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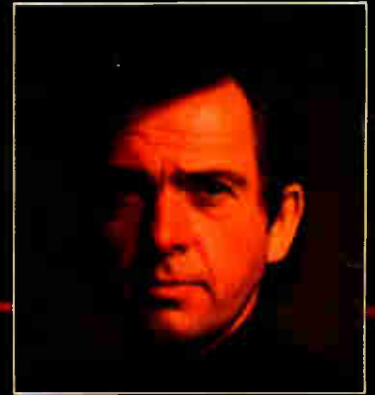
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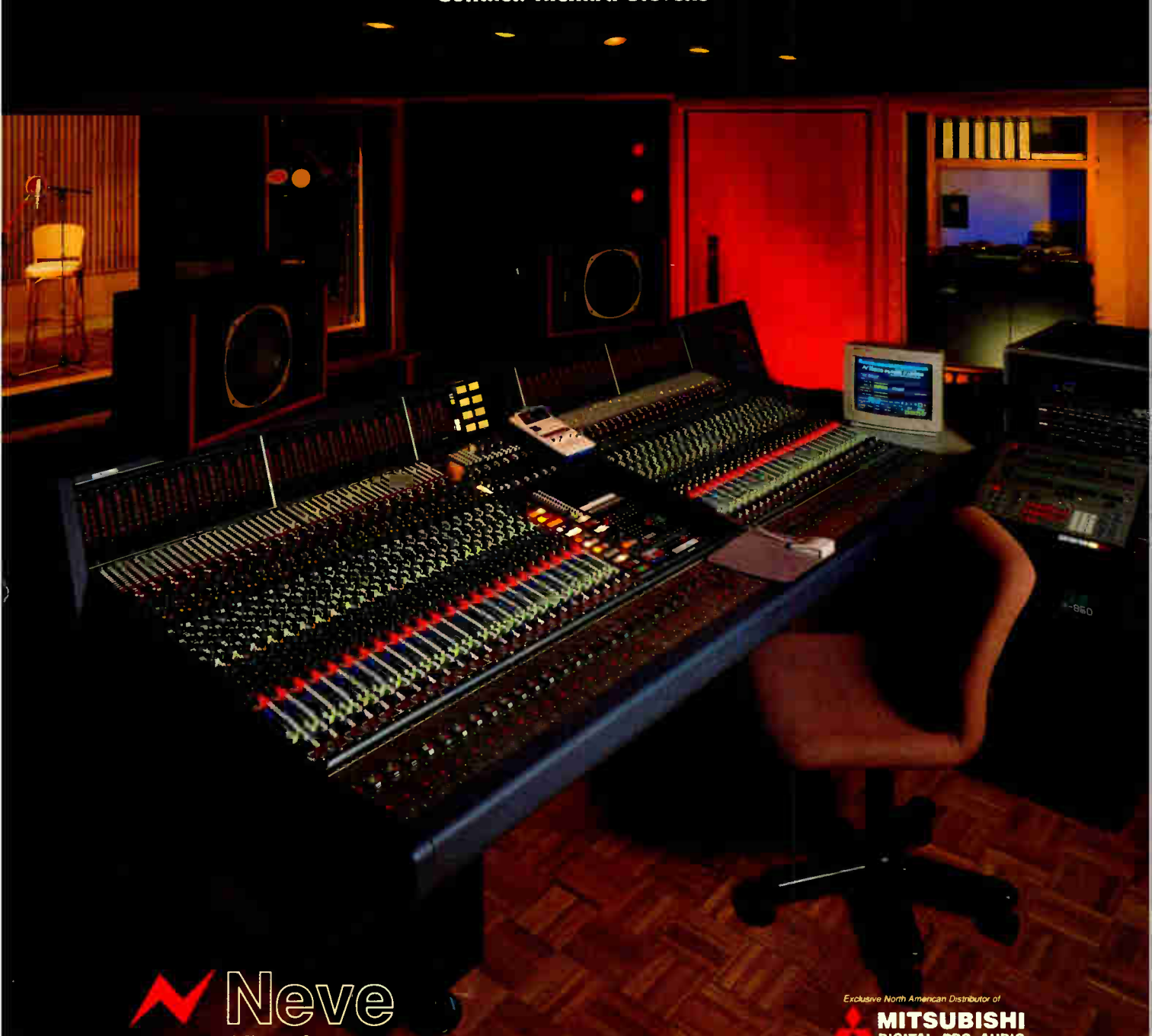
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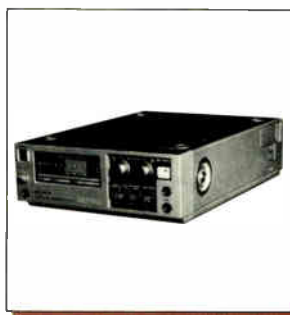
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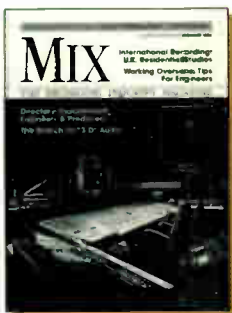
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FROM THE EDITOR

Founded 1977 by
David M. Schwartz and Penny Riker Jacob



Cover: The main room at London's Nomis Studios was designed by Tom Hidley, and features a customized 64-channel SSL G Series console, an 8-track NED Direct-To-Disk™ system and a Mitsubishi X-880 32-track digital machine. Photo: Cliff Bolton.

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We are quickly coming upon another major trade show, AES Europe, scheduled for March 13 to 16 in Montreux, Switzerland. In case you haven't heard, this particular show is a hot topic among industry insiders. A group of manufacturers has chosen not to support the convention this year, in protest of what they consider an inadequate and inconvenient venue. The proliferation of "must attend" trade shows, with their assumed costly obligations, is a deeper-rooted concern.

In just a few short years our industry has diversified to the point where it is unreasonable to attend all of the relevant trade shows. At the same time, the technology has become so peripherally influenced that limiting one's participation to a single industry puts a severe drag on career development.

There is a movement afoot to form another industry organization to monitor and advise those in the business of trade event planning, in order to avoid conflicts such as AES and SMPTE falling over the same days on opposite coasts. Many other issues, such as convenience of accommodations, quality of exhibitor services and security considerations, have become critical concerns for participating companies. Event organizers now face mighty challenges to keep their flock returning to the fold.

It's little wonder that many manufacturers are deciding against trade event presence in all but the best of circumstances. But is it necessary to create an organization to link the trade with the show? Is it even possible to find one body to adequately represent the wide-ranging concerns of these manufacturers? And if such a group develops, can it be effective without interfering with the organizers' rights to create and manage a show within their business purview?

In the end, we must choose for ourselves. Is this opportunity important to me, and worth my time and money? Over time, the worthwhile shows will prosper and the unnecessary ones will gradually fade away due to lack of attention. It's the way of the world.

Keep reading,

David Schwartz
Editor-in-Chief

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CURRENT

PASSPORT EXPANSION

Passport Designs, the Half Moon Bay, Calif., producer of electronic music software, has acquired all rights to *Alchemy*TM, Blank Software's award-winning sample editing program for the Macintosh. The purchase includes Blank Software's complete line of music software and proprietary digital technology, which Passport hopes to incorporate into a series of multimedia sound design products to be released early this year.

Alchemy won the 1988 *MacUser* Eddy Award as the top new music software program and is especially popular for its distributed audio network (DAN), allowing sample transfers from any sampler that follows the MIDI sample dump standard.

Donny Blank, founder of Blank Software, will assume a consultancy position with Passport. "Passport has exactly what's needed to maintain support for Alchemy and to take the technology to the next level," he says. "The association we've started here is the best thing that could have happened to the program."

In related news, Passport augmented its Music Data Library by acquiring Golden MIDI Music, a supplier of "Music Data" disks containing songs that can be played by any MIDI sequencer supporting standard MIDI files.

For further information, contact Anastasia Lanier at Passport: (415) 726-0280.

COMMUNICATIONS INDUSTRY REPORT

It may seem like old news to some, but investment bankers Veronis, Suhler & Associates, Inc., have released the seventh annual Communications Industry Report (1984-1988), showing that revenues of

publicly reporting companies in the recorded music industry rose to \$2.7 billion in 1988, up 34.5% from 1987. The recorded music segment led the communications industry in 1988 revenue growth.

The 187-page report examines the historical, financial performance of 275 publicly reporting companies in various segments of the communications industry: radio and TV broadcasting; cable TV; filmed entertainment; recorded music; newspaper, book and magazine publishing; business information; advertising agencies; and miscellaneous communications.

Each segment's analysis contains five-year company data on revenue, pretax operating income, operating cash flow and assets, along with calculated growth rates, margins and rates of return. Companies also are ranked by profitability and profitability growth.

The \$500 report can be obtained by contacting Eugene Braigen at Veronis, Suhler & Associates: (212) 935-4990.

LABELING LAW IN PENNSYLVANIA

In a move that the Recording Industry Association of America says will create a "chilling effect" on consumer sales, the Pennsylvania House of Representatives passed legislation prohibiting the sale of records, tapes or CDs that contain explicit lyrics, "unless the cover of such material contains a parental warning that the lyrics contain violent messages." The bill is still under consideration by the Pennsylvania Senate.

Although it is the manufacturer who is responsible for labeling the product, it is the retailer who is liable. If found guilty of selling unlabeled material, a retailer may be fined up to \$300 and sentenced to

90 days in jail.

According to the legislation, the warning shall read, "WARNING: May contain explicit lyrics descriptive of or advocating one or more of the following: suicide, sodomy, incest, bestiality, sadomasochism, adultery, sexual activity in a violent context, murder, morbid violence, use of illegal drugs or alcohol. PARENTAL ADVISORY."

Jason Berman, president of the RIAA, says, "In addition to the First Amendment constitutional issues raised by the legislation, there is a serious question about its retroactive impact. We intend to challenge the constitutionality of the bill if it is enacted."

CONVENTION NEWS

AES Europe will be held in Montreux, Switzerland, March 13-16, 1990 (see Editor's Notes). In addition to the educational program and awards banquet, a number of technical tours have been planned, including stops at Studer AG and Nagra Kudelski.

The 88th AES convention will include sessions on: microphones, systems and measurements, loudspeaker systems, acoustics, recording, history, digital audio, sound reinforcement, psychoacoustics, and studio and broadcasting.

More than 140 exhibitors are expected to participate. For more information, contact AES Headquarters in New York: (212) 661-8528.

Video Expo San Francisco will be held in that city February 21-23, 1990, and will bring together for the first time the North American Television Institute (NATI) and Computer-Aided Multimedia Presentations (CAMMP), an organization devoted to interactive presentations.

For more information, call (800) 248-5474. In New York, call (914) 328-9157. ■



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INDUSTRY NOTES

Philips Consumer Electronics promoted **Dr. Jean-Pierre Isbouts** to director of worldwide development of CD-I production tools in Knoxville, TN. . . In NYC **WaveFrame** selected **Martin Audio Video Corp.** as its New York-area rep. . . **James Goodman** moved up to national sales manager of **Otari Corp.** in Foster City, CA. . . **Hybrid Arts** outgrew its old home; you can reach the company at: 8522 National Blvd., Los Angeles. . . **Tom Laughlin** joined **Sony of Canada** (Willowdale, Ontario) as professional audio specialist. . . **SoundSphere Inc.** changed its name to **Auris Corp.**, and relocated to 1801 Maple Ave., Evanston, IL. . . The new director of sales at **Neve Electronics International** (Hertfordshire, UK) is **Hazel Simpson**. Other appointments include **Joe Naccarato** as general manager and **Alain Despatie** as technical services engineer at **Rupert Neve Canada** (Toronto, Ontario). . . At the fall AES Convention, **SPARS** members elected **Steve Lawson** to the board of directors. . . **Bob Demuth** is now director of technical operations at **Westwood One** in L.A., where part of his duties include overseeing construction of KQLZ "Pirate Radio". . . In NYC, video company **VSC Post** promoted **Shelly Riss** to vice president of sales and marketing, and hired **Tami Feldman** as director of animation and special effects. . . "Strategic communications agency" **The Benjamin Group** hired **Patricia Lamb** as director of public relations in Santa Clara, CA. . . **Editel/Chicago** promoted **Richard Mandberg** to VP general manager. . . **Carla Campbell** moved up to Eastern regional sales manager of **Panasonic/Ramsa Professional Audio** in Cypress, CA. . . **Paula Micallef** is now account executive at **Producers Color Service** in Clawson, MI. Other personnel changes: **Katrina Riedl** as inside sales coordinator and **John Graye** as senior customer service rep, video cassette duplication divi-

sion. . . **Hybrid Arts** (L.A.) has two new Canadian dealers: **Commercial Electronics Ltd.** (Vancouver, BC) and **Tele-Tech Electronics** (Toronto, Ontario). . . **Audio Inter-visual Design** of L.A. will act as the U.S. agent for **W. Albrecht GmbH Studiogerate**, West German manufacturers of sprocketless magnetic film recorder/reproducers. . . **John B. Kilcullen** joined **Solid State Logic** (NYC) as treasurer/controller. . . **Personics**, Redwood City, CA, announced a \$15 million round of fund-raising for its custom-cassette system. . . In NYC, **Heitaro Nakajima** accepted the AES Gold Medal in recognition of his contributions to compact disc development. . . **AudioLine** hired the following: **Denny Bergstrom** as sales rep in the Kansas City, MO, branch; **Barbara Gutknecht** director of marketing; and **Shannon Novack** and **Paul Schaleger** (contracted sound) at the home office in Milwaukee, WI. . . **Keith Clark** joined **Electro-Voice** as PR director in Buchanan, MI. . . **Gauss Loudspeakers** (Sun Valley, CA) named **World Wide Electronics** (Ft. Lauderdale) as its Florida rep. . . In Bloomington, MN, **Coda Music Software** named former Berklee instructor **Gary Brunotte** as general manager. . . **Audio Plus Video International** (Northvale, NJ) promoted **Beth Simon** as head of sales, **Jonna Gaston** as operations manager, and hired **Joe Di Frisco** as chief engineer. . . In Hollywood, CA, **Alan Gordon Enterprises** hired **Fred Ginsburg, C.A.S.**, as sales manager in charge of motion picture and video support equipment. . . In Los Angeles, the **Association of Visual Communicators** held its annual elections. Here are some of the results: **Glenn Otto**, president; **Peggy Kenline**, VP/membership; **Phil Shuey**, VP finance. . . Pro audio sales and service company **S.G. Audio** hired **Cathy Konrad** as office manager and **Mike Acklin** as a new salesperson. ■

SESSIONS AND STUDIO NEWS

SOUTHERN CALIFORNIA

At Scream Studios in Studio City, Virgin Records artist **The Origin** was in recording vocals and mixing with producers **Paul McKenna** and **David Kershbaum**. McKenna mixed the record on the studio's Mitsubishi 32-track digital recorder. . . Columbia artist **Warrant** was working on tracks at **Studio-Masters** in Los Angeles, with **Jayni Lane** producing. **Brad Cox** was at the console with **Greg Grill** assisting. . . At **Artisan Sound Recorders** in Hollywood, engineer **Greg Fulginiti** mastered LPs for **Oingo Boingo** with producers **Chris Lord-Alge** and **Jeff Lord-Alge**, and for **Trouble** with producer **Rick Rubin**. . . MCA recording artists **Perri** were in the studio recording their third album at **The Bakery** in North Hol-

lywood. The four sisters co-produced with **Jon Baker**. . . **Private Life** was at **Amigo Studios** in North Hollywood completing overdubs with producers **Ted Templeman** and **Eddie Van Halen**. **Lee Herschberg** engineered and **Mike Scott** assisted. . . Engineer **Toby Scott** (of Bruce Springsteen fame) was at **Devonshire Audio** in North Hollywood building tracks with the studio's two Sony PCM 3324 digital 24-track machines for **Patty Scialfa's** upcoming release on CBS. . . Island artist **Mica Paris** was at **Encore Studios** in Burbank with producer **Patrick Moten** overdubbing and mixing with engineer **Barney Perkins**. **Milton Chan** and **Elliott Peters** assisted. . . **Paul Lani** was at **Larrabee Studios** in Los Angeles mixing **Dono-**

van's "One Night in Time" and "Dear Heart" for PolyGram Records. . . Original Sound Recording artist the **UZI\$BROS** were at **Mr. Rogers Studio** in Hollywood working on their upcoming LP. **Will Griffin** produced with **Bernie Matthews** at the controls. . .

NORTHWEST

Camper Van Beethoven traveled to Northglenn, CO, to record tracks for the single "I Was Born in a Laundromat" at **Avalanche Recording**. **Dennis Herring** produced and **George Counnas** engineered, assisted by **Chuck Edwards**. . . At **Alpha & Omega Studios** in San Francisco, **Psychefunkapus** worked on a project for Atlantic Records with **Mark Desisto** producing and **Anna Maria Scott** assisting. . . **Loni Ding** remixed a Japanese version of her award-winning documentary *Color of Honor* for NHK-Japanese Public Broadcasting. All audio post-production for both the English and Japanese versions was completed at **Poolside Studios** in San Francisco, with engineer **David E. Nelson**. . . At **Klub Kev's Recording Company** in Seattle, **Kent Nelson** of **Sahalla Musical Services** recorded his second **Jack Gladstone** album, with **Scott Spain** engineering. . . Also in Seattle, producer **Steve Adamek** was at **Ironwood Studio** with engineer **Jay Follette**, working with **Enigma Records** artists **Triathlon**. . . **Laurie Lewis** and the **Grant Street Band** were at **Dave Wellhausen Studios** in San Francisco working on a new album engineered by **John Altmann** for **Flying Fish Records**. . .

NORTH CENTRAL

While **Bob Dylan** was in **Belmont Mall Studios** in Belmont, IN, he asked **John Cougar Mellencamp** to direct his video for the song "Political World." Also, Dylan did some overdubs on "People Get Ready," to be included in the new **Dennis Hopper** film *Flashback*. **Mike**



Glenn Phoenix of Westlake Audio congratulates Terry Lewis and Jimmy "Jam" Harris on the completion of their new Flytetyme studio complex in Edina, Minn.

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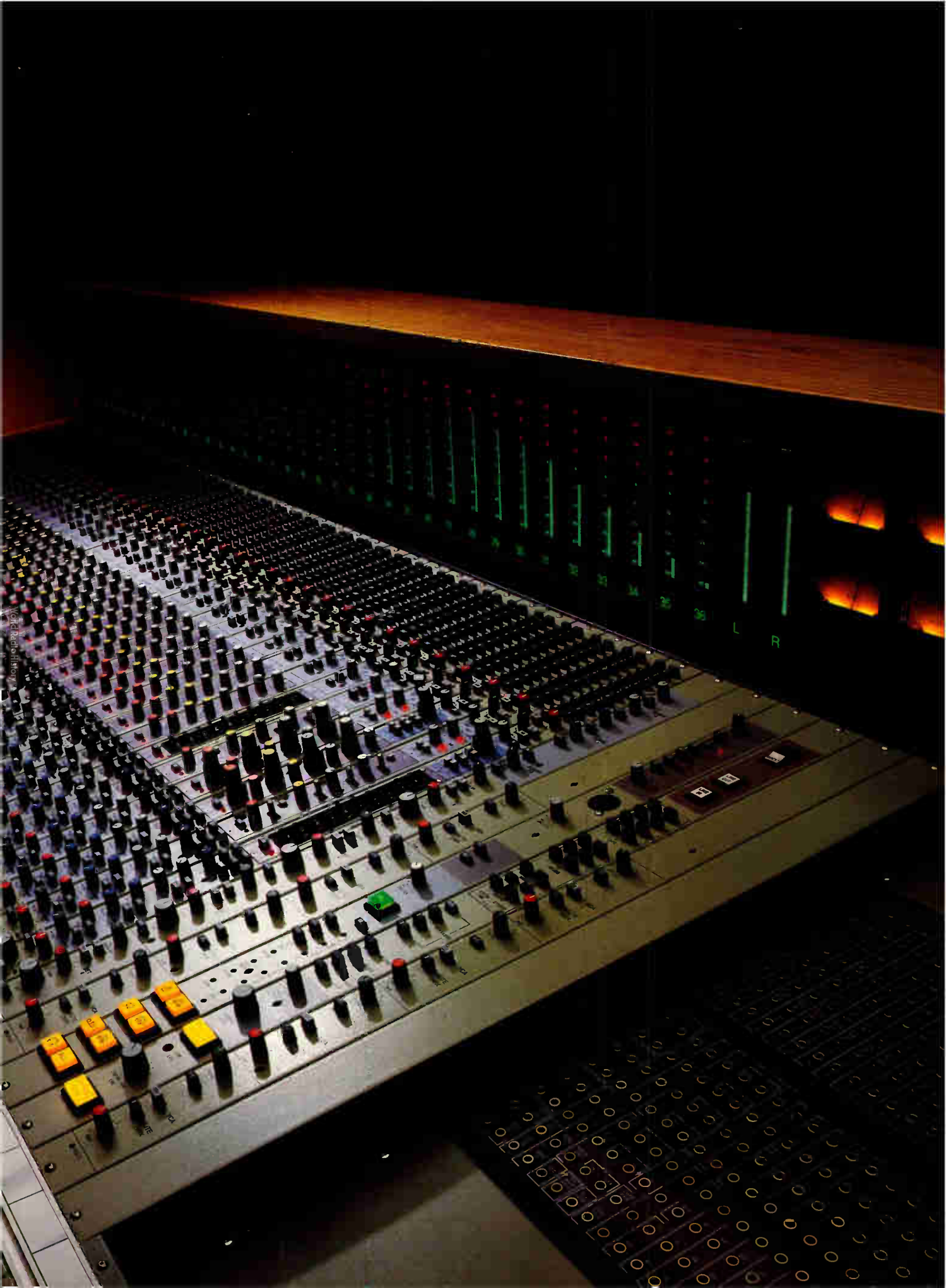
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The Fostex D-20 operates just like the most expensive analog open reel 2-channel recorders with SMPTE/EBU capability, and now we're offering a lease program which makes it easy for you to have all the benefits of even better performance at lower rates (see details below).

With the D-20 professional digital audio master recorder, you can post-stripe time code on an existing DAT tape (recorded on any DAT machine), or you can record time code and stereo audio on the D-20 and play that tape back on any other DAT machine with complete compatibility.

The 20-pin **synchronizer port** allows interface with all the popular synchronizer systems (ours included) and there's an RS-422 port for control which requires serial communication. There's an external sync input for composite video, plus Word Sync Input and Output capability - all standard on the D-20.



Because of our 4-head recording system the D-20 features **off-the-tape monitoring** so that you'll always know exactly what you have on tape - a very important feature considering the DAT's ability to record for two straight hours (no more multiple reels and alignment hassles).

You'll be able to control all transport functions by remote control—including **punch-in/out**. Built-in cross-fade timing gives you seamless punches. There's

even a **pitch control** complete with digital read-out.

Most important of all, the D-20 sounds great. It records and reproduces all the music completely, faithfully, and better than analog alternatives. So plug into the digital master recorder that has the professional features you need now at a price you can afford now.

* The analog recorder referenced is the Studer A-80 1/2" with 3-track head nest; the price comparison is based on option (A) below and an average of published rates of major audio rental companies for the Studer.

Details of the D-20 Lease Program:

* A simple one page application is all that's required. • Maximum 48 hour turnaround approval. • Two attractive payment schedules: (A) \$199.70 per month, 60 months, first and last payments in advance; 10% purchase option. (B) \$287.20 per month, 36 months, first and last payments in advance; 10% purchase option. • Please note that this lease with option to purchase is not offered through Fostex Corporation. All documents and associated paperwork will be completed by **Signet Lease Group**. Call them directly at (215) 783-6666. • High approval rating in the audio industry.

D-20 Digital Master Recorder **Fostex**

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Wanchic produced and Bill Deaton engineered... In Warren, MI, Detroit band **The Teen Angels** recorded and mixed five songs to be used for upcoming videos. Dave Sell engineered... David Brickner and Gina Moss were at **Tone Zone Recording** in Chicago mixing tracks that were recorded live at a Jews for Jesus recital, with the assistance of Timothy Powell's **Metro Mobile Recording**. Roger Heiss engineered the sessions... David Arkenstone recently completed the final mix of five songs for release on his *Narada Mystique* album at A.D. Productions in Milwaukee. Arkenstone co-produced the project with Eric Lindert. Bruce Sugar ran the board with assistance from David Henszey... **Refract Studios** in Dayton, OH, went remote to record the Gem City chapter of the *Sweet Adelines* in concert. The direct-to-DAT recording was engineered by Gary King and John Hughes... Das Krieg completed a three-song demo aimed at alternative metal markets at **Seagrape Recording Studios** in Chicago. Mike Konopka engineered and mixed the project...

SOUTHWEST

Stevie Nicks took time out from her concert tour to record the audio for her new video "Whole Lotta Trouble" at **Goodnight Audio** in Dallas with Dan Nash. The video features live footage of Nicks' Houston concert... Liz Davis was at **Studio East** in Tucson working on two new songs for her project with Lizzy D. Lizzy D. produced, with Harvey Tom and Taylor Smith engineering... Donny Ray Ford brought his band to **Planet Dallas Studios** in Dallas to co-produce a project with engineer/producer Rick Rooney. Steve Batchelor and Marian Ross assisted at the console...

SOUTHEAST

Engineer Bill Deaton was at Nashville's **Sounds Unreel Studio A** mixing *Exile* for Arista Records. Tim DuBois and Randy Sharp produced... Also in Nashville, Tanya Tucker stopped by **Music Mill** to record tracks for Capitol, with Jerry Crutchfield producing and Jim Cotton and Paul Goldberg engineering... **Platinum Post Mobile** (of Winter Park, FL) recently returned from Jamaica where it recorded more than 60 reggae artists and groups, including Ziggy Marley, **Third World** and **Steel Pulse**, who participated in *Reggae Sunsplash 1989*. Gary Platt engineered the event, with Bruce

Marshall as second engineer and Lance Brown assisting. Gene Pilarczyk was technical engineer and Phil Renghia was house sound specialist... Actor **River Phoenix** is also a guitarist/singer/songwriter. His band, **Aleka's Attic**, was at **Reflection Studios** in Charlotte, NC, recording a single for an upcoming album to benefit PETA (People for Ethical Treatment of Animals). Steve Haigler produced and engineered the project... **Kansas** was at **Soundscape Studios** in Atlanta working on songs for a new CBS album with Brendan O'Brien and Mitch Eaton engineering, and Ted Malia assisting... **Benjamin Cannon** was at **Master Sound Studios** in Atlanta to produce a new rap tune by Ernest T. "Cocaine Is a Mind Thing" was engineered by Carlos Glover... Mark Lindsey, former Paul Revere and The Raiders vocalist, started a new album at **KIVA Recording Studio** in Memphis, with Greg Archilla engineering... **Pebbles** was at **Cheshire Sound Studios** in Atlanta with the LA'Face Inc. production team of De'Rock and Kayo tracking her MCA album. Jim Dutt engineered and Mike Alvord assisted... At Nashville's **Sound Emporium**, Suzy Bogguss was in working with producer Wendy Waldman on overdubs for her Capitol album project.

Dennis Richey was at the controls...

NORTHEAST

At **Sanctuary** in New York City, PolyGram artist **Scott Parker** locked out **Studio A** to record an album with producers Mary Kessler and **Robbie Kilgore**. Acar Key engineered the project, with Eric Rosenblum assisting... **Power Play Productions** artist **Su Veneer** was at **Power Play Studios** in Long Island City, NY, working with producer/engineer/studio owner **Tony Arfi**... In Manhattan, **Tom Pomposello** produced a promo spot for a film series entitled *New York Goes to Hollywood* in **Videomix's** audio sweetening room... Mercury/PolyGram artist **Doro Pesch** was at **Kajem Victory** in Gladwyne, PA, remixing her single "Fur Immer, For Eternity" for re-release in Germany and Europe. **Kajem's Mitch Goldfarb** produced and engineered the remix, with **Brooke Hendricks** and **Brian Stover** assisting... **The Daves**, voted Philly's favorite unsigned band, took the act to **Royersford, PA**, to record material at **Iris Sound**. David Ivory produced and **John Patterson** engineered... Producer **Al McLaren** was at **D&D Recording** in the Big Apple tracking and mixing for artists **Lin Que**, **Axis** and

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Forte for Warlock Records. Mike Rogers was at the board. . . Also in the Apple, United Forces cut tracks at Pyramid Recording Studios, with George Summers producing, Mark Mandelbaum engineering and Angela Dryden assisting . . . Brothers Figaro left their home in Los Angeles to track their new Geffen album at White Crow in Burlington, VT, with Pat Moran producing and engineering. . . Paul Guzzone wrote and produced a PSA for Neighborworks at Brielle Music in New York City. Irwin Fisch arranged the spot and Bill Emmons engineered. . . Warner Bros. artists Grace Pool went to The Magic Shop in Manhattan to cut tracks for their new album, with Josh Abbie engineering and Andre Roquette assisting. . . At NYC's Eastside Sound, Quentin Vidor recorded his latest album with Jeff Ciampa producing and playing guitars. . . Island Records composer/performer Cornell Dupree cut basics and overdubs and mixed his latest release at Sound on Sound Recording in New York City. The self-produced artist brought in Ted Sabeto to handle engineering duties. Peter Beckerman assisted. . . Marlene Verplanck was at Blank Productions in Stamford, CT, cutting her new album for Mounted/Audiophile Records. . . Singer/songwriter Tara Meyer stopped by Crystal Sound Recording in Manhattan with producers Chris Meredith and David Krebs to record and mix a new song. Johnny Byrne engineered with assistant Beatrice Winkler. . . At Bayside Sound Recording Studios in Bayside, NY, Beat Generation produced Buster Poindexter's new single, "International Playboy," for RCA Records. Rick Huerta edited, and John Fig and Pete Puleo engineered. . .

STUDIO NEWS

New York's Sound on Sound added a Synclavier and has upgraded its Disk-mix Moving Faders automation system . . . Under the new ownership of Matthew Stoneman, Hollywood's Kitchen Sync upgraded its facility from 16-track to a 24-track Otari MX-80. Also included in the upgrade was an Amek Angela console. Professional Audio Services supplied the equipment. . . Cereus Recording in Tempe, AZ, opened a second studio, Studio B, with a Kurzweil MIDI-board allowing complete MIDI capability. . . Power Play Studios' Studio A control room was entirely redesigned and rebuilt by the team of Cary Dean Hart and Gordon Etches. . . Hatchery Stu-

dios of Warren, MI, added a pair of Tannoy NFM-8DMT near-field monitors and a 20-meg hard drive for its Emax. . . Paradise Sound Recording began construction of a new facility in Index, WA, in the heart of the Cascade Mountains. Chips Davis designed the control room . . . Music & Sound Design Studio in Somerset, NJ, announced that all recording and production will be digital and "tapeless." Everything, including voice, will be recorded to its Synclavier Direct-to-Disk system. . . Todd AO/Glen Glenn studios in Hollywood, CA, purchased an additional three ADAP digital audio recording and editing systems, bringing the facility's total to six. . . NBC ordered two more Amek BCII consoles for its Burbank, CA, facility. Both are 24-position chassis with 21 stereo input modules. . . Sunset Sound Recorders in Hollywood, CA, united the GML moving fader automation system with its 56-input custom console in Studio 1. The room is fully compatible with Studio 2, which features a 64-fader GML automation system integrated with an Amek APC-1000 console. . . John Storyk teamed up with Ed Montgomery to design and build Context Music, a six-room rehearsal/recording facility in Manhattan's Lower East Side. The 5,000-sq.ft. converted warehouse features floating floors for isolation and an Atari-based MIDI production area. . . Giant Sound Recording in New York City upgraded its facilities with the purchase of a 56-input SSL with G Series computer and Total Recall. Other equipment purchases include a second Otari MTR-90 and a Lexicon 480. . . Harvestworks, an audio arts organization in Manhattan, installed a digital audio workstation based on the 4-meg Macintosh IIx and Digidesign's Sound Tools. The upgrades were made possible with the support of the Belle Fund, New York State Council on the Arts, Digidesign and Apple Computer. . . Martin Audio Video Corporation installed an Amek Mozart console at Brielle Music in New York City. . . Southlake Recording Studios in Metairie, LA, purchased a Neve 8232 console as part of its studio expansion. . . Although NYC's Record Plant Studios closed its doors in October, the remote truck is still rolling. Kooster McAllister purchased the truck and rights to the name, Record Plant Remote, at auction and intends to renovate the control room and body. . . Criteria Recording Studios in Miami and Studio in the Country in Bogalusa, LA, recently purchased Studer A820-24 analog recorders

. . . Russian Hill Recording of San Francisco purchased two multitrack machines, an Otari MTR-100 with onboard Dolby SR and A, and an Otari MTR-90, bringing the total number of Dolby SR and A channels up to 48. . . Multimedia Productions completed construction of its new studio in downtown Baltimore. Equipment acquisitions include a Macintosh IIcx with Digidesign's Sound Tools, C-Lab's Notator sequencing/notation software and a Sony PCM-2500 DAT recorder. . . Davis Sound Studio in Davis, CA, has added a Yamaha SPX900 digital effects processor with an RCX-1 remote control unit, an E-mu Systems Proteus XR and a J.L. Cooper FaderMaster MIDI Command Controller. . . In Atlanta, Turner Broadcasting installed a 48-channel digitally controlled AMS Virtual Console System in Control Room C. . . Telemation, a production/post-production facility in Seattle, purchased a Lexicon Opus Digital Audio Production System. . . BMG/RCA Recording Studios completed renovation of its three-studio complex in midtown Manhattan with the installation of a new 60-input Neve VR with Flying Faders automation in Studio A. . . Zoetrope Studios in San Francisco ordered a TimeLine Lynx Post Production System, which includes a Lynx Keyboard Control Unit and three Lynx Time Code Modules, to be used for electronic editing of ADR material. The newly constructed dialog editing room will include an Otari MkIII-8 8-track as the source and an Otari MX-80 as the destination. . . Nashville's Digital Recorders purchased a Sony 48-channel PCM-3348 digital multitrack. The studio is also equipped with 24-channel Sony DASH hardware. . . Insatiable Sounds of North Hollywood, CA, recently installed a 32-channel Soundcraft 600 Series console to be used for master recording and mix-down. . . Trident Audio USA has taken an order for three of its new Vector consoles from The Nashville Network for use in its remote trucks and live broadcast studio. . . Among the studios installing the Soundmaster Integrated Audio Editing System were Score One Recording in Hollywood, CA, and The Burbank Studios in Burbank. . . Flytetype Studios, a 24/48-track production facility in Minneapolis, recently acquired two Tascam DA-50 DAT decks. . . In Memphis, KIVA Studios added a new Tom Hidley-designed suite to its facility. The room features a 56-input Solid State Logic SL4000 G Series console with G computer. ■

The _____ **Bottom Line.**



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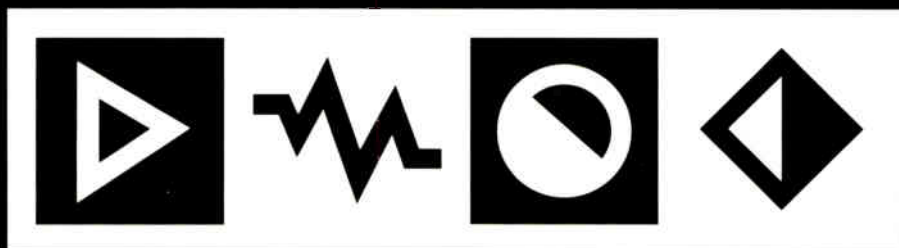
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Circle #166 on Reader Service Card

by Stephen St. Croix

I CAN SEE FOR MILES AND MILES

Wow! It's really 1990! I never thought that this would actually happen, but that was my last wrong prediction.

I have decided to dedicate this month's column to predictions that will turn out to be *right*. I will not cop out and offer only obvious ones in the interest of playing it safe. Even though I wrote this month's column way back on December 5, 1989, I will go out on a limb and offer you St. Croix's Kosmik Predictions for 1990.

There is one important caveat, however. This is a "CCC," or Completely Contentless Column. I am aware that many of my readers enjoy searching my columns for relevant content, and find satisfaction and a special kind of peace when they do locate it, much as they might with a truly convoluted crossword puzzle. I appreciate this, and usually try my best to make it a challenging search.

It is for those individuals that I give this CCC warning. Relax. Don't bother this time.

And now, on to the actual predictions. Though you may find them startling at first, please wait until the end of the year before you judge me — I think you

will be impressed by my accuracy.

First, a significant number of you who remain analog will give up and go digital, some because you want to and others because you *have* to.

Next, almost all of you will receive a subscription renewal notice from *Mix* magazine. Most will respond, some will not. Those who do not will slowly lose contact with the recording community, and within six or seven months will be so hopelessly confused and uninformed that they will be forced out of the business altogether.

Sixty-five percent of these dropouts will end up selling used cars, 11% will go into MI sales, another 11% will go into lines

ILLUSTRATION: JIM PEARSON

ST. CROIX'S KOSMIK PREDICTIONS FOR 1990

NATIONAL INQUIRER

BY LINDA PEARSON

CHER bares all in new video

DIRE STRAITS

LINDA RONSTADT Finds Her African Tribal Roots

ELVIS BACK IN STUPEFIED

DISCO LIVES

New Tattoos Visible

BIZARRE TECHNO CULT

THE FAST LANE

of work where discretion is required, 9% will become commercial air traffic controllers and the remaining 4% (all in the California area) will dedicate their lives to the pursuit of their dream—professional surfing. David, Sandy, “Hotdog” Bill and JoAnne will each break shoulders or arms in pursuit of the ultimate wave, and their children will run away in shame.

This comes to 100%. I used a calculator.

Of those who respond and renew, 99% will stay in the business. One percent will marry the talent they were

recording and leave for the bliss of family life *outside* the zoo.

Disco will suddenly return, enjoy a raging success and then die. This will begin on April 10 at 3:44 a.m. and end on April 10 at 3:48 a.m. Almost all of us will be fortunate enough to miss it.

Many will discover that digital data format “standards” are a myth at best, and a cruel joke to some.

Three of you will take apart an old, messed-up CD player and look into the laser while it is on. Only one of you will do it again.

One of you will make a major late-night talk show with the claim of going an entire year without a hard disk

crash. Subsequent interrogations will reveal this to be a hoax, and the

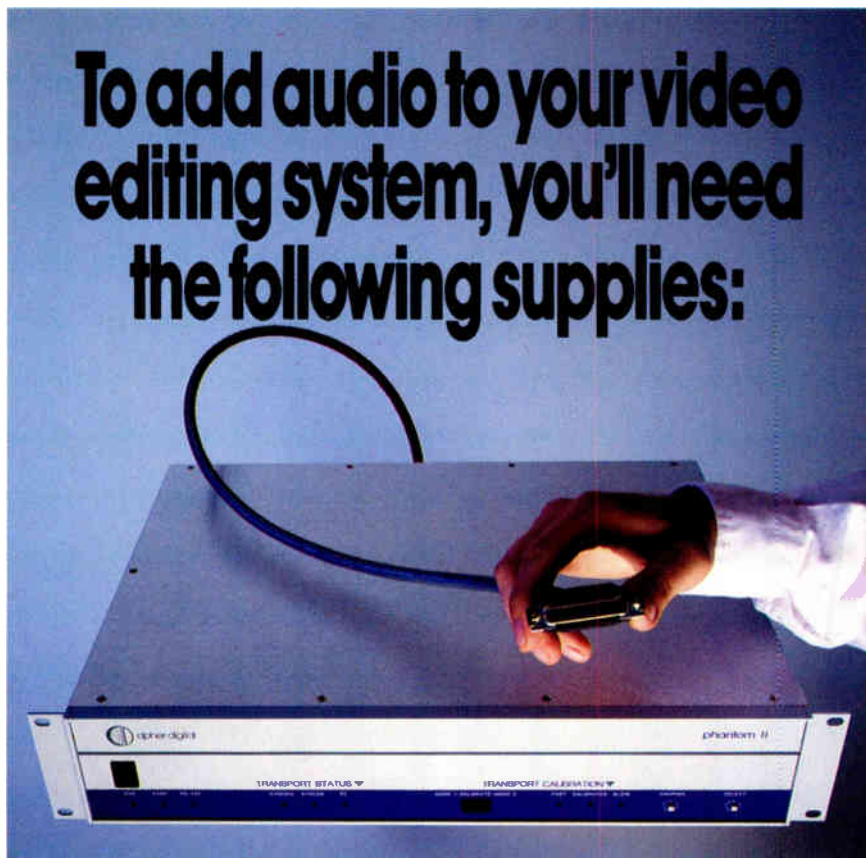
**DISCO WILL
SUDDENLY RETURN,
ENJOY A RAGING
SUCCESS, THEN DIE.
MOST OF US WILL
BE FORTUNATE
ENOUGH TO MISS IT.**

perpetrator will be sentenced to one year in QC at Rodime in Scotland.

Well over 1,200 of you will join a sort of “techno-cult” and share the belief that man can listen directly to AES/EBU data and understand it. The leader, an ex-owner of a major New York studio, claims to prefer listening to all Dire Straits CDs this way, thereby “avoiding *all* D-to-A conversion artifacts.” He will further claim that he fell onto this amazing discovery one day when his D/A converter failed and put raw digital data out to his preamp while he was “groovin’ to the latest Metallica CD.” He claims he “could hardly tell the difference when the converter lunched.”

HDTV will come, but the television industry will become paranoid because the quality is so good that, as they will put it, “viewers will not be able to distinguish the screen image from reality, and therefore may feel that it is permissible to tape it for their own use, much as they currently use video cameras to tape children’s birthday parties.”

Following the lead set by the recording industry when the deadly threat posed by cassette and, later, DAT technology fell upon us, the Television Broadcaster’s Association will lobby heavily and get a kind of “visual copy-protection” law passed. The law will require all HDTV monitors sold in the United States to have a 9-inch wide vertical black stripe permanently etched down the center of the screen. Proponents of this law will state that “the average viewer will hardly notice it after a while.” They



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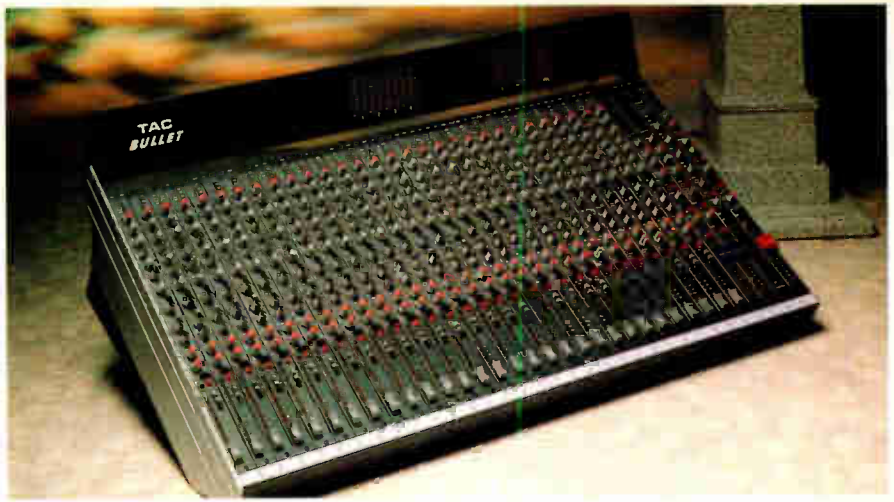


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figured 28/8/2 and 30/4/2. The small frame, which can be rack-mounted, is configured either as 10/4/2 or as an all-input 12/2. Up to 8 stereo line input modules, which include Remote Start switches and an RIAA equalized preamp, can be fitted to any format. Eight subgroup formats also have 6 stereo effects returns, whilst four subgroup formats have 4 stereo returns.

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will go on to say that "it will even help generate more revenue for the ailing American television manufacturing industry, as the missing nine inches becomes even less noticeable as you get into larger screen sizes."

One spokesman will be heard to say, "If you can afford the 75-inch Sashimi 300X HDTV system, you can actually see *all* of Cher in her new video, 'Guns and Hoses,' even when she stands in the center."

A small Santa Monica, California, company will come out with a \$300 kit to remove this black stripe, called "CHDTV." They will sell out in two days. Amazingly, the television industry will survive.

Someone will invent a 16-bit A/D converter that converts the 16th bit.

Someone else will claim that a new 24-bit converter is ready. Thirteen thousand of you will believe it.

Disneyland will go totally digital on July 1. Disneyland will crash on July 9. *This* will be big news.

The last U.S.-owned bank in Los Angeles will turn Japanese. The visual copy-protection law will be repealed.

The age-old "Pin 2/Pin 3 Hot" controversy will be resolved, finally. Yes, standardization will be achieved inexorably, allowing West and East Coast gear, and even European and British gear to be pin for pin, phase-compatible. Pin 1 will be declared hot for the entire world.

Radio Shack ("The Technology Store") will come out with the "Data-Mirror" for under \$5. This ingenious little device will convert today's standard, uni-directional, fiber optic communication lines to bi-directional with a simple mirror and prism arrangement in a 1-inch plastic add-on adapter. Tandy stock will soar as the company follows with a high-grade 40-channel digital console for under \$2,000.

Elvis will book a six-week lockout at Westlake.

Linda Ronstadt will enter her African Tribal Chant period and release two very successful theme albums.

The first digital virtual recording system for automotive use will be announced in Southern California, where commuters may spend as much as four hours a day driving to and from the studio. Known as "CAR-DAT" (Continuous Audio Recording Device, Automotive Technology), it will turn

out to be just more vaporware, unfortunately.

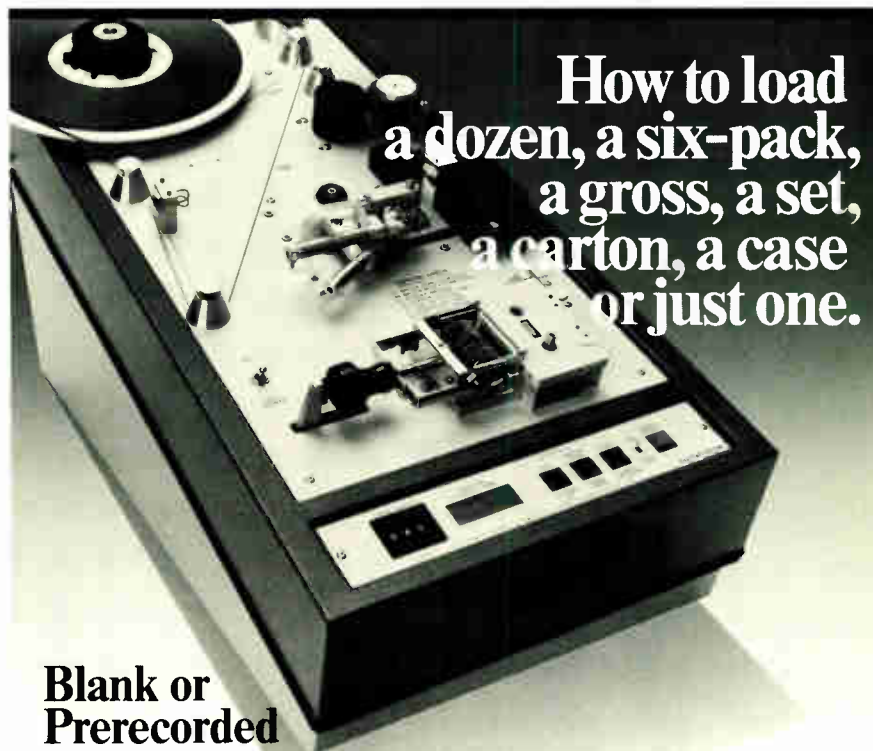
RCA jacks will be outlawed. Finally! Predictive Delta Modulation A/D converters will be perfected by Jeanne Dixon.

In response to today's growing health consciousness, the world's first combination recording studio/health spa will open in, yes, Marin County, California. Known as the Billie Holiday Health Spa-dio, it will enjoy unprecedented success. With alfalfa sprouts replacing last decade's cocaine as the commodity of choice, the musical end-product will have a much more healthy, solid sound, even if it

takes a bit longer to record.

Westlake offers 50% off of a six-week block, to cover a no-show. ■

Contributing editor Stephen St. Croix looks like this:



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by Ken C. Pohlmann

FOR ROCKET SCIENTISTS ONLY

Despite lingering skepticism, occasional muddled thinking and higher prices, digital audio has changed the topography of the playing field. Without question, this young technology holds all the answers to the future of the audio profession. Moreover, thanks to incredibly fast (too fast?) evolution, that future is approaching rapidly.

Recently, digital audio took another tremendous step up the evolutionary ladder with the advent of so-called "1-bit" architectures. These new chip sets

requires laser trimming of the converter current summing ladder, even with calibration of MSBs; quantization error and zero-cross distortion are manifested as non-linearity at low levels; and analog converters refuse higher degrees of chip integration. Although purveyors of 18- and 20-bit systems would certainly disagree, one could argue that PCM architecture has reached the limit of its performance. In other words, a whole new scheme is required.

One-bit architectures satisfy this need. They avoid the problems endemic to PCM and offer potentially higher performance levels. One-bit systems are characterized by very high oversampling rates, noise shaping and 1-bit conversion. However, as we shall see, the several 1-bit systems that

Figure 1: Signal flow in the Matsushita MN6471 chip, which converts 16-bit data to 1-bit streams at 768-times oversampling.

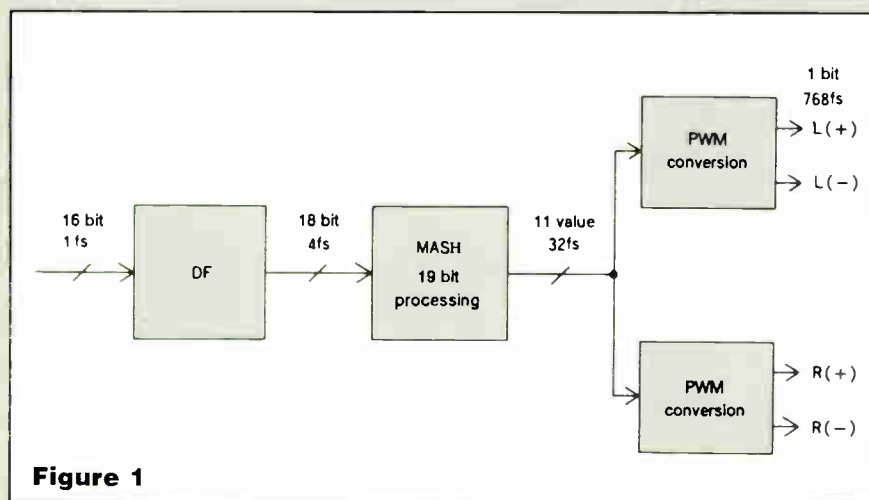


Figure 1

banish forever two of the diehard evils of traditional PCM architecture: steep analog filtering and parallel conversion. By removing these from the signal chain, noise, distortion and non-linearity drop close to their theoretical limits. In short, this technique has generated yet another revolution in digital audio. As with all revolutions, it's wise to be fully informed. But be warned: 1-bit technology isn't easy; you don't exactly have to be a rocket scientist to understand it, but it would sure help.

Traditional PCM architecture is hindered by several problems: Troublesome analog lowpass filters are needed, particularly with low oversampling rates; adequate linearity

have been devised are quite dissimilar from one another; in fact, 1-bit architecture offers far more design latitude than PCM.

Fundamentally, a PCM system represents the analog waveform as an amplitude signal, storing information that measures the amplitude sample by sample. However, the method is flawed when quantization introduces errors in that amplitude representation. Because a multiplicity of bits are used to form the representation, and because each bit has an error unequal to the others, the overall error varies with each sample, and there is no easy way to correct it.

By contrast, a 1-bit system takes a radically different approach. It em-

employs only one bit, at a very high rate, to represent the signal. Instead of an amplitude representation, a 1-bit system uses time division to represent the signal. Because only one bit is used, the error is constant and, hence, there is no relative error. In theory,

represent a signal formerly occupying 16 bits. Line A in Fig. 2 shows the re-quantization noise floor with 1-bit conversion. Line B shows re-quantization noise when noise shaping is

employed and the third-order MASH circuit. The MASH noise shaper is shown in Fig. 4; it contains two loops, a single integral circuit and a double integral circuit. The re-quantization error of the first is re-quantized by the second, and corrected by it. The signal is output from the circuit as 11 values ($\pm 5, \pm 4, \pm 3, \pm 2, \pm 1, 0$). These values, non-intuitively, represent the audio signal; for example, Fig. 5 shows the spectrum of 20kHz input data. The output signal is reproduced with a S/N ratio of 106 dB.

The final element in the system is D/A conversion. The 11-value signal is converted into pulses, each with a width corresponding with one value. It is important to note that the width of the pulses carries the vital information; the amplitude of this signal can only be high or low. Because great timing accuracy can be achieved through crystal oscillators, the widths are very accurate; hence, the error of the signal is low. Positive- and negative-going pulses are output, to cancel common noise. This high-speed (768-times the sampling frequency), 1-bit data forms a PWM representation of the waveform, as shown in Fig. 5. Proof of performance can be illustrated by looking at the linearity of the system; Fig. 6 shows that the system is linear through -110 dB.

With architectures such as MASH, some of the lingering problems with digital audio are well on their way toward oblivion. And the future looks even brighter. This generation achieves 18-bit resolution, but resolution of 20 bits or more is already possible. Moreover, these systems are applicable to both output and (hallelujah!) input stages. For the first time in a long time, professional recorders

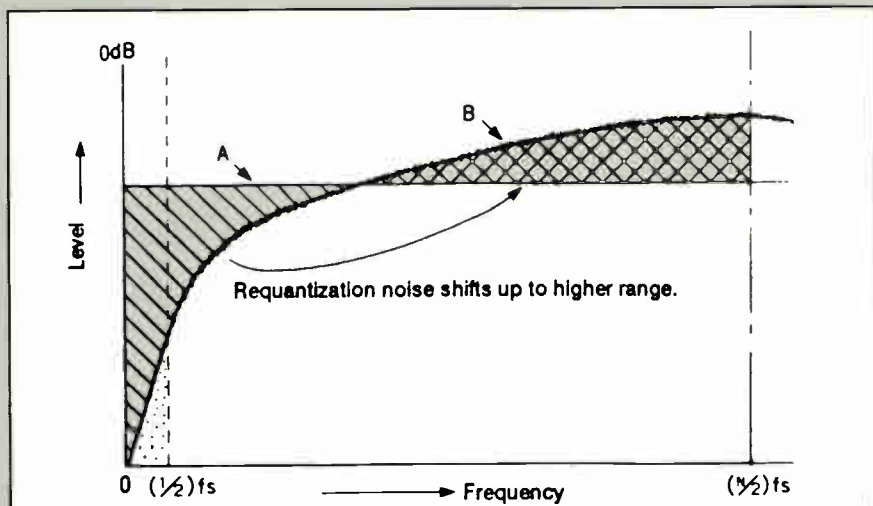


Figure 2: Requantization noise floor, with and without noise shaping.

neglecting jitter, an error would produce only an offset, and could easily be removed from the signal. Because time division is inherently more accurate than an amplitude representation, 1-bit is inherently better than PCM. Looked at in another way, PCM is an analog conversion method, whereas 1-bit is a digital conversion method.

Although all 1-bit systems use this basic approach, the details differ considerably. By way of example, let's consider the MASH system introduced by Matsushita (through co-development with Nippon Telegraph & Telephone) and used in both consumer and professional CD and DAT products. MASH is a multistage noise-shaping method, and its current D/A incarnation, the MN6471 chip, is shown in Fig. 1. It accepts 16-bit words at a nominal sampling frequency, and a digital filter stage performs 4-times oversampling and outputs 18-bit words. A noise-shaping circuit outputs data as an 11-value signal, at a 32-times oversampling rate. D/A conversion is accomplished via PWM (pulse width modulation), outputting 1-bit data at a 768-times oversampling rate.

The key to the system, and to 1-bit systems in general, lies in the concept of noise shaping, sometimes called bit compression. It describes, in the case of D/A conversion, how one bit can

employed. Overall, both noise levels are the same; however, with noise shaping, noise is decreased at some frequencies and increased at others. Specifically, noise in the audio band (from 0 Hz to one-half the sampling frequency) is decreased. In other words, with noise shaping, 16-bit performance (or much more) can be achieved with a single bit.

The real excitement and innovation associated with 1-bit systems comes in the design of noise-shaping algorithms. The more complex the algorithm, the lower the noise in the audio band. Fig. 3 shows three noise curves, for single-order noise shaping, sec-

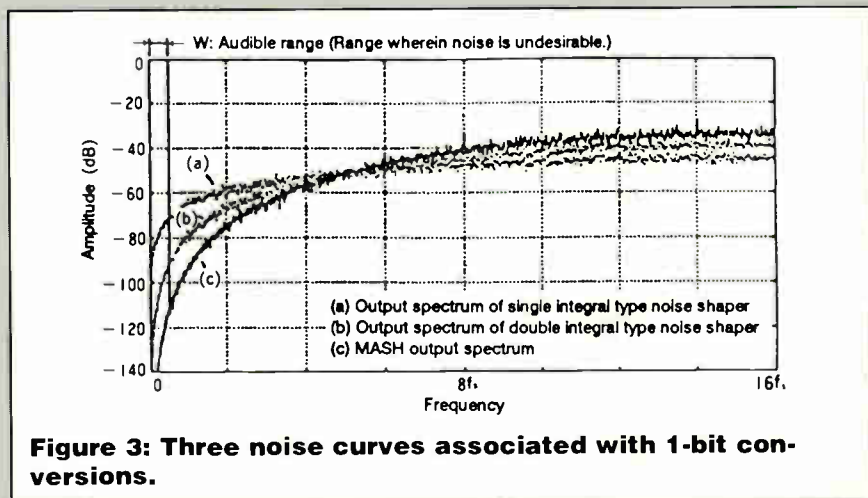


Figure 3: Three noise curves associated with 1-bit conversions.

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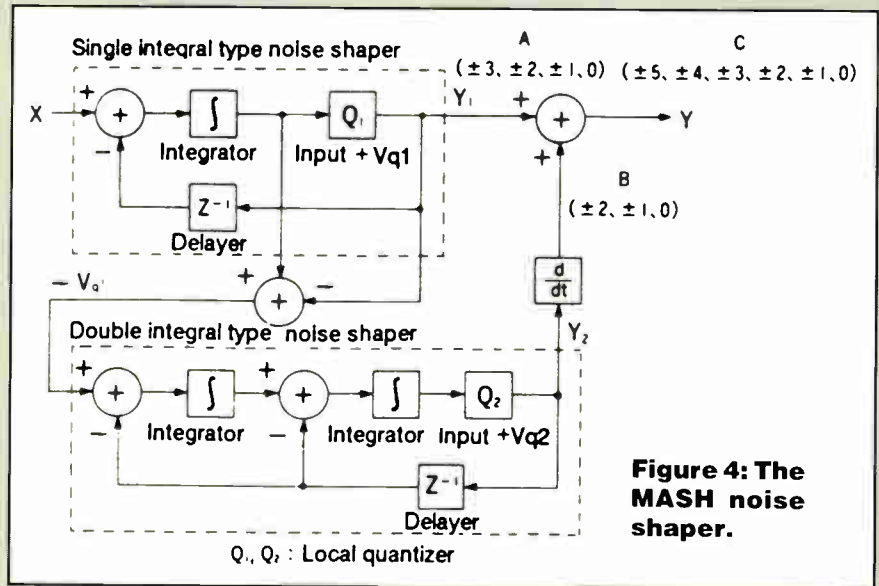
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will have the chance to compete with the performance of consumer players. In short, 1-bit architecture is an excit-

columns we'll return to look at 1-bit technology from companies such as Sony, Philips, JVC and others, and use research from Robert Adams and others to plumb this new technology.



ing development in digital audio; I predict that in time, all professional digital audio systems will use 1-bit conversion on both input and output.

Trust me, when it comes to fast-breaking audio technology, "Insider" will take care of you. If you're into rock-etry, you're on your own. ■

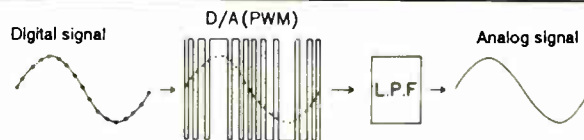


Figure 5: In the D/A process, the 768-times oversampled signal forms a PWM representation of the waveform.

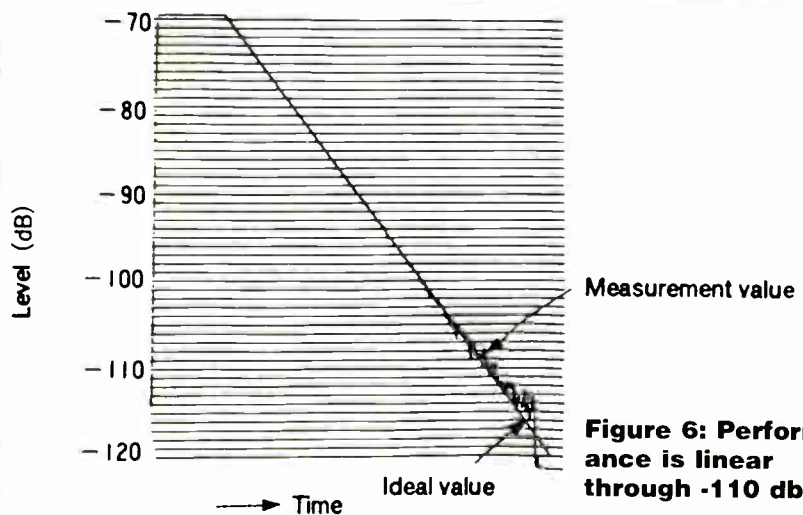


Figure 6: Performance is linear through -110 db.

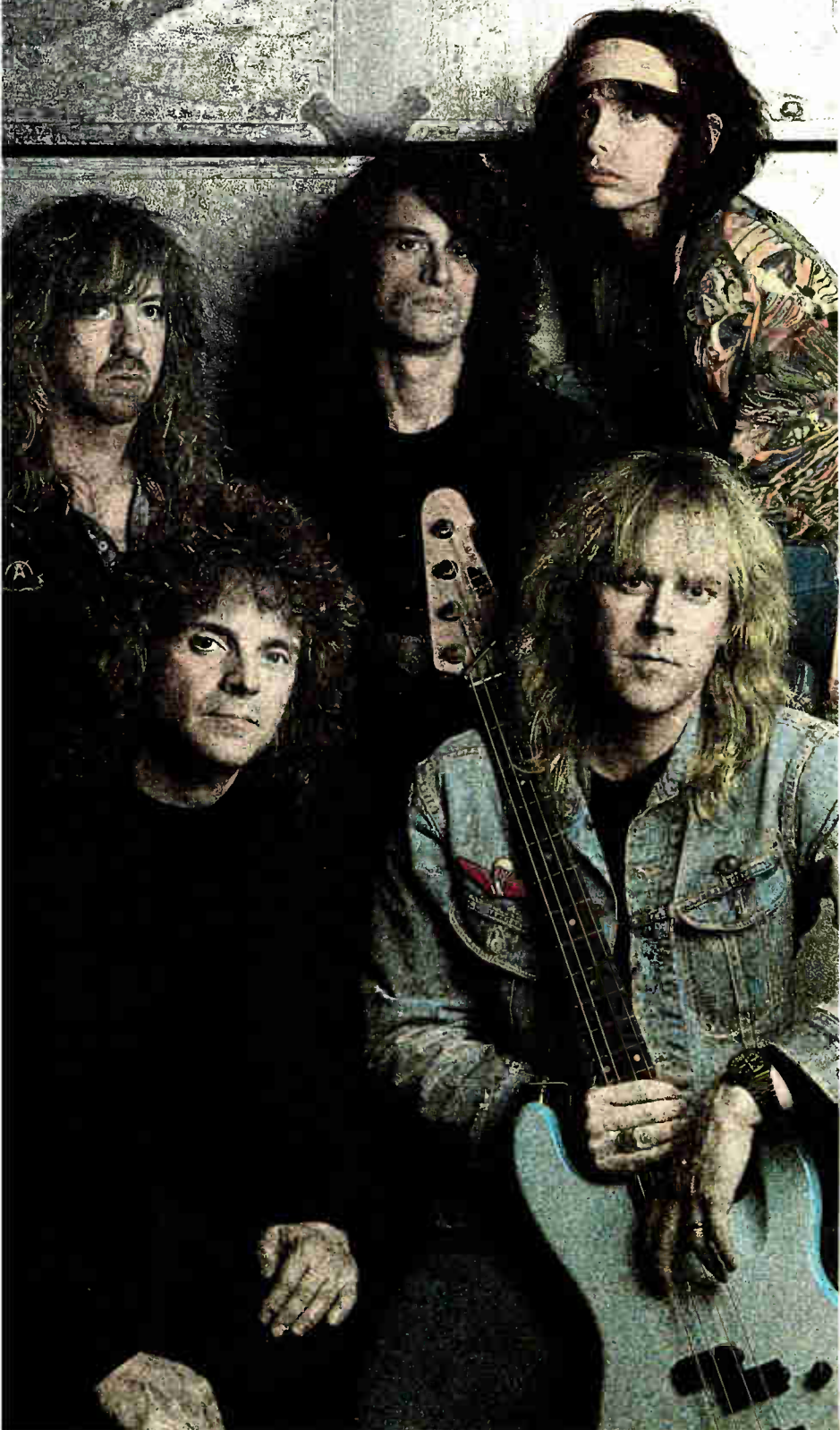
But we've only scratched the surface of 1-bit systems. There is considerable diversity among them, both in noise-shaping algorithms and D/A conversion methods. In upcoming

Ken C. Pohlmann is director of the Music Engineering program at the University of Miami, where his students are fully expected to know all this stuff.

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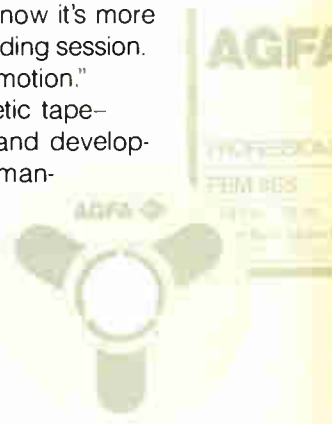
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by Mel Lambert

CREATIVE SYNERGY

COMMUNICATIONS IN THE STUDIO

Part 2
Creativity—on both sides of the glass—should involve a seamless transfer of musical expression from the artist to the attentive audience. The collective goal, as we ply our musical, technical or production expertise, must be to maximize the creative interplay in the studio or live performance. Last month I discussed the specific needs of musicians and performers; now I'll consider the engineering and technical staff's role in establishing a mood or environment in which creativity can find a practical outlet.

Essentially, an engineer's role during a session or live gig is to capture a sonic performance and then transfer it to a medium capable of relaying the audio information to the listener's ears. The first step is to ready the environment. Just as any flight crew follows a procedure prior to takeoff, a good engineer should develop an intuitive sense of what needs to be checked before a session or live date gets under way. We should run audio quickly through the board and detect that all is well with the various signal paths and that the input-to-output flow is clear and transparent. Musicians and artists place a great deal of trust in the individuals handling the technical aspect of a date. Many of them

have engineering chops of their own. It's disrespectful to be unprepared.

The performance area should be ready from the start of the session. No holdups! Mics, headphones and monitors ought to be checked and situated close to the musician's working position. Communication systems between the mixer, support crew and artists need to be in place. Anything less is an insult to your technical craft.

Breaking down the session into its composite parts helps avoid unnecessary delays. For example, during a recording session, what basic instruments should we track? Band members may be unused to playing on their own and will need to record most instruments together during the tracking dates, with selective solo overdubs. In what order should the composites be recorded? It's often a compromise



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between an ideal and a practical reality.

From an isolation point of view, we'd maybe like to have the piano basics recorded separately from the drums and bass. From an aesthetic point of view, however, most of us would agree that a track recorded by a collection of musicians playing as an ensemble offers more cohesiveness than one developed over a period of days or weeks.

In essence, an engineer or technician provides three complementary functions during a recording session:

- Objectivity, by which the occupants of the control room can maintain a definitive overview of the project and assess its development from a raw idea or creative spark, through the various

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SYSTEMS NEED
TO BE IN PLACE.
ANYTHING LESS IS
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intermediary stages to the finished commercial product.

- Communication, by which the producer, engineer and other musicians working in the control room can provide a focused, tight view of the proceedings to the individuals at the microphones. (Critical assessments from people whose judgment we value—and actively enlist—is imperative during any creative process. An artistic endeavor should be an attempt to communicate an emotion, attitude or belief; it is helpful to run those nascent ideas by a group of sensitive individuals before they see the light of day!)

- Rationality, by which an engineer can offer alternatives that might better fit the mood of the piece, or develop sonic textures—acoustically or using electronic manipulation—that complement the musical ideas from the studio or performance area.

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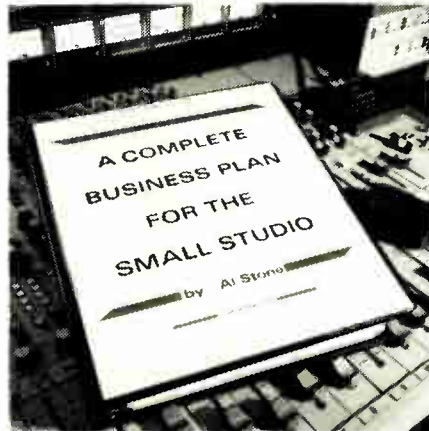
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selves in lesser or greater amounts, depending on the session. In this era of specialization, few production engineers who work regularly on rock dates would or should offer an opinion on signal processing for classical or jazz sessions; we assume that what comes off the floor is what the audience and ensemble members expect to be captured on tape. Similarly, a film re-recording engineer works with many sound elements that, through the actions of layering and blending, may be processed far beyond their original character.

While setting up the basic tracks, a good engineer scopes out the politics of the situation: who is the leader of the ensemble; how rehearsed are they and/or how well do they play together; what friction points might exist; how technically competent are the members; how prepared are they to begin recording; and how do they react to comments from the studio staff? Obviously, if none of you have ever worked together, or if it is a venue new to the group or yourself, this period of adjustment is going to take a little longer than if you are about to begin your third album with the same crew in the producer's home facility.


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During overdubs, we get the opportunity to explore the depth and texture of a project, and we begin to work with the band members in isolation. Now people skills become more and more important, as each performance explores new territory. During the overdubbing process, the producer can elect to add as many parts as seems appropriate, making sure that everyone understands why this might be necessary. Just as importantly, it is the session engineer's responsibility to express why that last take didn't work as well as the first. Again, the truth always stands us in good stead, although it may need to be couched in more revealing terms than a simple, "Let's try that one again."

And while the tracks are being built, it is essential that we retain a cohesive overview of the session, documenting every take and alternate. It's also a good idea to clean up the tapes as you go, if only to prevent confusion during remix and/or to make it easier on anybody who might need to remix your tapes for an extended dance remix, house mix or other special product.

Taking our creative cues from the artist and producer, while giving free rein to our own impressions of the material, we can begin to craft the material into a cohesive balance. Here, we have a tremendous responsibility: to honor the performer's aims, intentions and aspirations while blending together the various vocal, instrumental and electronic elements to form a balanced, attractive-sounding mix. ■

With over a dozen years of active involvement with professional audio on both sides of the Atlantic, Mel Lambert now heads Media&Marketing, a high-tech consulting and marketing service for pro audio firms and facilities.



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World Radio History

Studio Headphone Monitoring Systems

OUT OF THE DARK AGES

BY JONATHAN LIPP

Studio owners and designers go to great lengths to create environments conducive to artistic creation. Anything that creates stress is avoided, yet most recording professionals on both sides of the glass will testify that the status of headphone monitoring systems remains in the dark ages.

Until the popularity of multitrack recording took hold in the late '60s, the recording environment was similar to the performance stage, lacking only a paying audience.

Multitrack recording and the overdubbing ease it provides now places

musicians in an unnatural environment, isolating them not only from each other, but from the final artistic product. The natural electricity generated by simultaneous performance was and still is often lost.

Lifeless, sterile final mixes are often blamed on technology getting in the way of the art. Musical artists need to concentrate on their performances with as few annoyances as possible. Malfunctioning and inadequate studio equipment adds to tension. As studio tension increases, creativity decreases.

Modern recording techniques require musicians to hear each other

through headphones, an unnatural situation to begin with. With today's technology, why can't we create headphones or speakers that are as good as the naked ear in focusing our attention on the sounds we want?

On the modern concert stage, we have engineers who mix monitors solely for the performers. The studio performer has no such luxury. During basic tracks or live sessions, studio performers often must settle for a compromise of what everyone wants to hear, with no overall volume control.

Typically, cue systems are driven from the prefader auxiliary sends of the main studio console. This allows a special mix to be generated independently from the control room monitor mix. Most consoles can route talkback signals to the aux bus, permitting voice communications between the performer and the control room personnel.

In many situations studios use a mono system to keep things simple. A 2-channel system can send separate mixes in order to give the rhythm section or vocalists a different mix. Larry Brown of 440 Sound in Glendale, Calif., takes a different approach to monitoring. He prefers to send the

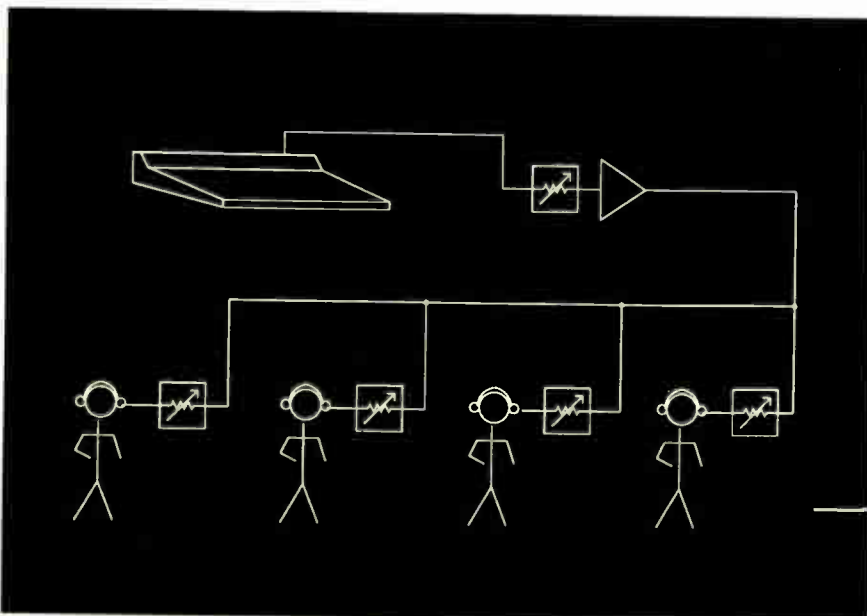


Fig. 1: Mass-feed systems use a single amplifier that supplies multiple headphones.

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performers the same mix he hears in the control room. This way he always knows what they are hearing. The only disadvantage is that he cannot use his solo system.

No one has been unhappy with his or her cue mix since Brown adopted his current method. The studio drives the headphones with a classic McIntosh hybrid amplifier. Brown says that a smooth amp makes a big difference.

Other than wanting to get solo back, he would like the ability to add or subtract specific signals from the overall cue send. He stresses that adding the right amount of reverb and delay to the mix helps all the performers, especially vocalists who need to stay

on pitch and at a consistent level.

It's true headphones need little power for full output—often as little as one-half watt is adequate. Most amplifiers are rated at 8 ohms, while most studio headphones are 600 ohms. When driving headphones, both stability and voltage swing are important, and some amplifiers will create nasty artifacts if not loaded as designed. I recommend traditional amplifiers of at least 50 watts when using 600-ohm headphones, especially if passive attenuators are used to control the individual volume of each headset. Another nice touch is peak monitoring meters or LEDs to make sure the amp is not clipping. A new

generation of amplifiers—designed specifically for headphone applications—is now on the market, and a few of them specify performance into 600 ohms. If you use such high-impedance headphones, shop with care.

The headphones are a critical link in the chain. Sonic quality, reliability and comfort are important. The most popular brands are AKG, Audio-Technica, Beyer, Fostex and Sennheiser. Most of the higher-end headphones are high impedance (600 ohms) but some are in the 30- to 70-ohm range. The lower impedance models will provide more volume when fed directly by many consoles, tape recorders and Walkman-type players, but do not fit well into mass-feed systems.

Headphones are generally classified into two types: open air and enclosed/isolating designs. Open-air types allow outside sound in, providing a more natural feeling, especially for singers who need to hear some of their own voice acoustically. Some open-air styles sit on the ear with foam pads, while others fit around the ear and rest on the head (circumaural). Certain open-air designs—such as the AKG K-240—might appear to be isolating headphones, although they have back vents that allow sound movement. Popular open-air types are the AKG K-240, Fostex T-20 and Sennheiser HD-520.

Enclosed/isolating headphones are helpful in situations where the studio sound level might drown out the headphone sound. Popular isolating types include the AKG K-270, Audio-Technica ATH910, Beyer DT770 and Sennheiser HD-250. Isolating headphones are often more expensive because it's more difficult to achieve good reproduction within a small, sealed space.

Headphone systems seem to be the last vestige of home-brew in the studio. Help is at hand, as equipment manufacturers have begun to address this need over the past few years. There are three types of headphone distribution systems on the market today:

MASS-FEED SYSTEMS

Typically, mass-feed systems (Fig. 1) consist of a central power amplifier that may have optional mixing inputs. This amplifier either feeds a parallel set of headphones directly or may offer separate passive output attenuators for each headphone. Individual attenuator packs may be added to such sys-



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tems to allow each performer local control of volume. In systems using passive attenuators, attention must be paid to the fact that the amplifier's maximum output swing will be reduced by the attenuator and must be proportionally higher to avoid clipping. Mass-feed systems featuring remote attenuator packs are offered by Furman Sound and USAudio. Simon Systems makes the CB-4, a unit that interfaces four high-impedance headphones to standard amps at 8 ohms.

DISTRIBUTED-FEED SYSTEMS

Providing separate amplifiers for each headphone, distributed-feed systems include individual volume controls located on the amplifier for each headphone (Fig. 2). Most systems have a common input for all amplifiers, while others have individual inputs that can be driven by separate mixer sends. The volume for each performer's headphone must be controlled at the amplifier. Since these systems use separate amplifiers in a single package, headphones of various impedances can be mixed in a system. Distributed-feed systems are offered by Gentner, Rane, Stewart, Loft/Goldline, Symetrix and Tascam.

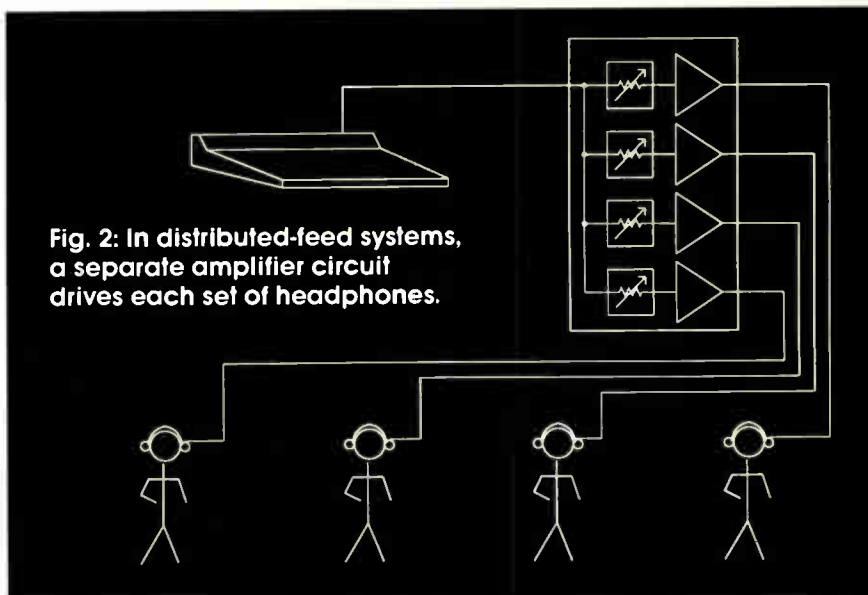


Fig. 2: In distributed-feed systems, a separate amplifier circuit drives each set of headphones.

INDIVIDUAL TOTAL MIX CONTROL

Other than hiring a stage monitor mixer and installing a matrix monitor console, studios have two options for providing artists with individual total mix control. One is to run a parallel snake through the studio and give each performer an individual line-level mixer and amplifier. [One such system, employed by White Crow Audio in Burlington, Vt., was spotlighted

in the May 1989 *Mix*—Ed.] The other is the Intelix Studio Psychologist, a remote control matrix mixing system.

The Studio Psychologist (Fig. 3) includes a compact mix pack for each performer and a central remote-controlled matrix mixing box. The central mixing system feeds an amplifier array which in turn feeds the individual headphones; thus each performer can access all available tracks for total

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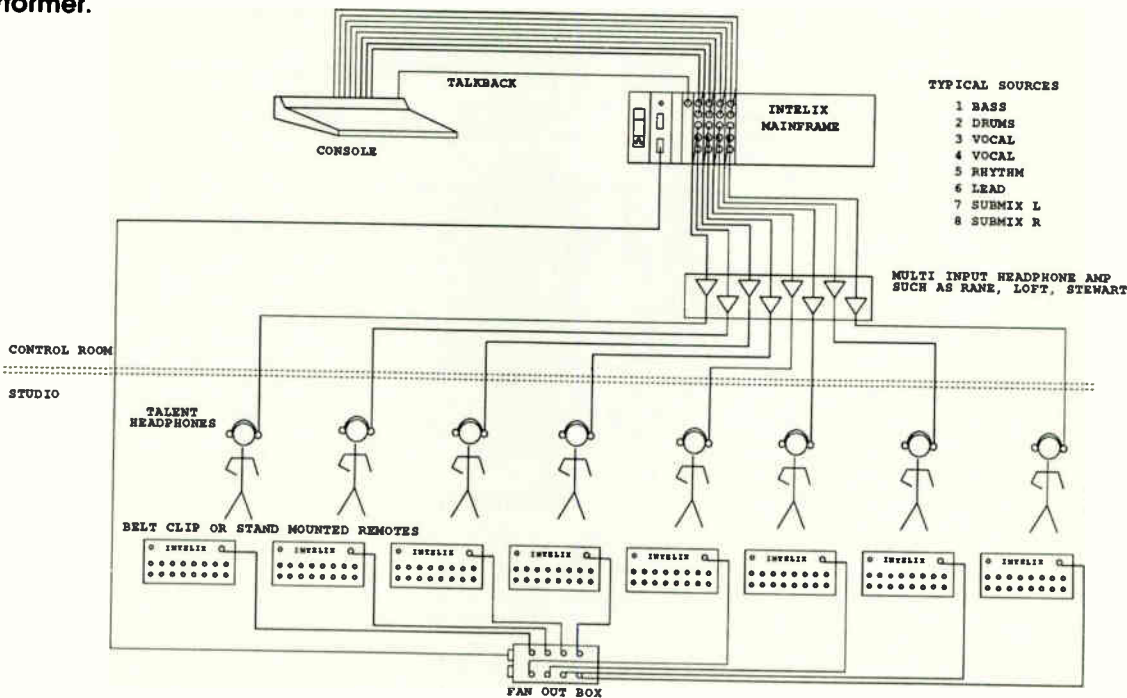
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Fig. 3: The Intelix Studio Psychologist system provides remote mixing stations for each performer.

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control over his or her cue mix. Alternatively, an overall premix could be on one mix channel and important individual tracks on the other channels, allowing the performer to hear more of a desired track.

The Intelix system uses LAN digital technology for communication between the studio remote mix packs and the central matrix located in the control room. Besides controlling the headphone mix, the microprocessor-driven central matrix can also be programmed to provide universal remote control functions such as speaker switching, lighting control, security interface and HVAC integration. In a typical studio, this system could integrate visual signaling functions and remote control of mechanical functions through a common set of wires.

Is this the end? Perhaps not, as systems such as the Studio Psychologist, as well as continual improvements in headphone design, may signal the beginning of a coming revolution, and we may at last be emerging from the dark ages of studio monitoring systems. ■

Audio equipment designer and former recording engineer Jonathan Lipp is also the president of Full Compass Systems, a supplier of professional audio gear in Madison, Wis.

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3-D AUDIO

A commercially viable third dimension in audio is imminent. After several decades of devising better and more complex ways to create sound, the industry has begun re-examining the way it is re-created and in the process redefining the parameters of that most basic industry standard—stereo. The current significance of the spatial manipulation of audio lies in the fact that the marketing types—pro and consumer—are as active as the techies, an indication that major dollars, and a possible new level of industry standards, are at stake.

The scientific side of the equation revolves around psychoacoustics, which examines the way the brain perceives sound. Finally, the human element is being looked at as the first in the sequence of events instead of the final one. The marketing side shows a concentrated effort to attack markets along a varied front—audio facilities, film companies, television networks, and consumer hardware and software manufacturers—all by a growing group of mostly new companies attempting to stake claims in a relatively uncharted region.

It's important to note that while all the new systems coming down the pike have an effect on the stereo image, they use radically different approaches with widely differing results. There are claims associated with some of these products and

PART ONE

SPATIAL MANIPULATION: THE FUTURE OF STEREO

BY DAN DALEY

technologies that do not necessarily match the claimed results. This stems from a debate as to what three-dimensionality is. According to Dr. Elizabeth Cohen, principal consultant to Charles M. Salter Associates, Inc. (an acoustical consulting firm in San Francisco), 3-D sound is "accurate and natural reproduction of spatial environments." All the systems that this writer heard have some effect on the stereo image: only one, QSound, actually produced a three-dimensional image from two speakers.

In this first of a two-part series we look at systems by Audio & Design, B.A.S.E. and QSound. Next we'll cover technologies from Auris Perceptual Engineering, Crystal River Engineering, Holophonics, Hughes Aircraft and Pete Myers. While these systems differ considerably in what they can do—and what they can't do—they seem to share several criteria: Some lay claim to primacy

and singularity of effect, and, to one degree or another, they are going after similar markets: combinations of professional audio, cinema, broadcast television, aerospace and car audio markets. Apparently, the marketing side of these entities are carrying the ball now, an indication that these technologies are well along. In fact, several are in their second generations.

AMBISONICS

Ambisonics is the name of a technology developed by Audio Design, which manufactures the Ambisonics control unit; AMS Industries manufactures the 4-capsule microphone that encompasses the other aspect of the system. According to Nigel Branwell, president and general manager of AMS, the microphone's capsules are arranged in such a way within the mic that a natural sound pattern is recorded, and then the signal is passed through a phased-frequency amplitude matrix (phase, frequency and amplitude manipulation) within the control unit. This arrangement makes the Ambisonics system hardware-dependent in both recording and playback aspects. It is, however, mono/stereo-compatible, and Branwell says some degree of aural enhancement is perceptible on Ambisonic-encoded software, even



without playback processing.

Ambisonics is an analog processing system that will have digital components in its next generation. Branwell feels that stereo television is driving much of the research and financing of the spatial manipulation industry, and that this in turn affects the pro audio industry by virtue of the fact that more and more audio work is done for video purposes.

An Ambisonics package goes for about \$3,000; the consumer decoder sells for around \$300. Presently, the Nimbus CD catalog uses the system, and Branwell says high-end audio and automotive sound markets are targeted.

B.A.S.E.

The Bedini Audio Spacial Environment unit is the result of years of tinkering and experimentation by John Bedini, best known as a maker of high-end consumer stereo amplifiers. Bedini Amplifiers and Bedini R&D were acquired by Gamma Electronics, which markets the B.A.S.E. unit via a combination of placements in film, television and audio recordings, in which the unit price of \$6,000 can be mitigated by endorsements by the users.

Using B.A.S.E., which operates totally in the analog domain, stereo elements in a mix can appear at the outermost edges of the spectrum and mono elements can be moved left or right and increased or decreased in gain, thus affecting the listener's perception of depth of field.

Michael Fishman, president of B.A.S.E. and executive vice president of Gamma Electronics, says that B.A.S.E. corrects inherent flaws in the concept of stereo through Delta timing, the nanosecond-measure interval of sound travel between ears relative to the sound source. "With recorded sound in stereo, the only depth information comes from gain. That's a major shortcoming in stereo," Fishman notes. "B.A.S.E. creates imaging in depth...it only does a one-time left/right cancellation. In normal stereo, at least 70 percent of the mix is down the middle. That's a double canceling of the signal. It loses crispness and depth."

Fishman points out that in post-production, the B.A.S.E. system can rebalance an image without a complete remix. "It can increase the ster-

eo spread without losing the center and can increase the center without losing the spread." As for its recording applications, Fishman claims that B.A.S.E. gives users an ability to recreate live sound and ambience with minimal use of outboard effects, while making the sweet spot broader.

In the mixing stage, B.A.S.E. does not produce discrete sound localization, Fishman acknowledges; however, he did say that when it's used in the recording of tracks, it can locate sounds discretely. A product demonstration I attended at the recent AES show in New York did not support that assertion.

B.A.S.E. is a stand-alone device that requires no encoding or decoding and can be inserted anywhere in the chain from recording to mixing to playback. One of the characteristics of this new wave of spatial and sonic processing is that it isn't intended solely for professional applications; consumer markets are also on the agenda. Gamma is currently negotiating with several prospective licensees to build its hybrid chips as a component for other consumer audio hardware.

Q SOUND

Now working out of a labyrinthine building in Calgary, Alberta, with 18 employees, QSound's senior vice president for development, Dan Lowe, began working on enhancing stereo eight years ago at home. A guitarist-turned-scientist and partner, John Lees, reviewed existing dummy head models initially, but Lowe says their research became far more intense and in-depth, focusing on both the muscular and neural aspects of the human auditory response system.

Developing its own software as it went along, QSound made computer models of human hearing patterns and sound wave characteristics, which have become the heart of the QSound system for sound localization. "Through understanding the brain's relationship to the localization process, you gain the insight necessary to overcome the physical limitations inherent in stereo," Lowe explains. The research was largely predicated on empirical results culled from hours of testing approaches and theories to arrive at what Lowe calls the "ultimate averaged model—one that truly re-

flects the real world."

Lowe is careful in his explanations, a caution induced by some sniping that QSound has endured from the industry and media stemming from a premature announcement of the unit's availability last May. Lowe states that the system will be ready for use this year.

As Lowe explains it, audio input signals are sampled at 192 kHz (i.e., 4-times oversampling). The math is computed at 56-bit precision with output samples available at 16- or 24-bits, accommodating current industry standards. The input signals are then distributed (based on their frequencies) to a series of DSPs in the unit, synched via an internal CPU because lengthy impulse responses take longer to process. The results are output digitally at either the 44.1 or 48kHz rate, as well as analog. The system is designed to work outboard of a recording console, using a remote control that has an I/O for each channel and a 6-axis joystick. The encoding takes place in the studio during mixing; decoding equipment is unnecessary since, as Lowe puts it, the listener's auditory system itself is the decoder.

At a demo I heard in Calgary, at QSound's studio, the results were quite dramatic. Placement of individual instruments in a mix are precise and discrete, with no perceptible change in frequency response when compared with the same mix in standard stereo. The image is broad yet still maintains an aural integrity. The main drawback is that the effect is reduced considerably when the listener moves to either side. However, Lowe asserts that this will be solved with a second layer of processing by the time the system is released. This year, QSound's current range of about 180 degrees will also expand to a maximum of 320 degrees, Lowe adds.

QSound has lined up some respectable audio industry names behind the technology: Producer Jimmy Iovine is on its board of directors; engineer Shelly Yakus has been working closely with QSound during its development; and investors are primarily potential users of the system, including film sound company Todd-AO. A version using its software mapping codes will be released this year on a new edition of Nintendo's popular video game, which will include a handheld control panel with stereo speakers built in. Lowe, however, adds that music ap-

Guidelines for Critical Listening to 3-D Sound Processing

The term "3-D sound" is often used quite randomly to describe a wide range of technologies, some of which have explicitly different aims and capacities. This family includes binaural recording for reproduction over headphones, loudspeakers, surround sound processing and environmental/room simulators. What all these technologies share is the desire to improve the accurate and natural reproduction of spatial environments. Advances in our understanding of psychoacoustics and the advent of digital signal processing technology have enhanced artistic control over the spatial dimension of sound and reproduction of natural-sounding spatial environments of 3-D sound.

The parameters an artist may have control over, which must be examined by the engineer for robustness throughout the reproduction chain, are: direction, distance-depth, source motion, image size, image stability and consistency, positional precision, type and size of listening environment, and timbre. Anyone interested in 3-D spatial imaging must understand the degree of control one has over these parameters.

To begin your exploration of this diverse family of 3-D sound reproduction processes, start by listening to binaural recording technologies over headphones. Try sketching the path of the sound around you on a piece of paper. Is it inside or outside your head? Are the sources/instruments placed in space discretely?

Although lateral imaging is quite good, most listeners do not hear frontal images and sometimes do not hear externalized images. In addition, these recordings often generate front-to-back position confusion (Durand, Begault, NASA). The seriousness of these drawbacks depends on a number of parameters, including choice of recording method, type of "dummy head," set of ears used during the recording

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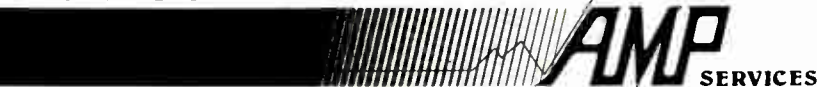
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process, equalization techniques, your ears and your headphone system. Some of the new 3-D sound systems offer improved externalization by using a head-tracking system (Wenzle, Wightman, Kistler and Foster, *ASA S Vol. 84*, 1988, IEEE 1989, W. Martins, AES, October 1989).

The next thing you might do is unplug your headphones and play the same recording over your loud-speaker system. This lack of compatibility is the main reason that binaural recordings have not been commercial *wunderkind*.

If you have followed the suggestion above and listened to a number of binaural recordings, you will probably agree that it is pretty easy to make an impact with a recording having spatial information on it. Now for the *caveat emptor* section.

Neisser wrote, "Expectations can have cumulative effects on what is perceived." Plausibility mechanisms are common to perceptual

processing hypotheses. Perceptual weighting based on a listener's expectations about the reliability and plausibility of directional cues is evident from both rigorous scientific experiment and common sense. For example, if you are listening to a 3-D sound demo over headphones of a match being lit as an example of the technique's ability to form frontal images successfully, just think about how many times someone lights up a match behind your back!

Suggested criteria for critical listening to these systems are derived from experience and recommended standard practices. Listen to a broadband spectrum of sounds in a variety of listening environments, over a number of speaker systems within the same environment, from different locations within the environment, and evaluate the following parameters:

Image. Is the image decoupled from the speaker location?

Reproducibility. What portion of

the illusion remains space invariant? Is it seating-location independent? Does it reduce sensitivity to seating location? (Sketch out that enlarged sweet spot.) What happens if you play the demo in another room, over a different sound system? How robust is the illusion as a function of room parameters?

Timbre Changes. There should be no artificial changes in source identification. The appropriate timbre changes due to source motion should be reproduced. Timbre should not jump or change voices when a source is moving from front to interior to surround.

Distance-depth. What kind of improvement do you notice? Do you have both independent and coordinated control over distance imaging?

Elevation. Do you get any? Is it a monaural effect?

Motion Cues. Are they smooth? Do they induce appropriate or inappropriate timbre changes?

—Elizabeth A. Cohen, PhD

plications are prime motivators behind QSound.

Iovine is emphatic about QSound's singularity as a three-dimensional audio device. "QSound stands alone as a sound placement technology," he says. "It is the only speaker-compatible system that gives an audio engineer the tool with which he can place a large number of discrete sound sources or tracks in 3-D space using a standard, 2-channel speaker system for playback. At this point in time QSound is the only system that can do this."

QSound will not sell the unit to end-users; rather, the company will provide it to individual projects with record companies footing the tab, based on the length of the project. The record companies will then tack on a premium to the cost of these QSound-encoded releases. The proceeds will be distributed as a royalty between the company, the artists and QSound. QSound has chosen this method to avoid having the technology "used as a gimmick," says Lowe. Larry Ryckman of QSound's parent company is confident, based on initial conversations with labels, that consumers will pay the premium once they hear the dif-

ference. Ryckman is equally confident about the future of the spatial audio enhancement industry as a whole. "This industry is very much like cable TV was in its early stages," he says. "It takes something you're familiar with and uses it in a new and exciting way."

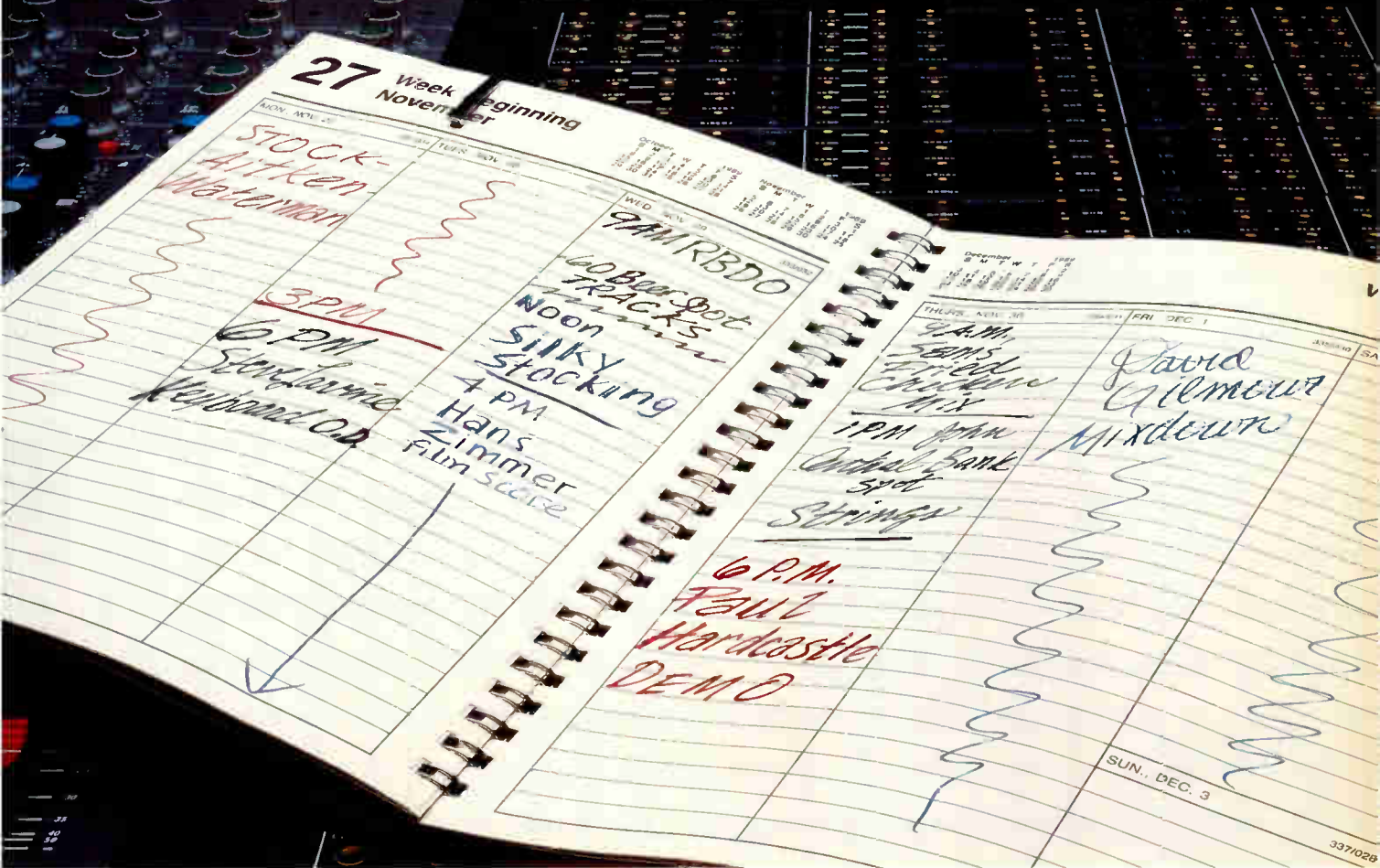
Some of the players in this game have gone the endorsement route with a vengeance, in some cases associating marquee-value names with their technologies—Jimmy Iovine and Shelly Yakus with QSound, for example; B.A.S.E. including endorsements from Greg Ladanyi and Alan Howarth in their literature. Another complicating factor has been the fact that at least two companies involved in spatial image manipulation, B.A.S.E. and QSound, both use public sales of stock for financing. "For a while I was getting more calls from stockbrokers than from audio industry professionals," Dr. Cohen states. "This technology is capable of being masked by lots of hype, and it prevents those who can truly do it from being taken seriously."

Whether these technologies live up to the hyperbole touted by their marketers will be determined in the fairly near future by performance. But many formats, all aiming at similar markets, will inevitably lead to a Darwinian process of elimination that will probably be determined more by power lunches and boardroom meetings than whizzing slide rules. In any event, the way things sound is going to change very soon. ■

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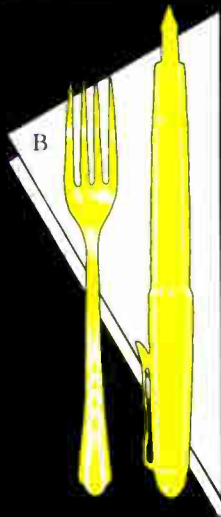
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by Mr. Bonzai

THE PASSIONS OF PETER GABRIEL



It was 1977's "Solsbury Hill" and the first of Peter Gabriel's solo albums that grabbed me initially—and still holds me with its wit, quirky rhythms, bizarre sounds and soaring spirit. Gabriel has followed through with a diverse series of daring and exquisitely crafted excursions culminating in 1989's *Pas-sion*. He is a painter with a master's command of acoustic oils, electronic pigments and gutsy brushstrokes.

Gabriel began his musical career in public school with a group called Garden Wall, which evolved into Genesis in 1967. After eight years of recording and highly theatrical touring, Gabriel launched his solo career, which so far has resulted in seven albums, two film scores, experimental music videos and a record company that transcends national boundaries.

His British utopia called Real World, a complex of recording and performance facilities [see "A Real World Tour"], is designed to meet individual artists' requirements, with visual/audio workshops, R&D labs and inspirational accommodations. I haven't seen it in person yet, but I had a colorful, transglobal chat with the man at the controls. . .

Bonzai: How are things going on your side of the Real World?

Gabriel: Very well, thanks, but we've been working through most of the night so I am a little ga-ga today.

Bonzai: You're working on a new video?

Gabriel: Well, it's a new video from an old concert—could I call you back? I'm getting one of those echoes. . .

• • •
Bonzai: Is this better?

Gabriel: Yes, much better—no echo.

Bonzai: I know how irritating that can be when you're trying to talk and your voice is repeating in the back of your skull.

Gabriel: Yes, but in fact I've used it for humorous effects at some of our village functions. I give people tongue twisters to repeat while they are wearing headphones with odd echoes and delays. It can be very entertaining. The aim is to say the tongue twister without spluttering or repeating yourself and win some token prize.



Bonzai: I read in one of your interviews where you talked about an experiment with some Czechoslovakian musicians who were put under hypnosis and told they were among the world's greatest virtuosos. Amazingly enough, they performed far beyond their abilities. . .

Gabriel: Yes, I read about this and it made a lot of sense to me. I believe



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we are our own worst enemies. Musicians are often looking for that moment of inspiration when they are free and can lose themselves. I think we are fairly flexible and talented as a species, but we don't get to realize most of what we are capable of.

Bonzai: The muse—the old idea that there is a guardian angel for the artist. Do you have any ideas in that direction?

Gabriel: Well, I don't think I've met my muse, but there are definitely times when you get the spine-tingling sensation and you know that something extraordinary is happening.

Bonzai: When did that happen most recently?

Gabriel: While I was listening to the Guo Brothers. They're Chinese and extremely soulful—very beautiful flute playing.

Bonzai: You've been taking many excursions around the world to tap into the music of other cultures. Can you tell me your reasoning behind this—the overall goal?

Gabriel: Originally, around '76 or '77, I started listening to bits and pieces of music from other places. On one side, I started off as a drummer and was always fascinated by rhythm. I was introduced to a drum machine, and suddenly the concept of being able to program my own rhythms was exciting. I started thinking, with all these possibilities, what is it I actually want to work with? I started listening out for other grooves.

There was a moment around that time when they changed the wavelength of the radio station I had been listening to and I began hunting across the dial. I came across a Dutch radio station that was playing some very strange things, including one piece of African music with very beautiful harmonies. I tracked it down, and it was the first African record I bought. Although I had heard things before, that was the moment when I thought there was something I wanted to learn about and try to use for my own work.

Bonzai: How do you balance the electronic music with the raw, "un-sample-able" music of ancient cultures?

Gabriel: You just mix to taste, really. I'm still very ignorant about all sorts of music. It's such an enormous subject, so it's very naive what I do sometimes, but it feels as if it works in

terms of straightforward gut reactions and composition. It might be grooves that find me, and I will try and program them or develop them in one way or another, playing with harmony or structure in composition. The content and the various musical forms I've listened to for the past ten years have really changed the way I work. It's opened me up a lot. I think it should be a normal part of every musician's diet, and not something for the eclectic or the eccentrics.

Bonzai: Let's go back to your youth—what type of music first affected you? What inspired you to follow a path of music in your life?

Gabriel: I have quite a few musical relatives—my mother and her five sisters all played and sang together. Her mother sang opera, as did my father's sister. There was music around, although classical music wasn't what excited me most. I was inspired when I heard early rock music, but church music was another influence when I was a kid—hymns in particular. I still write hymn melodies quite often.

Bonzai: Yes, there is a cathedral quality to your music. Tell me about collaboration—you were associated with a major group for many years, then

you went on your solo career, and now it seems that you are collaborating again with many different people. How does that chemistry of collaboration work for you now after all of these experiments?

Gabriel: Well, it's a thing that is always exciting and from which I learn the most. I feel very fortunate in that I can work with so many different types of musicians. There is such a wide range of people I can get turned on by, contact someone, and have a chance to work with them. That's a big buzz for me.

In a band situation you become a creature of habit. You have certain ways of relating, certain power structures build up and certain negotiating skills are acquired.

I feel a lot freer in my own work as I've gotten more confidence and an understanding of what I'm trying to do in developing a style. It means being able to work well with other people in an open way and understand what I can and can't do, and what they can and can't do. That's largely what I am trying to do with these studios—create a place where things can happen and hopefully we can get great performances.

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Mike Large, who used to work with SSL, runs the studio for me. He was the person, whenever we had any problems, who would come down and bail us out—in exchange for a good meal, usually. It was Daniel Lanois who suggested to me that Mike would be a great person to involve in this new studio idea, which has worked out really well.

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THAT MOMENT OF
INSPIRATION WHEN
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Mike has kept his SSL connections, and we are a three-SSL studio now. We did think long and hard about getting a mixture of desks, but what is really great about our situation is that if you start work in one room and want to carry on in another, you're

not suddenly thrown and the audio computer work discarded.

Bonzai: Has computerization in the studio helped you to realize your goals better?

Gabriel: Without question. I have a philosophy about these sorts of things. I think there are two ways in which we function as musicians. One is with what I call "Energy A," which is analytical, and for that the computer is wonderful. It allows you to pinpoint any small section of a piece, any sound, and have a very high level of control over it. However, that is quite slow and thoughtful, and produces a different type of music than "Energy Z," which is what happens when musicians are in the same room together and responding to what each person is doing. This is what happens when musicians see a red light go on and they know they must live on the spot. It's what happens during improvisation. You can have the same musician doing the exact same line in both ways, and it will come out with very different feelings as a result.

For me, the ideal equipment in the studio is that which allows you to work in layers. At each stage of the process you allow for this spontane-

ous, adrenalin-pumping, red light of Energy Z to really milk the most out of a performance. Then you go back and pull out Energy A and go over it with a microscope and correct it and improve it and build on it.

Say you're working with a synthesizer. You do your first pass to establish melody. Red light on—improvise. Then switch over to the analytic energy to correct and improve, which is perhaps a standard procedure. In the second layer, you may have various sounds available, perhaps on a joystick. Put the red light on and you're off again. You are doing a performance, but this time you're working with the melody you've defined and you're mixing in new sounds. If you have an array of different sounds around this joystick, you can mix different quantities of each according to the position. You do it with the red light on with a definite performance vibe and then go back and analyze it. In level three you might play with the performance parameters—set your attacks, decays and vibratos, put the red light on and improvise with those parameters. Then go back and correct and improve.

It's a way of trying, at each level, to allow both parts of our capacity to work for us—improvising and being spontaneous, with the capacity to analyze and improve slowly and in detail.

Bonzai: It's really a different type of musical creation than was possible in the past, as if we are participating in the evolution of the mind and the spirit, the way that music is created.

Gabriel: If you can really get the stuff you're feeling and thinking out, whatever communication device you have—music, art, dance, written word—then it does improve your ability to communicate, and therefore, perhaps to grow.

Bonzai: In terms of improvising, who are the most amazing artists you've worked with?

Gabriel: On the last record, *Passion, Music for The Last Temptation of Christ*, I named three in particular: the vocalists Youssou N'Dour and Nusrat Fateh Ali Khan, and the violinist L. Shankar. They all make me feel like a klutz, with their various talents. Incredibly spiritual musicians.

Bonzai: How do you feel these days as a hero in music and a spiritual leader in your own right?

Gabriel: I feel there are a lot of people doing interesting work, and that I

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am part of a process. I get a buzz if I feel I am picking up on something early on. In terms of appreciation by audiences or the media, I get a good dose of ego gratification, and then I don't take it too seriously.

Bonzai: How do you replenish and recharge your spirit?

Gabriel: By traveling, hearing other forms of music and from visual experiences such as films and paintings. . .

Bonzai: Painting—is there a painter who visually approximates what you are doing in music?

Gabriel: I wouldn't say it's what I'm doing in music, but Picasso comes to mind. He's a good example, and the ol' rip-off argument comes up. Picasso went to an exhibition of African masks and was so influenced by it that he started the "Mademoiselles D'Avignon" painting, which begat cubism and a lot of other revolutions in modern art. I don't consider myself a Picasso, but it is a good example that music is not the only field where people are accused of stealing.

The distinction I always make is between what is healthy and what isn't, between vomit and shit. In both cases,

stuff goes in through the mouth and is chopped up. One comes back up in pieces and doesn't feel good. The other goes through the system and nourishes it. I think there is a healthy way and an unhealthy way to take from other cultures and other people. Artists really have a responsibility to work with the things that most fire them up and most excite them. The problems only emerge when money and attention are only going in one direction. There is a responsibility for any artist who takes from other cultures to help promote the artists and the music that they are in turn inspired by.

Bonzai: Do you plan to continue scoring films?

Gabriel: Well, I've done two: *Birdy* and *The Last Temptation of Christ*. I've done an album and a tour and then a film score. That's worked well for me, 'cause I can function as an instrumentalist and an arranger, and I love film and working with such strong directors as Alan Parker and Martin Scorsese. It's a great way for me to learn about film, and I hope to continue.

Bonzai: You've really taken the opportunity to use music videos to convey your work, your music. Are we

going to see more of that?

Gabriel: Yes, I hope so. I really enjoyed working on the "Sledgehammer" video. We had a whole team of people throwing in ideas. I worked for a couple of weeks with Stephen [Johnson], and then with two teams of animators, Aardman Animation and the Quay Brothers. It was almost like a little community, and we had to work fairly fast with a comparatively tight budget. It was a very enjoyable experience.

Bonzai: What can we look forward to in the next year from you?

Gabriel: I'm beginning work on another album as soon as we finish this concert tour video. I'm trying to avoid all other distractions, but there is one other project that has been an ongoing thing for a number of years. We're trying to put together an "experience" park, which is where the amusement park may end up in the next century. I envision a place where artists of all sorts can be involved in the design of experiences in the form of permanent or semi-permanent installations. It's like a Disneyland concept where you pick your favorite artists—whether they be filmmakers, painters, musicians, writers—and tell them they can create anything they want for people to experience and interact with.

For a number of years it's been a fantasy, but people are beginning to take it a little more seriously. We've been talking to the Olympic Committee in Barcelona and the Minister of Culture in France. We've developed our ideas with a group of people, and I've been talking to artists like Brian Eno and Laurie Anderson. It's not going to be an overnight thing, but there are a lot of people and technologies moving in that direction. The "virtual reality" technologies are just about getting to their adolescence. We're trying to raise the initial funds, and if we get something going, then within 18 months to three years we should be a working organization.

Bonzai: It sounds like trying to establish a museum. . .

Gabriel: Yes, but with a lot more fun and spirit than your average museum.

Bonzai: Do you have one last word to the world?

Gabriel: I do like that idea that you have to empty stuff to create enough space for something to happen. ■

Editor-at-large Mr. Bonzai occasionally resides in the real world.

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Unless you're acquainted with the area, you won't have heard of the little Wiltshire, England, village of Box. It's nestled on the edge of a valley a few miles outside Bath, near the military town of Corsham, and in recent times was perhaps best-known for its great Victorian railroad tunnel, which was driven through the hills to run the Great Western Railway from London Paddington station through Bath and on to Bristol.

Box is hardly the place you might expect a major, world-class recording facility to spring up, but it makes sense. When he planned Real World, Peter Gabriel didn't want to convert yet another country mansion into a rural residential recording studio. Instead, he desired a unique international creative center in which recording was just one of many things to be carried out. And in wishing to offer the services of Real World to an international clientele, Box fulfilled a number of needs.

The countryside around this little town is indeed some of the most

picturesque and beautiful in all Wessex, yet the landscape was inhabited and molded by humanity for thousands of years before the Romans came, two millennia ago, and established their hot baths at nearby Aquae Sulis. As Bristol grew in importance as an embarkation point for voyages to the New World, the Great West Road, now the A4, carried stagecoaches through here on their perilous journey between London and the mouth of the Severn. The 18th century brought the building of a canal along a parallel course, followed by the Great Western a hundred years later. Through the town runs the River Bybrook, a tributary of the River Avon. And today the M4 freeway passes close at hand. There are many ways to arrive here.

Walk down that main road toward Bath from Brunel's tunnel and you soon come to the town's post office; turn right down narrow, winding Mill Lane, under the railroad bridge, and look to your right. You'll see a tall, sturdy 18th-century building with an overhanging loading bay about four

floors up. Built of the characteristic local yellow sandstone—Bath stone—it was once a water mill, and it still straddles the stream today. Around it is a cluster of smaller buildings, many built of the same materials. This is Real World.

In a corner of this remarkable expanse of real estate—12 acres in all—Mike Large has his office, virtually under the railroad. He's the general manager of the place—sharing his administrative building with studio manager Dave Taraskevics ("Dave T.")—and as such he looks after the smooth running of a fascinating collection of companies, all under Gabriel's Real World banner. There's Real World Studios, of course, but there's also a record company (Real World Records, looked after by Amanda Jones, who is pulling in musicians from around the globe to capture their art with the latest recording technology); an audio electronics company, Real World Designs, run by Peter Holmes; Real World Associates, which handles the financial management for Gabriel and the group (run

A REAL WORLD TOUR

Inside
Peter Gabriel's
Recording Complex

By Richard Elen

by Maria Pedro); and several other operations, involving over two dozen people. As a result of their experiences, they have their own building company, and there is even a Real World company, Fox Products, that makes light fittings and furniture! But in many ways it is the studio complex, housed in the mill building itself, that is the centerpiece.

There are three studios in the building—or at least there are three control rooms, each of which has a recording area associated with it. In fact, in almost all cases you can record in the control room, and when you see the largest of the control rooms you'll know why—it's the size of a small concert hall. But more on that later.

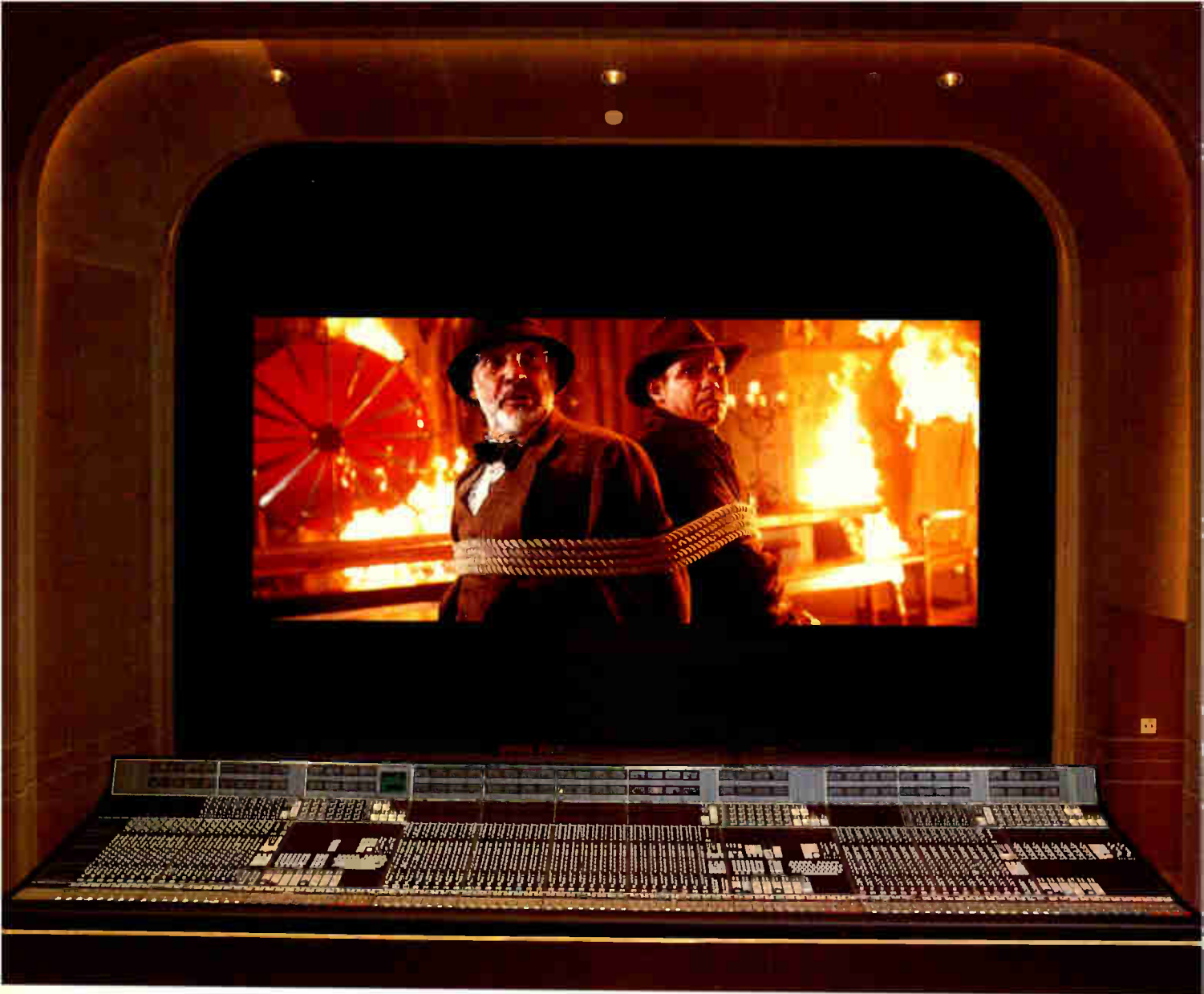
I started off my visit with a cup of coffee and a tasty, home-cooked vegetarian meal with Mike Large in what was once the mill owner's house. Built in 1904, it's been carefully restored and now houses guest accommodations upstairs—with six double bedrooms and additional space if necessary—and a kitchen, and spa-

acious dining room downstairs. Across the pathway outside is another building, known as the Producers Cottage, which is over 250 years old and

completely self-contained, with a kitchen and master bedroom downstairs and an open-plan, split-level upper floor that can provide extra ac-

Facing page: Exterior night view of Control Room One as reflected in the mill pond; right: Stone and wood combine to give this room excellent sound characteristics, with a natural, "live" feel. Note the extensive use of RPG Diffusers in the ceiling treatment.





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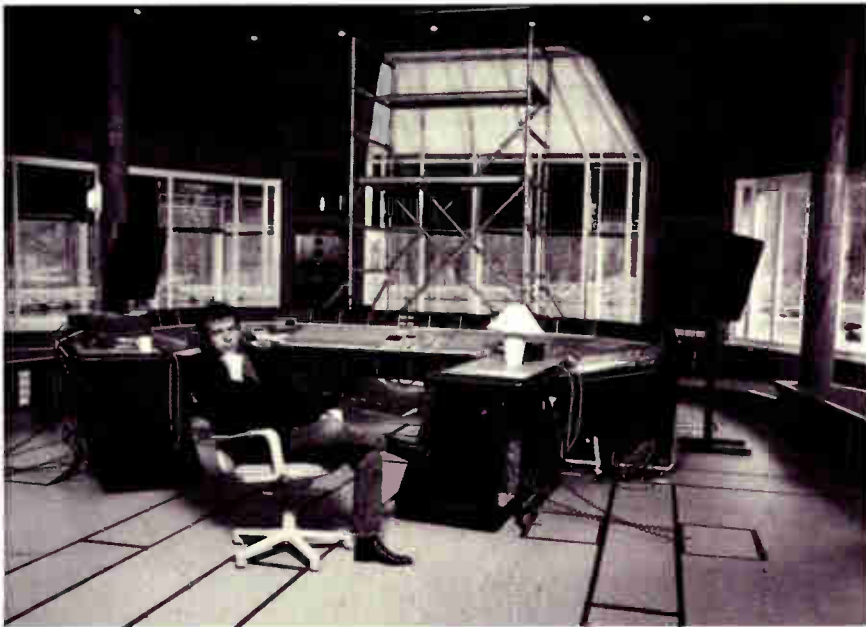
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Peter Gabriel in Control Room One, with its 64-channel Solid State Logic console and pond view.

commodation if desired, or be set up as a demo studio. A little further away is a recreation facility. Satellite TV is everywhere.

The idea of Real World is to provide a complex of recording and performance facilities that are linked together. To this end, you can hook up virtually any of the rooms in the building by virtually any kind of medium: audio, data, MIDI, video, machine control, you name it. They are completing the design and installation of their own system for sending MIDI data over long cable runs without degradation and with minimal delays, and a unique active foldback system. Characteristic Real World connector panels are installed throughout the facility and allow any control room to use any recording room. In fact, the concept at Real World is that there should be as little division between "mixing" and "tracking" as possible—Gabriel's own technique involves mixing essentially as he goes along. Everything is designed for maximum flexibility. "We've tried not to make any rules as to how a room is set up," Large says. "People can 'invent' their own environment, move equipment around, wheel acoustic screens into the control room to make a booth there, or partition off instruments. Tape machines can be in the room or outside it as you want."

Each recording environment has a different sound and a different feel—

a testimony to the fine acoustics work of Neil Grant, in cooperation with a group of top architects, engineers and artists. And you choose the one that suits your project best. At Real World the rooms have character because that was a fundamental design criterion—it was built-in.

Going into the main building, the first room Large took me to was the smallest control room of the three, known as the Production Room. It's about 6 by 5 by 4 meters and boasts some remarkable views of the river. Despite its relatively small size, the room is very comfortable. In the center is the console, a 40-channel Solid State Logic with G Series computer. All the consoles here are SSL, making Real World a showpiece for this manufacturer. Monitoring is on UREI 813Bs (driven by E2A amps, like Neil Grant's Boxer monitors elsewhere in the building), but there's a wide choice of near-fields. The multitrack here is the latest Otari MTR-90. The room has a good collection of outboard equipment, as do all the rooms, and there's an Apple Macintosh with Opcode MIDI interface. There are well over a dozen Macs of various types all over the complex, and every control room has one.

There's also a Sycologic M16 MIDI routing matrix. Since Syco Systems merged with Stirling Audio, Real World, with a shareholding in Syco, took over the product and placed it in

the hands of Pete Holmes' Real World Designs. It will be re-released shortly with 16-into-48 capability and re-named the M48. Its main feature is negligible delay. Real World's own units have been modified with their proprietary "long-range MIDI" drivers.

With multiservice connector panels in every room, there's plenty of flexibility with interconnection. Large's team has also developed a so-called "Universal Tape Machine Interface," or UTI, which enables any of their machines to be hooked up to any of their remote systems. "It converts any tape machine to a standard, more-or-less SSL format," he comments. "It means that if someone needs another multitrack, for instance, we can just wheel it in and plug it into the wall-panels."

Next to the production room is the Stone Room—about 6.5 by 6.5 by 6 meters. It's situated right over the mill race—the river drops several feet at the edge of the building and flows under the floor! Thick, multiple-layer glass panels allow a view of the river, with lights available to illuminate the scene. As its name implies, the Stone Room is a very live recording environment. The Bath stone walls, flagstone, and glass floor and a unique ceiling give the area a tight, dense reverber-

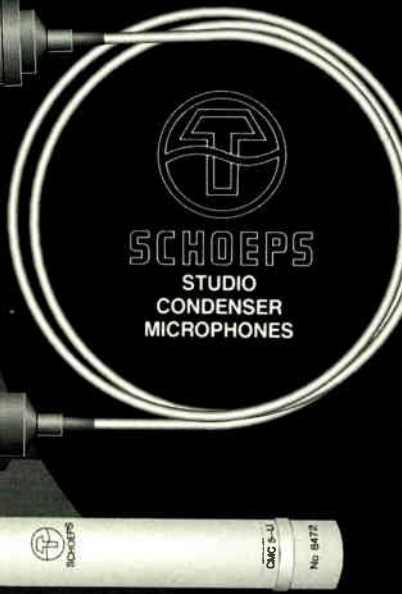
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ant sound. The ceiling is a three-dimensional RPG (reflection phase grating)—it's the materials that make it particularly unusual: square slabs of Welsh slate suspended at different heights by stainless steel threaded rods. "Neil Grant calculated the sequence—and then we messed it up by putting this catwalk through!" laughs Mike. "But apart from that, it's a proper RPG—in three dimensions rather than two."

Next we went into the main studio. To create this room, two floors have been removed to form a three-story space some 14 by 6.5 by 9 meters. There are several different recording areas, on several levels, including a suspended platform of damped mesh and a mezzanine. I asked Large what effect the design emphasis on steel cables, struts and mesh had on the acoustics. "The room has a sound and probably some of that is the stuff resonating. But I think if you try and design a room with no sound, it will be very boring. It's much better to have several rooms that you like being in; it's very likely that one room will sound right for what you want."

The upstairs control room, otherwise known as the Workroom, is on the top floor of the building and has excellent views across the mill stream. It's a large room, 13 by 7 by 5 meters, and has a lot of natural light thanks to expansive skylights. It's where Peter Gabriel works when he is here, and the room benefitted from this throughout the design phase. It has its own live room attached, but it is equally possible to record in the control room. The console upstairs is an SSL 4048E 48-channel unit with G Series computer and equalizers, integral synchronizer and eight stereo channels. It was originally bought by Gabriel to record the *So* album, and has since been heavily modified. The console has been fitted with Real World Design's ASM (Automated Send Matrix) modules, which provide four extra automated aux sends per channel. There are a pair of Studer A820 24-tracks, plus an A820 half/quarter-inch machine with center time code, and, of course, R-DAT. Monitoring is on a Neil Grant-designed Boxer system, plus the usual gamut of near-fields.

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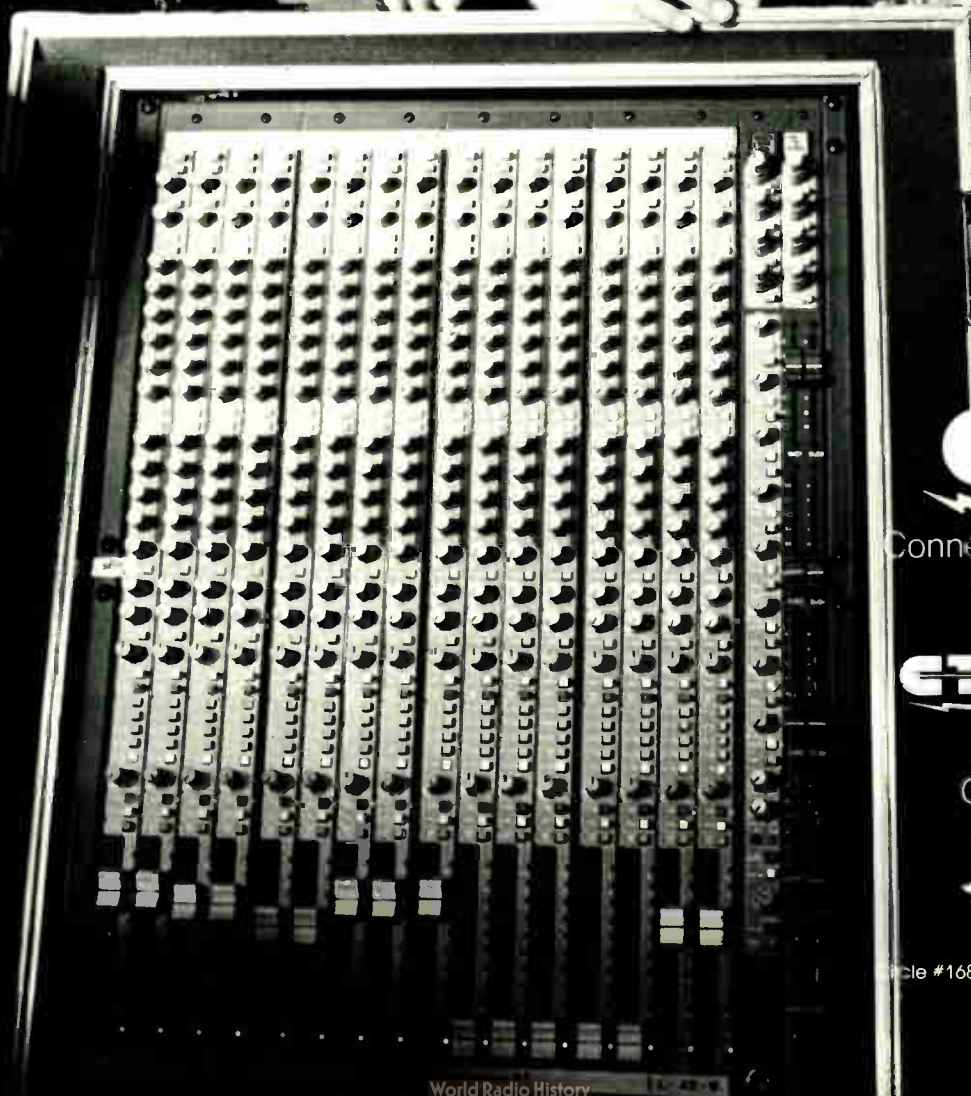
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The Musicians of the Nile recorded an album for the Real World label at the studios last year.

nal mill building and enter the new extension that houses Control Room One. Built partially underground, with a landscaped grassy hill covering some of it ("Our toboggan run in winter," Large points out), this room also features vast windows looking out over the mill pond.

The windows can afford to be big. The room itself, the latest to come online at Real World (in late February 1989, the rest of the complex having opened in late 1987), is immense. Imagine a room 15 by 17 meters (about 2,500 square feet) with three windows, each a good few meters high, occupying much of one of the shorter dimensions, looking out across the small lake and its fountains, with huge Boxer monitors mounted in concrete pillars on either side of the central window. Imagine a complex and sophisticated system of tilted absorbers high in the ceiling over a large, central sunken area mostly occupied by the biggest SSL console you've ever seen, plus an array of outboard gear in mobile racks and an AudioFrame system. Now imagine that central area surrounded by a raised platform big enough to partition musicians off from each other. A lot of musicians. Three walls are covered with intricate absorbers, and filling the rear wall is an immense diffusor of wood, metal and glass.

At the time I was there, the room was a wonderful mixture of times, places and technologies. A group of

Chinese musicians—recording an album for Real World Records—was doing overdubs, recording instruments designed a millennium ago on that huge 64-channel board, surrounded by the WaveFrame and Akai samplers. "This is how I like to see a room being used," Large enthuses. "Everything's happening in the room—you get a fabulous rapport between the producer and the musicians. There's no way that a musician feels stranded, or out on his own."

The console is an 80-channel frame, but only 64 modules are installed at present. Neve Prism modules provide alternate mic inputs, while a Real World Design ASM provides additional console sends. The console has been heavily modified in other ways, too. "There's a status computer that lets you have any combination of SSL statuses on any bank of eight modules—right down to things like line output to meters and other facilities that are normally only console-wide," says Large, who used to work at SSL. "You can work this board so that groups 25 through 32 can perform as stereo subgroups and be mixed down, so it's a bit like an SSL 6000 in that respect—although you might well call it an '8000.' I worked with Al Smart, who also used to be at SSL, and when we got hold of this console we did everything to it that we'd ever wanted to do to an SSL. So that was quite fun.

"There are Studer 1/2-inch and 1/4-inch machines here, too, and the

facility also has a Mitsubishi 32-track. A lot of the stereo mastering at the facility is performed to 1/2-inch, often with Dolby SR, which is also available on the multitracks. Peter Gabriel generally masters to a hard disk-based editor. "But digital hasn't become the standard—stereo or multitrack—that I thought it would," Large comments.

Near the big control room is a small recording area with an adjacent booth. It was originally going to be a reception area, but it turns out it has very useful acoustic properties. It was still being finished when I was there.

Expansion is still going on at Real World. Another stone building is being converted to become an offline video editing suite for another Real World company, Post Haste Television. Nearby are some industrial-looking buildings, one of which houses a rehearsal room—where Tears for Fears were working at the time—and behind that are the offices of WOMAD (World of Music, Arts and Dance) run in conjunction with Real World Records. There's a fine art printing company here, 107 Workshop, although it's not part of the group. And now Real World is planning expansion overseas, with proposals for a rather unique theme park project in Barcelona for 1992. The park will focus on art and music from all over the world, and will combine that artistry with the latest presentation technology. "The project is in its infancy," Large says. "I've been working on this with Peter, Brian Eno, Laurie Anderson and various other people."

There's a lot going on here. It really isn't your average British get-away-from-it-all rural residential studio, which, of course, is deliberate. Things happen at Real World, and the whole place has a businesslike feel to it. You get the impression that here, work will be done. Creative work, but work nonetheless. Says Large, "The studios themselves are peaceful, but there are people around doing other interesting things in their own right. It is a place to work in." ■

Richard Elen is a freelance writer based in England.





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AN ANSWER TO THE CHANGING NEEDS OF THE RECORDING STUDIO

by Paul Calderon

The UK studio world as a whole is in peril. There are too many studios chasing too little work, and while studio rates are going down under the pressure of fierce competition, the weaker studios are going down with them. The past few years have seen the closure of many a British studio, and even some managers of well-established studios are admitting privately that times are hard and that their rooms are sometimes empty for weeks, if not months. Silence is not golden.

Despite all this, residential studios are springing up everywhere in the UK, especially in London. Sometimes they're completely new, but more often existing studios invest in residential facilities, in an apparent attempt to keep an edge on the competition. During the last one-and-a-half years, half a dozen London studios went residential, including top studios like Marcus, Mayfair, Sarm West and Eden. Grand old institutions like Abbey Road and Air are said to be planning to go residential in the near future, too.

It was Rockfield in Wales that pioneered the residential concept 25 years ago. Located deep in the Welsh mountains, it provided guests with some simple beds to save them the bother of driving back to the hotel in the middle of the night.

In 1972 The Manor Studios capitalized on this idea and opened a state-of-the-art recording complex with lux



Above, Wool Hall is located in Bath, about an hour west of London. At left, Farmyard's studio is housed in a barn originally built in the early 1800s. Below, The Mews, Mayfair Studio's residential facility.



STUDIOS



Above, Chipping Norton was among the first of Britain's residential studios. Above right, the Pavilion Studio at Great Linford Manor, with an aerial view of the estate.



PHOTO: ROB BELL

The Mill, below and at right.



STUDIO SPOTLIGHT:

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urious residential facilities about an hour's drive from London. Shortly afterwards, Chipping Norton Studios followed with a similarly upscale approach, and the concept of the recording retreat, a band and a producer locking themselves away in the middle of nowhere to record an album, started to take hold.

Eighteen years later, the residential idea is well-established worldwide. The European continent features many residential, and their numbers are also expanding in the U.S. Yet it's in the cradle of the residential where things have really caught fire: Today there are well over 50 residential studios in Great Britain.

Neville Farmer is the editor of the UK trade magazine *Studio*. He signals an almost exponential rise in the number of British residential in the last four to five years: "I think that people are more and more realizing the advantages of staying on-site while recording an album. That's why more and more London studios are starting to offer residential facilities, although many people still prefer the peace and quiet of the countryside."

Internationally renowned Mayfair Studios was one of the first London

—FROM PAGE 65, THE MILL

Elton John's record producer, Gus Dudgeon, are set in a picturesque water mill on a private tributary of the Thames. New owners HSH Music Ltd. bought the complex from Led Zeppelin guitarist Jimmy Page, who called it The Sol.

The Mill has been completely re-equipped and refurbished. Besides the Neve VR 72/60, there is a Mitsubishi X-880 digital recorder and two Studer A827 multitracks, plus a 9-foot Bechstein grand piano with MIDI.

HSH Music Ltd. is operated by

studios to go residential. About two years ago they opened The Mews, a completely new residential studio just across the road from the original Mayfair premises. At that time many people thought Mayfair had taken leave of their senses, especially since the new studio was top mid-range, an already overgrown market. The idea that anybody might want to go residential in the pollution and chaos of London was regarded by many as near insanity.

Yet studio manager Kate Hudson

musicians Rod Halling, Roy Shipston and Simon Holmes, and includes the trio's production company. The Mill was formed just over a year ago as a composition, production and recording facility. Major projects have included the score for a full-length feature film called *Mountain Surfers*, the music for an Australian TV documentary set in the Outback, and the tracks for a CD project called CDQ, a sophisticated quiz game for which HSH had to accurately re-create nearly 400 Number One hit singles from 1953 to 1988. ■

has a clear vision of the market The Mews wants to serve. She asserts, "Affordable residential in Central London are something the record companies desperately need. Recording in the country may sound romantic and ideal, but a lot of A&R-types just don't have the time to travel up and down to remote recording locations. Also, there are many artists who actually like to record in the middle of the city with all its facilities."

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many times over in the last two years. Originally conceived to cater for up-and-coming bands, it also saw acts like George Michael, Art of Noise and the Bee Gees. Hudson says, "Many artists like to lay tracks in The Mews and mix in Mayfair."

The Mews has cheaper rates than Mayfair, but it also has a definite charm of its own. "The Pretenders came in with producer Mitchell Froom to choose a studio to work in, and they straight-away decided in favor of The Mews because they liked the atmosphere so much," remembers a studio assistant.

The Mews is, as the name says, housed in a former mews, which included stables, hayloft and a residence for the groom. Now the stables are housing luxurious accommodations for six people, and there is a separate cottage for one, named "The Producer's Cottage."

The aesthetic design of the studio is the brainchild of Hudson, and it's inspired by the work of the Dutch painter Mondrian. There's lots of white and gray, complemented by blue, red and yellow surfaces, delineated by black lines. Hudson says, "People have to work for a long time

in an environment like this, so the environment becomes very important. I [wanted] something that was strong and exciting, and at the same time relaxing and soothing. I took a risk with this design, but it seems to have worked out well."

Equipment-wise, studio designer John Hudson (co-owner of Mayfair with his wife, Kate) has left nothing to chance. A 32-channel SSL 6048 dominates the control room. The 24-track is Studer A80, and there are Lexicon 224XL and PCM70 reverbs, and F1 and 1610 digital and Studer 1/2-inch and 1/4-inch recorders for mixdown. An array of MIDI facilities, keyboards and drum machines fill out the room.

Surcharges for accommodations and food is common practice with London residential studios, because they also rent their studios without these facilities, whereas the residentials in the countryside work with an "all in" price. (British customers pay an extra 15% tax.) They work almost exclusively with longer-term total lockouts, financially lucrative and good for the studio manager's peace of mind. The further away from London, the more generally the need for seclusion and the longer the lockouts.

One such studio located deep in the heart of nowhere is The Wool Hall. It's situated close to Bath, just over an hour west of London, but within easy reach of Heathrow. Typical of almost all country residentials, Wool Hall is an old, converted, historic building surrounded by idyllic scenery. In this case it's a former wool market, dating from medieval times.

Pete Dolan is the manager and also one of the studio's five directors. Dolan was in charge of the building and renovation work, which started in 1984, to transform the "historical curiosity" into a state-of-the-art studio. This involved, among other things, building a special steel cage with several tons of sand in the floor to hold and isolate the control room.

In Dolan's opinion the studio's remoteness is one of its main attractions. "People can work here completely undisturbed and in complete concentration. It's an ideal place to work on long-term projects. Working here contains the energy and gives a constant focus to a project. But because we're so remote we have to have our own in-house maintenance well-organized."

Equipment-wise, The Wool Hall is

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top-of-the-range. There's a 56-channel SSL 6000 G Series desk and a choice of either 48-track analog (with Dolby SR as an option), 32-track digital with a Mitsubishi X-850, or combinations of digital and analog. Of course, there's the usual selection of outboard gear: Lexicon, AMS, Yamaha and EMT valve plates. Another attraction is The Keyboard Club. It's a MIDI programming room, at its conception one of the first in the country, with an array of MIDI gear and keyboards, including a Synclavier, PPG Wave 2.3, Emulator II with hard disk drive, Prophet-5, Super Jupiter, E-mu SP-12 and many more.

Accommodations at The Wool Hall are extremely stylish and comfortable (maximum 11 people), and the studio has seen many top artists working within its walls. Van Morrison is a regular guest, and from the States the Cars' bassist Ben Orr worked here on a solo album, while Joni Mitchell recorded part of *Chalk Mark in a Rain Storm* at the West England studio.

Another top residential studio is Great Linford Manor. Described as the "Rolls Royce" of the British studio world, its facilities are certainly impressive. Great Linford Manor is locat-

ed about 40 minutes north of London, on the edge of the British new model town of Milton Keynes, and studio owner Harry Maloney sees the studio's proximity to Milton Keynes as a big asset. "When you're recording in very remote places it becomes a problem when you need a bit of a break and want to go out to refresh yourself. Here, shops, cinemas, restaurants and sports facilities are all within minutes' drive, but we're secluded enough to guarantee peace and quiet."

This is true, since The Manor is located in the middle of a large, landscaped park, with facilities for water-skiing, windsurfing, swimming, horseback riding and tennis. Part of the British heritage, the main studio is situated inside a 1688 Gregorian manor house, built by a member of Parliament as a country retreat. Residential facilities, offices, kitchen, dining room, the control room and the superb studio (a former ballroom with excellent acoustics) are all located here. This studio is equipped with a 48-channel SSL 4056 E Series desk, Mitsubishi 32-track digital and Studer A820 analog.

One-hundred-fifty yards away from The Ballroom is The Pavilion, a re-

stored 18th-century stone pavilion that has its residential facilities in an adjacent 17th-century almshouse, complete with extra serviced cottages available for larger numbers of guests. If The Manor is a Rolls Royce, The Pavilion is at least a Bentley, because only the best in gear and acoustics is found. Again, there are Mitsubishi 32-track digital and Studer A820 analog machines, but the studio's main attraction and identity comes from the upgraded Neve desk, custom-rebuilt.

Many producers love the sound of the Neve, so it's not unusual that they use The Pavilion for laying tracks and the fully automated SSL in Studio 1 for mixing, although some like to go even further. Recently, American producer Mike Fraser (Aerosmith) came in with EMI band Thunder and block-booked both Studio 1 and 2 for six weeks.

Another top studio, but again with slightly different accents and aspects, is Farnyard Studios, located 30 minutes northwest of London. Although the setting of the studio is definitely rural and scenic, it still is close to one of London's underground stations. According to studio manager John Accock, this is a long-term asset, since all the travel times mentioned in this article

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are driving times, and London traffic is only getting worse. Public transport has become more of a preferred option.

Transport issues apart, what really must have been Farmyard's biggest ace is the influence of top producer Rupert Hine. Ten years ago he helped drummer Trevor Morais turn his rehearsal room into a real studio, and today they are co-directors. Hine has been responsible for a string of hits and hit albums from artists such as Tina Turner, The Fixx, Howard Jones and, recently, Stevie Nicks.

Yet Farmyard has facilities to stand up to scrutiny purely on its own right, without famous producer/directors. An SSL 4000 E Series desk with G Series computer, 48-track analog with 48-track Dolby SR and the best outboard gear available are among them. English history in this case is provided by the accommodations (eight double bedrooms), which are inside a large Jacobean manor house. The studio is housed in a barn, built in the same period (early 1800s). The control room provides lots of space for keyboards. The recording area is shortly to be enlarged to 60x40 feet, featur-

ing various spaces separated by glass doors and windows.

Residential studios in Britain tend to be top-of-the-range studios, but this is changing. Within the wave of new studios opened in the last few years, there is a new phenomenon: the mid-level residential. One of the studios covering this middle ground is Picnic Studios, opened about three years ago. This studio is aiming clearly at track-laying customers, exemplified by the versatile live room, which boasts 500 square feet of floor space, 20-foot-high ceilings and many reversible acoustic panels. The desk is a DDA AMR 24, the recorder is a multitrack Studer A80 MkIV, and despite the studio's track-laying bias, there's a healthy array of Lexicon, AMS, Yamaha and other processing boxes.

Apart from the above, studio manager Colm Sexton speaks of other qualities that attract customers. First, there's in-house engineer Mike Banks, a highly qualified and experienced engineer who's worked with artists ranging from The Shadows to Sam Brown; and second, there's the location. The studio is located on the edge of a small village, 45 minutes south-

east of London, in the middle of a "traditional Kent fruit farm." Accommodations are for up to six people, with a local Edwardian mansion providing overflow facilities.

Last but not least there's Chipping Norton Studios, one of the residential pioneers. Located just over an hour northwest of London in the middle of The Cotswolds (one of Britain's favorite countrysides), it can be classed as sub-top, or top-middle. Sixteen years ago it was among the first to offer luxury accommodations. Chipping Norton helped introduce a concept that is now most heralded and promoted: service.

Richard Vernon, studio manager and co-owner, says, "Everybody can fill a room with equipment and rent it out, but the secret of a successful studio, and I mean successful also from the point of view of the client, that he or she is satisfied with their product, is the way it's run and the care of the management. Service and atmosphere are of crucial importance."

He adds that when he started the studio with brother Mike (producer of Fleetwood Mac, Eric Clapton and The Yardbirds in the '60s, and more recently, Level 42), their incentive had much more to do with their love of music than any business considerations. What they wanted to create was a creative and technological environment that would breed good music.

Over the years Chipping Norton has seen clients like Duran Duran, Alison Moyet, Waterfront and Jeff Beck within its walls, and it is still very much in demand today. One seeming idiosyncrasy is the desk: a Trident TSM 32-channel model. When the music industry was feverish with remix craze a few years ago, there were some booking problems, but Vernon asserts that he sees no point in upgrading the desk: "Most of our clients come here because they like the Trident, and it's been that way for a long time."

The Vernons have recently seen more and more producers use the Trident to mix their projects, even though it is not automated. Back to the old hand work, as it were. The English certainly do have a way with history. ■

Paul Calderon is a London-based freelance writer who contributes to music and studio trade magazines in Europe and the U.S. He's also a songwriter, singer and guitarist.

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It's taken several years for me to develop long-distance work. Initially, I had a production that I thought would be suited for the European market, so I packed up my record company and studio directories and went visiting. I became familiar with some European labels, studied the market and began the long process of making contacts and building relationships. It's a continuing process, and it's difficult to stay abreast of who's hired, fired or just plain moved on, but that's a big part of what it takes. If you're intrigued by such possibilities and you're looking for some tips, I invite you to read on.

Talk with foreign artists, managers and A&R people at every opportunity. Stay on top of it after you have met them. Send them samples of your work, write, call and fax them to let them know you are serious about working together. If possible, offer them something—an artist, a gig, a label and artist that might have potential in their market—or use your American contacts to try to get your foreign artist distribution or performance opportunities in the States. I am currently working on an American recording contract for an English artist, another for an Italian artist, an Italian publishing deal for a Canadian act, a European recording deal for an American act, and production deals for myself in France, Italy, Canada and the States. Even when nothing comes of your efforts, they will be greatly appreciated, and it takes only a couple of successful deals to make it all worthwhile.

Nothing beats a personal appearance if you have serious interest from a potential client or if you are interested in a particular artist. Cash in your frequent flyer miles, tie it in to another trip, do whatever you can to get to the artist's home turf. Brush up on your French, Italian, German or whatever, talk with them about their proj-

INTERNATIONAL FREELANCING

SOME TIPS FOR ENGINEERS

by Stephen A. Hart

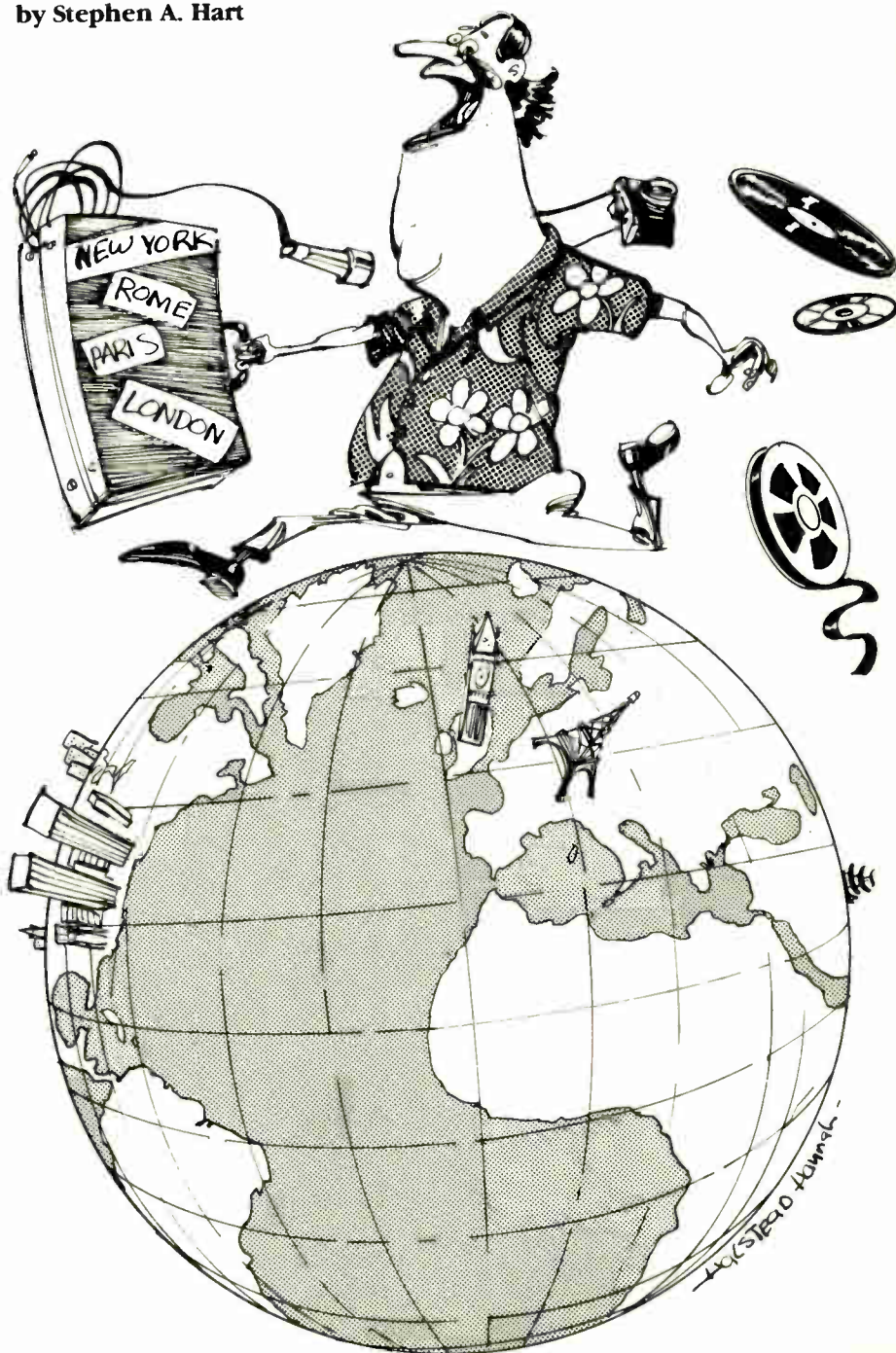
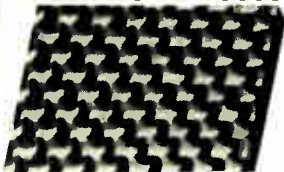


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ect and let them know what you have to contribute. Remember that there are good engineers and producers in every country, and clients need a reason to hire you, transport you, feed you and put you up. Be aware that it could be your personal style, your past credits or even your haircut that makes a difference. This approach takes a substantial amount of time and money, but it works.

Once you've got the gig, *assume nothing*. Your work has barely begun. There are lots of arrangements to make, including transportation, lodging, meals, studio selection, schedules, rental equipment—you need to know who is paying for what. If you don't make all these arrangements clearly and in advance, you'll probably end up spending half of what you make on basic survival and transportation. Leave no details for later. When you go, bring hard copies of all previous communications, including budgets, invoices and notes from telephone calls. It's amazing how items get forgotten or misplaced and terms get altered. All the same problems you encounter at home are heightened by language barriers and different ways of doing business.

It seems that studios everywhere have a Macintosh computer. So I have created personalized software on the Mac for international projects, such as invoices, payment guidelines, production schedules, travel itineraries, equipment request forms, mic and mix console setup sheets, track sheets, contact directories, etc. All the data for each project gets updated as we go, and at the end, I leave a copy for the client. Even with all this careful organization, you still get surprises: the rental car you had for a month that was supposed to have been on the record company's account, or the hotel bill someone neglected to prepay and your flight leaves in an hour. It helps to have some serious credit cards, and you should invoice for reimbursement immediately, because you can bet it's going to take forever.

STUDIOS

Call or fax your studios in advance to let them know what you need in the way of recording formats, alignment parameters, automation requirements, console setups, mic setups, tape stock and so on. Have them send you equipment and mic lists. Find out if the assistant (if there is one) speaks English.

Sometimes we're spoiled by what we have at home. Once I booked an overseas studio for a three-week mix with an SSL G Series with a digital 32-track and all the trimmings. I mixed the first song for two days, went to store the setup and discovered there was no Total Recall. Of course I had to remix a week later. Assume nothing.

Sometimes you get what you ask for and sometimes not. Recently, I arrived at an overseas session to be informed that all the outboard gear I had requested had been located, but we were changing studios. My digital 32-track, two Lexicon 480s, two PCM-70s, two TC delays, Eventide H3000s and racks of Aphex and Focusrite dynamics and EQ didn't mean much with a 28-input console. What to do? Stay flexible, or go crazy.

Monitoring is a major problem when you work in many different rooms, and different countries have regional preferences: soft dome tweeters, horns, mid-field, near-field with mid-field speakers, etc. Be flexible. Always bring some familiar reference CDs and DATs, or your own speakers (easier said than done considering customs regulations in some countries). I use records that I recorded and/or mixed. It takes that kind of intimate relationship with the music to evaluate a monitor system accurately and determine if it can work for you. Unfortunately, I find only about 50% or 60% of studios' main monitors really useful. My personal monitors that I use in the States are too big to travel with, but after two years of listening to smaller speakers I found some self-powered, accurate monitors that I actually can carry. Watch for my endorsement!

TRAVEL

Try not to pay for your own air fare or rental cars. Once it's on your credit card, chances are it will sit there for a while and you'll be paying the interest. Have your client prepay your air fare in their currency. Don't even go to the airport until you have confirmed your ticketing with the prepay desk of the carrier. Make your own travel reservations and fax them to your client. It's a lot more fun to travel when and how *you* choose. Join all the frequent flyer clubs. This will pay off down the line. Have baggage insurance, and carry on all valuables, like your portable DAT recorder, your notes and your favorite pair of shoes.

Twice in two years I have lost all or part of my baggage (never to be found), and clothes shopping wasn't written into the album budget.

Educate yourself about the immigration and customs regulations of your host country. Some countries, such as England, have some very tough laws concerning foreign workers. Italy, on the other hand, welcomes you to work there, but they want you to pay income tax (supposedly recoupable). In some cases, it's difficult for foreign employers to get all the appropriate work permits, and although I would personally never recommend lying to any immigrations official, sometimes it's just better to be on vacation. This is one more reason not to carry around any more equipment than you have to. Leave those racks of electronics at home.

PAYMENT

If you have never met the client before, or if it is your first job for him or her, it can be difficult to get an advance payment. They don't know if you're even going to show up. In this case, I would travel to the project site, maybe work for a few days to feel things out, but then insist on the advance. I strongly advise against doing the bulk of a project with no payment. It's extremely difficult to collect your fee once you're 6,000 miles away. Once you've developed trust with a client, it shouldn't be a problem to secure an advance to be paid before you leave home. And if you've had payment problems with a client, you should insist on an advance, and don't complete the project, or at least don't leave the country, until the balance of your fee has been given to you or deposited directly to your bank account. Make sure that there is a written agreement concerning payment in explicit terms.

Establish a cancellation policy. Last-minute cancellations are a spectacular way to lose a lot of money. When you have turned down work at home and spent a lot of time and money preparing for an extended international trip, you don't want the client to cancel or postpone everything three days before you leave.

If you accept foreign currency, remember that you will be charged an exchange fee (a percentage) when you convert it to dollars, and that exchange rates can fluctuate widely and rapidly. What you are paid one day can be worth less the next.

Try not to pay for your own air fare or rental cars. Once it's on your credit card, chances are it will sit there for a while.

The most effective payment I have found is a bank-to-bank electronic transfer made in U.S. dollars. This way your client pays the exchange fee and you pay only a minimal service charge to your bank. When dealing with a large, multinational label, have the host country's A&R or finance department arrange payment through its American offices. It's very simple—no foreign taxes to pay and no exchange fees. I usually contract to be paid in full before I leave the host country, so I just call my bank at home and check

if I have received a transfer. If not, I stick around and bother them.

I once had the reverse situation, where the project was finished, all mixes and edits were completed, but they held me hostage for four days (by not paying my substantial hotel bill) so that the artist had some time to live with the mixes. (Fortunately, all the mixes were approved.)

I forecast an active decade in the international marketplace. Europe, in particular, will be very active in the '90s, with the open market approaching and the Eastern bloc opening up. There will be more and more music freed from the barriers of economics and language. It is also my hope that there will be more acceptance in America of non-English language songs and different musical styles.

With all the preparations, precautions, risk, and extra energy and patience that international work involves, it's an adventure every time out. Passport, please? ■

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by Iain Blair

DANIEL LANOIS

SONIC ATMOSPHERES

W

hy'd it take me so long to finish *Acadia*? Basically because I kept getting sidetracked into doing other records that I just couldn't say no to."

Daniel Lanois is sitting in an office at Warner Bros. Records, Burbank, talking about his debut album, which follows hot on the heels of the Neville Brothers' *Yellow Moon* and Bob Dylan's latest, *Oh Mercy*: two of the projects that the soft-spoken French-Canadian producer just couldn't say no to.

"I originally signed to Opal Records, Brian Eno's label, back in the beginning of 1988, and started some of the songs for *Acadia* down in New Orleans," Lanois says. "But then I bumped into the Neville Brothers and that was that. I *had* to produce their record.

So I just stepped back from mine for a while, figuring I'd

finish it up after the *Yellow Moon* sessions.

Lanois eventually got back to his own project, but only after agreeing to also produce Bob Dylan's new album, again in New Orleans, where he had set up a studio in an old house. "I thought if I went down there to work, I'd be left undisturbed and I'd get the album finished pretty quickly, but it didn't quite work out that way," he laughs.

"But it all worked out for the best, because I originally had planned an instrumental record that was going to be very reflective and relatively quiet," Lanois reports. "After working with the Nevilles and Dylan, it turned into a vocal record with a much harder edge and, I hope, much stronger lyrics. They both inspired me to push myself a lot more."

The result is an eclectic, intriguing collection of 11 original songs (and a shimmering interpretation of "Amazing Grace") produced, naturally, by Lanois, and featuring guest appearances from the likes of U2's Adam Clayton and Larry Mullen Jr., Brian and Roger Eno, the Neville Brothers and Mason Ruffner, among others.

As a producer and engineer, Lanois' musical portfolio is one of the most impressive in contemporary music. His credits range from albums for Peter Gabriel (*So*) and U2 (*The Unforgettable Fire*, *The Joshua Tree*) to Robbie Robertson's 1987 self-titled solo debut, and over the years his musical vision has remained remarkably true to his original philosophy of recording: "Create a unique environment for each record wherever possible."

Born in Ottawa in 1951, Lanois began his recording career at an early age when, along with his brother Bob, he built his first studio in the family basement. "In the end we drove my mother crazy with the studio in her

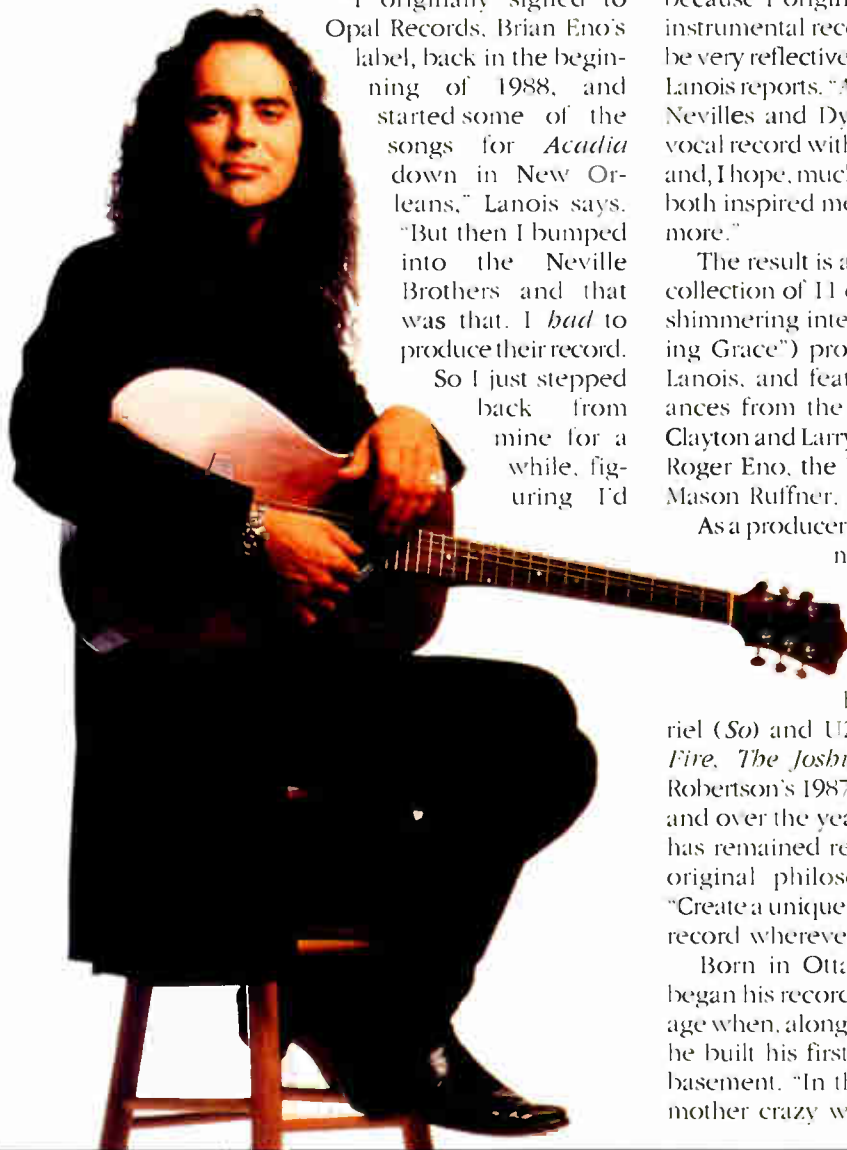


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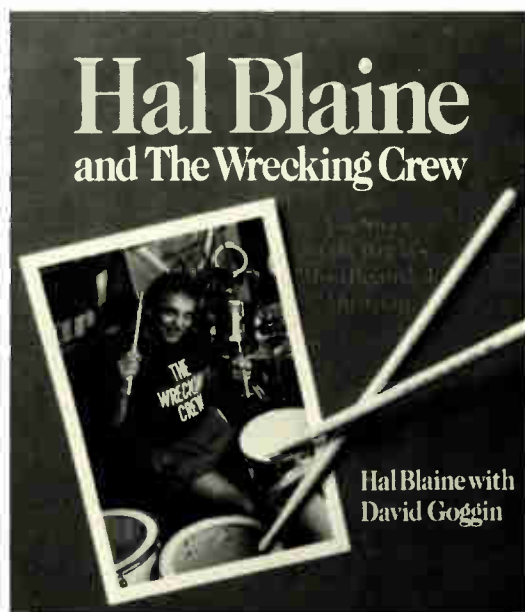
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house, so we moved to a big house nearby in Hamilton, which became Grant Avenue Studio," he recalls. It was here that the Lanois brothers produced a string of hits for local Canadian acts, including three albums for the Toronto-based band Martha and The Muffins (featuring his sister Jocelyn on bass), for which Daniel was named Canada's Producer of the Year three years running.

These successes, which included pioneering aural explorations with Brian Eno, quickly led to the string of prestigious projects mentioned above.

Mix: What music did you listen to in your teens? Who were your idols?

Lanois: As a young guitarist I was a big fan of Jimi Hendrix, Eric Clapton and Cream, but also more obscure artists like Django Reinhardt and lots of jazz artists. But probably Hendrix and Clapton were the biggest influences.

Mix: How did you meet Brian Eno?

Lanois: He heard a tape I'd done at Grant Avenue of a band called the Time Twins, who he met in New York. He really liked the sound, so he came to the studio to visit, and I didn't know who he was, but he just showed up and we started working on some ideas. He really opened my eyes and showed me how you could manipulate sound. In those days, engineers were very conventional in their approach to sessions. You recorded everything as dry and flat as you could and then got everything right in the mix. But Brian had little respect for that theory, and everything he did went to tape already very manipulated and treated, and I thought that was really an interesting way to approach things. So we had this way of using a 36-channel console, where from channel 24 to 36 would be effects returns, and they'd be bused not into stereo but into two channels all the time, as if you were ready to print all those channels all the time. So at any given moment I could print the effects very quickly, and at the time it seemed like a very extreme idea, because back then people only really monitored effects. So if something sounded good with an effect, within two seconds I could get it down on tape. Technically speaking, that's the kind of thing we came up with.

Mix: Producing U2 was an important

step for you. How did that happen?

Lanois: It was through Brian. This was before the *Unforgettable Fire* record. They were interested in finding a new sonic direction for their sound, and they felt Brian Eno would be a good choice. At that time, Brian and I had been working together for a few years in Canada, and we were in the studio and it seemed like a good idea to bring me along. That's how we met.

Mix: How did you hook up with Peter Gabriel?

Lanois: He heard some of the work I did with Harold Budd, specifically *Plateaux of Mirror*, which we did with Brian Eno, and at that time Peter was looking to work with someone on a soundtrack for a film called *Birdy*. He wanted to work with someone who was good at treating sound, and he just called me up.

Mix: Any interesting stories about the *So* sessions?

Lanois: They were all pretty much sketched out first by Peter, myself and David Rhodes, and we had a strong house rule—we wouldn't rely on fixing things in the mix, but we'd try to capture a really strong mood for each track using just the three of us and a rhythm box. Most of it was done

in the control room at Peter's studio, and we hardly ever used earphones at all. We just used the monitors for the vocals. And even more unusual, most of the drums and bass tracks were overdubbed. I usually like to capture as much of the live playing as possible in any session, but these were really the reverse. It was sort of like overdubbing the rhythm section on top of a demo. That was the spirit of the record.

Mix: What about working with Robbie Robertson?

Lanois: He operates in a very visual sense. He's loved films ever since he was a kid, and his writing is very visual. I like that a lot because I work the same way, and it's nice to share a philosophy with someone you're working with.

Mix: Let's talk a little about the Nevilles. What were you aiming for on *Yellow Moon*?

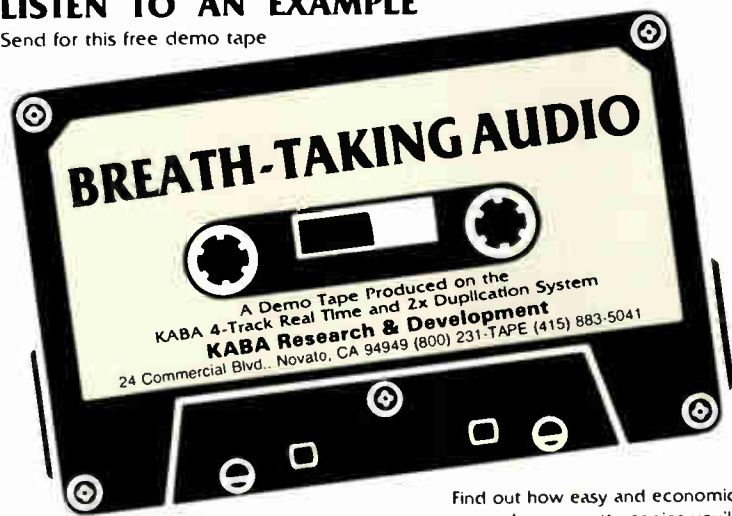
Lanois: The main idea was to create a very natural-sounding record and to let the band have a lot of input. They'd made a couple of records where the approach was pretty much dictated by the producers, and even the rhythm section had been excluded from some of that work, which is a real sin. That's

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the whole point of this band, so to make an album with a drum machine and ask the drummer to overdub is a mistake. I wanted to draw as much out of the band as possible, and I set up a portable studio in their neighborhood, I brought in some portable equipment, and just did the album in this old apartment house. It worked well because the whole focus was on them and the music. [For more on the project, see the August '89 *Mix*.]

Mix: What can you tell us about the recording of the Dylan album, *Oh Mercy*?

Lanois: It took seven weeks to record, and we did it in a big house in uptown New Orleans. We took the house over, but mostly did everything in just one room, in the control room. All the musicians set up there, including the drums. We only used the next room for the grand piano. It was a very intimate layout. I'd sit next to Bob, and Willie Green, the Nevilles' drummer, sat on the other side. So it was a very tight little circle, and there's a kind of communication you get from being physically close that's hard to reproduce with cans or monitors. So it was

very intimate, though some of the tracks were really rocking.

Mix: What sort of equipment did you use?

Lanois: I used a Studer A80 24-track with Dolby A—my favorite. A lot of it was cut at 15 ips, which I like because it gives you a great bass sound, really rich. On Bob's vocals, we used a Sony C-27A, a valve mic, through an LA-2A tube compressor, with a Neve 4-band preamp, a 1976 model, I think. So I went for the old sound in his voice and got a great, big, warm sound that also has a lot of presence. We punched that right into the patch bay, right to tape. The LA-2A has a volume control, an output level controller, so rather than use a fader, we just worked that control. The console I used is a [TAC] Matchless, which we used more for line returns than recording. For recording, we remained faithful to the outboard Neve system. Essentially, we taped on Neve and then monitored and mixed through the Matchless.

Mix: Can you choose one track and break down the recording process in some detail?

Lanois: Well, there was one song called "Most of the Time," which is very powerful and textural, and we'd tried

to lay it down with the full band and failed. The track just wasn't happening. So we then decided to go with a time reference using a Roland 808, but just the pulse. We played it in a very intimate way, just Bob and I and Malcolm Byrne, the engineer, and overdubbed on top of this box two guitars and a keyboard and a vocal. It was very simple, and not unlike my approach to the *So* sessions with Peter Gabriel. Then I overdubbed the bass next, a hook-type response in the chorus, and then two Les Paul guitars, using my Les Paul Junior and a Vox AC30 cranked up all the way. It's a real heavy guitar sound, but I set it away in the distance in the mix, so you just get this sense of power, but it's like a lid holding down the pressure. So in terms of aural perspective, the vocal is very much in the foreground and these power guitars are way off in the distance. Then, finally, Willie Green overdubbed the drums and Cyril Neville played percussion, so it was a kind of backward approach, but it's one of the most interesting tracks in terms of texture. There's a lot of anger bubbling under the surface.

Mix: How did you approach the mix?

Lanois: That song was very difficult.



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We tried a lot of mixes, and Bob wasn't even sure the song should go on the album. But then one day I hit on the answer, which turned out to be a strange balance, but it worked the best. It ended up with the percussion being very upfront, and the drums are set back with a lot of echo. It's really off-balance, but it works.

Mix: What about the mixes in general?

Lanois: We had a policy of mixing at the end of every day, so if we did a vocal, we'd do a mix, and quite often that would end up being the final mix. The rough mix would capture what we wanted. We mixed everything to DAT, so if a rough mix turned out well, we had the quality.

Mix: How was it working with Dylan in the studio?

Lanois: You know, he's an incredibly committed lyricist. I've never seen anyone work that hard on lyrics. He'd only work at night, starting around 8 p.m., and, of course, it got later and later as the record went on. By the end, he'd be arriving around midnight, and we'd go all night. Anyway, he had this fantastic concentration with the lyrics, and he'd come in with this page of words, and by the end of the night he'd have added on so much that this page would be a mass of graffiti that only he could decipher.

Mix: Tell us about your studio. Where is it?

Lanois: It's currently in New Orleans, and it's basically a portable setup. Everything fits in cases, even the Studer A80, which is a giant machine. I just like the idea of being able to go anywhere and record. The console is really the main backbone, and the reason I use the Matchless is because I can carry it anywhere. Actually, since doing the Dylan album, I've bought the API console out of the Record Plant in New York. It's an early '70s model, one of the biggest APIs ever made, and I'm going to restore that in New Orleans in anticipation of having a more permanent studio in the future. It's essentially a private studio, although friends will call up and insist that they record there!

Mix: What other equipment do you have?

Lanois: I use a Studer A80 1/2-inch, 2-track, 30 ips analog machine for edits. I mix to DAT, and if I need to do an edit on the spot, I'll transfer that to the 1/2-inch and do the edit. That

— CONTINUED ON NEXT PAGE

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— FROM PREVIOUS PAGE

works well. In fact, some things seem to improve with that extra generation. You get more of a mechanical sound and the bottom seems to improve.

As for the outboard gear, I use the big Lexicon reverb units, and I like Korg DDL-3000s—they're old favorites and I've got four of them. I prefer using them instead of direct boxes for instruments, because they've got a fantastic front-end amp. It sounds better than any DI box I can think of. That way, it also gives me the oppor-

tunity to mess around a little with the sound if I want to print an effect. I use API outboard preamps and equalizers, 4-band and 3-band, four LA-2As and a pair of old Decca compressors, which have this great warm sound I really like for vocals. As for mics, I really like the Sony C-37As. They have a real fat sound. I also use SM58s on some singers. For monitoring the musicians, I use earphones, but wherever possible I try to encourage the use of stage wedge monitors, so it's almost like a small P.A. system in the performance area, driven by heavy-duty Crest amps. As for the main

monitors in the control room, I use a pair of old Tannoy Golds in Lockwood cabinets. To this day they are my favorites, and I've tried 'em all. I always come back.

Mix: Why do you like to record in unusual places?

Lanois: Simply for the excitement. I like the idea of arriving somewhere new and transforming it into a studio. I like the strange rooms that you find in old houses and buildings. And also it gives you a sense of focus that you just don't get when you're in a big complex. You get a sound that's unique to that record, a sonic signature, if you like.

Mix: Tell us about your new solo album, *Acadia*.

Lanois: Most of it was recorded at the same house in New Orleans we did Dylan's album. In fact, after Bob's project, I just carried on with mine, because I couldn't face changing locations again. So it was the same equipment, same everything. But some of the record was done at Brian Eno's studio in England. He has a Harrison console and an MCI 24-track system. I spent two weeks there while he overdubbed some keyboards and did some background vocals. Again, it was the same working method, with everything being done in the control room. Then I moved to STS studio in Dublin, a little place that U2 uses for their demos, and as they were set up there at the time, I just moved in with my tapes, and Larry [Mullen] and Adam [Clayton] added some overdubs.

Mix: What was your overall approach?

Lanois: The main thing I wanted to capture was a very natural-sounding record, like with the Neville's. I also wanted a blend of acoustic sounds with electronic sounds. As you can hear on the record, there's a lot of breathing on my vocals, which is natural, and I didn't want to delete all that stuff. Similarly, if a feel was good but there was a little mistake on guitar, I'd just keep it. Too much polish on a record just doesn't work for me anymore.

Mix: Any advice for kids starting out who want to be producers?

Lanois: Get the most you can out of any given piece of equipment. If you like a certain sound, become a master at using it. From that will come a focus. ■

Iain Blair is a freelance writer based in Southern California.

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by Paul Potyen

HERBIE HANCOCK'S DESKTOP

PRE-PRODUCTION OF 'HARLEM NIGHTS'

One of the nice things about being in the editorial department of *Mix* is that if I talk fast enough, I can get away with a lot (or so it would seem). So last month I told you that this column would include evaluations of software I deemed to be of interest to persons of the professional audio persuasion. And in my second month—hmm, what have we here—an interview? Well, as

movie produced by Eddie Murphy, *Harlem Nights*. Hancock viewed this latest project as an opportunity to take advantage of some of the current available "desktop audio pre-production" software. And I viewed this as an opportunity to hear his views on how well it worked for him.



my high school English teacher used to say, a foolish consistency is the hobgoblin of little minds. Let's just say I thought this was too good to pass up.

Herbie Hancock has long had the respect of musically aware moviegoers as well as jazz buffs. His first film score was Michaelangelo Antonioni's *Blow-Up* in 1966, and since then he has chalked up credits for the soundtracks for *Colors*, *A Soldier's Story*, *'Round Midnight*, and now the new

Mix: How was music production on this film different from your previous scores?

Hancock: On every previous film I did all of the arranging and orchestrating as well as composing. I had only two-and-one-half weeks to do the music for this film, so I had to constantly come up with music and there was really no time to be writing it down. Fortunately, with the new technology you can immediately play the ideas, and depending on what instruments you have, you can come very close to the sounds that you're hear-

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ing in your head. Thanks to *Vision* I was able to use my Mac II as a tapeless recorder. On previous films I always used *Performer*, but *Vision* has so many excellent features.

Garnett Brown did the orchestrations, and I also had Dave Blumberg assist me. His basic job was to transcribe the music I came up with. I would make a cassette of the music I created in *Vision*, and he would transcribe the cassette.

Often Dave worked with *Cue* in setting up the score pages and laying out the bar charts. He knows the whole process: the software, the Mac, and composition and orchestrating. Sometimes he would suggest a tempo or an alternate orchestration. He got credit on the film as creative assistant. He could take the timing sheets and prepare the next cue for me on one Mac while I was doing composition on another one.

Mix: How did your music editor fit into this scenario?

Hancock: My music editor, Bunny Andrews, took rough notes at the spotting session at Paramount. Then they made 3/4-inch videocassettes with time code and window dub. We used the tapes to play back the scenes and take accurate notes of the timings. She entered all the cues into *Cue*. Whenever there were any changes, she could then bring a disk over here and I could make adjustments.

Mix: Did that happen very much?

Hancock: She had to come over three or four times, each time with several changes.

Mix: What happened next?

Hancock: I formatted it the way I wanted to see it—there are several ways to format in *Cue*. Once I chose a tempo, I wanted to see musically where the different hit points landed, so I told *Cue* that I wanted to see it in terms of music rather than in terms of numbers. Then I would print it out on my LaserWriter. Sometimes I would print out score sheets and the orchestrator would fill it in. Other times David would just make a piano reduction.

Mix: Once you had a tempo map in *Cue*, did you import that into *Vision*?

Hancock: I did that a few times, but I ran into problems when I tried to go from *Cue* to *Vision*. Some of the Opcode products are not very forgiving with Inits and CDevs. It's really a

shame, because those things are very handy. They save a lot of time for me.

Mix: Since you didn't import the template from *Cue*, what did you do?

Hancock: I just entered the tempo and the hit points manually in *Vision*. I wasn't using the software as an edit decision list; it wasn't necessary to use that feature in *Vision*. I simply tried to score it to picture, with the sequencer locked to the video via SMPTE. I work better that way. I would just play to the picture and make corrections if I needed to.

Mix: What instruments did you use in connection with the Mac and the software?

*Thanks to Vision
I was able to use
my Mac II as a
tapeless recorder.
On previous films
I always used
Performer, but
Vision has so many
excellent features.*

Hancock: I had a Synclavier, an AudioFrame, an E-mu Proteus, a Korg M1-R, a Roland D-550, a Kurzweil 250RMX, and a Yamaha TX802 and DX7II. I used all this stuff with a Studio 3 MIDI interface, which reads and writes SMPTE and converts it to MIDI time code. That's a great convenience.

When I got a chance to watch the film in my own environment, I would hear instrumental sounds in my head, and I could grab 'em and play right into *Vision*.

Mix: What percentage of the MIDI tracks that you recorded were used in the final mix, as opposed to a compositional and orchestrational reference?

Hancock: The majority of the film was done with live musicians. The film takes place in the late '30s. The odd thing is that one of the biggest orchestrations was actually done with all synthesizers and samplers. There were

some instances where the live players didn't cut it as well as what happened here in pre-production. Sometimes I beefed up the live performance with my MIDI tracks. I would say about 20 percent of it was done right here in my studio. There were no cases where I really preferred to have acoustic music and I settled for sampled stuff. But occasionally I did use the MIDI tracks because they matched what I heard in my head.

Mix: What do you consider to be the main advantages of this way of scoring and how does it affect the creative aspect of what you are doing?

Hancock: It's so fast. You can go right from the germ of an idea to grabbing a sound that you want so quickly with *Vision*. The fact that it's got these keyboard shortcuts is a great convenience. Also, the editing on *Vision* is so easy.

Mix: How do you feel about the end result?

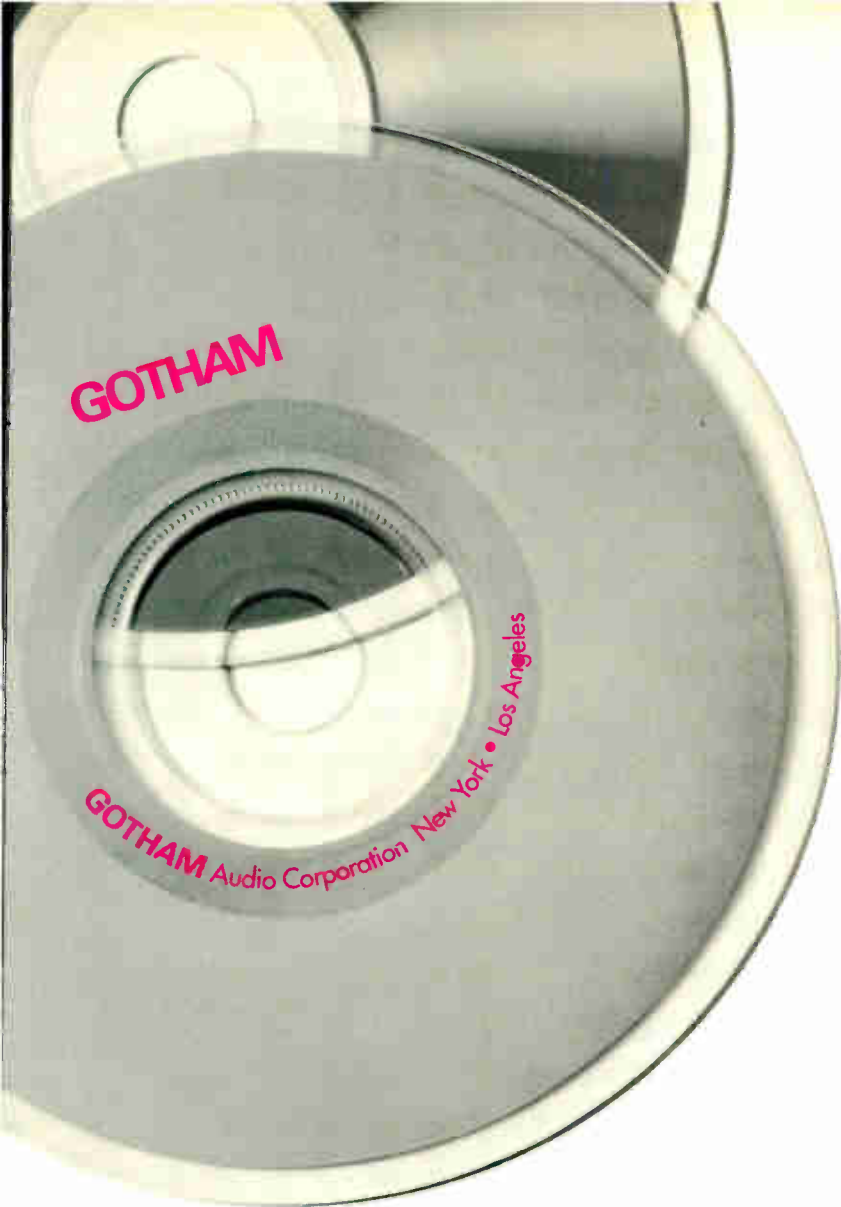
Hancock: Basically it worked out fine. I still have some questions as far as the accuracy of the SMPTE. There seemed to be some delays sometimes.

Bunny would export streamer information from *Cue* into a new system that her husband developed for the Yamaha C1 computer that creates punches and streamers. I was able to give her a tempo map on the day of the recording, and she could input new numbers and immediately come up with streamers electronically using this new system.

Sometimes I ran into problems where my SMPTE numbers didn't match the numbers that came up on the screen when we were recording. That got me worried. Nothing really extreme, but as many as six to nine frames. I don't know if that's my hardware or some other software in my system or what.

Mix: What would you like to have done that you could not do with this new technology?

Hancock: One problem had nothing to do with *Cue* or *Vision*. The Synclavier was made to work with the Mac as a dedicated front end. But I need to work with all the instruments in an integrated fashion. The only way I could do that was to know beforehand exactly which instruments I wanted to use on the Synclavier, assign them to the proper MIDI channels in the Synclavier software (which didn't seem to like MultiFinder), then I would have to exit that program and go into



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Vision. It was a nuisance and it didn't give me the flexibility that I would have liked. I would like to have had a greater integration of the Synclavier with the other instruments. The technology should allow that.

I would also like to be able to print out certain things in Vision. There's no provision in that program to print anything. When you port Cue into Vision it comes up as markers, and I would have liked to see that in hard copy. One of the advantages of having markers in Vision is that the exact notes are assigned in a much more convenient way for musicians.

Other than that, it all worked out very well. I loved the fact that you can make so many kinds of changes in Vision; if I did want to see what the music would look like in a music printing program I can designate the drum parts, for example, as non-transposing instruments.

Also, the controllers—that's something that blew my mind. In certain cases when I wanted to change or add a controller, I could just draw what I wanted and I could edit it.

Chip Shots

Audiomedia is the latest product announced by the folks at Digidesign. Described as that company's first product designed exclusively for the multimedia market, Audiomedia is a compact disc-fidelity digital audio recording and editing system for the Macintosh II, and, when used in connection with programs such as *HyperCard* or MacroMind's *Director*, it allows users to add CD-quality audio to their multimedia presentations. One key difference between this package and Digidesign's Sound Tools is that A/D conversion (at a 44.1kHz rate) is performed within the computer, rather than using the DAT I/O interface used with Sound Tools. Each Audiomedia package includes a Mac II Audiomedia card (with two input jacks, two output jacks and a microphone jack), the Audiomedia application and a HyperCard stack for integrating recording and playback of audio with other applications. Suggested list price is \$995. Digidesign, Menlo Park, CA; (415) 327-8811.

PRO-4, Passport Designs' professional sequencing program for the Macintosh, is now available. The package provides complete graphic

and event list editing, graphic faders, SMPTE sync and much more. *PRO-4* retails for \$495. Also available now is *MasterTracks Pro* for the Amiga, Atari and IBM-compatible systems. The different versions share the same features and user interface. The PC version runs under *Windows*, and is one of the few graphic-oriented sequencing programs for that system. Suggested list price for *MasterTracks Pro* is \$395. Passport Designs, Half Moon Bay, CA; (415) 726-0280.

K4 VDS is the latest product to be released by Musicode, and is described as an editor/librarian/sequencer for the Kawai K4 and the Atari ST. The sequencer allows overdub, multichannel recording and looping, and performances can be saved as standard MIDI files. You can select, edit and mix patches while the sequencer plays. *K4 VDS* retails for \$89. Musicode, La Mesa, CA; (800) 448-3601.

Cubase, Steinberg/Jones' Desktop MIDI Recording System for the Atari ST, is now available for the Macintosh as well. *Cubase* comes with two other MIDI programs, *Satellite* and *M-ROS Switcher*, which turn the computer into a multitasking machine capable of simultaneously accessing up to ten programs. The package sells for \$495. Steinberg/Jones, Northridge, CA; (818) 993-4091.

Performer Version 3.3 is now shipping from Mark of the Unicorn. This newest version of sequencing software for the Macintosh incorporates graphic automated "sliders" for real-time control over continuous MIDI controller data. The upgrade is free to registered users of Version 3, and \$495 to others. Mark of the Unicorn, Cambridge, MA; (617) 576-2760.

AcoustaCADD is Mark IV Audio's sound-system design-assistance computer program that runs on IBM compatibles. The program helps designers accurately and quickly design acoustically superior sound systems for concert halls. It was developed jointly by computer scientists and engineers in concert with acousticians at Altec and Electro-Voice, and is available to Altec and E-V sound product dealers, distributors and end-users. Multiple-user site licensing is \$925 for one year, renewable for \$100/year. Altec Lansing, Oklahoma City, OK; (405) 324-5311. ■

Associate editor Paul Potyten is a recovering musician.

by Dan Daley

TURNSTYLE PRODUCTIONS

A SMALL ROOM'S INCREASED SIGNIFICANCE

Viewed in the rarefied atmosphere at the apex of technology, 8- and 16-track commercial studios take on a quaint, almost antique glow. You'd almost expect to see an Edison Victrola at the terminus of the stereo bus. Sure, 8- and 16-track formats are increasingly common in artists' and writers' home and personal studios, but the formats pale in comparison to the whiz-

a core of a few clients working within a single layer or two of the industry.

One such studio is 3-year-old Turnstyle Productions, located on the fifth floor of an anonymous commercial building in the Chelsea district of Manhattan. A control room that's a bit bigger than the recording room, a lounge and a small



bang stuff flowing in from Japan, Switzerland and Minneapolis. Everyone figuring to write these formats off for contemporary commercial studio applications step forward. Not so fast.

The so-called upper-echelon home recording formats—and even a number of smaller but more elaborate rooms with 24-track equipment—are making a comeback on the commercial scene, and in so doing are changing the complexion of the recording industry marketplace, affecting a balance of power that was once ruled by budgets the size of Tiananmen Square. They are becoming, for lack of a better term, “project studios,” facilities whose existence is based on

office are spread out over 1,200 square feet. The physical plant took co-owner Michael Bramon less than \$10,000 to construct, using the labor of a pair of unemployed actor buddies over the course of six months. The rectangular recording room is spare and simple, piled with amps and guitars and cables. It won't make the cover of this magazine, but with a bit of input from local acoustical maven Al Fierstein, it works well enough. Double-sealed Plexiglas on the windows keeps the noise out and the sound in. The only problem

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Bramon encountered was when the photographer who used to work next door used his strobe light. "The lights would dim and the computers would glitch," he remembers ruefully.

The multitrack machine is the venerable TASCAM MS-16 1-inch deck; the mixing decks are an analog TASCAM 52 and a Sony 1000 DAT machine. The console is a 20 x 16 TASCAM M-520. Hardly the Power Station, yet high-profile clients like J. Walter Thompson, BBD&O, Columbia Pictures and Showtime are regular customers, and the studio produces work for major video clients like HBO's *Max Headroom* and *Comedy Channel* and network television's late, lamented *The Equalizer*.

Bramon originally built the place as a laboratory for his band, Pleasure Head, in 1986, shortly after he arrived in New York from Montreal. He began to take in the occasional outside project to help cover the overhead and make contacts. "At that time there weren't a lot of 1-inch, 16-tracks around," he recalls. "Next thing I knew I had 15 clients looking to use the room for the same reason I was—a nice place to do pre-production and demos."

Turnstyle charged \$50 per hour in the beginning, about the same as many budget 24-track rooms in New York's strangled market. But Bramon notes that the 16-track format makes projects go faster, the speed factor increasing as his engineering chops became honed and as he took on more of the production work personally.

Now Bramon is charging—and getting—\$60 per hour for demos, \$75 for television and film work, and \$150 for jingle finals. He says the major ad firms are beginning to realize they are getting the same quality as they did at much more expensive rooms in many cases. He installed a producer's table behind the console similar to ones found in audio-for-video facilities to make the gray flannel-types more at home. "It really worked to our advantage once the J. Walter Thompsons and the McCann-Ericksons came down," he explains. "They felt they could deal with it as long as they could order from Sarge's [a popular deli with the Madison Avenue crowd]."

Bramon is aware he has to maintain a certain level of quality to

-CONTINUED ON PAGE 92

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—FROM PAGE 90

compete with larger rooms, which he does by paying attention to detail. He recommends: Always use high-bias cassettes, make sure all the copies leaving the studio are perfect, constantly calibrate the cassette decks. "A guy at McCann-Erickson will listen to the cassette in his office," he says. "He doesn't care about the process that went into making it. It can happen in some fancier studios that use normal-bias cassettes because it's cheaper, or they let an assistant run the copies after everyone's gone home and it winds up having distortion on it."

Advertising clients expect certain amenities, Bramon has realized, as anyone who deals with them eventually must. "They want Sarge's, they want their sushi," he says, "but any restaurant can deliver that. They want a phone they can make long-distance calls on, they want coffee. We have all that here. They can get that at Power Station and other big studios, but they can also get that here and it sounds as good, and they save a lot of money.

As a salesman, that's exactly the pitch I use. I say listen to the quality and compare the cost."

Now one might think this angers some of the bigger kids on the block. One would be right. Bramon won't mention names, but he acknowledges that some of the larger studios and production houses around town have put a bit of heat on him, mostly in the form of phone calls that initially inquire about rates and end up venting dissatisfaction about a lost client. In response, Bramon says he offers similar quality for less money, and he pays all the fees and taxes that any business must in New York; his lower overhead is simply a bit of good fortune that he sees no reason to feel guilty about.

Michael Bramon gives the impression that he has seen the future. Technology keeps getting better and cheaper and more accessible, and that bodes well for him and others like him. "When the tapeless environment finally hits home—literally—I don't know how the major [studios] will compete," he says.

"From my own standpoint, I'm

happy to see this whole accessibility thing happening. When I came to New York, I wondered why are these big studios ripping off these clients [with exorbitant rates]? [It's because] the advertising people just didn't know any better. It's not like I'm trying to save advertising companies. I'm trying to make some money for myself. It's the whole parcel of how the studios were dealing with the companies—the condescending way the engineers would treat the clients. [Advertising clients] may say stupid things sometimes, but they're not stupid people. They're just [technologically] uneducated. In addition to giving them as good as they got from the big studios, I also try to treat them on a one-to-one basis. People are more educated now, both clients and musicians. And people are exchanging information. You never got that with the big studios." ■

Dan Daley is a Mix contributing editor. When not winning and dining in Manhattan, he ekes out a meager living as a sharecropper near Tupelo, Mississippi.

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by George Petersen

PRODUCT CRITIQUES AND COMMENTS

PRODUCTS AND PROMISE: KICKING A FEW TIRES AT AES

The annual U.S. convention of the Audio Engineering Society is a lot of things to a lot of people. It's communication: Papers are presented, workshops and sessions transpire, ideas arise, arguments ensue, agreements occur, deals develop. From scrawled schematics on cocktail napkins, to high-level meetings behind locked doors in plush hotel suites, it's *business*. And for the illuminati of the audio industry, this is *the* place to be and be seen.

Certainly, the main attraction to most AES attendees is the convention floor, where the real action is happening. Manufacturers have a two-fold interest: revealing their latest toys to a technology-hungry engineering public, and, of course, checking out the competition. I, for one, was particularly impressed with this 87th AES convention. Besides having a chance

to investigate new products first-hand and kick a few tires, my presence at the show kept me about 3,000 miles away from Oakland's earthquake-ravaged Cypress/1-880 freeway, where I would have been precisely at 5:04 on that fateful day, had I not gone to the show. . . Hmmm. . . New York never looked so beautiful.

Past AES conventions have always been full of products and promise, and this show was no exception. There was plenty to see—no shortage of innovation here, with a plethora of new ideas, new approaches and even new twists on older technology.

In that last category, the first annual George Petersen "Why Didn't I Think of That?" Awards go to AKG's K270-S and Bryston's 280-B. The K270 S is a version of AKG's popular K270 sealed parabolic headphones, but includes a microswitch that automatically shuts the unit off when the phones are removed from the wearer's head, thus



Demonstrations of the Symetrix DPR-100 Macintosh-based "Digital Audio Workplace" attracted steady crowds throughout the convention.

automatically eliminating feedback problems and sonic "bleed" from unused headsets in the studio. The Bryston 280-B is an interface that mounts under a Nagra IV-S and accepts two Dolby SR cards. The compact (less than 1-inch thick) unit can be powered either externally or directly from the Nagra, and a power save feature only delivers power to the SR cards when tape is rolling.

As always, consoles were big news. Soundcraft started the show off with unveilings of its 3200 and Delta 200 Series. Available in 24- and 32-bus versions, the flagship 3200 console features a split design with internal noise gates (full external key and side-chain access) on every channel and monitor input, as well as a flexible routing system allowing up to 20 aux sends. Identical EQ facilities on the channel and monitor inputs provide for true 68-input operation from a 36x32 configuration, and a maximum of 100 fader-controlled line inputs are available for mixdown. The Delta 200 updates the successful 200B, with a host of new features, including a choice of four input modules: stand-

ard, deluxe, stereo and dual line. Using 12 of the latter and a single master module, a Delta 200 could accommodate 24 line inputs in a single rack-mount frame.

Trident showed the Vector 432, an in-line console available in 32/40/48/56-channel versions. The Vector includes 44 VU meters, eight aux sends, 4-band EQ and an extensive muting system with up to 16 automute groups under manual, SMPTE or MIDI control.

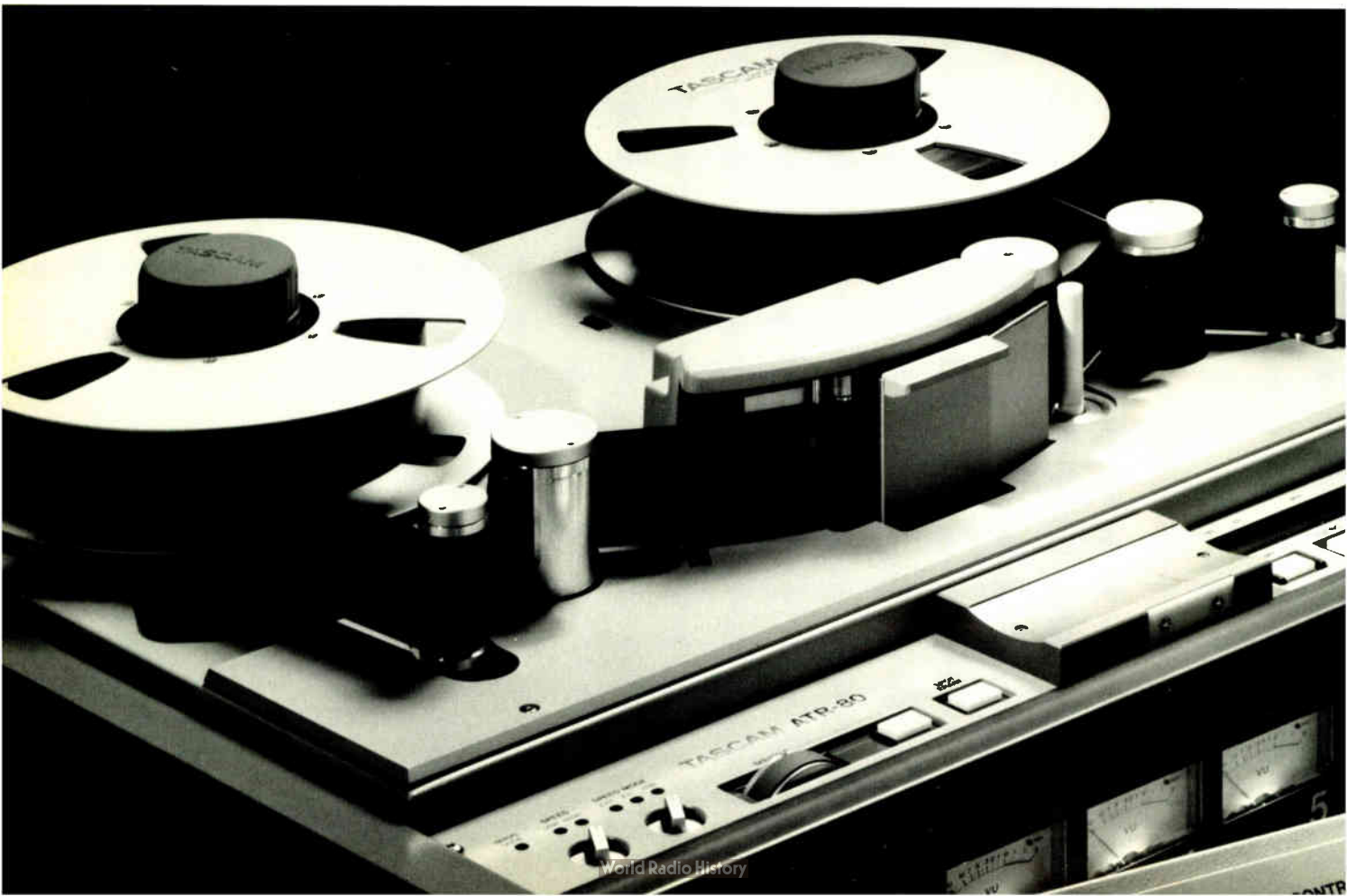
By now, just about everybody on the planet knows about the Sound Workshop acquisition, but still, it's going to take awhile to get used to seeing the Otari name on mixers. That may change soon, with the delivery of the first Series 54 console to R.O. Studios (near San Francisco) and the announcements of DiskMix 3 moving fader automation and TC-100. The latter is a compact, high-performance analog console designed for transferring audio source material from one medium to another, particularly in the video and film post-production environments.

U.K.-based Novation Intl. created quite a stir with the U.S. AES debut of its Alpha, an assignable, digitally con-

trolled analog mixing console featuring 999 snapshots and Total Dynamic Automation of all console functions. With 32 channels, 32-track routing and 32 monitors in an in-line frame, up to 72 inputs can be accommodated in a space that's barely over five feet wide. Alpha's lightweight console control unit can be located up to 25 meters from the audio electronics rack.

Taking a different approach is API, which showed a production version of its all-discrete, in-line recording console. The board allows configurations of up to 96 inputs, 48 track assignments, ten aux sends and GML Series 2000 moving fader automation as *standard* equipment. The first two consoles in the series have been delivered to NYC's Messina Music and for mobile installation in David Hewitt's new super truck at Remote Recording Services in Pennsylvania.

Now under the direction of former Soundcraft chairman Phil Dudderidge, Focusrite Ltd. had a strong presence at AES, exhibiting its ISA range of equalizers, preamps and dynamics processors, while celebrating the 1989 deliveries of Model 8924 consoles to NYC's Electric Lady Studios and Master Rock in London. Development of



a second-generation console is now underway, with availability expected sometime early this year.

The surprise winner in the console category at this AES was Audio Teknology Inc.'s (of Durham, Oregon) Paragon sound reinforcement board. Designed to handle either house or monitor mixing chores, the Paragon is available in 32- and 40-channel versions, with dynamics sections (compressor/limiter and noise gating) on each input module, along with 4-band EQ, 16 effects sends and comprehensive metering of nearly every console function (three LED bar graphs on each channel—for gating, compressor and gain) as well as 23 stereo fluorescent meters on the bridge. Its mic pre-amps are of the padless, high-voltage variety, said to be able to handle a dynamic range of up to 160 dB at a THD of under 0.005%. Retailing for under \$75,000 (for the P32 model), this sleek, high-performance machine makes a quantum leap toward bringing sound reinforcement mixing into the next century.

A truly revolutionary unveiling was Sony's SDP-1000 Digital Audio Effector, designed for mastering applications. With its large-screen display,



Bill Threlkeld and David Kimm of Soundcraft unveil the Delta 200.

central processing unit and keypad/sliders/trackball controller, the SDP-1000 resembles a personal computer at first glance, but instead offers 32-bit internal signal processing with 24-bit (AES/EBU, SPDIF) and 20-bit (SDIF-2) I/O word lengths. Features include digital 4-band equalization, HF/LF

shelf and cut filters, and limiter/expander/compressor/gating—all driven by SMPTE or MIDI for automated, dynamic effects control. Digital I/O is standard, 44.056/44.1/48kHz sampling rates are supported, and expect a price in the \$25,000 range when shipments begin early this year.

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*Manufacturers suggested retail price

A little less lofty was Rane's launch of the Flex Series in the new HR (half-rack) format. Addressing the problem of standardizing the mechanical mounting requirements of half-rack gear was no easy task, and after an initial effort by ART, Ashly, Crown, dbx, Furman, Rane and Symetrix (followed by talks with over 35 other manufacturers) HR was born. The Flex Series includes a variety of mixers, splitters, EQs, filters, compressors, limiters, gates, delays and other processors. Inputs/outputs are XLR, terminal strip or 1/4-inch, and the units can be mounted horizontally or vertically.

Making its AES debut was Zoom Corporation (Redwood City, Calif.), a company founded by a number of former Korg engineers. The flagship Zoom 9010 is a hot 4-in/4-out digital multi-effector with reverb, chorus, delay, pitch shifting, compressor, phasing, etc.—all with internal control of mix levels and a unique "multirouting" system that, among other things, allows the use of several effects simultaneously, or different processors can be accessed as separate, discrete effects. It's MIDI-controllable, of course,

and ROM cards provide additional programs and routing options. The Zoom 9010 marks a most impressive entrance from a serious new contender in the marketplace.

"What's-New-Is-What's-Old" Award: Tubes were hot (literally) as Summit Audio exhibited its EQF-100, a full-range equalizer using hybrid vacuum tube/digital technology. Pro net-priced at \$2,200, the handcrafted EQF-100 features four bands of seven switch-selectable frequencies, with up to 16 dB of boost or cut, variable bandwidth, high and low filters (each with three frequencies) and separate bypass switches for each section. This unit sounds oh-so-sweet, and best of all, it's available *now*.

Meyer Sound Labs and B.A.S.E. shared honors for the "Can a Hotel Demo Suite Be Packed Fuller than a Rush-Hour Subway Car?" Award. B.A.S.E. made the first public showing of the Bedini Audio Spatial Environment to steady crowds, anxious to hear the ambience enhancer firsthand. Another popular product demo was the Meyer HD-1 High Definition monitors. At a list price of \$4,135, this self-powered, self-contained, compact speaker system is not inexpensive, but

has an absolutely wonderful sound, and is flat down to 32 Hz. Hats off to all the folks at Meyer Sound Labs for this impressive accomplishment.

There was plenty of big news on the digital recorder front—Studer held the first public showing of the D820-48 digital recorder, offering 48-track capability on 1/2-inch tape in the DASH format. According to a company spokesman, the "competitively priced" machine will begin deliveries this year. Elsewhere in the DASH camp, Sony announced the sale of its 600th digital multitrack and reported strong sales of the PCM-3348: 21 of these 48-track digital recorders have been sold since their introduction a year ago. Meanwhile, Mitsubishi celebrated the 10-year anniversary of the unveiling of its first digital recorder, the X-80 2-track, which took place at AES in October 1979.

Ready for a new digital format? Yamaha showed a working model of its DMR8X All-Digital Personal Production System, which integrates an 8-track digital recorder (plus cue and time code tracks), digital mixer that handles up to 24 channels of audio, internal digital signal processing (the equivalent of three SPX900/1000s),



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locator and moving fader automation into a single unit. The system uses a *stationary* head format, with proprietary Yamaha 8mm tape cartridges that offer up to 20 minutes of record time at 44.1/48 kHz. All signals within the unit are handled as 24-bit digital audio (with up to 32-bit processing) and stored on tape with 20-bit resolution. A DRU8X expander unit syncs automatically to the DMR8X, adding eight additional tape tracks for 16-track recording (or 24-track capability with two DRU8X units). Don't go to the stores yet—first shipments are slated for this summer—and prices are estimated to be about \$30k for the DMR8X, with the DRU8X priced somewhere in the \$15k to \$20k range.

Another big development came from Akai, whose DD1000 provides 25 track-minutes of 4-track digital audio recording on each side of a standard, Sony 650-megabyte (removable and rewritable) optical disk. Built-in SCSI ports allow up to seven units to be slaved together, and both digital (AES/EBU and optic fiber) and analog inputs are standard. Instantaneous random access replay of samples can be referenced to a SMPTE cue list or triggered in real time. While the unit

is applicable in any number of production tasks, the DD1000 seems ideal for the storage of custom sound effects, music beds and stings in the audio-for-film/video environment. Deliveries begin this year, with pricing tentatively in the \$13k range. Speaking of pricing, Akai was able to lower the price of its A-DAM 12-track digital

recorder (reviewed in this issue) from \$35,000 to \$25,000, thanks to a better exchange rate and improved production efficiency. Akai has since taken the unprecedented action of rebating the difference to customers who purchased machines at the higher price. Bravo, Akai!

—CONTINUED ON PAGE 122



**Yamaha
DMR8X digital
8-track
recorder/mixer.**

OR, FOR JUST \$13,999 YOU COULD BUY A NEW MSR-24.

Maybe at one time it was worth risking second-hand sound, iffy reliability and outmoded technology to save money on a used 24-track. Not any more.

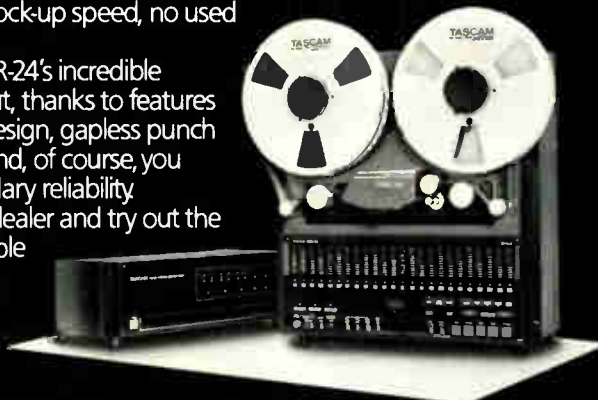
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World Radio History

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NEW PRODUCTS

SOUNDTRACS PCX

Designed for cost-effective studio production, the PCX is a new 24-bus, in-line console from Soundtracs (distributed in the U.S. by Samson Technologies, Hicksville, NY). Features include mute automation (up to 100 mute memories can be stored and recalled via MIDI, time code or manually), balanced group and master buses, 4-band sweepable EQ, and 32- or 48-module frame sizes (both with patch bays). The tape monitors include equalization and can be used as extra inputs, for a potential of more than 100 inputs. Options include stereo input modules and additional effects returns.

Circle #001 on Reader Service Card

FM 801A POWER AMP

Based on FM Acoustics' (Wadenswil, Switzerland) proprietary class-A input voltage gain circuitry, the FM 801A Precision High Power Amplifier delivers 430 W/channel into 8 ohms, 750 W/ch into 4 ohms and 1,500 W/ch into 1.5 ohms—with a continuous output current capability above 40A RMS per channel. An ingenious protection system is said to be able to differentiate between audio signals and error signals, to provide 100% amplifier protection, even while driving impedances below 1 ohm.

Circle #003 on Reader Service Card

ROLLS HALF-RACK GEAR

Rolls Corporation, of Salt Lake City, UT, has unveiled a new series of half-rack audio devices (all compatible with the new HR mounting standard), including the HR11C mic preamp/processor, HR6MX/HR6MQ submixers and HR100 power amp. The HR11C (\$310) includes a high/low input impedance switch, phantom power, ¼-inch and XLR in/out connectors, notch filter, 10-band graphic EQ and a compressor/limiter. The 6 × 1 submixers are available as the HR6MX (\$320, with XLR inputs and switchable phantom power) and the HR6MQ (\$260, with ¼-inch inputs); the mixers feature overload LEDs on each channel and a master output level indicator. The HR100 is a single-channel, 100-watt (into 4 ohms) MOSFET power amp, priced at \$320.

Circle #004 on Reader Service Card

GENELEC 1035A MONITORS

Now available from Quest Marketing (Auburndale, MA) is the Genelec 1035A control room monitor, a self-powered system said to produce levels up to 144 dB with low distortion. The system consists of two 3-way enclosures (each with double 15-inch woofers) and an external electronics rack that provides stereo tri-amplification (up to 1,000 watts to each LF section), as well as cross-overs, power-up sequencing and a driver-protection processor. The dual 5-inch midrange drivers and 1-inch HF compression

driver are mounted on a panel that can be rotated 90 degrees for horizontal or vertical use. The 1034A is a similar system having a slightly lower acoustic output with smaller enclosures.

Circle #005 on Reader Service Card

DAWN WORKSTATION

New from Doremi Labs (Covina, CA) is DAWN, the Digital Audio Workstation Nucleus. This Macintosh-based system features direct-to-hard disk or RAM operation modes, 2 input and 8 output channels, variable playback speed (forward, backward and scrub), SMPTE time code cueing, MIDI in/out, and a SCSI port for connecting additional storage devices, such as WORM drives, tape backup, erasable optical drives and additional hard disks. Specs include selectable sampling frequencies (44.1/48/96 kHz), a 20kHz bandwidth, 16-bit linear resolution and expandable RAM capacity: to 16 MB, providing 2.78 track-minutes at 48 kHz.

Circle #006 on Reader Service Card

FURMAN QN-44 GATE

The QN-44 (\$399) from Furman Sound of Greenbrae, CA, is a 4-channel noise gate featuring individual controls for threshold, attack, release and depth. Available in balanced or unbalanced versions, the QN-44 provides a maximum attenuation depth of 80 dB and includes an improved gain-control element, said to offer lower noise and distortion than gates using conventional VCA technology. Other features include channel-on LEDs and key input jacks.

Circle #007 on Reader Service Card



PAST EQUALIZER

New from Professional Audio System Technology (Haverhill, Suffolk, UK), the PAST equalizer is based on the popular Neve Series 80 technology. The single rack-space unit includes four overlapping bands with 18dB cut/boost control, highpass and lowpass filters (each with five selectable frequencies),

transformer-balanced line and mic inputs (phantom powering is optional), phase reverse switch, and a VU meter that is switchable to input or output. Gold-plated XLR inputs and outputs are standard, as are ¼-inch jacks for patching to balanced or unbalanced instruments.

Circle #002 on Reader Service Card





MOTIONWORKER

New from Motionworks (Chipping Norton, Oxfordshire, UK) is Motionworker, a unique multi-systems interface that brings machine control to any console automation system. The unit can control Adams-Smith, Audio Kinetics and TimeLine synchronizers, either as a stand-alone device or from the computer interface of Amek, GML or SSL automation systems. Motionworker enables engineers to operate many studio functions directly from the console's automation computer. In tapeless studio environments, Motionworker's virtual machine system allows automation control from an external time code or MIDI time code source; or the system can drive a sequencer from the console automation.

Circle #008 on Reader Service Card

TAC MAGNUM

Magnum is a new 24-bus console from Amek/TAC U.S. (North Hollywood, CA). Features include an in-line design, all-new FET muting system, 8 discrete aux sends (all switchable to monitor), fader reverse, in-place solo and solo/PFL controlled by master status switching, 30-segment peak hold LED metering above each channel, and 4-band equalization that can be split for simultaneous operation on channels and monitor signal paths. Options include fader automation and MIDI-controlled muting via the new Amek MICE (Multiple Interface Control Element), which provides MIDI control of up to 72 mute switches, with snapshot recall of up to 999 pages of muting sequences.

Circle #010 on Reader Service Card

ENSONIQ SOUND SELECTOR

Billed not as a hearing aid but as a "high-resolution listening instrument" is the Sound Selector from Ensoniq of Malvern, PA. Housed in a case the size of a conventional hearing aid, the unit can be programmed to detect and compensate for an individual's hearing loss across 13 frequency bands, and can be tuned with 1dB resolution. Based around a custom VLSI chip, the Sound Selector has a bandwidth much higher than conventional devices, providing usable gain at frequencies up to 8 kHz.

Circle #009 on Reader Service Card

Cititrax, from Hollywood Edge, is a 10-hour CD set of urban sound effects, including street ambiances, traffic, trucks, sirens, construction noises, a variety of interiors and much more—all digitally recorded and edited. Call (800) 292-3755 or (213) 466-6723. . . Now available: a video demo of the **JL Cooper Magi II** system, which brings SMPTE-based fader and mute automation to any console. The tape is \$13.95, including second-day air shipping. Call (213) 306-4131. . . New for the **Ensoniq VFX** synthesizer is Version 2.0 software,

GOLD LINE SPL-120

A new, low-cost (\$199.95) sound level meter, the Model SPL 120 is now available from Gold Line of West Redding, CT. The SPL-120 features a large numeric display, selectable auto-ranging SPL or highest SPL modes, and a choice of flat, A- or C-weighting scales. The basic SPL range is from 45 to 120 dB; an optional adapter allows measurements from 25 to 152 dB.

Circle #011 on Reader Service Card



LA RUE TCA-1 SMPTE TIME CODE AMPLIFIER/PROCESSOR

The TCA-1 SMPTE Time Code Amplifier from La Rue Professional Systems (Markham, Ontario) can restore and reshape low-level (down to -50 dBm), distorted or corrupt time code while maintaining transport synchronization data. This allows the re-recording of lower-level signals, thus reducing their effects on adjacent chan-

nels. Housed in a compact aluminum enclosure, the device features a low-noise balanced input stage, up to 50 dB of gain adjust, selectable time code filter, various code level indicators (minimum, optimum and peak), selectable "hard-wire" bypass and compensating balanced/unbalanced output. It's simple to use, easy to set up and lists for \$295.

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adding new features and seven new effects algorithms. Contact your dealer for details on this free upgrade. . . The capabilities of the **Lexicon 480L** have been expanded with Program Cartridge 1.0, offering a new ambience effect, panorama, random hall and digital compression/expansion capabilities. Call (617) 891-6790 for details. . . Operator handbooks for the **Flying Faders** console automation system are now available for producers and mixing engineers at no charge

from Neve. Contact Kris Gustafson at (203) 744-6230. . . Koss has released "**Sound Effects**," a brochure on hearing impairment and protection; for a free copy, call (800) USA-KOSS. . . The **Hollywood Film Music Library** offers 35 hours of digitally recorded production music CDs in a variety of styles: industrial, rock, sports, ethnic, classical, big band, country and more—all available on needle-drop or per-production blanket rates. Call (800) 373-3256 or (818) 985-9997 for more info.

by George Petersen

AKAI'S A-DAM SYSTEM

DIGITAL MULTITRACK FOR THE REST OF US



Digital multitrack. The words themselves have a distinctive, wonderful sound, bristling with a big-bucks image of world-class facilities and studios of the rich and famous. However, all that may soon be changing with the introduction of the Akai Digital Audio Multitrack (A-DAM) system, which brings the dues for the digital multitrack club down to an affordable \$24,995.

A-DAM is a 12-track recording

package offering up to 17.5 minutes of recording time on readily available (and inexpensive) 8mm videocassettes. While a 17.5-minute recording capacity may seem short, it is actually longer than a 2,500-foot roll of 24-track tape running at 30 ips (which gives you 16.6 minutes). The system's maximum running time is based on using a 90-minute videotape at 44.1 kHz (the maximum time at 48 kHz is somewhat shorter). Akai's research



The Complete Prescription

The New Orban 290RX



One channel of Orban's 290RX Adaptive Enhancement Processor. 2u x 19" std. rack width. Black brushed panel.

Powerful Medicine

The New Orban 290RX will bring your over processed, under sampled, and "older" material back to life! In broadcast, transfer records to tape with a "better than new" sound. In recording studios, dress up naked synthesizer or sampler tracks, or pull lost solo tracks back up out of the mud. In mastering, make your reissues sound fresher and years younger.

Three unique processing functions

The 290RX provides three unique processing functions in two independent channels of audio problem-solving power. Orban's patented **Harmonic Restoration** circuitry recreates the desirable *even-order harmonics* which give a signal sparkle and life, *without* the grainy side effects introduced by previously available "exciter" circuits. Our **Spectral Restoration** circuitry dynamically adds just the right amount of high frequency air and shimmer to dull, flat material. And our **Open Sound™ Noise Reduction** circuitry's separately adjustable downward expansion and bandwidth control have been carefully integrated to produce outstandingly transparent results while virtually eliminating noise modulation and preserving natural sounding highs.

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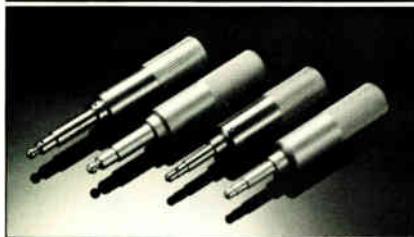
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proved that 120-minute tapes are too thin for reliable operation, and the system will automatically eject such tapes.

The method for recording tracks is proprietary to the system, which means tapes recorded on A-DAM cannot be duplicated or backed up using 8mm VCRs, as is possible with other video-based formats such as EIAJ (PCM-F1-type) tapes. Also, before recording in the A-DAM format, tapes must be formatted, in the same manner that you would format a floppy disk in a computer system. This tape-formatting process must be carried out in *real* time (this can take place while you're miking the drums, letting the band take five or emptying out the ashtrays), and the user must select emphasis on/off and a sampling frequency (44.1 or 48 kHz) for each tape prior to formatting.

System specifications state a frequency response of 20 to 20k Hz (+1 dB, -1.2 dB), over 90dB dynamic range and 16-bit linear quantization. Features include selectable 44.1/48kHz sampling rates, balanced +4dBm XLR inputs and outputs, independent digital delay on each track (up to 66ms), $\pm 6\%$ pitch change (only operable at the 44.1kHz rate), a choice of four crossfade times for smooth punch-in/outs, frame-accurate auto punch-in/outs, spot erase capability and storage of more than 100 cue points. With its fast, stable transport and an analog auxiliary track provided for cueing or time code functions, the system is ideal for syncing to video or a MIDI system, as well as music production for albums or jingles.

The recorder uses six rotary heads (three playback/three record), with a single head rotation equivalent to one frame of data. Since the heads rotate at 2,100 rpm, the system's frame rate is 35 frames per second. This internal frame rate does not affect synchronization with other systems. Double Reed Solomon Code—the same error-correction used by DAT—is employed, and digital data is recorded on the tape using a group interleave (channel scrambling) scheme, whereby data is spread out across three tracks, allowing continuous operation even if one of the playback heads is clogged or fails.

The system is made up of the DR1200 recorder, DL1200 program-

mable autolocator and DM1200 meter bridge. Since the DL1200 can control up to three DR1200 transports simultaneously (without an external synchronizer), users can upgrade the basic 12-track system to 24- or 36-track operation with the purchase of additional DR1200/DM1200 units.

The transport's rear panel includes ports for an external error-rate counter, 37-pin digital I/O connector (for making clone copies to/from another DR1200 or for connecting the optional AES/EBU interface adapter), 25-pin "D" port for an external synchronizer (Akai recommends TimeLine Lynx and Adams-Smith 2600 and Zeta models), internal sync ports for slaving multiple A-DAM units, 1/4-inch in/out for analog aux tracks, and connections to the meter bridge and autolocator.

All the components in the system are rack-mountable, although at nearly 80 pounds, the DR1200 transport requires a fairly hefty rack. More important is the fact that the DR1200's rotary heads and tape path need thorough, regular cleaning (at least once or twice daily). A removable top plate allows quick access to the head assembly, so a pull-out, drawer-style mount is a necessity if the machine is placed in a rack.

We put the A-DAM system to the test over a one-month period for the production of a pop album project, which provided plenty of opportunities for a test drive through all phases of tracking, overdubbing and mixing. I was pleased with the robust transport and excellent sound quality. I guess I shouldn't have been too surprised about the audio, since Akai has earned an excellent reputation over the years, especially with the industry-wide acceptance of the superb S900 and S1000 digital samplers.

Once A-DAM was set up in the control room, the first thing I noticed was fan noise, which wasn't overwhelming (about as loud as some computer hard drives), but it was discernible. With the supplied cables for the meter bridge and locator (about 25-feet long), you can place the transport in the rear of the room or in an adjacent area. Akai offers optional cables that double the distance; both units use standard "D" connectors, and enterprising studios could easily put together custom cables for permanent installations.

The DM1200 meter unit features 15-segment LED meters for each of the

Warning: To Avoid Risk Of Shock,

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Let's be frank. We're out to change your idea of what — and who — makes a professional power amplifier. So if you just bought a Crown MacroTech, turn the page — this comparison won't be a polite one. But it will stick to the facts.

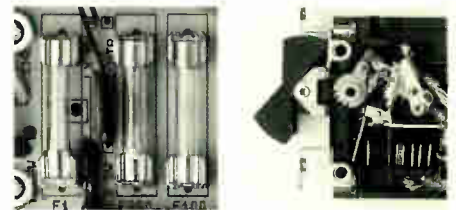
A look inside these two amps will give you a better idea of why BGW amps like the GTB Grand Touring Amplifier are built like no others in the world. And raise some questions about Crown MacroTechs.

mass of metal absorbs thermal transients without straining the fan. And without quick changes in transistor temperature. That's important: Transient musical loads put the worst kind of stress on power transistors. The effects of thermal cycling fatigue may not show up until after the warranty, but they can destroy lesser amps. Meanwhile, BGWs keep right on delivering clean, reliable power.

BGW pioneered DC speaker protection in 1971. We stopped using relays years ago, when they no longer met our reliability standards for BGW amps. The GTB, like all BGWs over 200 Watts, uses solid-state Thyristor Crow Bars to keep DC from ever reaching your valuable speaker cones or compression drivers.

REAL SPEAKER PROTECTION

Most amps today are direct coupled, so a blown output transistor (the most common failure) connects the power supply directly to the speakers. Earlier MacroTechs had no protection against DC. Now Crown has learned their lesson — or have they? The sensing circuit and relay they now use shuts off the power transformer, but allows the filter capacitors to discharge stored DC energy directly into your drivers — risking real damage.



Left: Time is money, and with Crown's MacroTech you can lose plenty of both: You have to pull it out of the rack every time a fuse blows.

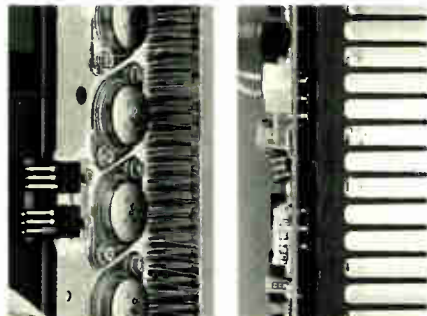
Right: The GTB's power switch is also a rocker-actuated magnetic circuit breaker. You can reset it in a second if power lines hiccup.

MAKE YOUR OWN COMPARISON

Before you buy or spec your next power amp, call us at 800-468-AMPS (213-973-8090 in CA). We'll send you tech info on BGW amps and the name of your nearest dealer: He can arrange a demo of any BGW model against any amp you choose. Then you'll be able to appreciate the advantages of BGW engineering with your ears, as well as your eyes.



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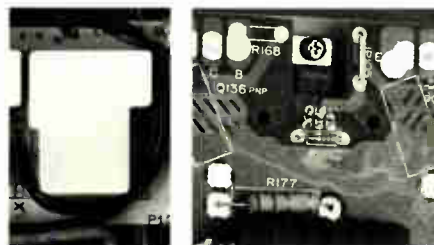
Left: The MacroTech uses mostly air to dissipate heat, not metal. The closely spaced fins are vulnerable to airborne dust and dirt.

Right: BGW uses ten pounds of aluminum to absorb thermal transients, extending power transistor life.

TAKING THE HEAT

If the MacroTech heat exchanger reminds you of an air conditioner, you've grasped its design. This approach works, at least until dust and dirt clog the fins. But as soon as the air flow slows or stops, temperature rises. Soon after that, the Crown shuts off — it could even fail.

The GTB uses massive extruded aluminum heat sinks with widely spaced fins. The



Left: Crown uses a slow-acting, less reliable relay. It can allow the filter capacitors to discharge stored energy directly into your drivers.

Right: BGW's modular power output section protects your speakers against DC damage with an instantaneous Thyristor Crow Bar. And the module is easily replaced in the unlikely event of failure.

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12 PCM tracks and a 12-segment level display for the aux channel. Front panel switches allow the user to tailor meter characteristics, with a choice of two release times (fast-acting 319ms or a more gradual 1,277ms), as well as auto peak reset (with peaks displayed for about 1.5 seconds) or continuous display of the highest peaks.

The DLI200 autolocator provides versatile and fast control of record and transport parameters. Features include 105 memory points (five are single-button selectable, with 100 more available in "stack" memory), programmable pre/post-roll times, frame-accurate auto punch-in/out, repeat and return modes, a "rehearsal" function (for checking punch points before committing to tape), keypad entry or on-the-fly capturing of locate and patch points, auto playback muting (selectable on any track), "trans punch-in/out" (digital track-to-track copying) and four programmable preset combinations of channel-mode (record/playback) settings. The LED readouts of minutes/seconds/frames are large and easy to view, and the user can select time display in either absolute or relative modes. These, respectively, are referenced from either the start of the tape or from any chosen point.

The comprehensiveness of the DLI200 locator is almost overwhelming, yet the unit is simple to use. Perhaps the most revolutionary aspect of the A-DAM is that all of this autolocation information can be stored in a TOC ("table of contents") section on the head of the tape and loaded instantly, eliminating the need for tedious re-entry of locator points the next time you work on a tape. One caveat to bear in mind is that the procedure to save autolocation points is nearly identical to the "format tape" command. Watch out for this, particularly at the end of a late-night session.

Punch-ins and outs were a breeze, and the user can choose from crossfade times of 12, 23, 46 or 93ms for seamless punches. One of A-DAM's hippest features is "trans-punch," which provides for digitally copying entire (or partial sections of) tracks. This is eminently useful in all kinds of situations: A "safety" track of a guitar solo could be copied before you begin a difficult punch, such as a single note in a complex riff. Trans-

punch also allows for digital editing capability. For example, one possible creative application is using three takes of a vocal performance (on three tracks) and copying various parts—say a first and third verse from Track 2, choruses from Track 1, and a second verse from Track 3—into a "perfect" version on an unused track. Once the desired track is assembled, the three original tracks can be erased, providing more tracks for backing vocals or solos.

AUTOLOCATOR INFORMATION CAN BE STORED ON THE HEAD OF THE TAPE, THUS ELIMINATING THE TEDIOUS RE-EN- TRY OF LOCATOR POINTS FOR YOUR NEXT SESSION.

After using the A-DAM for a couple of days, I encountered the dreaded "E 1 7" display, which indicates error code #7 on machine #1. This indicates a read/write error (excessive block error rate) originating either on the tape or from the heads. Whenever this is displayed, the A-DAM exits the record mode, although playback can continue. Aside from the remote possibility of mechanical/electronic problems, this indicates dirty heads or a bad or worn-out tape.

With A-DAM's unconventional use of the 8mm medium, the system is fairly sensitive to the type of tape used. I experienced a disconcerting number of "E 1 7" crashes with TDK MP cassettes, a problem that disappeared when I switched to a Sony HG-A formulation. For best results, Akai now recommends using Konica P6 xxP, Sony HG-A, Maxell MP and Sony MPn. Tapes said to provide acceptable operation are Maxell HG-M, Fuji Super HG and Scotch HG. *Not* recommended are Sony H18 MP, TDK H18MP and

TDK MPn Super Strong.

Unfortunately, the machine's otherwise excellent manual is woefully inadequate in covering the critical head-cleaning procedure, which requires just the *right* amount of finger pressure. If you use Akai's recommended head-cleaning routine (using an ethyl alcohol-moistened Kimwipe), there is a fine line between applying enough finger pressure to properly clean—or permanently damage—the delicate rotary head. Aware of this problem, Akai has issued a technical bulletin on head cleaning.

While we're on the subject, Akai guarantees the heads for 1,500 hours (an internal meter keeps track of usage) and reports that several of its beta sites have logged 3,000 to 4,000 hours before requiring replacement. A new head assembly is priced at about \$2,200, and the replacement can supposedly be handled by the average studio technician.

Overall, I was impressed with the solid operation and excellent audio performance of the A-DAM system, particularly after I mastered the head-cleaning procedure. The album turned out nicely, with the entire tape budget for the project under \$150! All the multitrack masters fit inside a shoebox, with room to spare—important for anyone with a packed tape vault.

A major point to consider is whether 12 tracks is enough. By stripping the aux tracks with time code, syncing to MIDI was no sweat, and this gave me 12 digital tracks, with another 24 channels on my Atari ST-based sequencer. On several of the album cuts, I premixed 12 tracks to digital 2-track, then dumped them back onto new A-DAM tapes, providing ten additional tracks for vocals and solos, with minimal signal degradation caused by the bouncing.

Another option is to start with a 12-track system and then expand into 24- or 36-track operation. This will certainly appeal to many smaller studio operations, which can tailor the system as their needs and finances grow. A 24-track A-DAM system can be put together for approximately \$45,000. While the DASH- and PD-format recorder manufacturers have ignored the digital middle market, Akai has come out with an innovative solution: A-DAM, digital multitrack for the rest of us.

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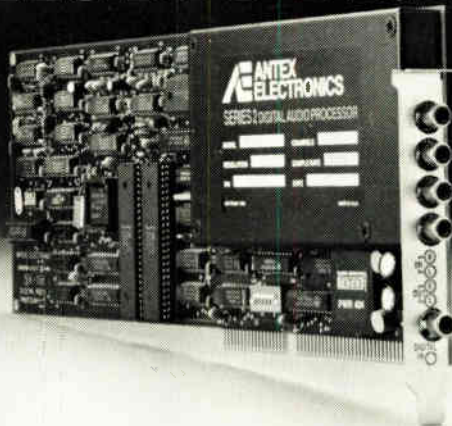


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by Mark Herman

SOUND REINFORCEMENT NEWS

Audio Techniques Inc. (Calabasas, Calif.) announced that it has contracted sound reinforcement giant **Maryland Sound Industries** to operate and manage its touring accounts (including the band **Chicago**). MSI will use Audio Techniques' audio equipment inventory for its West Coast sound reinforcement division. **Bob Ludwig** remains the owner and president of Audio Techniques and will continue to run the product sales division and consult on special projects. Ludwig says, "This move will benefit both parties. Between the two companies we can consolidate a lot of our equipment and ideas. As we upgrade with new gear, we'll gradually begin to standardize and strengthen the business association that we have already formed."

Great Lakes Sound Inc. announced that it has moved into a new 4,000-square-foot facility in Toledo, Ohio. Five years ago Great Lakes started out as a sound company, but is now involved with lighting as well. Company president **Bill Robison** states, "We are a regional contract company that covers Toledo and the surrounding area within a 100-mile radius. At this time we do no touring, but it looks like we will in the near future. We do just about every type of act except rock bands; we steer away from them primarily due to lack of money in the Toledo-area rock market. Most of our work is with symphony, industrial and corporate clients."

Great Lakes' console selection is pure Soundcraft, with a 32-channel 500 out front and a 32-

channel 400 for monitors. Several smaller 200s are used when needed. The main P.A. uses custom TBI proprietary, JBL-loaded, 3-way, full-range boxes with 15-inch, 10-inch and 2-inch horns. Double 18-inch RCF-loaded custom subwoofers and/or large double-folded dual 15-inch-loaded enclosures are used when more low end is required. Monitors are the new MacPherson 2-way wedges loaded with a 1-inch Radian driver and 15-inch E-V speaker. Robison says, "They sound great. They're efficient and cost-effective. We're very pleased with them." Other monitors are JBL 4604 cabinets.

Crest 8001 and 4001 amplifiers power the main P.A. system. Each house amp rack is loaded with three 8001s and one 4001. The stage monitors are powered by Crest 7001 and 4801 amps. Carver 1.5s are used on several other systems that use Bose speakers for small events. Signal processing devices include a Roland 3000 delay, dbx 166x compressors, a dbx 900 modular series rack and Yamaha SPX90s.

Recently, Great Lakes took delivery of the new Australian-manufactured ARX Sixgate unit that features six gates in a 1-inch rack space, and the ARX Quadcomp unit with four compressor/limiters in a 1-inch rack space.

Toa Electronics has developed a surprisingly advanced multiuse digital signal processor for sound reinforcement and installation usage. The new SAORI is inserted after the mixing console outputs and before the power amplifiers. It performs a range of tasks equivalent to two 30-band EQs, two 4-band notch filters, two 4-way crossovers, two constant-directivity horn compensators and eight digital delays—all in a compact, five-space, rack-mountable, expandable mainframe that holds individual signal processor modules. All parameters of each module are independently programmable via scrollable screens on a backlit LCD display, or

Below: The TOA SAORI integrated sound processor, model IS-100MF



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externally from a personal computer. Crossover functions, for example, can be adjusted for filter slopes, roll-off frequency and independent selections for Bessel, Butterworth and Linkwitz-Riley filters. Eight complete pattern-memory presets are provided; more are available with an external computer. The SAORI's digital converters incorporate 16-bit A/D and 18-bit D/A with 32-bit processing technology.

This is the type of device that is better understood on personal examination. Several major sound companies and audio acoustical consultants have expressed interest in the versatile SAORI system, which is slated for delivery this summer and expected to retail for under \$10,000. Personally, I think that the SAORI shows a glimpse of what the future will bring and has the potential of being very useful for touring and fixed-installation work. In the long run, it promises to be cost-effective and reduce rack space requirements, eliminate significant signal degradation and provide more precise parameter control.

Rumor Control . . . It's time to set the record straight on all the rumors regarding the status of **TC Electronic**, the manufacturer of the well-received 2290 digital delay. First, **TC Electronic of Denmark** is still in business, but **TC Electronic of America** stopped carrying the Dutch company's products last June. **Virtual Designs Ltd.** (N. Hollywood, Calif.) now has the exclusive importation and distribution rights to the TC Electronic product line in the U.S. The original European company, TC Electronic Is. of Denmark, went bankrupt and last September sold the company to **Gert Frederiksen**, who promptly changed the name to TC Electronic As. of Denmark. The address and telephone number remain the same. The company has reopened with the original staff intact, and the first shipments of new product arrived in



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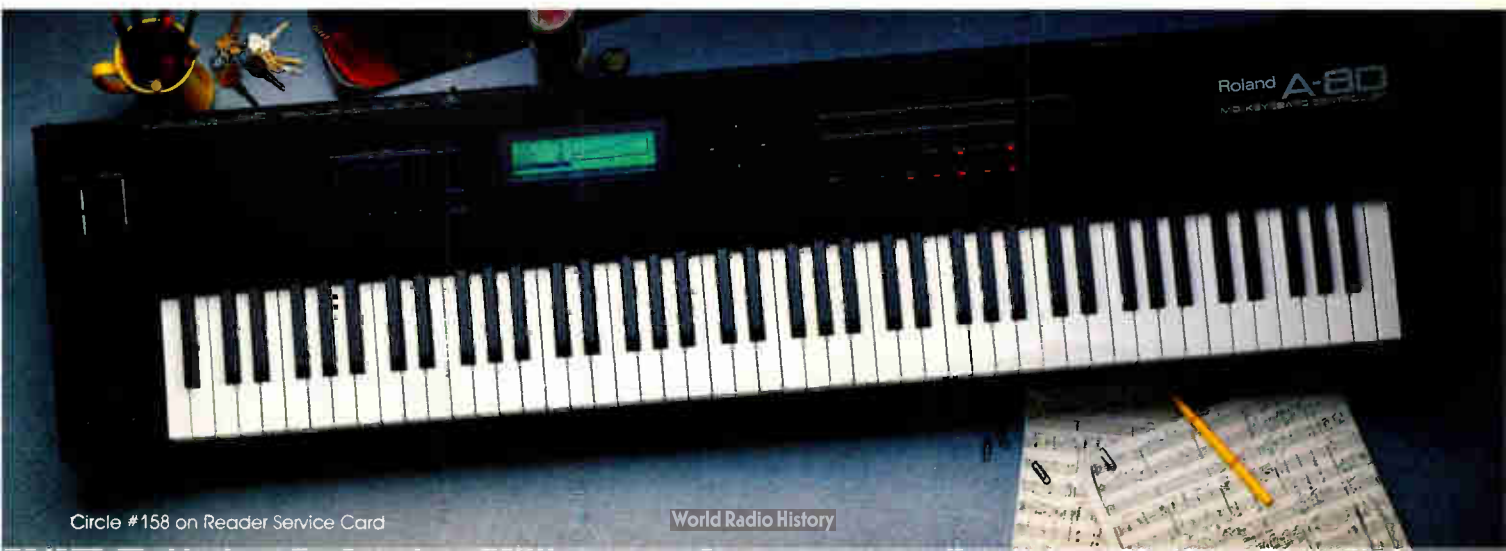
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the U.S. in late November.

Virtual Designs' **Ed Simeone** says, "The [new] products are exactly the same as before. New owner Gert Frederiksen is a first-class audio engineer who brings considerable enthusiasm, as well as needed capital, to the company. We showed two new products at the AES in New York: the 1280 stereo digital delay line and the 1380 multi-tapped 1-in, 3-out digital delay line. Both list for \$2,000 and are based on the 2290 converter

technology." Designed for precise time alignment with distributed loudspeaker systems, the units have over 100 dB of dynamic range and come in 5-microsecond steps with memory cards enabling up to 20 seconds of delay. Simeone says, "TC has heavily targeted the P.A. sound reinforcement industry for upcoming products."

The bulk of **LA Sound's** (N. Hollywood, Calif.) business is concentrated in the L.A. area. Now in its 12th year, owner **Richard Ralke's** company

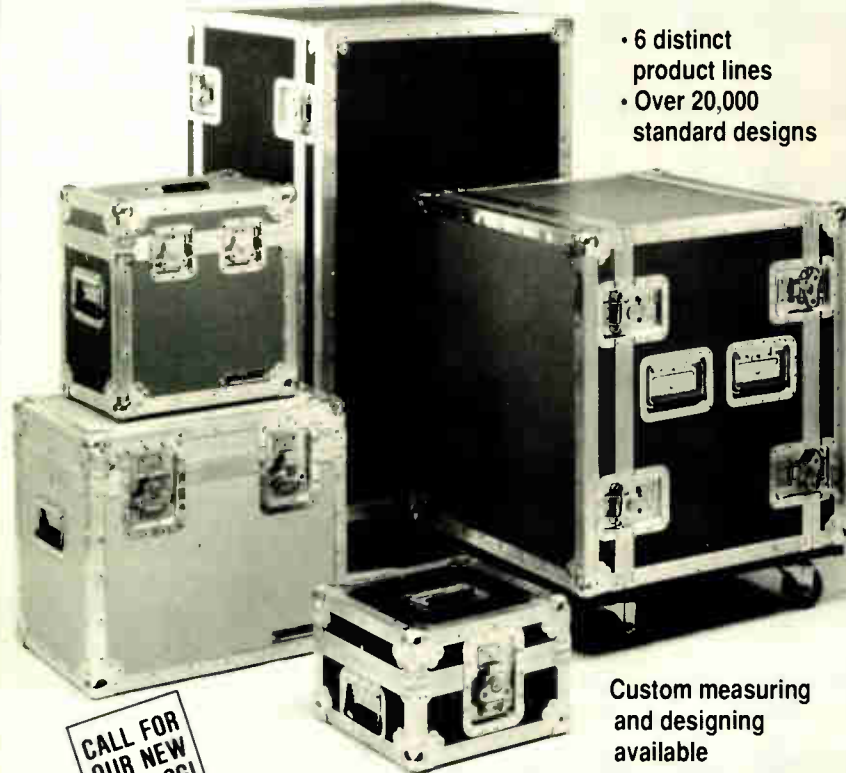
provides audio and visual services for private parties, the annual L.A. Marathon, the Strand Club in Redondo Beach and most of USC's campus pro sound. Additional work includes concerts with Billy Vera and the Beaters and occasional installations.

TAC Scorpion 32x8x2 house and 30x12 monitor consoles head the main LA Sound system. Wheatstone/Audioarts LM80 and 8000 consoles are also available. The house P.A. consists of old-model Meyer JM-3 cabinets (forerunner to the MSL-3), custom LASC 3-way cabinets, and EAW 800s for subwoofers. Monitors are proprietary LASC wedges loaded with PAS 2580CXL 15-inch coaxial speakers. Everything is powered by Crest 7001, 4001 and PL400 amplifiers. Crossovers are BSS 340, EQs are all Klark-Teknik, and processing is done with dbx 160 and 166, Drawmer 201, Yamaha SPXII and REV7, and DigiTech delays.

Last year, Manhattan-based **American Sound Reinforcement**—owned by **Mark Friedman**—merged with New York sound and lighting company **See Factor**. **Bob See** remains the president of the new See Factor; Friedman heads the audio department. Multiple sound systems composed of Meyer speakers, Crest amps, and Yamaha, Midas and Ramsa consoles are kept busy on national tours, one-off concerts and New York-area events. On the choice of speakers, Friedman says, "See Factor is primarily a Meyer Sound Labs-based sound company when it comes to loudspeakers. We have a large inventory of all the Meyer main, sub and monitor cabinets." A proprietary two-box JBL-loaded system is also available as needed. Amplifier power is provided by Crest 4001 and 8001 amps. The house mix shows Midas Pro 40, Pro 5 and Yamaha PM3000 consoles, while the stage uses either a Midas Pro 40 or Ramsa WR-S840. A wide variety of outboard equipment, including Klark-Teknik, Lexicon,

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Yamaha and Eventide, is standard in each system. Recent tour clients include **Squeeze** and **David Byrne**.

Located just outside of Orlando, **Dewey Bond Associates** (Longwood, Fla.) is a full production company formed a year ago by owner **Dewey Bond**. Bond started with staging, lights and a roof and recently progressed into the audio field with the purchase of a 24-box Electro-Voice MT-4 flying main P.A. system and 20 of Electro-

Voice's smaller DeltaMax cabinets. The new company has been quite busy servicing national one-offs, festivals, hotels, conventions, corporate clients, industrials and regional mini-tours. "We have been extremely busy and we are now gearing up to do national touring with sound and lights," Bond states. **Richard Chimelis** manages an additional office in Miami.

The E-V main speakers are powered with Crest 8001s on the 18s and 10s, and 7001s for the mid-highs and highs. Carver 1.5

amplifiers power Woodworx monitor enclosures that are loaded with a JBL 12-inch and 2-inch driver. Frontline mixing consoles are a 40-channel Yamaha PM3000 in the house and Ramsa WR-S840 on stage. Signal processing inventory is composed of Audio Logic gates, dbx 166 limiters, Klark-Teknik equalization, E-V crossovers, Yamaha REV7, SPX1000, SPX90 and Lexicon PCM42 effects. A 48-pair snake runs out to the house, and multipin connections are made with AMP Quicklatch connectors.

Recent work includes a variety of equipment on several stages for a large, annual local event—**Light Up Orlando**—and a Latin music festival in Miami that involved Dewey Bond handling two stages that hosted 40 salsa and merengue acts over a two-day period. MTV's "Summer Break Nights" shows at the **Wet'n'Wild** water amusement park in Orlando used Dewey Bond for 45 days last summer. Bond has worked with the **Florida Symphony Orchestra**, **Julio Iglesias**, **Molly Hatchet**, and this past summer provided supplemental main P.A., MT-4 equipment support for Chicago-based **dB Sound's** (no relation) tour with the **Allman Brothers**.

Performance Audio (Westport, Conn.) is oriented to local work in the affluent Fairfield County area. Business ranges from corporate work in Stamford, Conn., with Fortune 500 companies such as IBM, Chrysler, General Electric and GTE, to jobs for high schools, public events, theatrical presentations and some concerts. Folk act **Peter, Paul & Mary** is a steady client...Performance's sound system consists of Yamaha 2404 and 2408 consoles, E-V S1202 full-range boxes for the house P.A., E-V FM1502 wedges for monitors and Carver 1.5 amplifiers. ■

Mix sound reinforcement editor **Mark Herman** also operates a company specializing in console rentals for live sound and touring applications.

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Greg Ladanyi, The Complex

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THE ROLLING STONES "STEEL WHEELS" TOUR

Historically, mediocrity has never been something associated with the Rolling Stones, and their latest North American tour is no exception. Sizable in form, function and profit, their latest foray across the continent was a spectacle of monstrous proportions featuring Mick and the boys frolicking in an elegantly industrial, stylized landscape, which complements the "Steel Wheels" tour and album.

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The band looked and sounded great, offering a broad cross-section of their best material from the past quarter-century.

Visually, fans got their money's worth in the form of an innovative stage continuously awash in a sea of color provided by a state-of-the-art lighting system. Giant video screens positioned at stage right and left supplemented the already larger-than-life display. Halfway through the show you could count on an appearance by two inflatable 55-foot-tall Honky Tonk Women, and to cap things off, before you left an ample dose of fireworks exploded in the sky during an encore of "Jumping Jack Flash."

All the visuals in the world wouldn't make much difference, however, if the sound reinforcement system failed to live up to expectations. To fill the bill the Stones relied upon Dallas-based Showco's Prism Concert System to take on the rigors of the 36-city tour, which ended in December 1989.

Requiring an 18-person crew to operate and eight tractor-trailers to transport, the system could be viewed as three separate entities. To distinguish these three groups, Showco assigned a different "team" leader to each: Jeff McGinnis oversaw the operations of the Red Team System, David Conyers on the Blue Team System, and Gary Epstein on the Universal Team System. The first two groups of equipment were



by Gregory A. DeTogne



Above: Among the goodies at Benji Lefevre's house mixing position at the Dallas shows were two Harrison HM-5 consoles and a wealth of outboard gear. Insets at left: Mick and Keith rock it up, while the overleaf photo (taken at the Oakland, Calif., tour stop) indicates only a small fraction of the Steel Wheels set.



Top photo Lewis Lee. Other photos by Jay Blakesberg



PHOTOS: LEWIS LEE

PHOTO: JAY BLANESBERG

The "Steel Wheels" tour setup both day and night

identical leapfrogging main speaker systems (i.e., one system is used for one show while the other is torn down and sent to the next concert site). Each package consisted of entire speaker arrays, including subwoofer systems and frontfills, a large portion of the

monitor system, and amps and effects for the opening act, Living Colour. By contrast, the Universal System, which traveled to every show, featured the house and monitor mixing consoles, along with the main effects rack featuring two AMS reverb units, two AMS digital delays, two Yamaha REV7s and four "antique" UREI 1176s, among other things.

While design credit for the Prism Concert System went to Showco's Clay Powers, Jim Brawley and Lee Hardesty, the title of chief audio engineer fell squarely upon the shoulders of Benji Lefevre, who has logged 21 years in the business and served with the likes of Jack Bruce, Led Zeppelin, Peter Gabriel, James Taylor and George Michael. Lefevre, a Showco employee for more than a decade, chose two Harrison HM-5 consoles to better serve his mixing efforts, while monitor engineer Chris Wade-Evans sat behind a Harrison SM-5 (also outfitted with a 20-channel expander).

Once given the job, Lefevre concerned himself with getting all the practical things out of the way. "I wanted to plan the whole thing out so it would be as easy as possible for the crew to install the large amounts of equipment we were dealing with," he said, while preparing for one of the tour's New York City dates. "Together with some key people, I came up with methods of installation that were simply delightful for the guys working on the tour."

To facilitate the load-in and load-out process, a passageway that ran the entire length of the stage from left to right was built underneath. Elevator bays extended from this passageway to the stage floor, which allowed the P.A. to be installed without the roadies ever having to touch the stage surface itself. As a result, the lighting could be installed overhead while the P.A. was set up from underneath, and getting ready for each show was accomplished in what Lefevre refers to as "record time."

With logistics out of the way, Lefevre began thinking about how he

The Keys to the "Steel Wheels" Tour

While wailing guitars play a major part in defining that classic "Stones sound," the band has traditionally incorporated piano and organ tracks into their biggest hits over the years. For the North American "Steel Wheels" tour, the group selected session ace (and former member of the Allman Brothers) Chuck Leavell, who along with Matt Clifford brought their multi-keyboard talents along for the ride.

—CONTINUED ON PAGE 121

Right: Tour keyboardist Chuck Leavell



PHOTO: KEVIN MAZUR

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would approach his work. Initially, he spoke with the group while they were finishing the *Steel Wheels* album, and he expressed an interest in becoming involved in rehearsals as early as possible. Shortly thereafter, he found himself working with the band at Wykeham Rise, formerly a girls' boarding school in Washington, Conn. Sequestered in a separate area with his Harrison console, effects rack and small amounts of other gear, away from the main rehearsal room, he plotted exactly what he wanted to do and when. After the first couple of weeks, he was satisfied with his choice of microphones and their placement, and started to conceive of how he wanted to project the Rolling Stones to the public.

"On the tour, I wanted to make the large stadiums we were playing as intimate as possible," he recalls. "I wanted to steer away from the massive big stadium sound that gives people a feeling of being remote and distant. My reasoning was that basically the Rolling Stones are an R&B band just like many bands you see in local bars. I wanted to project them just that way even though we were working with a very sophisticated

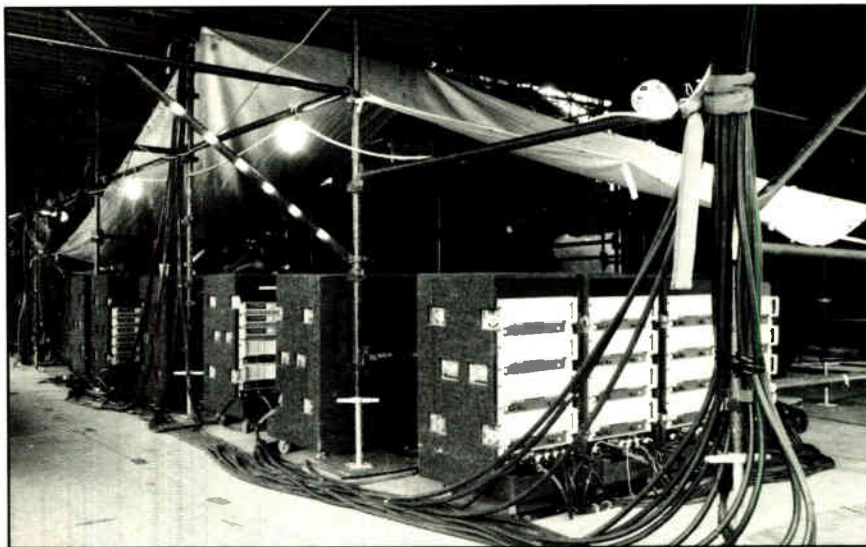


PHOTO: LEWIS LEE

500,000 watts of Crown amplifier power, driving Showco's Prism Concert System

sound reinforcement system. I didn't want them sounding very polished or hi-fi, I wanted to have a raw edge, while at the same time being able to project over the entire audience in a uniform fashion."

Lefevre's power to project over huge audiences was aided in no small

part by 500,000 watts of Crown power, served up over 250 of the Elkhart, Indiana-based manufacturer's Macro-Tech 1200 and PSA-2 amplifiers. Chosen for their performance and reliability, the Crown amplifiers drove a version of Showco's Prism Concert System, which was configured carefully just for this tour.

"Everything about the rigging scheme of the Stones' system was

—CONTINUED ON PAGE 138

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MIX—TRACKING YOUR FUTURE

MIX THE RECORDING INDUSTRY MAGAZINE

—FROM PAGE 116. CHUCK LEAVELL

Choosing Leavell for the tour was no surprise, because he played with the band on their European "Tattoo You" tour and subsequently on their *Undercover* and *Dirty Work* LPs. On the latter, Leavell also collaborated with Mick Jagger and Keith Richards, writing "Back to Zero." Jagger later asked Leavell to play on *She's the Boss*, his first solo record.

"For the most part my keyboard parts are organic: piano, organ and Wurlitzer," explains Leavell before a soundcheck at the Superdome in New Orleans, "and most of the coloration and other keyboard sounds—synthesizer and brass—are done by Matt Clifford, who does an excellent job with quite an array of weaponry up there. He does the cello and flute on 'Ruby Tuesday' and a lot of the brass sounds, on songs like 'Rock and a Hard Place' and 'Honky Tonk Woman.' Even the cowbell in the intro to 'Honky Tonk Woman' has been sampled off the record. It gets an amazing reaction every night. People go nuts every time they hear that cowbell."

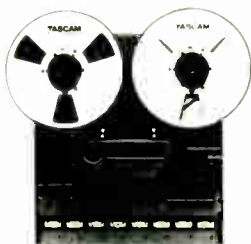
Leavell's stage setup is based around the Korg SG-1D sampled grand, which provides piano sounds and serves as a master MIDI controller. "My main thing is to have a great piano sound," Leavell notes, "and the Korg SG-1D does it. It's great. Believe me, I've tried them all. I've been adamant about pianos throughout my career. When I was with the Allmans, I used to drag around a Steinway 9-footer. The crew hated me, but it sounded great.

"In addition to the internal sounds, the Korg drives a Yamaha TX802 and a Korg M1-R. The Stones use a lot of basic sounds—piano, organ and the Wurlitzer [electric piano] sound on 'Miss You' and 'Harlem Shuffle.' The TX802 gets the basic Wurlitzer sound, with a bit of the SG-1D's internal piano sound mixed in. I have a volume footpedal on the TX802, so I can adjust the blend immediately if I need to. I also have a B-3 that's been modified with a MIDI out so I can use the right hand up top for organ bits and the left hand on the bottom doing piano or whatever else I need. On a couple of occasions I use it with the

—CONTINUED ON PAGE 122

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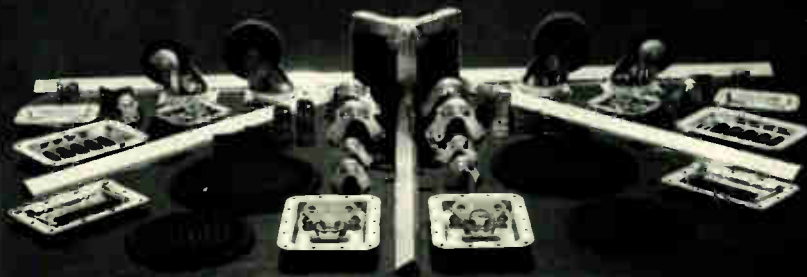
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—FROM PAGE 121, CHUCK LEAVELL

organ sounds—for example, on '2,000 Light Years from Home,' I use the organ sound and color it with the drawbars flowing in and out in addition to driving other instruments via MIDI. Nothing sounds like a B-3, and that's why I'm carrying this one around."

According to Leavell, "One of the most interesting things in the setup is the Conneaut Audio Devices Maxcon 2 mixer. It's 16 x 8 x 2, and having eight subs is so flexible. The mix to the monitors is one of the subs and all the other keyboard

sounds are fed from me to the house, although the organ is miked separately. Benji Lefevre—the house engineer—and I discussed at length about what kind of keys mixer to use. We tested several, and when we heard this CAD mixer he was blown away. While it is a rather large mixer to have in a keyboard setup, Benji felt that it was the best-sounding thing we could possibly get. It really sounds warm and clean, sparkly and beautiful. Benji's happy, I'm happy and it has survived 37 shows up to this point."

—George Petersen



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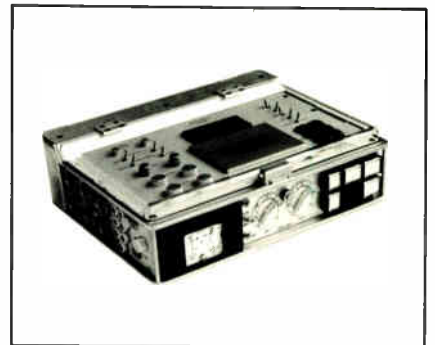


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—FROM PAGE 97

Of course, DAT remained a major topic of discussion among attendees, and there was plenty to talk about. Swiss manufacturer Stellavox (distributed in the U.S. by International Audio Technologies of Chantilly, Va.) gave a sneak preview of its Stelladat DC-operated location DAT recorder prototype, which despite its extremely rugged, all-metal chassis, weighs in at just 3 kilograms. Stelladat is beautifully crafted and will offer a host of options: digital I/O (AES/EBU, SDIF2, SPDIF, etc.), built-in mixers and SMPTE time code based on the newly proposed NHK standard. In other news, Fostex announced that a hardware/software retrofit for its popular time code D-20 studio DAT would be available if the IEC chooses to adopt the NHK standard.

At this point we come to workstations, that dreaded '80s buzzword, but I guess we're stuck with the term until somebody comes up with a decent alternative for *this* decade. But what-



Stelladat.

ever you call 'em, the show offered considerable new activity in this area, with perhaps the biggest splash coming from Symetrix, which debuted a pre-production version of the DPR-100 (initial deliveries are expected in the next couple of months). Under development for four years, and now dubbed as a "Digital Audio Workplace™," the DPR-100 offers up to 40 tracks of recording in blocks of eight, plus real-time level control, EQ, compression, limiting and gating, with dynamic recall of every system parameter. Using a Macintosh II/IIx/IIcx merely as a system controller, all record and edit events can be locked to SMPTE/EBU time code, VITC, house sync and/or internal word clock. No less than 42 simultaneous analog and



Paul Wolff demos API's all discrete console.

digital in/out ports are provided for: primary inputs, track outs, stereo mix out, eight optional pre/post-fader or pre/post-EQ insert loops for external analog/digital signal processing, and four group effects sends and returns.

Having acquired Integrated Media Systems, Studer was showing off the latest additions to the Dyaxis disk-based production system, including the Dyaxis 2+2 simultaneous 4-channel playback system, an advanced synchronizer for locking to house code, SMPTE or film tach, DAT backup and a "Time Scaling" option (for changing program length without a pitch change). In other news, Digidesign and Otari have agreed to produce a high-end, disk-based recording system. Alpha Audio unveiled the DR-2, a simple-to-use 2-track disk recorder that requires no host computer and offers up to 60 minutes of stereo, 16-bit recording (with time code); pricing starts at \$10,000. Lexicon finally announced the arrival of the Opus/e, a stand-alone version of the digital audio editing system. Sans mixer, Opus/e is obviously less expensive than the original Opus system, and can be upgraded to the full Opus system at a later time or serve as a "satellite" workstation in a multisystem operation.

Don't let all this digital talk lead you to believe that analog is dead—in fact, there were ample signs pointing to this medium's robust future. Otari previewed the MTR-15, a high-performance 2-track, available in four versions: 1/4-inch NAB, NAB plus center-track

time code, DIN stereo, and 1/2-inch 2-track. The MTR-15 also features auto-alignment and memory storage of four tape formulations at each speed (3 3/4 to 30 ips). Studer exhibited production models of its A827 24-track. Sony boasted sales of 120 APR-24 analog multitracks in the year since its intro last fall, and now offers a new serial communications enhancement for using the deck in audio-for-video applications.

"The Shape of Things to Come" Award goes to Thompson, a U.K.-based firm that announced plans for the T24, a low-cost, 2-inch analog 24-track that is controlled by a master



Zoom 9010

computer. The PC handles autolocation functions, transport controls and auto-alignment parameters, along with high-resolution, onscreen metering... even track sheets and session notes. The T24's bold approach could influence the way tape recorders are designed for years to come. It will be interesting to check out the production models, due for unveiling at the APRS show in London this summer.

From a product standpoint, this AES was a resounding success—in fact, there were lots of neat doodads to be found, and we'll be presenting these in our "Preview" section in future months. Keep your eyes peeled.

Overall, AES did a fine job of presenting the 87th convention, with a couple of exceptions. Security was anything *but* top-notch, with innumerable stories of exhibitors being ripped off—before the show, during the show, after-hours—particularly with easy-to-fence items such as DAT decks and studio monitors. This situation must be addressed before the doors open on the next fall show, September 21 to 25, 1990. And this problem is not just a "New York" thing. In Los Angeles last year, I walked onto the exhibit floor the night before the show and left with a new Tascam cassette deck (loaned for the *Mix* TEC Awards ceremony), without ever being stopped or questioned at the door.

A more important issue concerns the venue itself. With the unquestionable success of the New York AES show, this convention has outgrown the Hilton as a venue, and expanding to the Sheraton is an inadequate solution. Exhibitors in the Sheraton were not happy about the poor attendance to that hotel (although it is only a half-block away from the Hilton), even with AES giving away free T-shirts as inducement to cross the street. Since the spacious Jacob Javits Center in Manhattan has proven to be an unpopular site for SMPTE conventions,

many exhibitors felt that AES should look to another East Coast town for the convention, with Boston and Orlando cited as possibilities. Now is the time to consider some alternatives. ■

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

by Phil De Lancie

MASTERING IN THE DIGITAL DOMAIN

The advantages of digitization in the storage and transmission of audio are by now generally accepted. But even as digital recording and playback media proliferate, analog systems continue to hold their own in both the professional and consumer realms. Sooner or later the balance is likely to shift, and the all-digital production/delivery chain, from studio to consumer, will become the norm. In the meantime, we live in a hybrid world, using a wide range of recording, processing and playback techniques—both digital and analog.

Nowhere is this multiformat integration more evident, or more important, than in the mastering room. As the emphasis on digital has grown, both up and downstream from mastering, analog consoles are increasingly being supplemented with devices that allow all-digital signal manipulation. Because the expense of professional digital technology has so far proven prohibitive for widespread use in multi-

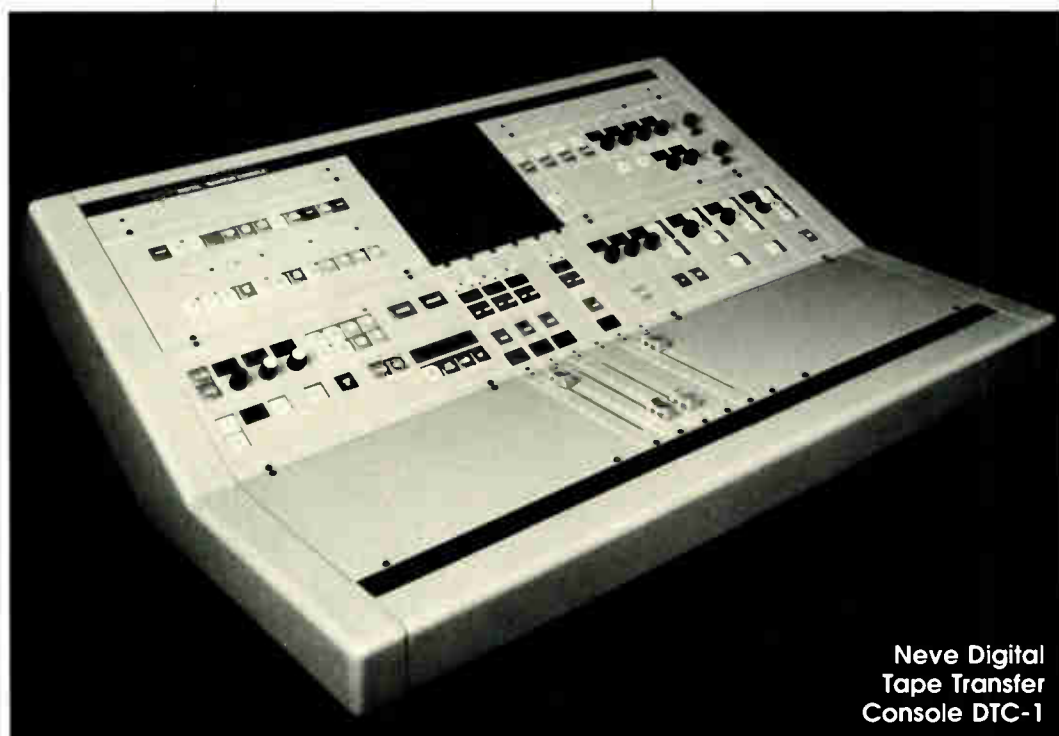
track recording desks, 2-channel applications have become an important initial focus for developers of digital consoles and "workstations."

All the attention in this area has certainly had its benefits, with a variety of editing and signal processing options now available that extend capabilities well beyond the functions found in the typical analog mastering setup. But when it comes to real-world usage within the daily routine of the mastering room, does the gear currently on the market really live up to the high expectations aroused by stiff prices and ambitious claims? To find out,


five mastering engineers, with the AES show fresh in their minds, were queried by *Mix* on digital mastering equipment and the incorporation of digital production into their work.

Mix: Are you currently equipped to control level, equalization and dynamics in the digital domain?

Scott Hull, Masterdisk, New York, N.Y.: We have the Neve DTC and the Harmonia Mundi EQ and compression modules. We use the Harmonia sometimes by itself, but more often in series with the Neve to give us greater flexibility, because the same EQ setting can



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TAPE & DISC

sound very different between the Neve and the Harmonia. Then there is the Lexicon 480, which is primarily for digital in and out reverberation, though there are some EQ and dynamics programs in there. We also have the Roland 660 digital EQ, but it's not really part of our regular arsenal.

Peter Humphreys, Masterwork Recording, Philadelphia, Pa.:

The Philadelphia market has not been too digitally oriented. Until this past year, the only people that we worked with on a regular basis that we needed to service digitally were the major labels, and we are not like houses in New York or L.A. that deal with the majors constantly. We've been striving to raise the awareness of the independent Philly labels as far as thinking CD. But so far, processing in the digital domain hasn't been something that we could get people to pay enough for to make back our investment. It hasn't really been a problem, because so much of our work comes in on 30-ips 1/2-inch or Dolby SR. We've been processing in the analog domain and digitizing when we go to 1630 for the CD master. But we are at the point now, with so many people bringing in DAT projects, that we will have to be able to also process in the digital domain to stay ahead of everybody.

Ted Jensen, Sterling Sound, New York, N.Y.:

We do the bulk of our digital processing on the Neve DTC, and we also have the Harmonia Mundi EQ and level-control modules. The user interface on the Neve is very, very well worked out. The Harmonia sounds good, but so far the automation and user interface have not been the best. But they are working on it, and we look forward to seeing the improvements. Either system can be used in any of our four mastering rooms.

Steve Marcussen, Precision Mastering, Hollywood, Calif.:

We have the Neve DTC as well as all kinds of processing in the Harmonia Mundi world, like EQ and compression. If a client comes in with a digital tape and they want to stay in the digital domain, we can process everything digitally. If they come in with analog, we usually

keep it that way until we go to the 1630 CD master. But sometimes clients like to use the DTC because the time code-based automation makes it easier to make a lot of moves in critical passages.

Glenn Meadows, Masterfonics, Nashville, Tenn.: We have been working with the JVC digital format since 1981. We felt it sounded the best, and the editing was far better than anything else on the market at that time. We expanded on that with the JVC DM-900, a 4-in., 2-out digital console with aux sends and 4-band parametric EQ. It allows you to mix JVC processors with AES/EBU inputs, and do crossfades or overlaps in the digital domain. This is all interfaced to an IBM PC, which stores all your moves with time code on a floppy disk. Another part of the JVC package is the Cutting Delay 90, which gives you preview for your cutting lathe. For dynamics, we have the Sony DAL-1000, a digital limiter with instantaneous attack and release times and a compression ratio that is solely dependent on how hard you drive it. We've also been playing with the Valley International 2-channel digital dynamics unit, which works more like a conventional limiter/compressor.

Mix: How has (or would) the addition of digital processing changed the way you work?

Hull: Generally, if a project comes in analog, then we keep it analog until it has to go digital, and if it comes in digital, we keep it digital until it has to go analog. Where the original master is digital, we are now doing more of our cutting from prepared EQ masters, except in those cases where it takes us less time to run the EQ master while we cut. Either way, we like to have the disc sound as close as possible to the CD. Of course, if we need to do things to make the vinyl work that aren't needed for the CD, the two are done separately.

Humphreys: The tendency earlier on was that if you start with analog masters, you cut your disc analog. But now that digital is so accepted, and there has been such a de-emphasis on LPs, people are more likely to process with the CD in mind, and then just cut a good disc

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from the 1630 CD master. The beauty of that is repeatability and consistency. Once you have a master that you are happy with, you don't have to do your magnificent changes live every time. I have a feeling that disc cutting will become more like a transfer process, because you don't really want it to be all that different from the CD. The exception to that would be with the 12-inch [single], where you would cut it to get out of the lacquer whatever you can get out of it.

Jensen: The big thing is the change in emphasis toward CDs. Before we had the Neve, we set things up basically as we would for the LP. Now the thinking starts with the CD, and if anything special has to be done for the vinyl, we take care of it after.

If a project comes in on digital, we use the DTC for everything: CD, cassette and LP masters. If it comes in on analog, we can do all the signal processing in analog, if that's what the producer likes, and put off the conversion to digital as long as possible. Or we can convert im-

mediately and do all the processing digitally. It's up to each engineer and client as to how they want to proceed. Sometimes we'll go through each way, make a DAT of each and compare to decide which sounds better. It doesn't always turn out better one way or the other.

Marcussen: It really has not changed any of our procedures. Having the first generation of digital console was in some ways limiting, because the Neve only has four bands of EQ. But since we added the Harmonia modules, we have more flexibility in the digital domain.

Meadows: It didn't change the way we work. It just changed what the 2-track format was and gave us a whole lot more flexibility. We can EQ analog tapes on our way into the system and cut in real time from analog. So the equipment didn't change our work, but the market has changed it. Probably 80 percent of the country charts are mixed to digital. At the same time, many of the country and gospel acts aren't even releasing on LP. So the whole

mix of what we do in the mastering room has changed, and if you don't have some form of digital signal processing, you are at a significant disadvantage.

Mix: Do you foresee the continued coexistence of digital and analog processing in the mastering room, or will analog eventually exist only at either end of an otherwise all-digital process?

Hull: We still anticipate analog processing where it is cost-effective for the client. Not everybody has the digital budget. Many people are mixing to a digital format like DAT, but they don't have the money for digital mastering. We inform them as to what we think might be better, but it is their decision. So we intend to maintain an analog environment.

Humphreys: For the next four or five years, the two will coexist in some form, but eventually things will move in the all-digital direction. If you have a good digital setup, you are going to want to get right in the digital domain. There is very little reason to mess around with

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tape and put a lot of wear on the original source master. The only hesitation I have is the fact that some of the analog equipment out there is proven and great. There are analog equalizers that are superb, and that have a warmth that is missing from digital. So there will always be people who like the way that gear shapes the sound. But it's going to be so much faster, cleaner and quicker to move information around in the digital domain. What we'll probably end up having is an analog transfer room where any analog things can be done to a project, while the other rooms might be all digital.

Jensen: They will definitely coexist for quite a while—partly to keep as many options open as possible, and also because of cost. We charge a fair amount of money to use the Neve. A lot of people don't want to go for that. And there are still a lot of tapes that come in analog. If a room has good analog gear, there is no reason not to use it.

Marcussen: We feel that if a client comes in with an analog source, they mixed to analog for a reason, and it's not our decision to say, "Hey, you should be working in the digital domain." It's their call. So the two will continue to coexist.

Meadows: I anticipate coexistence. We have two rooms. Ninety-five percent of the projects I work with are on digital when they come in the door, and the room I work in is almost 100 percent digital processing. Our other mastering room is geared more toward analog signal processing, but we are looking at adding digital processing capability to it.

Mix: How would you define the distinction between a digital mastering console and a digital audio workstation?

Hull: The chief bone of contention I have with the workstations is that they tend to be designed for environments other than mastering, like sound effects and film or video post-production. They can be made to work for us and do most of the things we need to do, but the functionality tends not to be conducive to working quickly. I don't believe that because something looks like a computer it can't provide a fully functional mastering environment.

The interface flexibility that you have on a computer is enormous when compared to the traditional hardware interface of a console. I guess my "wish system" would be both, meaning a completely user-definable piece of hardware.

Humphreys: They can be very much the same, if they are done right. But right now, the workstation concept means working from a screen and doing everything with a keyboard and mouse, and maybe a scrubwheel to make you feel like you are touching something.

Jensen: A workstation would imply that you've got an all-in-one package including a hard disk-based editor. In some cases that might be convenient, but in others it would not because you have to dump everything on and off your disk. That really puts a crimp on your flexibility, and it seems to me that overall it would just take longer to do it that way. If there were some less cumbersome means of loading information, something in cartridge form, like a Bernoulli drive, then it might be a bit more interesting. The other problem with the "virtual console" approach, where you are looking at a screen with a picture of a console on it, is that everything that takes one button operation on a console is at least two keystrokes on a computer. And most of the software that I've seen has so many arbitrary things that you have to remember that it is just hard to use.

Marcussen: In my definition of a workstation, you would have the ability to edit, crossfade, add echo and overlay one thing on top of another, or maybe even go back to the source and alter a mix. The existing workstations are trying to put together a mastering suite with an editing station, and I don't think they are excelling at the level of mastering for disc. All of them seem to be a little complicated to use. You have to be fluent in computer, as opposed to using an existing mastering desk and twisting the knobs. A mastering console is a dedicated unit, with a path that your signal passes through as you improve it, whereas in a workstation you juggle with it internally.

Meadows: With a digital console, you play a tape, the data goes

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TAPE & DISC

through the board, you EQ it in real time, and it comes out the other end. It also needs to be able to remember what you did and play it back. And if you have to change projects in the middle, you can take the tape out, stick another one in and go on to something else.

In a workstation, the audio you work with is in some form of RAM, which has pros and cons. The high-speed access to any point is great. But you have to twiddle your fingers while you upload and download in real time. Even if you can do that in the background, like on the Sonic Solutions box, you run out of memory. So it's very inflexible if a client wants something on the spur of the moment, because you have to load something out to make room, then load it out again afterwards. If your facility is geared to productivity, a hard drive-based system, as they are currently configured, is a real bottleneck. Plus, all the workstations we've seen so far are computer-bound, because you are stuck with menus and mouses and icons. They are not intuitive to the way a recording engineer likes to work. Give me buttons and knobs, or at least a bunch of function keys that I can pre-define for what I want to do so I don't have to search around on a screen while I'm working.

Mix: Are you satisfied with the operation, capabilities and sound of the current generation of digital mastering gear, or do you feel that manufacturers still have a long way to go?

Hull: I think most have a long way to go. We are in the market to buy, but we haven't because no one has really done the all-in-one box for us. There are at least five or six units that I have gotten to spend some time with. The SSL01 sounds good, and everything on the front panel does what you would expect it to on first look. But it still needs an onboard automation system, which they are supposed to be working on. Then it could be used as a real-time console the way that we use the Neve, but with the added flexibility of disk-based recording and editing.

Sonic Solutions is very good, but

it can't really be used as a console. The WaveFrame is an excellent-sounding real-time unit, with a very nice universal digital interface, amazing EQ possibilities and an automation system, but it was still being worked on when we saw it. DAR is more for video post, and Dyaxis seems like a small cousin to the Sonic Solutions, though I haven't seen it since Studer took over. So we are holding off because things are still settling. In order for the client to pay a lot more, it's got to be very clear that a device really made their record. And that's the area where the manufacturers are coming up a little bit short right now. Much of what they offer can already be done pretty well by existing boxes. So it's not always going to be obvious to the client that they have to use this new process.

Humphreys: More than any other part of the business, mastering houses have always had their own individual ways of putting gear together. So I think you are going to see lots of combinations of things for quite a while. I don't think anybody is going to find just one package that does everything for them. I think we are quite a ways away from being able to buy one frame and just updating it with software. But there are some adequate systems out there that do the job pretty well. The one I love is the Muse, but I don't know if our business could bear the cost of it. It's from a real new company, so that makes me a little scared. But something like it is the perfect concept, where you are actually putting your hands on it, becoming a part of the music, making your adjustments and being able to automate those moves. That's being able to interact with your equipment. Digital processing on computer with screens and mouses is very cost-effective, but it's really not flowing like music. It would be hard to work that way with an artist or producer and have them feel like they are really part of it. And the guy who has the things that make you feel a part of it is going to win out in the end.

Jensen: The EQ on the Neve is a bit limited because you only have four bands to work with, and they

don't overlap as much as I would like. The sound of it is awfully close to perfect, though there are some by-products from the EQ that I wish weren't there. The only other real mastering console I've seen is the Muse, which certainly does the things I like in a lot of areas. The EQ is very flexible, even to the point of being able to program your own curves and coefficients. Of course, there is the danger that things can be so flexible that it can be hard to just select what you want. It remains to be seen whether it will eventually get to a workable final form, but so far it looks encouraging.

The SSL 01, when I saw it awhile ago, took more of a post-production workstation approach, but I think they may have made a few changes that would make it more interesting. They have said that they will get one to us to look at. As far as the computer-based virtual consoles, I haven't really compared the sounds or the features because I just don't care for that way of working.

Marcussen: I think that current gear is satisfactory. We do run into situations where one piece won't clock to another, but we are in the infancy stage of this stuff, and one has to expect these types of problems. I know that three years from now there will be a lot more gear available, and it will be a lot easier to use. But there are some great-sounding CDs being made now, which wasn't the case three years ago, because we've all got greater tools to work with.

Meadows: Most of the stuff that's coming out has been designed by computer people in the lab. Nobody has really gone out and studied a broad cross-section of how people really work. The hardware should at least be designed to work in the environment that it is going into. At the AES Convention there were computer screens and graphics interfaces for nearly every piece of gear, but we are in the audio industry, not the computer industry. Years ago, everybody talked about how good their gear sounded, but now they talk about how fast they can get from screen to screen. The analog portions of some of these systems sound awful, because everybody has forgotten

how to design great-sounding analog.

We are asking for an on-site demonstration of the Muse, but the one significant negative of the Muse and others like it, such as the Neve, is the price. A system can be the best thing in the world, but if there is no way you can realistically pay for it, then it's a moot point. We are also expecting to evaluate the new Sony box to add to our analog room. Another thing we are looking into is a true multi-user networked system from Symetrix, a distributed processing, multitasking

hard disk recorder that allows multiple projects to be on one common mainframe and be processed in different rooms simultaneously. It can be used as a 40-channel recorder or chopped up into smaller independent groups of channels, accessible from different workstations on the network. ■

Phil De Lancie, a mastering engineer at Fantasy Studios in Berkeley, Calif., is our resident voice on formats, trends and technologies in the world of prerecorded music mastering and manufacturing.

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PROFESSIONAL AUDIO

by Phil De Lancie

TAPE & DISC NEWS

The RIAA has released figures showing a marked slowdown in the overall growth of sales of pre-recorded music products during the first half of 1989. Record company shipments (net units after returns) were up a modest 4.5%, while the dollar value at list price of those shipments was essentially unchanged from the same period in 1988. Cassette singles performed strongly, registering unit gains of 500%, while CD singles suffered a 61% decline. LPs and vinyl singles continued to wither as well, with drops of 60% and 40%, respectively. The CD showed a gain of 38% in units and 16% in value, reflecting a drop in average CD pricing. Sales of the industry's dominant configuration, the cassette album, held steady.

The RIAA is also publicizing the contents of a report on home taping by the Office of Technology Assessment. The report was commissioned by members of Congress in 1987 to aid in the exploration of policy options on copyrights and home taping. OTA maintains that more than 1 billion musical selections are taped annually, with 40% of the American public having engaged in the practice in the past year. The RIAA is pleased that the report supports its view that home taping is a serious threat to the economic health of copyright holders and the music industry in general. Congress, however, is most likely to be impressed with the part that shows 93% of surveyed respondents find home taping acceptable for personal use or to give to friends. Some of those home tapers might even be registered to vote.

NARAS has formed a National Archival Committee to encourage

and aid the preservation of the nation's recorded musical heritage. Tens of thousands of aging master recordings stored in record company vaults are in danger of being lost forever if programs are not initiated soon to ensure their survival. The committee hopes to coordinate efforts, promulgate standards and

OTA maintains that more than 1 billion musical selections are taped annually, with 40% of the American public having engaged in the practice in the past year.

perhaps lead a drive to win federal assistance. Veteran jazz producer Orrin Keepnews, committee co-chair, reports that the group's initial meeting, held during last October's AES show, was "very preliminary." The concerns of some participants about the long-range stability of digital recording formats means that just agreeing on a standard archiving medium may turn out to be quite a challenge. (Comments and suggestions related to archiving may be sent to *Tape & Disc*, c/o *Mix*, for forwarding to the committee.)

The specific issue of archival media is also being dealt with by another committee, one jointly formed by AES and the American National Standards Institute of New York, and including NARAS repre-

sentatives. Under the direction of Dr. Peter Adelstein of the Image Permanency Institute in Rochester, N.Y., this group is charged with developing standards for the measurement and classification of life expectancy for magnetic and optical storage media and systems, as well as standards for storage, handling and transfer techniques. The committee's work should aid archivists in the selection of appropriate media and procedures, but Adelstein estimates that it may take as long as ten years before guidelines are finalized.

Optical Disc Corporation (Cerritos, Calif.) has appointed 18 U.S. and Canadian distributors for the ODC 610A, a recording system that produces LaserVision-compatible videodiscs for random-access editing and other low-volume applications in post-production and broadcast environments.

S-type, the new consumer noise reduction system from Dolby Laboratories, has taken another step toward introduction with its recent unveiling to Dolby licensees at gatherings in London and Tokyo. The complex circuitry has been reduced to a set of three ICs, and the company hopes to have a single-chip version by fall. A model 420 S-type encoder for duplicators should be available this spring, followed by the appearance in early summer of the system on high-end consumer cassette decks. Dolby hopes eventually to convince major labels to switch from B-type to S-type encoding for their prerecorded cassette releases.

Optical Disc Equipment, a joint venture of Canadian CD manufac-

turer Cinram and Vadeko International of Toronto, has completed the production design of its new CD Max 600, a \$500,000 machine that integrates metalizing, spin-coating and laser inspection into one compact, fully automated unit. The system operates with existing molding, printing and packaging machines in either an in-line or batch-processing environment. No clean room is required. Cinram is expected to order five to 15 of the units as part of a major expansion of capacity at its Scarborough, Ontario, plant, where a prototype has been in operation since last summer. CD Max 600 will also be available for order by outside CD manufacturers.

Final installation is now complete in a third mastering room at Bernie Grundman Mastering in Hollywood. "Even though [vinyl] discs aren't as popular anymore, we've put a lathe in there because we want it to be a full-service room," Grundman says. Harmonia Mundi digital EQ and compression have been integrated into the room's custom console to facilitate simultaneous analog and digital signal processing. The cutting system features a Scully lathe driven by Compudisc, and a Westrex/Henkel cutting head. To reduce machine noise, the room's DMR-4000s have been built into the wall, with control panels "remoted" to the console.

Sony Classical (formerly CBS Masterworks) becomes the first major label to offer its wares on DAT, with the release of the last recording made by recently deceased piano great Vladimir Horowitz. Further DAT releases of both reissues and new product will follow, but a Sony representative was unable to say when. Other labels are certain to watch with interest, but until DAT machines are more widely available, it seems unlikely that DAT releases will become the norm.

Two U.S. subsidiaries of Pioneer Electronic Corporation have agreed to the purchase of DiscoVision Associates from IBM and MCA for \$200 million. DVA licenses 1,400

patents and applications related to recording/reproducing technology for LaserVision and compact discs, as well as a number of newer optically based data storage and retrieval devices.

The defunct Shape Optimedia plant in Sanford, Maine, has come back to life under the name U.S. Optical. The plant has been running three shifts, five days a week, with about 50% of its equipment in use while it continues personnel training. Output at 100% of capacity is planned by spring. The

company is set up to do 5- and 3-inch CD-Audio, as well as CD-ROM.

SPLICES

San Francisco-based **Reference Recordings** has released what it calls the world's first "direct-to-CD" recording, "Dick Hyman Plays Fats Waller." The glass master for the project was cut at **Disctronics Manufacturing** from a microwave transmission originating in a recording studio where the artist's performance was being played back from floppy disk on a Bosendorfer SE piano...The recent sale of three

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TAPE & DISC

OIDC 610As to **Spectra Image Systems** of Burbank brings to six the number online in that facility's Laser Edit post-production rooms...

Concept Design of Burlington, NC, has created a RAM version of DAAD, the company's "digital bin loop" for high-speed cassette duplication. DAAD II substitutes solid-state memory for the original version's hard drive storage. The company also has opened a new factory with a larger manufacturing area to expedite delivery of DAAD systems... **TDK** has announced the selection of its SA tape by Rykodisc for the cassette release of David Bowie's *Sound and Vision* collection, duplicated using DAAD. The SA and DAAD combination has also been chosen by audiophile label Sheffield Lab for its first-ever series of cassette releases... **Otari** is replacing its in-cassette duplication line with a new "E" series based on the DP-4050E-C2 (one master, two slaves). A three-slave unit (DP-4050E-Z3) is also available. The companion DP-4050E-Z Buffer Unit increases the total number of slaves simultaneously recordable from a master to 65... **Sunkyoung Magnetics** has been licensed to use an interlocking hub design for cassette tape pancakes patented by El Mar Plastics of Carson, CA...

JLP Manufacturing (Somerville, NJ) has introduced the O-2000, an O-Card Insert Machine with varispeed cycling between 30 and 100 per minute... A line of Trans-Field Bulk Erasing Equipment is now available from **R.B. Annis Company** of Indianapolis. The units are designed for continuous operation at intensities up to 3,400 gauss for erasure of tape pancakes, audio and video cassettes and computer discs... **TLW** (Independence, OH) has completed its expansion with the opening of a clean room for loading of custom-length broadcast VHS cassettes... **Martin Audio Group** has added 12 new positions to its KABA real-time duplication system... **KABA**, meanwhile, has announced that Anne Baker and Lauraine Bacon have become assistants to president Ken Bacon, and Bud Martin has been added to the Novato, CA, company's technical staff. ■

Digital Transfer of PCM-F1 Format Recordings to DAT

by Jacques Verdier

Since the introduction of Sony's PCM-F1 digital audio processor a decade ago, many digital audio master recordings have been made using videotape as the storage medium. The Sony PCM-F1/Nakamichi DMP-100 and their successors, the PCM-701, 501 and 601, all used the EIAJ recording/encoding standard that provides for 14-bit resolution or (optionally) the 16-bit resolution mode developed by Sony. The format's cost, portability and sonic quality have made the F1 family a standard for digital audio location mastering.

Yet this standard has some drawbacks. Sixteen-bit operation is an option provided by Sony, but it is not supported in the EIAJ format. (F1 is, however, fully compatible with the EIAJ 14-bit resolution.) The trade-off resulting from this higher resolution option is reduced error-correcting power, with only 16 video lines of error correction instead of 32 lines. Added to this problem is the wide choice of videotape and videocassette transports, recording speeds, television formats (NTSC, PAL, SECAM) and recording options such as hi-fi audio and/or video bandwidth modes. The issue of tape interchangeability even within one video standard is still

significant due to the loose tolerances of most consumer video transports.

DAT's introduction as a digital recording format addresses many of these configuration issues. Variations still exist in the DAT format, such as different sampling rates and subcode information, but with DAT transports the interchange compatibility problems are greatly resolved. Preliminary "tests" indicate that playback of recorded tapes on different DAT machines is quite consistent and error-free from machine to machine. Integrating the digital processor and tape transport, and settling on one cassette size, results in a recording format that successfully crosses geographic and technical boundaries. On top of that, with DAT there are no tracking or skew adjustments to make, and no color and dropout compensators to turn off.

THE TRANSFER

Given the numerous possible F1 recording modes, digital transfers to DAT must be done with caution. If the intent of the transfer is to use DAT as the final replay medium, several issues must be considered; and there are even more issues to look at if the DAT transfer takes place to provide a delivery format for transfer to CD.

When transferring to DAT for replay on DAT, sampling frequencies must be consistent. When transferring to DAT for CD mastering, sampling frequency, bit resolution, emphasis flag and copy prohibit flag issues all have to be addressed.

Two methods have been shown to be successful when making digital transfers from F1 tapes to DAT. The first method involves the use of "professional" DAT machines such as the Sony PCM-2500, Sony TCD-D10PRO or Panasonic SV-3500, and the second method uses "consumer" DAT recorders such as the Sony DTC-1000 or Aiwa XD-001.

When the recording machine is a professional model, the sampling frequency of the F1 tape is normalized to 44.1 kHz. The consumer video machines typically used in conjunction with F1 processors replay the encoded videotapes at a speed that conforms with the horizontal and vertical scanning rates appropriate to the particular television standard used. For example, the F1 tapes used with the North American and Japanese NTSC television standard actually record and replay at approximately 44.056 kHz. In shifting from 44.056 to 44.1 kHz sampling frequency there is a pitch change of approximately 0.1%.

To most listeners this pitch change is not



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TAPE & DISC

significant; however, during post-production editing, intercuts between 44.1 and 44.056 material become evident and should be avoided.

The following equipment is needed for transfer: a professional DAT recorder or AES/EBU-modified consumer DAT recorder, a consumer or industrial video transport, and a Sony PCM-601 digital processor or a digital output-modified PCM-F1/701/501 digital processor.

The video output of the transport is routed to the video input of the digital processor, and the digital output of the processor is connected to the digital input of the DAT recorder. While this setup will work, it is important to note that there is still a pitch error of 0.1% unless the source EIAJ tape was made on a processor recording at 44.1 kHz and the replay video transport is synched to the video output of the transfer digital processor, also running at 44.1 kHz.

When the DAT recorder is a consumer unit, the machine is inhibited from accepting data at 44.1 kHz. With machines such as the Sony DTC-1000, removing a simple diode jumper enables digital recording at 44.1 kHz. This however does not allow recording at 44.056 kHz. In order to resolve the 44.056 to 44.1kHz problem, the videotape replay transport has to be an industrial or professional machine capable of accepting and locking to external sync from an EIAJ processor operating at 44.1 kHz. The replay sample rate is independent of record frequency, so the same pitch error of less than 0.1% also occurs if the master tape was recorded with a processor running at 44.056 kHz.

In this case the equipment used for transfer consists of a consumer DAT (with the 44.1kHz inhibit diode removed), an industrial Beta/VHS transport (Sony SLO-420, or SLO 1800/Panasonic AG 6300, or AG 7500), and a Sony PCM-601 digital processor or a digital output-modified PCM-F1/701/501 digital processor.

The digital processor video output is connected to the sync/video input of the industrial transport and the tape machine set to external sync mode. The video output of the transport is routed to the video input of the digital processor, and the digital output of the processor is connected to the digital input of the DAT recorder.

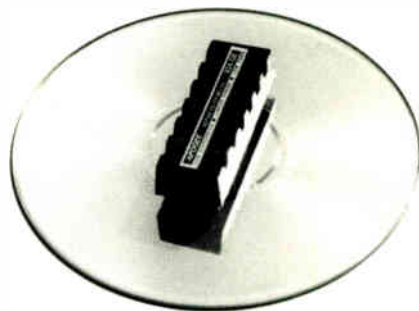
OTHER CONSIDERATIONS

Several consumer DATs and at least one professional DAT need to see a continuous data stream at their digital input during the record/play and record set modes. If the data stream is interrupted, the DAT stops. This is irritating at best, and at worst causes the DAT to pop out of record when uncorrected dropouts occur during videotape replay. Putting an additional digital processor in the copy mode in series between the video transport and the transfer digital processor provides an idling data stream for the DAT during momentary, uncorrected dropouts.

While the presence of a dropout or interruption during the program segment of the video replay is a cause for concern, it is common to have dropouts or discontinuities in the EIAJ master tapes at the end of takes or segments. When assembling segments for subsequent editing, many discontinuities can occur, and, needless to say, frequent DAT machine stops during transfer can be a nuisance. The interposing PCM processor in the copy mode provides a "copy black" signal, allowing a benign transition during momentary dropouts. Most of the time this provides the continuous data needed by the recording DAT.

It is recommended that an EIAJ/F1 tape, with numerous (uncorrected) video edits, be copied to a second tape through the digital processor copy function to provide a safety and a copy master that does not have error-correction discontinuities. (The video edits on the master tape have a 2/3

The heart of the Apogee Electronics enhancement package for EIAJ (F1-type) digital processors includes the 924-GE input filter, which replaces the standard Murata filters and provides dramatically improved performance.



chance of error-correction discontinuities that can exceed the correction range of the video-to-digital transfer processor.) An industrial video transport, with its higher quality scanner mechanism and ability to lock to external sync, is the definite choice when setting up the EIAJ-to-DAT transfer procedure. The industrial machine allows for precise resolution of replay speeds (sampling frequency), and the improved dropout performance gives greater assurance of successful transfers.

RECOMMENDATIONS FOR CD MASTERING ON EIAJ MACHINES

The following points should be considered when using EIAJ/F1 machines for producing master tapes intended for compact disc release:

- Master at 44.1 kHz, not 44.056 kHz. PCM-F1/DMP-100 and PCM-701 machines can have their crystals changed to 44.1 kHz.
- Transfer to DAT using an industrial video transport whose external sync input is locked to 44.1 kHz.
- The pre-emphasis circuit in the analog input of the A/D converter of the EIAJ processor should be switched out and the emphasis flag turned off (a simple modification). Most CDs produced today do not use pre-emphasis, and there is a chance that during digital transfer from one professional format to another the emphasis flag will be lost.
- Adjust the DC offset of the recording processor as carefully as possible. While DC offset is not as big an issue as before because of the availability of digital highpass filters, considerable DC offset can cause later editing problems, and when severe, can reduce the dynamic range capability of the mastering processor.
- The resolution of the digital processors ideally should be 16-bit to take full advantage of the CD delivery medium. However, a number of recordists prefer to run at 14-bit resolution with its improved error-correction advantages. Some recordists use two processors simultaneously during mastering: one running at 16-bit and the other at 14-bit resolution. If all goes well, the 16-bit tape transfers successfully. If not, the 14-bit tape is there as a backup. In any case, it is recommended that two transports be slaved to the mastering digital processor(s) for dropout redundancy.



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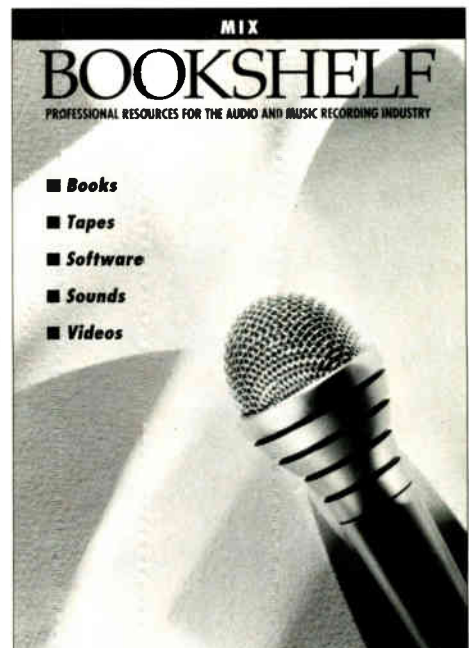
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MODIFICATION KITS

Previous mention has been made of modifications to the line of EIAJ digital processors and DAT machines. Several lowpass filters have been developed by Apogee Electronics (of Santa Monica, Calif.) to enhance the sonic performance of consumer and professional digital audio products. In addition, a number of modification kits have been developed to increase the capability of EIAJ processors and DAT recorders. Among them are a digital output board that can be retrofitted into Sony PCM-F1/701/501 processors to allow digital transfers to DAT machines. Conversion of consumer DAT to professional standards is also supported in the form of sampling and emphasis switching kits.

Hopefully, the preceding discussion will provide the necessary guidelines for precise, painless digital audio transfers from F1-type digital processors to the DAT recording format. ■

Jacques Verdier is a broadcast equipment and facilities designer who has spent the past 25 years recording and mixing for broadcast, tape and CD.

—FROM PAGE 118, STEEL WHEELS

integrated into the overall show," says Showco's vice president of field operations, Robin Magruder. "We've worked with the band since the "Some Girls" tour in '78, and became involved in the preliminary production discussions for this tour. To fit the Prism Concert System into the scheme of things, we held a series of meetings in London, Dallas, New York and Connecticut to work out every detail of the logistics, from taking the system from the trucks to operating conditions. Throughout the process, it was imperative that we maintain a correct relationship with the rest of the set, because in this case, the Prism arrays were actually a scenic element, and we didn't have the luxury of hiding everything behind scrims."

Aesthetics aside, Showco's underlying performance philosophy was to achieve predictability and accuracy. To help obtain these goals and predict how the system would perform in a live environment, they used computer modeling. According to Clay Powers, one of the three Showco designers working on the project, they began their studies by defining the sound field in a model stadium. Next,

the geometry of the seating area was considered and a radiation pattern specified. They then matched hardware to that pattern, with other factors such as levels of distortion, reliability and service taken into account.

"We developed the modeling programs ourselves," Powers says. "But they aren't some sort of magic piece of software capable of doing something you couldn't calculate with pen and paper. They simply allow us to crank through many calculations at a very fast pace. Based upon our calculations, the system was optimally designed, constructed and verified with the aid of Techron's TEF technology."

Bearing a price tag that is "more than you and I are going to make next year," Magruder jokes, the Stones' Prism Concert System was significantly different and somewhat radical in appearance compared to other concert systems. It is Showco's policy to maintain a tight lip when it comes to questions about the Prism arrays' contents, and they would admit only to "using the very best professional sound reinforcement products available today." For each show on the tour

—CONTINUED ON PAGE 158

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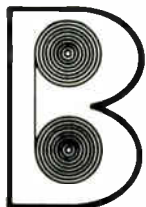
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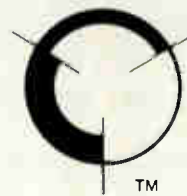
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NONA HENDRYX: MUCH MORE THAN SKIN DEEP

Challenging music is nothing new to Nona Hendryx. Since her days as a singer and songwriter for the soulful trio LaBelle, she's played hard rock, fronted the *tres moderne* New York space-funk band Material, and cut solo albums dappled with a techno-pop sheen and solid dance grooves. She's been all over the map stylistically, but it's safe to say she's never put out a disc quite like her latest, *Skin Diver*, on former Tangerine Dream member Peter Baumann's Private Music label.

Appropriately enough, these two progressive musicians met at the New Music Seminar a few years ago. They collaborated on a track for Hendryx's last EMI LP, and that led to Baumann's offer to make an entire record with her for his fledgling label. "The name of the label is actu-

ally quite literal," Hendryx says from her Manhattan apartment. "He likes to take artists who do other kinds of music and let them do their personal music—the music they might not be able to do on a larger, more commercial label."

Skin Diver is an intensely personal project, brimming with Hendryx's dreams, longings, insecurities and, most of all, her inner strength. Hendryx's lyrics are alternately confessional, rawly emotional, abstract, metaphysical and surrealistic (she cites Dali as an influence), and the spare musical settings amply showcase her powerful, emotive voice. This isn't likely to be a commercial smash, but as a revelatory work of art, it has to be considered one of her most successful works. "I write from inspiration," she comments, "from the inside. That's how I feel most comfortable. What's on there is me."

It will no doubt surprise those who think of Hendryx only as an exotic chanteuse to learn that she's quite a tech-head, and has been for a

number of years. "That probably started with Material, who were very techie," she says. "Through them I got into sequencers, and eventually it was the drummer in Material who suggested I get into computers myself. At first I was reluctant, but eventually I saw how it could help me with my writing, so I wouldn't be dependent on getting together with a drummer and a guitarist to work out what I wanted to do."

She co-produced *Skin Diver* with Baumann (who also helped her with synth programming), and she handled the computers, drum machine and percussion programming herself, working things out in her home studio before tracks were laid down at Westlake Studios and John Tesh Studio in Los Angeles. Her personal studio arsenal includes a Tascam 8-track recorder and Ramsa mixing console, Tascam and Roland submixers, Yamaha RX-5 drum machine, Akai S900 sampler, Roland MKB-1000 master keyboard controller, Roland MKS-20 and 30 synth modules, Roland Jupiter-8 retrofitted for MIDI, a Macintosh running Mark of the Unicorn's *Performer* and *Professional Composer* sequencing/notation software, and a Revox 2-track for mixdowns.

"It's been so wonderful having a studio at home," she says. "So many times I've lost ideas because I didn't have a way to record them. Now, if I think of something at 2 in the morning I can get it down." When she spoke in the fall, she said she planned to move to Los Angeles and build a larger studio in her home there. "I need a break from New York," she says, "and I want to be someplace where the weather is better. I'm a real tennis freak, and I'll be able to play all the time out there." When she's not baring her soul in the studio and onstage, that is.

—Blair Jackson

JOSEF ZAWINUL: A CHANGE IN THE WEATHER

Although none of the records Josef Zawinul has made since *Weather Report* disbanded a few years ago

have gotten the attention they deserve in this country, he continues to be a significant international force, respected from Rio to Tokyo for his distinctive hybrid of jazz, rock, classical and Third World music forms. His most recent disc, *Black Water*, may be the best he's produced since his former group's late-'70s heyday; certainly it offers ample proof of his continuing vitality as a composer and keyboardist.

The material on *Black Water* represents a natural evolution for Zawinul. Tunes like "Medicine Man" and the incendiary live version of "Carnavalito" build and mutate like classic Weather Report constructions. "And So It Goes," written by Zawinul's son Anthony, also has a warmly familiar feeling. "Little Rootie Tootie" is Monk with a twist—swinging and a little bit irreverent, like Monk himself. Where Zawinul shows the most growth is on the two vocal tunes, "Black Water," a subtle parable about South Africa, and the antiwar "Familial." Zawinul uses voices like instru-

Josef Zawinul

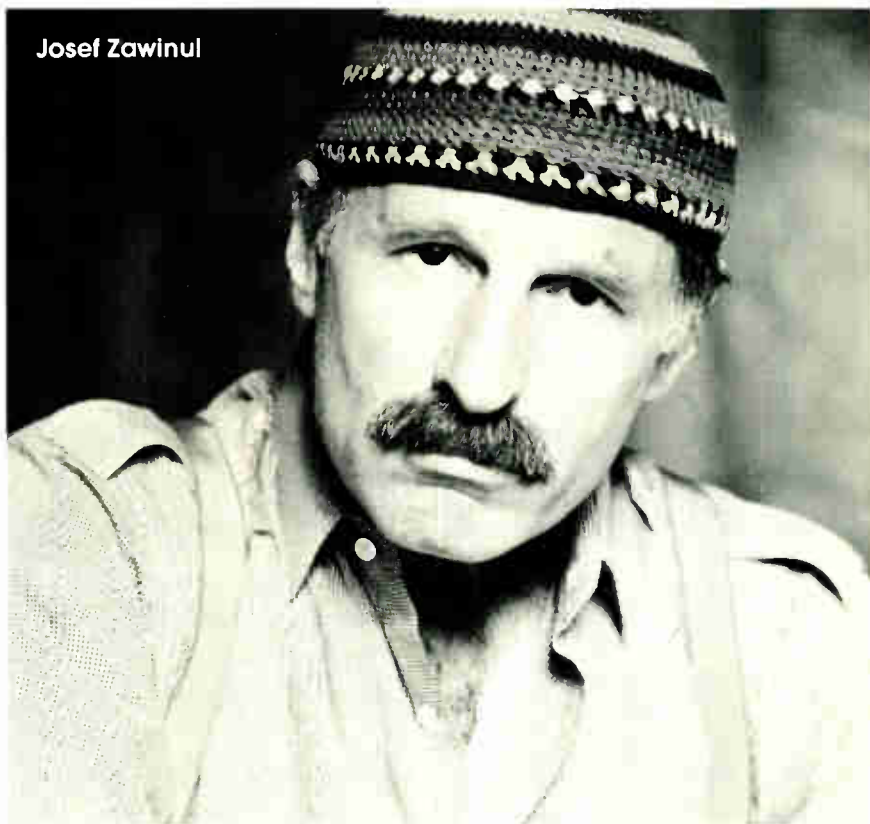


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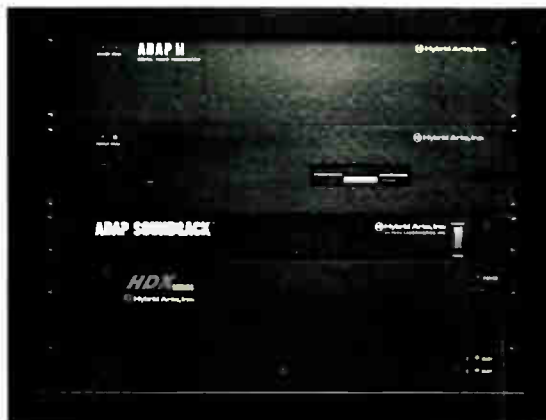
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ments, and, conversely, his own synth playing frequently strives to capture a human sound.

"I always liked vocal music, but it took me a long time to find singers who had the right qualities for the music I write," Zawinul says. "In Weather Report we tried things here and there, and I wasn't always pleased with how it came out. But with that band we did more chanting than singing. Carl Anderson [the main singer on "Black Water"] is so great and expressive, and I was very happy with the words Gerald [Veasley, bassist for the Zawinul Syndicate

band] came up with."

While the Zawinul Syndicate is still primarily an instrumental group, and the majority of the vocal passages in the music are still produced by Zawinul through a distorting vocoder, he acknowledges that "spoken word and songs with words allow us to get to ideas a little quicker, which I like." And having songs in English has not proven to be a barrier between Zawinul and his international audience. "It seems like people all over the world speak enough English to understand our songs," he comments. "And even when they don't understand the words, they can still appreciate the

quality of the human voice as an element in the overall music."

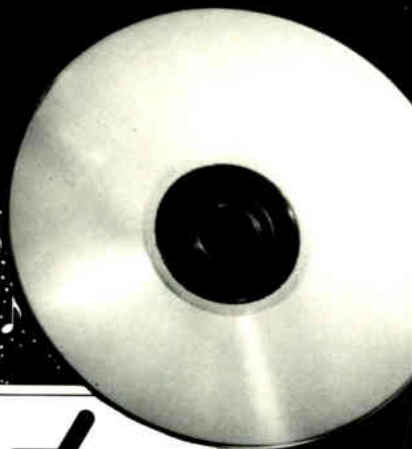
Another increasingly important element in Zawinul's music is Scott Henderson's jagged electric guitar. Henderson's angular, slightly detached style provides an interesting contrast to Zawinul's warm, textural approach. He describes Henderson as "a brilliant player who brings some blues and R&B with him," not to mention such diverse influences as Jimi Hendrix and John McLaughlin. The presence of the guitar marks the biggest change in approach from Zawinul's Weather Report days, and he freely admits that was a consideration.

"You cannot replace [Weather Report saxophonist] Wayne Shorter; it's that simple," he says. "I didn't want to have another saxophone player that I'd have to tell everything to. Me and Wayne never had to talk about it. We knew what we wanted. It was our music and our vision. So I wanted to try another sound that was different from what we did in Weather Report."

Zawinul still does the majority of his writing and recording at his Southern California home, and the last couple of years this process has become a family affair: His 20-year-old son Ivan now works for him as a second engineer and programmer (Paul Erickson remains his primary tracking engineer); son Anthony is coming into his own as a composer; and Erich Zawinul designed the cover of *Black Water*. "I can't think of a better situation," the proud 57-year-old dad says. "Not only do I like working here [home], but if you have a good, relaxed home, you have a nice place to fall back to when you've been on the road. I like having a home where I can work, play and be with family."

—Blair Jackson

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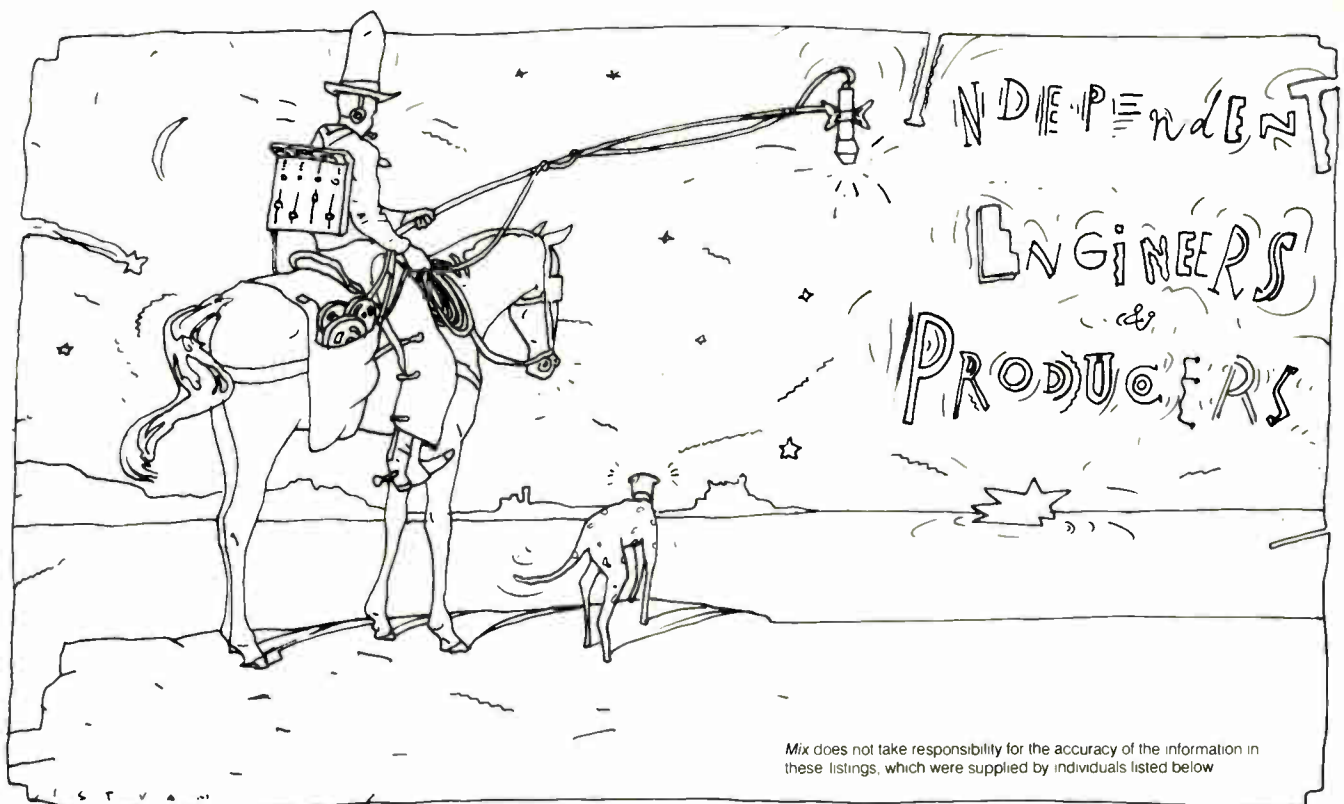
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M. DAVID ACOSTA, GREGORY JAMES, J. DEON HILL, *Engineer & Producer*, SILENCE, INC., PO Box 710, Maplecrest St., Maplewood, NJ 07040; (201) 763-0453. Credits & Services: Studio production. Nu Shooz, "I Can't Wait" Hot Tracks remix, Kool & the Gang, "I Sweat" remix, Frankie Castle, "It's So Hard" remix, Steve Washington/George Clinton, Roxie Mixing and remixing. Live engineering. Dan Reed Network, Adrian Belew, Chuck Berry, Country Joe MacDonald, Shadowfax, B.B. King, Roomful of Blues, Buddy Rich, Dave Mason, Dan Siegel, Bonnie Raitt, The Band, The Byrds, New Riders of the Purple Sage, John Lee Hooker, James Cotton Blues Band, Al Stewart. Services offered, we are an independent production establishment. Our experience embodies audio, film, video and computer implementation. We specialize in forging accessibility from the latest in high-technology production tools, and we remain aggressive in their application. An extensive roster of skilled performers, composers, arrangers, and technicians awaits your beck and call (Larry Fast, Joe Franco, Steve Washington, Jerry Ragavoy and more). Audio equipment includes Macintosh IIcx, Digidesign Sound Tools with DAT II/O, Mass Micro data cartridge, Super-Mac Dataframe 600MB hard disk and much more.

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RICHARD ADLER, *Engineer*, RICHARD ADLER RECORDING SERVICES, PO Box 21272, Nashville, TN 37221; (615) 646-4900.

MICHAEL AHARON, *Engineer & Producer*, MICHAEL AHARON MUSIC, 705 Schell St., Philadelphia, PA 19147; (215) 238-0918; FAX: (215) 248-9115. Credits & Services: Credits: producer, arranger and/or multi-instrumentalist for Fred Small (Flying Fish), John McCutcheon (Rounder), Tom Juravitch (Flying Fish), Trapezoid and other pop, rock, jazz and folk artists. Composed original music for the film *Let the Door Be Made of Iron*, winner of the CINE Golden Eagle and PhilaFilm gold awards and submitted for nomination for Academy Award for Best Documentary Film of 1988. Original music and sound FX design for various industrial films and national TV ads. Clients include The National Educators Assoc., N.J. Educators Assoc., Heinz and Rosenbluth Travel Services; album/demo production and arranging. Film scoring. Performance on keyboards, fretless bass, guitar, cello and drum programming. Attention: songwriters: additional mu-

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PAUL ANTONELL, *Engineer*, Box 373, Germantown, NY 12526; (518) 537-6305.

PHIL APPELBAUM, *Engineer & Producer*, BOGUS THUNDER, 5532 Amistad Rd. NE, Albuquerque, NM 87111; (505) 822-8273.

FRANK ARN, *Engineer*, BANTAM SOUND SERVICES, 4724 Kester #101, Sherman Oaks, CA 91403; (818) 907-5181. Credits & Services: Credits: staging production and sound engineering since '74 on tours with Rare Earth, Bob Seger, Parliament/Funkadelic, Tommy Bolin, Keith Carradine ("I'm Easy" tour), George Benson ("Breezin'" and "In Flight" tours) etc. RIAA gold and platinum awards include *Night Moves*—Bob Seger and *In Flight*—George Benson. AA degree in electronic engineering, metallurgy and certificate in recording engineering. Services: consultation, design and wiring of complex signal processing/keyboard/guitar racks including custom-built rack modules, live sound engineering with Zeta Sound and others. Independent recording engineering dates and projects with producer Paul Sabu. Recent sessions include albums for Only Child, Neil Henderson, Precious Metal, Little America, Douglas Miller (Grammy nominated live LP), Bridge 22, etc. Recent concerts as production manager and F.O.H. engineer include Heartland Jam II and III, Richard Marx, Jackson Browne, Tiffany, Restless Heart, Graffiti Band, Only Child, Neil Henderson, L.A. Marathon and much more. Thank you *Mix* magazine.

PATRICK ARNOLD, *Engineer*, PO Box 12, Charleston, WV 25321; (304) 346-6964; (304) 744-5164. Credits & Services: Chief engineer. Soundtracs Recording, South Charleston. WV. Studio demos and albums. Trained at Recording Workshop, Chillicothe, Ohio, and Full Sail, Orlando, Florida. Eleven years live sound reinforcement. Services offered: studio demos, remote recording, acoustic design; studio construction and installation; special FX; drum sounds; acoustic instrument, live sound mix.

DEAN BAILIN, *Engineer & Producer*, 4 CATS STUDIO, 325 W. 52nd St., New York, NY 10019; (212) 582-8663; FAX: (201) 327-5428. Credits & Services: 24-track 2" and 16-track 1/2" extensive MIDI setup. Pre-production/finished master recordings. Digital mixdown. Producer/engineer/songwriter. Vast experience in synth drum programming to aid artist in arranging/crafting songs to meet today's standards. SMPTE-based synchronization of multitracks to computer allows for flexible arranging possibilities with virtually no track limitation.

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KEVIN BEAMISH, *Engineer & Producer*, KEVIN BEAMISH PRODUCTIONS, INC., 4615 Stark Ave., Woodland Hills, CA 91364; (818) 702-0265; FAX: (818) 713-1629. Credits & Services: 17 years experience as producer/engineer with international multi-platinum success. REO Speedwagon—4 albums including *Hi Infidelity*, Jefferson Starship, Y&T, Saxon, Leather Wolf, etc.

GEOFF BENSON, *Engineer & Producer*, GEOFF BENSON MUSIC, 233 E. Wacker Dr., Ste. 904, Chicago, IL 60601; (312) 819-0432; FAX: (312) 649-0096.

RAY BENSON, *Producer*, BISEAUX PRODUCTIONS, PO Box 463, Austin, TX 78767; (512) 477-5556.

GLENN E. BERKOVITZ, *Engineer*, SPINNING REEL SOUND SERVICES, 11929 Windward Ave., Los Angeles, CA 90066; (213) 313-2776. Credits & Services: Specializing in audio—production and post-production—for film and television. I bring to my work a thorough knowledge of all systems in use today. I incorporate digital and time code technologies in my production recording equipment and techniques, and help create full MIDI/SMPTE recording and scoring studios. Recent credits include *Robocop 2*, *Less Than Zero* and *Miss Firecracker*. Gathering of stereo digital effects, location and studio music recording and, of course, clean dialogue—it's all worth the effort and I give it my best. Large or small, it has to be good and, hopefully, fun.

JEFFREY BERNSTEIN, *Producer*, SOUND CHOICE, 125 Bedford Ave. #4L, Brooklyn, NY 11211; (718) 963-0836; FAX: (718) 963-0836.

DAVID BIENERT, *Engineer & Producer*, LO-KEY PRODUCTIONS, 16161 Ventura Blvd., Encino, CA 91436; (818) 344-0374; FAX: (818) 990-5078. Credits & Services: New audio engineer/producer. Recent grad in audio engineering, sound reinforcement, videotape production and editing. Work from tracking through video to tour with your band, your concept, your sound.

MICHAEL BITTERMAN, *Engineer & Producer*, MIDNIGHT MODULATION, 2211 Pine Ln., Saugerties, NY 12477; (914) 246-4761. Credits & Services: President of Wildlife Records. Produced and engineered *Woodstock—Moods & Moments*.

—CONTINUED ON NEXT PAGE

INDEPENDENT ENGINEERS & PRODUCERS

—CONTINUED FROM PREVIOUS PAGE

(Prism Records), *Five After Eight* (Original Cast Records), *Company Wife* Denise Finley, *A Woodstock Sampler* (Wildlife), *Oblivion Grrn* (Wildlife) Engineered Jean Redpath (Rounder), Priscilla Herdman (Flying Fish), John Hall, The Band, John Sebastian, NRBO Town and operate Midnight Modulation, a fully loaded 16-track studio w/full MIDI setup. Located in Woodstock, NY. I have access to many of the fine musicians here. I have produced artists ranging from folk music to pop to cabaret to rock. I can give you a state-of-the-art sound for a fraction of the price. I am extremely eclectic and will serve every project on its own high merits—from production through engineering the final mix.

STEVEN BLANE; *Engineer & Producer*, BLANE & DEROSA PRODS., INC. 109 W. 27th St., 4th Floor, New York, NY 10001; (212) 633-1925. Credits & Services: Have produced and directed sessions with James Earl Jones, E.G. Marshall, Lynn Redgrave, Megan Follows, Frank Langella and others. Specialize in voice-over recording to R-DAT, PCM/Beta, 2-track Dolby A/SR or dbx, editing, sweetening, mixing and mastering, music composition, managing and production, fully equipped MIDI production and multitrack recording facility, casting services, script preparation and editing.

ROBERT BLANK; *Engineer & Producer*, BLANK PRODUCTIONS, 1597 Hope St., Stamford, CT 06907; (203) 968-2420; FAX: (203) 329-7193. Credits & Services: Over 300 national TV spots, 3 Clio nominations, 15 gold and platinum records including Sting, Chaka Khan, Kid Creole. Complete digital and analog production facility including disk-based recording and Studer multitrack, all-digital automated mixing and \$100,000 synth setup in 100-year-old farmhouse 35 minutes from NYC. Sync-to-pic, 48-track lockup, 2 MIDI production rooms, great atmosphere.

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RICHARD (RICK) BOYLE; *Engineer & Producer*, 2126 Avenue J, Wichita Falls, TX 76309; (817) 761-6059.

JAMIE BRIDGES; *Engineer & Producer*, 256 State St., San Mateo, CA 94401; (415) 347-1186. Credits & Services: I've engineered and produced in the San Francisco Bay Area and L.A. for ten years, recording every style and sound imaginable—some famous, some not. I can engineer and produce your project without getting in the way of your music, or work with your producer. I can also help you find a studio or studios that best suit your music and budget.

HARRY BROTMAN; *Engineer & Producer*, BROTMAN MUSICAL SERVICES, 19010 Avers Ave., Flossmoor, IL 60422; (708) 799-7711. Credits & Services: Recent national airplay *Magnum Force Hang Out* (Meltone), engineered and mixed, *The Manhattan Hot Like an Oven*, (Valley Vue), engineered and mixed. Foreign chartings: *Keyman Edwards Love's Got to Be Strong* (Island), engineered and mixed, *Nouveau Nation Partytime Lovers* (Westside), mixed; *Streetlife Keep on Moving* (Westside), engineered and mixed. 10 cuts on CD. Tracking projects with L.A.-based producers: Michael White (Family Members) and David Resnick (Bucketheads). Services: engineering, co-production, production, analog and digital synthesis, sampling, programming/sequencing. Lucky 13th year serving America's heartland. Requestable at many fine 24-track facilities, including ARS Studio, P.S. Recording, Sonic Art, Seagrape, Startrax and Pyramid. European near-field monitors/amplifier system goes everywhere. Also: European condenser and ribbon microphones plus various outboards (18 channels of the good stuff!). Custom pre/post-production assistance on all projects is included.

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CHRIS BUBACZ; *Engineer & Producer*, ONTEN PRODUCTIONS, 87-86 116th St., Apt. D-5, Richmond Hill, NY 11418; (718) 441-5271; (914) 362-1620. Credits & Services: Engineering, mixing and production for artists on labels such as Atlantic, Arista, Passport, Enigma, Megalorice, CBS, MCA, Private Music, RCA and A&M.

ERICH T. BUCHOLTZ; *Engineer*, 2122 Wood St., Latrobe, PA 15650; (412) 539-1075.

RICHARD JAMES BURGESS; *Engineer & Producer*, 7095 Hollywood Blvd. #106-345; Los Angeles, CA 90028; (213) 850-7337; FAX: (213) 850-5302. Credits & Services: Programmer, drummer, engineer, producer. Credits: Spandau Ballet, King, Adam Ant, Five Star, Living in a Box, Colonel Abrams, Shriekback, When In Rome.

SIDNEY BURTON, JR.; *Engineer*, BURTON SOUND ENGINEERING, 28 Cunningham St., Boston, MA 02125; (617) 427-4376. Credits & Services: Mix engineer, Maurice Starr Productions, New Kidds, Seiko, Omnimax, Perfect Gentlemen, Michael Jonzun, Anna Rodriguez, CBS Critique, Mission Control, House of Hits, SSL, Amek, mix-to-picture.

KEN CAILLAT; *Engineer & Producer*, CAILLAT PRODUCTIONS, PO Box 1064, Malibu, CA 90265; (213) 456-6047; FAX: (213) 456-5778. Credits & Services: Grammy Award-winning producer, Grammy-nominated engineer—Fleetwood Mac *Rumours*. Album credits include Fleetwood Mac *Rumours*, *Tusk*, *Fleetwood Mac Live*, *Mirage*, Chicago, David Becker *Siberian Express*, Lionel Richie *Dancing on the Ceiling*, Tom Scott *Streamlines*. Film or television credits include *52 Pick-up*, *Firewalker*, *RoboCop*, *Miami Vice* and Universal Studio's *Earthquake* commercial (3-D Audio). Spherical sound 3-dimensional audio. Pink Floyd *A Momentary Lapse of Reason*. Michael Jackson's *Bad*. Roger Waters' live radio broadcast from Radio City Music Hall, Tom Scott's *Streamlines* and Lionel Richie's *Dancing on the Ceiling*. Electronic Design, Photon Game Centers. Services: production, arranging, song reconstruction and evaluation, 3-dimensional audio, film scoring, sound effects and mixing, and electronic design.

DOMINIC P. CAMARDELLA; *Engineer & Producer*, SOUND DESIGN, 33 W. Haley, Santa Barbara, CA 93101; (805) 962-8489.

STEVE CAMPBELL; *Engineer*, AXSTUDIOS ANYTHING AUDIO, 1551 Elmwood St., Clearwater, FL 34615; (813) 441-8975. Credits & Services: Owned and ran Axstudios in Columbus, Ohio, for 3½ years (see Nov. 1989 *Mix* Directory). Owned and ran rental P.A. business for 15 years. Have done live/studio mixing for 22 years actively. Have done live sound for major concert tours (top-name national acts) 6 years steady. Now moved my business to Clearwater, Florida, to set up shop. I am innovative, dependable and dedicated to always doing my best for my clients. I also manufacture crossover (passive) networks for speaker systems. High/low power. I have (3) nice systems.

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ALEX CIMA, Engineer & Producer, 1501 E. Chapman Ave. #100; Fullerton, CA 92631; (714) 680-4959. Credits & Services: Credits include releases in domestic and international labels, all TV networks, independents, plus audio logos, commercials, film trailers, music videos, and special projects for major entertainment companies. Services include audio recording/production, music synthesis, project troubleshooting, consulting and the use of a proprietary computer program for video/film footage-to-MIDI sequencer synchronization.

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ANDREW R. COHN, Producer, ARC NEW AGE MUSIC, 2844 W. Eastwood Ave., Chicago, IL 60625; (312) 478-3008; FAX: (312) 346-9603.

MICHAEL COLLINS, Engineer & Producer, THE COMMERCIAL REFINERY, INC. 2105 Maryland Ave., Baltimore, MD 21218; (301) 685-8500; FAX: (301) 685-0313.

KEITH COMPTON, Engineer & Producer, Nashville, TN; (615) 646-5432.

DAN CUBERT, MARC GODINO, Engineer & Producer, Q-TECH PRODUCTIONS, 246 Morris Ave., Summit, NJ 07901; (201) 277-1671. Credits & Services: Production group offering wide range of services: arrangement, production, engineering for jingles, demos, album projects, soundtracks, etc. In-house multitrack studio, access to variety of samplers, drum machines, synthesizers. In-house composers, musicians and superb coffee. Call or write for more information.

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DAVID DACHINGER, Engineer & Producer, DEE PRODUCTIONS, 127 W. 78th St.; New York, NY 10024; (212) 496-0049; (212) 645-1945 (Leslie Best, booking). Credits & Services:

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ROBIN DANAR, Engineer & Producer, SQUID PRODUCTIONS, 1689 1st Ave. #1; New York, NY 10128; (212) 289-5868. Credits & Services: Suzanne Vega, The Church, Laurie Anderson, B-52s, Randy Newman, Linda Ronstadt, Ry Cooder, Bustler Poindexter, Garland Jeffries, Reckless Sleepers, Grayson Hugh, Buckwheat Zydeco, Manhattan Transfer, Kids in the Kitchen, Uptown Horns, Crossfire Choir, Grace Pool, Shawn Colvin, Peregrins, Walkers, Circus of Power, Longhouse, Urban Blight, Lonesome Val, Joy Askev, Sylvain Sylvain, Richard Lloyd, Chris Stamey, Peter Holsapple, Velvet Rhythm Ringers, OK Savant, Second Self, Saqqara Dogs, Anna Domino. Squid Productions provides both recording engineering and production services and live engineering and production services. Studio specialties have been high-quality demos and independent records, with several subsequent major label releases. Live specialties have been coordination of shows, live mixing and remote recording internationally. Live mixes and multitrack recording and mixing have also been done for MTV, Showtime, Westwood One, WNEW-FM and other international radio networks. Will tour.

JIM DEAN, Engineer & Producer, MUSIDEO PRODUCTION GROUP, PO Box 117008; Burlingame, CA 94010; (415) 344-4434. Credits & Services: Credit: Hobo, Don't Panic, The Leaders, The Queen Bees, The Banana Slug String Band, Masters SME, Mara Miller, Linda Gauthier, World Zap Art, Chico Freeman, Patrick Wittingham, Ronnie Montrose, Jonnie Lippis, The Uptones, Enigma, Profono/CBS, Blue Rockit Records, Blackhawk Records, Rear View Recordings, Music for Little People Recording Company. Services offered: Music production and engineering for albums, demos and soundtracks. I have 11 years' experience recording a variety of musical styles from all over the world. I am always listening for new talent and concentrate heavily on artist development while increasing my contacts with record labels. If you are trying to define your "sound" and get it on tape or disc, I can be of assistance. Send tapes to the address listed or write for further information. Tapes will not be returned without a stamped, self-addressed envelope.

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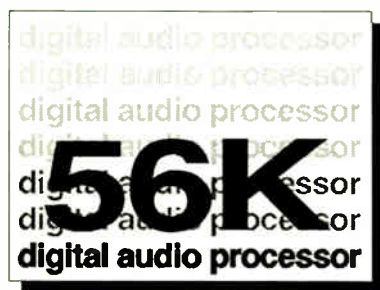
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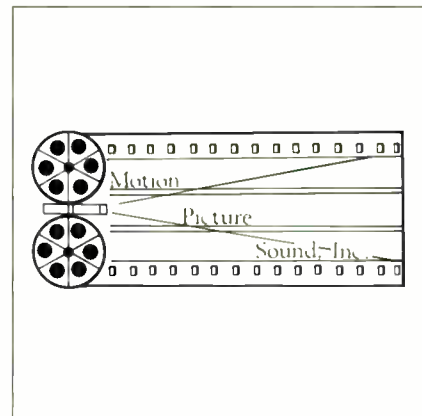
DON FEINBERG; Engineer, 2011 Ocean Ave. #4B, Brooklyn, NY 11230; (718) 376-5776. Credits & Services: Five Top Ten singles last year, Debbie Gibson *Out of the Blue* and *Electric Youth* albums. Singles and album cuts with Cover Girls, Five Star, Fat Boys, Brenda K. Starr, Mac Band, Samantha Fox, Pretty Poison, Nona Hendryx, Miki Howard, Altershock, The Family Stand, Marlena Shaw, Jonathan Butler, Arthur Baker, Tommy Page, Marlon Jackson. California calls welcome.

VITO FERA; Engineer & Producer, NETWORK SOUND PRODUCTIONS, INC. 119 Peachwood Dr.; Swedesboro, NJ 08085; (609) 467-1682.

RICK FISHER; Engineer, 560 W. 43rd St. #32E, New York, NY 10036; (212) 594-1990; FAX: (212) 594-1845.

RICHARD J. FLORA; Engineer, 1049 Fairfax Dr.; Gretna, LA 70056; (504) 393-1932.

JAMES E. FOX; Engineer & Producer, LION & FOX RECORDING, INC. 1905 Fairview Ave. NE, Washington, DC 20002; (202) 832-7883. Credits & Services: Folk, reggae, rock, big band, jazz, country. Full-service 24-track recording studio—Emulator II, DX7, LinnDrum, Hammond B-3, drums. Complete MIDI system with computer sequencer and tone generators (Kurzweil, Alesis, Roland, Yamaha).




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TOM GARTLAND; Engineer & Producer, 140 Parker Rd.; Elizabeth, NJ 07208; (201) 351-4522. Credits & Services: Technical coordinator. New Music America Tenth Anniversary concert series, producer, Blue Blue Blue; engineer, Keith Richards, Randy Muller, John Patton, many others, sound reinforcement, live recording and advance work for tours and festivals a specialty.

CECIL GASPARI; Engineer & Producer, BREAKING RECORDS. PO Box 50802; Montecito, CA 93108; (805) 969-4589.

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LOU GIORDANO; Engineer & Producer, LG PRODUCTIONS. 312 Cambridge St.; Cambridge, MA 02141; (617) 497-0647. Credits & Services: Records: Christmas *Ultra-Prophets* LP (IRS), Bob Mould *Workbook* (Virgin), The Embarrassment *Train of Thought* (Bar None), Big Dipper *Craps* (Homestead), Mission of Burma *Forget* (Taang), Moving Targets *Brave Noise* (Taang), Jones Very *Words and Days* (Hawker), Eleventh Dream Day *Beet* (Atlantic), Tours: Bob Mould U.S. '89 (Oct. 1 to Nov. 14), Europe '89 (Nov. 19 to Dec. 5).

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MARK G. GREGOR; Engineer, G&G MUSIC PRODUCTIONS. 5141 Fairway Lakes Dr.; Westerville, OH 43081; (614) 882-0752. Credits & Services: Bonny Durr (A), Groveport Apostolic (A), Nightmare (A), Overcomers (A), TEC (S), '88 Posse (S), Brian Gregor (A), Bad Boys (A), among others. Also provide video camera work and editing, computer graphics and A/V consulting. Video credits include Lennox, AT&T, Halstead Industries, local TV show *Heart Talk*, among others.

THOMAS J. HALL; Engineer & Producer, TRIAD STUDIOS. 4572 150th Ave. NE; Redmond, WA 98052; (206) 881-9322. Credits & Services: Credits: UB40, Queensryche, Hair Apparent, Randy Meisner, Fifth Angel, Terry Brown, Kenny G, Mick Guzauski, Autograph, Michael Powers, Bloodgood, Roby Duke, Jim Strpech, Uncle Bonsai, Pop Mechanix, November, Dan Dean, Darkhorse Musicmedia, Ralph Towner, Phantom, Bud Shank, Eric Tingstad, Paul Speer, Mark Lindsay, The Magical Strings, Rail, D. C. Lacroix, The Cedar Walton Trio and many others. Services offered: all facets of demo and album

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TERRY HAMMER; Engineer & Producer, HAMMER PRODUCTIONS. 418 Fourth Ave.; Mansfield, OH 44905; (419) 524-6968. Credits & Services: Credits: Fabulous Thunderbirds, Squeeze, Go-Go's, Toxic Reasons, Dead Kennedys, Earl Zero, Soul Syndicate, Robert Gordon, XTC, Husker Du, Gang of Four, Mutants, Flamin' Groovies, Pere Ubu, Dead Boys, Gong, Jim Carroll Band, Mark Nattalin, Charlie Musselwhite, Romeo Void, Toots & the Maytals, Magazine, Shak'n' Street, Slits, SUT, many others. Service offered: While living in San Francisco from 1979 to 1982 have mixed and produced hundreds of live remote broadcasts for various Bay Area radio stations, commercial and college. Specializing in reggae and hard core, but mix most any kind of music. Have done live remotes for all major record companies' up-and-coming new artists. Specializing in raw direct 2-track mixes.

R. MARK HANSEN; Engineer & Producer, ART OF MUSIC PRODUCTIONS. 5531 S. Owensboro; West Jordan, UT 84084; (801) 967-2993. Credits & Services: I have worked in many different genres. Whatever the style you'd like to work in, I most enjoy projects with a message. Most of all, I love the creative process and being in the studio. Credits: Points West *Running Again* (modern album), Sadistic Intent *The Unveiling* (speed metal extended play), BioHazard "Blood for Real Estate" (hardcore EP). Currently in production: Covenant Project (metal album), After the Thin Man (modern album), John Wilson (soft-rock album), Scar Strangled Banger (metal album).

DAVE HARDY, ALEX LEDVIN; Engineer & Producer, UBIQUITY PRODUCTIONS, INC. PO Box 91; Lindenwold, NJ 08021; (609) 783-7650. Credits & Services: Island Records, Select Records, Prudential Insurance Co., Pyramid, Pop Art, Muscle Majik, WDAS Radio. Ubiquity Productions specializes in urban contemporary. House, club, rap and jingle production (full-service). Full automation and a wide array of sound modules and outboard gear makes this facility production heaven. Product can be cut in-house or production staff will travel for transfer. Minutes from Philadelphia. For information, call (609) 783-7650 or (215) 742-3067.

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JAY HENRY; Engineer & Producer; VISUAL MUSIC, 235 E. 13th St. #3-D; New York, NY 10003; (212) 505-9281. Credits & Services: 16 years experience in recording and broadcast industries. Has 16 gold and platinum records on MCA, Warner Bros., Columbia, Def Jam, CBS, Epic, Arista, Profile and Atco. Has worked on projects with Prince, Run-DMC, L.L. Cool J., Al B. Sure, Heavy-D, Slick Rick, Guy, Teddy Riley, Living Colour, Jeff Redd, Shannon, Whodini, BB&D, Public Enemy, Skyy, Defunkt, Alphonse Mouzon, Larry Coryell and Daniel Ponce. Software-based, audio/video pre- and post-production. Completed soundtracks include national promo videos for Calvin Klein, Oscar de la Renta, Perry Ellis. Full music production services for albums, singles and master demos, including digital recording and editing, arrangements and lyrics; music video packages, multitrack mixdowns, studio and location production services for video and film; MIDI/SMPTE interfacing to video, film and live performance with MIDISCORE™ featuring Macintosh Ix computer. Sample library, sample editing, synthesizer and drum programming, custom signal processor software and unusual equipment rentals.

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DENNIS HETZENDORFER; Engineer & Producer; PROFESSIONAL AUDIO SERVICES, 8795 SW 57th St.; Cooper City, FL 33328-5930; (305) 434-1377.

BOB HODAS; Engineer & Producer; PO Box 9485; Berkeley, CA 94709; (415) 649-9254. Credits & Services: Credits: Barbara Higbie, Doobie Brothers, Village People, Marty Balin, Amanda McBroom, Osamu, Mickey Hart, Will Ackerman, Casiopea, Schoenherz and Scott, Sayuri Ishikawa, Good Sound Foundation, The Pope, Modern Mandolin Quartet. Services: recording and concert engineering, album, film and demo production, consulting.



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JEFF A. HOFFBERGER; Engineer & Producer; NATIONAL EVENTS INC., 12048 Monte Rd.; Lake Jackson, Manassas, VA 22111; (703) 330-0599; FAX: (703) 550-0521. Credits & Services: House engineer, monitor engineer, production manager, stage manager, tour bus driver. Clients include: Bluegrass—Laurel Blaydes, The Country Gentleman, Bill Harrell, Hobbs and partners, Johnson Mountain Boys. Contemporary—Marvin Hamlisch, Henry Mancini Orchestra, Maureen McGovern. Country—Asteep at the Wheel, Sawyer Brown, Billy "Crash" Craddock, Rodney Crowell, John Schneider, Randy Travis. Comedians—Danny Gans, Fred Truvelina, Bill Cosby, Red Skelton, Wayland Flowers & Madame Jazz—Jean Carnes, Betty Carter, Jahmad Jahmal, Al Johnson, Les McCann, CoCo Taylor, Joe Williams, Little Howlin' Wolf. New wave/punk—The Call, Beat Farmers, Beat

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ELI JANNEY; Engineer & Producer; EPRODUCTIONS, 4000 Massachusetts Ave., Ste. 1613; Washington, DC 20016; (202) 362-0715.

STEPHEN JARVIS; Producer; AKASHIC RECORDS GROUP, PO Box 395; Danville, CA 94526; (415) 837-7959.

DANNY JONES; Engineer & Producer; DANNY JONES PRODUCTIONS, 3252 Grenoble Ln.; Memphis, TN 38115; (901) 365-0021. Credits & Services: Credits: Beach Boys, Bobby "Blue" Bland, Jim Corcoran, Jim Dandy, DeGarmo & Key, The Ellisons, Farrell & Farrell, Flying Burrito Brothers, Etta James, Jean Knight, Patti LaBelle, Mylon LeFevre, Ramsey Lewis, Neville Brothers, Billy Joe Royal, Staple Singers, Diane Tell, Allen Toussaint, Irma Thomas, Rufus Thomas, Stevie Ray Vaughn, The Wallets. Services offered: producing, engineering, arranging, music publishing, artist development, 24-track recording and mixing room, MIDI programming and sequencing, consulting, excellent studio musicians.

E. KEVIN JONES; Engineer & Producer; SOUND & SOUND ALIKE, 790 Riverside Dr., Ste. MP; New York, NY 10032; (212) 926-8294. Credits & Services: Stephanie Mills, Najee, Chuck Stanley, Club MTV, Palladium, Ashford & Simpson, Lillo Thomas, Eugene Wilde, Eddie Murphy, S.O.S. Band, Harry Belafonte, Mickell's N.Y.C., D-Train, Atlantic Starr, Kashif, Dave Valentine, Noel Pointer, Johnathan Butler, George Howard, Eric Gable, Alex Bugnon. Services offered: live sound engineering, production management and full crew and technical contractor. Offering worldwide services and will fulfill all your production needs, including personal security, stage design and tour managing.

LOU JUDDSON; Engineer & Producer; INTUITIVE AUDIO, 243 Flamingo Rd.; Mill Valley, CA 94941; (415) 388-3702.

GREG KAMMER; Engineer & Producer; REPLICANT RECORDING, 325 North Rd.; Ashford, CT 06278; (203) 429-4120. Credits & Services: Holiday Clocks, Bats 'n' Rabbits, Bill Mocarkey. Eight-track analog, 2-track digital (PCM) mixes. A satisfactory demo or successful audition will yield production and engineering services on speculation. All modern musical styles accepted but good writing and originality is a must. Investment inquiries welcome. For all others an hourly rate plus cost(s) will apply.

KAREN KANE; Engineer & Producer; 396 Broadway; Somerville, MA 02145; (617) 628-6469 (New England); (312) 769-9009 (Midwest). Credits & Services: Over 85 album credits to date, many independent labels, plus artists on Rounder Records, Flying Fish, Folkways and Ladyfinger Records. Artists include Kay Gardner, Suede, Judy Fjell, Alix Dobkin, Betsy Rose, Fred Small, Willie Sordill, The Chicken Chokers, Charlie King, Marcia Taylor, Southern Rail, Linda Worster, Matt Glaser. Wes. I offer no-charge pre-production meetings and unbiased advice about recording in the New England area, in which I've been working for the past 15 years. I specialize in acoustic music as well as great acoustic drum sounds. I am easy to work with—fast, efficient and patient. Will travel to any city.

STEPHEN KAY; Producer; TECHNISOUND, INC., 140 Madison Ave.; Westfield, NJ 07090; (201) 233-2026. Credits & Services: Julius Hargrett, Charlie Singleton. Grand Master Flash, NBC (Olympics, Wimbledon, ROMA '87), Pepsi-Cola, Gianettino & Meredith Advertising, Sid Woloshin Inc., Resorts International Casino, TKR & OK Cable, Gitano, Rock Video International, consultant for Sound Genesis Corporation. Records, film scores, jingles, demos and session work featuring a fully loaded Fairlight Series III Updated with REV8, the system now features 16MB RAM, 8-track disk-based digital recording and over 400 MB of instant-access disk storage. Gigabyte sound library, from orchestral to dance/pop/rap. Fully



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JOHN P. KAYNE, DAN SNYDER, Engineer & Producer; PEPTUNE PRODUCTION SERVICES, 61 Old Bridge Tpk., East Brunswick, NJ 08816; (201) 254-5583. Credits & Services: Providing broad-based production and consultation services in music and sound for all media as well as solo and group projects. Our experience with all facets of audio, composition, recording, performance and hardware technological know-how ensures professional-quality work from demos to full-blown multimedia productions. Our MIDI/4-track studio with lockup to video, featuring synths like the Emulator II+ HD as well as various outboards, provides us with a cost-effective pre-production facility to keep budgets at a minimum while maintaining state-of-the-art sound. We have access to fully equipped 8/24-track studios only minutes away from our offices, as well as additional musicians, vocalists, songwriters and lyricists. Well-versed in musical idioms from avant-garde to classical to rock, there is no style that escapes us. Besides our production work we are also technical specialists in media electronics including multitrack audio, effects, synths, MIDI, video transports, camera and projection, as well as computers. "Not since the Manhattan Project has there been such a secret collaboration of sheer unknown genius, sound that will change your understanding of physics."

HELEN KEANE, Producer; HELEN KEANE RECORD PRODUCTION/ARTISTS MANAGEMENT, 49 E. 96th St., New York, NY 10128; (212) 722-2921; FAX: (212) 722-8121.

KURT G. KELLISON, Engineer & Producer; ATAVISTIC VIDEO, PO Box 578266, Chicago, IL 60657-8266; (312) 935-0081; FAX: (312) 944-0925.

PETER R. KELSEY, Engineer & Producer; 14874 Tyler St., Sylmar, CA 91342; (818) 367-4445. Credits & Services: Credits include Bill Ward, Jean-Luc Ponty, Weather Report, Pebbles, Wall of Voodoo, The Fixx, Graham Parker, Michael Stanley Band, Slayer, Linda Ronstadt, Elton John, Brian Eno, "Weird" Al Yankovic. Services: any variation on the producer/engineer theme.

JAMES L. KENNEDY, Engineer & Producer; HEART CONSORT MUSIC—BML, 410 1st St. West, Mt. Vernon, IA 52314; (319) 895-8557.

PITT KINSOLVING, Engineer & Producer; 686 Arroyo Pkwy., Ste. 260, Pasadena, CA 91105; (213) 303-5362. Credits & Services: Recording affordable audiophile quality to bring out the best in your music. I am especially skilled with acoustic (folk, jazz and classical) music, on location or in the studio of your choice. Producer: a life-long involvement with music as listener, performer, promoter, sound reinforcement and recording engineer has developed the experience to guide your record project through to a successful conclusion. I am available to work anywhere in the world at rates to fit your recording budget.

MICHAEL R. KOENIG, Engineer & Producer; CRYSTAL STUDIO RECORDING, 92 Kinderkamack, Park Ridge, NJ 07656; (201) 391-0327; (201) 666-4365.



MANNY KOUKOULAS
Plainview, L.I., NY

MANNY KOUKOULAS, Engineer & Producer; GENESIS SOUND EXPERIENCE, 134 Manetto Hill Rd., Plainview L.I., NY 11803; (516) 937-3667. Credits & Services: Full 8-track production facility with 64-track IBM sequencer software. MIDI

equipment including Mirage, DSS1, DX11, DS8, TX81Z, Yamaha piano module, Alesis HR-16 Digital mixdown available. Full guitar station with synths and Marshall. Credits include many Christian music recordings as well as lectures recorded for a Christian publishing company.

BILL LACKEY, Engineer & Producer; PLH SOUND, 4140 Gilbert St., Oakland, CA 94611; (415) 654-0180.

GEORGE C. LANDRESS, Engineer & Producer; 6138 Glen Holly, Los Angeles, CA 90068; (213) 462-3220.

ALAN LEININGER, Engineer & Producer; AIR LEININGER PRODUCTION SERVICES, 2506 Coolidge St., Hollywood, FL 33020; (305) 920-2998. Credits & Services: Freelance record engineering/production. Location or studio, analog and digital. Broadcast expert—18-year industry vet. Written and produced thousands of local and national spots for radio and TV. Recording experience from gospel, country and rock to punk, rap and pop. Remix and edit specialist. Low-budget challenges welcome. For agencies and artists, my efficiency and professionalism will get you more bang for your buck.

JEFFREY LESSER, Engineer & Producer; JET LASER PRODUCTIONS, 232 Madison Ave., Cresskill, NJ 07626; (201) 816-9144. Credits & Services: Producer of The Roches, Rupert Holmes, Barbra Streisand, Pat Travers, Head East, Sailor, Strawbs, Straight Lines, Sparks, Starcastle, Hounds, Vivabeat. Co-producer of Timbuk3, Kool & the Gang, Colourfield, Chiefs of Relief, Royal Crescent Mob, Will & the Bushmen, Richard Barone, Won Ton Ton, Louise Goffin, Mental as Anything, All About Eve, Earl Slick, Kids in the Kitchen. Engineer and/or remix: Lou Reed, Debbie Harry, Missing Persons, Robert Palmer, Ric Ocasek, Ultravox, Oingo Boingo, Quarterflash, Renaissance, Blue Oyster Cult, Ruben Blades, House of Shock, Fernando Saunders, Climax Blues Band, Stylistics, Alice Cooper. Television: *Playboy Candid Camera*, *Silver Spoons*, *Robert Klein Show*, *Ripley's Believe It or Not*, *Rock & Roll Tonight*. Tech specs: producer/engineer/mixer, SSL, E and G Series Auto. Neve, live recording, electronic and sample MIDI recording, songwriter, vocal and music arranger. Comments: reviews all submitted tapes. International reputation, travels extensively, expert in every aspect of records, film, video, radio, television and advertising.

PETER T. LEWIS, Engineer & Producer; LEWIS MUSIC PRODUCTIONS, 11911 Weddington St., North Hollywood, CA 91607; (818) 769-3334; (213) 281-7586 (service). Credits & Services: Fifteen years of experience including live reinforced sound, records, films, commercials, pre-recorded production shows, television. IATSE (Local 695).

JOHN W. LINTON, Engineer & Producer; SANS-SERIF PRODUCTIONS, PO Box 492, Haverford, PA 19041; (215) 449-1227; FAX: (215) 828-8879. Credits & Services: Voice-over narration (technical and medical copy specialty); radio production, recording/P.A. engineer/audio post.

EUGENE LO, SHARON LEA ERICKSEN, Engineer & Producer; SECOND WIND PRODUCTIONS, 284 Sidney St., Cambridge, MA 02139; (617) 494-0214. Credits & Services: Together, we are a versatile team offering high-quality work in every aspect of record production including songwriting, arranging, producing and engineering. Past work include positions at HBO/Cinemax and Greene Street Recording Studios (NYC). Credits include many independent recordings, releases for Arista, Virgin, Elektra, Geffen, Def Jam, and major artists such as Aretha Franklin and Ziggy Marley. Complementing our record production services are our work in film scoring, and sound design for TV, radio and film. We travel extensively and are constantly on the move, so please send all correspondences and leave messages at our address in Cambridge, MA.

JESSE LOMBARDI, Engineer & Producer; FANTASY PRODUCTIONS, 26 Westminster, Ste. #5, Venice Beach, CA 90291; (213) 392-2344.

NIKOS LYRAS, Engineer & Producer; NEW MEMPHIS MUSIC, 1503 Madison Ave., Memphis, TN 38104; (901) 276-8520; FAX: (901) 526-4237.

JOSEPH MAGEE, Engineer & Producer; JOSEPH MAGEE AUDIO ENGINEERING, 4124 Vinton Ave., Culver City, CA 90232; (213) 840-6925.

JOHN J. MANFREDI, Engineer & Producer; MEGA SOUND PRODUCTIONS, PO Box 3101, Elmira, NY 14905; (617) 732-0913. Credits & Services: Barry Manilow, Congressman, Amory Houghton, United, Fund, Headstart, Attila, EXE. Written over 300 compositions (all musical styles), commercial jingles being aired (on radio and TV) in upstate NY and Phil. metro area, for political campaigns, retail businesses, car dealerships, restaurants and national charitable organizations. Produced and engineered: rock group projects, jazz, R&B, gospel, bluegrass, contemporary C&W groups, 15th-century opera and instrumental music. I am comfortable working with musical projects large or small and musicians who play loudly or softly. Music instructor at local private college. Services offered: owner, engineer, producer, musician, composer, Mega Sound Productions 1-inch 16-track facility. Studio/en-

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ERNIE MANSFIELD; Producer, MANSFIELD MUSIC GRAPHICS WINDSAILOR MUSIC (BMI), PO Box 737; Berkeley, CA 94701; (415) 652-3647. Credits & Services: Produced *Windsailor*, *ColorDrops*, on Catero Records, Aspen/Blackhawk Records and National Radio of Spain Also produced albums on CBS-France, Cathedral Records and Center for Growth in Wholeness Arranger/transcriber/copyist for many artists including Narada Michael Walden, Herbie Hancock, Terry Riley, John Adams, Dan Kobialka, Landmark Records, San Francisco Symphony My specialty area is acoustic music jazz, folk, classical, new age, etc My skills include arranging-composing, performing on a number of instruments (woodwinds and keyboards) and start-to-finish production, including rehearsing, recording, album art supervision and copyright administration I'm also a specialist at songbook production Music-Graphics is a full-service music typesetter/songbook designer, working on many book productions including *The New "Legal" Real Book* Send for brochure Through my recordings and performances I have received grants from the National Endowment for the Arts and the California Arts Council

MICHAEL J. MANZO; Engineer, MANZO COMMUNICATIONS, INC. 4 Granite Ave., Paterson, NJ 07502-1105; (201) 790-6112. Credits & Services: Multitrack production and mixing services, location and remote recording services, editing services, studio maintenance and repair services

DAVID MARSAC; Engineer & Producer, MARSAC AUDIO SERVICES. PO Box 77; Briarcliff Manor, NY 10510; (914) 279-7945.

SCOTT MATHEWS; Producer, PROUD PORK PRODUCTIONS. 230 Montcalm St., San Francisco, CA 94110; (415) 648-9099. Credits & Services: Producer, songwriter, multi-instrumentalist and vocalist, Scott Mathews has worked with the likes of The Beach Boys, Rosanne Cash, Ry Cooder, Elvis Costello, Robert Cray, Sammy Hagar, John Hiatt, John Lee Hooker, Mick Jagger, Dr. John, Patti LaBelle, Nick Lowe, Eddie Money, Roy Orbison, Bonnie Raitt, Little Richard, Todd Rundgren, Boz Scaggs, Barbra Streisand, The Waterboys, Robin Williams, Bobby Womack and the list refuses to end Scott is currently accepting tapes from singer/songwriters and bands for production consideration

ROBIN MCBRIDE; Producer, BIRD PRODUCTIONS. 1946 N. Hudson Ave., Chicago, IL 60614; (312) 787-6060.

MICHAEL J. MCNAMEE; Engineer & Producer, MAC-AT-TACK PROD., INC. 14699 NE 18th Ave. 6J; North Miami, FL 33181; (305) 947-8315.

FRANK MERWIN; Engineer & Producer, A&F MUSIC SERVICES. 2834 Otsego, Pontiac, MI 48054; (313) 682-9025.

its & Services: Founder, Mobile Fidelity Sound Lab. Mobile Fidelity Records and Productions, creator of The Mystic Moods Orchestra and producer/engineer of numerous special effects recordings Principal in development of Colossus digital audio system with Louis Dorren 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, 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

JIMMY MILLER; Producer, MILLER VIGLIONE PRODUCTIONS. 5 Strathmore Rd., Haverhill, MA 01832; (508) 373-3686. Credits & Services: Producer with 24-track SSL recording studio just outside of Boston Credits include Traffic, Blind Faith, George Clinton, Motorhead, BBC Rock 'n Roll Circus with John Lennon, The Who, Jethro Tull and Led Zeppelin Eighty-eight gold records Award for Eric Clapton's *Crossroads*, 12 albums with the Rolling Stones including *Beggars' Banquet*, *Let It Bleed*, *Exile on Main Street*, *Sticky Fingers*, *Goat's Head Soup*, *Tattoo You*, *Hot Rocks* and more

JOSEPH F. MIRAGLILO; Engineer & Producer, FISHBOWL PRODUCTIONS. 89 Clinton St., 3rd Floor, Everett, MA 02149; (617) 389-5816.

PETER J. MOORE; Producer, M.D.I. PRODUCTIONS. 116 Beaconsfield Ave., Toronto, Ontario, M6J 3J6 Canada; (416) 533-1749; FAX: (416) 533-1749. Credits & Services: Produced Cowboy Junkies' first, second and third albums, SILOS for RCA debut release, all the music for 14-hour HDTV miniseries *Chasing Rainbows*, Gemstone Productions of *Glory Enough for All*



RANDY MOORE
Madison, TN

RANDY MOORE; Engineer & Producer, DEER VALLEY PRODUCTIONS. 122 W. Monticello Ave. #13; Madison, TN 37115; (615) 868-6055. Credits & Services: Produced and recorded various jazz, classical and European new wave rock Also produced and directed many educational and industrial videos Services include full audio and video production MIDI production and audio-for-video posting

PAUL MOSER; Engineer & Producer, P.M. III PRODUCTIONS. Studio City, CA; (818) 763-3053.



TAAVI MOTE
Sherman Oaks, CA

TAAVI MOTE; RUF-MIX PRODUCTIONS. 12966 La Maida St.; Sherman Oaks, CA 91423; (818) 760-0269; FAX: (818) 905-7242. Credits & Services: Production *U2 Desire* (Hollywood remix), *Stacy Lattisaw*, 12", Jeff Lorber *Private Passion*, Ralph Dudley, Helena Buscema and Gypsy Rose, various projects in the works Mixing/engineering Smokey Robinson, Reggie and Vincent Calloway, Jimmy Somerville, Big Noise, Freaky Executives, Kenny G, Randy Jackson, Joyce Irby, Native, Jeffrey Osborne, Judson Spence, Ready for the World, El DeBarge, Five Star, Nu Shooz, Pebbles, Cool 'R, Jody Watley, Madonna, Natalie Cole, *Beverly Hills Cop I and II* soundtracks, Gladys Knight, James Ingram, Patti LaBelle The best in pre- and post-production, recording, overdubs, mixing, remixing (12", LP and singles) Song publishing also available Using the best recording studios available, you get the most dynamic sound in analog or digital Extensive variety of outboard equipment available Call for further information

WILLIAM P. MUELLER; Engineer & Producer, 13816 Sunny Brook Rd., Phoenix, MD 21131; (301) 628-7260; (301) 666-0196. Credits & Services: 1985 Grammy nomination—Best Engineered Album, Michael Hedges, *Aerial Boundaries* 1986 Grammy-nominated album, Douglas Miller, *Unspeakable Joy* Remote recordings Mr. Mister, Barry Manilow, Ella Fitzgerald, Oscar Peterson, National Symphony, Charlie Price, Chuck Brown, DIR Broadcasting Audio-for-video, ABC Sports, Michael Hedges, Will Ackerman, Shadowfax, Exile, MPT Production for Don Mark (Capitol Records), engineering for Kix (Atlantic Records), two albums for Vigil on Chrysalis Services offered 48-track digital, 48-track analog studio SSL 4000/ Sony or Studer Remote Trident/Sony or Otari, Sony 3202 DASH, BTX Shadow, AMS 1580s, RMX-16, EMT Plate, Lexicon 224XL, Lex 200, (3) SPX90, BBE 202, Sontec EQ, assorted gates, DDLs, compressors, etc

RICHARD A. MUSK; Producer, MUSK MUSIC, INC. 455 Hope St., Stamford, CT 06906; (203) 323-7022. Credits & Services: Credits HBO, Cinemax, IBM, Armstrong Tire, Huebline, GTE, Steuben Glass, *Time* magazine, Capitol Records, Universal Studios, Wyeth Laboratories, Ricoh, Fisher Price, Banner Industries, NeXT Computer Services original composition and arrangement for film, video, industrial, documentary, jingles, logos, songs Fairlight CMI rental and programming

JOSEPH NICOLETTI; Producer, GLOBAL VILLAGE MUSIC AND NICOLETTI PRODUCTIONS, INC. PO Box 2818; Newport Beach, CA 92663; (714) 494-0181; FAX: (714) 494-0982.

DAVE NODIFF; Engineer & Producer, NF/X. 158 Bishop Dr., Framingham, MA 01701; (508) 872-6843. Credits & Services: Recent clients include: *The Condition*, O.K. Choralie, Linda Serafin, Hellbent, Fender Benders, Newsong, Team Ministry, Beatniks Contact for complete track record and rates Offering experienced multitrack engineering and production in all formats and musical styles Large (50' L x 25' W x 14' H) in-house facility 16/8-track analog plus (2) Sony (PCM) digital 2-track recorders, complete MIDI setup, guitar controller plus DX7, MKS-50, CZ-1000, W-30 keyboards Additional services include on-location recording, audio-for-video and pro audio rentals

BILL NOLAND; Engineer & Producer, Pasadena, CA, (818) 398-1417. Credits & Services: Produced the latest album for Field Trip (Slash Records, scheduled for release in February 1990), co-produced "Salesman" from Stan Ridgway's album *The Big Heat* (R S Records), produced the Romans "Just By Chance" from *Only 39,999,999 Behind Thriller* (Restless Records) Former co-founding member and songwriter in the band Human Hands, former member of Wall of Voodoo Co-produced all Human Hands songs on *Hereafter* (Nate Starkman & Son Records), L A F M S *Darker Scratch* (Fruzzbee Records) and *Keats Rides a Harley* (Happy Squad Records) Produced and engineered soundtracks for art videos and art installations such as Branda Miller's *Auto Olympia* for the American Film Institute's 1984 Olympic Arts Festival and May Sun's *L.A. River/Chinatown* at the Santa Monica Museum of Art Eight-track 1/2" Tascam and 16-input Studio Master board MIDI studio suitable for quality demos in a comfortable and quiet setting

RICHARD OLIVER; Engineer & Producer, 854 7th Ave. #9, New York, NY 10019; 37 W. 20th, 8th Floor, New York, NY 10011; (212) 459-9643 (home); (212) 255-5313 (work). Credits & Services: Engineering major projects including Rolling Stones, Orleans, Yes Producing and engineering rock, metal, pop, R&B Major film, music video, television and even advertising Extremely large digital experience, multitrack to CD masters Also published songwriter Also started NuArt Films with Yianni Stamas Producing films, videos, records and CDs, and producing digital sound-to-film, music, voice, ADR, FX, all aspects (212) 627-7985 Extensive working knowledge and long-term experience recording and computer mixing on consoles such as SSL, Neve, Trident and MCI/Sony Many 48-track projects Full working knowledge of synchronization, frame rates, pilot tones, 60Hz, 50 and 59.9, lock-to-picture, outboard equipment, digital projects, Mitsubishi and Sony machines Mixing to all formats 1/2" stereo, 1/2" stereo, mono L pilot right, 1630, X-80, F1, DAT, 4-track, 6-track for Mag Also editing Also unparalleled technical knowledge. And on and on and on And... an acceptable, productive, responsible, nice guy people like to work with



BRAD S. MILLER
Incline Village, NV

BRAD S. MILLER; Engineer & Producer, MOBILE FIDELITY PRODUCTIONS OF NEVADA. PO Box 8359; Incline Village, NV 89450-8359; (702) 831-4459; FAX: (702) 831-4485. Cred-

DAVE PALMER; Engineer, 1268 Cedar, Birmingham, MI 48009; (313) 646-7532; (313) 540-8231. Credits & Services: Emmy Award—Best Sound Cinemax sessions *A Session with Chet Atkins*. Grammy Award—Best Latin Recording Eddie Palmieri *The Sun of Latin Music*, motion picture music—*A Perfect Couple*, *Health*, Robert Altman, *Rich Kids* Robert Benton. Partial album credits: *Blood, Sweat & Tears Live*, *BS&T More than Ever*, Jaco Pastorius *Jaco Pastorius*, Earl Klugh *Solo Guitar*, *Whispers & Promises*, *Life Stories*, *Wishful Thinking*, *Low Ride*, *Night Songs*, *Late Night Guitar*, *Heart String*, *Soda Fountain Shuffle*, Chet Atkins *Sails*, *Street Dreams*, Al Dimeola *Land of the Midnight Sun*, *Elegant Gypsy*, *Casino*, *Splendido Hotel* (co-produced), Alice Cooper *Welcome to my Nightmare*, Carly Simon *Carly Simon*, Michael Urbaniak *Fusion III*, Lena Horne *Nature's Baby*, Paul Winter Consort *Icarus*, Patie Austin *In My Life*, Led Zeppelin *IV* and Jimi Hendrix *Cry of Love* (asst eng). Experience encompasses field recordings, live remote recordings, video recordings, advertisements, ex-director of recording—Electric Lady Studio, NY.

GENE PARCIASEPE; Engineer & Producer, 1011 River Renaissance; E. Rutherford, NJ 07073; (201) 777-7118; (201) 441-5996 (beeper).

MARK PAUL; Producer, PHUSION, 10120 SW Todd St., Portland, OR 97225; (503) 297-8720.

MARK S. PLATI; Engineer, M.P. MUSIC, 80 Montague St. #4F, Brooklyn, NY 11201; (718) 522-5812.

JOE PODLESNY; Engineer & Producer, AUDIO PRODUCTION SERVICES, RR 3, Box 15, Bernardston, MA 01337; (413) 648-9071. Credits & Services: Credits Tim Moran and Tony Vacca. David Darling, Will Ackerman, National Public Radio. Connecticut National Bank, Digital Equipment Corp., Syracuse University, Black and Decker, World Book, Foxboro Raceway, Florentine Films, Richard Harshorne (Apple Hill Chamber Players) *Hound of the Baskervilles*, Tonio DiPaolo, 80-member Keene Pops Choir, Michael Haynes *Ocean Blue/Ocean Black*, Lisa Smith *Feel Like Running Away*, Pat and Tex LaMountain *Home*, *Complicated Bone Marrow Transplant*, Peter Jones, Debbie Weyl, The 4 Zoos, John Manchester, Roger Trincknell, Molly Mason, Jay Ungar, Hollywood Doctors, Tom Pope, White Noise, Lisa McCormick. Services: complete custom production services, personal musicians' services and referrals, MIDI equipment, operation and consultation (complete arrangements), production and film music, studio/acoustic and mechanical/hardware design, planning and consultation, engineering, cassette duplication.

DOUG POMEROY; Engineer & Producer, POMEROY DIGITAL AUDIO, 193 Baltic St., Brooklyn, NY 11201; (718) 855-2650.

WILL RASCATI; Engineer & Producer, FOR THE RECORD MUSIC PRODS., PO Box 1685, Lombard, IL 60148; (708) 932-1120. Credits & Services: Credits *Slyx Paradise Theater*, *Kilroy Was Here*, *Caught in the Act* (album and video soundtrack), Dennis DeYoung *Desert Moon*, Peter Brown *They Only Come Out at Night*, *Survivor Rebel Girl*. 1983 Grammy nominee for Best Engineered Recording *Kilroy Was Here*. Over 20 album credits. Services offered: I produce excellent records and demo tapes at reasonable rates. Specializing in mainstream pop and hard rock. My strong points include song arrangement and making your music sound "like a record." In addition to engineering and production, I offer overall consultation and record label shopping of our completed product.

JIM REEVES; Engineer & Producer, REEVES AUDIO RECORDING, 21 Primrose Ave., Yonkers, NY 10710; (914) 793-6496.

STEVEN REMOTE; Engineer & Producer, REMOTE MEN VISUAL MUSIC ENT., PO Box 791, Flushing, NY 11352; (718) 886-6500; FAX: (718) 886-7214.

JOHN M. ROBB; Engineer & Producer, HCR 1, Box 11-B, Walnut Shade, MO 65771; (417) 561-4182; FAX: (402) 592-0997.

ROB ROBERTS; Producer, OCEANHILLS MUSIC GROUP, 522 Jones Pl., Walnut Creek, CA 94596; (415) 932-0488. Credits & Services: Produced and recorded, separately and collectively David Cochrane, Paulinho Da Costa, Ndugu Chancler, Paul Harris and Chuck Kirkpatrick, among other recording artists. Recognizing and evaluating the uniqueness and potential of the artist and material within the current marketplace. Producing contemporary rock/pop-AOR cross-over/contemporary Christian rock/jazz rock.

RICK ROONEY; Engineer & Producer, PLANET DALLAS STUDIOS, PO Box 191447, Dallas, TX 75219; (214) 521-2216. Credits & Services: Russ Parr (Priority/Capitol Records), Nemesis (Profile Records), George Gimarc's *Rock and Roll Alternative* syndicated radio program with the Smithereens, The Rainmakers, The BoDeans, Winter Hours, Mojo Nixon and XTC, Bang! Bang! Shock Tu, Princess Tex (Horsehead Records), The Daylights (109 Records), The Uptown Girls (Oak Lawn Records), The Trees, Shallow Reign, Bone Circus, Look-See, Intimate Acts, The Matt Iddings Band, Lesson Seven



**RICK ROONEY PLANET DALLAS
Dallas, TX**

(Oak Lawn Records) 24-track MCI automated console with analog or digital mixdown, studio design by Lakeside Associates of Los Angeles.

BOB ROSA; Engineer & Producer, OUTLAW PRODUCTIONS, 143 Fingerboard Rd., Staten Island, NY 10305; (718) 448-1048. Credits & Services: All engineering services including production, mixing and remixing. Own full range of mobile state-of-the-art outboard gear. Also own home MIDI studio, Profound Sound. Credits include Bee Gees, Michael Bolton, Cheap Trick, Gavin Christopher, Cover Girls, D-Project (Japan), Duran Duran, Sheena Easton, The Fan Club, The Fat Boys, Fleetwood Mac, Aretha Franklin, Whitney Houston, David Grant, Debbie Gibson, James Ingram, Freddie Jackson, Janet Jackson, LaToya Jackson, Mick Jagger, Grace Jones, Kane Gang, Lace, Latin Rascals, Madonna, Martika, Anne Murray, New Order, The Ocean Blue, Paul Pesco, P+I Shop Elys, Rip Planet, Evan Rogers, Run-DMC, Seduction, Seikima-II (Japan), Shannon, Sly Fox, Starpoint, Donna Summer, The System, Pia Zadora, Zebra Management, Ms. Leslie Best (212) 645-1945.

STEVEN ROSCH; Engineer & Producer, ROAR PRODUCTIONS, 6655 Dobbin Rd., Ste. H, Columbia, MD 21045; (301) 596-2600; FAX: (301) 596-2601. Credits & Services: My own multitrack and MIDI studios and staff allow me to offer my clients' world-class quality at in-house rates. With 25 years of performance, arranging and production experience, I have the skills and background to provide a highly successful and marketable product. I specialize in producing/arranging packages for rock, R&B and new music artists, also original soundtracks for radio and video, contemporary jingles for radio and TV. Credits: upcoming Brad Sachs album, Benjamin Woodson 12" single, Daniel Winans, Trash and Passion, United Charity Campaign, F.A.A. national jingle, I&M National Heritage Corridor soundtrack, 16mm film *Reasonable Doubt*, national cable TV (A&E), Washington Homes jingle, O'Connor, Piper & Flynn radio and TV jingle, Philosophy, I always listen before I speak. Want to talk?

JAY ROSE; Engineer & Producer, JAY ROSE SOUND DESIGN, 20 Marion St., Brookline, MA 02146; (617) 277-0041; FAX: (617) 232-8869. Credits & Services: Produces and engineers commercials and video films exclusively, more than 150 top awards as sound designer, director or editor, including 13 Clio's, Andy One Show, Emmy, Hollywood Radio TV Festival, other awards. Develops tracks in own studio. 4-machine SMPTE editing, multitrack digital workstation, Kuizwell, etc. Also mixes and engineers at major New England 24-track facilities, directs in NY and LA. Owns Nagras and DAT for location recording. Expert CMX CASS and AKG DSE-7000 editor. Credits include designing or directing thousands of spots (McDonald's, NYNEX, Blue Cross), network promos and openings (NBC, Showtime, Discovery), documentaries and home videos (MGM, Parker Brothers, Digital Equipment). Award-winning advertising writer.

MIKE ROSENMAN; Producer, SAUNA STUDIO, 4514 215th Pl., Bayside, NY 11361; (718) 229-4864; FAX: (718) 767-1239. Credits & Services: Music production and composition for commercials, records, film and video. Pre-production including MIDI programming and arranging. Wide range of vocal talent available. Credits include pop records, TV documentaries, radio and TV commercials. Musicianship with technology, custom-tailored to your project.

BARRY RUDOLPH; 5627 Irvine Ave., North Hollywood, CA 91601; (818) 985-1855. Credits & Services: Engineered for Hall & Oates, Lynyrd Skynyrd, Rod Stewart, Waylon Jennings, Al Wilson, Johnny Mathis, Shalamar, Lakeside, C'Bryan, Don Cornelius, James Last, John Prine, Roy Buchanan, Stanley Clarke, Natalie Cole, Levon Helm, Steve Cropper, Duck Dunn, Robin Smith, The Rockmelons, Dazz Band, Parthenon Huxley, —CONTINUED ON NEXT PAGE

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INDEPENDENT ENGINEERS & PRODUCERS

—CONTINUED FROM PREVIOUS PAGE

David Kahn, Maurice White, Juice Newton, Cher, Robbie Nevil, Jermaine Stewart, Richard Scher, Ashley Maher, Steve Diamond, Jeff Pescetto, Steve Dubin, Chris Bond, Josquin Des Pres, Fisc, Yves Chovard and Gary Stockdale

JAMES SABELLA; Engineer & Producer, 49 Oakdale Rd., Roslyn Heights, NY 11577; (516) 484-0862. Credits & Services: Credits have worked with CBS/MCA recording artist, also many independent labels, with rap, R&B, pop, metal and thrash. Services offered: 24-track recording studio with Neve 8068 MkII console, Studer tape machine, Pultecs, Sony DAT machine, Lexicons, EMT and classic Neumann microphones. Offering complete production services including television, film scoring and narration, audio visual presentations, radio spots and jingles, editing and dubbing, high-speed duplication plus all mastering needs, Macintosh SE computer/MIDI workstation with complete array of keyboards and synthesizers. Also offering production packages, which include shopping to major record labels.

JOSH SCHNEIDER, DEREK MARCIL; Engineer & Producer, MID-SIDE PRODUCTIONS, 11684 Ventura Blvd., Ste. 475; Studio City, CA 91604; (818) 763-2028; FAX: (818) 763-3977.



Dennis Scott Productions

DENNIS SCOTT
Nashville, TN

DENNIS SCOTT; Producer & Engineer, DENNIS SCOTT PRODUCTIONS, 2601 Hillsboro Rd., Ste. N3, Nashville, TN 37212; (615) 292-9459 (Nashville); (516) 829-8747 (NY). Credits & Services: Credits: Recipient of the 1981 Grammy Award for Best Recording for Children. Dennis has produced artists such as Crystal Gayle, Loretta Lynn, Tanya Tucker, Glen Campbell and the Muppets. Directs and engineers Lee Arnold on a *Country Road*, a weekly syndicated radio show for the Mutual Broadcasting Network. Written and produced numerous children's LPs for Sesame Street, Random House, MacMillan, Troll Publications, Caedmon, Peter Pan and Wonderland Records. Created music for videos including *Scholastic Magazine*, *New Zoo Review*, Video Research and Select Video. Work featured on *Who's the Boss* (performed by Ray Charles), *Fame*, *Hee Haw*, *Richard Simmons Show*, *Muzak* and others. Has written material performed by Tina Yothers, Jimmy Osmond, Sandy Duncan and The New Christy Minstrels. Currently music director for the National Child Safety Council. Services: Specialize in creating and producing music of many styles for records, TV, film, radio and jingles. Original songs and lyrics as well as underscoring and post-production. Children's product is particular area of expertise. Own and operate 16-track studio with SMPTE hookup. Quality material written and produced according to creative and budgetary needs.

PAUL SETSER; Producer, PAUL SETSER CREATIVE, 2930 N. Newhall St., Milwaukee, WI 53211; (414) 962-9174.

MARK S. SHEARER; Producer, HARD WAY RECORD CO. PO Box 540, Dearborn Heights, MI 48127; (313) 561-2134 (home); (313) 278-6068 (office).

BRADLEY SHELTON; Engineer, ENDLESS SUMMER PRODUCTIONS, PO Box 120695, Arlington, TX 76012; (817) 461-0533.

ALAN SILVERMAN; Engineer & Producer, ARF PRODUCTIONS, 1 Tiffany Pl., New York, NY 11231; (718) 237-4133. Credits & Services: Album: Bill Evans/John McLaughlin, Miki Howard, Judy Collins, Dory Previn. Film Score: David Mamet's *House of Games* and *Things Change*, *Zelly and Me*, *The*

Muppets Take Manhattan, *Strippers*, *Laserman*. TV themes: *CBS NY News*, *CBS This Morning*, *Sugar & Spice*. Commercials: CARE, Clearasil, Coke Classic, Coke Int'l, Coors Lite, Crisco, Downey, Duracell, Folger's, Good Seasons, Goodrich, Hasbro, Johnson & Johnson, Kodak, Lulthansa, Martini & Rossi, Mercedes, Milton Bradley, Nabisco, Nickelodeon, Ny-Quil, Prudential, Saab, Scope, State Farm, Subaru, Thomasville Furniture, Tide, Trump Plaza. Services: Freelance recording/mixing/production/co-production. Recording and synchronization consultant for film/video.

BERESFORD SINCLAIR; Engineer & Producer, SINCLAIR BROS. PRODUCTION, 13441 Tobiasson Rd.; San Diego, CA 92064; (619) 748-6771.

JERRY SKORA; Engineer, PRODUCERS VIDEO/ON SITE VIDEO SYSTEMS, PO Box 1865; Palatine, IL 60078; (708) 934-0999.

MATTHEW W. SMITH; Engineer & Producer, 3334 Durkin Cir.; Dublin, OH 43017; (614) 889-0995. Credits & Services: A/V production, advertising, consultation, talent direction, music composition, interior A/V, systems design, product specialism. Progressive, professional, experienced.

MARK S. STOCKER; Producer, LITTLE APPLE PRODUCTIONS, c/o Creative Sound Studios; 601 N. 6th St.; Allentown, PA 18102; (215) 250-6261. Credits & Services: We specialize in custom music production and are the leader in that field in our area. From radio and television commercials, audio post-production for video, radio station IDs, song demos to finished album projects, film scores, and musical signature pieces, we deliver quality production, digital technology, and exquisite expertise with a relentless desire to deliver the product you envision and deserve, at a price that won't crimp your style. Call us for rates and times. A demo package will be delivered at your request. We can also provide you with video and recording facilities if you like. We are your complete one-stop shopping production house. Call today!

BOB STONE; Engineer & Producer, BOBCO MUSIC, PO Box 27728; Los Angeles, CA 90027; (213) 250-7625; FAX: (213) 482-3683. Credits & Services: Produced: Beverly D'Angelo, Dweezil Zappa, *Normal Life* theme (CBS) Platinum awards: *The Whispers*, *Thank God It's Friday*, *Mickey Mouse Disco*. Gold awards: *Big Fun* (Shalamar), *The Two of Us* (Yarborough and Peoples). Grammys to the Artist: *Last Dance* Donna Summer, *Jazz From Hell* Frank Zappa. Singles: "Second Time Around," "Valley Girl," "Love and Desire." Albums: *London Symphony Orchestra*, *Shut Up 'N' Play Yer Guitar*, *Broadway the Hard Way*, *Pattie Brooks*, D.C. LaRue, *Noel* (produced by Sparks). Music for film/video: *Pee Wee's Playhouse*, *Uncle Meat*, *Batman* (TV cartoon series), *Tarzan*, *Isis*. Chief engineer for UMRK Larrabee Sound. All productions done with top arrangers, studios, engineers and mastering facilities. Call or FAX for current info.

RON STREICHER; Engineer & Producer, PACIFIC AUDIO-VISUAL ENTERPRISES, 545 Cloverleaf Way, Monrovia, CA 91016; (818) 359-8012; FAX: (818) 357-0602. Credits & Services: Services: 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. Ron is 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 techniques. Credits: Audio consultant to the Mann Music Center productions of the Philadelphia Orchestra, the Metropolitan Opera, New York City Opera; on-location recording of the Bolshoi Theatre Orchestra for the U.S. tour of the Moscow Ballet; staff engineer and faculty member at the Aspen Music Festival and Recording Arts Institute; audio consultant to the Los Angeles County Museum of Art; recording and production of the Los Angeles Philharmonic Orchestra and numerous other broadcasts over National Public Radio, American Public Radio and PBS networks, record projects for Angel, RCA, CMS Desto, Discovery, CRI, SAZ and others.

BILL THOMAS; Engineer & Producer, AVALANCHE RECORDING STUDIO, 10650 Irma Dr., Ste. 27; Northglenn, CO 80233; (303) 452-0498; (303) 494-6927. Credits & Services: As a 10-year veteran of the L.A. session scene I've engineered for top acts such as Manhattan Transfer, George Benson, Seals & Crofts, Autograph, Robert Tepper and numerous others. I recently relocated to Denver, CO, to become involved in the emerging Rocky Mtn. music scene. The past year I've been producing and engineering for some of Colorado's finest acts including Dick & the Chicks, Zedex, The Gathering, Hat Trick and several others. My direction for the '90s will be producing, engineering and exposing Colorado's artists to the national airwaves!

THOMAS TOMASELLO; TOM TOM PRODUCTIONS, 478 El Cajon Dr.; San Jose, CA 95111; (408) 578-6901. Credits & Services: As musicians with ten years production experience, we have produced, arranged and engineered a wide variety

of album and jingle projects. Musical styles range from gospel (including contemporary Christian), pop, rock and country to Broadway, easy listening, Latin and big band swing. We have also produced many sound tracks for various shows, touring productions, musical groups and solo artists. MIDI production and pre-production services employing Macintosh computer, Emac digital sampler, Yamaha DX7 (mode s1 and II), Thor SG-1D (sampled grand piano and master controller) and Roland Octapads are also offered. With extensive experience in conventional production, arranging and scoring services, we cover the full production range from electronic to acoustic music. Finally, professional yet budget-conscious demo production services are available for both active and aspiring artists and composers.

J. BURKE TRIESCHMANN; Engineer & Producer, OPEN DOOR PRODUCTIONS, PO Box 8556; Berkeley, CA 94707; (415) 527-9311.

MATT TUCKER; Engineer & Producer, MCM GROUP, 7808 Green Lake Rd.; Fayetteville, NY 13066; (315) 637-6656.

ELLIS B. TURNER; Producer, TURNOUT PRODUCTIONS, INC., 205-24 Murdock Ave.; St. Albans, NY 11412; (718) 217-0080.

DAN VAGANEK; Engineer & Producer, 74 West St.; Colonia, NJ 07067; (201) 381-1861.

GARY M. VANDY; Engineer & Producer, GARY M. VANDY PRODUCTIONS, 6920 Manasota Key Rd.; Englewood, FL 34223; (813) 475-6125.

Cecil Van Houten; Engineer & Producer, MUSICWORKS, 704 Walnut St.; Earlham, IA 50072; (515) 758-2677.

BRIAN A. VESSA; Engineer & Producer, BV PRODUCTIONS, PO Box 3272; Santa Monica, CA 90403; (213) 826-5902. Credits & Services: Credits: four gold albums, including Jose Jose and Juan Gabriel, Michel Rubini, *Secret Dreams*, Brett Perkins *New Accelerated World*, *Disney Not Quite Human II*, HBO *The Edge*, USA Cable *The Haunting of Sarah Hardy*, NBC movie *Crossing the Mob*, *Moving Target*, *Hands of a Stranger*, CBS *Too Good To Be True*, *Unholy Matrimony* Don Johnson video feature *Heartbeat*, Michael Mann films *Band of the Hand* and *Manhunter*. Commercials and industrials for Porsche, Disney, Del Monte, etc. Electronic sound effects supervisor on *Friday the 13th Part VIII*. Services: music production and engineering, Synclavier, music editing, sound effects and studio electronics. I have well over 20 years experience as a musician, 15 years in the professional audio field, and a degree in electronics. I enjoy being involved with the creative process of music in all styles and capacities, being equally comfortable with microphones, computers, synthesizers and synchronizers.

JAY VIGNEAU; Engineer & Producer, ON YER TONES PRODUCTIONS, 63 Etna St.; Brighton, MA 02135; (617) 783-3593.

DUSTY WAKEMAN; Engineer & Producer, MAD DOG STUDIO, 1717 Lincoln Blvd.; Venice, CA 90291; (213) 306-0950. Credits & Services: Michelle Shocked *Captain Swing* PolyGram LP, Dwight Yoakam *Greatest Hits* Warner Bros LP, Darden Smith CBS LP, Martin Stephenson London LP, La Ya Ya R&B compilation LP, Black Velvet Band Elektra LP, *Daddy's Dying* Propaganda Films soundtrack, Lucinda Williams *Rough Trade* LP, Bone Daddys *Chameleon* LP, Buck Owens *Capitol* LP. Services: music recording for albums, film, TV, advertising. Co-owner of Mad Dog Studio, a full-service 24-track with Neve 8108 w/Necam, Studio A800, great mics and tons of outboard gear; Emulator III.

DENNIS WALL; Engineer, OFF THE WALL PRODUCTIONS, 10 Howland Cir., West Caldwell, NJ 07006; (201) 228-4099. Credits & Services: Anthony and the Camp, Ashford and Simpson, Brenda K. Starr, Alex Bugnon, Chad, E.G. Daily, Sarah Dash, The Doobie Brothers, Elisa Fiorillo, Billy George, Freddie Jackson, The Jets, Melba Moore, Mr. Spats, Najee, Tommy Page, Nelson Rangel, Ronnie Spector, John Waite, Scott White. Audio-for-video and film: ABC, CBS, Disney Channel, ESPN, HBO, MSG, NBC, Showtime, TBS, WOR, WPIX, USA *The Chair*, *This Evening*, *Fun House*, *Lifestyles of the Rich and Famous*, *Monsters*, *Shaggy*, *She Devil* AT&T, A&W, B.F. Goodrich, Cannon, Chef Boyardee, Chloe Perfume, Crest, Color Tile, Digital Equipment Corporation, Hershey's, London Fog, March of Dimes, Metropolitan Life, Minute Rice, Mitsubishi, Newmark and Lewis, New York Transit Authority, PC Richards, Radio City Music Hall, Seamans, United Methodist Church, Westinghouse, Xerox. Services: audio engineering and mixing. MIDI systems design and setup. Computer-based sequencer programming and pre-production SMPTE/audio/video/MIDI synchronization.

SCOTT WARNER; Engineer & Producer, FLAGRANT UNDERGROUND STUDIOS/RECORD COMPANY, RJ Casey Industrial Park; Pittsburgh, PA 15223; (412) 322-8001.

ALAN WATTS; Engineer & Producer, TTS PRODUCTIONS, 300 West End Ave. #6B; New York, NY 10023; (212) 595-3908. Credits & Services: Credits: Living Colour, Aerosmith, De La Soul, Fine Young Cannibals, EPMD, George Clinton,

Newkirk, Big Daddy Kane, 3rd Base, Latifa, Marshall Jones, The Black Flames, London, Cookie Crew Services: high-quality engineering and producing with great concern for the artist and performance

DAVE WAY; *Engineer & Producer*, c/o Soundworks; 254 W. 54th St.; New York, NY 10019; (212) 247-3690. **Credits & Services:** Services include all aspects of engineering plus production, remixes, programming and songwriting. Extensive work as engineer on projects for Teddy Riley & Guy, Boy George, Blondie, Aretha Franklin/Whitney Houston, George Benson, Club Nouveau, Soul II Soul, David Peaston, Big Daddy Kane, Jasmine Guy, Starpoint, Zan, The Redhead Kingpin Bachelor's degree in music production and engineering from Berklee College of Music

JOE WEED; *Engineer & Producer*, HIGHLAND RECORDS, PO Box 554; Los Gatos, CA 95031; (408) 353-3952. **Credits & Services:** Two albums received "Indie" nominations from the National Association of Independent Record Distributors (NAIRD) for best album of the year, 1988, New Age category. Joe Weed produces, engineers, writes and arranges material in most styles, but concentrates on acoustic instruments. Working principally in his own Highland Studio in the Santa Cruz mountains, Joe Weed achieves clear, accurate, beautiful recordings of acoustic instruments by employing world-class microphones and using mic placement and ambience to portray each instrument to its best advantage. Joe Weed also travels to other studios for project work. Recent releases on CD include *The Waltz of the Whippoorwill*, *Oktober County* and *The Dream of the Manatee*.

JOHN WIDOFF; *Engineer*, JOHN WIDOFF, AUDIO, 2888 S. Buchanan St. #C-2; Arlington, VA 22206; (703) 931-9233.

SANDY WILBUR; *Producer*, SANDY WILBUR MUSIC, INC. 48 E. 43rd St., 7th Fl.; New York, NY 10017; (212) 949-1190.

DARLEEN WILSON; *Producer*, BROWNSTONE PRODUCTIONS, 20 Clare Ave.; Roslindale, MA 02131; (617) 325-8904.

SUSAN WINTHROP; *Engineer & Producer*, AUDIO ANTICS WEST, 156 W. 94th St.; New York, NY 10025; (212) 662-8685.



GEOFFREY WORKMAN
Denver, CO

GEOFFREY WORKMAN; *Engineer & Producer*, ORIGINAL PROJECTS UNLIMITED, INC. 36 W. 3rd Ave., Denver, CO 80223; (303) 722-9653. **Credits & Services:** 26 platinum album certifications. Credits include Journey, Queen, The Cars, Motley Crue, Twisted Sister, Toto, Foreigner, Dokken, Sammy Hagar, Ron Wood, Tommy Tutone, Gary Myrick, Roxanne, Sully Dog, Warriorsoul and more. Workman is available for production and engineering services on major label projects and independents alike, and is also very active in seminars, lecturing and panels. Original Projects Unlimited is a full-service personal and business management firm as well as a production company. Consultations are available and bands may feel free to submit material. Original Projects Unlimited also produces the annual Songwriters Association of America's Music Fair held in Denver, Colorado. Studios feel free to submit brochures.

RORY YOUNG; *Engineer & Producer*, ACME RECORDING STUDIOS, 112 W. Boston Post Rd., Mamaroneck, NY 10543; (914) 381-4141; FAX: (914) 381-4543. **Credits & Services:** Complete 24/48-track, automated studios and MIDI programming facility with vast experience. Album projects, scoring, producing and/or programming available in a relaxed environment. Atlantic Starr *As the Band Turns* LP A&M Records (gold record) (engineer and programmer), Atlantic Starr *All in the Name of Love* LP Warner Bros. Records (gold record) (engineer and programmer), Tom Stacy *Nu-View Christmas* LP PolyGram/London (associate producer, engineer and programmer), Willie Colon *Contrabando* and *Especial No. 5* LPs

EMI distributed, SOS All Stars two LPs SOS Records (engineer and production), Geri Allen *Open on All Sides* and *Twylite* LPs (programming), *Have Yourself a Very Merry Christmas* various artists, Dr. John, Nicolette Larson, etc., Real Live Records/Rhino (engineer and programming), Samuel Zyman *Quintet for Winds, Strings and Piano* Island Records (engineer), Soldier String Quartet *Sequence Girls* independent (engineer and production)

BRITISH/FOREIGN

GEORGE ACOGNY; *Producer*, ESTA MGMT., 16A Ilite Yard, off Crompton St.; Walworth, London, SE17 3QA U.K.; (01) 708-3744.

MARTIN ADAM; LOE ENTERTAINMENT, 159 Broadhurst Gardens; London, NW6 3AU U.K.; (01) 328-6100.

DAVE ALLEN; *Producer*, FICTION RECORDS, 28 Ivor Place; London, NW1 U.K.; (01) 723-9269, (01) 724-9294; E-Mail: DGS1936 (IMC).

DAVID M. ALLEN; 4A Palace Rd., East Moseley, Surrey, U.K.; (01) 941-3790.

TIMMY ALLEN; ZOMBA MANAGEMENT LTD., Zomba House, 165-67 High Rd., Willesden; London, NW10 2SG U.K.; (01) 459-8899; Telex: 919884 ZOMBA G; FAX: (01) 451-3900.

CHRIS ALLISON; YOUNG PRODUCERS STABLES, 65 Colet Gdns., St. Paul's Ct.; London, W14 9DN U.K.; (01) 741-3284.

PETER ALLISON; LINKLINE, 72 Oakley Sq.; London, NW1 U.K.; (01) 908-6262.

JEREMY ALLOM; *Engineer & Producer*, SCARLETT MANAGEMENT LTD., 169-171 High Rd.; Willesden, London, NW10 2SE U.K.; (01) 451-3727; FAX: (01) 451-4600.

GEORGE ALTHAUS; *Engineer*, POST HOUSE MUSIC, Snoll Hatch Rd.; East Peckham, Kent, TN12 5DX U.K.; (0622) 871201.

CHRIS & EDDY AMOO; MANOR ENTERTAINMENTS & MANAGEMENT LTD., 3rd Floor, 9 Carnaby St.; London, W1V 1PG U.K.; (01) 437-1958.

AMOS ANDERSON; *Engineer & Producer*, GLASSHOUSE PRODUCTIONS, LTD. Unit 19, Perry St.; Coventry, CV1 3BY U.K.; (0203) 223892.

DAVE ANDERSON; *Engineer*, SCARLETT MANAGEMENT LTD., 169-171 High Rd.; Willesden, London, NW10 2SE U.K.; (01) 451-3727; FAX: (01) 451-4600.

CHRIS ANDREWS; NEGUS FANCEY CO., 15 Ossington St.; London, W2 4LZ U.K.; (01) 727-2063.

DAVID ANFIELD; ANFIELD MUSIC LTD., 276 Monument Rd., Edgbaston; Birmingham, B16 8XF U.K.; (021) 454 4671.

ROB ANTSREY; *Producer*, RECLUSE PRODUCTIONS, Brooklands, Landford; Wilts, SP5 2AA U.K.; (0794) 390837; FAX: (0794) 390816.

ART OF NOISE; POLAR UNION LTD., 119-121 Feston Rd.; London, W11 4BD U.K.; (01) 243-0011; Telex: (8954780) POLAR G; FAX: (01) 221-2722.

TONY ATKINS; *Producer*, VILLAGE RECORDERS, 4 Midas Business Centre; Wanzl Rd., Dagenham; Essex, RM10 8PS U.K.; (01) 517-1072.

KEVIN BACON; AXIS STUDIOS, 50 Sheldon St., Sheffield; Yorks, S1 4SQ U.K.; (0742) 750283.

PHILIP BAGENAL; *Producer & Engineer*, EASTCOTE PRODUCTIONS LTD., 249 Kensal Rd.; London, W10 U.K.; (01) 969-3739.

SIMON BAISLEY; *Producer*, EQUATOR MUSIC, 17 Hereford Mansions, Hereford Rd.; London, W2 5BA U.K.; (01) 727-5858.

DAVID BAKER; JOHN TROTT MANAGEMENT, 214 Ingrave Rd., Brentwood; Essex, CM13 2AG U.K.; (0277) 217667.

MICHAEL BAKER/AXEL KROELL; MALCOLM MELLOWS MANAGEMENT, 102 Woodfield Rd., New Barnet; Herts, EN5 5NJ U.K.; (01) 440-3005.

TIM BALDWIN; GENETIC MGMT., GENETIC STUDIOS, Wood Cottage, Streatley Hill, Streatly, Nr. Reading; Berkshire, U.K.; (0491) 873042; FAX: (0491) 873112.

DENNY BALL MUSIC; 16-24 Brewery Rd.; London, N7 9NH U.K.; (01) 609-5161.

RUSS BALLARD; JOHN STANLEY MEDIA MANAGEMENT, 112 Park Rd., Hampton Hill; Middlesex, TW12 1HR U.K.; (01) 979-4189.

MIKE BANKS; *Engineer*, PICNIC RECORDING STUDIOS, Court Lodge Farm, West Peckham; Kent, ME18 5JN U.K.; (0622) 813741.

BOB BARRATT; 62 Pont St. Mews; London, SW1X 0EF U.K.; (01) 584-9765.

STUART BARRY; NO-NONSENSE PRODUCTIONS, Cunnington House, 14 Cunnington St., Chiswick; London, W4 U.K.; (01) 994-1956; Telex: 934384 BMS G; FAX: (01) 747-0778.

JAMES "JIMBO" BARTON; DREAM ABOUT IT PROD., 38 Kendal St.; London, W2 2BU U.K.; (01) 258-3891.

DAVE BASCOMBE; RENEGADE PRODUCTIONS, 2nd Floor, 145 Oxford St.; London, W1 U.K.; (01) 437-2777; Telex: 8951182; FAX: (01) 318-1439; E-Mail: DGS-1117 (IMC).

FREDDY BASTONE; ROAR MANAGEMENT, 67 Gloucester Ave.; London, NW1 8LD U.K.; (01) 603-1345; Telex: 5688223; FAX: (01) 603-9880.

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DAVID KERSHENBAUM; WORLD'S END MANAGEMENT LTD. 134 Lots Rd.; London, SW10 0RJ U.K.; (01) 351-4333; Telex: 893851; FAX: (01) 351-5044; E-Mail: WORLSEND-UK (IMC).

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MARTIN LASCELLES, GEOFF GURD; *Producer*; DE-MIX PRODUCTIONS LTD. 7 Croxley Rd.; London, W9 3HH U.K.; (01) 960-1115.

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PHIL LEGG; *Engineer & Producer*; POWERPLANT MANAGEMENT. 169-171 High Rd., Willesden; London, NW10 2SE U.K.; (01) 451-3727; FAX: (01) 451-4600.

CRAIG LEON; *Producer*; MALCOLM MELLOWES MANAGEMENT. 102 Woodville Rd., New Barnet; Hertfordshire, EN5 5NJ U.K.; (01) 440-3005; FAX: (01) 441-1873.

STEVE LEVINE; *Producer*; DO NOT ERASE PRODUCTIONS LTD. Unit 18B, 101 Farm Ln., Fulham; London, SW6 1QJ U.K.; (01) 381-6298; (213) 852-1100 (U.S.).

STEWART LEVINE; *Producer*; C.B.M. (CATRINA BARNES MANAGEMENT). 27 Daventry St.; London, NW1 U.K.; (01) 724-5962; FAX: (01) 724-0772.

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STEVE LILLYWHITE; XL TALENT. Studio 7, 27a Pembridge Villas; London, W11 3EP U.K.; (01) 938-1917; FAX: (01) 229-7511; E-Mail: DGS1059 (IMC).

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ANDY MACPHERSON; *Producer*; REVOLUTION STUDIOS. 11 Church Rd., Cheadle Hulme; Cheadle; Cheshire, U.K.; (061) 485-8942.

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PAT MORAN; *Producer*; ROCKMASTERS LTD. 110 Westbourne Grove; London, W2 5RU U.K.; (01) 727-8636; Telex: 94016455 ROCK G; FAX: (01) 229-4061.

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DAVID MOTION; *Producer*; PARTISAN MANAGEMENT. 39 Great Windmill St.; London, W1V 7PA U.K.; (01) 434-0851; E-Mail: DGS1552 (IMC).

MUIRHEAD MANAGEMENT LTD.; 202 Fulham Rd., Chelsea; London, SW10 9PT U.K.; (01) 351-5167; (01) 352-4564; FAX: (01) 352-1514.

MULTI MEDIA LTD.; 22 St. Peter's Sq., Hammersmith; London, W6 9NW U.K.; (01) 741-1511; Telex: 27789; FAX: (01) 741-0206.

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BLAD NASLAS; *Producer*; OVAL RECORDS. 326 Broxton Rd.; London, SW9 7AA U.K.; (01) 326-4907.

BILL NELSON; *Producer*; Unit 15, Littleton House; Littleton Rd., Ashford; Middlesex, TW15 1UU U.K.; (0784) 247176; FAX: (0784) 241168.

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DAVE NEWSON; *Producer & Engineer*; MARK AMPELO RECORDING STUDIOS. 27 Britton St.; London, EC1 U.K.; (01) 251-2376.

PHIL NICHOLAS; *Producer*; ZOMBA MANAGEMENT LTD. Zomba House, 165-167 High Rd.; Willesden; London, NW10 2SG U.K.; (01) 459-8899; Telex: 919884 ZOMBA G; FAX: (01) 451-3900.

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NO-NONSENSE PRODUCTIONS; Cunnington House, 14 Cunnington St.; Chiswick; London, W4 U.K.; (01) 994-1956; Telex: 934386 BMS G; FAX: (01) 747-0778.

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OPAL LTD.; 330 Harrow Rd.; London, W9 2HP U.K.; (01) 286-9532; FAX: (01) 289-3494; E-Mail: DGS1094.

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—FROM PAGE 138, STEEL WHEELS

(with the exception of the Alpine Valley [East Troy, Wis.] performance, which, due to spatial considerations, had to use a scaled-down version of the system), two main Prism arrays were constructed on each side of the stage. They covered the entire audio spectrum, ranging from bass through frequencies in excess of 15 kHz. The gray-black cylindrical arrays were composed of 84 enclosures. A rigging scheme allowed the cabinets to be interlocked in a flush fashion that also left them aligned for optimum performance. Each side contained 32 subwoofers, and five more enclosures were mounted in frontfill positions to provide coverage for fans seated in front of the stage.

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Newsweek succinctly described a concert on the Stones tour by writing, "The volume level was properly deafening, fireworks properly blinding, the band sounded fine." For Benji Lefevre and Showco, the last part of the review was probably the best compliment. As for that nagging question as to whether this will be the band's last outing, no one can say for sure. "Personally, I see them playing forever," Lefevre states. "They are a band that really enjoys playing together, and that means that they will probably be making music for a very long time."

Okay. So maybe I'll be back 40 years from now to write the sequel to this story. My grandchildren will probably be getting ready for college by then, and I'll need the money. See you then. ■

Gregory A. DeTogne is a publicist/freelance writer based in the Chicago area.

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