, inversions and harmonizing. Final lessons conclude with composing a melody.

Complete 3-volume set/6 disks:

2404 • for Apple II+/IIe/IIc \$199.95

3500 • for IBM \$199.95

2469 • for C-64/128 \$199.95

✓ **ALFRED'S MUSIC ACHIEVEMENT SERIES**, Sandy Feldstein A theory-test series, correlated to the *Practical Theory Complete* package, that generates a new, randomized series of items in each section each time the test is used. It stores the scores for each student, which are easily reviewed by the teacher and student; up to 50 students' scores on one diskette! MIDI keyboard-compatible. Book and three disks.

3505 • for IBM and compatibles \$125.00

What you need to run it: IBM PC, XT, AT or compatible with at least 512K RAM. MIDI interface and MIDI instruments optional.

3506 • for Apple II and Commodore 64 \$125.00

What you need to run it: Apple II+/IIe or Commodore 64. MIDI interface and MIDI instruments optional.

✓ **PERCEIVE** from Coda Music Software

This interactive environment for exploring music is a complete course of study in theory, ear training and timbre that requires no extra hardware and no previous knowledge of music or notation. Students' progress is reinforced by text and workbooks and is tracked by the Reports module. Six programs on two disks cover intervals, triads, seventh chords, scales, modes and tunings, plus waveform analysis and graphic sound design. Hear notes through the Macintosh's internal sound chip or any MIDI sound source as you "touch" the onscreen keyboard. Includes 120-page textbook, 55-page workbook and 30-page reference manual.

16030 • for Mac \$99.00

What you need to run it: Macintosh 512K, Plus or SE. MIDI interface, MIDI instruments and ImageWriter printer supported as optional output devices.

THE MUSIC CLASS from Coda

Five complete courses teach you what you need to know: how to read notes and music symbols, follow rhythms and use your ears to tell what's happening in a piece of music. You can choose the speed and repetition and keep a record of the student's progress. Handsomely packaged, every course comes with an easy-to-read guide and special sections on musical concepts.

14956 • **FUNDAMENTALS: Learning the Basics** \$49.00 (Note reading, rhythm I, major/minor scales, intervals.)

14957 • **RHYTHM: Learning to Feel the Beat** \$49.00 (Two disks, four programs about rhythmic structure, meter, measures and pulse.)

14958 • **EAR TRAINING: Learning to Hear** \$49.00 (Melodic error detection and correction, aural interval recognition, melodic and rhythmic dictation Part I and II.)

14959 • **MUSIC SYMBOLS: Learning the Language** \$39.00 (Animated graphics and games teach you how to read the symbols and words that make up the musical language, two disks, four programs.)

14960 • **NOTE READING: Learning to See and Understand** \$39.00 (Learn to read notes on any clef in any position in any piece of music.)

14961 • **COMPLETE PACKAGE** \$189.95 (What you need to run it: Apple II/II+/IIc/IIcS with 64K; one disk drive.)

✓ **TAKENOTE** from Take Note Software

This ear-training program for the Atari ST has recognition drills for pitch, intervals, chords, arpeggios and scales and teaches you how to get around on the keyboard, guitar fretboard and staff. It accepts input from a mouse or MIDI keyboard and sends output to the Atari internal sound chip or optional MIDI instruments. Automatically tracks student progress.

16035 • for Atari \$79.95

What you need to run it: Atari 520 or 1040 ST; monochrome or color monitor. TOS in ROM required. MIDI instruments supported as optional input/output devices.

✓ **NOTE WIZARD** from MIDImouse

Music Features timed note-reading drills in five levels with nine stages per level. Drills include two-, four- and six-note problems. Saves test results for instructor; uses MIDI keyboard for input device. For beginner through advanced.

15051 • for Atari \$69.95

What you need to run it: an Atari ST 520, 1040 or Mega; any MIDI keyboard.

✓ **SCALE MASTER** from MIDI-

mouse Music These speed drills on scale skills cover major, natural minor, harmonic minor and melodic minor, plus blues scales in all 12 keys. Accuracy and tempo are recorded for instructor review; three song files with chord progressions are included for practice. Beginner through advanced.

15052 • for Atari \$69.95

What you need to run it: an Atari ST 520, 1040 or Mega; any MIDI keyboard.

✓ **CHORD MAGIC** from MIDImouse

Music Train on major, minor, diminished and augmented triads; seventh chords, including dominant, major, minor, diminished and augmented; plus all inversions. 36 timed drills; use your MIDI keyboard as the input device. Beginner through advanced.

15053 • for Atari \$69.95

What you need to run it: an Atari ST 520, 1040 or Mega; any MIDI keyboard.

✓ **ATARI MUSIC EDUCATION**

SERIES from MIDImouse **Music** MIDImouse's instructional software for the Atari is now available at a special package discount! The combination of Note Wizard, Scale Master and Chord Magic provide a thorough, three-stage course in music fundamentals.

15054 • for Atari \$188.95

What you need to run it: Atari ST 520, 1040 or Mega; any MIDI keyboard.

EAR-TRAINING, THEORY AND TECHNIQUE TUTORIALS: Instructional Software from Electronic Courseware Systems Music education software allows students to learn independently, at their own pace and skill level. Many programs offer incentives for improved performance and retain student records for the instructor. These lesson-specific programs are available on Apple II+ or IIe, IBM and compatibles, Atari ST and Commodore 64/128; most of them implement MIDI. Call or write for our complete catalog of educational software, which includes extended program descriptions. (Please specify computer when ordering.)

- M-1158 • Keyboard Blues—MIDI \$79.95
- M-1155 • Keyboard Note Drill—MIDI \$39.95
- M-1168 • Keyboard Arpeggios—MIDI \$79.95
- M-1157 • Keyboard Chords—MIDI \$79.95
- M-1167 • Keyboard Fingerings—MIDI \$79.95
- M-1166 • Keyboard Intervals—MIDI \$79.95
- MIDI Jazz Improvisation (Apple and IBM only)
 - M-1252 • Volume One \$79.95
 - M-1253 • Volume Two \$79.95
- M-1154 • Keyboard Jazz Harmonies—MIDI \$79.95
- M-1236 • Keyboard Extended Jazz Harmonies \$79.95
- M-1239 • Functional Harmony: Basic Chords—MIDI \$39.95
- M-1107 • Elements of Music \$99.95
- M-1169 • Early Music Skills—MIDI \$39.95
- M-1171 • Keyboard Speed Reading—MIDI \$79.95

- ✓ **ALFRED'S BASIC PIANO THEORY SOFTWARE, Sandy Feldstein** Designed for young piano students (age 7 and up). Contains fun games and theory drills for the student, at home or in the teaching studio, to reinforce new concepts presented at the piano lesson. MIDI compatible, full color.
 - 2102 • for Apple/ Commodore \$29.95
 - 2107 • for IBM (5.25" disk) \$29.95
 - 3149 • for IBM (3.5" disk) \$29.95
 - 3512 • for Atari ST \$29.95

MUSIC MADE EASY, Sandy Feldstein A fun, self-teaching program that teaches the basics of music in a colorful, step-by-step approach. Lessons include: the staff, clefs, measures, time signatures, notes and rests, ties and slurs, repeats and endings, flats, sharps, naturals, scales, key signatures, dynamics, tempos, chords, inversions, harmonizing and creating melodies. Each lesson is reinforced with drills and quizzes.

- 8281 • for Apple II \$29.95
- 8282 • for Commodore 64 \$29.95

✓ **PYWARE MUSIC ADMINISTRATOR from Pygraphics** A complete management system designed for music educators. It has interactive modules and flexible reporting for easy tracking of student files, an automatic uniform check-out system and equipment-inventory and music-library management. Features include a general ledger, budget planner and fund-raising manager, plus a built-in word processor. This integrated system allows you to build customized databases and reports and offers power, convenience and ease of use.

- 16060 • for Apple \$295.00
 - 16061 • for IBM \$295.00
- What you need to run it: Apple IIe, IIc or IIgs with at least 128K RAM, or IBM PC, XT, AT or compatible with at least 640K RAM. Supports Apple ImageWriter, Epson, Okidata and compatible printers.*

HARDWARE

• APPLE/MACINTOSH

APPLE STANDARD MIDI INTERFACE from Sonus For use with Apple IIe, II+ or IIgs. One in, two outs, with drum sync.
14963 • \$99.95

APPLE MIDI INTERFACE WITH TAPE SYNC from Sonus For use with Apple IIe, II+, IIgs. Sends sync tone to tape. Also has one in, two outs, with drum sync.
14964 • \$149.95

APPLE IIe, II+, IIgs MIDI INTERFACE WITH DRUM SYNC from Passport MIDI in/out, DIN sync out and two MIDI cables.
13001 • \$129.95

APPLE IIe, II+, IIgs MIDI INTERFACE WITH TAPE AND DRUM SYNC from Passport With tape sync, this interface will send a sync tone to your analog tape recorder. Your tape recorder will then be

in sync with additional MIDI overdubs. Provides in/out, DIN sync out, tape sync in/out, two MIDI cables.
13000 • \$199.95

MACINTOSH PRO PLUS INTERFACE from Opcode For use with the Macintosh Plus and 512K. Includes one MIDI in and three MIDI outs. Comes with appropriate Mac cables and power supply.
13302 • \$125.00

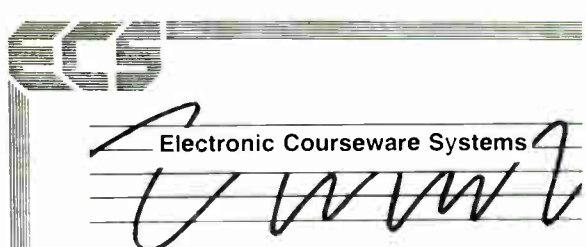
STUDIO PLUS II INTERFACE from Opcode For use with the Macintosh Plus; it fits under the computer so it stays out of the way. Two MIDI ins let you record from two keyboards at once or record and sync at the same time; six MIDI outs include two independent sets of three outputs each to reduce MIDI delay. Special features include modem and printer-through switches for using accessories without unplugging cables. It also acts as a 2-in, 6-out MIDI thru box when the computer is not in use.
13303 • \$225.00

✓ **STUDIO 3 INTERFACE from Opcode** The state-of-the-art solution for professional sequencing and video scoring applications. This rack-mount, Macintosh MIDI interface has two independent inputs and six user-assignable outputs. It reads and writes all SMPTE time code formats and will do Jam Sync. It even has printer and modem serial pass-through.
16065 • for Macintosh \$459.00

• COMMODORE/AMIGA

AMIGA MODEL A INTERFACE from Dr. T's Standard MIDI interface for the Amiga 500 or 2000. It features one in, two outs and serial pass-through.
14347 • \$75.00

COMMODORE 64/128 STANDARD MIDI INTERFACE from Sonus This standard MIDI interface includes one in and two outs.
13103H • \$89.95



Electronic Courseware Systems

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50 Instructional MIDI Programs
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COMMODORE 64/128 MIDI INTERFACE WITH TAPE SYNC from Sonus One in, two outs, sends sync tone to tape.
14342 • \$149.95

COMMODORE 64/128 MIDI INTERFACE WITH DRUM SYNC from Passport MIDI in and out, DIN sync out, two MIDI cables.
13102H • \$129.95

COMMODORE 64/128 MIDI INTERFACE WITH TAPE AND DRUM SYNC from Passport With tape sync (and cable kit #13101H), this interface will send a sync tone to your analog tape recorder. Your tape recorder will then be in sync with additional MIDI overdubs. Includes in/out, DIN sync out, tape sync in/out, two MIDI cables.
13100H • \$199.95

COMMODORE TAPE SYNC CABLE KIT 1 from Passport For use with the tape and drum sync; required for the sync-to-tape features.
13101H • \$25.00

• IBM

MPU-IPC IBM INTERFACE from Roland Finally, an affordable, smart interface for IBM users. This unit combines the IPC half-card and a port terminal with one in, two outs, one sync out, one tape in, one tape out and metronome out.
14546 • for IBM \$199.00

V-4001 MIDI INTERFACE from Voyetra An all-in-one, smart interface (MPU-IPC compatible), including FSK Sync Conversion, unpitched metronome and one in, one out, tape sync in/out.
14547 • for IBM \$199.00

OP-4000 MIDI INTERFACE from Voyetra Identical to its cousin, the OP-4001 (see below), but does not include FSK/CLK sync. It's designed for

use with MIDI sync or SMPTE.
14545 • for IBM \$179.00

OP-4001 MIDI INTERFACE from Voyetra An all-in-one, smart interface (MPU-IPC compatible), including FSK/Clock sync conversion, unpitched metronome and one in, one out, tape sync in/out.
13201 • for IBM \$239.00

✓ **MQX-32 EXTENDED FUNCTION INTERFACE from Music Quest** This MPU-401 compatible interface for IBM computers has two independent MIDI outputs for 32-channel MIDI transmission. It will read/write 30-frame drop and non-drop SMPTE time code and MIDI Time Code. The MQX-32 gives you SMPTE cue point control and chase-lock tape sync.
16070 • for IBM and compatible \$299.00

MIDI CABLES from Hosa High-quality cables are DIN-plug-to-DIN-plug. Please specify your plug color preferences (black, blue, red, orange or white).

CBL1 • 1' MIDI cable \$4.00
CBL3 • 3' MIDI cable \$5.00
CBL5 • 5' MIDI cable \$6.00
CBL10 • 10' MIDI cable \$8.00
CBL15 • 15' MIDI cable \$10.00
CBL20 • 20' MIDI cable \$12.00

INSTRUMENT CABLES from Hosa Reliable, 1/4"-to-1/4", metal-tipped, instrument cables. 5-year warranty.
IC5 • 5' instrument cable \$8.00
IC10 • 10' instrument cable \$10.00
IC18 • 18' instrument cable \$12.00
IC25 • 25' instrument cable \$14.00

MT-70• MIDI THRU INTERFACE from Sonus Solve your MIDI cable nightmare. This unit includes two ins, eight outs and has independent input switches for each of the eight outputs. Compatible with all MIDI setups.
14348 • \$95.95

✓ **14001 • THE SHARP PC900 OPTO-ISOLATOR** This hard-to-find component is a crucial part of most D.I.Y. MIDI projects. \$3.00 each

THE MIDI VIEWPORT from Datastream

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SONICFLIGHT DIGITAL SAMPLES from MIDImouse Music Sonicflight samples feature advanced computer editing techniques, including layering and stacking of samples, crossfield sampling and sample splicing, resulting in superb clarity and sonic realism. When ordering, specify your sampler brand.

Available for Casio FZ-1/10M, Ensoniq Mirage/EP5, Roland S-50, Akai S900, DPX-1, Prophet-2000 (specify expanded or unexpanded), Prophet-2002+, Prophet-440, E-mu Emulator II (E-II disks 1 to 10 only) and Emax.
Each disk \$24.95, 10 or more \$19.95 each. Sample list may vary for each brand. Below is Roland S-50 list.

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#2 Bass: 1) Slap Bass; 2) Picked Bass; 3) Double Slap; 4) Metal Bass.

#3 Master Strings: 1) Cello/Violin; 2) Strings; 3) Pizzicato.

#4 Bass: 1) Brass Section/Trumpet; 2) Saxophone.

#5 Orchestra Classics: 1) Gong/Timpani/Orch. Strings/Finale+ Applause/Orch. Tune.

#6 Anthology: 1) Clarinet; 2) Flute; 3) Oboe; 4) Bassoon; 5) Bassoon/Oboe; 6) Clarinet/Flute.

#7 Composer's Tool Kit: 1) Drum Kit/Bass/Piano; 2) Drum Kit/Bass/Piano/Flute; 3) Drum Kit/Bass/Saxophone.

#8 Drum Kit: 1) BD1/BD2/SD/Tom/CH1/OHH/Ride/Ride Done/Crash1/Crash2; 2) BD1/BD2/Tom3; 3) BD1/BD2/SD/Tom1/CH1/OHH/Ride/Ride Dome; 4) BD1/BD2/SD/CH1/Tom1/Tom2/Tom3/Ride Dome.

#9 Percussion: 1) Timbali1/Timbali2/TimbaRim/Cowbell1/Cowbell2/Woodblock/Cabasa/Scrap1/Scrap2/Vibraslap1/Vibraslap2/Tincup/Jinglebells/Tambourine/Belltree/Triangle; 2) four different keyboard setups.

#10 Cosmos: 1) Bass Tock/Spacevoice; 2) Dark Base/Spacesynth; 3) Tock Two/Space Bells; 4) Soft Encounter/Polyspace.

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#16 Male Voices: 1) Aah/Aah Choir (dramatic); 2) Eee/SoftChoir Eee; 3) Ooh/Aah Choir; 4) Oom/Amen Solo; 5) Eeh/Amen Solo.

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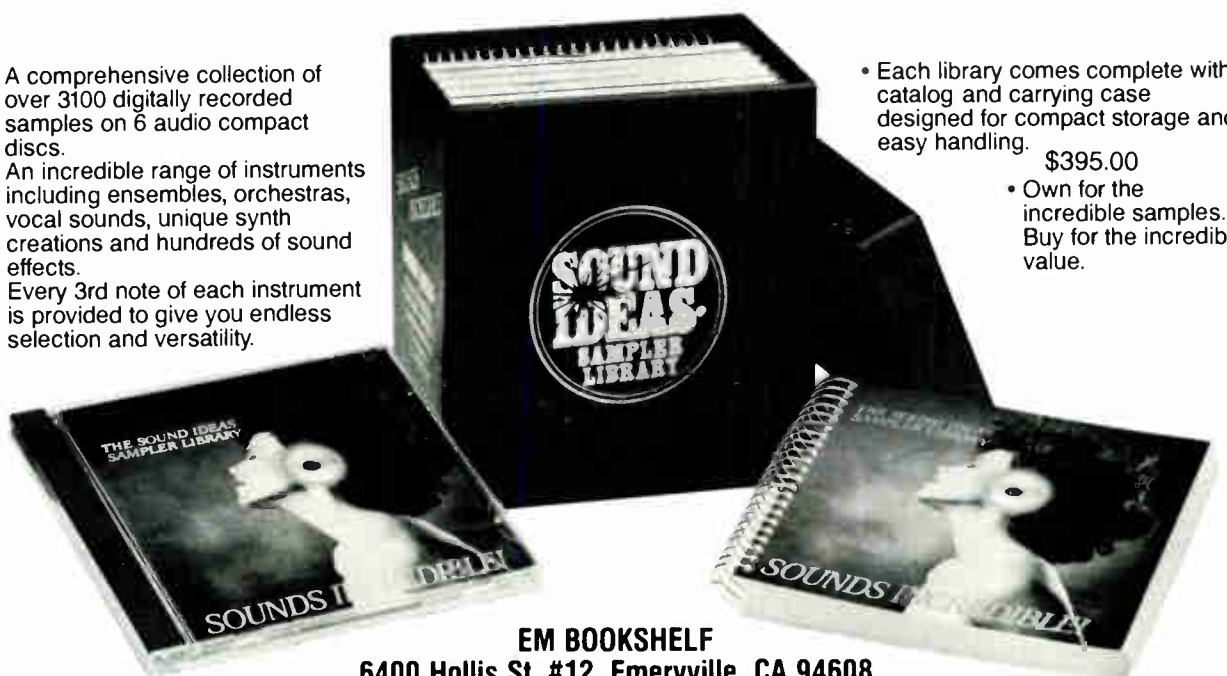
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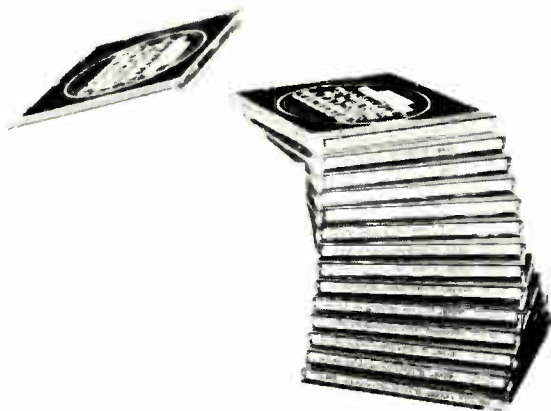
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And Still More for 1989

Roland

- D20 Sequencing**
- R8 Drum Machine Book**
- W30:**
Soundmaking Book
Sequencing & Recording
Drum Patterns Handbook

Yamaha

- V50:**
Soundmaking Book
Sequencing & Recording
Drum Patterns Handbook
- RX8 Drum Machine**

Korg

- M1:**
Effects Book
Advanced Programming
- T1:**
Soundmaking Book
Sequencing & Recording
Drum Patterns Handbook

- Almost Instant Pianist**
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Level 1, Volume 2
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- The Instant Composer**
Volume II
Volume III
Volume IV

- College Series**
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Orchestration Solutions
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NORTHWEST

REMOTE RECORDING & SOUND REINFORCEMENT

—CONTINUED FROM PREVIOUS PAGE

Colossus digital audio system with Louis Dorren Services offered: location/studio recording where accurate archival of live performance or final mix is required. Production services include the Colossus (4-channel) PCM digital audio system with 1630 compact disc format compatibility, and/or 4-channel surround microphone (MS-4). Recommend that interested parties inquire as to latest compact disc samples in release by clients utilizing Colossus or MS-4 or both. Conversion of existing sound effects and music libraries into Colossus format and then to optical hard disk also available. Written information package available upon request.

PACIFIC MOBILE RECORDERS; Audio Recording; 2616 Garfield Ave.; Carmichael (Sacramento), CA 95608; (916) 483-2340. Contact: Kal Coffey/Hibbard. REMOTE RECORDING. Vehicles: Chevy C50 w/20' box, air conditioned, lift gate. Control Room Dimensions: 18' x 7'6" x 7'6". Mixing Consoles: Harrison MR-4 36 x 24 x 36 w/VCA grouping, A/B Systems mic inputs. Audio Recorders: Otari MTR-90 24-track w/auto locator, Sony/MCI JH-110B14 2-track, 3M M79 2-track, TEAC cassette decks. Outboard Equipment: Lexicon 200 digital reverb, UREI LA-4 limiters, USAudio gates, Lexicon PCM60 digital reverb, Yamaha SPX90, Ibanez digital delay, 27-band EQ, active and passive direct boxes. Microphones: Neumann, AKG, Sennheiser, E-V, Shure, Beyer, Crown, Audio-Technica. Monitor Speakers: E-V Sentry 500, JBL 4313, M&K close field monitors, Auratone. Power Amplifiers: Yamaha P2201, Crown D-150A. Video Monitors: Sony color, Sanyo B&W. Cameras: Panasonic AG-155, Sanyo B&W. Other Major Equipment: 36-channel 3-way isolated split, 16-



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Carmichael (Sacramento), CA

channel 2-way isolated split, 250' 36-pair snake, 65' sub-snakes, intercom system, 220/110V transformer isolated, 100 amp AC distribution system, pre-wired for additional 24-track recorder. Rates: Starting at \$1,350/day. Packages available, call for quote.

PERFORMANCE AUDIO; Sound Reinf., Staging, Rental, Audio and Video Recording; 2358 S. Main; Salt Lake City, UT 84115; (801) 466-3196. Contact: Craig Hyton.

PHILIP PERKINS; Sound Reinf., Audio and Video Recording; 45A Wright St.; San Francisco, CA 94110; (415) 824-6137. Contact: Nancy Baddock.

THE PLANT RECORDING STUDIOS; Audio Recording; 2200 Bridgeway; Sausalito, CA 94965; (415) 332-6100. Contact: Bob Skye. REMOTE RECORDING. Specialization & Credits: "Rover." The Plant's mobile recording unit, offers the finest in mobile acoustic environments and equipment for live concert recording, remote broadcast, audio for film and video, in-house recording and post-production/audio sweetening. Rover is a certified LEDE® control room on wheels that features an acoustic accuracy that surpasses many in-house studios. It has become one of the most popular live-to-two-



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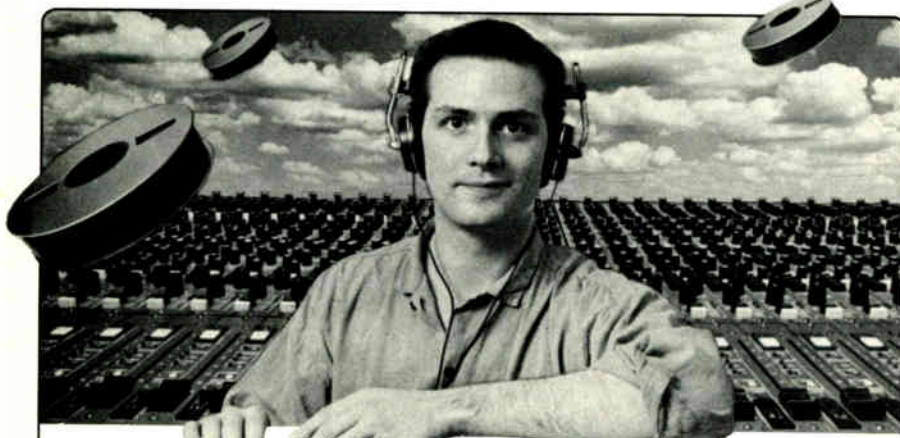
track as well as multitrack mobiles because of its ability to deliver clean, accurate sound to the client with virtually no guesswork involved. Rover is available for everything from one-nighters to lengthy tours. If you are looking for more than just saturated tracks, or if you prefer recording and mixing at your place, Rover is the mobile to call. Some of our clients/projects include: John Denver, U2, Stanley Turrentine, Marty Balin, Jacques Cousteau, Judy Collins, NFL Films, Anita Baker, National Public Radio, Bobby McFerrin, Jimmy Smith, Todd Rundgren, Carmen McRae, Ronnie James Dio, Kenny Burrell, Island Records, Billy Preston, Chick Corea, Harry Belafonte, Paul Williams, Peter, Paul and Mary, A. Jarreau, John Faddis, Milt Jackson, Les McCann, Robert Cray and Bourgeois Tagg.



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PRO MEDIA; Sound Reinf., Rental; 3563 San Pablo Dam Rd.; El Sobrante, CA 94803; (415) 222-0307. Contact: John Monitto.

PROFESSIONAL SOUND AND RECORDING; Audio Recording; 3100 W. 71st Ave.; Westminster, CO 80030; (303) 426-7819. Contact: Phil Crumrine. REMOTE RECORDING. Vehicles: 1984 Winnebago Centauri van, compact 20' x 7.3' x 7.5', good for limited-access venues, air conditioned. Mixing Consoles: Soundcraft 1624 24 x 16 x 24, Rowland Research Audiophile 8 x 2, Soundcraft 200B 16 x 4 x 8, additional consoles available. Audio Recorders: (2) Stephens 821B 24-track w/autolocator and 16-track heads, Revox PR-99 1/2-track, (2) Nakamichi DMP-100 digital w/video decks, Panasonic AG-6400 VHS Hi-fi, (12) TEAC V2-RX 3-head cassette deck. Synchronization Systems: Available as required. Outboard Equipment: Lexicon PCM60, Yamaha REV7, Yamaha SPX90, DeltaLab ADM 1024, (2) Symetrix 522 gate/limiter, (2) Symetrix 501 comp/limiter, dbx 900 each w/(2) parametric EQ, (4) compressor and (3) gate, BBE 202R, any outboard gear available upon request. Microphones: Schoeps 501-V stereo, (4) Schoeps CMC-3, (2) AKG C-414EB, (2) AKG C-451 w/shotguns, AKG C-33 stereo, (3) Shure SM81, (2) Sennheiser 421, (2) Crown PZM, C-ducer, Shure, E-V. Monitor Speakers: Yamaha NS-10, E-V Sentry 100, B&W DM-100, JBL Control 1. Power Amplifiers: Rowland Research Model 5, Intersound SP-300, Hafler DH-200. Video Recorders: Panasonic AG-6400 1/2" VHS Hi-fi. Video Monitors: (2) BMC 13". Cameras: Canon VC-20A. Other Major Equipment: Full audio-for-video services, Clear-Com system, all internal wiring is Mogami Neglex, audio AC circuit is transformer isolated and maximum draw of AC circuits is 15 amps or less. Rates: Available upon request.



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NEW MIC SPLITTER

BSS Audio Applies OverDesign™ Technology



"You call that a splitter?" gloats roadie with new BSS mic splitter.

LONDON: BSS Audio Ltd. has just produced a new mic splitter using its world-famous OverDesign technology. This despite the fact that a mic splitter is a functional device that performs the mundane task of providing multiple feeds from a single mic source.

Quizzed about the company's OverDesign approach to a mic splitter, company managing director Chas Brooke dryly stated: "Yes, I know we're viewed in the audio industry as a bunch of obsessive zealots. But we have to OverDesign every aspect of every product. I couldn't look my wife in the eye every morning if one of our products failed to operate at optimum level in every possible situation.

"OverDesign pays. Through superior performance in the short term. And

uncompromising reliability over the long term.

"In the case of our MSR-604 mic splitter, we had literally no design standard to compete with," says Brooke. "Other than home-made devices consisting of transformers, tape and wire. These appear to be less expensive at first, but end up costing more in the end. Because the client's time is valuable. Spare parts are expensive. And then

there's the hidden cost of replacing the device after its abbreviated lifespan."

According to company handouts, the MSR-604 is a dedicated non-interactive splitter OverDesigned to solve the problem of supplying multiple feeds to differing technologies from a single source.

It is the first of its kind to boast four fully independent channels: Two rear panel-mounted, electronically balanced and non-floating outputs for House and Monitors. It also has two identical, front panel-mounted, actively buffered, fully transformer balanced and floating outputs for TV, Radio and Mobile Recording facilities.

BSS tells us that the MSR-604 is OverDesigned to eliminate signal degradation and improve overall performance by providing proper current driving stages for long shielded cable runs.

Its seemingly endless list of attributes includes: a particularly low noise floor; special Master Gain section and Remote Gain/Headroom



"OverDesign™ is my life!" says one of Chas Brooke's BSS researchers.

control for ease of use; phantom power switch and a consistent, positive grounding system. Plus its standard racking capability allows mounting convenience and unusually quick assembly.

Why OverDesign something as functional as a mic splitter? "Because," says Brooke, "We can't bear to think of the alternatives. And neither should you."

Think Of The Alternatives



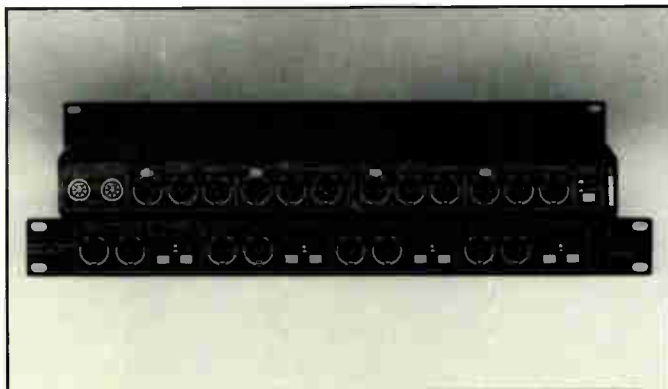
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NORTHWEST

REMOTE RECORDING & SOUND REINFORCEMENT

GEORGE RELLES SOUND: *Sound Reinf.*; 2021 Kincaid St.; Eugene, OR 97405; (503) 686-9325. **SOUND REINFORCEMENT** Touring Radius: Regional. Maximum Venue Size: 6,000. Vehicles: 1988 GMC W4 diesel 8' x 16' box. House Loudspeakers: (8) Meyer MSL-3, (6) Meyer 650-R2 subwoofer, (6) Harbinger 508 (JBL 2225/2445 loaded), (6) Harbinger 512 (JBL 2225 loaded), (2) Community Boxer subwoofer, (8) Klipsch LaScala. Flying System Available: Yes. Monitor Loudspeakers: (4) Meyer UPA, (2) Meyer UM1, (4) EAW SM202, EAW 155, (6) Harbinger 524. House Consoles: Hill 4400 32 x 8 x 2, Hill B3 24 x 4 x 2, Allen and Heath 16 x 4 x 2, CAD Maxcon 40 x 8 x 2. Monitor Consoles: Hill M3 24 x 8, Soundcraft 500 32 x 12. **Outboard Equipment:** Lexicon 200 digital reverb, (2) Lexicon PCM70 digital effects processor, DeltaLab ADM512 Super TimeLine digital delay, (2) Audio Digital Add-2 stereo digital delay, Barcus-Berry Electronics 202 signal processor, BBE 822, Aphex Type B Aural Exciter, EXR exciter, ADR Scamp rack w/(2) S30, S100, S23, S25, (6) S31, (4) S03, (2) S04, Meyer CP10 parametric EQ, (2) Sundholm 2103 EQ, (2) Rane parametric EQ, (6) Rane ME30 1/2-octave EQ, (2) CDT PFB rack w/(6) comp/limiter (4) gates, Drawmer M500 dynamics processor, (2) Lexicon LXP, Lexicon MRC MIDI controller, (8) dbx 1531 1/2-octave EQ, Klark-Teknik DN410 parametric EQ, Panasonic SV-2500 R-DAT recorder, Eventide Harmonizer 3000. **Power Amplifiers:** (14) Hill DX1500, (3) Crown Micro-Tech 1200, (4) Halfer P-500, (3) BGW 250, (3) Carver PM 1.5, Crown DC-300A, Crown D-150. **Microphones:** (3) AKG C-460, (8) AKG C-451, (2) AKG C-414, (6) Neumann KM84, (8) Shure SM81, (10) AKG C-535, (6)

Sennheiser 421, (2) E-V RE20, (4) Shure SM53, (8) Shure SM57, (4) Shure SM58, (2) Beyér M260, (2) Sennheiser 431, (2) RCA 77, (2) Countryman EM101, Shure SM85, AKG D-330, (6) Boundary Layer mics. Rates: \$350-\$2,000/day plus travel



RANDALL SCHILLER PRODUCTIONS
San Francisco, CA

RANDALL SCHILLER PRODUCTIONS: *Sound Reinf.*, *Pentat.*, *Audio Recording*; 1207 Fifth Ave., San Francisco, CA 94122; (415) 661-7553. Contact: Randy Schiller. **SOUND REINFORCEMENT.** Touring Radius: Local, regional. Maximum Venue Size: 20,000 people. House Loudspeakers: (16) Gauss 1502 super tweeters, (8) Eastern Acoustic Works KF-850 full-range systems, (8) Eastern Acoustic Works SB-850 sub-bass systems, (16) Harbinger 1208 horns w/JBL 2441 drivers, (6) Eastern Acoustic Works SR-115 bass bins, (8) Eastern Acoustic Works SR-215 double bass bins, (16) Cerwin-Vega B-36A/L-36PE low frequency folded horns. Flying System Available: Yes. Monitor Loudspeakers: (8) Harbinger 524, (2) Harbinger 514 (bi-amplified), (4) Gauss HF-4000 drivers on Gauss horns, (4) Altec 814 bass bin w/ Gauss 5840 driver, (4) JBL 4628B speakers. House Consoles: Soundcraft 200B SEQ 24 x 4 x 2, Biamp 16 x 2 x 1, Biamp 883 8 x 2 x 1,

Tapco 6100RB/6100EX 14 x 1. **Outboard Equipment:** Yamaha REV7 digital reverb, Yamaha SPX90 digital reverb, Eventide H910 Harmonizer, DeltaLab 2048 digital delay, DeltaLab DL-2 digital delay, dbx 161, dbx 163 compressor/limiter, UREI 1178 stereo compressor/limiter, Orban 622B parametric equalizer, Fostgate DSM3602 360 digital space matrix. **Power Amplifiers:** (3) Carver M1.5T 360-watt/channel, (8) SAE-A-501 250-watt/channel, (18) SAE-A-201 100-watt/channel, (8) SAE-A-1001 500-watt/channel, (2) Phase Linear 700B 350-watt/channel, Crown Micro-Tech 1200LX 275-watt/channel. **Microphones:** (2) E-V RE20, (4) E-V 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, (10) Countryman DI. **Lighting:** Phoebus Ultra Quartz. **Other 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 elec. crossover, Uni-Sync MS-10 10 x 3 mic splitter, SA-3050 spectrum analyzer, Yamaha Q2031 1/2-octave stereo equalizer, (4) MXR dual 15-band stereo graphic EQ. Rates: Call for prices on equipment and equipment packages. **REMOTE RECORDING.** Control Room Dimensions: 12' x 15'. **Mixing Consoles:** TEAC Model 5B, TEAC M35EX, (4) TEAC Model 1. **Audio Recorders:** Otari 5050B, TEAC 80-8, Sony TC-8544S, Sony TC-8502T, Pioneer RT-707. **Noise Reduction Systems:** (2) dbx 154, (2) dbx 157. **Outboard Equipment:** (2) Sony TC-WR930 stereo double cassette deck, (2) Sony K-81 TC stereo cassette deck, Awa ADF-990 stereo cassette deck, Uni-Sync MS-10 10 x 3 microphone splitter, TEAC MB-20 meter bridge, (4) Technics SL-1200 MkII turntables, Sound Workshop 242 stereo reverb unit, Bozak CMA-102DL mixer, UREI 1620 mixer, Aphex Type C Aural Exciter. **Microphones:** Neumann U87, (2) AKG C-414, AKG D-12, (2) Sennheiser MD-431, (2) Shure SM91, Crown PZM 6LPB/PX-18B, (2) Shure SM81, (14) Shure SM57, (10) Shure SM58, Shure 5200 "Green Bullet," Monitor Speakers: (2) JBL 4411, (2) JBL 4311, (4) JBL 4401, (2) Auratone. **Power Amplifiers:** BGE 100-1 30-watt/channel, SAE 2401 250-watt/channel. **Video Recorders:** JVC HRD-470U VHS Hi-fi/HQ video deck, Sony SL-2700 Beta Hi-fi video deck. **Video Monitors:** Sony KV-1956B 19" monitor, Magnavox 13", Sony XRB 27". **Cameras:** Sony CDD-V110. Rates: Upon request. **Specialization & Credits:** We are a multifaceted company providing facilities and services in the areas of audio, video, film and theater. We are dedicated to providing the highest quality in a relaxed but professional environment. In addition to recording studio services and location recording services, we provide sound reinforcement for venues ranging from small clubs to large outdoor concerts, audio design and installation, film and video production and lighting services. Check out our latest audio and video design and installation at San Francisco's Juke Box Saturday Night and please come and experience the finest live sound system in San Francisco at San Francisco's finest club—the I-Beam!

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SRSF RECORDINGS/ENTERTAINMENTS ENTERPRISES*: *Audio Recording*; PO Box 14131, Denver, CO 80214; (303) 232-2398. Contact: Sharon R. Smith-Flesher. **REMOTE RECORDING Specialization & Credits:** SRSF Recordings/Entertainments Enterprises specializes in audio promotions/distribution of compact discs, 45s, LPs and cassettes. SRSF Recordings targets adult contemporary, folk, bluegrass and country formats. SRSF Recordings arranges studio recording, location recording, pre-mastering and pressing. SRSF Recordings are distributed throughout the United States, Canada and Europe. SRSF Recordings are directed to A&R directors, producers, promoters and music/program directors in radio. SRSF Recordings is a member of ASCAP, CMA and IFCO. SRSF Recordings has been listed in the 1989 edition of *Encyclopedia of Associations for Excellence in Professionalism*, 1989 *Songwriters Digest*, and the 1989 *Who's Who in Entertainment*. SRSF Recordings artists promote works in Nashville, annually, at the Country Music Fan Fair. SRSF Recordings cater to the gay and lesbian community supporting the National Gay and Lesbian Task Force.



THIRD EAR SOUND COMPANY

THIRD EAR SOUND COMPANY
Richmond, CA

THIRD EAR SOUND COMPANY, Sound Reinf., 601 S. 8th St., Richmond, CA 94804; (415) 233-2920. Contact: David Trinchero, Raul Suarez **SOUND REINFORCEMENT.** Touring Radius: Regional. Maximum Venue Size: 20,000. Vehicles: GMC 18' bobtail (diesel), Ford 15' van, cargo vans. House Loudspeakers: Harbinger 828 3-way w/1' box horn-loaded system w/18" bass section, 12" mids and 2" high-frequency section, Brooke-Siren FDS-360 cross-over tri-amp and phase align, (40) stacks available, dual 18" subwoofer cabinets, dual 15" low/mid cabinets, 2" bi-radial horn packs, JBL and PAS components, various one box systems available for smaller venues. Flying System Available: Yes. Monitor Loudspeakers: (30) 2-way floor wedge w/15" and compression driver sections w/JBL, E-V and PAS components, 2- or 3-way drum and side fills w/15" or 18" bass and 2" high-frequency sections. House Consoles: Soundcraft 800B 32 x 8, Soundcraft 500B 32 x 8, Ramsa WR-81 18 x 4, Yamaha PM700, Yamaha PM430. Monitor Consoles: Soundcraft 800B 32 x 10, Soundcraft 400B 24 x 10, Yamaha PM1000 modified 16 x 6. Outboard Equipment: White Instruments equalizer, Klark-Teknik equalizer, Audio Logic equalizer, UREI equalizer, Orban equalizer, Audioarts equalizer, dbx 160X compressor/limiter, dbx 166 compressor/limiter, Gatelex noise gate, Yamaha delay/reverb, Roland delay/reverb, Delta Lab delay/reverb, Eventide delay/reverb, MXR delay/reverb, Aphex Exciters. Power Amplifiers: Carver PM-1.5, Carver PC-175. Microphones: Shure SM58, Shure SM57, Shure SM56, Shure SM54, Shure SM59, Sennheiser 421, AKG 451, Electro-Voice PL77, Electro-Voice RE20, Beyers M88, Audio-Technica ATM11, Audio-Technica ATM21, Audio-Technica ATM63, other models available. Other Equipment: Clear-Com intercom system, power distribution system. Rates: Superior service and best prices. Call for quote.

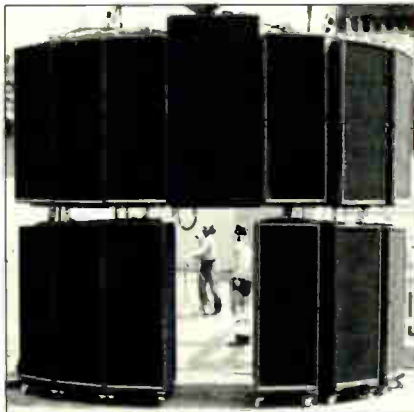
TRANSPARENT RECORDINGS, Audio Recording, San Francisco, CA; (415) 563-6164. Contact: Lolly Lewis

UNITED SOUND ASSOCIATES, INC., Sound Reinf., 2112 W. Nob Hill Blvd., Yakima, WA 98902; (509) 452-8686. Contact: Mark Strosahl

XXXX AUDIO SYSTEMS, Sound Reinf., Rental, 6384 Freeport Blvd., Sacramento, CA 95822; (916) 443-3535. Contact: Doug Humphrey

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A-1 AUDIO, INC., Sound Reinf., Rental, 6322 DeLongpre Ave., Hollywood, CA 90028-8191; (213) 465-1101; (800) 446-4466; FAX: (213) 465-9467. Contact: Al Sinisca, Bobby Ross, Rick Southern **SOUND REINFORCEMENT.** Touring Radius: National. Maximum Venue Size: Unlimited. Vehicles: 48' air-ride tractor trailers, 24' air-ride bobtails. House Loudspeakers: A-1 Audio fully integrated flying P.A. w/Meyer MSL-3, Meyer UPA-1, Meyer subwoofers. Flying System Available: Yes. Monitor Loudspeakers: Meyer UPA-1, Meyer UM-1, Meyer MSL-3, A-1 Audio custom double 12" and single 15" vocal monitors. House Consoles: Yamaha PM3100/40C and DMP7 digital mixers, Harrison "Alive" consoles, Cadac computerized consoles, Soundcraft 800C. Monitor Consoles: Ramsa WR-S840, Harrison, Soundcraft 800C, Yamaha PM3000/40C, Yamaha PM2800M, Yamaha MC2408M, all specially modified. Outboard Equipment: State-of-the-art digital processing gear by Lexicon, Yamaha, Eventide, AMS, Sony, Klark-Teknik, dbx, UREI. Power Amplifiers: Crest 8000, Crest 4000, BGW 750B, Yamaha, Meyer M-1000. Microphones: All Sennheiser, Neumann, AKG, Shure, Vega, Micro, Nady, large (30 simultaneous units) wireless (UHF and VHF) RF microphone systems. Other Equipment: Wide selection of



A-1 AUDIO, INC
Hollywood, CA

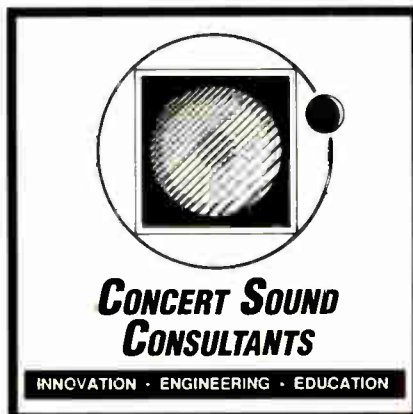
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REMOTE RECORDING & SOUND REINFORCEMENT

DELICATE PRODUCTIONS, INC.; *Sound Reinf., Lighting;* 1390 Flynn Rd. #A; Camarillo, CA 93010; (805) 388-1800. Contact: Spy Matthews.

ESTRIN ASSOCIATES/BEST AUDIO; 10640 Burbank Blvd.; North Hollywood, CA 91601; (818) 763-2378. Contact: Jim Seiter.

GOLD SOUND; *Sound Reinf., Rental;* 11907 Juniette St.; Culver City, CA 90230; (213) 827-3540. Contact: Ed Cirino.

HG SOUND; *Sound Reinf., Rental;* PO Box 766; Manhattan Beach, CA 90266; (213) 834-6566. Contact: Harold Goodman.

LE MOBILE; *Audio Recording;* 11131 Weddington St.; North Hollywood, CA 91601; (818) 506-8481. Contact: Guy Charbonneau, Trish Khur.



PACIFIC AUDIO-VISUAL ENTERPRISES

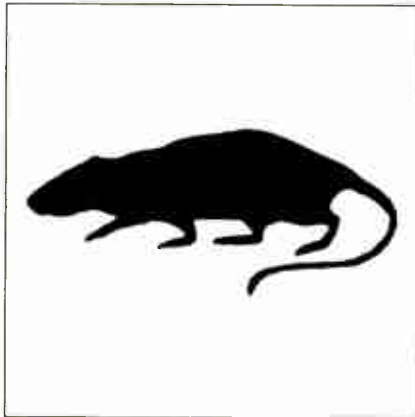
PACIFIC AUDIO-VISUAL ENTERPRISES
Monrovia, CA

PACIFIC AUDIO-VISUAL ENTERPRISES; *Sound Reinf., Audio Recording;* 545 Cloverleaf Way; Monrovia, CA 91016; (818) 359-8012; FAX: (818) 357-0602. Contact: Ron Streicher. **SOUND REINFORCEMENT.** Touring Radius: Worldwide. Vehicles: Consulting for any size project, equipment for small-scale reinforcement projects only. House Loudspeakers: JBL House Consoles: Soundcraft 800B. Outboard Equipment: Lexicon, Yamaha, Aphex Power Amplifiers: Haller 200. Microphones: Schoeps, AKG, Neumann, Beyer, Shure, Sennheiser. Rates: Base rate: \$65/hr. variable, pending project requisites. **REMOTE RECORDING.** Vehicles: Dodge van. Control Room Dimensions: Per venue/setup on site. Mixing Consoles: Soundcraft 800B [custom modified], Quantum 12A [custom modified], custom-built 6 x 2, custom-built 3 x 2. Audio Recorders: Studer B67 [pair, custom modified], (2) Sony PCM-F1 processors, R-DAT, Revox B77 [pair, custom modified], Otari 5050-BQII. Noise Reduction Systems: dbx Type I, Dolby A, Dolby SR. Outboard Equipment: Lexicon 200, Yamaha REV7, dbx 900, Aphex Type B, Aphex Compellor. Microphones: Schoeps Colette system, AKG 414/P-48, AKG 460, AKG 450, AKG C-422 stereo, AKG C-24 stereo, Calrec Soundfield system, Beyer, Sennheiser, RCA, Coles, Shure, Neumann TLM170. Monitor Speakers: Norberg BCS-16, JBL 4612, KEF 103.3 Power Amplifiers: Haller DH-200, Haller DH-220. Rates: Base rate \$65/hr. variable pending project requisites. Specialization & Credits: Ron Streicher has an international reputation for "live-to-stereo" audio projects on location as well as in the studio. As owner of Pacific Audio-Visual Enterprises, he provides cost-effective, quality-oriented services by specializing in basic, time-proven production techniques—without unnecessary fuss or gimmickry. The result: a successful job... on time, and within budget. With a lifelong background in music presentation, Ron is well qualified to serve as a music consultant as well as engineer on any project: location or studio recording or broadcast; live concert sound reinforcement; music and performance coordination; audio systems design and consultation; lectures and seminars on recording tech-

niques. Complete facilities are maintained ready to travel for in-studio or on-location projects across town or around the world. Credits: Sound reinforcement for Mann Music Center productions of the Philadelphia Orchestra, the Metropolitan Opera, New York City Opera and others; location recording of the Bolshoi Ballet Orchestra for the U.S. tours of the Moscow and Donetski Theater companies; radio broadcasts of the Los Angeles Philharmonic Orchestra; audio consultant to the Los Angeles County Museum of Art; audio production for numerous broadcasts by National Public Radio, American Public Radio and PBS; record projects for companies including: Angel, RCA, CMS Desto, CRI, SAZ, etc.

P.P.A. INC.; *Sound Reinf., Staging;* 425 W. LaCadena Dr., Units 7 and 8; Riverside, CA 92501; (714) 682-3429. Contact: Henry Austin, Kevin Kelly. **SOUND REINFORCEMENT.** Touring Radius: National. Maximum Venue Size: 20,000 indoors, 30,000 outdoors. Vehicles: Ryder trucks, Rollins trucks, semis. House Loudspeakers: (16) Turbosound TMS-3, (44) Hill M4 4-way, (30) Vega horn-loaded 3-way, (8) Vega CVX 3-way, (8) Vega F horns 2 x 18" Flying System Available: Yes. Monitor Loudspeakers: (8) PPA/JBL 2 x 12" + 2", (8) PPA/JBL 1 x 15" + 1", (4) PPA/JBL 2 x 15" + 2", (10) Hill W4 2 x 12" + 10" + 2". House Consoles: Soundcraft Series 4 (Raven) 40 x 16 x 2, Yamaha PM2000 32 x 8 x 8, Soundtracs M Series 24 x 8 x 2, Ramsa WRB716 16 x 4 x 2. Monitor Consoles: Soundtracs MC 32 x 12, Audioarts M8 32 x 8, Yamaha 2408 24 x 10. Outboard Equipment: (8) Klark-Teknik DN360 EQ, (14) Brooke-Siren FDS-340 crossover, (2) Clear-Com 2-channel com system, (4) Lexicon LXP-1 w/(2) MRC controller, Lexicon PCM60, Lexicon PCM42, Lexicon PCM41, (2) Yamaha REV7, (2) Yamaha REV5, Yamaha SPX90, Eventide H910, (2) Roland SDE-2500/1000, dbx 120X sub synth, (8) dbx 904 gate, (3) dbx 166 comp, (2) dbx 903 comp, ADR 1070 comp/limiter. Power Amplifiers: (12) Crest 8001, (12) SCS 2600A, (46) Hill TX1000 tri-amp, (12) Crown DC-300A, (12) Yamaha P2200, (8) Carver PM-1.5. Microphones: (16) Sennheiser 421, (4) Sennheiser 441, (24) Shure SM58, (30) Shure SM57, (8) AKG 451/CK5, (2) AKG 460/CK1, (4) E-V RE20, (2) PZM, (4) E-V PL80, (2) E-V PL77, (2) Beyer M500, (2) Beyer M201, Beyer M200, Beyer M300, HM Electronics FM w/87 cap, (2) Shure SM81, (4) AKG 535. Staging: (24) 2' x 4' x 8' risers w/Marley flooring, (28) 4' x 4' x 8' risers w/Marley flooring. Lighting: (4) Genie 20' airlift towers, (76) PAR 64, 18-channel/2-scene EDI controller w/(18) channel dimmer. Other Equipment: Roscoe smoke machine, EDI arena strobe light system, custom 16' x 4' sectional drape system, 40' x 22' traveler track w/sharks-tooth scrim drape, Fostex B-16 tape recorder, (2) TEAC 3340 4-track tape recorder, (16) Cerwin-Vega IR Earthquake sub-woofer, (4) Cerwin-Vega PD-18 3-way bin. Rates: Varies upon show demands, call for bids.

RAINBOW REMOTE RECORDING; *Sound Reinf., Audio Recording;* 34 Jackson; Irvine, CA 92720; (714) 551-5367. Contact: Dale McCart.



RAT SOUND
Sun Valley, CA

RAT SOUND; *Sound Reinf., Lighting, Staging, Rental;* 11800 Sheldon St. #D, Sun Valley, CA 91352; (818) 504-2930. Contact: Dave or Brian. **SOUND REINFORCEMENT.** Touring Radius: National. Maximum Venue Size: 5,000. Vehicles: 16' International S1700, 15' Ford Cube van, 14' Ford Cube van. House Loudspeakers: (16) Rat Trap 15-1" [dual 15", dual 10", 1"], (4) Rat Trap 15-2 [dual 15", dual 10", 2", 1"], (10) Rat Trap 12-2 [quad 12", 2", 1"], (16) Rat subs [dual 18"], 18" are Gauss 4883, all others are JBL, all horns Renkus-Heinz. Flying System Available: No. Monitor Loudspeakers: (12) Biamp 15", 10", 1" wedges, (8) Biamp dual 12", 1" wedges, (8) Biamp 15", 1" wedges, (8) Rat Traps tri-amp for sidefills and drum fills. House Consoles: Soundtracs M Series 32 x 8, Soundcraft 200B 32 x 4 w/S Series EQ, Yamaha 2404, Yamaha 1604. Monitor Consoles: Soundcraft 400B 24 x 10, (2) Yamaha 2408. Outboard Equipment: Klark-Teknik EQs (mains), Brooke-Siren FDS-360 crossovers (mains) TDM (mons), Lexicon, Yamaha, dbx, Aphex, Symetrix signal processing, cassette decks, CD players. Power Amplifiers: Crest

Audio 8001, Crest Audio 7001, Crest Audio 4001, Crest Audio P1400, Crest Audio PL300, Crest Audio 2501A. Microphones: Beyer, Shure, Sennheiser, AKG, Electro-Voice, C.T. Audio. Staging: 9 x 8 drum riser. Lighting: 100 par can system 24-channel 2-scene, (2) Ultra Arc follow spot. Other Equipment: Full backline rentals, (2) smaller P.A. systems w/equipment not listed. Rates: \$650 to \$1,500 a night for regional sound up to 20kW O.H. 10 onstage mixes! Call for tour rates. Specialization & Credits: Rat Sound offers two fully integrated, custom designed and built sound systems. We offer the quality, packaging and dependability of much larger company's systems at reasonable prices. These systems are fully compatible to form one larger system. We are presently seeking national and regional tours in the 1,000 to 3,000 capacity venues. Credits include national tours in 1984, '85 and '86 with Black Flag, 1989 national tour with Metal Church. Clients include The Untouchables, Sherman Hemsley, Thomas Dolby, Social Distortion, Jane's Addiction, Flesh & Blood [Dear Mr. President], Butthole Surfers, Goldenvoice, Pacific Concerts, Bill Silva Presents, Avalon Attractions and house sound at John Anson Ford Amphitheatre, Los Angeles. In addition, Rat Sound sells professional products by the following manufacturers: Crest Audio, Carver, Beyer Dynamic, Shure, Klark-Teknik, Brooke-Siren Systems, Renkus-Heinz, Gauss, TDM, Whirlwind, Latin Percussion, PAS, C.T. Audio and Omnicraft.



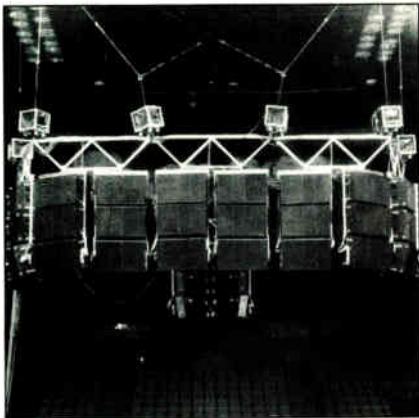
RECORD PLANT INC.
Los Angeles, CA

RECORD PLANT INC.; *Audio Recording;* 1032 N. Sycamore; Los Angeles, CA 90038; (213) 653-0240. Contact: Mark Eshelman. **REMOTE RECORDING.** Vehicles: (2) GMC bobtail w/full air cond. and heat, air ride suspension, Mobile Unit II 29'2" x 8'4"; Mobile Unit III 34'4" x 8'4". Mixing Consoles: Mobile Unit II: API 44 x 24 16-bus full patch bay, designed specially for live recording applications; Mobile Unit III: API 44 x 32, 24-bus full patch bay, designed for live recording applications. Audio Recorders: Otari MTR-90 24-track analog, Ampex ATR-102, Ampex ATR-104, Sony 3324/3348 digital, Mitsubishi 32-track. Noise Reduction Systems: Dolby A Synchronization Systems: (2) Lynx. Microphones: Mic/outboard processing supplied according to production requirements. Stock includes most recording-quality makes and models. Monitor Speakers: Mobile Unit II: JBL 4320, Mobile Unit III: Meyers ACD, Auratones, Yamaha NS-10s, Yamaha NS-20s, etc.

RECORDING SERVICES COMPANY; *Audio Recording;* 2414 W. Olive Ave.; Burbank, CA 91506; (818) 843-6800. Contact: Tom Hilbe. **REMOTE RECORDING.** Vehicles: One-ton Dodge conversion remote recording audio truck. Total outside dimensions: 19 x 8 x 10'8". Control Room Dimensions: 12'5" x 7'4" x 7'9". Mixing Consoles: Audionics 501 26 x 16 x 4, Soundcraft 200B 24 x 4 x 8, Yamaha PM180 6 x 2, custom submixer [line level] 12 x 4. Audio Recorders: (2) Otari MTR-90II 24/16-track, (3) Ampex MM1200 24/16/8-track, Otari MX70 16-track 1", Otari MX-5050 8-track 1/2", Ampex ATR 100 4/2-track. Noise Reduction Systems: Dolby SR, Dolby A Synchronization Systems: Lynx, BTX Shadow. Outboard Equipment: Lexicon 224XL, Lexicon 200, Lexicon 97 Super Prime Time, (2) dbx 160, Teletronix LA-2A [tube limiter], (2) UREI 1176LN, (2) UREI LA-3A, UREI LA-4. Microphones: AKG 451, AKG 414, Sennheiser 416, Sennheiser 421, Sennheiser 441, Shure SM57, Shure SM58, Shure SM59, E-V RE20, Sony ECM-50, other mics available upon request. Monitor Speakers: JBL 4311, Auratone 5C. Power Amplifiers: BGW 750, BGW 250, Crown D-60. Video Recorders: JVC 850 3/4", JVC 6650 3/4". Video Monitors: Panasonic 6T-S1300N 12" color, (3) Philips 5" B&W.

ROD'S SOUND SYSTEM AND OTHER PROFESSIONAL SERVICES; *Sound Reinf.;* 720 Bernard St.; Los Angeles, CA 90012-1197; (213) 342-9015. Contact: Rod Chushan.

SILVERADO SOUND; *Sound Reinf., Rental;* 540 Quintana Rd.; Morro Bay, CA 93442; (805) 772-7403. Contact: Paul Larson, Scott Morris.



SPEEDA SOUND
Fresno, CA

SPEEDA SOUND; Sound Reinf., Rental; 3279 W. Sussex Way, Fresno, CA 93722; (209) 227-2203; (209) 227-2209. Contact: Mike King, Carnot Pease.

STUDIO FIVE SOUND; Sound Reinf., Rental, Audio Recording; PO Box 4291; Point Mugu, CA 93042; (805) 485-7454. Contact: Jim Pearson. **REMOTE RECORDING.** Specialization & Credits: Studio Five Sound specializes in high-quality sound reinforcement for both indoor and outdoor situations, from conference rooms to football stadiums. Studio Five Sound also does complete sound system design and installation for new and upgraded systems. Rental equipment listings, prices and customer references are available on request. Our remote recording facilities include a Tascam M-70 recorder with dbx noise reduction. To complete your project, Studio Five also does cassette duplication in-house on our 10-station real-time duplication system. Prices are available on request.



STUDIO ON WHEELS
Glendale, CA

STUDIO ON WHEELS; Audio Recording; 339 Windsor Rd. #6; Glendale, CA 91204; (818) 243-6165. Contact John Falzarano.

WESTWOOD ONE COMPANIES; Audio Recording; 8966 Washington Blvd.; Culver City, CA 90232; (213) 840-4000. Contact: Richard Kimball.

ZETA SOUND SYSTEMS; Sound Reinf., Lighting, Staging; 6934 Tujunga Ave.; North Hollywood, CA 91605-6212; (818) 761-3998. Contact: C. David Hopkinson.

OUTSIDE U.S.

ALLSTAR SOUND EQUIPMENT LTD.; Sound Reinf., Lighting, Rental; 11212-143rd St.; Edmonton, Alberta, T5M 1V5 Canada; (403) 452-2546; FAX: (403) 454-6452. Contact: Clive Alcock Shawn Bowley. **SOUND REINFORCEMENT.** Touring Radius: Regional, national. Maximum Venue Size: 15,000. Vehicles: 22' and 24' vans. House Loudspeakers: (36) Martin B215, (24) Martin MH212, (24) JBL 2445, (36) tweeters. Flying System Available: Yes. Monitor Loudspeakers: Biamp 1 x 15" high-power wedges w/2" horns, Biamp medium-power wedges w/1" horns, Smart System fill boxes, heavy duty drum monitoring. House Consoles: Soundcraft, TAC/Amek up to 40 channels by 16 groups. Monitor Consoles: Soundcraft 40



Allstar Sound Equipment Ltd

ALLSTAR SOUND EQUIPMENT LTD.
Edmonton, Alberta

channels into 12 mixes. Outboard Equipment: BSS cross-overs, Klark-Teknik graphs, dbx limiters, Yamaha, Lexicon, Roland, Valley processing. Power Amplifiers: QSC, Bryston. Microphones: Most common models by Shure, Sennheiser, AKG. Lighting: Thomas instruments, Altman instruments, compact folding truss system, Celco control, Dilor dimmers. Rates: Phone for quotes. Specialization & Credits: Specializing in concert sound systems, touring production services, full concert lighting, remote recording, broadcast mixing and communications systems. Credits include: XVth Winter Olympic Games opening and closing ceremonies, Edmonton Folk Festival, Calgary Jazz Festival, Edmonton Jazz Festival (10 years), k.d. lang, Colin James, Blue Rodeo, David Lindley, Jeff Healy, David Foster, Randy Travis, Ricky Scaggs, Dwight Yoakam, John Hiatt, Nylons, Nazareth, Georgia Satellites, Edmonton Symphony Orchestra, Calgary Philharmonic Orchestra, Vancouver Philharmonic Orchestra and many more.

COMFORT SOUND RECORDING STUDIO, Audio Recording; 26 Soho St., Ste. 390; Toronto, M5T 1Z7 Canada; (416) 593-7992. Contact: Doug McClement. **REMOTE RECORDING.** Vehicles: GMC 5-ton w/22' box. Control Room Dimensions: 7' x 16'. Mixing Consoles: Neotek Elite 50 inputs + 16 assignable line inputs. Audio Recorders: (2) Ampex MM1200 24-track, Sony 601 digital stereo w/JVC VHS, TEAC C-3 cassette deck. Outboard Equipment: Lexicon PCM60 digital reverb, Yamaha REV7 digital reverb, Yamaha SPX90 digital effects processor, Yamaha D1500 digital delay, Rane stereo 1/3-octave EQ, (2) Drawmer 201 dual noise gate, Symetrix 544 Quad noise gate, A&D time code reader. Microphones: (2) AKG 451, (2) Shure SM81, (4) Sennheiser 421, (2) Sennheiser 441. Monitor Speakers: Tannoy NFM-8, Yamaha NS-10, Auratone cubes. Power Amplifiers: QSC, (2) BGW 100, (2) Amcron D60. Video Recorders: MTC VHS Hi-Fi. Video Monitors: Panasonic 12" color. Switchers: Panasonic 12-input. Cameras: Panasonic color. Other Major Equipment: 54-input 3-way transformer isolated split, 500' 54-pair mic snake, Clear-Corn 2-channel intercom system, Sola 5KVA power regulator/cleaner. Rates: \$1,695/12 hr. day plus \$350 for second 24-track machine.

J.L. SOUND SYSTEMS; Sound Reinf., Lighting, Staging, Rental; 250 King St. E.; Hamilton, Ontario, L8N 1B7 Canada; (416) 527-6863. Contact: Joe Sciamanna. **SOUND REINFORCEMENT.** Touring Radius: National. Maximum Venue Size: 20,000 seat. Vehicles: 18'. House Loudspeakers: CE SM-50 E-V loaded, 40 bottoms, 22 tops. Flying System Available: Yes. Monitor Loudspeakers: (25) SM-W-15 E-V loaded, (15) SM-W-12 E-V loaded. House Consoles: TAC 40-ch., Yamaha PM1800 32/40-ch., various Soundcraft. Monitor Consoles: TAC, Yamaha, Soundcraft. Outboard Equipment: Yamaha REV7, Lexicon, Symetrix, DeltaLab, Aphex, Brook-Siren, Bryston crossovers, Barcus-Berry Electronics. Power Amplifiers: (60) Bryston, (12) Carver 1.5, (20) Yamaha, (20) various other makes. Microphones: (45) E-V, (70) Shure, (15) Sennheiser, (4) Cetec Vega. Staging: Smoke machines and effects, various modules available. Lighting: 240k avail. and LDS packs, follow spots, 48k ACLs.

LE STUDIO MOBILE; Audio and Video Recording; PO Box 367 Outremont Station; Montreal, Quebec, H2V 4N3 Canada; (514) 273-6861. Contact: Guillaume Bengle.

ULTRASTAGE, INC.; Sound Reinf., Lighting, Rental; 4917 Bridge St.; Niagara Falls, Ontario, L2E 2S2 Canada; (416) 356-0499.

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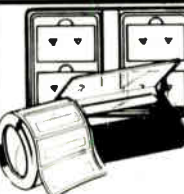
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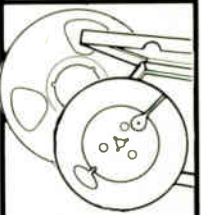


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by Craig Anderton

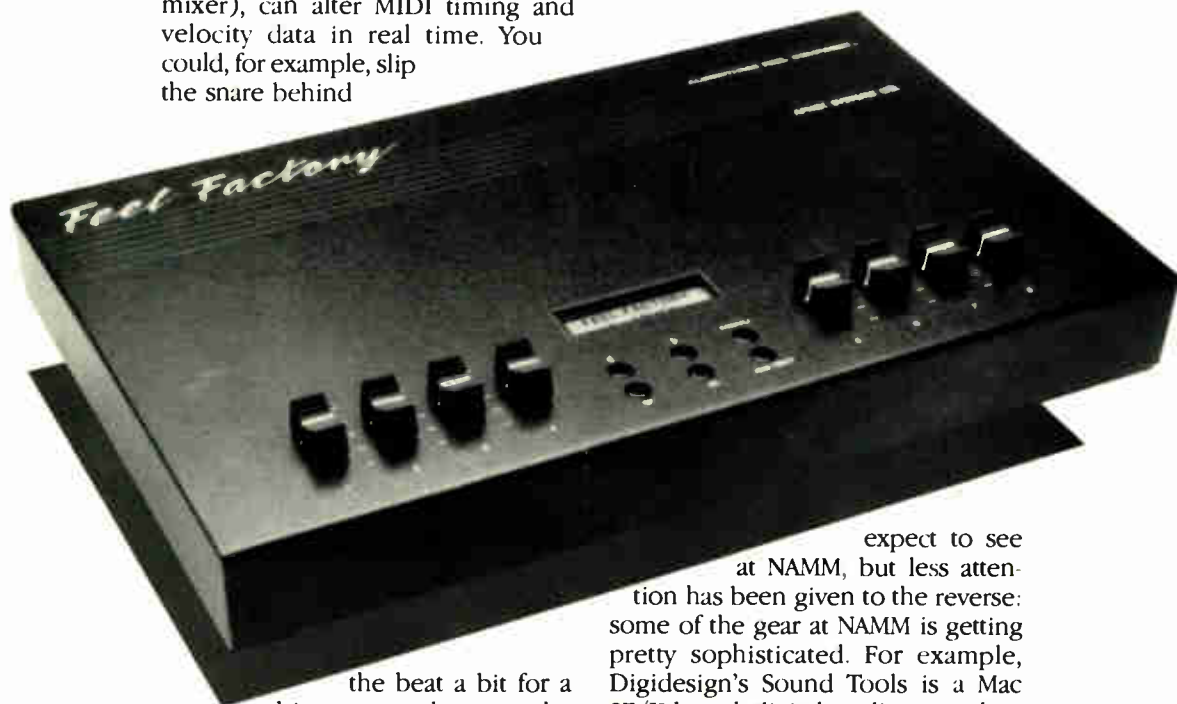
RETURN OF THE NAMMSTERS

The winter NAMM show in Anaheim presented a veritable cornucopia of products. Two columns ago we talked mostly about synths; last month we delved into signal processors, software and MIDI. But we still didn't cover everything of interest, so let's check out more of the goodies shown at NAMM.

Aphex Systems has started a new division, headed by Michael Stewart, to produce innovative MIDI devices. Its first offering, the Feel Factory (which looks like a little 8-track mixer), can alter MIDI timing and velocity data in real time. You could, for example, slip the snare behind

produced by Kahler. This SMPTE-to-MIDI converter listens to recorded program material and creates tempo maps, with the sync signal recorded on an empty track. The sync track can then control MIDI clock-driven devices such as drum machines and sequencers. To round things out, Impulse is a 12-input percussion triggering system that does drum pad/trigger-to-MIDI conversion.

There's been a lot of talk about how AES is starting to include equipment you'd normally



the beat a bit for a bigger sound, move the strings ahead of the beat to compensate for the psychoacoustic delay caused by using envelopes with long attacks, and put the hi-hat just in front of the beat for a more insistent sound. It also includes a SMPTE reader/generator and SMPTE/MIDI converter. The Studio Clock is an improved version of the Human Clock, originally

expect to see at NAMM, but less attention has been given to the reverse: some of the gear at NAMM is getting pretty sophisticated. For example, Digidesign's Sound Tools is a Mac SE/II-based digital audio recording and editing system that costs \$4,000—a fraction of what comparable systems cost just a few years ago. Sound Tools consists of the Sound Accelerator DSP board, AD IN analog-to-digital converter and *Sound Designer II* editing software. Steinberg/Jones showed its hard disk recording system, called

—CONTINUED ON NEXT PAGE

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Installation and wiring is exceptionally easy. The M-600 is the only modular mixer that's available with all the necessary finished cables and installation hardware. And that can eliminate a lot of installation hassles and expense. At the same time, no other mixer at its price gives you multi-pin, computer-type connectors for quieter, more secure connections.

But the real pleasures of the M-600 will only be evident after it's in your studio. Up to 64 stereo or 128 mono inputs can be accessed directly from the top panel. A patch bay can be added for fast, flexible routing. That's convenience.

The M-600 has all the features you'd expect in a professional mixing console. Like balanced insert patch points on all inputs, PGM busses as well as the stereo master buss for increased signal processing capability. Plus sweep-type parametric EQ, balanced inputs and outputs, phantom power, talkback/slate channel and all the audio performance you'll ever need. Without the exorbitant price you don't need.

So check out the M-600 modular mixing console. It's ready for fame when you are.



TASCAM

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—CONTINUED FROM PREVIOUS PAGE

Topaz; and IBM aficionados were not left out in the cold, either. Spectral Synthesis demoed its SynthCard Dual DSP Board, an IBM-compatible digital signal processing "engine" designed specifically for music and sound applications. It will cost anywhere from \$1,995 for a starter kit to \$18,500 to turn your PC/XT/AT into a digital audio workstation. I suspect we'll be seeing more and more of these systems as the line between professional and semi-pro continues to blur.

Those who enjoy sampling, but have a hard time finding acoustic instruments to sample, have warmed to the idea of buying CDs of well-recorded samples. Currently, there are two major manufacturers of such CDs: McGill University and Proonus. Both had major introductions at the show; McGill introduced eight new volumes of sounds (Rock Percussion and Tympani, Rock Strings, Latin Grooves #1, Latin Grooves #2, Jazz Sounds, More Strings/Winds/Piano/Percussion, Pipe Organ and Historical Instruments) at \$69 per volume, and Proonus had a bunch of great-sounding new CDs as well. But what interested me the most at the Proonus booth was the *Studio Reference Disc*. This \$49.95 CD contains 70 minutes of test and reference tones, white and pink noise, acoustic piano listening test, polarity test, pitch references and a whole lot more. This seems ideal for studio/broadcast/laboratory applications, and I can hardly wait to get my hands on one.

In keeping with the sampling theme, Ensoniq introduced a line of Signature Series samples for the EPS. Artists who have contributed sounds to the series include Nile Rodgers, John Robinson, Claude Gaudette, David Hentschel, Paul Jackson Jr. and yours truly. Finally, if you want to generate your own samples with a computer, check out *Wave* for the Amiga by MIDImouse. Designed for 12-bit samplers, this program generates samples using additive, wavetable, FM (which can be of two different samples, not just sine waves) and AM synthesis techniques. Onboard filtering and signal processing is included, as well as 16-stage amplitude and pitch envelopes. To top it off, this is the only low-cost software package I've seen that includes granular synthesis functions.

Electronic drums have taken quite a beating recently, with several manufacturers pulling out of the business. However, ddrum has persevered, and its ddrum 2 is just the ticket for electronic drummers: high-quality, sampled (and editable) sounds, 64 non-volatile memory locations (no batteries, either) for storing different "kits," a built-in 8-channel mixer and sturdy rack-mount packaging. A variety of additional sound cartridges are also available.

If you're tired of carting a computer to gigs to play back sequences for your MIDI backup band, two new products from Micro-W and Musicsoft translate MIDI data into tones that can be recorded on ordinary cassette tape, then played back into your instruments. So you can perfect all your sequences at home on a computer, dump the data to tape, then simply play back your tape through the decoder and drive your MIDI instruments. Although neither unit can record ultra-dense MIDI stuff (I think something like 16 channels with pitch bend, modulation and polyphonic would probably cause them to freak out), for many applications these look to be real useful devices. You can even store sequence information at the head of a multitrack tape—clever.

Now that we've outfitted our studios with all this neat gear, the problem is how to put it in an equally neat arrangement. Here's where Playstation (from Playstation Products of Cypress, Calif.) comes to the rescue. This modular, ergonomic housing system for rack-mount gear, keyboards and computers takes the form of a cockpit around the operator. Signal processing gear arches over your head for easy access, while pull-out drawers let you get at your master keyboards and such. Because the design is modular, you can add to it at any time and customize the setup for your own particular needs.

All in all, this was an exciting NAMM show. The mood was up, the products were winners and there seems to be a serious effort at streamlining the user interface as well as providing more value for the money. I'm already looking forward to the summer show—but frankly, the Winter '89 show is going to be a hard one to top. ■

Craig Anderton writes books, produces and performs music, and edits Electronic Musician, our sister publication.

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Ravi Shankar



RECORDING RAVI SHANKAR IN RUSSIA

Even for a musician of Ravi Shankar's stature, it was an extraordinary day. On July 7, 1987, the Indian composer/sitar master performed a special concert at the Palace of Culture in Moscow's Kremlin that mixed traditional Indian music and players with Russian folk, orchestral and choral ensembles, all playing a series of pieces written by Shankar for the occasion. The result, an ambitious seven-part song cycle called "Swar Milan," was Shankar's attempt to bridge cultural differences between the Indian and Russian people through the common language of music. The remarkable fruits of Shankar's labors are captured beautifully on *Ravi Shankar Inside the Kremlin*, on the Private Music label.

As several Western acts have learned over the past few years, recording in the Soviet Union is no picnic, even under the best circumstances; it gives new meaning to the term "red tape," and the only English phrase *every* Russian seems to know is, "*It is impossible.*" So imagine what it was like trying to record inside the hub of Soviet

power, the Kremlin itself!

"I'm told that the Fleetwood [mobile truck, used to record the concert] was the first vehicle ever to enter the Kremlin without Russian plates," says a bemused Kurt Munkasci, who produced the project. The noted New York engineer/producer, best known for his work through the years with Philip Glass, originally considered recording the concert with a couple of DAT machines, "but the whole thing snowballed, as happens pretty often in this business." Billy Joel successfully employed the London-based Fleetwood truck when he played the Soviet Union a couple of years ago, and conveniently enough, just before Munkasci arrived in Moscow, the mobile unit was in nearby Scandinavia on Prince's European tour. Getting the Fleetwood, its Helios desk and MCI recorders into place turned out to be the easy part.

Munkasci found that a team of Russian audio engineers had already set up a plethora of AKG 414 mics amid the 140 musicians and singers, to handle both a television broadcast feed and the house P.A. feed. That was fine, except the Russians wouldn't allow Munkasci and his principal engineer, Robert Bielecki, to take splits from their mics. "So we

scraped together everything we could from the Fleetwood," he says. "Fortunately, they had a good selection." The team close-miked the large Indian music ensemble, used an additional three mics on the Chamber Orchestra of Moscow Philharmonie, three more for the Government Chorus of the Ministry of Culture and a couple for the Boyan Russian folk ensemble. But hanging a room mic to pick up the audience and the hall's ambience proved to be more of a challenge.

"We wanted to hang a Calrec soundfield mic from the ceiling," Munkasci says, "but to get up there you have to go through all these different levels—just like any theater—and at each level there was a different guy with a different key. We started at 8 a.m., and by noon we'd gotten through four doors, explaining what we were doing through interpreters at every step. We had one to go, but the guy at the top level wasn't there and nobody else had the key. That was *his* job. We waited awhile and finally he showed up. We explained as we'd done to the others, but this guy just said, 'nyet.' And that was it. I guess it was expecting a lot to think they were going to let some Americans put a mic in the ceiling of the Kremlin."

The shows themselves—three concerts before a total of 18,000 Party regulars and their families, mostly invited—went smoothly. "The musicians all played great, and the audience was very open and receptive," Munkasci says, adding that some in the crowd were apparently there for non-musical reasons.

"During intermission I noticed that practically the entire audience filed out, and when they came back many of them had giant boxes on their laps. It turns out that in Moscow, the only place you can buy chocolate is at the theater, so everybody was stocking up. I gather that's one way they get people to come to the theater!"

In the end, the hard work and dealing with different levels of Soviet bureaucracy paid off for Munkasci and his team. "I wish we'd had digit-

al multitracks for this, but I guess I'm spoiled," he says. "Basically, I'm very, very happy with how it came out. We weren't really sure what we had until we rough mixed, and it turns out we got it all."

—Blair Jackson



Sandy Bull

A NEW KIND OF "JUKEBOX": THE RETURN OF SANDY BULL

Few instrumentalists carry their musical life around with them quite the way Sandy Bull does. After hearing Indian musicians in the '60s, he started playing raga-like forms on guitar. When he learned the oud, he incorporated it into his live shows. Same with pedal steel guitar, which he took up in the early '70s. He loves soul music and salsa with nearly equal fervor, so he plays both, maybe tossing in a classical guitar piece in between. This sort of eclecticism has enchanted Bull's audiences for years—and made his records a little hard to get a handle on. The title of his latest disc, *Jukebox School of Music*, aptly explains his approach. There are smatterings of a dozen or more styles on this all-instrumental project, each of them reflecting a dif-


ferent side of Bull's musical personality.


Bull was one of the most highly regarded players to come out of the early-'60s folk scene, an unabashed eclectic whose early interest in ethnic music foreshadowed the burgeoning youth culture's fascination with the world beyond America. He made a number of records for Vanguard between 1962 and 1972, but hadn't released a record since.

Jukebox School of Music started out as a humble cassette-only project to satisfy the demands of fans who see him play in clubs across the country. But it eventually fell into the hands of Keith Holzmann, head of the new ROM label, who signed Bull to his roster. Within a few months of its release last summer, *Jukebox School of Music* was being played on some 350 radio stations, an amazing feat for any artist, and sales had surpassed the company's and Bull's modest expectations.

Bull has long been a solo performer, with a capital "S." Not content to just play his stringed instruments, he also has used a MIDI system for a few years, enabling him to pit his various axes against rich, fully textured parts. The new album reflects this approach; with the exception of one exquisite track featuring his longtime musical ally Billy Higgins on drums, all the parts were played by Bull. "I like there to be something interesting going on in the backgrounds I write," he comments, "but at the same time I like them to be simple so they don't conflict with the tonalities of the main instrument I'm using."

Bull recorded *Jukebox* at his Trolley Barn Studio in Venice, Calif., using a Sony F1, his trusty 1972, 10-channel Neve Broadcast Mixer that travels on the road with him, and an arsenal of other equipment, including a Yamaha PF15, Oberheim DMX, QX1 sequencer, a pair of DX7s, Yamaha REV5, Roland S-50 sampler (for bass parts), Roland MKF-20 piano module, and a host of fine mics, some modified by Stephen Paul. "I had all the parts in the computer except for the live instrumentals,"





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Bull says. "I didn't do any editing. I got the backgrounds the way I wanted them, then did live takes with the main instrument over and over until I got a performance I was happy with."

He shared the engineering duties with Lenise Bent, who "gave me invaluable advice on when something was maybe too far out in the mix," Bull says. "We work well together, which is why she goes out on the road with me and mixes, too."

If this wasn't exactly a big-budget project using the latest and greatest recording gear, you'd never know it from listening to the resulting CD. This melange of styles and textures, which takes the listener from the barrio to a C&W bar to the Middle East to the inner city, is dripping with soul and spirit. Bull, for one, makes no apologies for his eclecticism: "Basically, I like anything that swings, and to me that includes Bach, Indian music, salsa—the whole nine yards."

—Blair Jackson

A COUNTRY GOLD MINE FROM RCA

These are good times for people like Billy Altman, the respected music critic and historian who now also has become what is known in the biz as a "packager." For the past year-and-a-half Altman has spent much of his time working on a series of CDs (and cassettes) of old country and blues music dug up from the vaults of RCA Records. The first two releases, which came out near the end of 1988, are sparkling compilations of rare country music from the '30s: *Ragged But Right* presents tracks by a host of string bands like Gid Tanner & His Skillet Lickers, the Prairie Ramblers and J.E. Mainer's Mountaineers; and *Are You From Dixie?* features songs by some of early country's best duos, such as the Allen Brothers, the Delmore Brothers and the Blue Sky Boys. The music on these CDs speaks volumes about the heritage of American music, and sonically they are superb, with as much punch and presence as you could hope for from music recorded a half-century ago. Altman and a team of engineers and technicians have truly given this old music new life.

As Altman learned, it can be a long road from conception to birth with this sort of anthology. He originally approached RCA in part because he was aware of the company's country and blues legacy, "and because I heard that they had kept track of most of their masters pretty well through the years," he says. "A lot of companies have been careless or moved their storage facilities so many times they've lost a lot." RCA has moved its vaults just three times in 60 years.

After getting approval to launch the RCA Heritage Series, Altman's first step was to get as many second-generation records (i.e., original pressings) as possible, in the hope that he could track down the masters. Going through RCA's files proved slightly daunting: "They're not filed by record or catalog number, but by matrix number, which is the number scratched into the record." There was a predictable amount of bureaucratic rigmarole getting requests to the company vaults, but "we ended up with about an 80 percent success rate in finding



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the original masters, and that's very, very good," Altman says. "For this sort of thing, depending on the artist and the company, you might not find any masters at all.

"The masters came in various conditions," he continues. "I'm dealing pretty much with material that's pre-tape, so it's all metal masters—10-inch metal plates. If a song was a big hit and RCA had done a couple of pressings, sometimes we'd find two or three duplicate masters of varying quality. But some of the best masters were cases where a song came out and really didn't do much commercially. Some of those were in pristine condition because only a couple thousand records had been pressed, and then the master was put in this little cardboard box and literally not opened for 50 to 60 years."

The most important step in the process of getting the sound of the master onto CD is the transfer to digital tape. "Digital technology has enabled us to restore the sound in a way we never could before," Altman says. The chief transfer engineer on the project was Bernardo Cosachov, who Altman describes as "an absolute master. He really knows how to get an old 78 master sounding as good as it can. The main tools of his trade are just a big old turntable and many needles. But it's how you get the stylus playing the metal master—that's tricky. It's an exacting science and Bernardo has an incredible touch. A couple of times when he couldn't be there, other engineers, who are also very good, really couldn't make heads or tails of some of these masters. Bernardo would come in the next day and have it perfect in just a few minutes."

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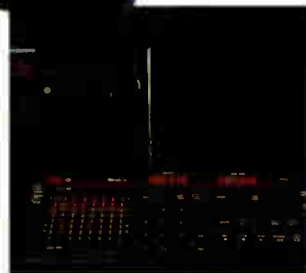
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tape, action on the project shifted to Sonic Solutions, the San Francisco-based company that has had a high success rate in eliminating noise from old recordings. "I was amazed at the work they did," Altman says. "With recordings that old it's not unusual to find scratches and pops and damage caused by oxidation, but Sonic Solutions uses computers to program certain frequencies where the scratch is and, in effect, cancel it out. I was really pleased RCA let us budget for that, because it made a difference."

Next up for Altman is the imminent release of a pair of blues packages: *Alabama Bound* presents some rare Leadbelly sessions from 1940, half of them featuring the Golden Gate Jubilee Quartet gospel singers; and *Throw a Boogie-Woogie* is '30s blues at its best, split between Sonny Boy Williamson and Big Joe Williams. "Beyond that," he says, "RCA has given me the go-ahead to do six more, which I'll probably alternate between blues and country. RCA's really been very supportive through this whole thing. They have so much great music in their vaults, they could have stuff coming out for years."

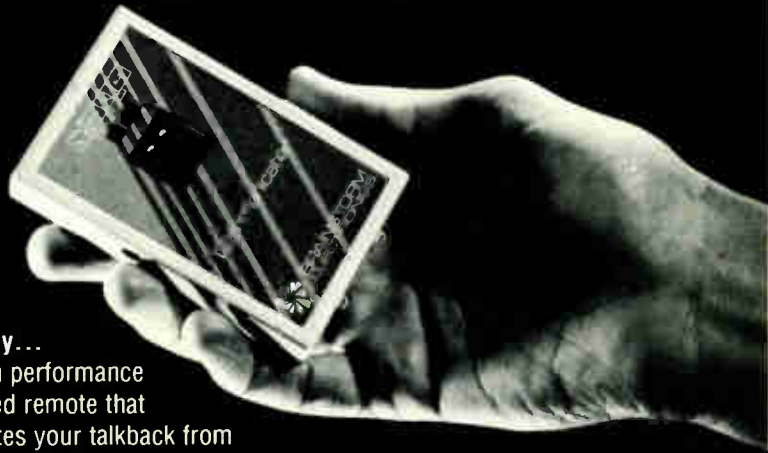
—Blair Jackson

RUSH: A SHOW OF FORMATS

In what may be a picture of things to come, Canadian-based progressive rockers Rush, and their label, Mercury/PolyGram Records, have issued their current release in six different formats. *A Show of Hands*, a double live album recorded and filmed during the band's last two world tours, is the first record to be released simultaneously as an LP, cassette, CD and full-length VHS video, as well as in 5-inch and 12-inch CD-V laser disc formats.

"We have to have a consistent presence in the recording and touring world," says lead vocalist and bassist Geddy Lee, who with drummer Neil Peart and guitarist Alex Lifeson make up the band. "We're not the kind of band that gets a lot of mass acceptance, hit singles and articles in *People* magazine. This

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is our way of keeping our name out there."

The three audio formats have the identical song selection; however, the three video releases each contain different selections taken from concert footage shot by Larry Jordan (best known for his video work with Pink Floyd and Billy Idol).

"While the growing popularity of CDs and cassettes allowed us to make *Hold Your Fire* (our last studio album) a little longer than a record likes to be, this time we were in the quandary of making a double-record set that would fit on *one* CD, so the hard-pressed consumer wouldn't be obliged to shell out for *two* CDs," says Peart. "So, this time we had to keep the time down to around 74 minutes, and we had to be fairly selective about the songs we included."

The band and their engineer, Paul Northfield, also spent an unusually long time mixing the recordings in order to deliver an album that represented a blend between the sonically sophisticated Rush of the studio and the rawer sound the band displays in concert.

"The approach to sound was a difficult balance," says Peart. "We wanted it to sound good, but we wanted it to sound live, too, and it's difficult to find the right meeting point sometimes."

The group was among the earliest to tour with an extensive MIDI setup, which enabled them to reproduce live, as a trio, many of their recordings that had been extensively layered in the studio.

"No one else has ever played with us on or off stage," says Lee. "Although, I do have a guy who loads all my computers for me. There certainly isn't a need to add anyone in order to reproduce our records; we've proven that."

"Using the studio to our advantage was a gradual learning process," adds Lee. "It came from working in our earlier days with guys like Terry Brown, who taught us a lot about writing songs visually, in a cinematic way, and Peter Collier, who has produced us more recently. You just keep growing; it's a craft that you just keep learning more about."

—Bruce Pilato

THOMAS DOLBY ON SAMPLING



Thomas Dolby has been at the forefront of music technology since he burst onto the scene with his 1983 album *The Golden Age of Wireless*. We solicited his views on the ethics and legality of sampling.

Mix: Many of your past recordings have featured synthesized and sampled horns. Do you consider a sampled horn less "real" than recording a live horn player directly to multitrack?

Dolby: Once anything is encoded on magnetic tape, it's already electronic. The fact that you can take that tape, take jam sessions from successive nights and sequence them one after another, you're already cheating time. So if you take one line of a saxophone player and put it in a different place, then it's really no different. You can't say one is real and one is synthesized.

Mix: But if you modify what a horn player does through sampling, it's no longer the horn player playing. He or she is not physically doing it anymore.

Dolby: As soon as you record what he's playing, he's not physically doing it anymore. If he's in a club and he's going through a sound system and you put effects on the horn sound, would you say he's not playing it anymore?

Mix: The person's still playing, but the sound is colored.

Dolby: But where do you draw the

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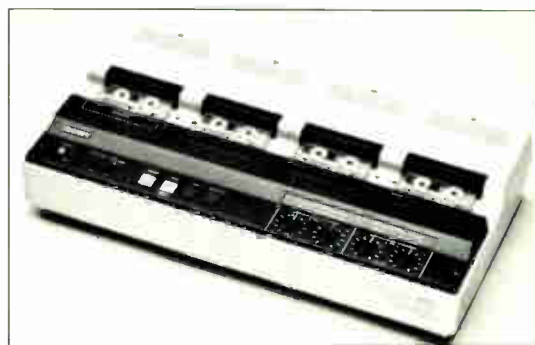
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World Radio History

line? Where do you say it's no longer a horn player? The point is this: why draw the line anywhere? Is someone going to make a moral judgment and say, "I don't like this piece of music because it's not real," or are they going to make an intuitive judgment and say, "I don't like this piece of music," period.

Mix: I heard a song on alternative radio by an obscure new wave group that used actual samples of The Jackson Five singing their hits. Should there be a way to prevent such a blatant misuse of sampling?

Dolby: The answer to that is, if you don't like the record, don't buy it. And if you're The Jackson Five and feel you've been cheated, then sue them. For the rest of us, there's no need to pass judgment.

Mix: But how would you feel if you spent weeks developing an intricate sample and some upstart band took it off your CD and used it?

Dolby: I wouldn't feel the least bit upset by that. I feel that as soon as I release something, it's public domain. I've been sampled a zillion times, going back to "She Blinded Me With Science." The drum sound at the end of that is one of the easiest things in the world to sample. But I don't get offended by that, because I don't think anyone can make a record as good as "Science" just by sampling the drums. When it comes to a sample, it's not how big it is, it's what you do with it.

—Bruce Pilato

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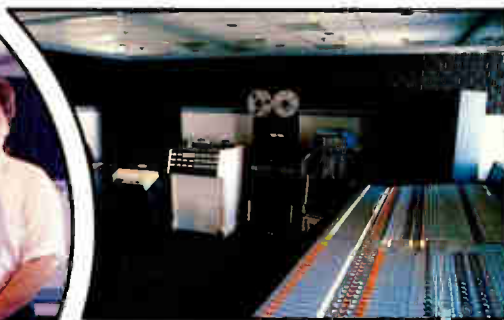
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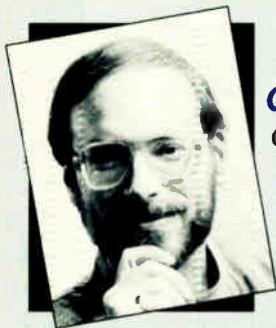
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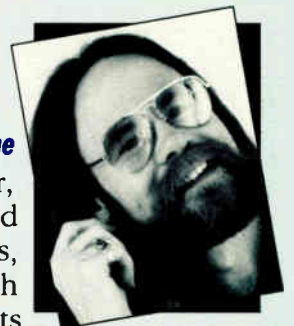
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Mix product editor George Petersen evaluates new equipment, software, books and instructional videos in a working production environment—his own digital recording studio.



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A musician, producer, designer, engineer and resident jack-of-all-trades, Stephen writes each month on futuristic audio concepts and technologies as they apply to the present.



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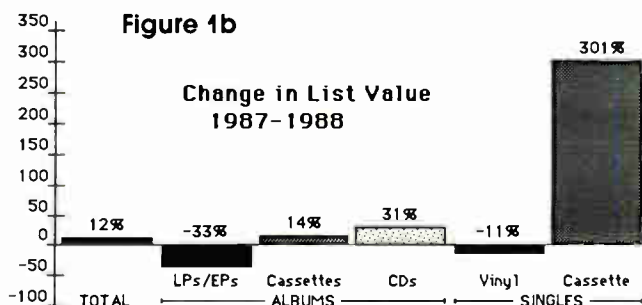
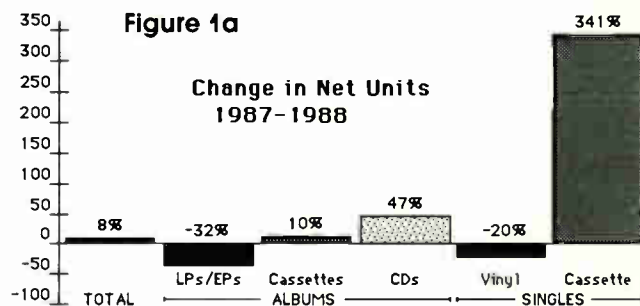
by Philip De Lancie

VINYL SLUMPS WHILE INDUSTRY JUMPS

A LOOK AT RIAA'S FINAL 1988 REPORT

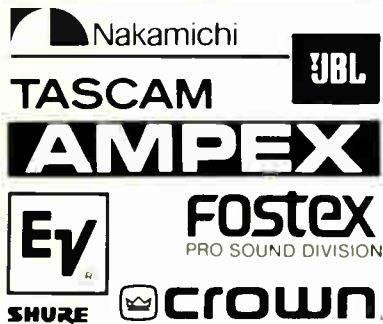
Final figures are in from the Recording Industry Association of America on last year's sales of prerecorded music product, and they paint a picture of robust growth marred only by a continued decline in the popularity of phonograph records. The RIAA, whose member companies are said to account for about 90% of U.S. record industry volume, reports an 8% increase for 1988 over 1987 in net units (total less returns) shipped by record companies (Fig. 1a). That brings shipments to a new high of 761.9 million units (Fig. 2a), a particularly significant feat considering the previous record of 726 million was all the way back in 1978, at the height of disco fever. In the painful slump following that peak, shipments plummeted to a

In terms of dollar value (total suggested list price of net units shipped), 1988 figures continued their steady post-1982 rise with a jump of \$687 million over 1987 to a record of \$6.25 billion (Fig. 2b). That 12% gain (Fig. 1b) was even greater than for units shipped, reflecting the ever-increasing



low of 577 million in 1982 (the year before U.S. introduction of the CD), and the record industry seemed poised to go the way of polyester bell-bottoms. Thus, the 1988 achievement marks an important psychological milestone in the lengthy recovery from post-disco trauma.

impact of the high-priced CD configuration on record company revenues. Average suggested list for CDs, while down \$1.65 from 1987, was still nearly twice that for LPs and cassettes (Fig. 3). Recent price cutbacks and ongoing releases of mid-price catalog material are likely to further narrow that gap this year. But market projections prepared by electronics industry consultants BIS Mackintosh, reported in *Billboard*, predict that for the foreseeable future, buyers of popular releases will continue to pay at least 35% to 40% more for CDs than for other album configurations. The premium paid for the industry's newest format, the CD single, appears to be even greater, but a valid comparison is hard to make due to differences in program material between the various "sin-



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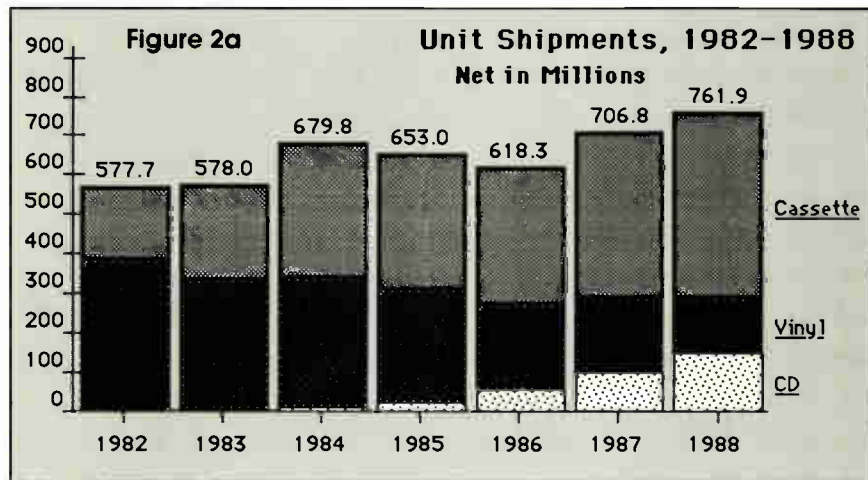
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gles" configurations.

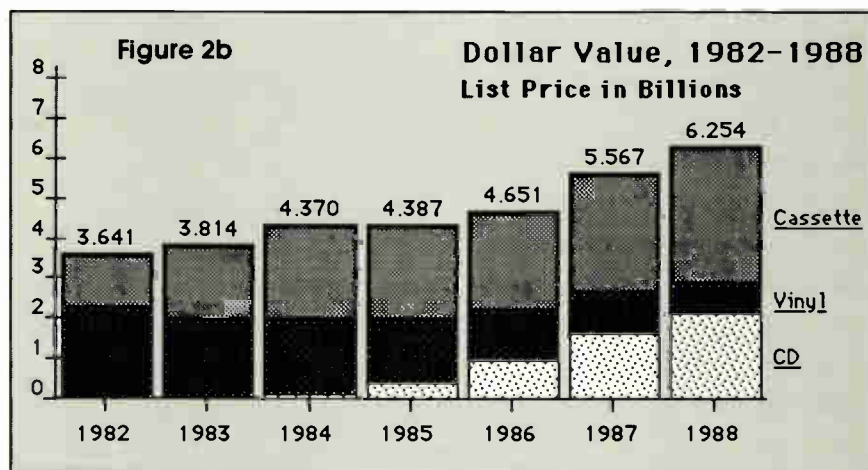
Despite the high prices, the CD share of the album market continued to grow at a healthy pace, registering a climb of 47% in units and 31% in value (Fig. 1). Cassettes surged as

sales decline would soon become far gentler, with a loyal band of record enthusiasts (hard-core phonographers?) sustaining the format at a small but respectable market share. Wherever these vinylphiles are now, they don't seem to be doing much buying. Even if they are anxious to



well (10% units, 14% value), making the LP, with declines of more than 30% in both categories, the only loser among album-length configurations. The LP's slide leaves it with only a bit more than 10% of the full-length market (Fig. 4), down from almost 60% in 1982. While this fall has been largely

add to their collections, record companies and retailers have made it much harder to do so by cutting back substantially on the number of LP titles released and stocked. Further, the glut of CD manufacturing capacity and resultant plunge in replication prices have finally brought CD releas-



attributed to the emergence of the CD, the increase in cassette units shipped has actually been greater than that of the CD by a ratio greater than five to three. Cassettes now account for an astounding two of every three albums shipped.

The implication of these latest figures for those involved in record manufacturing can hardly be consoling. A couple of years ago it was possible to assert that the slope of the LP

es within reach of small, independent record companies. Depending on the targeted clientele, those who can't afford to release in all three album formats may choose the CD, with its greater money making potential, at the expense of the LP.

In the area of singles, the trend is far less advanced, but the direction is similar. Vinyl still accounts for nearly three-quarters of the market (Fig. 5), but the cassette single is up to 25%

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just one-and-a-half years after its introduction. The year-to-year gains of more than 300% in cassette singles for 1988 (Fig. 1) are somewhat deceiving, because the format wasn't available until mid-1987. But it seems clear that this configuration is destined for success. It's still too early to draw any solid conclusions concerning CD singles, which were introduced during 1988, but initial results look promising.

All in all, 1988 was a good year for prerecorded music, though increases in units and value were less spectacular than the 1987 leaps of 14% and 20% respectively. While one hopes that the positive trend will continue, the outlook for 1989 is far from certain. In Washington, the all-powerful Federal Reserve Board is committed to a policy of cooling inflationary pressures by forcing up interest rates (your tax dollars at work). As consumers find themselves spending more on mandatory expenses like adjustable-rate mortgage payments and higher interest charges on credit cards, they are likely to have less left over for optional outlays like home entertainment products. Given the uncertainties, we'll have to wait for the RIAA's October release of statistics for the first half of the year to see whether the industry is on a roll or headed for the rocks.

...
Last month I wrote that Dolby Labs is backing away from its effort (first reported here in May 1986) to make Dolby C the standard noise reduction format for prerecorded audio cassettes. Hard to believe, but Dolby is not the only company featured in this column for whom all has not worked out as planned. (Was it something I said?) Final Technology, whose laser turntable was written up in November 1986, has concluded after lengthy delays that it will not go ahead with marketing the device. Having completed the initial production run, the company was able to cost-out the unit, and determined that the turntable would have to retail between \$8,000 and \$10,000. While the company believes there is a market for the product at that price, it has expressed a preference for larger-scale production of mid- to high-priced components, not limited production of esoteric products. The company is now seek-

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Gregg Jampol, Recording Engineer

As recording engineer for numerous major contemporary Christian artists, Gregg Jampol has acquired the reputation of obtaining successful high energy mixes on such consoles as AMEK, Trident, SSL, and Neve. Nicknamed “Platinum Ears”, Gregg recently came in contact with the **Dayner Series** console during an overdub session at Fourth Creation Recording Studios.

Upon hearing the warm and clean sound of the **Dayner**, Gregg and the production staff on Ken Parks’ *“Sooner Than Later”* album (originally mixed on a \$90,000.00 British console) unanimously decided to remix the entire project. After the remix session, the mixing team was completely “blown away” with the open/transparent sound and dynamic range achieved by the **Dayner**.

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Pictured during mix session at Fourth Creation Recording Studios:
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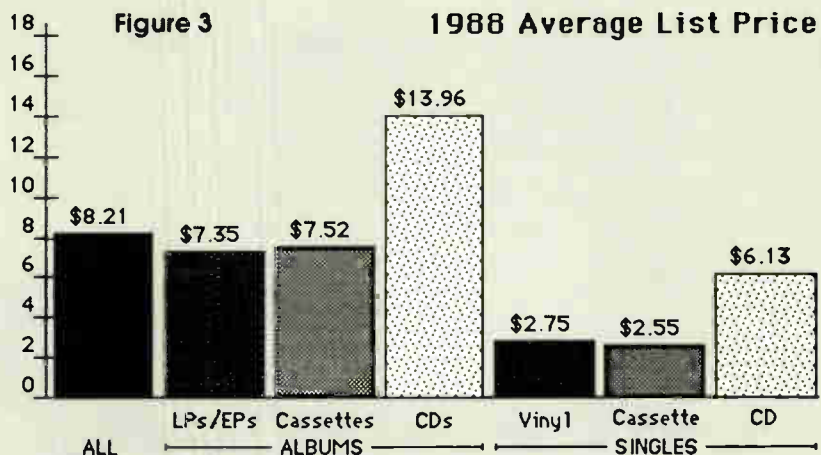
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ing licensees or joint venture partners in the hope of seeing someone else bring the laser turntable to market.

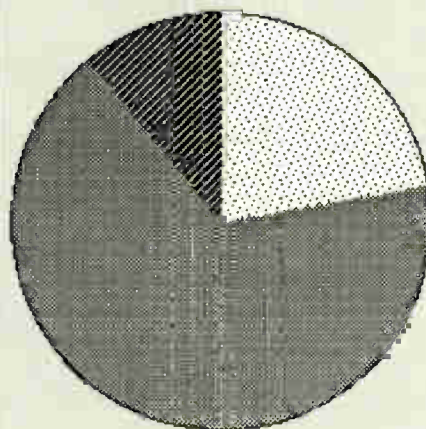
August 1987, has recently completed a ten-week trial run in four major retail chains, and the response seems to be encouraging. An article in *Billboard*, citing figures supplied by the



On a more positive note, recent word from two other "After Mix" features should dispell any kiss-of-death theories. Personics, the in-store custom taping system covered here in

chains, shows that outlets with the installation experienced a boost in overall music product sales of 3.5% to 5.5%, with no reduction in sales of prerecorded formats. Apparently, gains

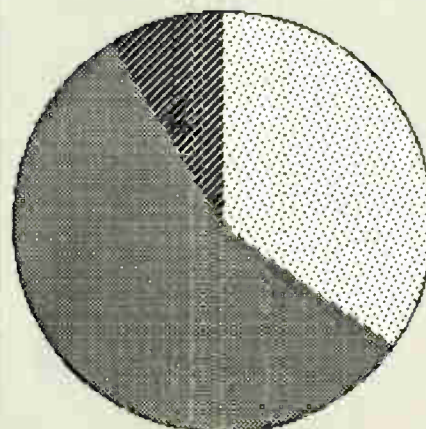
Figure 4a



**1988 Album Shipments
Net Units in Millions**

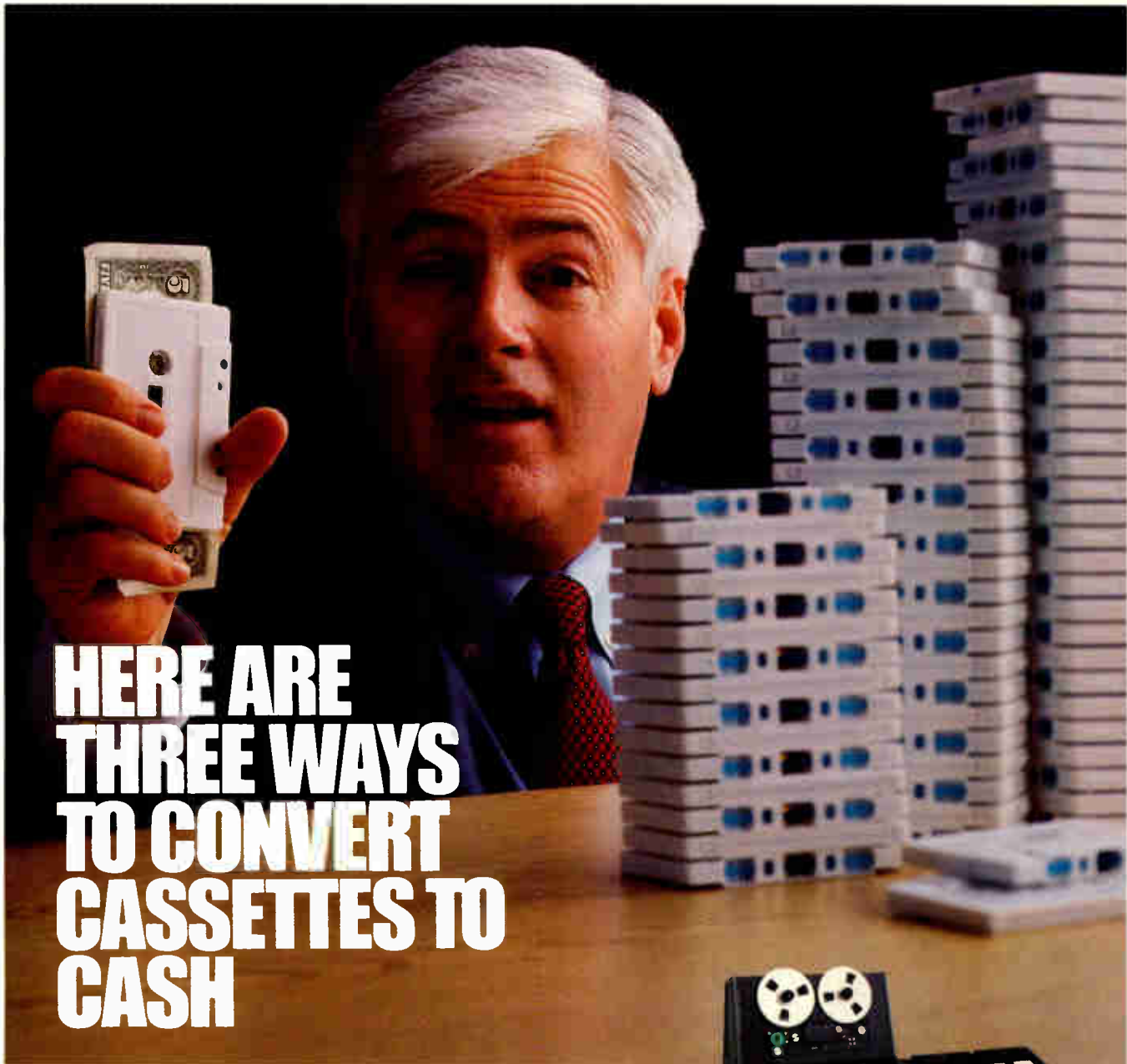
	Units	%
CDs	149.7	22.3
Cassettes	450.1	67.0
LPs/EPs	72.4	10.8

Figure 4b



**1988 Album Shipments
List \$ Value in Millions**

	\$ Value	%
CDs	2089.9	34.8
Cassettes	3385.1	56.3
LPs/EPs	532.3	8.9



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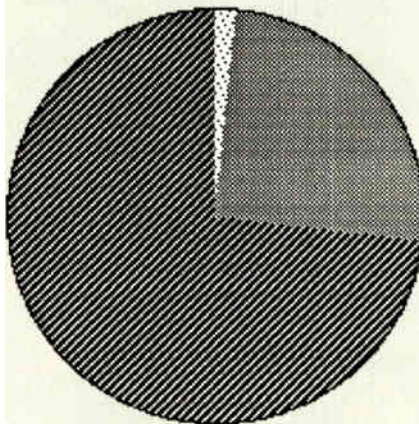
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were reported in sales of prerecorded product by artists whose music was on the system, which may help to allay fears that Personics would cannibalize rather than complement existing formats. The much-encouraged company now plans to field an installed base of 500 machines by the end of 1989.

Meanwhile, Otari Corporation has announced the sale of three T-700MkII video dupers to VTR Productions of

needed, that burgers are indeed more important than "art." While recording artists get framed records and swelled heads for unloading just a few million copies of their songs, jingle writer Gary Fry recently saw shipments of his latest work reach 80 million. Fry's "Menu Song" for McDonald's was distributed on flexi-discs inserted in newspapers and magazines across the country. Fry is rumored to have beat out better-known jingle singers Steve Winwood and Madonna for the pro-

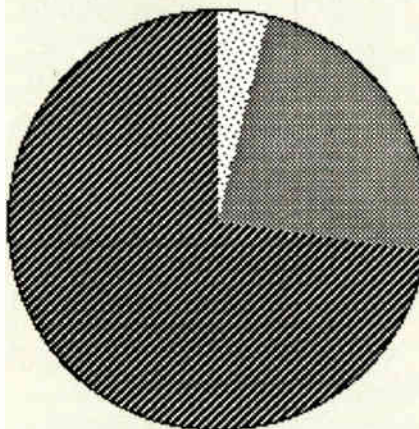
Figure 5a



1988 Singles Shipments
Net Units in Millions

	Units	%
CD	1.6	1.8
Cassette	22.5	25.1
Vinyl	65.6	73.1

Figure 5b



1988 Singles Shipments
List \$ Value in Millions

	\$ Value	%
CD	9.8	4.0
Cassette	57.3	23.2
Vinyl	180.4	72.9

Toronto, Canada. The machines utilize the high-speed Thermal Magnetic Duplication (TMD) system developed by Du Pont (see "After-Mix," October 1986). VTR becomes the first high-speed video duplicator in Canada and the fourth TMD facility in North America. The new systems reportedly give the company an output capacity of more than 4,300 two-hour programs per 24 hours.

Finally, recent word from Chicago gives further confirmation, if any is

motion, said to be the largest single pressing of a recording ever. The RIAA has yet to disclose whether the records will be included in its 1989 figures. ■

Phil DeLancie, a mastering engineer at Fantasy Studios in Berkeley, CA, is our resident voice on formats, trends and technologies in the world of pre-recorded music mastering and manufacturing.

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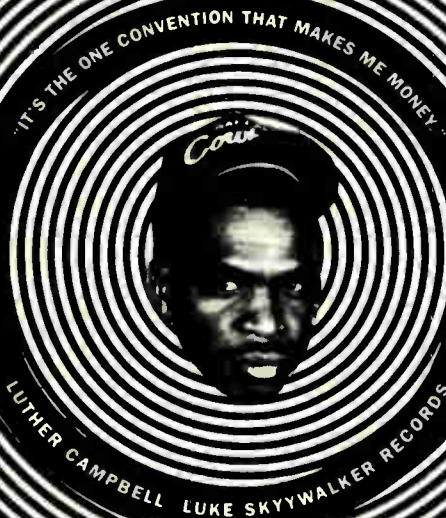


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—FROM PAGE 117

system and sound technician for musical performances at the Naumburg Bandshell in Central Park. Rock Against Racism is an organization of musical groups that has staged an annual concert at the bandshell since 1979.

The history of *Ward vs. Rock Against Racism* and its journey to the Supreme Court has taken surprising turns. Earlier, the U.S. Court of Appeals for the 2nd Circuit ruled that the existing New York City regulation was a violation of the free-expression rights of the performers—certainly one of the more unusual applications of the First Amendment in a court of law.

The Court of Appeals, however, ruled that the city does, in fact, have the right to limit the noise level of concerts, but that the Constitution permits only “the least restrictive means available.” In another unusual turn, the court remarked that the city’s attempt to control the sound level of the live

mix is too intrusive on the artistic presentation of the music.

This ruling was appealed by New York City in October 1988, and the case became even more complex. In front of the Supreme Court, New York City’s chief assistant corporation counsel, Leonard J. Koerner, argued that the existing regulation did not threaten the performers’ artistic expression because the city-supplied technician knew how to provide the mix that each band wanted.

Although no member of the Supreme Court admitted ever attending a rock concert, the justices, in hearing this case, raised a number of important issues and observations.

Associate Justice Anthony M. Kennedy asked whether the sound technician at a concert is as important as the conductor of an orchestra. Koerner’s reply was that the person handling the sound was really only a technician.

Rock Against Racism’s attorney, noted civil rights lawyer William Kunstler, emphatically disagreed, explaining that the role of a con-

ductor and a live sound mixer are, in fact, very comparable. He argued that New York City’s effort to substitute its own technician for one supplied by the performers was, according to a published report in the *New York Times*, “as if the city said that we’re going to put Georg Solti in there [to conduct an orchestra] instead of Zubin Mehta because Solti plays *andante* and *dolce* and Mehta always plays loud.”

Going one step further along this line of reasoning, Associate Justice John Paul Stevens asked Koerner a hypothetical question: If the city couldn’t control the sound levels by controlling the live mix, could it instead substitute its own musicians for musicians who were playing too loud? Would it be the same performance if these substitute musicians all played just as well and precisely the same as the original musicians?

Such a hypothetical situation, Koerner noted, would present a tougher case, because it would put the city in the position of substituting its aesthetic judgment for that of the performers.

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So far there has been no agreement by the Supreme Court on what the U.S. Constitution permits a city to do about noise levels at concerts. The case is expected to be decided some time this summer. ■

Randy Savicky is president of RPS Communications, Centerport, NY.

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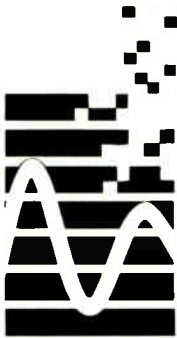
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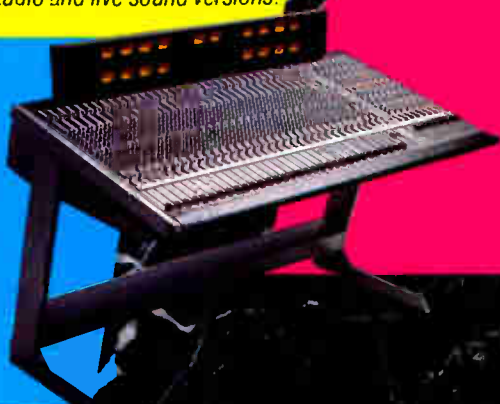
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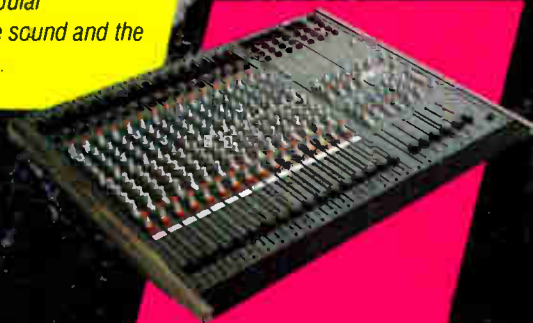
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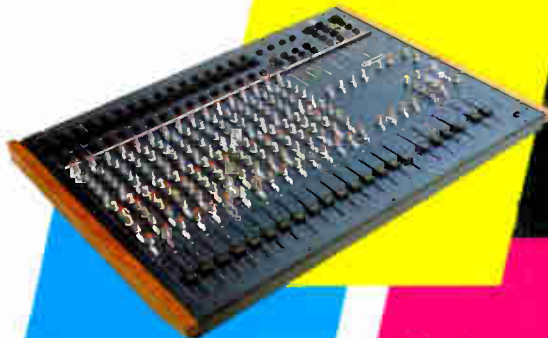
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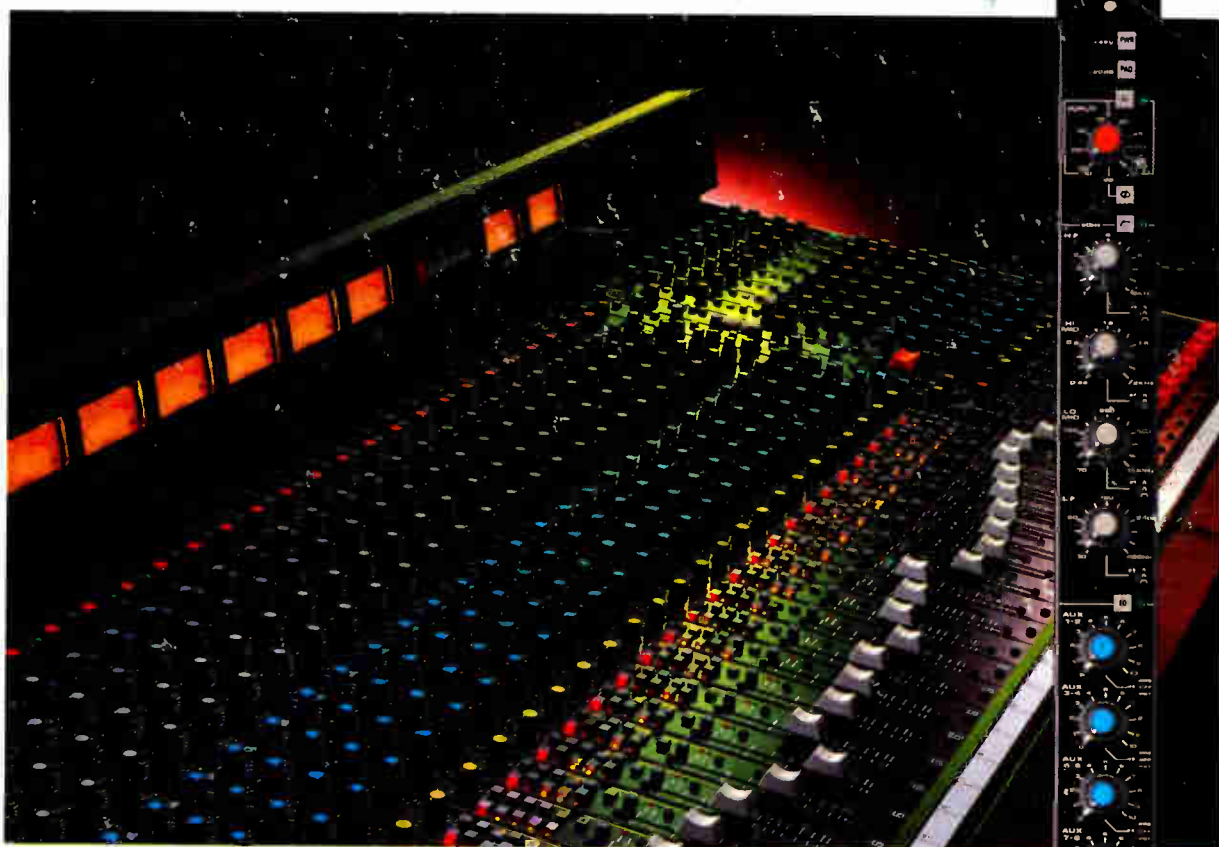
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