

KEITH OLSEN • EDDY GRANT'S STUDIO • DAVID FOSTER

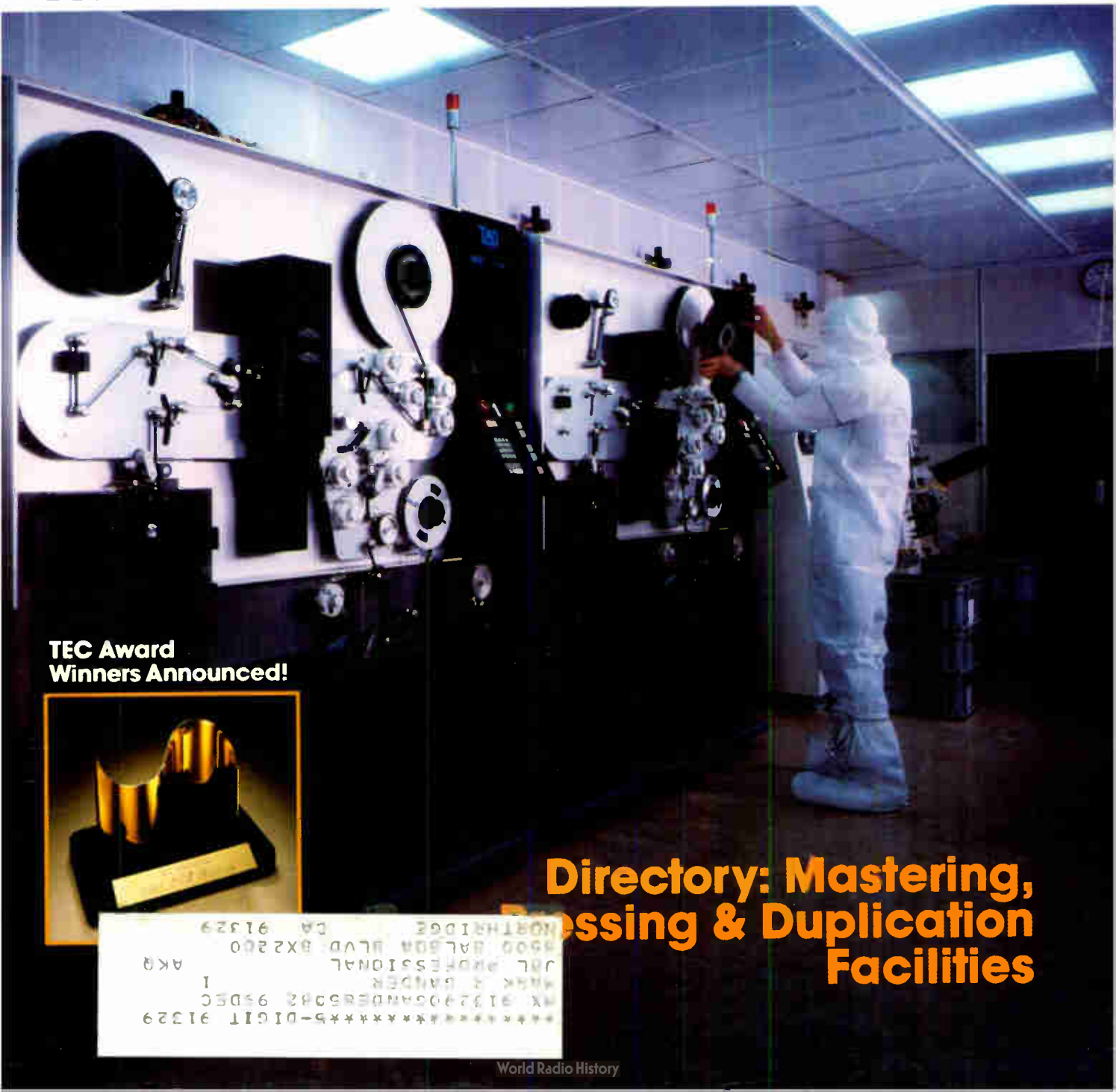
U.S. \$4.95 CANADA \$5.95 DECEMBER 1988

MIX

Premastering: Tips from the Pros

Clint Eastwood Brings "Bird" to Life

THE RECORDING INDUSTRY MAGAZINE



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MIX

DECEMBER 1988

THE RECORDING INDUSTRY MAGAZINE

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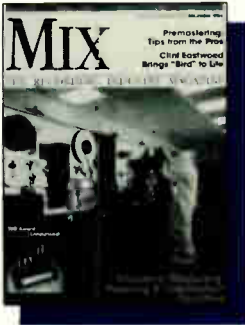
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FROM THE EDITOR



Cover: Featured on this month's cover is Hoek & Sonepouse BV in Amsterdam, site of the first thermal magnetic videotape duplication facility in Europe. Pictured are two Otari T-700 MkII TMD high-speed video duplication machines, which use a high-powered laser to facilitate the duplication of VHS tapes at extremely high speeds. Behind the operator are two Otari T-301 automatic video cassette loaders. Photo, courtesy of Hoek & Sonepouse.

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It was big news a few weeks back when Steve Jobs unveiled what he called the computer for the '90s. The NeXT system, from the fellow who brought us the Macintosh, portrays the next generation of personal computing as more of a compact workstation with the power and facilities of a mainframe.

But something else has gotten into these computers that previously had been seen as generally a secondary consideration: the sound and music capabilities. Not only can the user now dynamically rotate molecular structures on screen, but he/she can take a coffee break and have the magic box create spontaneous original music on a high-fidelity internal playback system.

The storage ability of this machine has also been getting high scores on the wow meter. Our old friend, the optical disk, has been employed in the standard unit to provide over 250 megabytes of read/write/erase capability. All the better to store multimedia programming.

"Every NeXT computer system is capable of producing CD-quality stereo output (44.1 kHz, 16-bit two-channel digital audio)," says the manufacturer. "In fact, the NeXT computer system uses the same chips that form the basis of most CD players today. A built-in speaker, a stereo headphone jack and line-out jacks for connecting to an audio system are standard features of the display. The MegaPixel Display also has a microphone jack for voice-quality sound input. Finally, two channels of the Integrated Channel Processor are devoted to sound, so that sound I/O does not overload the system and diminish performance."

Optical disks? Sixteen-bit audio? The computer and audio worlds are further blurring their lines of distinction. It seems as though the future looks rosy for both the hacker who has a good sense for media production, as well as the audio engineer who isn't afraid of mice.

This month we take a closer look at optical disk manufacturing in this, our annual Tape and Disc Technology issue. As usual, we include our listings of disc mastering, record pressing, CD replication and tape duplication facilities.

Keep reading,

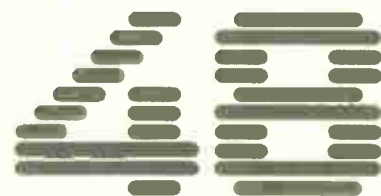
David Schwartz
Editor-in-Chief

Introducing the world's first



The new Sony PCM-3348. It's 48 tracks on half-inch tape. On one machine featuring oversampled AD/DA converters and digital filters. Plus 12 newly developed LSIs, increasing reliability while reducing power consumption to 1.2 kW. All with complete half-inch compatibility—in the space of the industry standard DASH 24-channel recorder.

It works with the tape you've got. Not only can you play any 24-channel DASH tape on the PCM-3348, but you can also add an additional 24 channels to your recording—while maintaining absolute integrity of the original channels.



And the machine is just as compatible as its tape. Because of its built-in synchronizer, connecting the PCM-3348 to a Sony PCM-3324 or 3324A is simple.

It works like no other machine. Because it's built like no other machine. The PCM-3348 features a newly developed transport that gently shuttles 14"

48-track digital recorder.



reels of tape with unprecedented speed. Two channels of selectable AES/EBU or SDIF-2 digital inputs/outputs are assignable to any of the 48 tracks. An internal 20 seconds of 16 bit memory can be reinserted back onto tape either manually or by external trigger. Vari-speed control of $\pm 12.5\%$. And a revolutionary digital/analog output that can be advanced up to 250 words.

But the features don't stop there. With the supplied RM-3348 Remote Controller, you also get variable cross-fade control. Two track real-time ping pong. And a host of variable track modes—all stored in a battery-backed memory unit.

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CURRENT

Mix Publications Acquired by Act III

David Schwartz, president of Mix Publications, Inc., and Paul Schaeffer, president of Act III Publishing, announced an agreement in principle for the acquisition of Mix Publications by Act III, effective by the end of the year.

"We're very excited about joining Act III Publishing's group," Schwartz says. "They have demonstrated the expertise and commitment to quality consistent with our philosophy, and I'm convinced that this association will allow us to continue to develop and improve our position in the expanding field of technical publishing."

Mix Publications, Inc. includes: *Mix*, *The Recording Industry Magazine*, *Electronic Musician Magazine*, the Mix Bookshelf; and the Technical Excellence and Creativity (TEC) Awards.

"We're pleased to have the industry leader Mix Publications join Act III," Schaeffer says. "And we're delighted to be able to draw on the experience and expertise of their strong management team led by David Schwartz." As part of the transaction, Mix Publications' management team of Schwartz and vice presidents Hillel Resner and Mark Gunther will continue to run the company.

Act III Publishing currently publishes *Broadcast Management of Engineering*, *World Broadcast News*, *Corporate Video Decisions*, the advertising industry magazine *Marketing and Media Decisions*, and the television magazines *Channels*, *TV Facts Figures and Films* and *Television Business International*.

Act III Publishing is a privately held company owned exclusively by well-known television producer Norman Lear. It is located at 19 W. 44th Street, New York, NY 10036.

Trident Buyout

Trident Audio Developments Ltd., the last of the major independent British

console manufacturers, has been purchased by Relyon Group PLC, a publicly traded British company. Directors Malcolm Toft and Jack Hartfield have sold their entire interest in the company and will remain as consultants.

Toft, a director for 16 years, explains: "We looked around at our competition and realized that we needed more financial muscle to carry out our ambitious plans. Our backing has been growing and we needed a large capital commitment to nurture our success. Relyon provided that and will allow Trident to chart its own course."

The development of the Di-An console was seen as a major factor in the buyout. In the past ten months Trident has installed three and is about to ship another. David Stocks, financial director at Relyon, says, "The company has a brilliant new product with the Di-An and a solid history as an innovative producer of the finest quality mixers. With our greater financial strength and pro management techniques, we believe we can significantly expand Trident's market share."

Bud Brimberg, an American-trained attorney, has been selected by Relyon to serve as managing director. Wayne Freeman has accepted the position of director of international sales and marketing, and Lon LeMaster will manage U.S. sales.

NSCA Looks at Product Safety

The National Sound & Communications Association recently held a forum to address industry concerns of product safety, liability, listing and certification. The lack of communication between the commercial/pro audio industry and agencies like Underwriters Laboratories and the Canadian Standards Association prompted the forum.

The result of the meetings is the formation of a new Industry Advisory

Committee (IAC), known as the Product Safety Group of NSCA. The panel of ten to 15 industry representatives will be chosen from a larger working committee of primarily, but not exclusively, NSCA member companies.

Participation in the Product Safety Group is open to all interested parties. Engineering-oriented individuals are preferred due to the technical material to be evaluated.

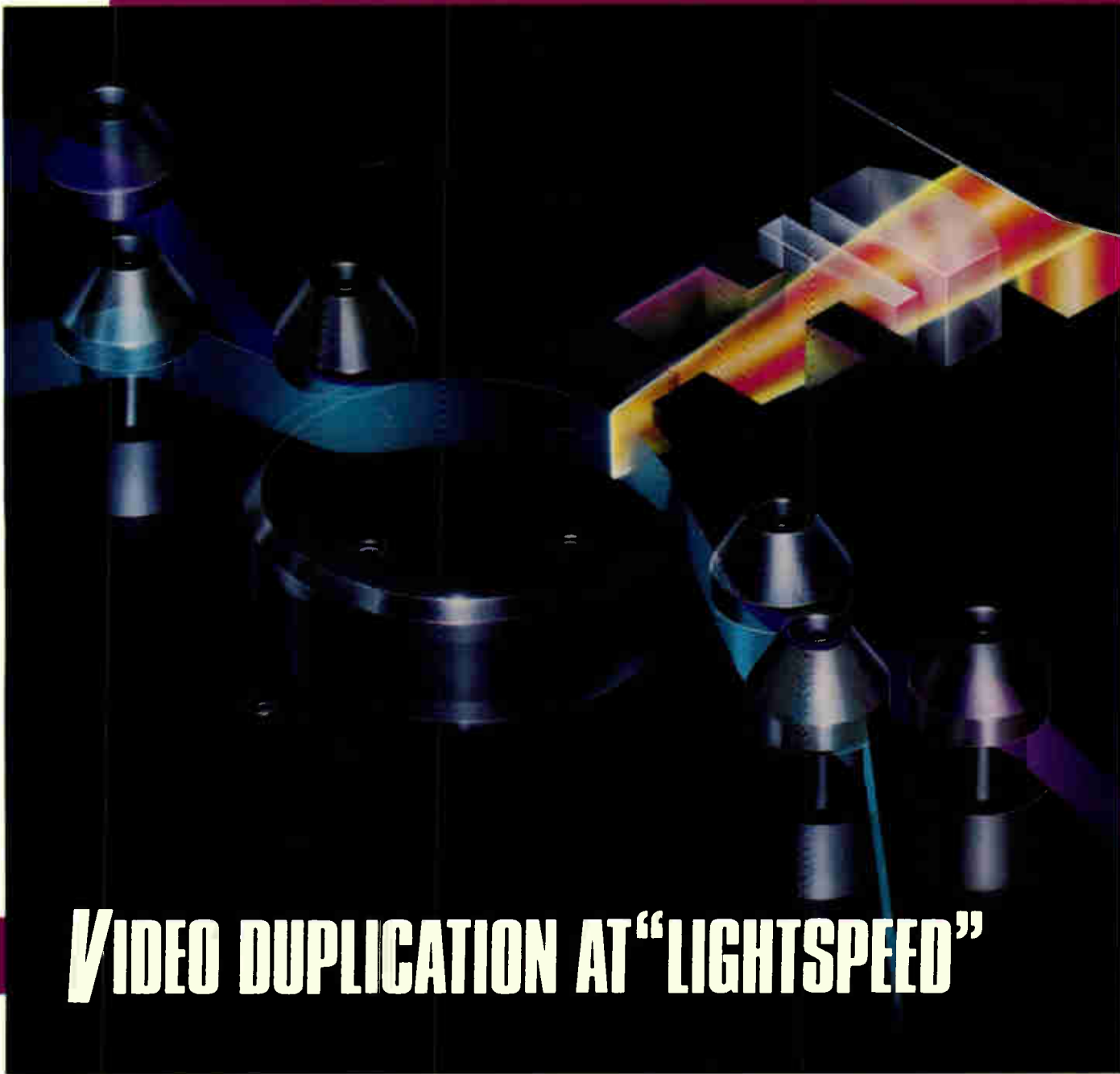
For more information, contact Mr. Francis Rebedeau, Executive Secretary, National Sound & Communications Association, 10400 Roberts Road, Palos Hills, IL 60465; (312) 598-7070, FAX: (312) 598-4888.

SOUND-NET Debuts

Sound Net, a Toronto-based communications company, has introduced an electronic bulletin board specifically directed to the needs of acoustical and sound engineers, as well as people involved in the music industry. The network (appropriately named, SOUND-NET) features electronic mail, public domain software and direct access to participating manufacturers and distributors.

Also, SOUND-NET can provide news of industry events and workshops, new products and services, and classified ads including individual exchange, business-to-business and job information services. On-line conferences offer informal debates on such topics as MIDI, and acoustics and vibration. A unique service allows you to upload a file for printing on a laser or plotter, with your hard copy delivered by conventional mail.

SOUND-NET is non-profit, with a user's fee of \$35. All that is required is a personal computer with a 1200 or 2400 baud modem and communications software. For more information, contact Sound Net, 164 Sunnyside Ave., Suite 102, Toronto, Ontario M6R 2P6, Canada; (416) 530-4423. ■



VIDEO DUPLICATION AT "LIGHTSPEED"

Up to 405 times faster* than real-time . . . that's Otari's new T-700 laser-based video duplicator!

The T-700's endless-loop design gives you the advantage of *continuous* operation, so you can produce uniformly high quality VHS duplicates *over two times* faster than with other high speed systems now on the market.

Plus, the T-700's "pancake" duplication approach saves time in Q.C. because it allows *statistical* sampling rather than the time consuming *batch* methods necessary with real-time duplication.

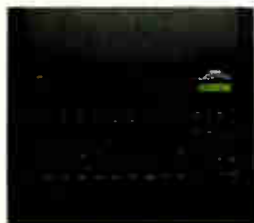
So if you're looking for uniform, high quality cassettes, *plus* lower labor costs and reduced floor space requirements, call Otari at (415) 341-5900.

OTARI

*405X in NTSC-EP mode; 135X in NTSC-SP, and 192X in PAL.

It's no surprise who the innovator

Without a doubt, Yamaha is one of the biggest names in the music industry. Our reputation for being on the leading edge of technology is especially amplified in our new line of digital audio products.



*DMP7D
Digital Mixing Processor.*

Let's start with the DMP7D. Also known as a digital mixing processor. Better known as a landmark in sound technology. From input to output, the DMP7D is fully digital. It's MIDI-controllable. And its applications include mixdown of digital multi-track recordings, digital track

bouncing, and CD mastering. In short, it's the ultimate performing and engineering tool.

Our latest breakthrough in



SPX1000 Signal Processor.

digital signal processing is the SPX1000. It's packed with 40 professional effects and effect combinations preset in ROM. Another 60 of your own creations can be stored in RAM. In addition to 20 KHz bandwidth on all effects, the SPX1000 boasts a new reverberation algorithm and dramatic new panning effects.

Among digital equalizers, the Yamaha DEQ7 is unequalled. There's both digital and analog I/O.



in digital audio technology is.

It's loaded with 30 different EQ and filter configurations, in stereo.

And the most unforgettable feature is its 60 user-programmable memory locations.

For clear communication, the FMC1 Format Converter allows direct transfer of Yamaha digital output signals to other standard digital formats. So you eliminate the need for D/A and A/D conversion, while maximizing the sound quality of the final recording. If you



AD808 Format Converter.



DEQ7 Digital Equalizer.

need to convert digital to analog,

there's the DA202. Or, if you're going from analog to digital, the AD808

will get you there. Either way, you achieve sound that'll please even the most discerning ear.

Once again, it's easy to see when it comes to innovation, there's nothing new about the name Yamaha.

Yamaha Corporation of America, Professional Audio Division, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario M1S 3R1.

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Why the world's top studios overwhelmingly choose Mitsubishi digital

Of the top studios in Los Angeles, Nashville, New York and London, the overwhelming choice for digital is Mitsubishi. Why? Because the vast majority of top producers insist on Mitsubishi for their digital work. And why is that? Because Mitsubishi sounds best.

Mitsubishi machines make digital recording profitable for the studio owner. They attract more and better clientele—and command higher rates. Plus they're more productive and more reliable in professional recording applications.

New X-880 32-channel digital

Mitsubishi's new X-880 is smaller and lighter thanks to LSI technology. It uses less power and runs quieter. It's our *third* generation multi-track (we've been at this longer than anyone). And it's fully compatible with X-850 recorders, so you'll be compatible with most other top studios.

All the features of its predecessors are here and more, including improved design auto-locator and a sample accurate chase synchronizer option for 64-track lockup.

Call for a brochure or demonstration in your studio.



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CA 91306 (818) 709-4662.

INDUSTRY NOTES

Video Expo Orlando and Video Expo San Francisco, bringing exhibits and seminars to video professionals, are slated for December 12-16 at Orange County Convention/Civic Center, and February 13-17, 1989, at the San Francisco Civic Auditorium, respectively. Call (914) 328-9157, or (800) 248-KIPI outside New York for more info . . . **Neutrik USA** has appointed a full national roster of regional sales organizations to represent its connector products. To locate the regional office closest to you, contact Neutrik USA Inc., 1600 Malone St., Millville, NJ 08332; (609) 327-3113, FAX (609) 825-4804 . . . **Jim Bonis** has been appointed national sales and marketing manager for **Applied Research & Technology, Inc.** . . . **Michael W. Miller** has joined **BASF Corporation Information Systems** as field sales manager. He will be responsible for day-to-day tactical management of each of the company's regional sales offices throughout the U.S. . . . The **Electronics Representatives Association (ERA)** has introduced a new Associate Membership program, designed to provide manufacturers with market-specific assistance to use sales representatives more effectively and sell products more efficiently. Contact ERA at 20 E. Huron St., Chicago, IL 60611; (312) 649-1333, FAX (312) 649-9509 . . . **Jerry Smith** has joined **Virtual Designs Ltd.** . . . **Integrated Media Systems** has moved to expanded headquarters at 1370 Willow Road, Suite 201, Menlo Park, CA 94025; (415) 326-7030, FAX (415) 326-7039 . . . **Anita Lanning** has been named studio manager for the Southfield, Michigan-based **Ron Rose Productions** . . . The **Music Distributors Association (MDA)** has announced an aggressive new program for membership expansion that will encompass the sound, communications and electronics industries. For details, contact MDA at 136 West 21st St., New York, NY 10011-3212; (212) 924-9175, FAX (212) 675-3755 . . . **Tom Day** has been promoted to service manager at **QSC Audio Products**, and **Neil Pedit-**

noff has joined the organization as senior engineer. . . **Jeffrey S. Wetherell** has been named president and chief operating officer of **Telex Communications, Inc.** . . . **Carillon Technology, Inc.** has appointed **Leslie B. Tyler** vice president for technology. Tyler will head a newly formed CTI Research department. . . **Agfa-Gevaert, Inc.**, Ridgefield Park, NJ, and its parent **Bayer AG**, West Germany, will merge with its subsidiaries **Compugraphic Corporation**, Wilmington, MA, and **Matrix Corporation**, Orangeburg, NY, by the end of the year to form **Agfa Corporation**. This new company will integrate the various business activities in the photographic and electronic imaging systems fields. . . **Digital Audio Research Ltd.** has moved from the San Francisco Bay Area to new offices at 6363 Sunset Blvd., Ste. 802, Hollywood, CA 90028; (213) 466-9151, FAX (213) 466-8793; **Lee Bartolomei** has been promoted to regional sales manager. . . CD manufacturer **Nimbus Records, Inc.**, has opened a West Coast sales office and appointed Sandy Richman as Western regional sales manager. The office is located at 4524 Tobias Avenue, Sherman Oaks, CA 91403; (818) 783-4250 . . . **Ampex Corporation** has opened a \$2 million, 9,600-square-foot test center, housed at Ampex's Opelika, AL, processing plant. The facility has eight separate labs for 1-inch video, cassette video, audio, instrumentation, plastics, physicals and microscopy. . . **Rocco Ferrante**, performer and concert artist, moves up at **Technics** to the newly created position of education manager, electronic musical instrument division. . . **Christie Electric Corp.** of Gardena, CA, manufacturer of battery analyzers/chargers, has appointed **MPCS Video Industries South, Inc.** of Hollywood, FL, as its distributor for Florida and Georgia. . . **Edge Distribution Corp.**, Sudbury, MA, named **Tim Kalliches** applications engineer. The company has also announced 13 new U.S. reps for BSS Audio, with some of the firms also representing Turbo-sound. ■

SESSIONS AND STUDIO NEWS

SOUTHEAST

Mr. O Audio Studio in Columbus, GA, reports that heavy metal band **Rick Wick-ed** were in working on their upcoming release. . . **Keith Wilson** was recently at **Cotton Row Recording** in Memphis with his band, **Catch 22**, to work on a new album project. **Ronnie Kittell** engineered. . . **Ronnie McDowell** and **Joe Meador** produced and **Mike Bradley** engineered sessions for Ronnie's latest album for Curb Records at Nashville's **Soundshop Recording Studios**. . . In other news from Nashville, **SyncroSound Studio** has been working with **Jonathan Edwards** on an album for MCA/Curb. The project is produced by **Wendy Waldman** and engineered by **John Wiles**. . . Those masters of rap, **Run-D.M.C.**, recently spent two days at **Alpha Audio** in Richmond, VA, cutting new tracks for their upcoming concert tour. Most of the work was completed using Alpha's new Synclavier and Direct-To-Disk System. . . The **Tony Spinner Project** continued work on several sides at **Memphis Sound Productions**, with **Eli Ball** producing and **Dan Pfeifer** engineering. . . **John McCullough** was in at **Strawberry Skys** in West Columbia, SC, producing tracks for **Maurice Williams**. . . **David Rosenthal** recently finished laying keyboard tracks and programming at **International Sound Studio** in North Miami Beach for **Donna Allen's** forthcoming album on Atlantic Records. . . Producer **Jerry Crutchfield** was in at Nashville's **AMR Studios** to record **Kim Grayson**, with engineering assistance from **Warren Peterson** and **Robert Charles**. . . In other Nashville activity, **Woodland Sound Studios** reports that **Willie Nelson** was in with producer **Chips Moman** and engineer **Bob Krusen** working on a TV project for CBS. . . RCA Records artists **Alabama** were at **Emerald Sound Studio** in Nashville with producer **Josh Leo** doing overdubs on their

latest project. **Steve Marcantonio**, **Ken Criblez** and **Chris Hammond** engineered. . . Recent activity at Atlanta's **Studio One** includes **Atlanta Rhythm Section**, cutting overdub tracks and mixing, with **Brendan O'Brien** engineering and **Buddy Buie** co-producing with O'Brien. . . **Anita Spratt** has completed work on her debut album with producer **Brandon Barnes** at **Sound Cell** in Huntsville, AL. . . **George Hamilton IV** was in at **Lamon Sound Studios** in Charlotte, NC, putting the final touches on his upcoming country album, with **The Moody Brothers** producing. **David Moody** engineered, with **Bill Connor** assisting. . . At **Pegasus Studios** in Tallahassee, Epic recording artist **Dickey Betts** has been mixing his latest album. **Jon Mathias** was engineering and co-producing with Betts. . . **Pillowtexans** have been tracking at **OB Studios** in Smyrna, GA, with the engineering guidance of **Harry O'Brian**. . . At Charlotte, NC's **Reflections Sound Studios**, **Robert Plant** and his band were tracking, with engineering help from **Clive Franks** and **Steve Haigler**. . . Producer **Greg Quessel** and engineer **Brendan O'Brien** were on hand at Atlanta's **Soundscape Studios** to work on the latest effort from **The Swimming Pool Q's** for Capitol Records. . . **Mojo Nixon** and **Skid Roper** have been recording a new album with engineer **Don Smith** and producer **Jim Dickinson** at **Sounds Unreel** in Memphis. . . R&B legend **Isaac Hayes** was at Atlanta's **Master Sound Studios** to record theme music for an upcoming movie called *I'm Gonna Git You Sucka*. . .

NORTHEAST

Carolyn Harding has been recording new material for the Profile label at **Blank Productions** in Stamford, CT. . . **Dee Dee Ramone** was recently at NYC's **Chung King Studios** working on a solo album,

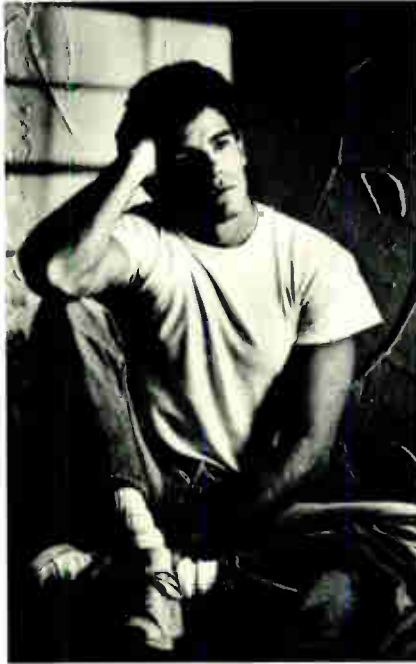
with **Daniel Rey** producing and **Greg Gordon** engineering. . . **Steve Messina** recently returned to **Island Media Studios** in West Babylon, NY, to lay down overdubs on his jazz material. **Gordon Davies** engineered. . . **The Zulus** recently completed sessions for their upcoming LP on Slash Records at Boston's **Syncro Sound Studios**. **Bob Mould** of **Husker Du** handled the producing chores, with **Katsuhiko Naito** engineering. . . At **Kajem/Victory East** in Philadelphia, **Patti Labelle** recorded vocals for the single "I Can't Complain." It was produced by **Raymond Jones** and engineered by **Larry Di Carmine**, with help from **Jeff Ches-tek**. . . Among the artists recently recording at **Dreamland Recording Studios** in Bearsville, NY, were **The B-52's** with **Don Was** producing, **David Cook** engineering and **Martin Kunitz** assisting. . . **Chris Jasper** was programming and recording an LP by artist **Liz Hogue** for CBS Records at **EARS** in East Orange, NJ. **Chris Bertolati** was at the console. . . **Tom Backus** of **PCI Recording** in Rochester, NY, has been tracking and mixing the debut LP for **The Cowpokes**. . . **Liza Minnelli** dropped by NYC's **Sound On Sound Recording** to do some vocal overdubs with the **Pet Shop Boys**. **David Amlen** handled the engineering. . . Recent activity at **Carriage House** in Stamford, CT, included sessions with **Tour de Force**, produced by **Rob Weitzman** and **Danny Muro**. . . Drummer **Liberty De Vito** has been working on tracks for his upcoming solo project at **Sountec Studios** in East Norwalk, CT. **Michael Mugrage** has been producing the sessions. . . **Quantum Sound** in Jersey City, NJ, recently saw CBS artist **Constina Jackson** cutting and mixing her newest album with producer **Reggie Lucas** and engineer **Doc Dougherty**. . . Capitol Records artist **Sweetie G.** has been in at **Power Play Studios** in Long Island City, NY. **Rodney Askew** engineered and **Rob Sutton** assisted on the sessions. . .

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Circle #070 on Reader Service Card

Cove City Sound Studios in Glen Cove, NY, reports that **Ric Wake** has been in to produce a new single for **Taylor Dane**, with engineering help from **Bob Cadway** . . . Recent action at **Unique Recording Studios** in Manhattan includes **Larry Robinson** producing **Eu** for Virgin Records. **Gerry Brown** was at the console with **Rob Von Arx** and **Quinn Batson** assisting. . . **Herbie Azor** has been keeping busy at Long Island's **Bayside Sound Studios** working on the new tracks for **Dana Dane**'s upcoming album. . . The recording of **Oblivion Grin**'s debut album on Wildlife Records took place at **Midnight Modulation** in Saugerties, NY, with **Michael Bitterman** engineering the sessions. . .

NORTH CENTRAL

At **Studio A** in Dearborn Heights, MI, award-winning gospel group **Commissioned** was laying down rhythm tracks for their next album on Light Records. **Michael Brooks** and **Fred Hammond** produced, and **John Jaszcz** and **Randy Poole** engineered. . . **Williams Systems** of Lafayette, IN, debuted its portable Tascam 16-track system on a live remote album project for Rooster Blues Records guitarist **Eddy Clearwater** . . . Two Toronto bands hired **Comfort Sound**'s Mobile Unit to record tracks for upcoming LPs, taking advantage of large room acoustics. **The Phantoms**' session, produced by **Billy Bryans**, took place at an abandoned Toronto movie theater, and **Blue Rodeo** recorded at the McWaters Productions warehouse. . . **The Chenille Sisters** finished mixing their live album at **Solid Sound** in Ann Arbor, MI, with engineering help from **Rob Martens** . . . Drummer **Michael Hanson** recently recorded and mixed some new material at **Smith/Lee Productions** in St. Louis, MO. **Sean McMahon** engineered the sessions. . . At **Paisley Park Studios** in Minneapolis, English band **Pere Ubu** has been mixing their new album for Phonogram. . .

NORTHWEST

At **Alpha & Omega Recording** in San Francisco, **Chico Bennett** produced and engineered the **The Freaky Executives**' debut album for Warner Brothers. . . **James Roger Nelson** has been producing a video album project for **Jimmy Blue** at **Data Tracks Recording** in Cottage Grove, OR, with **John Eastman** engineering. . . Seattle's **Ironwood Studios** recent-

ly saw engineer **Myron Partman** working with recording artists **Keith Anderson** and **Mark English** . . . The engineering on the first live broadcast of a concert from Denver's Red Rocks Amphitheater was handled by **Professional Sound and Recording** of Denver, and featured singer **Joan Armatrading** . . . **Fifth Angel** was in at **London Bridge Studios** in Seattle finishing tracks for an Epic/CBS release, with **Rick Parashar** at the controls . . . **Huey Lewis & the News** returned to **Studio D** in Sausalito, CA, to finish mixing a live radio show for Westwood One from a previously taped concert. **Robert Missbach** was at the controls with **Jim Vereecke** assisting. . . **Rhythm Riot** has been working on their second release for Infrasonic Records at **Dave Wellhausen Studios** in San Francisco. **Dan Levitin** produced, with mixing chores handled by **Ken Kessie** and **Dick Lord-Alge** . . . Recent activity at Seattle's **Crow Studios** includes sessions with Latin rockers **Los Lobos** . . . From nearby Redmond, WA, comes word that **Bud Shank** was recording a new LP for Fantasy Records at **Triad Studios**, with **Tom Hall** at the board. . . Across the border in Burnaby, B.C., **Sue Medley** has been working on her new album at **Inside Trak Studios** with producer **Bill Henderson** and engineer **Gary Tole** . . . The 18-piece **Kicks** jazz band recently completed a direct-to-digital recording at **Spectrum Sound Studios** in Portland, OR. **Michael Klinger** produced the sessions, which were engineered by **Leo Kulka**, with help from **Michael Carter** and **Jeff Dennerline** . . .

SOUTHWEST

At **Inside Track Studios** in Denton, TX, **Sara Hickman** finished mixes on her debut album, with **Terry Slemmons** engineering and **Carl Finch** producing. . . Rio Grande Valley rap act **The Rocket Crew** were recording their debut single for Taurgon Records at **Pro Sound Recording** in McAllen, TX, with **John J. Harper** producing and **Jaime Arroyo** at the board. . . Producer **Chris Christian** was in at **Future Audio** in Dallas to record vocal tracks for an upcoming children's record. **John Carey** and **Tony Rodriguez** engineered the dates. . . **Malcolm Harper** was at the console, assisted by **Deborah Harper**, as **Reelsound**'s digital 48-track mobile unit recorded the 14th annual Christian Artists' Music Seminar in the Rockies in Estes Park, CO. . . **Patrick Keel** was self-producing his new 12-inch single for Oak Lawn Records at **Planet Dallas** in Dallas, with **Rick**

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World Radio History

Rooney engineering . . . At another Dallas studio, **Goodnight Dallas**, engineer **Kerry Crafton** has been busy recording material by **Big Picture** with producer **Gordon Perry** . . .

SOUTHERN CALIFORNIA

Enigma recording artists **Paper Cuts** were at **Valley Center Studios** in Van Nuys recording material for their next album with engineer **Kevin Reeves** . . . Recent activity at Hollywood's **Sunset Sound** included CBS artists **Deacon Blue** tracking and overdubbing their upcoming release.

David Kahne produced and **David Leonard** engineered, with assistance from **Brian Soucy** . . . **The Beastie Boys** were recently in at **Westlake Audio** in L.A. The dates were engineered by **John Sacchetti** and **Jim McMahon** . . . L.A. rock group **17** recently mixed four songs at **Amigo Studios** in North Hollywood with producer/engineer **Conley Abrams** for CBS Canada . . . Producer/engineer **Bob Rose** recently booked a series of sessions at **Music Grinder** in L.A. with local band **Love Razors** for PolyGram Records. Assisting Rose was **Keith Kresge** . . . At **Ground Control Studios** in Santa Monica, **George Michael** was in with producer/engineer **Chris Porter** to mix the live Paris show

for Westwood One . . . **George Tobin** recently purchased an Otari DTR-900 for his studios in North Hollywood. He is using it with his Trident Di-An console to produce **Tiffany's** second album . . . **Keith Cohen** engineered, and **Reggie** and **Vincent Calloway** produced the new **Sharp** album for Elektra Records at **Larrabee Sound** in Los Angeles . . . Saxophone giant **Tom Scott** was in at **Sound City** in Van Nuys self-producing his newest effort for GRP Records. **Gary Lubow** engineered with help from **Bruce Barris** . . . Producer **Richard Perry** was in at **Devonshire Studios** in North Hollywood to overdub vocals with **El DeBarge** and **Michael McDonald**. The project, a Warner Brothers album of songs from the '50s performed by new artists, was engineered by **Mike Mancini** with assistance from **Larry Goodwin** . . .

STUDIO NEWS

Michael and **Cruz Sembello's** San Fernando studio, **Bossa Nova Hotel**, recently went through an extensive renovation and upgrade that included a Mitsubishi X-850 digital 32-track recorder, a Mitsubishi Superstar console and Westlake monitors . . . **The Music Factory** has a new 3,700-square-foot facility in Norristown, PA. The new site includes five rehearsal studios as well as the recording studio and offices . . . **Starlight Sound** in Richmond, CA, has recently received shipment of a Studer A800 MkIII 24-track tape machine . . . **Miller Recording** in Starkville, MS, has expanded to 16 tracks with the addition of a Sony/MCI JH-16 recorder and a NEOTEK Series II board . . . **Nickel Recording** in Hartford, CT, has just purchased a Soundcraft 6000 console for master recording and mixdown applications . . . NYC's **Hit Factory** has purchased two Otari MTR-90 24-track machines for its new Times Square studio . . . A Neve 8078 recording console is the latest acquisition for **Gramavision Recording Studio** in NYC . . . Award-winning producers **Jimmy Jam** and **Terry Lewis** have purchased a Synclavier system with a 16-track Direct-To-Disk recorder for their **Flyte Tyme** studio in Minneapolis . . . **Eastern Standard Productions, Inc.** in Buffalo, NY, has recently completed an expansion of its duplication facility, doubling its real-time duplication capability and tripling its audio cassette loading capability . . . At the heart of Washington, DC's newest 24-track recording and music production facility, **Sound Logic Studios, Inc.**, is a Kurzweil 250 with SMPTE lockup. ■

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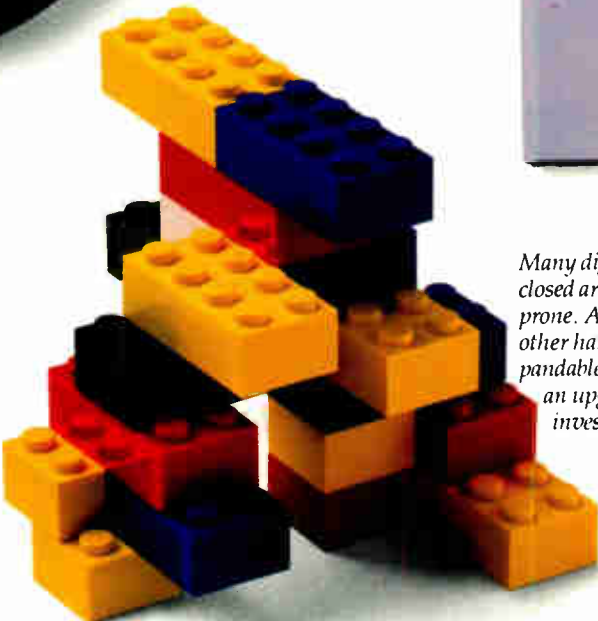


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THE REALITIES OF FIBER OPTICS

Part 2

While soldering irons are used today for splicing interconnection wires (and were used formerly for splicing recording wire), they may become obsolete in light of optical splicing. As we observed last month, fiber optics offers a nearly ideal means of conveying digital data from one place to another. But there are many types of fiber optic cable, suitable for different applications. Let's continue our discussion of this technology.

Fiber optic cable is engineered according to the reflective properties of the boundary. For example, the boundary between core and cladding in stepped-index cable is sharply defined, causing light to reflect angularly; light entering the cable at a great angle might pass through the cladding. With graded-index fiber, the index of refraction decreases gradually from the central axis outward. This gradual interface results in smoother reflection characteristics.

In theory, the internal light reflections are perfect, so any light entering the fiber must leave it. In practice, significant internal losses occur from modal dispersion or pulse broadening. In this respect, stepped-index fiber is inferior to graded-index. Simply put, some light reaches the end of the fiber earlier than other light, due to path length differences in the internal reflective angles. In stepped-index cable, there is delay between the lowest-order modes (those modes that travel parallel to the fiber axis) and the highest-order modes (those propagating just below the critical angle). In other words, reflections at steeper angles follow a longer path length and leave the cable after light traveling at shallow angles. A step-index fiber may exhibit a delay of 60 nanoseconds per

kilometer. Because a light pulse thus is spread over time, data rate must be limited.

Graded-index fiber was developed to minimize modal delay. This is achieved by compensating the high-order mode delay, ensuring that these modes travel through a lower refractive index material than the low-order modes. This means that the high-order modes travel at a greater speed than the low-order modes, allowing all modes to arrive at the end of the

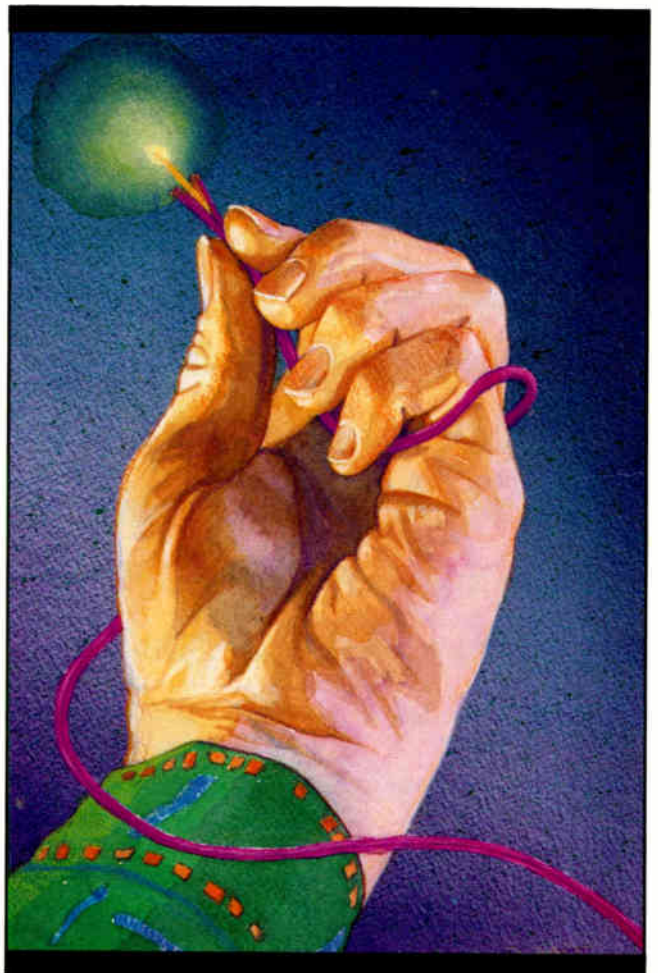


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fiber at nearly the same time. Specifically, light travels faster near the cladding, away from the center axis, where the index of refraction is lower. Light traveling farther from the core is sent in a bending path that enables it to catch up with slower-moving light in the more optically dense center. Consequently, pulses are smeared less and data rate can be boosted. By selecting an optimal refractive index profile, this delay can be reduced to 0.5 nanometers per kilometer.

In either fiber type, the degree of spreading is a function of cable length. Bandwidth specification is proportional to length. For example, a fiber may be specified at 500 kilobits/second for one kilometer. It could thus achieve a 500 kb/second rate over one kilometer, or, for example, a 5 megabits/second rate over 100 meters.

Single-mode fiber eliminates modal dispersion completely. In single-mode systems, the step-index fiber core is so small that only one light path, or mode, exists through the fiber. Because there is only one mode, modal dispersion is eliminated. Single-mode systems often employ laser drivers;

the narrow beam of light propagates with low dispersion and attenuation, thus providing higher data rates and longer transmission distances. In a

Already some system designers have found fiber optic systems easier to install than standard cable.

multimode system using either stepped- or graded-index fiber, wide core fibers carry several light waves simultaneously, often emitted from an LED source. However, dispersion and atten-

uation limit applications. Multimode systems are most useful in applications with short to medium distances and data rates of less than one gigabyte.

Fiber optics lends itself to multiplexing, in which thousands of independent signals may be transmitted simultaneously. One digital bit stream operating at 45 megabits, for example, is interleaved with others operating at the rate to achieve an overall rate of a gigahertz or more. Other types of multiplexing are being researched; one system uses lasers tuned to different wavelengths or colors. For example, ten lasers, each differing by 0.00135 micron in wavelength, are multiplexed by shining the colors through a diffraction grating to combine the colors, and are transmitted through a fiber. At the output, another grating breaks the light back into its original colors and independent channels.

Increasingly, the elements of a fiber optic system are being integrated into small transmitter and receiver modules. This integration simplifies system design and manufacturing. More importantly, the user is freed of any fiber optic concerns. Along with subsystem integration will come complete data links in which everything between one buffer memory and another is integrated. The goal is to make fiber optics as simple to use as copper wire. Already some system designers have found fiber optic systems easier to install than standard cable.

As with any technology involving data protocol, standards are required. In the case of fiber optics, FDDI (fiber distributed data interface) and FDDI II are two standards governing fiber optic data communications networks. They interconnect processors and form the basis for a high-speed network, for example, as a front-end network of workstations and microcomputers. FDDI uses LED drivers transmitting at a nominal wavelength of 1,300 nanometers over multimode fiber with 62.5-micron core. Connections are made with a dual-fiber cable using a polarized duplex connector. It offers bandwidths of up to 100 megabits for up to 500 station connections. The FDDI II standard adds greater flexibility to fiber optic networking; for example, it will allow a time-division multiplexed mode providing individual routes with a variety of data rates.

Fiber optic interconnection pro-

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As may be seen, Bryston takes very seriously the correct functioning and long term reliability of its products.

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vides a number of interesting challenges. Whereas the electrons in an electrical wire easily find their own way through virtually any mechanical splice, the light in a fiber optic cable is more fickle through a transition. Cable ends must be planar, smooth and touching—a tall order considering that the cables may be 100 micrometers across. Similarly, the interfacing of cable to connectors requires special consideration and tools. Fundamentally, fiber and connectors must be aligned and mechanically held together. The problem of interconnection points to a disadvantage of fiber op-

tics—inevitable losses in connections—and the cost of fiber optics prohibits its use of bus structures.

The mention of cost brings us to the most important detail concerning fiber optics. Is fiber optics a reality in terms of cost? The answer appears to be affirmative. Clearly, over distances of several miles, fiber optics is cheaper than wire cable. That was quickly discovered during the Vietnam War when the shortage (and high price) of copper first inspired telecommunications companies to withdraw their copper cables from service and replace them with fiber optics. Although audio studios are not concerned with long distances, fiber optics is still via-

ble. According to some estimates, any run of 50 feet or more that requires shielded copper wire may be made more cost-effectively with fiber optics.

When designing for distances of less than 50 feet, the choice of transmission method is determined by data rate. As rate requirements are increased, fiber optics becomes more affordable. A single 500 Mbit/second-kilometer cable could carry the entire studio's digital audio data. Of course, the hidden cost-effectiveness of fiber optics is its quality of transmission. In that respect, there may be no choice. As recording studios begin experiencing the joys of running 50-MHz lines, fiber optics will be the only practical means of interconnection.

Fiber optics is just the beginning. Many companies are aggressively developing active optical technology. For example, integrated optical circuits, or IOCs, are solid-state devices that provide light-guiding capabilities as well as interaction with the light to provide signal processing. This is made possible by changing the optical path length of the guided light or by separating various modes of the guided light. Phase and amplitude modulation, mode conversion, polarization and switching are some examples of optical signal processing. IOCs made with lithium niobate, coupled to single-mode fiber, already are being used for a variety of sensors. Could that kind of technology ultimately result in a digital optical microphone? Maybe. But that's another story altogether. ■

Ken Pohlmann is an associate professor of music and heads the music engineering program at the University of Miami in Coral Gables. He is author of Principles of Digital Audio and The Compact Disc Handbook, and a consultant to the digital audio industry.

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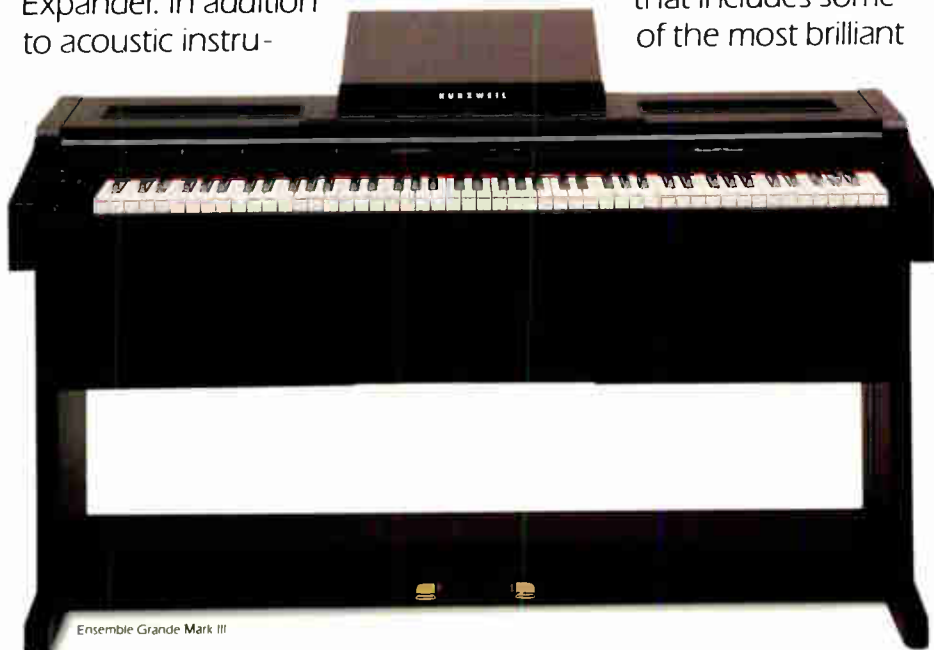
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by Stephen St. Croix

MORE IMPERSONALIZED DRUM IMITATIONS

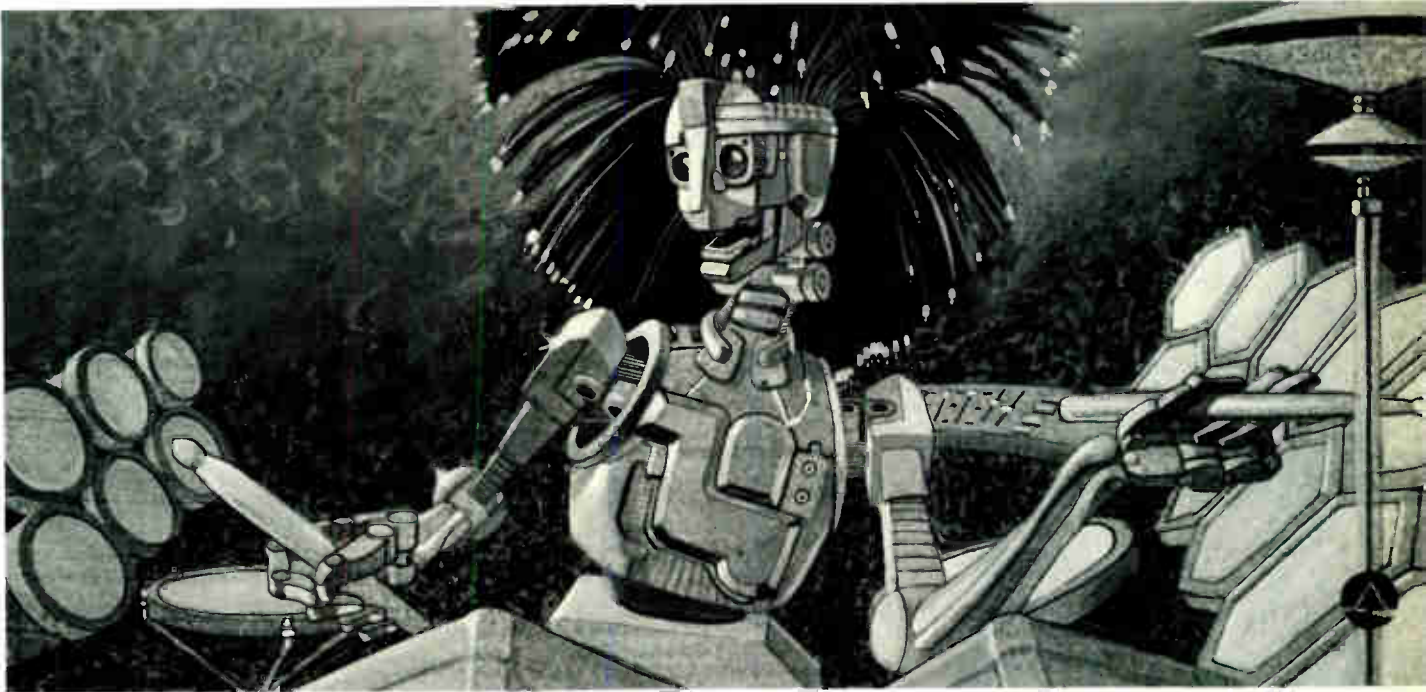
I write this month's column from a resort cabin in Zephyr Cove, Lake Tahoe. Calibration trips like this help me gain a true perspective on what we really do for a living. You know—sometimes you have to get far away from something before you can see it clearly. This *is* far away. If there is any technology here, it is so evolved that it is not visible to my untrained eye (or even to my other eye, which *is* trained).

This time I got to thinking about the existence of one of our 1988 buzz-

words: "humanization." What the hell is going on here when we need the word "humanization" in our professional recording vocabulary? How did we ever get into this condition?

In the June '88 issue of *Mix*, I wrote about my feelings on drum machines in general, but now I would like to focus on the power and problem of MIDified (sequenced) drum tracks.

With the evolution of the newest wave of drum machines, new precision and accuracy are possible. Unfortunately, along with the prizes of tech-



THE FAST LANE

nology come the prices. In this case we gained precision and lost personality. No one I know would ever look me in the face and try to tell me that drum machines sound like drummers. The newest generation of 16-bit (or better) models do actually make sounds of real drums, or at least a real drum being hit *once*. But I have noticed while attending concerts and sessions that drummers do not, in fact, hit each drum *once*, or even twice. Nor do the really good professionals repeat exact 12-bar patterns six times in a single song.

Drum machines love to do this, however; in fact, the accompanying manuals actually urge you to use them in this manner. But it is the resulting lack of warmth that gives rise to the need to humanize.

There is a triple threat waiting out there: three strikes and you are out, to mix metaphors.

The first strike is quantizing. If you can't play the machine with recordable timing, it is best to let another drummer do it. If this is not possible and you must keep a sloppy track, then you must correct the timing by quantizing. Hopefully you are using one of the serious machines that lets you select controlled areas to correct, and offers error windows within which no corrections are made. In any case, you should do so realizing that this is similar to radical surgery—it may be necessary, but it will take a great deal of work to recover.

The second strike is repeating bars or verses. This is an *excellent* way to put a song out of its misery. Any remaining life will instantly disappear as that same little snare accent that was kinda cute in the first bar comes back to haunt you in the second, third and fourth. If you must copy bars to build songs, at least play as many as you can, and copy only the sections (and tracks) you *need* to. Then go over and lay on the accents, so that they are never repeated in the song.

The third strike is the sound itself, or more specifically, too few sounds repeated too often.

Do this, and you're disco.

Though I rave about how we have lost warmth in this new age, I recognize the realities of the situation. Since timing correction and quantizing features on sequencers and drum machines do allow borderline playing to

be corrected to a sort of new wave, cold perfection, it *will* be used.

How I Win After I Strike Out:

Although this is technically cheating, I propose that carefully applied *random* factors can do quite an impressive job of restoring a feeling of live warmth, especially if followed up with a bit of skillful hand editing.

I do not use the internal sequencers resident in my drum machines. With 15 different machines, it is simply too much to learn, and I have seen no evidence that any one of them even *has* a sequencer with enough editing power and general features to be worth learning.

I use only the best computer-based MIDI recorder/editors, like Southworth's *One Step*. This allows me to do extremely careful timing correction (you didn't think that I was saying that only *you* were subject to sloppy drum machine playing, did you?), such as correcting only those events whose timing is outside or inside of certain windows, for example.

After this corrective modification, I often map the tempo in order to recreate that "live drift" which occurs on stage as a natural part of a band drinking, smoking and playing together. This was not taken away by time quantization; it is simply not present in the typical overdubbed modern music recording procedure.

Then I usually selectively randomize timing, just a bit, to warm it up even more. Care must be taken to avoid resynthesizing the sloppiness that you originally removed by corrective surgery.

Last, I hand-tweak the accents to give the right "push." Then some other drum beats are accented to fit the vocal hooks or instrumental highlights. This helps immeasurably to give the illusion that the drums were played by a real drummer, live, and that he actually responded to what he heard the other musicians doing as he played.

That pretty well covers what I do to timing. Now on to velocity. This, if you have velocity-responsive drum machines, is *very* important. If you do not have velocity-responsive drum machines, stop reading now, go out and buy some, and return to this point to continue reading.

I believe that creative velocity editing should follow slightly different principles than those for timing. First,



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a tiny bit of randomness is again used. As before, this can produce impressive results if it is done with care and restraint. Then I hand-draw velocity curves over the bars of interest, and again over the entire song. This is usually done on separate tracks, and then experimentally summed with the original, so that any bad ideas may be painlessly removed. Then, as before, individual accents are put in to coincide with the context of the tune itself.

I have also developed patterns that I apply separately to the snare, ride and other drum tracks for the sole purpose of simulating an often forgotten feature of today's popular top drummers: most (not all) of them have two hands.

Though the timing difference in a left- and right-hand snare hit may be minimal (or at least analyzable), the character of each hit is usually audible, both in velocity and tonality. Dealing with this is crucial if you wish to kill the machine feel.

Normal snare work must be handled properly. (I made a videotape of a favorite drummer and watched carefully as I listened.) Rolls are special. This is obvious the first time you try

one on a drum machine. There are typically at least four different repeating velocity patterns in a good rock roll: one dominant, slow, smooth rise

**Though I rave
about how we
have lost warmth
in this new age, I
recognize the
realities of the
situation.**

and fall pattern, with other shorter, more elaborate patterns that are significant components in the actual "style" of a given drummer.

I have developed and stored a library of these pattern velocity and timing sets, for application to selected sections of my work.

The last of the promising areas deals with the actual *sound* of the drums themselves. The most direct approach here is to get a sampling drum machine and build a library of several (not two, Roger Nichols) hits on each drum. Then, if you have recorded your snare track with velocity, or if you have generated a velocity snare track as outlined above, you assign the MIDI drum numbers of your alternate snare hits to the snare track's velocity information. Typically this would be done with the hardest-hit snare samples being played back by the recorded snare hits with the highest velocity, and so forth.

The drawbacks here are that you must take the time to build a comprehensive drum sample library for each drum that you want to do this with, and you will probably need *several* high-quality sampling drum machines. This technique really uses up drum channels.

A more synthetic (but useful) approach uses only two identical ma-

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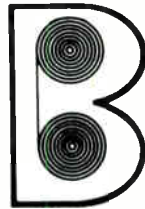
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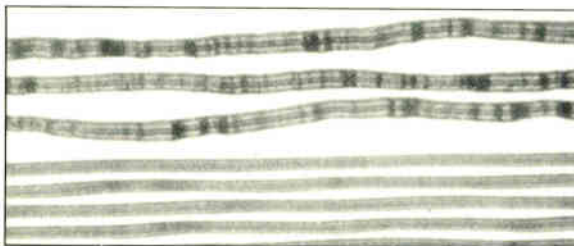
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chines. If you have sampling machines, make two samples of your snare; for example, one normal and one hard, and load one into each machine. Then, after you have recorded the drum MIDI work and done the above humanizing, copy the snare track so that you have two duplicate tracks. Then alter the velocity information as required to crossfade between the two snares.

Mix the two snare outputs together, and consider it one monster layered snare. You now have 128 mixes of this snare set available to you, under MIDI velocity control. This can be quite expressive! If you do not have sampling machines, but you have a couple of identical ROM-based machines, you can still divide up the snare tracks as before and send one to each of the machines. Again, mix the two snare outputs from each machine together to form one snare. This time, however, you hand-edit the *timing* on one of the tracks, very slightly. Since the samples are exactly the same in the two machines, these small changes in tempo (which are actually small changes in time, or delay in one channel) will actually flange the snare in a totally controllable fashion.

This will not be a swept flange, of course, but a completely controllable and predictable change in tonal character—exactly what we are after. The bigger the timing difference between the two tracks, the more hollow and full the snare sound. Very useful!

The actual depth of this effect is controlled by the mix of the two outputs: if mixed at equal level, the effect is most pronounced, while a decrease in the level of either output lessens the depth of the effect. Those of you who are awake may realize that adding a *velocity* track to either of these channels makes dynamic control of the effect intensity possible.

I have several tunes currently on the air using these secret tricks, and I openly share them with you now, because my editor told me to. Try this stuff out—it really works.

I listen to your work as I drive around in my car. I would rather hear it like this than with the default performances of those mindless machines machines machines. ■

Stephen St. Croix has a drum machine in his car.

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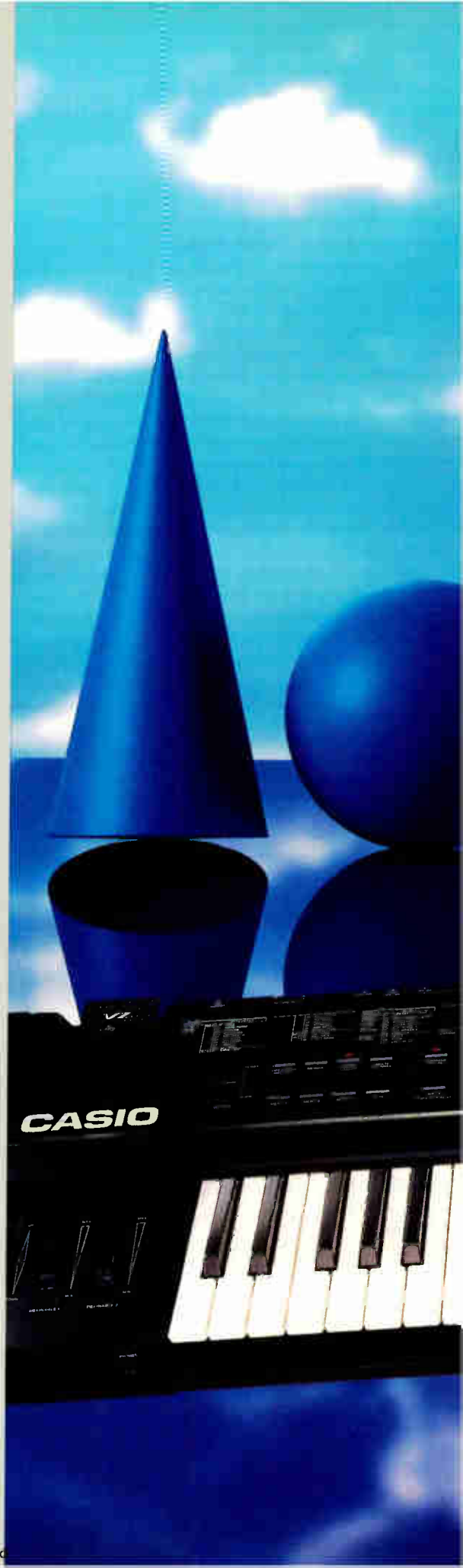
velocity split and positional cross-fade capability. You'll swear you're playing a MIDI stack instead of a

single keyboard. As a MIDI master keyboard, the VZ-1 can be split into 4 "zones," with separate send and receive channels for each note range.

The VZ-1 comes complete with 64 sounds and 64 Operation Memories, plus a free ROM card (RC-100) with an additional 128 of each, for a total of 384 timbres out of the box. Optional ROM cards with additional sounds are also available. And with an optional RAM card (RA-500), you can store up to 64 sounds and 64 Operation Memories of your own.

And finally, to enable you to effectively manage all of its programming power, the VZ-1 has a wide, backlit LCD graphic display, making editing quick and intuitive under any lighting conditions.

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by Mel Lambert

RECORDING MEDIA FOR THE '90s

In our forward, headlong rush toward the future, we can often forget from whence we came. No, I'm not going to indulge in a succinct treatise on paleontology and its influence on the ballpoint pen; I'd like to consider the enormous debt that the recording and production industry owes to the chemical industry and that unsung hero, the material scientist.

As we reach to caress the transport controls of our latest digital 32-track, or glance admiringly at the wondrous

patterns racing across the controller CRT of our digital synthesizer, it is easy to forget that without a dedicated bunch of scientists slaving away in chem labs throughout the world, our industry would not have been able to develop so rapidly.

We are all familiar with the history of sound recording and how the work of early audio pioneers helped to put phonographs into the hands of an eager public. Advances in wax cylinder and platter systems brought the



Time has made a considerable impact on technology. This Ampex Mark IV—the first practical VTR—was considered revolutionary in 1956, despite its crude monochrome images and behemoth cabinet. A young engineer, Ray Dolby, played a significant role in its development.

possibility of mass production, where the realities of consumer merchandising became a financial impetus for the fledgling record labels. Developments in vinyl compounds led to the advent of microgroove 33- and 45-rpm formats which, in turn, fostered a revolution in cutting lathe technology as the public hungered for enhanced, high-quality stereo playback.

And in the studio, the advent of 1/4-inch mono tape machines from Ampex and 3M in the late '40s and early '50s literally revolutionized the way we could edit together various takes, or fabricate a performance from composite elements recorded on different days and at different facilities. As the tape machine manufacturers began to experiment with more tracks—initially four on half-inch, followed by eight on 1-inch and then 16/24 on 2-inch—Ray Dolby and his teams in London and San Francisco, and David Blackmer's group at dbx, came up with some elegant solutions to that nagging, inherent problem of additional analog tape tracks: tape hiss! We now have access to blindingly sophisticated digital multi-tracks capable of printing 24, 32 or even 48 tracks on half- and 1-inch tape, which then allows us to edit the results with a razor blade. And just around the technology corner are affordable random-access editing systems that owe more to the minicomputer for their ancestry than to a trusty ol' Ampex AG-350 or 3M M56 reel-to-reel.

However, all this technology would be useless without a suitable storage media: lacquers in the case of disc mastering, and tape and hard disks for the modernists. We often take it for granted that all analog tape formulations, for example, are alike. Sure, we realize that they need different bias level and high-frequency EQ adjustments, but all formulations are pretty much the same, right? Don't you believe it.

To put it another way: what makes you stick religiously to one particular brand of tape over another? You certainly don't want a repeat of that ugly binder problem that tape manufacturer "A" experienced two years ago, which—according to the ultra-reliable industry grapevine—resulted in multi-track masters for the last Starship project literally erasing themselves.

There is a good rationale for mak-

ing the choice of one type of analog or digital tape over another (and, come to think of it, the choice of the kind of floppy disk for our samplers and automation systems). The real reason we go to such lengths to specify one brand of analog or digital tape over another is that we trust the firm's chemists and technical engineers to have developed a formulation that is not only tailor-made for the professional job we demand of it, but is also the very best that state-of-the-art technology has to offer.

By their very nature, hard disk drives and related media do not take kindly to prying eyes.

That brand-new reel of 2-inch tape is more than gamma ferric oxide bonded to a 1.40-mil thick sheet of polyester wound around a plastic hub bounded by aluminum flanges! It represents a multimillion-dollar investment by one of the major tape manufacturers, whose undaunting pursuit to develop and market the "perfect" recording medium has resulted in the marvel of chemistry that you see gracing the transport in front of you.

What we are buying is confidence that the material we've spent hours in the studio to record, overdub and remix with all the sonic blenders and benders at our disposal, will come back every time we press the rewind and play buttons. And we don't want any unnecessary distortion, frequency-response anomalies or other strangeness to mar the sound.

Without the continuing and relentless pursuit of that last possible decibel of dynamic range, that extra decimal point in the distortion and IM performance, or that extension of the HF response at mid/high record levels, we would be severely lacking in the kinds of tricks we can pull with both analog and digital multi-tracks, with or without elegant noise reduction systems.

The downside, however, as we move increasingly toward all-digital editing systems and recorders of the

not-too-distant future, is that we will have to take the recording media more for granted. By their very nature, hard-disk drives and related media do not take kindly to prying eyes; keeping dust and other airborne horrors from coming between the magnetic platters and the air cushion/head assembly must be sealed from our examinations. Even floppy drives and backup optical WORM drives need a reasonably well-controlled environment in which to function reliably; once again, it makes sense to treat them as "invisible" media in the studio.

But if we can no longer run the material through our hands, and the need for extensive machine alignment is all but removed (when was the last time you aligned the floppies in your automation computer?), how are we going to keep in touch with changes in the technology? After all, when a tape manufacturer offers us a sample reel of a new analog or digital tape, we have machines to carry out A/B comparisons and test equipment that can zero in on performance levels.

Most of us are familiar with the spec lingo, and can at least make an intelligent guess about how the numbers will be reflected in sonic advantages. But how are we going to judge different brands of removable optical disks, or come to terms with the new jargon of these computer-derived media? There will also be new techniques for handling magnetic and optical media. How do you ship a 20-gigabyte magneto-optical erasable platter across town for a jingle session? What temperature and humidity conditions should be provided in the storage environment? Do these media have a finite shelf life?

Information is going to have to become freely available. All the developers of random-access editing systems will have to develop active lines of communication between their customers and the media manufacturers' R&D departments. Digital technology is the wave of the future; let's go surfing with a confidence in the future materials used to capture our creative endeavors in the studio. ■

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

Before After



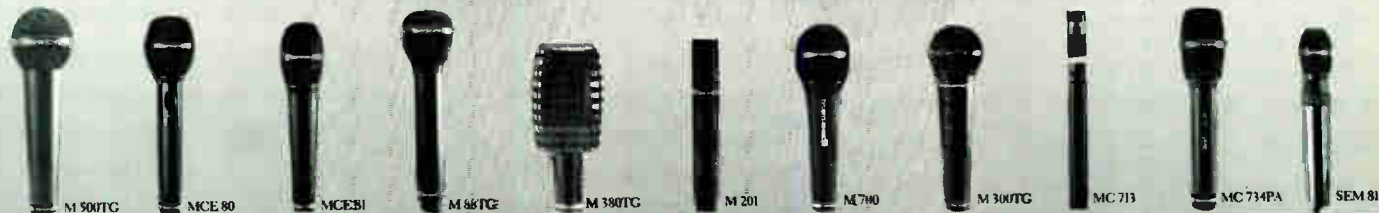
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The TEC Awards, held November 3 in Los Angeles, raised over \$28,000 for deafness research and audio engineering scholarships. Besides the 19 winners in the technical, creative and institutional fields, Les Paul and the late Bob Liftin were inducted into the TEC Awards Hall of Fame. See our January issue for more details.

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PREMASTERING THE PROFESSIONAL WAY



Some Tips & Pointers from Top Mastering Engineers

by Linda Jacobson

The best mastering engineers are the first to admit they're not miracle workers. The quality of a final CD or cassette master is dependent upon the quality of the original multi-track recording. As Denny Purcell of Georgetown Masters puts it, "You can't make a silk purse out of a sow's ear. Just because something's on a CD doesn't make it sound great."

A mastering engineer works not only for, but *with* the recording engineer, producer and/or artist (whoever has creative control) to produce the final master. When you bring your tape to the mastering studio, the folks there will engage in what they call "run down": listen to your tape in their studio, change a few things—

modify EQ, boost levels at certain places, raise vocals a bit, refine fades, remove noise—whatever's required to smooth out the rough edges and prepare the tape for the CD plant or cassette duplicator. Later they'll transfer it to the "standard" PCM format and perform digital editing and formatting.

Before all this happens, though, it's invaluable to have a premastering session at the mastering studio, with an engineer who's experienced in creating CD, cassette and LP masters. Run-down time will run less, and you'll end up with the best transfer of your master for your chosen medium.

To provide you with some pointers that should help put your tape in good shape for CD, LP or cassette mastering, *Mix* spoke to the following

mastering experts:

- Jim Bosken, president of QCA, manufacturer of records and cassettes with a record/cassette mastering room that sees all genres of music. In business in Cincinnati for almost 38 years, QCA services independent labels and artists almost exclusively, also acting as a CD broker.

- Steve Hall, who, with Gary Rice, left MCA six years ago to open Future Disc, an independent mastering business in Los Angeles. Future Disc handles mostly pop, R&B and rock releases, with major labels as their major clients.

- Ken Lee of Sonic Arts, a disc mastering and CD/disc/cassette premastering facility in San Francisco. They mostly handle custom work for independents from throughout the Northwest in all genres, particularly, notes Lee, "'underground,' reggae, country, lots of 12-inch dance singles and jazz."

- Denny Purcell, VP of Nashville's Georgetown Masters, a two-room editing/CD prep/disc cutting facility that mostly handles major-label projects (40% of what's on the country charts has been cut at Georgetown). The place opened three years ago with a cutting suite/CD room and has added an editing suite that features "the only [Sony] DAE-3000 [digital editor] in this part of the country."

- Jim Shelton, owner of Europadisk in downtown Manhattan, who was chief engineer/manager of New York's MasterDisk until he went into business on his own ten years ago. Today Europadisk provides CD premastering, digital transfers, LP pressing/manufacturing, and also produces cassettes and CDs for major and independent labels putting out "rock and roll, pop, dance music, classical and lots of jazz."

Many mastering studios, like the ones above, will create CD masters from any type of tape you give them. If you've done some "homework," this mastering process can occur quickly (in a couple of hours) and relatively inexpensively. Georgetown Masters, for instance, can take a tape in any digital format, transfer the program material onto pre-stripped (time coded), ¾-inch videotape (using Sony DMR-4000 video decks), dumping the digital data, just as it is, to a Sony PCM-1630. "That's assuming it sounds exactly the way they want it to sound," points out Denny Purcell. "Then it only takes two or three hours to do a CD job. When we put on a pre-stripped tape, all we do is put down the frame-

Photo: Denny Purcell at Georgetown Masters in Nashville.

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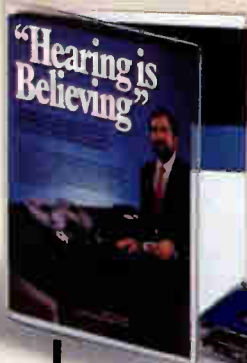


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accurate SMPTE start and stop times. We also print out a sheet, called a 'DTA,' for the digital tape analyzer that Sony makes: we play the whole tape on the DMR deck, and at the end the DTA shows where there is any error correction, if there are any holes or dropouts, or averages. When the tape leaves us, it's with that sheet, so anybody who gets it knows that the tape left here in fine shape.

"But often there are many simple things we have to do because the client hasn't done his or her homework," continues Purcell. "Our rate for a CD prep job is based on two hours in the editing room. Quite often a guy calls and says he knows it's not more than two hours' transfer time. He comes in at 10 a.m. and at midnight he's still there—there are balance problems, EQ differences, all sorts of things. To prevent that, a lot of the CD prep, premastering work can be done in the recording studio."

Such as?

When Recording Basic Tracks . . .

Preparing your master tape for CD or cassette starts with your original recording. Steve Hall (Future Disc) says, "First, become familiar with the studio monitors you're using by listening to material you like or know very well. This is really important, because it will reflect what your master tape will sound like based on how you relate to those monitors.

"When recording, make sure the individual tracks and instruments on your multi-track are as quiet and noise-free as possible. Remove all hums, ticks and pops from those tracks, because that will create fewer headaches all the way along the line."

Choose the Appropriate Master Tape Format

When getting ready to mix, you'll need to decide on the master format you'll use. Remember that mastering facilities such as Europadisk like to see the real thing, not some copy. Jim Shelton notes, however, that if the tape is digital, a pure D-to-D clone is fine, but an analog copy won't do.

Ken Lee of Sonic Arts states, "We can transfer from anything to anything, even make a CD from a cassette master. Any reel-to-reel format works— $\frac{1}{4}$ -inch or $\frac{1}{2}$ -inch, 15 or 30 ips, Dolby SR or not. We receive a variety of digital source masters. PCM-F1's popular right now, with a VHS or a Beta companion for storage. [Sony] 1630s

generally come in on a $\frac{3}{4}$ -inch U-matic. The videotape/F1 formats are rarely striped with time code, so we stripe all final CD prep masters, and put two minutes of silence in the beginning as leader and one minute as lead-out.

"People can supply different tapes for their master," adds Lee, "like three songs on a $\frac{3}{4}$ -inch U-matic, two songs on a DAT and four songs on a PCM-F1. We'll perform the assembly and maintain continuity from all the different sources. Engineers should choose a format they feel comfortable with."

The aforementioned Sony 1630 format is the same used for Future Disc's CD and cassette masters. Steve Hall identifies it as the "most expensive for mixing your 2-track master, mostly because renting a 1630 system for your studio runs about \$400 a day—200 for the machine, 200 for the processor. [Also, a digital editor is required to assemble your master. However, videocassettes do cost less than analog tape stock.] If you start with Sony 1630, you can remain in the digital domain throughout the entire mastering process. Other digital formats are the reel-to-reel Mitsubishi X-80 or X-

86 or Sony 3202. These will give you similar results and will be a little easier to use because you can do razor-blade edits in the studio while you're mixing."

In Hall's opinion, "The best-sounding format is a 30-ips, $\frac{1}{2}$ -inch analog master. Close to 75-80% of our material comes in that way, and we handle the transfer to 1630. We charge \$200 for a flat copy to the 1630. You can also use $\frac{1}{4}$ -inch analog; a few people still use it on hot-rodged machines and they sound pretty good, although $\frac{1}{2}$ -inch is quite a bit quieter than $\frac{1}{4}$ -inch. And some people are getting good results using Dolby SR with these tapes as well.

"The last formats to consider in mixing," advises Hall, "would be F1 or R-DAT. The F1 format is now obsolete, and I feel R-DAT is superior in many ways, including sound. These formats will enable you to make a relatively high-quality digital master at a minimum cost."

Mixdown & Editing: A Primer by Steve Hall

"The level you record your master at is up to you, and should depend on



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12-inch single, for instance, you probably want to insert three or four seconds between each tune for cueing time. On an album, I like to make the tracks flow musically from one to another. Certain types of songs with similar style can be edited right up against each other. If you're going from an up-tempo cut to a ballad, you might want to insert four to five seconds between those cuts.

"For CDs, pay special attention to fades. Be sure your fade is smooth and goes all the way to the end of the fade, and does not cut off at low level, because this will become relevant on your CD and in mastering we'll have to correct that.

"If your master is on X-80 or X-86 or Sony 3202, I recommend placing striped tape—time coded—between the cuts. Because this is digital tape that's been recorded on with the input level on your machine turned off, it contains zeroes, what we call 'digital black,' on the digital track, and time code on the control track. This will allow you to edit right up to the downbeat of the tune, as long as you have this time-coded tape preceding it.

"I recommend leader tape with analog tape, so we can fade the hiss away

more easily during mastering. People used to use biased tape between cuts, but that's no longer quiet enough for CDs. The exception is a live music or orchestral project, or maybe a pipe organ, where you might want to leave the natural ambience of the hall or the room between the cuts."

(It's important to note that mastering houses *can* and *will* take care of every little detail for you. Bring them any 2-track tape that's not properly EQ'd, with unmatched levels, and the mastering house will work with it, creating three separate masters if required [one for each end product format]. They'll handle EQing, etc., adding compression/limiting if required for LP or cassette, or will stripe and PQ-encode the digital CD master—even if the original tape provided is an analog cassette!)

Don't Forget Alignment Tones

Send in a tape with no tones, and the mastering house is forced to align their machine to a standard reference tape that doesn't know your setup from a hole in the wall. Jim Bosken points out, "Analog [recording] machines vary from day to day. If your machine was down 3 dB at 10k the

day you did your mix, your cassettes will sound dull. But if your machine is down 3 dB at 10k that day, and you put on alignment tones, they will also be recorded down 3 dB. When we align to your tones, we would turn it back up to zero, and you end up with a tape that sounds like what you expect to hear."

Future Disc appreciates engineers who supply analog tapes with a set of tones consisting of 30 seconds each of 1k, 10k, 15k, 100 Hz and 50 Hz. "This allows the mastering studio to align our playback tape machine to match the machine you recorded your master on. A lot of tapes come in without the 50Hz tone on the bottom end, and in today's music there's a lot of information down there below 100 Hz," explains Steve Hall. "The 50Hz tone gives us a better picture of the response of the machine that you recorded your master on."

On a single recording project that uses several engineers, producers and studios, Hall recommends, "You make a set of master tones that all studios and engineers align to for consistency in your master tape. This will keep the level and EQ and especially the azimuth of the recorders the same

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Customer *Quartet Records - 461 Hamilton #7, Palo Alto, CA 94301*
 Technical Contact *Kenneth Lee & Steve Actis*
 Phone Number *415-957-9470* Date *8/2/88*

Program Title *"Excursion In Blue" John Hardy*
 Program Number *G-1005*
 Total Number of Tracks *7* Total Program Duration *51:26*

Subcode Edit on audio channel 1? Yes No

Track No.	Index No.	Description	ISRC	Pre-emphasis	SMPTÉ Start hr min sec frame	SMPTÉ End hr min sec frame
		Lead In			0:00:00	2:00:00
1	1	<i>Excursion In Blue</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2:00:00	09:18:20
2	2	<i>My One And Only</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	09:26:25	15:22:00
3	3	<i>Paul's Pal</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	15:29:00	24:08:00
4	4	<i>Soulless</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	24:14:25	29:31:00
5	5	<i>How Deep Is the Ocean</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	29:34:27	38:27:27
6	6	<i>Nuke City Blew</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	38:34:18	44:37:15
7	7	<i>Stiff Swift</i>		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	44:42:28	53:25:18
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
		Lead Out			53:25:18	57:30:20

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Along with your tape, send plenty of information about what's on it to the mastering house. It facilitates the creation of logs like this one from Sonic Arts of San Francisco; they send it out with the finished CD prep master for use by the manufacturer in the laser mastering stage.

throughout your master."

Jim Shelton agrees that azimuth accuracy is the most important benefit of using alignment tones. He tells his clients to "start out with 1 kHz or 700 Hz—either one works—and then 10 kHz and 100 Hz. It's interesting to have a second and higher high frequency tone; in addition to 10, you might use 15 kHz, or 12, and then at the low end in addition to the 100 Hz you might use a 50 Hz or a 30. The higher the frequency, the more accurate you can get the azimuth."

Ken Lee may concur, "The test tones from the studio will be the foundation from which we set all the machines and electronics in our room," but he doesn't hold them as gospel. "We still have to listen to the program to make evaluations, listen to the dynamics and the frequency response of the program, ask the producer or artist whether that was what they had in mind, especially since we're dealing with different monitoring systems. I have to confirm with them that that's what they heard in the studio; if not, why not, and what are the differences."

Although digital tapes don't require alignment tones per se, Lee notes that digital masters coming into Sonic Arts usually include a level tone "to give

me the left and right perspective and make sure everything's up center."

DAT Considerations

Whether mastering for CD or cassette, R-DAT is "the best real reference copy a producer and engineer has ever had, as to exactly what his product sounds like. Most of the record companies and producers I work with have DAT decks; most of the producers get DAT copies to see what their CDs should sound like," says Denny Purcell. Approximately 20% of Georgetown Masters' business comes in on DAT, which gets transferred to the 1630 for editing, or transferred to the Sony PCM-3402 DASH machine. Some engineers who go R-DAT, notes Purcell, "like using the 48k sampling rate, but you can't edit 48k—yet. I've talked with Sony about that, and they say they're developing it within a year. But with the PCM-3402, if a client likes to work at 48k, you can electronically edit between the two machines at 48k. Otherwise it has to be 44.1, or you have to take a 48k tape and change the sampling frequency of it with another box. And who wants to do that? You lose bits."

"All DAT tapes should have a 1kHz tone for reference level," adds Steve

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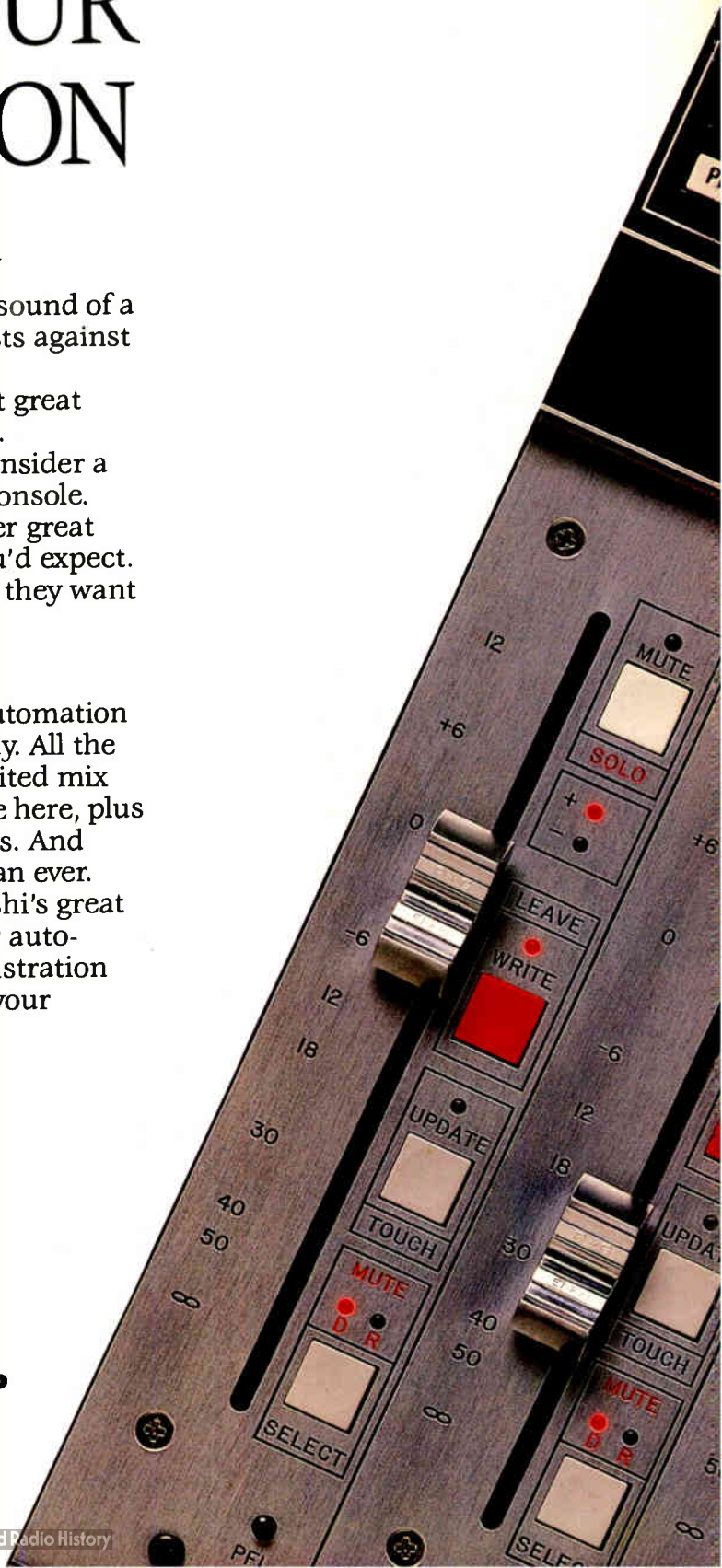
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Hall. "A full set of frequency response tones is not necessary because the machine is always flat. There's no curve, no roll-off or head bumps to worry about. They're absolutely flat until you get up to about 20,000 cycles. But R-DAT should be transferred to a 1630 format for the best results."

Paperwork—Please!

"A lot of people don't realize how important cue sheets are," bemoans Jim Bosken. "If I'm cutting five or six jobs every day, and someone takes the time to neatly fill out a sheet, it makes my job a lot easier. It also impresses me that whoever did this mix cared about it enough to give me the proper information to do the job right. There's nothing magic about a track sheet. Just tell me what's on the tape, starting with the tones and what frequencies and levels they're at. Give me a list of the songs in the right order and the times of each one; let me know where the side breaks. Some customers go as far as to say, 'Two minutes and ten seconds into the first song, there's a loud vocal peak' or 'Three minutes and 20 seconds into the fourth song, there's a guitar solo at extremely loud levels.' The more you

tell us, the more we have to work with from the beginning, and the better the job we can ultimately do."

Europadisk's Jim Shelton doesn't always look for cue sheets from his customers, noting that leadered analog tape shows the beginning/end of each song, but says it would be helpful if the recording studio identified any serious head bumps on the bottom end. However, a digital tape master gives no visual indication as to where selections start. For that reason, Europadisk requires cue sheets for digital masters, "with some kind of rough timing so we know the beginnings and ends of things."

Documentation from the "better" recording studios, adds Ken Lee of Sonic Arts, also includes "overall program length, whether or not it has noise reduction, any anomalies within the mixes or between mixes, and any level imbalances between left and right channel, which we then compensate for with the approval of the producer. If there's an imbalance, it may be because the producer wanted that for an effect. If you send tapes to a place that you're not familiar with, and you find that something's changed, it's probably because you

had something as an effect and somebody there thought, 'That can't be right,' and corrected it for you."

Prepping for CD vs. Cassette

For the most part, all involved say if you make your product as clean and "together" as you would for CD, you'll be in good shape for cassette mastering (CD being the most critical due to the lack of noise on the end product). If you're going to do a CD, you might prefer mixing to digital, but that's not to say if you already have a good-quality master tape on an analog format that it won't make a good CD. It could.

Other than that, at Georgetown (which handles cassette masters as they do CDs, transferring the program material to 1630), Purcell notes that a "cassette master would have approximately a minute break between the A and B sides of the program, where the CD would just have the normal flow."

One More Thing . . .

While preparing the goods for the mastering house, the most important thing is "to be thoroughly familiar with how your tape sounds, in a lis-

—CONTINUED ON PAGE 114

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by Tony Thomas

DR. TOBY MOUNTAIN

COMPACT DISC MASTERING AT NORTHEASTERN DIGITAL

Just a few years ago, putting out your own CD was unthinkable. Not only was the cost prohibitive (CDs were selling for about \$20 then), but you had to wait in line to have them manufactured at overseas facilities that were drowning in back orders. What a difference a few years make. Now you can have CDs produced quickly and affordably. Plants that have come on line in this country in the past couple of years are eagerly competing for work, and CD production prices are

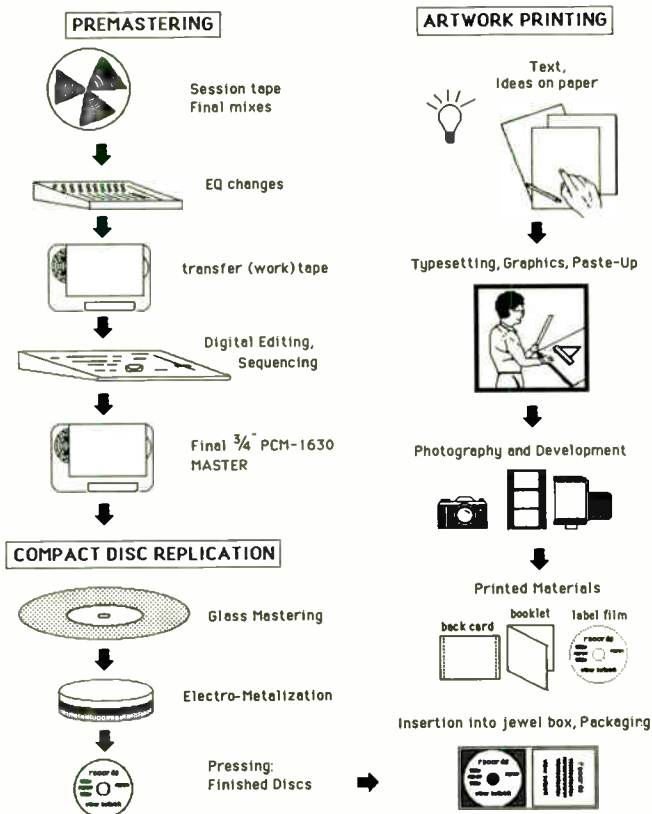


dropping rapidly. Consequently, independent labels are jumping into the CD business headfirst and making money in areas ignored by the majors. Such labels as Rounder and Rykodisc are reissuing gems from the past, as well as backing a wide variety of new and esoteric artists.

One of the pioneers of the CD pre-mastering business is Dr. Toby Mountain of Northeastern Digital Recording, a company that specializes in quality CD mastering for small independent labels. His client list includes Arlo Guthrie, Frank Zappa, Richie Havens, the Kingston Trio, Mission of Burma (for whom he produced the longest CD ever made at 80:05), Polaroid Corp., Bose Corp., Wang Laboratories, NFL Films, Aircraft Music Library and Omnibus.

Mountain began his career as a

Left: The steps in the production and manufacturing of a compact disc. Above: Dr. Toby Mountain with Sony DAE-1100A digital editor and custom Troisi console in the main editing room at Northeastern Digital Recording.



trained musician. In fact, he holds a PhD in composition from UC Berkeley. He cut his teeth in digital recording and signal processing while at Stanford University. After a teaching stint at the University of Connecticut, he started Northeastern Digital Recording in 1984, in the infancy of the CD boom. We caught up with Mountain as he was beginning another day at his Shrewsbury (near Boston) studio.

Mix: How much has the cost of producing CDs gone down in the last year or so?

Mountain: In the past year-and-a-half,

the price of raw discs has gone from \$2.25 to between \$1.25 and \$1.40, a drop of between 30% and 40%. Originally CDs cost over \$3 apiece to produce, but as a result of the competition, the price has edged down steadily. The mastering phase of CD production has stayed about the same. To just sequence tunes on a rock or jazz project costs about \$500 to \$600. For a classical project requiring quite a bit of editing, it may cost \$1,500 to \$2,000.

Mix: Can you break down the various steps of producing a CD by cost?

Mountain: We charge \$85 an hour for editing, which is reasonable compared to New York or L.A. The cost for

a glass master and injection molding parts is \$500 to \$1,000, although, we've found that several plants are waiving that fee if you do a thousand or more discs. The other cost is for the actual manufacturing. That ranges between \$1.25 and \$1.50 per disc, depending on the plant. Then you have to figure in artwork costs and the cost of jewel boxes, which is about 25 to 30 cents. A complete project will run between \$4,000 to \$5,000 for a thousand discs.

Mix: How can a recording studio help keep the costs down on a CD project?

Mountain: First of all, the engineer should get the sound as clean as possible. We love to have tapes come in that sound great, so we don't have to do a lot of post-EQ work. Secondly, there is quite a bit of confusion about the various video-based recording units on the market, such as the F1 and the 501. The tape should be checked to make sure that the mix was recorded properly and the video machine is working properly. Care must be taken to assure that the tape is logged correctly, especially if there are several mixes on one tape.

Mix: Are there any inexpensive methods of editing a tape besides using a digital editor?

Mountain: Some people have tried to sequence songs on the F1, but unfortunately, because of the way the signal is recorded on the F1, it can be done with only limited success. There will usually be some type of pop or click on the tape. With the U-Matic machine and the 1610 and 1630 processors, you don't have that kind of problem.

Mix: What about the new CD-3 format? Do the discs cost that much less to produce?

Mountain: The raw CD-3 price is just under \$1. So it is not that much less from that standpoint.

Mix: Is it practical for small labels working on tight budgets to do their own CDs?

Mountain: Depending on the recording and production costs, you probably have to sell 2,000 to 3,000 units to break even. If you sell less than that, you're probably not going to make any money. There are also hidden costs, such as royalties, that you have to figure in. We have a lot of independent-label clients who are concerned with the number of tracks we put on a CD, because that adds to the royalties that have to be paid.

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Mix: What do you think about the THOR system announced by Tandy Corp.? Will that make real-time CD duplication and mastering a possibility for recording studios?

Mountain: My understanding is it will be a recording format, so I don't know how popular it will be for mastering. As far as real-time duplication, I think that the THOR optical format will be very popular. The THOR format could do small runs of CDs very effectively.

Mix: How profitable is it to operate a CD premastering facility?

Mountain: We've been doing very well. In fact, we have more work than we can handle. I think that is partly due to the fact that there is a lot of work to be done. The business is very exciting and everyone wants to do a CD. It is also because we do very good work, and that passes through the grapevine. We enjoy doing all types of music, and we prefer working with smaller independent labels like Ryko-disc, Rounder, Newport Classics, Northeastern Records and Folk Era Records. About 20% to 25% of our

It is possible that DAT may be used for mastering one day. It seems to be a very robust system, although the biggest problem is putting time code on the tape.

business consists of remastering discs from older analog tapes.

Mix: What type of equipment do you use?

Mountain: We have two rooms, and both use the Sony Digital Editing System. In addition, we have a large amount of outboard gear such as reverbs, equalizers, analog tape machines, cassette machines, DAT machines and processors. We also have a custom-built 12-input board with EQ.

Mix: Have you seen a lot of projects

that have been recorded digitally at home?

Mountain: We are seeing a fair number of people who do a record with an F1 and some MIDI gear in their basement. A good musician with reasonable gear can produce something at home that is close to studio quality. It is an interesting trend in the music industry.

Mix: What formats are being used for mastering?

Mountain: Most of the tapes come in on 1610 or 1630, DAT, F1 or analog. Occasionally we'll see a Sony 2-track DASH tape, but not very often. A lot of studios are starting to use DAT as a mixdown medium, especially Boston and New York studios.

Mix: Where do you think CD mastering is headed?

Mountain: We may be moving to different formats. It is possible that DAT may be used for mastering one day. It seems to be a very robust system, although the biggest problem is putting time code on the tape. The hard disk may also play a role in disc premastering, although I don't see it as the final solution. The optical disc may be another option to replace tape. That will result in less expensive hardware and editors. No matter what is produced from a technological standpoint, it must be ergonomic in design so that people can work with it happily. ■

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Tony Thomas has been involved in broadcasting, recording and publishing for over a decade. He is managing director of Target Communications International, a full-service ad agency, broadcast production firm and MIDI-based recording studio in Southern California.

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by Bruce C. Pilato

BLUE WAVE STUDIOS

The sun-drenched island of Barbados sits at the easterly bottom of the vast Caribbean, just off the coast of Venezuela. Two thousand miles from Manhattan and 4,200 miles from London, it is a small country surrounded by the vibrant blues and greens of the merging Caribbean Sea and Atlantic Ocean. On its coasts are long stretches of brilliant white beaches.

In a world of strife, Barbados appears as an oasis of progress and stability. Under British rule until 1966, it is a land where cultures mix without confusion and a gentle rhythm seems to permeate every aspect of life. It is known, by natives and tourists alike, as the isle of enchantment.

But, aside from being one of the most desirable vacation spots in the world, Barbados is also the home of Blue Wave Studios, one of the most

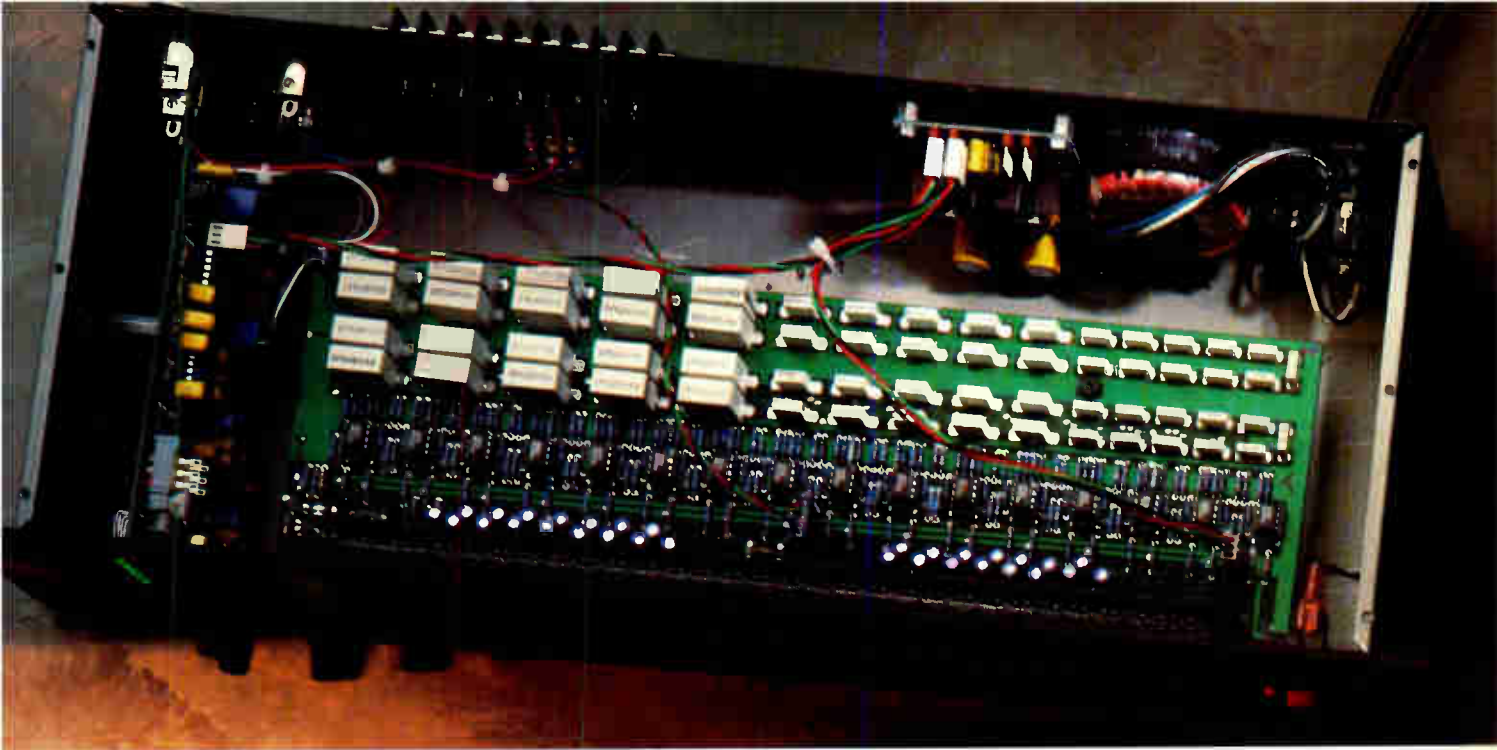
unusual recording facilities anywhere.

Owned and operated since 1982 by reggae star Eddy Grant, Blue Wave offers an innovative blend of modern recording and environmental paradise. Recently it has attracted a growing number of rock superstars, including Sting, Jeff Beck, Bradford Marsalis and Mick Jagger.

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Dynamic Range	+117 dBm	+114 dBm	+112 dBm	+112 dBm
Frequency Response	18 Hz to 30 kHz +/-0.5 dB	10 Hz to 40 kHz +0/-3 dB	20 Hz to 20 kHz +1/-2 dB	20 Hz to 20 kHz +/-0.5 dB
Number of Bands	31	30	30	30
THD plus noise	Less than .005% @ +22 dBm @ 1 kHz	Less than .01% @ +4 dBm	Less than .5% @ +22 dBm	Less than .01% @ +4 @ 1 kHz
Suggested Retail Price	\$550.00	\$699.00	\$849.00	\$995.00

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For a hands-on demonstration of the SC31, visit your professional audio dealer or sound contractor. Or write for additional information:

Audio Logic, 5639 So. Riley Lane, Salt Lake City, Utah 84107. Or call (801) 268-8400.



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*All specifications taken from manufacturer's published literature.

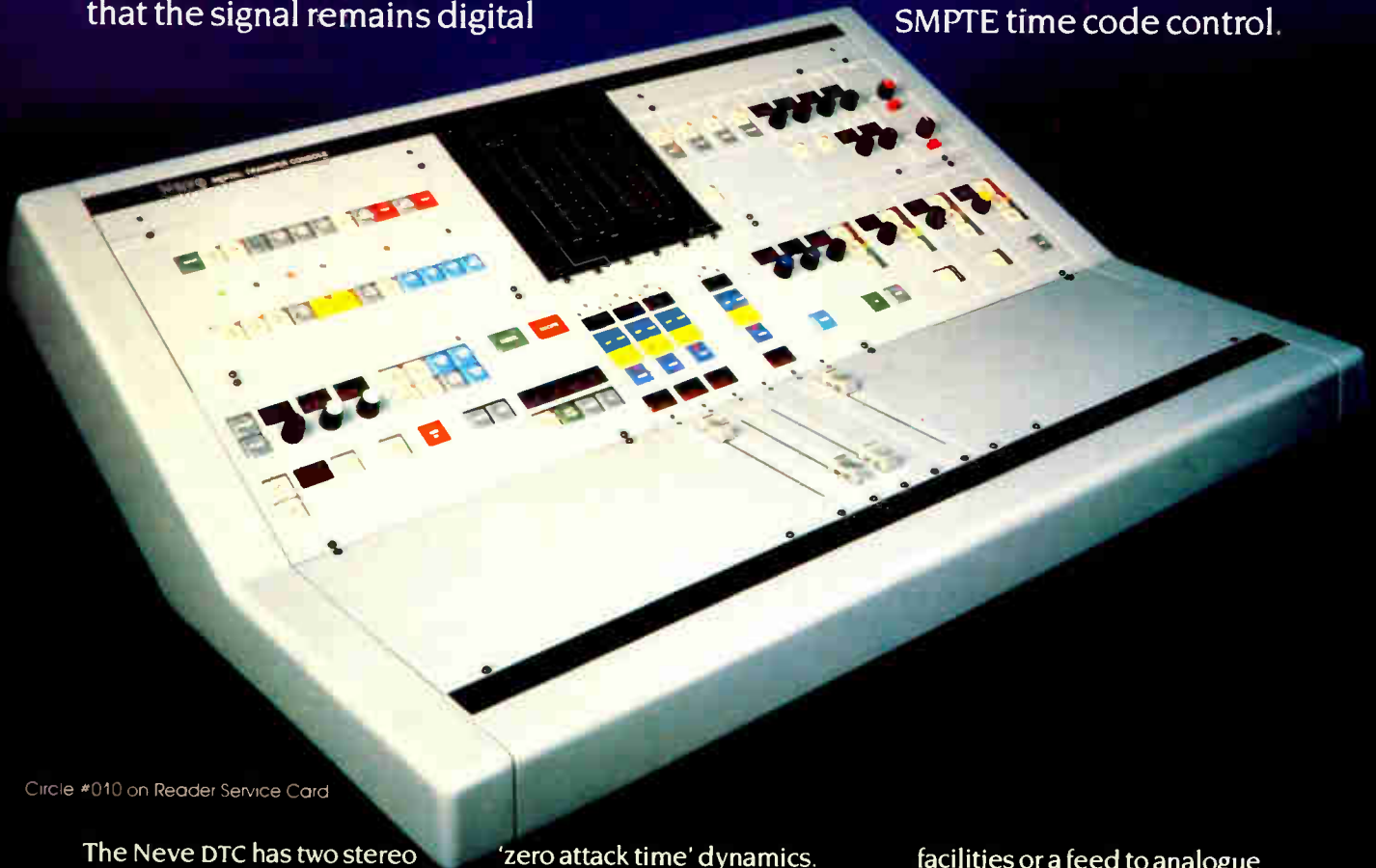
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ARTIST'S STUDIO

Blue Wave is among the few recording complexes that bring the scenic beauty of the West Indies to those in the music industry who need state-of-the-art recording.

Grant, a native of Guyana who has lived most of his adult life in England, chose the small isle as the home of Blue Wave after going there on several vacations.

"It's a mellow country with wonderful people," says Grant (who is among the island's best-loved celebrities). "It's politically stable; there are no uprisings. It's accessible to all the major metropolitan areas by air. The communications are the best in the world. You can pick up the phone and dial anywhere directly. And basically, it's just nice."

Built on the historic, 35-acre Bayley sugar plantation in the rural St. Phillips Parish district, Blue Wave began as Grant's private studio but soon evolved into an active commercial business. "I've always had a studio," says Grant, who built the studio half-way through recording his platinum *Killer On The Rampage* album. "I had a studio in England before this."

Although best known for his 1983 worldwide Top 10 hit, "Electric Avenue," Grant has been active in the music business since his racially mixed British band The Equals topped the charts in the mid-'60s with "Baby Come Back." While a member of The Equals, Grant also wrote "Police On My Back," later a hit for The Clash.

At age 21, Grant suffered a heart attack, which forced him to quit the band. With money he had saved, he opened The Coach House in London, the first black-owned recording studio in Europe.

Now at 42, Grant is a Third World business icon and the head of two thriving organizations, Blue Wave and Ice Records, a label also based at his Barbados complex. There he has also produced several Caribbean artists, including reggae singers The Mighty Gabby and The Mighty Grainer.

He recently ended a decade-long association with CBS Records in America and has signed with Capitol. A new album, *File Under: Rock*, was released in August in the U.S. Its single, "Give Me Hope Johannesburg" was a Top 5 hit in Europe and pushed the album to near double-platinum status.

According to Grant, Blue Wave is

used half the year for his projects and the other half by other artists. For the reggae singer/songwriter, it allows for the best of both worlds.

"I can pay for this studio with one album. I've paid for this place over quite a few times. So I don't have to worry about it from a cost standpoint."

The plantation on which the complex is housed is among the oldest in the Caribbean. Built in 1726, it originally covered several hundred acres and was one of the largest sugar-producing plantations in the British Commonwealth. It was also one of the most brutal slave farms and the site of a bloody uprising in the mid-1800s, an event that eventually led to the abolishment of slavery on the island.

"I wasn't aware of the history of this place until after I was in possession of it," says Grant, whose home faces a huge oak tree on the property that was used to hang rebellious slaves. "The people who sold it to me never told me it had been a slave plantation. I guess they were afraid I would say I wasn't interested in buying it."


When Grant purchased the buildings and 35 acres of land in 1982, most of it was completely dilapidated. It took nearly two years and over \$1 million to bring the facility up to its current state. And although it is considered an historic site, Grant received no government funds for its restoration.

In addition to a huge colonial house where Grant lives with his wife, Anne, and their four children, the complex has a spacious guest house with several individual units that house visiting musicians and their families, engineers and staff.

The studio building itself is over 10,000 square feet and contains offices for Blue Wave and Ice Records, along with a recreational room, lounge, and another apartment, occupied by a staff engineer. There is also a full tennis court and a built-in swimming pool, used year-round. The entire complex is built high on a hill that overlooks the coast, and standing in its center is a huge windmill, the studio's trademark.

When Grant took possession, all that was left of the building that would house the studio were the walls. Grant restored nearly everything, making an effort to keep as much of its original design as possible. Much of the patchwork on the stone was done with island coral, just

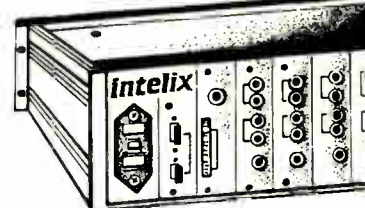
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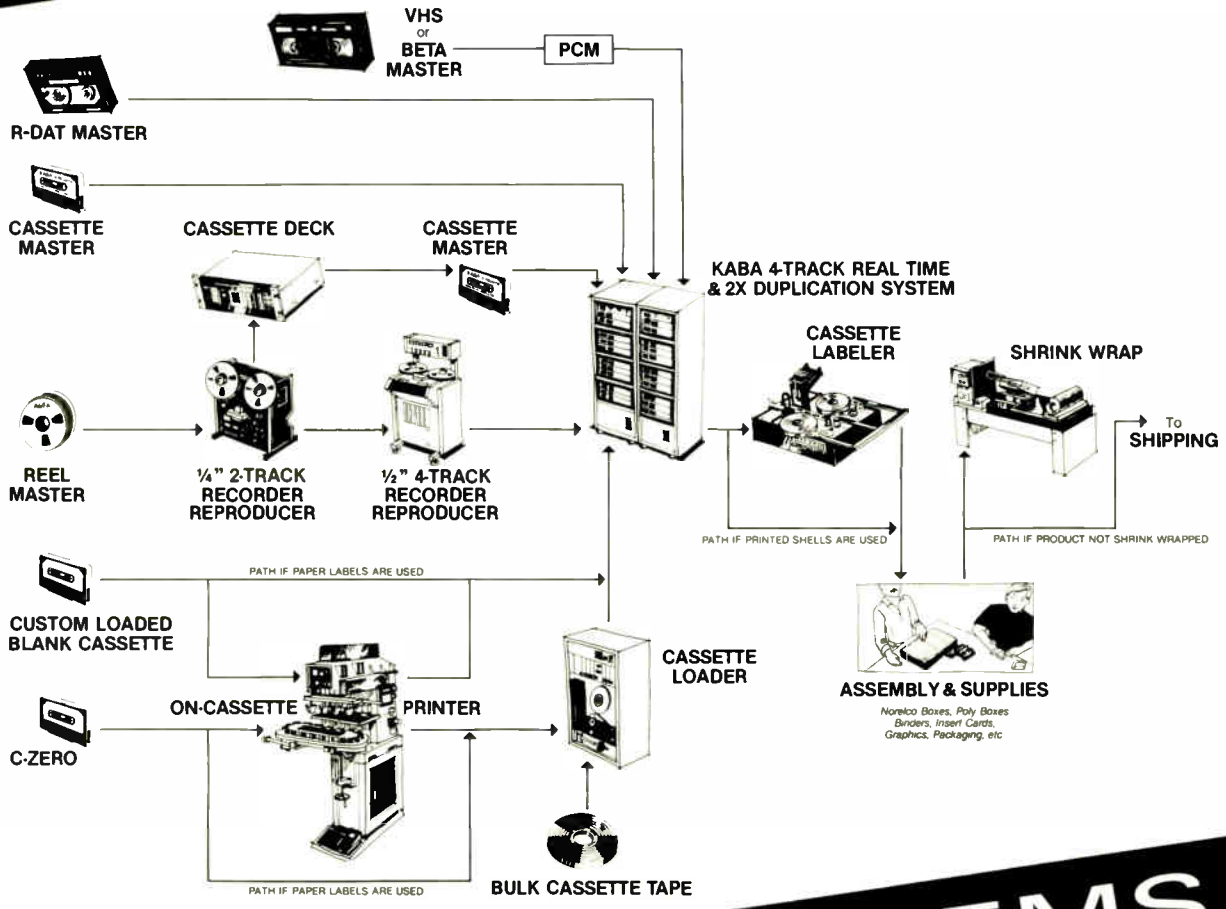


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as they would have done hundreds of years ago.

To design the studio itself, Grant brought in his longtime friend and engineer Frank Aggarat, a native of Trinidad, who lived and was educated in England. Aggarat remains the studio's chief engineer.

The control room contains a curved back wall and descending ceiling for the best possible sound reflection. The walls in the control room are covered with alternating strips of mahogany, purple heart and green heart wood, all imported from Guyana.

Through the glass of the control room can be seen the 20 x 30 recording room, which features the original brick walls from 1726. Portable padded baffles are brought in when a deader sound is required. The main room also employs a removable carpet over the wood floor.

The main console is a Solid State Logic 4000 with 48 inputs. Since the majority of the processing gear was to the right of the board, Aggarat custom-wired the desk so channels 1 through 24 run from the center to the far right. The remaining channels start at the far left and work to the center. The desk is wired through an Adams-Smith synchronizer to two 24-track Otari MTR-90 tape machines. Ampex machines are used for mixdown with a Sony U-Matic ¾-inch video deck for digital mastering. The studio is fully video-compatible.

The control room is scattered with a large arsenal of outboard gear. The large JBL 4350 monitors are driven by three Crown PSA-2 power amps, and the smaller Yamaha NS-10s and the headphone system are wired to both Crown and Studer amps. Also in the control room is a complete Synclavier system, purchased by Grant two years ago. The large recording room is wired throughout with MIDI hookups.

Blue Wave is littered with a full array of instruments, including a Yamaha C-3 grand piano, several drum machines, an acoustic drum kit, guitars and basses, and a bank of keyboards, including the ubiquitous Yamaha DX7.

A collection of sophisticated equipment on a remote island might seem risky when it comes to upkeep, but according to Grant, being on Barbados has never been a service problem for Blue Wave. "Solid State Logic is

I've never run a single advertisement or anything like that. It's like a private club.

fantastic about getting any spare parts we might need. Anything we require can be air-shipped within 24 hours. In addition, Frank Aggarat is a first-rate technician; he can build or rebuild anything."

The overhead of keeping such a facility on Barbados, in general, is inexpensive, with the exception of electricity. Grant says it costs four times more than it does in most countries.

For two years after Blue Wave opened, Grant spent all his energy on his own records and bringing the complex up to its current status. Its commercial application came as a fluke.

"Guys like Phil Manzanera, Justin Hayward and Eric Stewart, formerly of 10cc, would come to Barbados on holiday and they'd stop by while I was recording and say, 'Hey, this place is so nice, I'm sure other people would

Bernie Grundman
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like to record here.' And I'd say, 'Yeah, but would *you* come and work here?' and they all said, 'Yes!' "

Manzanera was the first to use Blue Wave when he recorded his first post-Roxy Music project there in 1984. "That's how it started, then people just started calling me up. I've never run a single advertisement or anything like that. It's like a private club," says Grant.

"It's a business, but it was never set up as such from the onset. It's just that demands were placed on me so people could have it as a place to work. It has dictated itself in the

commercial sector; I never set out to build a commercial studio."

The studio got its biggest endorsement when Sting brought his 1985 jazz-flavored *Dream of the Blue Turtles* project to Blue Wave, where it remained for nearly four months. "When Sting came, all of a sudden we were a very hip place to work," says Grant with a slight laugh.

The following year, Mick Jagger booked the facility to record much of his second solo album, *Primitive Cool*. With him, he brought an all-star cast that included Jeff Beck, G.E. Smith, Simon Phillips, Dave Stewart and others.

"It was a great place to cut Mick's album," says producer Ed Stasium, who engineered much of *Primitive Cool*. "It was totally relaxing. In fact, I recently ran into Sting and he was telling me he saw a ghost there. He's absolutely convinced he saw it in the middle of the night. He said he tried to get it on videotape, but there was nothing on the tape. He thinks it was the ghost of a former slave who had been hung."

Oddly enough, the studio has been used very little to record reggae, the staple music of the area. "Most of the reggae recordings and dub mixes are done in Jamaica," says Blue Wave engineer Roland Stephens. "They have 20 to 30 studios down there, but nothing like this. Most of the places down there have Soundcraft boards and stuff like that. They really don't need more than that."

Grant says an equipment update is in the future for Blue Wave, but not until he is a little more certain of the direction the industry will take.

"It doesn't make sense to me [to update] right now because no one knows what they're doing with digital. Digital is not working in its current format, and I think it would be a bridging situation for me to have a digital machine now. They're going to be obsolete because the next recording station they're going to come up with will be total. It'll be an update on the Synclavier syndrome.

"So, whatever I've got should do until I get into total solid state. Probably SSL or Sony will come out with the definitive digital workstation, and that will supersede the present desk and tape machine syndrome. That's what I'm waiting for."

In the meantime, Grant plans to pull his attention slightly away from Blue Wave to make a concentrated effort toward breaking his new record in the U.S. and elsewhere. He is about to embark on an extensive European tour and hopes to bring his show to the States in 1989.

Grant's philosophy is best summed up in the lyrics to his 1984 ode to the studio, "Blue Wave": "There's a lot to do and I want with you to go on, from strength to strength, Blue Wave." ■

Bruce Pilato is a Rochester, NY-based freelance journalist, husband and father. He also is a serious video collector who has amassed a library of hundreds of titles.

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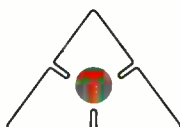
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World Radio History

by Blair Jackson

KEITH OLSEN

AND THE HITS JUST KEEP COMIN'

There are better known producers. There are certainly more flamboyant producers. But chances are the people who fit into those categories are envious of Keith Olsen's track record over the past decade-and-a-half. He's been behind the board for some of the biggest records of the modern era, including Fleetwood Mac's eponymous 1975 smash, Foreigner's *Double Vision*, Pat Benatar's *Crimes of Passion*, and Whitesnake. Rick Springfield, Sammy Hagar, the Grateful Dead, Joe Walsh, 38 Special, Kim Carnes, Heart, REO Speedwagon and Santana are a few of the other commercial superstars Olsen has guided on his way to becoming one of the world's most successful producers. In all, the records he's worked on have sold some 65 million copies. We caught up with the ever-busy Olsen at Goodnight L.A., his state-of-the-art studio in Van Nuys, California, where he'd just completed mixes for the new album by Night Ranger. There were projects galore on the horizon, as usual, not the least of which is his new record label, Kore, distributed by Atlantic. Our conversation this day, however, centered on his views about production.

Do you find that bands are more savvy about the studio than they used to be?

I do. I think a lot of it comes from the fact that there's now a lot of inexpensive home recording equipment. People are learning the art of recording without having to spend six albums in an expensive studio figuring out how to make a record. Things go more quickly, and the bands have a better understanding of what I'm doing, too. They all have home reverbs and know what some of their options are. Part of what I do, though, is to take them past those options and maybe trick-out a sound here and there



Keith at his studio, Goodnight L.A.

and make it really sparkle. *Trick-out?*

That means to use something other than the standard programs on a box—basically construct a sound from scratch. It's real easy to use the standard programs; that's what the musicians are doing at home.

The whole art of demo making has changed so much. The old voice-with-guitar demo is obsolete at this point.

That's true, and unfortunately musicians have also learned the art of demo *over*production at home. It's not that unusual to hear 24-track demos now, and that's when you get into "demo-itis." That's where the blinders get so intense that they want

the song to sound exactly like the demo, down to the last detail. Then I want to ask, "Why not just release the demo?" They don't need me.

I don't want to overstate this, though. I think it's great that musicians are learning the art of recording before they go into the studio.

Are the parameters of your involvement with an act clearly stipulated up front, before you go into the studio?

First off, there's major involvement, or I don't get involved, because that's what I like to do. I want to be there in the decision-making process from the very beginning. Quite frankly, I try to get as much a feeling as I can from my first meeting with these people. So I'm there trying to figure out if I'm interested in them, and they're doing the same with me. We're both seeing how we communicate with each other and how we'll get along creatively. These are things you can tell pretty quickly, I've found.

The next stage, generally, is that the band or artist has to come up with material that is commercially viable, or that I can turn into a record that will sell. That's why a lot of people come to me—because I sell records. **So in the case of a band like Night Ranger, you hear the material before you decide to work with them? You wouldn't go on past reputation?**

I don't make a final decision until I hear stuff, although past reputation certainly influences my decisions. For instance, I might know beforehand that certain writers in the band always come up with good songs. Then I hound those writers—in a friendly way, of course—to come up with those great songs. Maybe when we go into the studio the band has eight or ten songs that might not be the ten *right* songs. That's the hard part—telling them they need two more great songs. That happened with Night Ranger. We wanted to go in at a particular time, and they had some really great songs, but I kept hounding them to come up with a couple of tunes in a particular vein. After two weeks in a rehearsal studio, they came up with what I think are two of the best songs on the record. I'm thrilled that we made that decision and I admire them tremendously for doing it.

I've spoken to a couple of producers

who said they really don't like to get involved with albums where they only produce one or two tracks. I notice, though, that you've done that with Santana, the Starship and some others. How do you feel about that?

I agree with the other producers, because you lose continuity in the project. Some bands are doing that nowadays and I know why they're doing it—they're searching for the hit. I always prefer to do the whole record, but I don't rule the other out. Also, sometimes you don't know how much of what you do is going to be used. With the Starship, for instance, we did more songs than got on the record, because they wanted to do some with Peter Wolf and some with Narada [Michael Walden]. They're a band in search of an identity. We tried to make a tougher version of Starship with the songs we did together, but they ended up only using three of the six we did. Narada's song ended up being a big hit single, but it destroyed their AOR credibility, which is why they came to me in the first place. It's too bad, too. I think Mickey Thomas is a tremendous singer, and we had him singing some real rock and roll, and we had the band playing as a *band*.

With a band like Whitesnake, you've had the chance to work with them at a real formative stage in their career. Is it easier to work with a band that doesn't have a lot of studio ex-

perience as opposed to a band that already has an established way of working?

I try to be flexible. I have certain ways of working that I'll tell a band about right up front. If those work for the band, great. If they're not working, or they want to show me a way they like working, I'll bend to them. But they have to give me a shot. You have to be flexible on all sides of the glass, because otherwise everything is going to sound alike. Santana would sound like Whitesnake. I'm sure Carlos [Santana] would be thrilled with that! [Laughs] What I'm saying, though, is that you have to take every band for what makes them unique. I'm certainly not one of those producers who believes that every snare drum has to sound the same. It's what's *different* about bands that attracts me to them most of the time.

To what degree does who you work with reflect your personal taste in music?

My personal taste in music goes from hard rock to folk music. I like real commercial pop music and I like songs that mean a lot and I like kick-butt rock and roll. I loved doing Santana. I also liked doing songs like "Hot Blooded" [for Foreigner] and "Hit Me With Your Best Shot" [for Pat Benatar] and Whitesnake. I can't generalize, because I really do like a lot—really *most* of what I work on.



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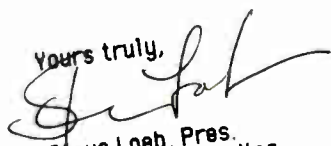
I've also put in some letters we received from clients so you can see for yourself what they, in their own words feel about working with this console.

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Now, based on the first nine months on line, it's clear from client reaction and the quality and success of the records that have come out of Greene Street's new room that the APC 1000 really does deliver on all ends.

I'll keep you posted on further progress and reactions to the APC, and in the meanwhile regards to everyone there.

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World Radio History



Have you ever been tempted to work with artists who don't have so much commercial potential? For instance, if you discovered a little off-the-wall band and thought it just might be fun to get them on a record?

Well, I think if you look at what I've done you'll find things like [Pat Benatar's] "Hell is for Children," which really says a lot but isn't a big hit tune. Within the realm of being marketable, you can say a lot and make a stand.

On occasion I have seen artists who I liked and who I almost thought I might want to work with, but I start thinking about how I would commercialize them, and that's not always the best thing for some kinds of acts. But I think quality music can be commercial, regardless of what form it takes.

How does being a former musician help you in production?

You have to be able to communicate in musical terms at all times. You have to know what you're doing and what they're doing, and if there's something that hits you the wrong way, and you think it's going to hit listeners in the wrong way, you have to be able to communicate that—"take the third out of the bass and just hit the tonic at bar 27, beat one." You don't have to be a virtuoso musician—although some producers are. Knowing a lot can be a help or a hindrance, because sometimes people who know a lot are tempted to tell the band too much of what they should be doing and in the process take the music away from the band. And that's where you sometimes get into the situation of a producer's records sounding the same, because the level of performance reflects the producer's, rather than the band's, abilities.

What can you tell me about your studio, Goodnight L.A.?

Home of the hits all the time! [Laughs] It's a studio I built nine years ago smack-dab in the middle of Van Nuys. It's out of Studio Row, so it's away from the craziness somewhat. I wanted to build a studio—with the best equipment money could buy—for my artists. Before I built it I'd been paying for studio time and my artists had been paying for studio time, and we'd been working a little here, a little there. You always get bumped around unless you spend an extraordinary amount for lockout.

So I got a big, empty warehouse

and started with chalk and snap-strings on the floor and said, "Let's put a wall here, a wall over here. We'll curve this here"—all based on what felt right, more or less. Then I had an architect come in and draw it up, then went to plans and had it built.

Did you use other studios as a model? Favorite control rooms?

Not really. At that time, nine years ago, I thought control rooms weren't as large as they should be, so I made a very large control room—big enough for a band, a manager and people from the record company to be in there and not feel too crowded.

Recently I did a full update on the place and put in two Sony digital machines and this Trident Di-An console

and started with chalk and snap-strings on the floor and said, "Let's put a wall here, a wall over here. We'll curve this here"—all based on what felt right, more or less. Then I had an architect come in and draw it up, then went to plans and had it built.

Do you have any favorite pieces of outboard gear right now?

You know, there are so many boxes of bells and whistles, and a lot of them work really, really well, and a lot of them are a great value for the dollar. Things like the [Yamaha] SPX90 and the REV7II—great values. The PCM-70 does some wonderful things. The AMS harmonizer is still the best harmonizer in the world, but it's too expensive. The [TC Electronic] TC 2290 digital processor is unbelievable—signal in, signal out, absolutely identical.

Do you feel a responsibility to keep up with it all?

Oh, yeah. I'm always looking for some-



Keith with Ozzy Osbourne at Goodnight L.A.

that you have to hear to believe. It's a digitally controlled analog console, the second of its kind in the world. [George Tobin has the other one.] Everything is remembered and recalled and is dynamic—mic input levels, patch points, panning, EQ. It has 24 aux sends on every input. It has all moving faders. It only has one equalizer on the face of the console and you access it. It works really well and sticks it all on a 3½-inch disk, pops it out, and there's your mix!

It must be quite a combo with the Sony digital.

It's unbelievable. Talk about some clean-sounding records! And you can cut rock and roll digital! [Laughs] People are still locked into analog for the wrong reasons.

What kind of monitoring do you have?

I've got a system that George Augspurger originally designed and I have since highly modified. It was a bril-

liant design he came up with, using JBL components.

And of course the distributors all hound you, trying to sell you something or maybe give you something to try. [Laughs] You try something for a week maybe, read the manual for a couple of hours. And if it does the same things the SPX90 does for five times the price, you say, "Send it back!"

I'm getting into digital EQ lately and it's wonderful. Equalization without phase shift sounds so totally different. It's very expensive, but it's incredible. Digital equalization and compression is a new world. It just doesn't sound the same as analog. It's great.

Does being a producer feel like a different job now because of all the changes in technology?

No, but that can be a problem if you let it be. Basically, you're still trying to record a great song in a way where you capture a great performance. That doesn't come from a machine. It comes from players. The sound is def-

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initely last. You can get a great snare drum sound with this really special tom-tom echo on the left tom-tom coming only out of the right channel on the downbeat of the chorus, but if the song is lousy, you're not going to sell two records. That stuff's great, but it's all additive. The song is still the important thing.

Do you bear things that other producers do and incorporate those ideas into your own work?

Sure. You can't rely on yourself to know everything! I try not to *steal*, but I listen to other people's records and sometimes I'll hear something that intrigues me. I was influenced by the Beach Boys, for instance. Thank God for the Beach Boys! They made America appreciative of vocal harmonies and changed the way vocals are recorded.

Are there any trends in production over the past few years that you don't like?

Well, I'm not crazy about a lot of the dance records out now, which have very little melody or lyric content, but plenty of gimmicks. That trend bothers me. A lot of dance records are more sonic experiments than songs. I'm not saying I feel uncomfortable with it. I can do that, but I don't enjoy it. I like having real drummers and real bass players. Occasionally I'll sequence stuff, but I like the raw communication between musicians. I like that little thing called "performance."

Do you feel like you have a special bond with the artists you've worked with?

In a certain way, yes. You get real close to an artist while you're working together, but you always know the artist is going to move on, so it's tough. With the ones who become close friends it's really tough, because you don't know where to draw the line of where the personal relationship ends and the business one begins. Sooner or later, those relationships have to cross and when they do, you get into things like the artist having to say, "Well, you're my friend, but I don't want to do my next record with you. I want to try something different." And that can be hard, even if what they're doing is completely understandable. We *all* have to move on and move forward. That's what it's all about. ■

Blair Jackson is managing editor of Mix.

NEWS

FROM AROUND THE WORLD

ART Australia Now ARX Systems

Audio Research and Technology, an Australia-based manufacturer of professional audio equipment, has changed its name to ARX Systems.

ARX spokesperson Duncan Fry explained that the new name would avoid any confusion with the U.S.-based ART (Applied Research and Technology). The company has distributors throughout Australia, as well as New Zealand, Tasmania and South-east Asia.

Apple, Soundtracs Choose London's TSC as Dealer

The Synthesizer Company Ltd. of London recently announced dealership agreements with Apple UK and Soundtracs' UK distributor, Larking Audio.

"We believe that we are the only full Apple dealer specializing in the music industry throughout the whole United Kingdom, and that this strong relationship with Apple UK will benefit the service we can offer our customers," says Jonathan Cole of TSC. The agreement with Larking Audio means that TSC is the exclusive dealer for Soundtracs' full range of mixing consoles.

Eden Revamps Studio One

London's Eden Studios has reopened its doors with a separate machine room, an expanded control room and a new, acoustically variable recording area. Eden's technical director, Mike Gardner, redesigned the space to accommodate an SSL console, two 24-track machines and a burgeoning arsenal of outboard equipment. The Quested monitors are now built into recessed enclosures in the control room, and the lighting and decor have been completely updated.

First opened in 1975, the facility has serviced artists such as the Bay City



The control room at Sydney's Rhinoceros Recordings is fitted with Australia's first SSL G Series console.

Studio Spotlight:

Australia's Rhinoceros on the Loose

Ideally located only ten minutes from some of the most attractive beaches that the metropolitan Sydney area has to offer, Rhinoceros Recordings has been one of Australia's leading recording facilities since it opened for business in 1980.

In a major upgrade completed this summer, the studio has expanded to include an enlarged control room for its new 72 channel SSL G Series console. According to principals David Nicholas and Andrew Scott, the desk is the largest

console ever made in a single frame by SSL, and is also the first G Series console to be purchased by an Australian studio. The board is currently configured with 56-channel modules and includes Total Recall, an integrated MIDI patch bay and a Macintosh controller with MIDI lines running to all three studios.

The 1,000-square-foot control room is surrounded by three large isolated recording areas (including a dedicated live room) and an adjacent machine room. Besides the massive console, the studio is equipped with 96 tracks of Mitsubishi digital multi-track, 24 tracks of Studer A800 analog and an impressive array of MIDI and other outboard gear, making it an attractive venue for world-class projects. ■

INTERNATIONAL · UPDATE

Rollers, Elvis Costello, Joe Jackson, Duran Duran and Sade, and continues to offer a whole range of services to its clients.

London's Music Room Installs Di-An

Trident Audio has announced the delivery of its third Di-An digitally controlled analog console for music recording. A 48/32/48-configured board has been installed at the Music Room in London. "I love it!" says Music Room owner Paul Travers, who uses the board with a Studer A820 and Dolby SR. "I'm still young and haven't had time to get too conservative yet. In the case of the Di-An, it proved well worth the risk."

Trident sold its first two Di-An consoles to Keith Olsen's Goodnight L.A. Studio in Van Nuys, Calif., and Rock Studios in Burbank, Calif. One of the outstanding features of the console is its ability to reset itself in 20 milliseconds.

Hong Kong's Centro TV Enhances Its 3-D Graphics Capabilities

Answering the needs of a growing in-

ternational client base, Centro TV recently took delivery of a Cubicomp Vertigo V2300 3-D animation system for its Hong Kong facility.

Producing mostly commercials and corporate work, Centro specializes in computer graphics, and according to president John Chu, "When it came time to expand our existing system, we went with the Vertigo for its strengths in modeling and picture quality. We also liked its strong animation software."

One of the first projects to make use of the new system is a station ID package for TV-3 in Malaysia.

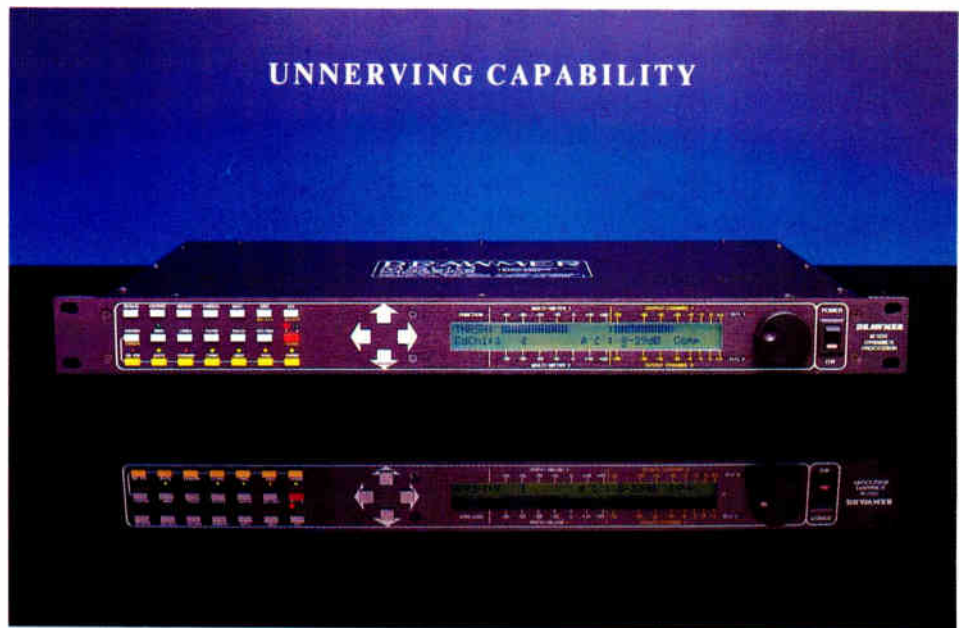
International Studio News

Two Solid State Logic SL 5676 M Series Film post-production systems have been ordered by Moscow's Mosfilm for music, dialog and effects mix-down. The systems include 42 channels, a G Series Studio Computer, Total Recall and Instant Reset. . . SSL has also received a contract from Studio Billancourt in Paris for a 60-channel SL 5684 M Series Film system. . . Group Andre Perry's Le Studio in Morin Heights, Quebec, has installed a 56-channel SSL G Series console with eight custom stereo VCA faders. These

will be used as automated returns for the rack of eight Focusrite 110 equalizers now in use at Le Studio. . . Compass Point Studios in the Bahamas is now equipped with a 48-channel Neve V Series console. The purchase of the new board marks the beginning of a systematic equipment upgrade for that studio, which celebrated its 25th anniversary last year. Compass Point is owned by Chris Blackwell, founder of Island Records. . . London's Mayfair Studios has completed redesign of the recording area in its Studio 2. Among the first clients using the new room was Marc Almond, who recorded strings for a single. . . British composer and guitarist Ray Russell just installed a 32-input NEOTEK Elite console in his Last Chance Recordings studio in London. . . Yet another London recording studio, Odyssey Studios, reports that it has installed a 56-frame AMS Calrec UA8000 board in Studio One for up to 48 tracks of recording. Studio Two continues to serve as an SSL-equipped mixing suite. . . Metalworks Studios in Mississauga, Ontario, continues its expansion with the opening of a second studio with 48-track MIDI capabilities. Earlier this year

—CONTINUED ON PAGE 154

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audio/video needs of musicians and production studios.

Just the Facts, Ma'am

Things change quickly in pro audio. To make sure everyone here knows all the facts about the latest equipment, we've added a Product Specialist to our staff. His *only* job is researching equipment—reading brochures and tech manuals, going to trade shows, talking with manufacturers—and sharing that knowledge with our customers.

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by Philip De Lancie

AMERICAN HELIX

COMING ON LINE IN A BUYER'S MARKET

In the early days of the CD phenomenon, the debut of a replication facility was big news in the music industry. But lately replication has become more commonplace, and new plants have been greeted with far less fanfare. The once easy quest for notice, and market share, has become a struggle. With growth in manufacturing capacity apparently outpacing growth in demand, trade reporting is most likely to focus now on concerns of a shake-out in the field. Despite the obstacles, there are many whose faith in the long term viability of the industry is unshaken. Among them are James Boyer and David Dering, founders of American Helix Technology Corporation. Their brand-new CD replication facility in Lancaster, Pennsylvania, is coming on line under less-than-auspicious market conditions. But armed with a marketing plan that emphasizes personal service and high quality standards, they hope to carve out their own niche by tapping into previously overlooked pools of potential clients.

One element that bolsters the company's self-defined image of customer-oriented service, and distinguishes it from many of its competitors, is the recording industry outlook brought to management by the involvement of James Boyer. Boyer is a Grammy-winning audio engineer whose credit list includes Chicago, Sheena Easton, Paul Simon and Whitney Houston, as well as feature films like *Arthur*, *A Star is Born* and *Beverly Hills Cop II*. In particular, Boyer has been closely associated with Billy Joel, whose *52nd Street* was reportedly the first pop CD commercially released in the U.S.

Two years ago Boyer teamed up with David Dering to found American Helix. Dering, president of the new company, brings extensive background in optical molding and automated processes from his previous position as director of operations for MXL Industries, a manufacturer of custom optical lenses. With the finance-oriented input of former securities broker Scott Robertson, American Helix has obtained capital backing

(L to R) American Helix vice president Jim Boyer, president David Dering and administrative VP Scott Robertson.



through affiliation with High Industries, a privately held supplier of structural steel to the construction industry.

American Helix begins life in a 20,000-square-foot plant, representing an investment of about \$3 million. Heavy reliance on industrial robotics has been incorporated into the facility's design, with an eye toward reducing labor costs and increasing reliability. Commercial production is scheduled to begin at the end of November. James Boyer will direct marketing and oversee the technical service staff. Reached at the plant, Boyer spoke confidently about the company's plans and its ability to prosper even as more-established competitors are struggling.

Mix: Is the new plant intended strictly as a replication facility, or will it incorporate premastering and mastering capabilities for CD-Audio?

James Boyer: The plant will incorporate mastering facilities, but audio premastering will not be done in the plant. All the sequencing and EQ will be done out-of-house in a studio. There are groups of studios to which we have access, depending on where the client is located. We will coordinate it all. If I can't actually be there during the premastering, I have long-standing relationships with mastering people with whom I can walk through things. Obviously, when I am unfamiliar with programs it is difficult to do that over the phone, so I would have to be there. My clients would expect it and I would expect it.

Mix: Will premastering be offered for CD-ROM, CD-I or CD-Video? What kind of additional facilities are involved in providing those services?

Boyer: The mastering and any of the software development for CD-ROM will be done in-house. It is hard to build a facility that can encompass advanced media like CD-I, where you have graphics or video. So some CD-I, such as text and data, is likely to take place in-house, and video and graphics will be out-of-house.

Mix: How did you arrive at the decision to offer premastering for CD-ROM but not CD-Audio?

Boyer: First of all, we didn't really want to be in the studio business. Premastering, as I understand it from my years in the business, has to do with resequencing a client's tape, EQing it

or converting it from analog to digital. Every client has a different wish, and you must have the equipment to cater to the infinite number of variables. You have every kind of format and every kind of noise reduction. For instance, if your client has 30-year-old mono tapes, you have to find a mono machine. Considering all those possibilities, we didn't really want to spend money on all that equipment when there are already studios equipped for that. Rather than building a complete mastering facility in addition to the mastering we do to make the glass masters, we have chosen to take that kind of work out-of-house to a mastering studio, where they can prepare the final 1630 masters for us.

Mix: What kind of facilities will you be offering for the in-house CD-ROM premastering/mastering?

Boyer: Depending on the client's application, there is a lot of equipment involved. First of all, you need to classify the kind of data you are going to

**“Every client has
a different wish, and
you must have the
equipment to cater to
the infinite number
of variables.”**

be working with. There is the field type, in which all the data appears in the same form but with different specific information. Then there is text, such as legal or medical journals. Then you get into graphic data, which may be bit-mapped, video-image or mathematical representations of drawings. The most complicated is the combination, which involves two or more of all those I have mentioned within a single application.

After you have evaluated the type of data, you have to know which operating systems the clients want to work on. Do they want to cater to Apple or MS-DOS? You have to know all the different formats that are out there. Then, unless they already have the data in ROM form, you develop the retrieval software for them and you develop the actual ROM. That is a software writer's dream. The retrieval software determines how you access the information on the ROM disc. Once you have identified it, indexed it and

placed it on the disc, you use the retrieval software to pull the data off the disc. There are certain standards that exist for that, like the High Sierra standard, or MS-DOS if you are working with a PC. Within these general standards, each project can be tailored to clients' needs according to their criteria.

The data might be on 9-track tape, or on floppy disk or hard disk. That is the source. We need to know the format on tape—for instance, IBM or ASCII. From that we make the U-Matic master tape while recording in real time through a computer in the mastering chain that converts the data from the source. Then you go through a similar process to master as you do for CD-Audio.

Mix: What type of cutting system will be used to prepare the glass masters?

Boyer: We will be using an optical system, one of the new Direct Read After Write (DRAW) cutters. We haven't decided between the two companies that make them, DISC and ODC. They are both quite good, and both have certain attractive things about them. We are in the middle of evaluating product from the two systems right now. We like the direct read approach. There is no question that it is better from an economic standpoint.

Mix: You have chosen the phrase “third-generation hybrid” to describe your plant. Outline the flow of product from step to step in the replication chain. How does it differ from first- and second-generation plants?

Boyer: First-generation plants were defined as batch systems, with huge clean room facilities. Entire plants were built as clean rooms, and everything except the actual pressing of the disc was done in a batch. In second-generation they still kept some of those batch systems, but the clean rooms were scaled down to mainly the places where the disc was exposed to the air, like the press area. And some in-line production was created. Third-generation is basically an in-line system where one device feeds the next. From the molding machine you feed the metalizing machine, which feeds the lacquer-coating machine, which feeds the printing machine, and then on to packaging from there. And the clean room facilities are even smaller, so that every area where the disc is exposed to air between processes is now a clean room, as opposed to one giant room holding all the

equipment. That costs a lot less to maintain.

Our facility is a hybrid of that third generation. Our integration follows the same basic flow as the others, but it has some unique things about it. I'm not going to describe it for you to put in print because it is our own technology. Our president has spent ten years in the optical molding and coating business, and he is doing some things a little differently in the integration with processes that haven't been done before. So I can't make that available to the rest of the world for free. But it is similar to Shape's Unit Disc Manufacturing System, if you need to put a label on it. We haven't developed our own machinery; we're integrating available equipment from other manufacturers.

Mix: Your literature notes that tolerances are stricter in the replication of CD-ROM than for CD-Audio, and that your plant has been designed with the more demanding format in mind. Are you already making test discs at the plant, and are you finding that the block error rates are actually consistently lower than on the discs of your competitors?

Boyer: The plant is not finished so we haven't done any evaluations yet. The tolerances that we speak about are in the specifications for the equipment and the specifications for the actual physical facility itself. We plan to perform the tests to verify those numbers. We have done some testing on some of our competitors' products, and there is some product that is very good and some that is borderline. So we know where we would have to stand, and we can see that it is not really going to be a problem.

Mix: What is it specifically about the equipment and/or processes you use that makes the end product different and better? Is it the cutter, the molding machines, the metalizing or something else?

Boyer: The manufacturing technology has been pretty well defined. We are basically just tweaking it because of both my experience in the mastering/mastering area and David Dering's experience in the actual manufacture of polycarbonate product. Whenever you are concerned with quality, you have to start with your sources. One source is the raw materials that we use, like the polycarbonate, and how we handle them in the plant. A second factor is how we handle our cli-

ents' tapes, or, if we are involved in the mastering, the conditions under which those tapes are made, the alignment and the distortion level. Then we follow through from that, making sure in each manufacturing area that everybody concerned with each process cares about the quality of that process and the quality of the final product. We feel those things will really contribute to the quality of the product in the end.

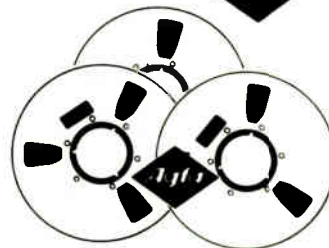
Mix: American Helix was probably conceived during a worldwide shortage of CD manufacturing capacity, but the plant comes on line during a glut that has left one U.S. manufacturer in bankruptcy. Has this transformation of the market altered your approach from what you had originally planned?

Boyer: It hasn't altered our marketing plan at all. We have held true to our plan from its inception despite what is going on. You have to realize that American Helix is not a commodity player. We are not a PDO or a DADC. We don't have the capacity of 8 million discs a month. We are not in that league. We are a small facility. To start with, our capacity will be a million-and-a-half, with the capability of growing to 8 million annually. We feel that we can exist as a subset of all those commodity players. We have identified some areas in the audio business that others have so far left alone because they weren't large volume runs. There is a need for replication there, just as there is a need for independent record companies to coexist with the Big Six record companies. We have found people who have never been contacted before who would be very happy to have CDs made for them. For a large plant that has to support a higher overhead, the economics of those small runs just doesn't work out. Compare a plant that has to support 150 to 200 people to a 20,000-square-foot plant that supports 15 people. With the setup time and the running time, it is too costly for them to put up a small run. We think we have a lean, mean manufacturing machine, and that gives us the flexibility.

Mix: What proportion of your total output do you expect to be doing in each of the various types of CDs?

Boyer: It's hard to say. At this point, because of my background in the audio business (and also because CD-ROM hasn't really developed to the point where you could call it a commodity business), we are going to be

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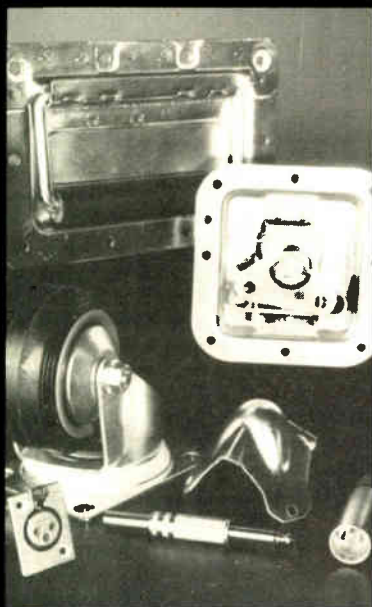
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heavier in CD-Audio. Typical users of ROM might want 100 discs to distribute within a company. But that is changing rapidly as people become more aware. We will probably start with 75% audio and 25% ROM, and then work more to an even point. At the same time we will be increasing our capacity, so we won't be dropping anybody off the list.

Mix: What do you think needs to happen in order for more favorable conditions to return to the CD market?

Boyer: Something has to be done about the pricing of the discs. People have stopped buying because they have realized that the prices are ridiculous. The solution is not to make a smaller disc and charge less for it, like the CD-3. You have to give people product at a reasonable cost. A reasonable profit but also a reasonable price. There is no question that people want CDs. But they don't want to pay those prices anymore. I think the manufacturers have cut prices as much as they can without going out of business. So it has to be done at another level. The price of the players has come down significantly, so I think that right now it is the price of the disc that is determining whether people buy CDs.

Mix: With increased capacity, CD manufacturers have become much more price-competitive. How will American Helix be pricing its products?

Boyer: We will certainly be competitive. Scenarios of a dollar-a-disc have been presented in the industry, but that is for runs of a million and up, and we are not in that business. We are happy to make 500 discs for an artist, but there is a premium attached to doing such a small quantity. So we may be more expensive per disc on smaller runs, but that is because we are willing to do them. We will be competitive on larger runs.

Mix: Which of the recordable CD technologies do you feel holds the greatest promise? Do you foresee eventually manufacturing recordable as well as prerecorded discs?

Boyer: The recordable disc does not use the same manufacturing technology. It is a layered disc, a sandwich type of thing. We have stayed away from that area because of the way it is changing. We have had people ask us to make them the substrates, the blank discs for WORM (Write Once Read Many). But we are going to wait be-

fore we decide which of the writeable systems we might go into. It is all in its infancy at this point.

• • •

While athletes worldwide were gearing up last summer to break records at September's Olympic Games, Shape Optimedia spearheaded a team effort that seems to have set a new record for turnaround time in the CD replication industry. On July 22, a performance by pianist Michael Ponti at the Newport Festival was recorded for the Newport Classic label by Northeastern Digital Recording in cooperation with station WGBH. As the curtain fell, NDR's Toby Mountain began digital editing of the tapes, which were later driven by Larry Kraman of Newport Classic to Shape's plant in Sanford, Maine. Less than 11 hours after Kraman's arrival, 500 finished CDs were ready to go, including 100 earmarked for sale back at the festival that evening. Shape's express service is available on an advance booking basis for a "reasonable price premium" . . . Electro Sound of Sunnyvale, CA, is now offering 80:1 Speed Kits for high-speed audio cassette duplication systems. The kits introduce mechanical and electrical modifications to the company's existing 8000 series, allowing a 20% increase in duplication speed. The master kit features EQ circuits redesigned for lower distortion as well as higher slew-rate output amplifiers. The slave upgrade includes ceramic-coated capstan sleeves, a new dancer-arm assembly and memory for automatic recall of four tape-type setups. Electro Sound claims significant quality improvements from the kits, even for those 8000 series users who continue to duplicate at 64:1 . . . Audio cassette tape length may be verified at high speed with Audico's Model 200-9 Timer/Rewinder/Exerciser. A sensing device distinguishes between tape and leader, and a time readout can be provided for a C-60 in less than 20 seconds. The unit may also be used as two rewinders, with combined capacity of 400 C-60s per hour, or as one timer and one exercise, which life-tests cassette shells to determine their quality. ■

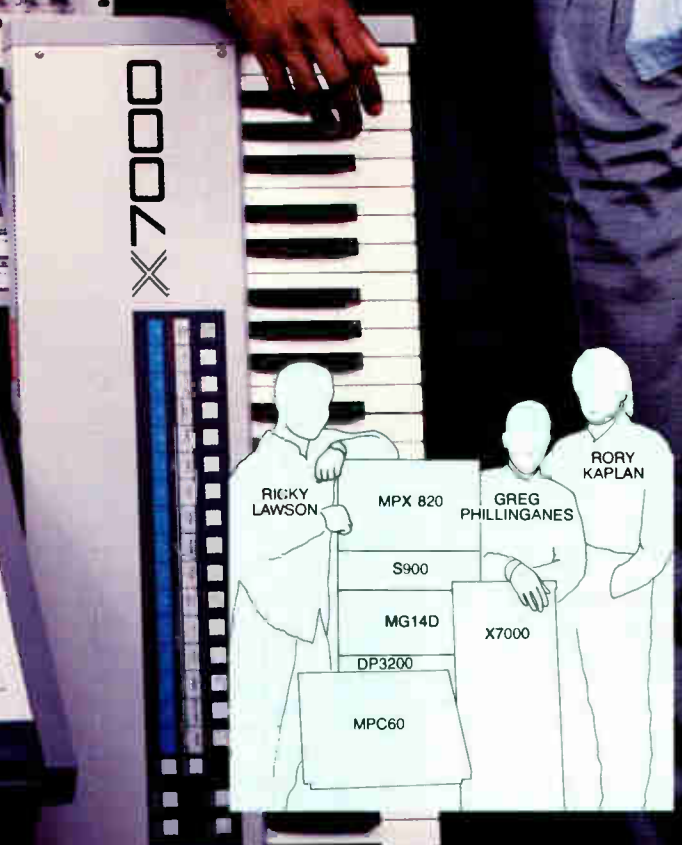
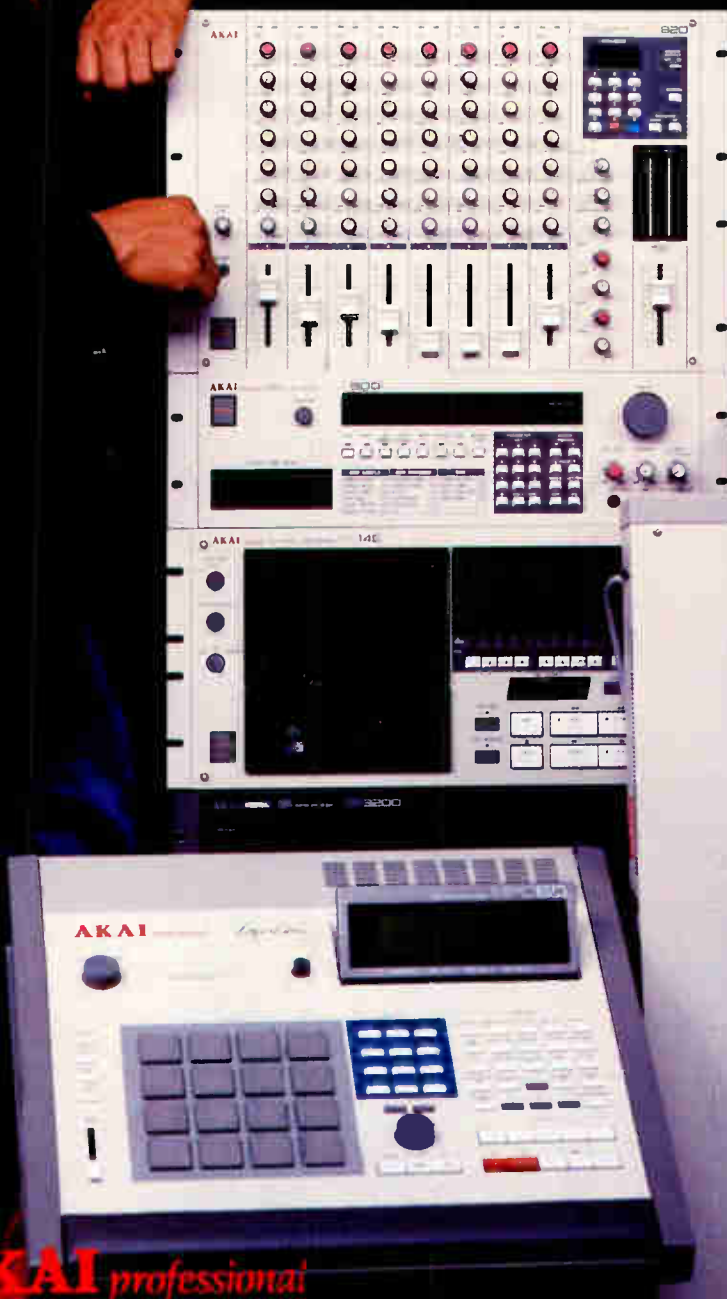
Phil De Lancie is our resident expert on record mastering and manufacturing, tape duplication, CD replication, storage and formats. He's also a mastering engineer at Fantasy Recording Studios in Berkeley, Calif.

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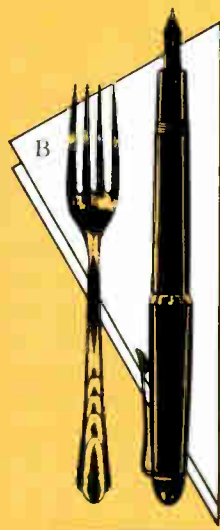
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World Radio History

by Mr. Bonzai

DAVID FOSTER



Although he hails from the Great White North of the border, David Foster has the muscular good looks and sunny disposition of a SoCal volleyball champ. In fact, he's bounded into the music industry and won the gold, the platinum, and armfuls of Grammys and Junos. His grasp of what works as a producer, arranger, player and writer has helped him pump out hits for Chicago, Lionel Richie, Kenny Rogers, Barbra Streisand, Kenny Loggins, Neil Diamond, Michael Jackson and Dionne Warwick, to name a few. His touch has sparked hit film music in *Urban Cowboy*, *St. Elmo's Fire* and *The Secret of My Success*. His '88 album, *The Symphony Sessions*, underscored the Winter Olympics and stands as a sweeping pop classical fusion. He's written for such diverse performers as Alice Cooper and the Japanese super-

star Seiko. This guy gets around.

Foster's energy and *joie de vivre* are almost blinding. We met at a BMI luncheon and I'm glad I brought my shades. He was the guest of honor at a tasty press event to announce his appearance as keynote speaker at Songwriter's Expo 12. For those aspiring to success in the music biz, Foster is a role model worth examining. He makes his triumphs look easy, but actually he's been exercising his abilities since the '60s, when, as a teenager, he toured with Chuck Berry and Bo Diddley. Years of session work gave definition to his musical muscles. His position is secure, and he gladly shares the spotlight with ace engineer Humberto Gatica and those he works with and depends on. In his spare time (where does he get it?), he sponsors celebrity sports to raise



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funds for kids in dire medical need and uses his public performances to draw attention to such social tragedies as apartheid.

Foster is a sharp cat—no doubt about it. We met later for a lengthy chat and he spoke offhandedly, as if there are no secrets to his success.

Bonzai: What's the story with your new studio?

Foster: Well, I bought a piece of property with a building that belonged to a musician before me. We gutted it and started all over again. Humberto Gatica and I have a couple of favorite rooms in Los Angeles, one of them being Lion Share. For this studio, which we named Chartmaker, we tried to design a room that would accommodate our particular needs. All along, we knew we didn't want to build a room with mix capabilities. We like to mix on the Neve board, so I purposely bought an SSL board for this room. We wanted a private place for our work, but we didn't want to be completely cut off from the outside world. The large portion of an album goes down in recording and overdubbing, while mixing is only about one-fourth or one-fifth of an album. So the majority of the time is spent here at Chartmaker, and for the completion of projects I go into the outside world.

Bonzai: Where do you do most of your mixing?

Foster: Still at Lion Share, but a few new rooms have popped up that we are investigating. I've had a few projects over the past year, but one of them didn't require any mixing—my live album recorded with the Vancouver Symphony. I was able to edit that here, then digitally edit at Capitol.

Bonzai: What other recent projects have you been involved in?

Foster: Well, I just scored *Stealing Home*, a film which is doing well. I'm real proud of the music. Lately, I've been in the studio with Neil Diamond for almost six months.

Bonzai: How is it coming along?

Foster: It's going great. You know, when I first hooked up with Chicago in 1981, it was very easy for me. I was so familiar with the band, and I knew exactly in my mind what they should sound like to start having hit records again. That was perhaps overzealousness or overconfidence, but in my mind I knew I was the right guy to

work with them. I didn't have to go back and review all their material and figure out the key to their success, because I knew all their material—probably better than they did.

With Neil, I was a fan, but from a distance. So I went back and reviewed all his work, beginning with "Solitary Man." I put all my favorite songs, which were mostly his hits, on a cassette and drove around listening. I tried to figure out what it was that made him Neil Diamond, and what he had moved away from. Keep in mind, though, that no one can have

sing anyone else's lyrics, but he heard this song and loved it.

Bonzai: You mentioned that you put all the music on a cassette and drove around?

Foster: Is that illegal? [Laughs]

Bonzai: I've heard about this being done a lot—making rough mixes and listening in the car during the production of an album. I enjoy the car because there are no interruptions and the sound quality is great in that contained environment.

Foster: Well, first of all, studio playback is not realistic when compared



A session at Chartmaker. Pictured (left to right), Woody Woodruff (chief engineer), David Foster, Rick Bowen (synth programmer), Dave Reitzas (engineer).

hit records all the time. I can't think of anybody that has defied this fact of life. Perhaps Whitney Houston is an exception so far, but there seems to come a time when it just doesn't work anymore for an artist. I tried to find the essential ingredients in Neil's musical fiber and it was fun reviewing his entire body of work. For this new album, I think we have stayed true to what he is all about. What happens is, artists get together with different producers, and the producers make the records for their own needs—I am guilty of this, as well, in some cases. I felt that Neil had been left behind, so we tried to stay true to form and I think it's going to be a terrific album. We've been working very hard on it.

Bonzai: Who's written the material?

Foster: He and I have written about half the album together, and he's written the rest himself, with the exception of one or two songs. We covered one song, actually, by a major new artist. I didn't think he would want to

to the usual listening environment of the audience. You can get systems for reduced dollars that sound very good, but the car has always been the place where you have your radio. It's where you really hear things for the first time. Not in your home, not on the stereo, not on the record, the cassette or the radio at home. For me, and for most people, I think it's the car.

Bonzai: When you are working on a project, do you take rough mixes and drive around with them?

Foster: Oh, yeah. We even approve final mixes in the car. We had this setup at Lion Share where we could transmit FM to the car. It's kind of a bogus deal, because we made a cassette copy first, so the quality was horseshit. But we do it to get balances, because you are so used to listening in the car to the records that sound good; you're used to the relationship between the vocal and the track, or between the kick drum and the snare drum. You are used to those

PHOTO: MR BONZAI

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Bonzai: Let's go back to your early life. Can you remember the first music you heard?

Foster: I started classical piano when I was five years old, but the first songs I remember are "Que Sera, Sera" by Doris Day, "Muleskinner Blues" and "Hound Dog." This was around 1957.

Bonzai: I loved "Muleskinner Blues." What a wild vocal.

Foster: I guess it would be a novelty song by today's standards, but it got me going. It was the first record that I owned. My sister worked at a coffee shop, and the guy who serviced the jukebox gave it to me. I played that record to death. Then I got some 78s by Jerry Lee Lewis. Mind you, all this time I was playing classical piano, and my teacher would have been horrified if she knew what I was listening to on the side. I consider myself to be a dedicated musician, but I was never fully dedicated as a classical musician. I had a good understanding of the music and an ability for interpretation. But I never had an incredible amount of facility on the keyboard. So I had this diversion going, and that took me all the way to age 13 when The Beatles came along. Then it was no longer a diversion, it was a necessity for me to switch. So, I quit taking piano lessons.

Quite honestly, my parents pushed me to take classical lessons and I am forever grateful. They weren't horrible about it, but I had to do 15 minutes a day. That's nothing, but sometimes even that was too much for me. I remember ruining an entire Saturday because I wouldn't practice for 15 minutes. I sat at the piano all day in defiance and refused.

Bonzai: Is there an important figure in your career...

Foster: \$2 million a year! Just kidding.

Bonzai: Someone who had a profound effect on your early training, your growth as a musician?

Foster: Absolutely—Oscar Peterson. When I was 13 I was fortunate enough to win a scholarship to the University of Washington for the summer music program, where I was thrust into a

situation with college kids. I went to Seattle for two summers in a row, and the bandleader was a friend of Oscar Peterson's. He was playing there at a nightclub, but I couldn't go because I was only 13. Our bandleader said he would get his autograph for me. I thought this was just great. I talked to our bandleader afterwards about the performance, and then he handed me a sheet of paper. "Dear David, keep working on your music. It's a worthwhile endeavor. Oscar Peterson." It was written in this beautiful handwriting and I kept it in my wallet for about 20 years. Three years ago we finally met and, of course, the circumstances were different. I loved being able to tell him the story. It was a small thing, but he had taken the time to write the note and it really made an impression on me.

Then I started getting into Stan Getz and Bill Evans, Chick Corea, and Miles. Even though The Beatles were influencing me on the rock and roll side, during that time I also listened heavily to jazz.

Bonzai: I read somewhere that you played on tour in England when you were 16.

Foster: Yes, by age 16 I had quit school, much against my parents' wishes. But they knew I would do music for the rest of my life. They let me go to England under the auspices of older guys in the band who were sworn to take care of me. We moved to England and toured with Chuck Berry and Bo Diddley. Now the picture is complete. By age 16, I had been exposed to just about every musical influence, which is why I feel just as comfortable producing The Tubes as I do Kenny Rogers. It relates back to my early musical training.

I would say to anybody starting out that it's great to be in a garage band and be an asskicking rock and roller, and it may get you through life, but it may not. Training is not such a bad idea.

Bonzai: Could you create a sample producer scenario where you are approached to work with a new act? What are the steps you go through in evaluating the group or artist?

Foster: You may be asking the wrong guy, because I've never been the kind of producer that takes on new acts and develops and formulates. I've been more the one that works with established acts and tries to take them to another plateau, and sometimes

succeeds, sometimes doesn't.

You get to a certain point where the job becomes deciding what to do, which projects to choose from. You have to decide which ones are right for your career, and even more importantly, which ones you can do well. Back in the early days, I would jump at anything and that's why I often had three or four projects going at once. It was madness, but I guess I had the energy to pull it off.

Bonzai: Well, even with an established artist, how do you prepare? Did you do demos with Neil?

Foster: Yes, we did demos. By then we had decided we were going to work together. We had talked about doing an album for about two years, but the final decision for both of us came when I went to his house and we sat for about an hour and talked philosophies and music. I stood up and said, "I'm in." Then he said, "I'm in." That was it. Then there was about four months before we could start, because I was working on the film. We picked a start date and we picked a finish date. I am so committed to this project that we even agreed I wouldn't do anything else during the

six-month period. He knew my past and how discombobulated I could be.

It's great to be in a garage band and be an asskicking rock and roller, and it may get you through life and it may not.

So it's been very concentrated.

In the case of Chicago, I met them and was very excited about working with them. We spent three months going over their material, but I felt it could be stronger and started writing with the guys in the group. By the fourth month we finally got into the studio.

Bonzai: How is it different working with a large group as opposed to a single artist?

Foster: I think any producer would agree that working with a large group can be hell. I say that in a kidding way, but it's very, very difficult to work with seven people. In a group like Chicago, it's compounded by the fact that it's seven very successful people. When you are in such close quarters for such a long time, it's difficult with seven people, or with one person. It's also difficult for the artist. But I believe there has to be a certain amount of tension to get the best work out of everyone.

Bonzai: How does it compare with working in film?

Foster: Well, you have all that to deal with, plus directors and all the people at movie companies. One of the big-

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gest problems in doing films is that most films use "temp music"—that is, they put favorite records, existing music, into the film. It's chosen by the music editor, the film editor, the director or a combination of all three. That's the way they showcase the film to the movie company and at private screenings when it's still in a rough-cut form. Test audiences give their opinions. They put this temp music in because they don't want to show it dry. Then the composer gets hired and is asked to reproduce the feel of the temporary music. A director with-

out a lot of vision can get hung up with the temp music and never be satisfied with the new music. On *St. Elmo's Fire*, I was lucky because there was never any temp music. I was actually hired to do the film before it was shot. On *Secret of My Success*, there was temp music. In a couple of cases, I never beat the temp music because it had been integrated so well into the picture that it worked perfectly. I just couldn't top it, so I suggested we get Herbie Hancock, because they were looking for a funk thing. It was difficult to get Herbie, but he finally agreed to do it. I was ecstatic, because he is so brilliant. He

came up with this piece, but the director didn't feel it worked as well. The temp music was so fixed in his mind that he couldn't see it any other way. Dan Carlin, the music editor, had done such an excellent job that the final decision was to go with the original music choice.

Bonzai: What happens to these pieces of lost music?

Foster: Magnetic heaven, I guess. In some cases, they do resurface. Kenny Loggins and I worked on a piece of music a few years ago that just might make it in an upcoming film.

Bonzai: Can you give me some impressions of the folks you've worked with? Let's start with Kenny Loggins.

Foster: Kenny is probably the most meticulous artist I've ever worked with. He'll bring me little tapes after we've started working on a song. Here he is, in the bathroom at three in the morning, whispering: "David, Eva and the kids are asleep, but I just got this idea and had to put it on tape. . . ." And then we sort out his midnight madness the next day. He really will slave over one word in a song, because he looks at the overall picture. He is consistently meticulous about every aspect of a song, which, in his case, makes for the best possible finished product. He's usually absolutely right. He's a melody man—loves working on the melody. And he's a great singer—on my top five list of singers.

Bonzai: Paul McCartney?

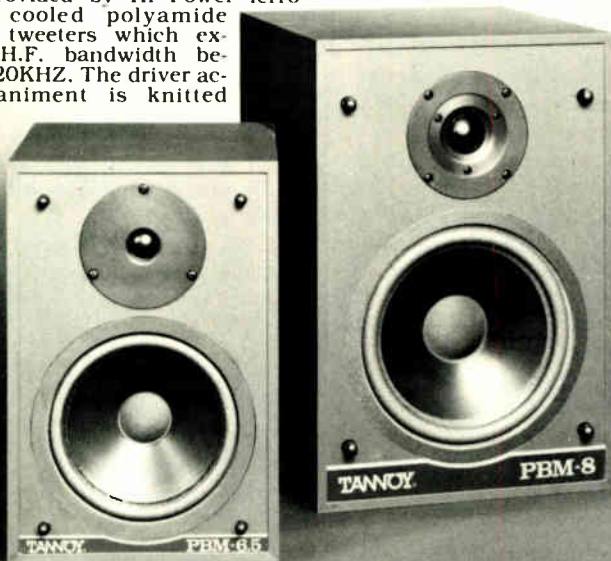
Foster: Funny you should mention him. Paul called me just last week. A few years ago, we worked together at a time when I was getting burned out from too much work. I wasn't able to give him my all. But those tunes have laid in the can for three years and now have resurfaced. He wants me to come over to England and finish them. Paul is a musician's musician. Honest to God, he'd rather hang out with a musician than the Queen of England. He has no desire to rub shoulders with anyone. He's done all that. He truly loves making music. I walked into the studio one morning and he was with Linda and the kids. His wife is on the organ, the kids are playing bass and keyboards and he was on the drums. It was like the Partridge Family, and they were all lovin' it. He's an early riser. Drives a little mini-Minor. Has a humble homelife. Still works hard on his music. I think he's a little cut off in terms of listen-

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ing to other people for influences. He wants to have other people in his life but it's hard to get through to him. We haven't done the great things together that I hope we can, but I'm looking forward to giving him my best this next time around.

Bonzai: Barbra Streisand?

Foster: I did two songs with Barbra for the *Broadway* album, one of which didn't make the record because we both decided against it. But I did the song "Somewhere," which was the single from the album. On one level, she is the most terrific and interesting human being I've ever been around. She's fascinating to observe, and I love her as a friend, too. In the studio, she is also meticulous—but she can go over the top. Through the entire process, which can be maddening sometimes, comes great product. She is not unlike Quincy, in that she eventually gets the best results. From the intensity, which is only her striving for every option, comes greatness.

Bonzai: What about the Japanese artist Seiko Matsuda?

Foster: It was a major project, and a big step for her, too. We recorded here at Chartmaker. I found her to be an absolute delight. She obviously loves the American way, and she is a huge star in Japan. I think she's sold more records than anybody there. And she entrusted her career to me. At first, when I said yes to the project, I didn't even really know why I agreed. It just seemed so interesting, and I really liked the way she sings. As we got into the project I realized that it was something I couldn't take lightly. She has a huge career, and I had to do the best I was capable of. I think I succeeded, and the album did very well. I was with Phil Ramone a few nights ago and he said the album had sold over 750,000 copies, which was even better than her previous album.

Bonzai: Do you think you'll work with her again?

Foster: I'd love to. I don't know what she has in mind, but I had a great time. It was also a chance for me to start writing again, because I hadn't written for about a year before that. Some of those songs are now finding themselves new homes, with English lyrics and artists over here. She did the whole album in Japanese, except for two songs. It was a very enjoyable experience.

Bonzai: Michael Jackson?

Foster: I can't really say I know Michael. I ran into him a half-dozen times, played on a couple of his records, and he's always been absolutely perfect with me. I think he is a genius. I put him in the same category as Stevie Wonder. On a human level, I have a lot of compassion for him and sympathize with the pressure, but I've never spent any time with him socially. Musically, I think he is ferocious, and I would drop everything to write a song with him.

Bonzai: If you could pick anyone at all to work with, who would it be?

Foster: For the longest time that person was Barbra Streisand, and it came true and was great. The last couple of years I have thought of Sting, only because... well, for obvious reasons. I felt that Barbra maybe needed somebody like me, but I can't imagine Sting ever needing me. It's nice to fantasize. I'd like to do a rock opera, and I feel like there is one burning in me. Sting would be the perfect guy to write it with and have him sing it. There really hasn't been anything to match *Tommy* in 20 years. So, Sting, if you read this, call me.

Bonzai: What's the best advice you can give about the music business?

Foster: Quite honestly, you have to know how to politick. You have to be willing to be a nice guy, and be willing to try and put yourself in the right situations. Being a session player was the best thing for people like Jay Graydon, David Paich and myself, and in later years, Richard Marx being a session singer. You put yourself in the right place all the time. Just by the nature of doing sessions every day, you are with all the artists you want to be writing for and producing. If you're on top of it, and you're talented, and good, and sharp, and don't do drugs, and show up on time, and are an all-around go-getter, things will come your way. Broadstrokes advice: if you are absolutely 100% convinced that you want to be a musician or a songwriter, and are willing to devote your whole life to it and not get sidetracked, and are prepared to work 16 hours a day, then you might make it. That's what it takes. Nothing less will do. ■

Mr. Bonzai froze his butt off in Canada for three years, where he worked as a radio announcer/producer and learned that editing is the splice of life.

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BIRD

by David Leland

During the late '50s and early '60s, "Bird Lives" became a kind of battle cry for the more militant jazz buffs. They scrawled, painted and drew the saying upon walls, billboards and subway cars from New York City to the West Coast. The message was clear and simple: Charlie "Yardbird" Parker's jazz music lives on, despite the innovative alto saxophone player's death at the age of 34, the result of a life of excess.

But now, 34 years later, "Bird Lives" has taken on a new and, at times, eerie meaning, as Parker's solos have come alive again with the help of modern recording techniques and a lot of tender loving care by film director Clint Eastwood. For the past year Eastwood has dedicated his heart and soul to the making of the movie *Bird*, the story of the tortured genius of Charlie Parker.

Parker, who died in 1954, is still considered one of the most-emulated players of all time. The master saxman grew up in Kansas City and at age 17 was picked up by bandleader Jay McShann. He continued his musical journey into New York, where he became famous for his lyrical playing and flamboyant lifestyle. His is a story of



genius and addiction—with habits that so ravaged his body, the medical examiner who performed the autopsy on him at Bellevue Hospital reported the man's age to be 65.

Eastwood has chosen not to sensationalize Parker's drug and alcohol use in *Bird* and, instead, illuminates the positive side of the man, an aspect that may catch the fancy of some of today's jazz listeners who have never listened to Parker.

"It wasn't intended to be an educational film," says Eastwood, who first saw Parker at Jazz at the Philharmonic in 1947. "But like anything, even if you read a biography, you walk away feeling like you know the guy a little better."

From the onset of making the film, Eastwood set his heart on authenticity. He says he was never content with the making of *'Round Midnight*, a jazz film featuring Academy Award-nominated saxophonist Dexter Gordon. The pace was too slow and the music (composed for the film by jazz pianist Herbie Hancock) was too mellow for Eastwood, who prefers the up-tempo feeling and frenetic pace of the be-bop era.

"*'Round Midnight* mentions be-bop, but there's really none of the music in it," says Eastwood, referring to the ballads used primarily in the soundtrack. "It was more of an '80s transition."

All 11 tunes on the *Bird* soundtrack, released on CBS Records, were originally composed by Parker but feature modern accompaniment by studio musicians. The effort has not bypassed noted *Los Angeles Times* jazz critic Leonard Feather, who wrote the liner notes for the album. Says Feather, "Just as *Bird* the motion picture is unlike anything that preceded it in the annals of jazz and movies, *Bird* the soundtrack has no parallel in recording

history.”

The effort began a little over two years ago when Warner Bros. obtained the script from Columbia Pictures. Although no stranger to Parker's music, Eastwood asked longtime friend Johnny Adams, a jazz DJ on KRML-AM in Carmel, to put all Parker's music on tape. (Eastwood had first met Adams when the disc jockey acted as a technical adviser on Eastwood's *Play Misty For Me*, which was filmed at KRML's studios in the early '70s.) Adams put together 12 90-minute cassette tapes. Eastwood listened to them but wanted more, so he traveled to Paris, where he spent a week with Chan Parker, the saxophonist's widow. He was rewarded with several unreleased tapes, which he brought back to the United States.

At that point he needed to find a way to isolate Parker from the rest of the musicians on the tapes and records, many of which were recorded using the most primitive techniques in living rooms and basements. Eastwood first sought out Lennie Niehaus, who has worked as musical director on Eastwood's films *Pale Rider*, *Heartbreak Ridge*, *Tightrope* and *City Heat*. The two went to Rick Chace Studios in Los Angeles to attempt what had never been done for a movie soundtrack: a feat that would allow Bird to live again and play with contemporary musicians.

Audio consultant Gregg Geddes first transferred the raw sound from 1/4-inch tapes to a digital medium, then



During the summer of '87 Eastwood used a temporary facility in San Francisco to work on the production of *The Dead Pool* during the day, editing portions of *Bird* at night.

began the task of equalizing any tones that weren't in Parker's two-and-a-half octave range. "We took out anything we could in Bird's range," explains Niehaus. "We kept everything as much as we could without sacrificing the alto." Using a UREI Little Dipper, Geddes filtered out many of the high and low frequencies. "It hand-limits the signal so portions of the record can be identified according to their frequency response," he notes.

Next, using two dynamic active fil-

ters—a Dynafex by MicMix and an Ellison purchased in France especially for the job—Geddes removed the remaining frequencies. He adds that the music, much of which had been recorded onto acetates during the '50s, had loud clicks, crackles and pops that needed to be equalized out.

Geddes says no one was really sure if the experiment would work well enough to satisfy Eastwood and Niehaus. "What we had to do was not clean them up, but to second-guess what we could get away with when they were recalled. I was pleased with the results."

After isolating Parker's alto sax, Geddes transferred the sound to 35mm tape so, while the musicians were putting down their parts, the music could be synched with the movie.

"We had the processed signal on one side and the unprocessed signal on the other," says Geddes, referring to one track with Parker alone and another with Parker and the full band. "The musicians could at least get an idea of what the song was like."

Once over at CBS Records, Niehaus and engineer Bobby Fernandez began to weave their magic. First, Niehaus mapped out a click track to go along



(From left) John Guerin, Monty Alexander, Ray Brown, and Lennie Niehaus seated.



PHOTO: MACK MACDONALD

On location in rural Locke, Calif., Eastwood takes a break during the filming of the Kansas City scenes in *Bird*.

with the isolated sax tracks. Because of the poor recording conditions and quick takes on the original music, the tempos often varied from bar to bar. Two of the songs on the *Bird* soundtrack—"I Can't Believe That You're In Love With Me" and "All of Me"—were originally recorded at the home of jazz pianist Lenny Tristano, who had an early model tape recorder, with drummer Kenny Clarke tapping out the beat using brushes on a telephone book.

Because of the unsophisticated recording equipment and conditions in the 1940s and '50s, the piano and bass had particularly poor fidelity. Says Niehaus, "Some of those old things sounded like an alto and drum duet. The worse [the tapes] were recorded, the better it was for us [to eliminate the sounds]."

Niehaus adds that he was quite familiar with Parker's music long before he began work on *Bird*. "I'd been listening to *Bird* since I was 15," explains Niehaus, a sax player who performed with Stan Kenton's big band, "so I was familiar with certain phrases he would use. This helped greatly in the tremendously complex editing process." He also doubled the original string parts for "April in Paris."

Next, the musicians were called in to bring the music to life. "The musicians were in absolute awe of the opportunity," says Niehaus. It provided the opportunity of a lifetime for most

of them, but for bass player Ray Brown, it was a revisitation. Brown had played with Parker in New York when the bassist was only 19. Another old friend of Parker's who plays on the soundtrack is trumpet player Red Rodney, who, as the "token white" in many of Parker's combos, played the solo on "Now's the Time," which was originally recorded by Miles Davis.

Eastwood made sure that the music did not become too slick and that the musicians kept that "raw" quality of the be-bop era. "We didn't do it over and over," says Eastwood of the recording sessions. "They just listened to *Bird* and got with it."

Other musicians on the sessions included: drummer John Guerin; pianists Monty Alexander, Barry Harris and

Walter Davis, Jr.; bassist Chuck Bergerhofer; trumpeter Jon Faddis; vibes player Charlie Shoemaker; and alto saxist and Parker clone Charles McPherson, who played melodies on several newly recorded passages arranged by Niehaus.

Niehaus plays sax in one of the opening segments, when *Bird* is a teenager in Kansas City. Even then, the utmost integrity has been maintained. "I tried to play a few phrases that he started using later in his improvisation," confirms Niehaus. "People don't realize the work that went into this."

But, ah, the results were well worth it—for critics as well as the production crew. Shortly after the film was completed, Eastwood showed it at the Cannes Film Festival in France, where it received the award for Best Technical Achievement in a Motion Picture. "There was a lot of push by jury members for us to win a lot of things," says Eastwood, who adds that Forrest Whitaker (who plays Charlie Parker) also received the award for Best Actor. "But they don't do it like that over there, they like to spread it around."

Eastwood released the film in Europe after the festival, and by August the soundtrack had sold 70,000 copies, according to KRML's Adams. (On September 30, the film premiered in America at the Museum of Modern Art in New York, and was scheduled for nationwide release in mid-October.) Adams adds, "With *Bird* the door is open and what you hear is a legacy of jazz. It's also descriptive of a period of jazz. I think Clint is devoted to jazz—almost as addicted as I am; it's almost like a ritual."

Indeed, Eastwood attempted to leave most of the songs intact, and as a result, the movie runs about two hours and 40 minutes. (Most movies try to stay under two hours because they are easier to distribute.) With it, Eastwood believes he has accomplished his goal. "It's important when you are doing a movie about a musician that when you walk out of there, you know a little more about him and his music," he says. "I can't think of anything that I would do different."

And, thanks largely to Eastwood, *Bird* lives. ■

David Leland writes for the Carmel Pine Cone and other Monterey Peninsula publications. Also, he has been a musician for the past 15 years.

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Audio Animation Digital Console

A fully automated, all-digital console developed specifically for CD/digital tape prep and mastering has been unveiled by Audio Animation of Knoxville, TN. The 2-channel Muse offers real-time, 24-bit processing,



FIR filtering techniques, powerful automation (stores over 80 minutes of parameter settings, changing at 100 times per second) and a sample rate of up to 100 kHz automatically driven by the source, with digital inputs and outputs. The Muse lets the engineer implement EQ and dynamic control range through conventional pots or by designing curves on its high-res color monitor. Each of the EQ's five bands offers over 1,000 settings for Q, center frequency, cut and boost, while the DRC module provides over 2,000 settings for ratio, threshold, attack and decay controls.

Circle #144 on Reader Service Card

dbx Hiss Reducer

Addressing a wide variety of applications is the 563X hiss reducer, a new addition to the half-rack Performer Series from dbx (Newton, MA). This system is designed to eliminate background hiss that emanates from some audio

sources, without sacrificing treble overtones. Because the system provides single-ended noise reduction, no prior encoding is necessary. The 563X offers

single-slider, "set-and-forget" programming to dehiss any audio or video tape running from 1 7/8 to 30 ips. The filter allows musical or program high frequencies to pass, but instantaneously and unobtrusively attenuates other high-frequency energy. Features include: a control to adjust the initial amount of hiss reduction; LED display; front panel, 1/4-inch input to a high-impedance preamp with +0 to -20dB gain trim, and stereo link capability. The rear panel has 1/4-inch inputs and outputs (-10 or +4 line levels), low- and high-level output,



and master/slave pushbutton for stereo dehissing. The suggested retail price is \$219.

Circle #145 on Reader Service Card

AMS Logic 1 Digital Console

AMS/Calrec has released its Logic 1 digital mixing

console, which is fully integrated to work with its AudioFile digital audio workstation. The Logic 1's 32-bit floating-point architecture is said to offer an internal dynamic range in excess of 1,500 dB. The system's automation monitors every console function and allows for real-time updating (not snapshot recall) of any control adjustment. The console will be distributed in the U.S. by AMS Industries (Seattle, WA).

Circle #146 on Reader Service Card

E-V DeltaMax Speakers

Two DeltaMax systems currently comprise the new, electronically controlled speaker series from Electro-Voice (Buchanan, MI): the compact, 12-inch DML-1122 and the 15-inch CML-1152 2-way, full-range systems. The electronic controllers for the systems are dedicated packages with conventional frequency division, speaker protection, equalization and time delay. Protection circuitry monitors amplifier clipping and the excursion and temperature

of all drivers. When an overload is sensed at the amplifier terminals, the input signal is limited, without changing the spectral balance of program material.

Each system is enclosed in a birch plywood, 30° wedge cabinet, with a

trapezoidal shape for tight cluster designs. An optional three-point flying system with steel-reinforced, aircraft-type hardware allows the system to fly in multi-cabinet arrays.

Circle #147 on Reader Service Card



First Light Video

Shaping Your Sound is a series of 80-minute educational videotapes created for musicians, novice recording engineers and home studio owners. Priced at \$59.95 each, the titles include "Microphones" (exploring mic theory, selection and placement), "Equalizers, Compressors and Gates" and "Reverb and Delay," which together cover the basics of signal processing. All programs in this series, published by First Light Video (Los Angeles), incorporate "before and after" demos, computer graphics and live musical examples to facilitate the learning process. The series is hosted by Tom Lubin, the engineer/producer/educator known nationally for his seminars on multi-track recording with Fostex gear. *Shaping Your Sound* is available

from music and audio dealers, First Light Video, or Mix Bookshelf: (800) 233-9604 or (415) 653-3307.

Circle #148 on Reader Service Card



UltraAnalog 20-bit D/A Converter

A new, dual, 20-bit audio D/A converter featuring distortion suppression via internal deglitch amplifiers has been developed for all professional audio applications. The DAC D20100 provides superior linearity and stability over time and temperature, according to its manufacturer, UltraAnalog (Fremont, CA), and requires no external trimming to achieve its published specs. A universal serial digital interface allows the user to select from 16-, 18- or 20-bit resolution and from several input coding formats. It also features up to a 100kHz update rate per channel. Pricing on this "mini-module" (2" x 3" x 0.4") subsystem is approximately \$75 per channel (in volume), and availability is factory-direct.

Circle #149 on Reader Service Card

Hot Off The Shelf . . .

ART's ProVerb

Memory Update doubles the number of presets to 200 (including 90 new factory sounds), as well as adding internal battery memory backup. Call (716) 436-2720 for more info. . .

Cintaschrome, a new formulation of chromium dioxide cassette duplica-

Peavey Production Console

Totally modular is the key phrase for the new Production Series 1600/2400 recording consoles from Peavey, of Meridian, MS. Offering ultra-low noise design, gold-plated signal contacts, "unlimited" future channel options and the ability to accept after-market fader automation, the console is currently available in 16-, 24- and 32-channel versions. Features include: rack-mount power supply; electronically balanced input circuitry; 4-band sweepable EQ on each input; and 8, 16 or 24 submasters. LED metering is standard, with VU meters available as an option.

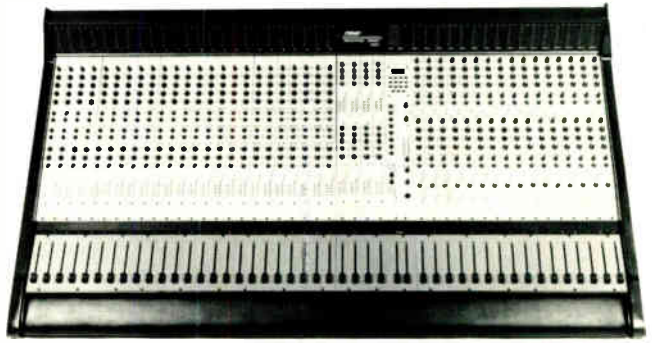
Circle #150 on Reader Service Card

DAR Updates SoundStation II

The SoundStation II digital audio workstation, from the UK-based Digital Audio Research, is now available in 2-, 4- and 8-channel record/edit/playback configurations. New features include: stereo "Time-Warp" (time compression and expansion of audio without pitch change); fully animated playback display (precise visual indication of track positions and durations of assembled audio, with

tion tape, is available in C-60s and 10,000/12,500-foot pancakes. CintasVAC, the manufacturer, also makes a line of ferric tapes. Call (904) 445-5545 for more info. . .

The Last System Formula Series is a family of products for the protection of tapes, disks, styli and tape heads. The Formula 10 Tape Preservative is said to dramatically increase



user-generated label for each segment); punch-in record; long crossfades; and full chase synchronization—all enhancing SoundStation's digital sound segment cutting and trimming, track slipping, reel-rocking and overall editing capabilities.

Another new feature is the system's ability to lock the selected internal sampling rate clock to a variety of sources, including PAL and NTSC video and SMPTE time code. Prices start at around \$60,000.

Circle #151 on Reader Service Card

Trident Series 24 Console with Patch Bay

The Trident Series 24 console now comes with its own 364-point TT patch bay, available on the 28-input mainframe, or a 468-point bay on the 36-input mainframe. The Series 24 console, featuring 4-band high- and low-mid sweepable EQ with variable high-pass filter, balanced inputs with separate gain controls and phase reverse, 8 aux sends with pre/post switching in pairs, 24 subgroups with direct mix assignment, and much

more, is available from Trident USA (Torrance, CA) for \$31,900 (28 inputs) or \$35,900 (36 inputs).

Circle #152 on Reader Service Card



the storage life of tapes by stabilizing the binder and reducing hydrolysis of polyester components. Call (415) 449-9449 for more info. . .

Integral Systems' Organizers are two IBM-compatible programs for production facilities: "Tape Library" offers tape location via title, artist, content, dates, keyword index and producer; "Order Tracker"

reduces billing cycles by tracking studio time, rentals and sales. Call (212) 262-3300 for more info. . .

Signature's CD Music Library has expanded with two new releases of 34 themes for A/V, video and commercial use. Each theme is from three to five minutes long and available on a one-time, buyout agreement. Call (616) 695-3068 for more info. . .

by George Petersen

PRODUCT CRITIQUES AND COMMENTS

T ANNOY PBM-8 PLAYBACK MONITORS

The Tannoy PBM-8s are the latest addition to Tannoy's popular PBM series of near-field reference monitors. Unlike Tannoy's traditional approach—using point-source, Dual Concentric speakers—the PBM series sports discrete components. A less obvious difference is that this new series is made by Tannoy North America in Kitchener, Ontario, and its design combines the resources of engineering teams from the company's Canadian and British facilities. These two-way speakers utilize an 8-inch poly woofer and 1-inch dome tweeter, crossed over at 2.8 kHz, in a rear-ported 15 x 10½ x 10½-inch cabinet weighing only 18 pounds.

One of the first things I noticed about the speaker was the hefty, five-

way binding post inputs on its rear panel. Besides accommodating a variety of connectors—banana, spade lug, etc.—these posts were drilled to allow the insertion of 12- (and with some effort, 10-) gauge wire. Since I am particularly picky about studio wiring, I was pleased to see these well-designed connectors, the likes of which are rarely seen on smaller studio monitors.

I connected the PBM-8s to my studio's BGW power amp, and the real fun began: listening tests. Immediately apparent was the speakers' relative inefficiency: with their stated sensitivity of only 92 dB (measured with a 1-watt input at 1 meter), you need a fair amount of power to drive them. Tannoy recommends a 125-watt/channel amp, which will provide a reasonable amount of headroom for monitoring at sane listening levels.

Poor low-frequency response is a symptom common to many small speaker designs, yet the PBM-8s are not afflicted with this malady. The PBM-8's combination of 8-inch woofer and a very effective rear-firing port provides a 3dB down-point of 47 Hz; a solid bottom end, indeed. I handle a lot of electronic music production work, and knowing what's happening in the low-frequency spectrum is critical. The Tannoys functioned extremely well in this regard, and I felt confident about mixing and tracking with the PBM-8s. Mixes done on the speakers translated well to playback on a variety of other systems, ranging from high-end audiophile speakers to car stereos.

High frequencies are handled by a 1-inch dome tweeter, providing realistic top-end response and fairly wide dispersion characteristics when used in near-field applications. The PBM-8s are not equipped with a tweeter control and don't really need one. They sound fine right out of the package.



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PHILIPS AND DU PONT OPTICAL



AUDITIONS

Although the PBM-8s do not incorporate mag shielding to prevent interference with video monitors, I could place the speakers as close as six inches to the picture without visual distortion. Tannoy may want to build this into future models, and while they're at it, possibly offer optional adapters so these 15-inch-tall speakers could be mounted horizontally in standard 19-inch racks.

At \$448 per pair, the Tannoy PBM-8s represent a good value and are a suitable choice as secondary reference monitors or as mains in a small studio, edit suite, MIDI room or remote recording van.

Tannoy North America, 300 Gage Ave., Unit 1, Kitchener, Ontario, Canada N2M 2C8; (519) 745-1158.

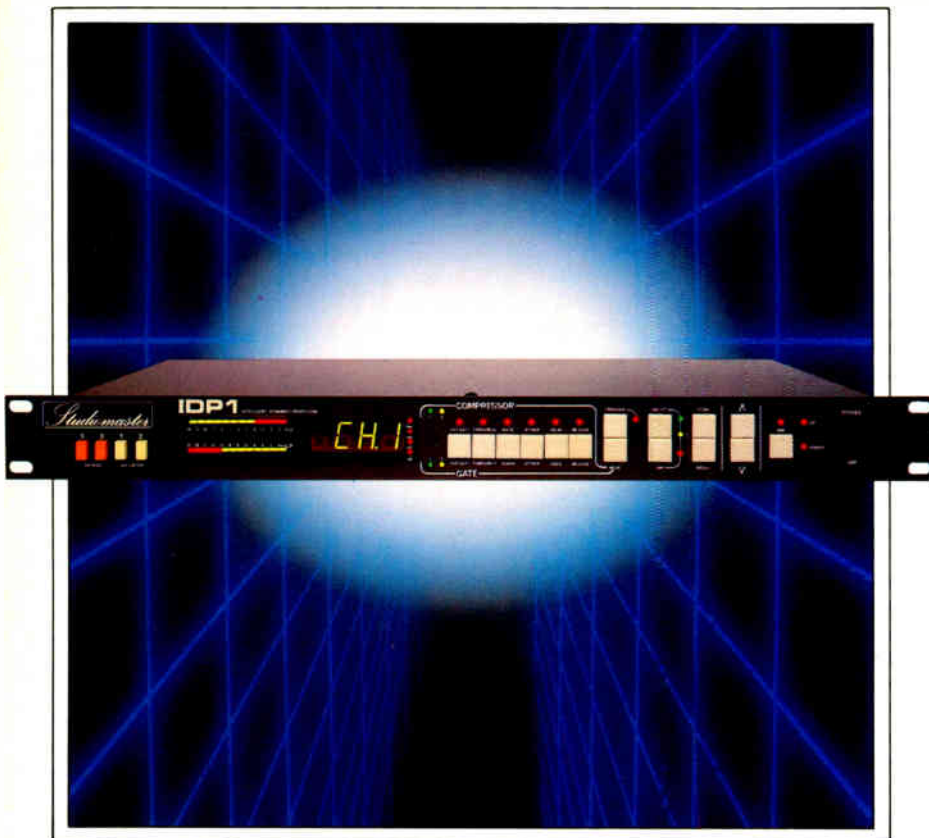
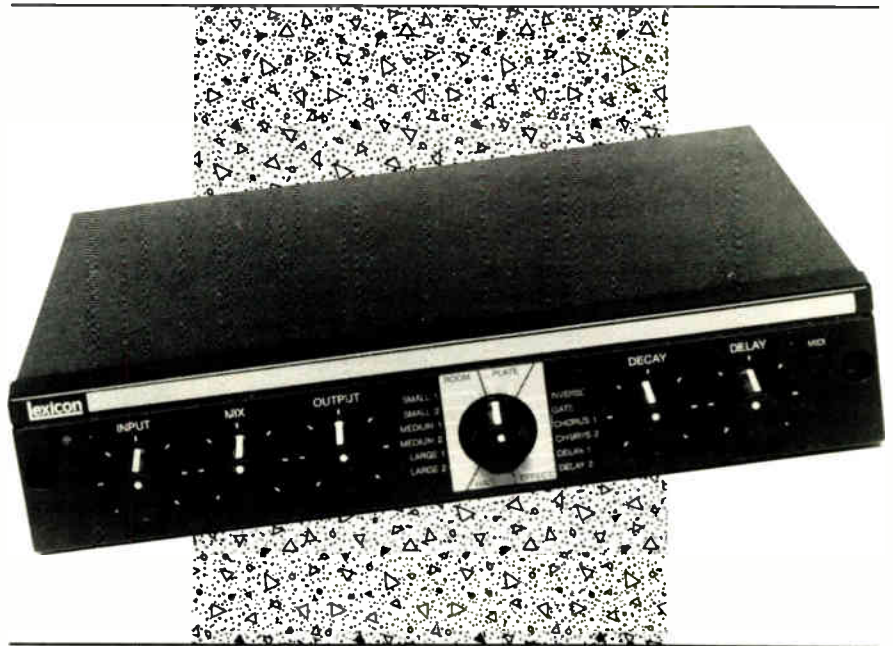
Lexicon LXP-1 Multi-Effects Processing Module

The LXP-1 shares a common legacy with Lexicon's other digital innovations, beginning with their 1972 introduction of the first commercial digital audio device. When their PCM60 de-

buted in 1984, it surprised an industry that believed quality reverb could not be achieved in a device costing under \$1,500. Now, four years later, Lexicon has pulled another rabbit out of the hat, this time in the guise of the LXP-1, a fully programmable, multi-effects

processor in a pint-sized case, at an equally miniscule \$499 retail price.

Certainly there are other low-cost digital reverbs on the market, some less than half the LXP-1's price, yet none of them compare to the degree of depth of parameter control, pro-



The StudioMaster IDP1 is an intelligent dynamics processor. Within its compact 1U case are two channels of fully programmable, MIDI compatible dynamics processing which can compress, expand, limit, gate and duck either 'manually' or via MIDI. These two channels can also be quickly linked for true stereo operation.

The IDP1 also features an Expander Gate which can be used in conjunction with the main program to eliminate any background noise or tape hiss etc. Further, the HOLD parameter in Compressor mode can be used to drastically reduce low frequency distortion (by about 0.34% at 100Hz), an inherent problem with many other compressors.

The front panel, though devoid of rotary controls, is clear and simple to use; indeed, in the words of Studio Sound magazine, the IDP1 has 'a well thought out operating system, which makes it a pleasure to use. Briefly, it employs a 'one key-one parameter' approach which makes editing faster and more straightforward than 'page' type systems.

The IDP1 leaves the factory with 23 useful programs preset, and a further 100 program spaces are available for the user. At the touch of a few buttons, programs can be switched over at desired points to make subtle changes to an instrument or mix. With MIDI triggering it, the IDP1 will not even need you to touch buttons. Now you can't do that with rotary controls!

For detailed colour literature, contact Jim Giordano, Paul Reeve or Tony Allen at STUDIOMASTER INC, 1340-G Dynamics Street, Anaheim, CA-92806 Tel: (714) 524 2227 Fax: (714) 524 5096

Circle #064 on Reader Service Card

STUDIOMASTER

THE SOUND EXPERIENCE

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grammability and versatility offered by this half-rack wonder. Lexicon obviously has done their homework concerning market requirements for such a unit, with excellent results. Most importantly, the LXP-1 can be operated on four different levels, depending on the user's requirements and needs. The most basic of these is merely selecting one of the 16 presets; the next step involves tweaking sounds via the two front panel (delay and decay) controls. Combinations of the former settings can be stored into user registers, or parameters can be assigned to different controller functions—such as mod wheels or footpedals—and altered in real time, via MIDI. The last stage is controlling the LXP-1 through system exclusive data from a computer.

The LXP-1's front panel is logically laid out, with the usual input, output and mix controls, program select switch, MIDI pushbutton (for selecting MIDI channels and storing registers) and two parameter controls. The latter's markings of "Delay" and "Decay" actually refer to predelay and reverb decay on the standard reverb programs only. These knobs control entirely different functions in the LXP-1's effects programs, and the user must refer to the manual to know what parameters are being altered.

Programming the front panel parameters and assigning them to the LXP-1's 128 internal user registers was a simple matter of holding down the unit's MIDI button while sending a program change message from any MIDI controller. This brings up one of the LXP-1's disadvantages: its internal memory settings cannot be accessed without using an external device such as a MIDI controller, computer or the Lexicon MRC (a remote box specifically designed for programming the LXP-1, PCM70 and many FM synthesizers).

The LXP-1's flexibility and depth of programming levels are impressive, yet the bottom line is the unit's sound, which is very good, both in terms of audio quality and the algorithms of the reverb and effects programs. I particularly liked the plates, halls and medium rooms; since these are the types of programs I use most often for recording and live sound, I am most critical about their sound when auditioning any reverb. The LXP-1's programs passed the test. While the unit doesn't provide a wide variety of ef-

fects programs, those it does offer (gated and inverse reverb, chorusing and delays) are a valuable addition.

The LXP-1 owner's manual is excellent, concise and informative. Software developers and advanced users will appreciate its 22 pages of MIDI implementation data, and undoubtedly we will see many patch editor/librarian programs for the LXP-1 in the months to come.

With the LXP-1's great sounds and under-\$500 price, it seems Lexicon has another winner. However, when such features are combined with a flexible, multi-level interface allowing

users to grow with the unit, Lexicon may finally have achieved the signal processing equivalent of *Everyman*. I'm sure we'll be hearing more from this half-rack wonder.

Lexicon, 100 Beaver Street, Waltham, MA 02154; (617) 891-6790.

A Complete Business Plan For The Small Studio

Finally, here is a book that addresses all the trials and tribulations of the business of running a small studio. *A Complete Business Plan for the Small Studio* offers a common-sense, nuts-and-bolts approach to operating a



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Circle #067 on Reader Service Card

modest—yet profitable—8- or 16-track recording facility. In fact, this ring-bound, 272-page treatise by studio owner Al Stone could become to studio owners/managers what John Woram's *Recording Studio Handbook* is to engineers.

Based on Stone's experiences and hard-learned lessons over the years, *A Complete Business Plan* is presented in a highly readable, anecdotal style that gets right to basics. And the emphasis here is on *business*, with chapters devoted to purchasing, financing, budgeting, employees, management, building the business, setting rates, advertising, accounting and implementing a business plan.

A major portion of the book is devoted to methods for selling the studio's services and expanding into new markets. Throughout the text, Stone gives numerous examples of how to find (and deal with) new clients by telephone, personal contact and business letters. Special attention is paid to effective telephone techniques used for sales and marketing, qualifying prospects and dealing with "problem" clients.

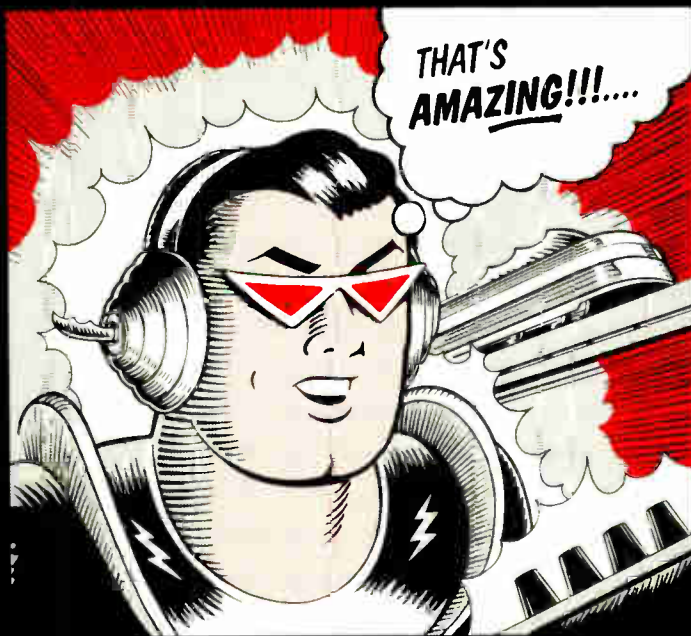
Comprehensive addenda provide samples of common studio documents (rate cards, invoices, rental and music production agreements, credit applications, work orders and talent releases), as well as direct-mail letters for studio promotion and for contacting new clients, such as ad agencies, schools, churches and corporate accounts.

Despite what some might feel is an exorbitant price of \$75 (less than a couple hours of studio time), the book's cost could easily be recouped if it results in a single new client. *A Complete Business Plan for the Small Studio* is an excellent investment for the 8- or 16-track studio owner, and I'd wager that quite a few 24-track facility operators could learn a trick or two from this text. Highly recommended.

C.A.S. Productions, 7108 Fremont Court, Indianapolis, IN 46256; or, from Mix Bookshelf, (415) 653-3307 or (800) 233-9608. ■

Mix products editor George Petersen lives in a 100-year-old Victorian house on an island in San Francisco Bay. He is currently researching mic techniques for mimes.

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World Radio History
Circle #026 on Reader Service Card

by Larry Oppenheimer

STUDIOMASTER

IDP1 DYNAMICS PROCESSOR

Studiomaster is branching out. Having made low- and mid-priced mixing consoles and power amplifiers for the last 15 years or so, they have apparently decided to broaden their line into signal processing. The IDP1 Intelligent Dynamics Processor, a programmable, MIDI-controllable, 2-channel compressor/limiter/gate, is their first step.

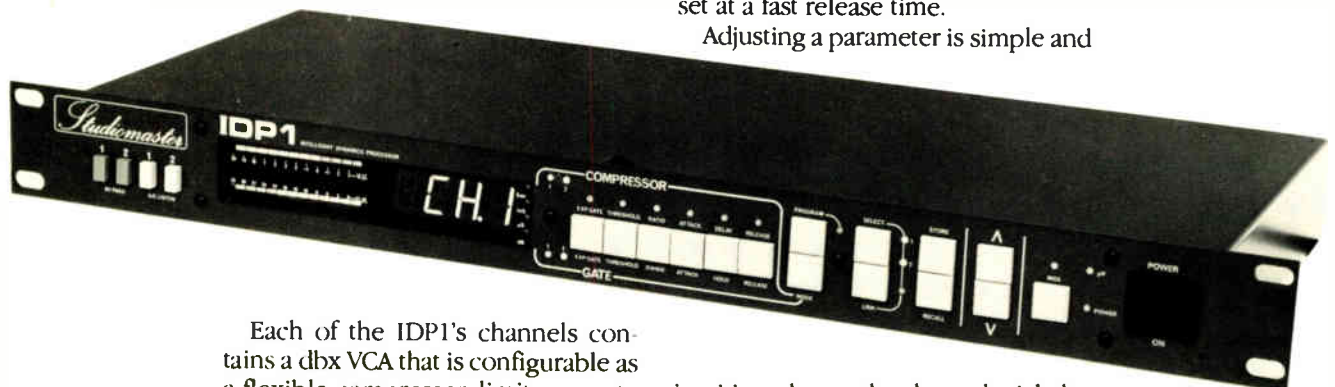
The IDP1 is a compact, one-unit, rack-mount package weighing about nine pounds. The rear panel is very straightforward, including MIDI In and Thru connectors (there is no MIDI Out), sidechain send/receive insert loop, -10 dBV/+4 dBm operating level selector and ¼-inch unbalanced input/output jacks (this is only indicated in the manual's signal flow lock diagram).

The front panel is similarly straightforward, although more heavily populated, with bypass and sidechain listen switches for each channel, 12-element LED ladders for input level and gain reduction, four-character alphanumeric display, 14 status LEDs and six parameter select buttons. On the right are six buttons that adjust global status (detailed below), increment/decrement switches and MIDI channel selector.

tively with the compression or gating action of the main processing section; thus, you can gate before compressing. The channels can be used independently or stereo coupled with the Link button.

In the compress mode, the following parameters are available: expander gate threshold, compressor threshold, compression ratio, attack time, delay time before onset of release and release time. The gate mode offers expander gate threshold, gate threshold, expansion range (maximum attenuation), hold time before release and release. The expander gate threshold is a Schmitt trigger to prevent jitter; it closes down when the signal drops more than 4 dB below threshold, and opens up as it crosses. Studiomaster defines gate attack as occurring when the signal exceeds the threshold, while some other manufacturers define it as occurring at the *beginning* of gain change action, i.e., when the signal drops below the threshold. The parameters all have wide ranges: release time is variable from 30 milliseconds to 50 seconds. The Hold and Delay parameters can be used to prevent "pumping" when the unit encounters low-frequency signals while set at a fast release time.

Adjusting a parameter is simple and



Each of the IDP1's channels contains a dbx VCA that is configurable as a flexible compressor, limiter or gate and is preceded by a simple gate called an "expander gate." The latter operates simultaneously and interac-

intuitive: choose the channel, pick the mode, select the parameter and use the increment/decrement buttons to adjust the value. There are 99 user

Even A Master Can Use A Little Inspiration From The MUSE

The MUSE. A fully digital transfer console specifically designed for **excellence** in compact disc mastering and tape preparation.

The MUSE offers *true inspiration* through profound advancements in processing power, functionality and precision. Unprecedented speed and ease-of-use unleash your artistic expression.

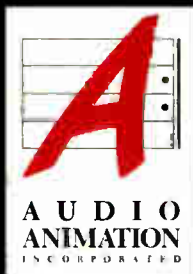
The MUSE provides the ultimate in flexibility and creative freedom by channeling its powerful capabilities to you through a remarkably intuitive interface. The control panel, designed with the guidance of top mastering experts, makes all relevant information instantly available through a high resolution color screen and 10 displays of up to 80 characters each. Create EQ and DRC curves with great finesse via the color screen . . . or with conventional controls.

The MUSE makes it simple for you to be a perfectionist with 24 to 56-bit extremely accurate real-time processing. Surpass the most demanding expectations of your clients **and** yourself using **the MUSE's** highly sophisticated software and **thousands** of control settings. Configure the processing modules, route signals, edit automation, adjust time code, design ultra-precise EQ and DRC curves, monitor any point on the signal path with headphones, line or VU meter . . . and much more.

And **the MUSE** will maximize your productivity with an automation scheme that allows over 80 minutes of updating control functions at 100 times per second. An entire CD may be mastered automatically . . . even while **the MUSE** is unattended! Store and recall every setting simply and swiftly with a disk-based system.

The MUSE achieves a new standard in sonic quality. Clear, uncolored sound is the superb result of **the MUSE's** proprietary architecture and algorithms, unparalleled processing speed, FIR filtering techniques and zero phase distortion. **All processing takes place totally within the digital domain** to give you the utmost in sound performance.

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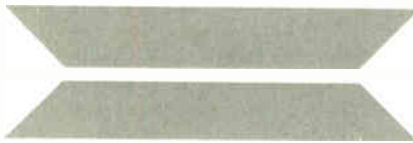
Audio Animation, Inc.
210 W. Main Street
Knoxville, TN 37917
Tel. (615) 544-0453
FAX. (615) 637-3473

memories (in addition to the 28 factory presets) where you can store the setup of either channel. This procedure is as easy as the rest of the operations.

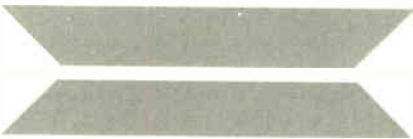
A user memory may be recalled into either channel regardless of the channel for which it was originally stored. Each memory stores the setup for only one channel, offering maximum flexibility in loading or storing programs, but requiring more keystrokes than storing both setups into one memory. Personally, I prefer the flexibility.

The owner's manual is short and concise, with plenty of graphics and examples. The introductory section on common dynamics processing tasks is well-presented and covers the basic points, as well as applications to complement the introduction's theory. Furthermore, appropriate factory presets are noted in the text. I had a problem finding some basic specs, such as the unit's weight or the configuration of the input/output jacks. Sometimes the information was there but was hard to find, sometimes it was nowhere to be found.

Each channel of the IDP 1 can be independently set to respond to MIDI program change commands on a selected channel (Omni mode operation is not possible). Further, MIDI



The sound of the IDP1 seemed to be very clean.



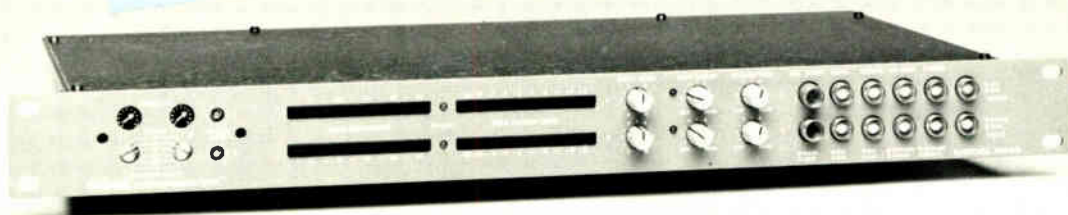
can trigger the IDP1's dynamic processes; a note-on or aftertouch command can be used to trigger the IDP1's attack, and a note-off can trigger the release. The velocity of the

message is interpreted as the "signal" level. Pitch bend messages can also trigger IDP1 functions, and a program change 0 command performs a temperature-compensating recalibration to assure that display values are accurate. The MIDI-triggered functions permit a variety of useful effects, such as triggered fade-ins, fade-outs and ducking.

Features are the IDP1's long suit. Considering its size, there's a lot of bang for the box and many thoughtful details: the sidechain loop simplifies frequency-selective dynamics processing, ducking and even more bizarre applications, such as putting a delay in the sidechain. Bypass and sidechain monitor are also handy, while the expander gate is another useful idea. With all these features, I was very impressed with the ease of learning and manipulating the IDP1. Although not quite as fast to tweak on the fly in a performance as a standard compressor/gate with front-panel knobs, the IDP1 was definitely speedy to use.

This brings up one of the questions that interested me most in contemplating this field test: how useful is programmability in a dynamics proc-

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essor? After all, there's not a lot to set up in a regular old compressor, and engineers know the basic settings they need for a given situation, so what real advantage does programmability offer?

As I used the IDP1, I began to appreciate having a bunch of pre-rolled problem-fixers that I could just grab and instantly compare. It seems there were always a half-dozen things I could try on the spot when a need arose. The factory presets were generally well-constructed and provided good starting points for new setups.

But it is the inclusion of MIDI that brings this package together. In a system with multiple synthesizers or samplers, a simple program change can access a dynamics control preset for each composite sound, just as a MIDI-controlled reverb lets you set an ambience for each. Plus, the expressive possibilities of using a MIDI controller to trigger ducking or gating are intriguing. When combined with the ability to trigger fades from a controller or sequencer, the concept of a microprocessor-based dynamics device becomes quite attractive.

I used the IDP1 for a variety of tasks, ranging from standard compression applications on vocals, bass and acoustic guitar, to effects and fades. In one case, I was doing a mix that needed a fade-out at the end to finish at a particular point. After a pass in which everything but the fade was right, I decided to try the IDP1. About half the instruments were being played by a MIDI sequencer reading SMPTE time code, so it was easy to patch the mix into the IDP1 and hook it into the MIDI system. After spending a little time tweaking the placement of the trigger and the length of the fade-out, the unit performed the fade just the way I wanted it, which freed me to concentrate on the rest of the mix, confident that the fade would be consistent on each pass. This type of control could be very useful in an audio post-production environment.


I regret finding no MIDI Out. Aside from the obvious applications of dumping the user memories (which cannot be done on the IDP1) or remote editing from something like Digidesign's *Q Sheet*, this also precludes using the IDP1 to extract amplitude envelope information from a signal and convert it to MIDI. Analy-

sis of audio signals and conversion/mapping of the results to MIDI data is an area that is ripe for development.

I was not able to make the expander gate serve me as well as the MIDI functions, however. The attack and release of this gate are not user-controllable, and I found them to be too quick, resulting in an inability to set the threshold such that note decays were not cut off. Without the expander gate, the noise pumping that is inherent in compression sometimes became quite objectionable. Some work is still called for on this feature. It would be useful for this gating effect to be switchable in the signal

path, i.e., to come either before or after the main dynamics processor. This function is, I believe, software generated, so this task should not be too difficult.

The sound of the IDP1 seemed to be very clean, although I regret that I was unable to put it on the test bench. I tend to look at signal processing devices from two applications standpoints: that of sonic "transparency" (authentic reproduction for areas such as jazz, classical music and many post-production chores), and that of getting "sounds," which is of importance whenever I am looking for effects rather than exact reproduction. I



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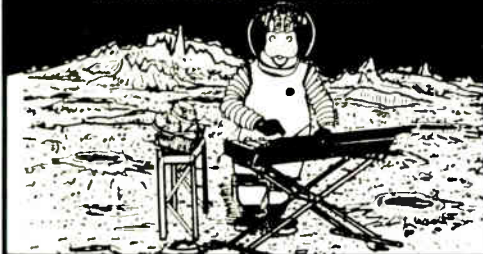
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have heard faster and more transparent dynamics processors than the IDP1, albeit in rather expensive, non-programmable units from manufacturers who had been established in this area for many years. (It should be noted that I have heard diametrically opposite comments from others whose opinions I respect.) I also had a few problems with the loss of continuous parameter settings that comes with digital control, which dictates that parameter values be quantized. In most cases I was able to find settings that worked, but a few times I needed a value that was between those offered.

Most of my uses for the IDP1, however, were for creating sounds for pop music applications. In this context, I found the IDP1 to be quite pleasing: the particular flavor of "squash" that it lent to 12-string guitar, for example, helped me fit the instrument into the mix in a way that made it present, yet blended it smoothly with the rest of the rhythm section. The 12-string's unevenness was reduced, but the desired rhythmic impact of the string noise was not diminished.

As Studiomaster's first offering in this area, the IDP1 offers an excellent complement of features and some interesting possibilities that expand the number of its uses. It is not an inexpensive unit (\$1,330 list), and if you can't use programmability and MIDI control, you may have a hard time justifying it. However, before you decide you don't need these features, put some thought into how you might use them, and keep in mind that the IDP1 is a 2-channel unit. Despite some minor inconveniences in the documentation and Studiomaster's abuse of the term "intelligent" in the device's name (its only "intelligence" is programmability), the IDP1 is a very good and useful addition to the ever-growing arsenal of programmable, MIDI-controllable signal processors on the market.

(Note: As this issue went to press, Studiomaster unveiled software Version 1.6, which improves the status display in stereo link mode and indicates the program change number when the unit is controlled via MIDI. For more information, contact Studiomaster at 1340-G Dynamics Street, Anaheim, CA 92806; (714) 524-2227. —Ed.)



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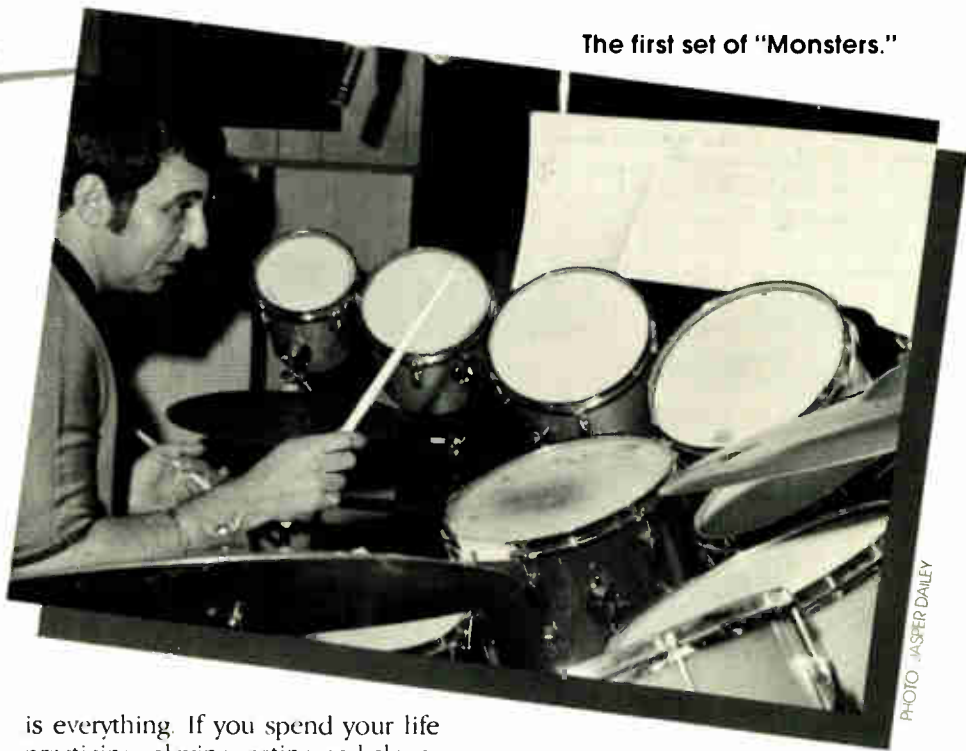
Upbeat

THE HAL BLAINE STORY

by Hal Blaine with David Goggin

My drums have always been my closest friends. I always loved playing, alone or with others. This was my way of communicating in the world; the music world was the only one I seemed to have any regard for. I was terrible in school, but I was wonderful in "drums." Maybe it was the show-off syndrome, but as a kid I always felt I would become a star and buy my parents a home and anything my sisters and brothers ever wanted. We were so damn poor. All I knew was that music was to be my lifelong profession. There was really nothing else for me.

If there is one thing I want to pass on to the up-and-comers in the music world, it's the fact that to be truly successful you must become married to your instrument. You may wed a wonderful person, but it takes someone special to understand that they will always play "second chair" to your musical instrument. This probably holds true for other instruments, too, whether it's a scalpel or a monkey wrench. The second important thing is to find a balance between you, your instrument and your family. Balance



The first set of "Monsters."

PHOTO: JASPER DAILEY

is everything. If you spend your life practicing, playing, eating and sleeping music, you will probably end up a mental case.

It's also essential to be a good listener. Music is a collaborative art form. You must always be aware of what the others are playing, because you use their efforts in building a song, a riff or an arrangement. And don't tune out the everyday needs of those who surround you. If you cut yourself off from the balanced life, it'll be the ruination of your family life, and eventually it will destroy your playing and your creativity. Think of building your life like you build an arrangement. There

must be highs and lows, and nothing is easy, but when you get the right words, melody and chord changes, your life will be like sweet music to your soul.

As a kid, drumming was my entire life. My sister, Marcia, got me my first drum kit when I was 13, and I've worked day and night ever since, pounding out my life. I was tormented with school and the poverty of my daily life, but in my private musical world I experienced the greatest natural high a person could feel. This is probably why I never got into the

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heavy drinking and drugs that seem to be a part of growing up these days. Of course, drugs were not a part of growing up in a ghetto in the '30s. It wasn't until the headlines broke—"Gene Krupa, Dope Fiend, Jailed"—that marijuana became a common item in the papers and also became associated with music.

After long years of paying my dues in cheap clubs from coast to coast and developing my chops, I made it to Hollywood and started building a reputation as a session drummer. At first, I was like any other drummer. I had my drums in the car, I'd go to the gig, sweat it out setting up, then sit down and try to be comfortable and creative. It was an exhausting grind.

I realized I had to make some changes if I wanted to accelerate my career and succeed. Hollywood had the solution ready and waiting for me: cartage. The cartage company delivered my drums, and arriving at the studio a half-hour early, I set them up, played the date, packed up the drums, and the cartage company picked them up. It was wonderful—well, almost.

Half the time my drums were delivered to the wrong studio. Other times a case or two would be missing, and I would panic to get things ready in time. Sometimes they were left at the front door of the studio, and I would have to haul them through the maze of cables and microphone stands that had been set up. When my session calls started multiplying, I added a second set of drums to make scheduling easier. The record companies paid the cartage bill, which was \$4.25 a session when I started. My last cartage bill was \$165. Times have changed, but butter used to be a nickel a pound when I was a kid.

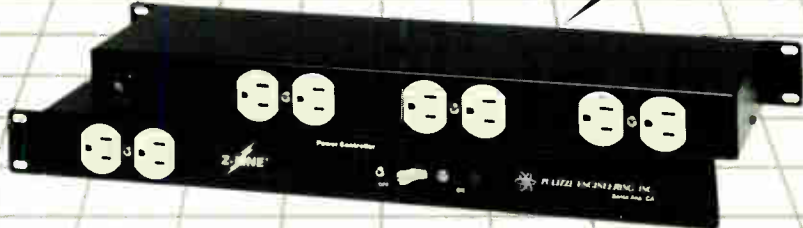
I was so busy I found it impossible to handle setting up and playing all the dates I was called for. There was only one solution. I needed a roadie, someone to set up and tear down and haul the sets of drums from studio to studio. The guy I found was Rick Faucher, a young kid who was working for Wally Heider on remote recording dates. He was a natural: a music fan and a mechanical genius. Rick built race cars as a hobby, and he straightened out my cars more than once when I had trouble.

Rick lived just off the Hollywood Freeway, minutes from all the top studios. It took me 25 years to develop my own setup, but I taught it to him in one day. I could call him at the last

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minute, and he'd have my drums at the studio and set up in minutes.

When I first notified the cartage company that I would no longer be using its service, the shit hit the fan. They told me I couldn't get my drums out of storage, because there was a few hundred bucks in past-due bills from some of the record companies. They had a California Public Utilities Commission license, and no one could deliver without that license. The word got back to me that I had better not mess with these people. They were known as arm- and leg-breakers and had some pretty shady connections.

I was badly shaken by the situation, but I also had a few friends who were known as tough characters. I talked things out with my business manager, Phil Singer, and we hit on a plan. Phil met with the district attorney, and we found out that I could legally get around the cartage companies and the Teamsters if I had a personal valet. So Rick officially became my valet (and knew he was taking a risk in doing so). We had a letter sent out to all the cartage companies from the DA stating that if anything happened to me, Rick or our families, a formal investigation would be conducted. We were making a major change in the way the music business ran in Hollywood.

I paid off the old cartage bills, got my drums and Rick took over. Then the cartage companies started taking movies of Rick delivering my drums. He was subject to continual harassment, but this skinny kid, who weighed about 105 soaking wet, never flinched. They made life difficult, but they never laid a finger on him, me or my drums. I was still holding my special police officer's rating from the San Bernardino Police Department and a concealed weapons permit, and I was never without my .38 detective special.

Within a couple of months, Rick was setting me up four or five times a day. On the weekends he kept the equipment in top order. I soon had five kits, and Rick hired some of his friends to keep them all in perfect condition. He would change heads as necessary, or follow instructions on notes I left after a session. He even drove to dates in San Francisco, San Diego and Las Vegas. He insisted that he maintain everything personally and had *carte blanche* at the pro drum shops, per my request.

Many record companies refused to honor my cartage bills for Rick. We

Before long, many drummers wanted a personal setup man like I had.

were getting in the hole with all the bills, and my business manager came up with another solution: set Rick up with his own cartage company. He got his PUC license, a new Ford van and was in business. I was making quite a name for myself, and soon other drummers started calling Rick to handle their cartage, but he told them he was too busy working for me. Before long, many drummers wanted a personal setup man like I had.

The cartage companies were between a rock and a hard place. They came to Rick and offered him all kinds of bribes to work for them. He was a hot commodity, but he stuck by me. The next step was for the cartage companies to hire and train special drum-setup personnel. The rest is history. If nothing else, Hollywood drummers can thank Rick and me for breaking the ice. Today, a drummer can walk in and play a job as a gentleman. The union passed legislation that a company hiring a drummer/percussionist has to pay for cartage. That led to the same benefits for bass players, harpists and other musicians who had to haul a cumbersome instrument to a date. It also includes the elaborate electronic setups common these days.

Rick stuck with me throughout the golden Hollywood years. He eventually started handling Jim Keltner, Ringo Starr and Larry Brown, among others. Everyone in Hollywood knew Rick and respected him. He was one of the few guys who had keys to all the studios and alarm systems and could walk in at any time, day or night, for a setup. Rick was always giving a helping hand to the setup guys at the studios, and he was also never too busy to grab a sandwich for a musician.

Rick was instrumental in creating my monster drum kit, a development that changed the sound of recorded music and put me at the top of my profession. Through my requests and guidance, he worked closely with Howie Oliver and the Pro Drum Shop

to make that first set with the elaborate tom racks, which we called Octoplus. Rick used to call me "The Naz," referring to Lord Buckley's characterization of Jesus. "The Naz never did nothing small," he would say.

The development of my monster drum set led to the kits that are marketed today by every drum company, including the electronic drum companies. I had no idea then of the impact my introduction of mid-range tuning and the racks of drums would have, or that it would mean recording studios would have to invest in lots of microphones to handle the proliferation of big kits. Of course, sampling and synthesizers have brought more changes to the studios, but they'll never replace a live kit in performance. I even feel that after the newness of all these electronic devices wears off, we'll see a return to some of the basic, good ol' drumming of the past.

Looking back over the years, I feel proud and lucky to have been a small part of a great era of record making. I have my gold records and photos, and I can always turn on the radio and hear my drums on hits that will live on long after I'm gone. ■

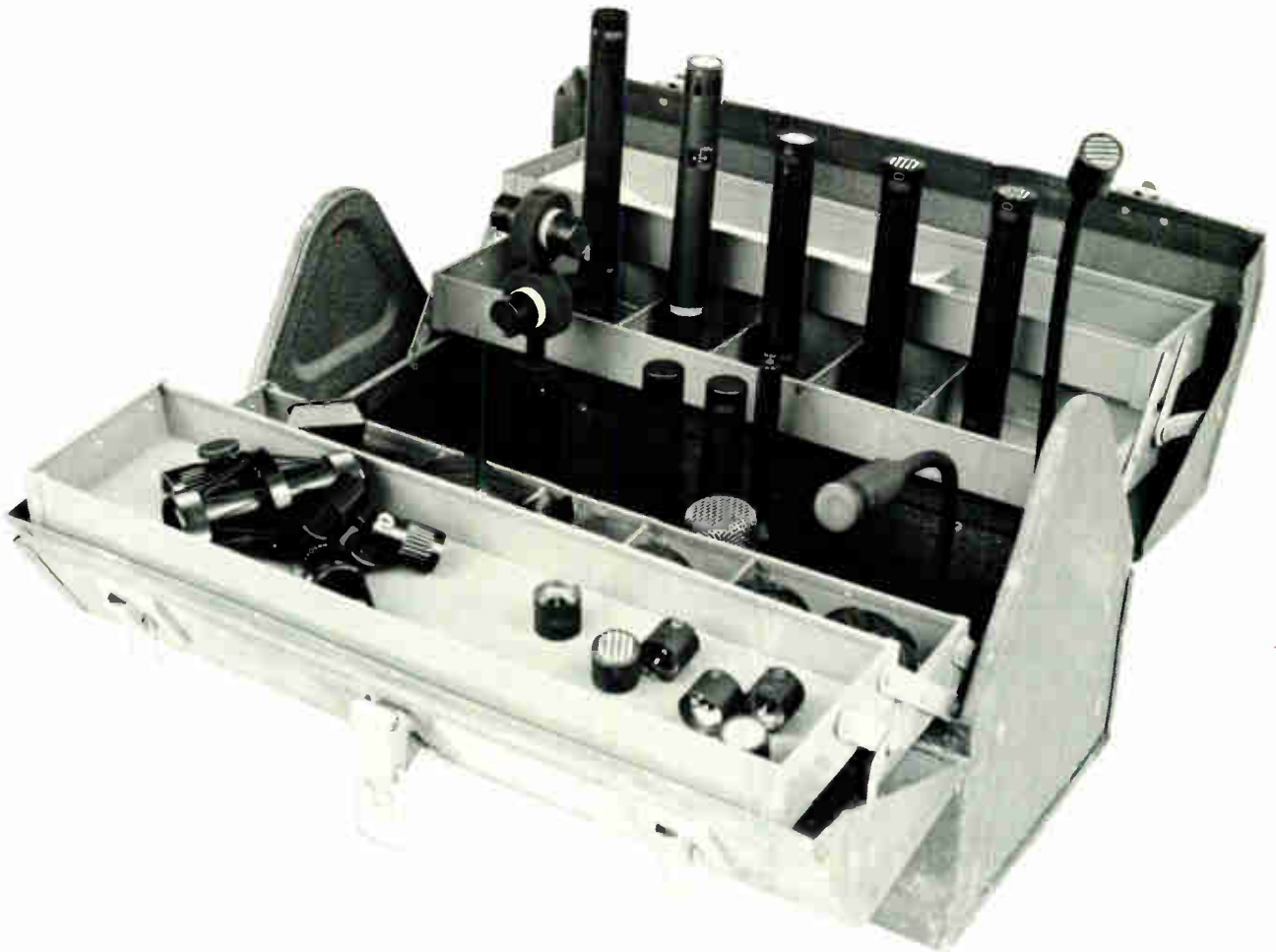
—FROM PAGE 48, *PREMASTERING*

tening environment that you know," emphasizes Jim Shelton. "A lot of people make a cassette from the tape, and take the cassette home. But cassettes are notorious for sounding completely different on different cassette machines. The point is, you need some kind of reference where you have a good idea of what you're starting out with on your master tape before you bring it to the mastering studio. So when you hear the recording played back in the mastering room, you can relate it to what you heard before, and have a good idea of what changes you want to make."

Whatever you do, remember, as Jim Bosken reminds us, that "mastering engineers can do as much as we can do to try to make the tape you give us sound as good as possible. But we can't perform miracles. There's so much that goes into mixing, so many things [recording] engineers pick up along the way that allows them to get top sound." ■

Linda Jacobson is assistant editor of Mix, and the owner of Wordswork, a creative technical writing/editing service based in San Francisco.

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by Craig Anderton

CD + GRAPHICS + MIDI WILL IT CHANGE THE INDUSTRY?

The MIDI connector first appeared on keyboards. Shortly thereafter signal processors sprouted the now-ubiquitous MIDI jack. Then came the flood: guitars, guitar amps, mixing consoles, drums, lighting controllers and even wind instruments becoming a part of the ever-advancing MIDI tide. When Atari included MIDI in their ST series

ers Association (MMA) think you are; in addition, CD originators Sony/Philips are considering implementing MIDI into the CD digital audio standard. The resulting protocol, CD+MIDI, may signal the widespread acceptance of MIDI into the world of the audio/hi-fi consumer—as well as change the way musicians make recorded music



COURTESY WARNER NEW MEDIA

Graphics screen from "Picture Book" by Simply Red.

of computers, MIDI was on the way to acceptance as a standard computer interface. Now there's talk of someday finding MIDI connectors on everything from tape recorders to home security systems.

But are you ready for a MIDI output connector on your CD player? Warner New Media and the MIDI Manufactur-

ers Association (MMA) think you are.

The main booster behind CD+MIDI is Warner New Media, an independent company that operates with the support of Warner Communications. Headed by industry veteran Stan Cornyn, WNM is dedicated to exploring new ways to use music and video technology. WNM first proposed CD+MIDI to

the MMA in January '88; since that time, all parties involved have worked together to insure a worldwide standard with the same sort of consistency and acceptance as MIDI itself.

CD+MIDI is possible because CDs have a significant amount of storage space (approximately 30 megabytes, about 5% out of the CD's 600-megabyte total) reserved for future use. This storage space is referred to generically as *subcode* (the P and Q codes that keep track of CD timing and similar "housekeeping" are examples of subcodes at work). Fortunately, subcode memory does not compete for space with audio. Over 70 minutes of audio can be recorded on CD along with the 30 MB of subcode data.

CD+GRAPHICS: GET THE PICTURE?

Subcode space is already being used to hold graphics data (CD+Graphics, or CD+G, as defined in the original

CD spec from Sony/Philips). Since CD+G is part of the CD+MIDI equation (both compete for the same subcode memory space), let's look into what this graphics data can do.

Graphics capabilities are medium resolution (300 x 200), and it takes about seven seconds to draw a new image on screen. There's also a 16-color limit; however, these 16 colors can be different for each picture (e.g., 16 different gray scales for one image, 16 different colors for another, 16 variations on a few colors, etc.). The image does not appear all at once, but is "painted" to the screen in small vertical rectangles.

There are provisions for 16 channels of graphics information. Generally, channel 0 provides the graphic backdrop against which other information from channels 1-15 appears. For example, adding in channel 1 might give you lyrics in the language of the original performance, while channels 2-15 could provide translations into other languages.

Another obvious use for CD+G involves opera. Consider listening to an Italian opera with an English libretto flashing by on the screen, along with biographical information on the main characters, and perhaps some historical background.

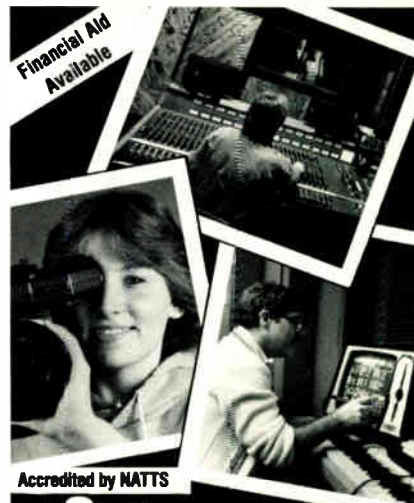
Naked, the latest Talking Heads CD, already contains CD+G data, and if you have the \$400 CD-Graphics Decoder that JVC showed at last summer's Consumer Electronics Show, you can see them. (The price of a CD player with graphics output is expected to be around \$400.) The graphics on the Talking Heads CD are fairly conservative, but nonetheless interesting—lyrics, chord changes to some of the songs and even a "track sheet" showing which instruments are playing during specific parts of the tune.

One problem that could arise concerns the use of the graphics for purely commercial advertising. On the other hand, if Sting is singing a song about Amnesty International, CD+G could list Amnesty offices to which contributions could be sent, as well as information about the work that Amnesty has done to help end the torture of political prisoners. In that sense, CD+G provides the graphic "sidebars" that allow for a more participatory listening experience.

Adding CD+ Graphics+MIDI To Your CD

If you're about to put out a CD, stop. Adding graphics and MIDI data is not all that difficult, and if you're planning to sell a reasonable number of CDs over which you can amortize the costs, it may not be that expensive.

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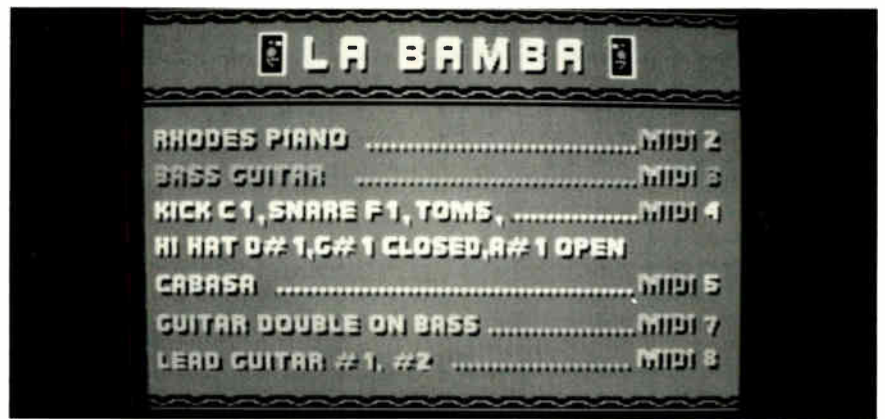
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CD+MIDI: THE MIDI CONNECTION

Like MIDI itself, the idea of CD+MIDI may seem limited at first, but once you start thinking about the possibilities, you begin to recognize how unlimited the potential really is. At this point, perhaps the biggest hurdle faced by CD+MIDI proponents is the need to convince manufacturers to spend the extra money required to include a MIDI output jack with CD players. Just like MIDI, though, once the jack is there we can expect it to be used. Here are just some of the possible applications:

Streamlined sheet music distribution. If a CD includes MIDI data for the lead vocal, bass line, chordal accompaniment and so on, it would be a simple matter to bring the CD to a facility (e.g., music store) equipped with transcription software and a laser printer, and print out sheet music on the spot for a nominal fee. Warner/Chappell, the world's largest music publisher and copyright holder, has given their support to WNM in this new venture.

The concept offers several advant-



This CD+MIDI screen from "La Bamba" lists the MIDI channels used for instrumental sequences.

ages to store owners and sheet music publishers. Stores wouldn't have to stock a lot of paper inventory. It would be easier to get sheet music for more esoteric CDs if the sheet music information was already encoded in the disc (ever try finding sheet music for an old record by an unknown group?). Since a computer is involved, it should be easy for the store owner to keep track of royalties—there wouldn't be any returns of unsold product; sheet music would be generated only as needed, on a per-custom-

er basis.

Education. Music educators could use MIDI data to spotlight particular aspects of a piece of music. For example, with pop tunes, the bass line, trumpet line or lead could be sent to MIDI gear for further analysis. Teaching students to differentiate between various parts in a piece of music would be simplified with CD+M.

CDs could also be designed specifically for education. A "How to Program Synthesizers" CD might include: audio narration and sounds of differ-

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ent patches, graphics data showing waveforms and how varying controls affect those waveforms, and for the *coup de grace*, MIDI System Exclusive (sys ex) data for downloading into your synth from the CD—along with sequenced compositions that illustrate how to make the best use of these timbres!

Budget CD-ROM for MIDI data. Thirty megabytes is a lot of data (even CD singles hold a lot of subcode data—around 8 MB). If this is used for storing synth patches as sys ex data, you wouldn't have to worry about balky tape interfaces, or loading disks into computer-based editor/librarian programs (although the latter would, of course, be helpful if you wanted to edit and tweak the system exclusive data after loading it from the CD). What's more, since the CD+MIDI data doesn't compete for memory space with the audio, over 70 minutes of patch sounds could be recorded for "browsing"; you could then load the banks with those sounds that interest you the most. Throw CD+Graphics into the equation, and it would be easy to highlight keyboard ranges over which particular patches sound best, or show patch sheets for especially interesting sounds.

Thirty megabytes can store a reasonable number of digitized samples. Companies that release instrumental sampling libraries (Prosonus, McGill University, Sound Ideas, etc.) could also include some digitized samples in a universal sample file format (perhaps the Audio IFF standard used in the Macintosh, or Digidesign's Sound Designer format).

Karaoke. In the many Karaoke bars throughout Japan, people (often happily inebriated) sing along with background tracks from which vocals have been deleted. Karaoke has never caught on in the U.S., but CD+G+M is well-positioned to aid the Karaoke market wherever it might develop. While graphics show the lyrics to facilitate singing along, the MIDI data could drive a small, multi-timbral instrument *a la* Roland MT-32 or Yamaha TX81Z.

Practicing. You are probably familiar with the "Music Minus One" recordings, consisting of an ensemble playing a piece but without one of the main instruments—guitar or sax, for example. The student can play along with this recording and fill in the missing part. With MIDI sequen-

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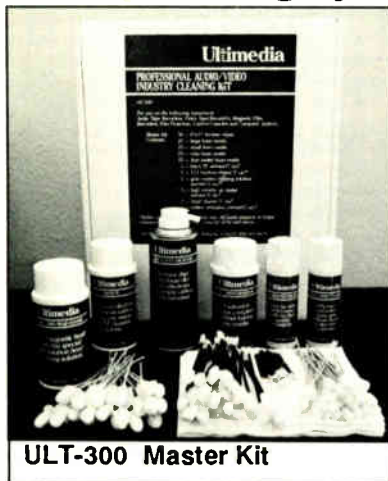
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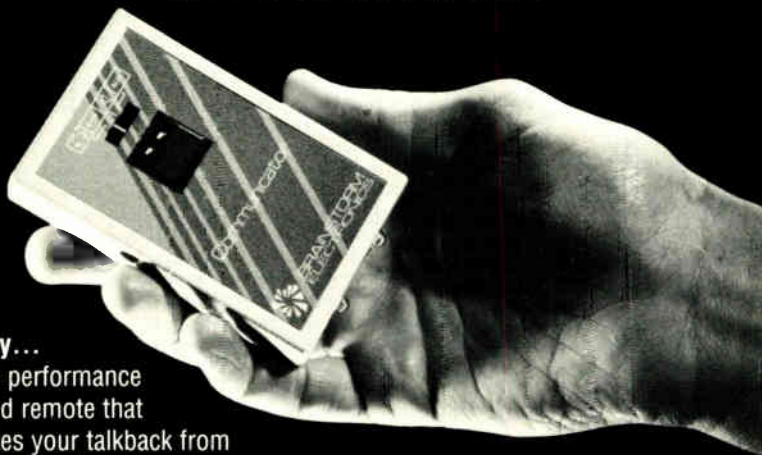
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ces stored along with the music on a CD, it would be easy to have your “MIDI band” play a tune from the record (you could first hear what it sounds like on the CD audio tracks), and simply turn off the MIDI track corresponding to the part you want to practice.

MIDI color organs. The color organ, popular during the '60s, triggered lights according to variations in the music. Color organs never really caught on for a variety of reasons; however, MIDI lighting control opens up a lot of options. With 16 assignable MIDI channels available, the effect would be far more impressive than traditional color organs. You would be able to “see” each individual instrument, with velocity information controlling each lamp.

In-store demos. How about a self-running demo for MIDI instruments, designed specifically for music stores? The audio part of the CD explains how the instrument works, while CD graphics show important features, block diagrams of how the instrument fits into a system and so on. Meanwhile, the CD MIDI information could send sys ex data into the instrument—anything from patches to samples to sequences—and issue MIDI Start, Stop and Continue commands at the appropriate times to run various sequenced demos. Manufacturers might also avail themselves of this opportunity to get in a sales pitch or two, thus freeing up the store’s salespeople to handle specific questions and problems. (I’ve heard rumors that Ensoniq is investigating the possibility of using CD+G+M as a way to provide in-store demo support to dealers.)

Imagine what this approach could mean when demoing a complex signal processor. The CD could provide audio source material to feed into the signal processor, while CD+MIDI sends MIDI data to the unit to change control settings, and the CD graphics show the theory behind what’s happening.

The ultimate bass box. How many stereophiles do you know who love thumping bass sounds? Well, you could feed the MIDI data into the consumer equivalent of 360 Systems’ MIDI Bass set for the channel carrying bass information, and there you have it—as much bass as you want.

Home entertainment. Some hi-fi

enthusiasts are born "tweakers" and love playing with their sound (witness the aftermarket in graphic equalizers, spatial expanders and so on). For these people, CD+MIDI represents a way to pull out lead lines and such, feed them into an inexpensive MIDI sound-generating device and modify the instrumentation of the music—while leaving the main-channel audio completely intact. Artists will also have the opportunity to do such tricks as encode alternate takes of solos as MIDI data; considering the interest in remixes and dance mixes, CD+MIDI could provide an easy, inexpensive way to pull several mixes out of a single tune.

IS CD+MIDI FOR THE MASS MARKET?

CD+MIDI seems well suited to consumer applications. Warner New Media would like to think that the concept has broad-based consumer appeal, as would manufacturers debating the notion of including a MIDI port with each CD player. In my opinion, CD+MIDI is a promising, clever idea, but one that will not necessarily appeal to consumers *at first*. Many of the applications that seem like an ideal fit for CD+MIDI

tend toward industrial, professional and educational markets; but CD+MIDI will probably follow a similar path to MIDI itself, which gradually filtered down from the monied studio pros to the consumer.

THE FUTURE IS NOW

According to one unnamed inside source, the first CD+MIDI product will appear on the market next June, and albums are already being formulated with CD+M in mind. Film scorer/musician Alan Howarth is working on an album project that will include graphics and MIDI data. While understandably secretive about how he's going to apply this new technology, he promises there will be some very good reasons to want to hook up graphics and sound. As mentioned previously, the new Talking Heads CD already includes graphics information, and other groups are rapidly following suit. Since it is relatively inexpensive to include graphics and MIDI information on CD (see sidebar), we can expect that this data will become available on more and more commercial releases.

Will CD+G+M change the music industry? It all depends on whether ma-

nor manufacturers include MIDI and graphics output jacks on their CD players. At the time, it was quite a leap of faith for the keyboard industry to include MIDI on all their gear—but one which has been proven to be both worthwhile and lucrative over time. If the consumer electronics industry makes a similar leap of faith and embraces MIDI, the rewards are likely to be substantial as well.

MIDI has proven itself to be a coy little critter that eventually delivered a lot more than it initially promised, (something of note in itself). Mating it with the CD can only make life more interesting and productive for musicians, and considering the increased consumer awareness of MIDI, CD+MIDI might be the critical element that catapults MIDI beyond the music world and into living rooms everywhere. If so, the benefits for musicians could be as significant as the MIDI specification itself. ■

Craig Anderton writes books, produces and plays music, and edits Electronic Musician, our sister magazine. This article initially appeared in longer form in the September '88 Electronic Musician.



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PAN MAN ANDY NARELL

by Morrie Warshawski

In a world full of anachronisms it may come as no surprise that one of the most popular musicians in Trinidad happens to be Andy Narell—a white man raised in New York and currently living in the San Francisco Bay Area. What makes Trinidadians so enamored of Narell is his fierce dedication to their national instrument, the steel pan.

Since 1978, Narell and his bands, The Andy Narell Group and the recent Pan Attack, have created five jazz albums that display his mastery of this quirky instrument that lies at the heart of Caribbean music. He has brought the pealing metal trill of steel pan to numerous film scores, including *Ghostbusters*, *9½ Weeks*, *48 Hours*, *Cocoon*, *Gorillas in the Mist* and *Moon Over Parador*. His presence can also be found sprinkled on albums by artists that run the gamut from Aretha Franklin and DeBarge to Manhattan Transfer and the Pointer Sisters, and on commercials for Apple Computer, Southwestern Bell and Porsche.

Narell jumps adroitly between his roles as composer, live performer, studio musician and producer. But the thread that holds all his activities together is Narell's love of a shiny chrome-plated saucer that began its life as an ordinary 55-gallon industrial oil drum.

The night I catch Narell



PHOTO: TIA DODGE

at the Great American Music Hall in San Francisco, he provides the audience with a thumbnail history of the instrument. Narell projects a soft voice and carries his slim frame casually around the stage as he changes instruments and prepares for the next set with his older brother,

—CONTINUED ON PAGE 124

ROBBEN FORD: BACK TO THE BLUES

by Iain Blair

1988 has proven to be a vintage year for fans of guitarist Robben Ford. Not only did he release his long-awaited second solo album, entitled *Talk To Your Daughter*, but he also played a nationwide headlining tour of clubs to promote the release.

If all that's cause for

celebration among his many admirers, it's even more heartening news for the artist himself. "I can hardly believe it myself, but it's ten years since I released my first solo album, *The Inside Story*," says Ford. "I just hope people haven't totally forgotten who I am in the meantime."

Despite the somewhat leisurely pace of his solo career—"It's not out of choice, either," Ford hastens to point out—there's little danger of that happening. The guitarist, who first made his mark back in 1974 when he was discovered by Tom Scott and invited to join the L.A. Express for Joni Mitchell's *Court and Spark* tour, has been anything but idle over the past ten years.

"Working with Tom and Joni and the L.A. Express was really my first exposure to jazz fusion," comments Ford, who stresses that his roots are in blues and R&B rather than jazz. "I grew up in Northern California, not rural Mississippi or the Delta, but from the time I first heard guys like Paul Butterfield and Michael Bloomfield, I fell in love with the music. That's how I got started, playing and singing the blues in a bunch of local groups in the Bay Area."

After a successful stint in the Charles Ford Band (named after his father),

—CONTINUED ON PAGE 126



PHOTO: CARL STODNA

ROB WASSERMAN'S BASS INSTINCTS

by Robin Tolleson

Mastering engineer Bernie Grundman heard hundreds of records last year, but Rob Wasserman's *Duets* stands out in his mind. "It has a nice, natural, spontaneous sound, and I really enjoyed the performances because they exposed more of the artists' abilities," Grundman says. The young bassist assembled something of a dream cast for his second album—Rickie Lee Jones, Aaron Neville, Lou Reed, Jennifer Warnes, Dan Hicks, Cheryl Ben-tyne, Bobby McFerrin and Stephane Grappelli each

have a track with Wasserman.

The 36-year-old Wasserman claims to have been influenced musically first by the Beatles, then by bassist Charles Mingus, but spent a lot of time listening to cellist Pablo Casals' records. "That probably affected me more than any bass player—his solo cello suites. That had something to do with my feeling that the bass could be a solo instrument."

His first solo outing was the critically acclaimed *Solo*, a collection of songs played on the upright bass, but with the ease and melodic beauty of a six-string guitar. Now *Duets* brings together a mixed bag of twosomes and lets us hear them where there's no room to hide. "There's a rawness in the record,"



says Wasserman. "I found that these kinds of tunes would only work when they were spontaneous. If that meant keeping in the boot-tapping on the Lou Reed tune, or various imperfections in the bass parts and vocal parts on all the tunes, at least you know that it's not pasteurized, it's a raw album. The only thing that's not spontaneous is the overdubbing, but since it was built on spontaneity, and most of these are first-takes, I don't think that hurt it at all. Every tune was recorded bass and voice first.

"When the project started I tried to be technically pure, keep isolation, record singers away from me and all that," says Wasserman. "It worked with Hicks using headphones, but Rickie Lee didn't want to wear headphones. So I stepped into the room and we started rehearsing 'Autumn Leaves,' and we immediately clicked. I was standing right next to her and the tape was rolling, and that turned out to be the take. The microphone was about five feet away from me, so I sound real distant, like a 1940s jazz

bass, but you can feel the bass is locked into every little breath, locked into what she was doing."

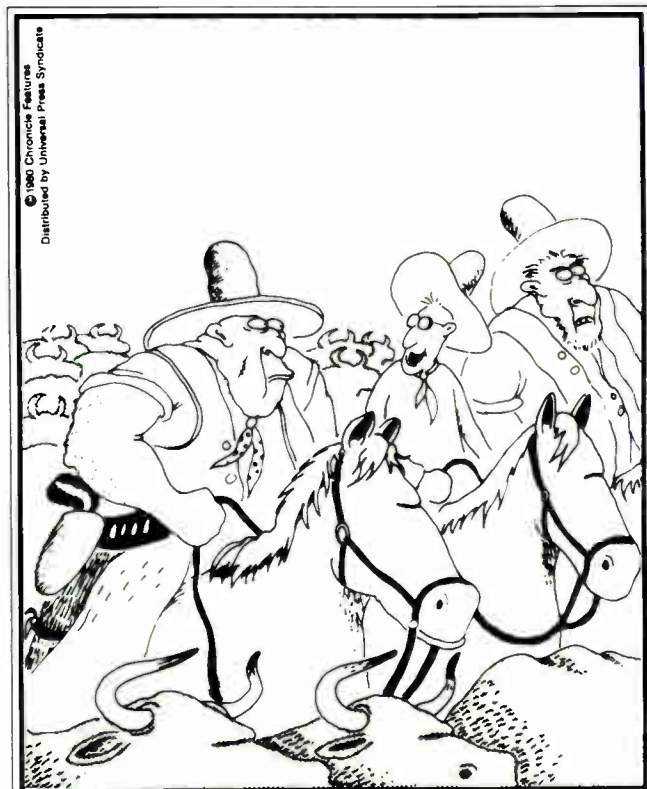
The bassist was pickier about recording his bass on his first project. On *Duets* he had too much else to think about. "I go into a studio and see what they have," he says. "On *Solo* I used two Neumann U87s, but now I'm just open to whatever the studio has that sounds best on any given day. Usually I put a mic on the left side, lower F hole, and then a mic up near the middle of the fingerboard, which picks up the high end of the instrument. With the electric upright I've just been going direct. I didn't use amp sounds or anything. But on the bass 'duet' I wrote, I miked it so although it's two upright electric basses, you can hear me breathing and my fingers moving."

Wasserman had his ground rules worked out about the project. He agreed to let his guests pick their own songs, but was adamant about keeping it a true duet record. "Most things that are called duets have bands, and I

— CONTINUED ON PAGE 128

THE FAR SIDE

By GARY LARSON



"Anyone for a chorus of 'Happy Trails?'"

—FROM PAGE 122, ANDY NARELL

Jeff, who teaches steel pan at the University of California at Berkeley.

"It all began in the 1930s as a result of political repression in Trinidad," Andy Narell points out while hanging a new lead pan on its leather hooks. "When drums were banned," he continues, "people started banging on ordinary pots and pans." Then Narell throws out a litany of key names: Lord Humbug, the original pan man; Winston Spree Simon, who first got the idea to hammer different pitches out of the top of a steel drum; and Ellie

Manette, the "father of steel band"—Narell's mentor, master tuner and inventor of the lead, tenor, double-second and triple cello pans.

Then the two brothers break into a duet version of "Jamaica Farewell" with a driving calypso rhythm that has the audience twitching their shoulders and hips from side to side. Narell's wrists flutter like hummingbirds as he extracts staccato bursts of notes from his lead pan.

It was Narell's father who first brought the music of the Caribbean into his children's lives. Mr. Narell's thesis on "Steel Pan" earned him an MSW, which he parlayed into a job as

a social worker on Manhattan's Lower East Side. As Narell explains it, "My dad was looking for a program for kids. He had this exchange student from Antigua, named Slow, who knew how to make steel drums. He made one set and taught a group of kids how to use them. Next thing you knew, there were 20 bands playing in dad's neighborhood center."

Andy was only 8 at the time. But he quickly took to the outsized instrument and was soon playing professionally in a group whose name still causes him some embarrassment—the Steel Bandits. Grace Lines made extensive use of them to drum up business for their cruise ship tours. The band specialized in Caribbean music and American pop standards like "Fly Me to the Moon" and "Begin the Beguine."

Then, in 1966, Narell met Ellie Manette, the man who helped shape his future. "He made us a set of instruments that put us in another ballpark," recalls Narell. "My relationship with him over the last 20 years has had a profound impact on my playing. He's given me my voice."

As Narell explains, there is nothing assembly-line about creating a steel pan. Each instrument is fashioned from an empty steel oil drum that is beaten first with a short-handle sledgehammer until the top becomes concave. The lengthy process of creation includes continuous beating with successively smaller hammers. Notes are achieved through a process of "grooving." The smooth, concave surface receives a series of convex rectangles that make the whole look much like a turtle's shell. After annealing the drum face down in a hot fire comes the crucial part of the process—tuning.

Men like Manette who make and tune steel drums are known as "hammers." It was Manette who first perfected the art of tuning each note around its edge to bring out the harmonics in the overtone series. Every tap of his small ball peen hammer means he must slightly readjust the entire surface. Each creation is a unique instrument that can cost anywhere from \$700 to \$1,500.

"It's like having a real close relationship with Stradivarius," says Narell. "If you lose a drum it's impossible to replace it. That's the headache and the beauty of it."

Narell's last album, *The Hammer* (Hip Pocket/Windham Hill Jazz), pays

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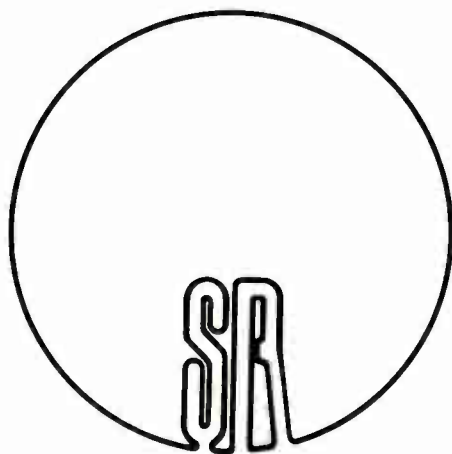
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homage to the craftsmen of steel pan. During the 18 months it took to create the album, Narell traveled to Trinidad three times. There he had what he calls "one of the greatest experiences of my life"—headlining with a 100-piece steel orchestra during Trinidad's annual Panorama Competition. Watching a video of the event you can just make Narell out—a small white buoy bobbing in a sea of black pan players, swaying to a cacophonous tune called "Pan Rising."

The album's sleeve sports a black-and-white photograph of a group from the early 1940s called the Invaders Steel Band. A young, barefoot Ellie Manette sits with a small oil drum between his knees. Part of "The Hammer" lyrics just above the photo read: *I want to hear the hammer*

ringing out

From every panyard

From Europe to Africa

Just like here in Trinidad

This hammer must never die

Let me tell you why

Anytime the music dead

Is life go buss we head

So the children start singing

the refrain

*Begging me to ask the question again
Where the man wid de hammer gone
Tell me, tell me where he gone.* ■

—FROM PAGE 122, ROB BEN FORD

the guitarist joined Jimmy Witherspoon's band in 1973. There he met his longtime collaborator, keyboardist Russell Ferrante, and the following year he was drafted by George Harrison for his *Dark Horse* album tour after the ex-Beatle caught Ford's shows with Joni Mitchell in London. "I think he's brilliant," commented Harrison at the time. "He's a great blues and rock player."

In spite of such outings, it was in jazz, and specifically fusion, circles that Ford really made his name. After working with Joni Mitchell on *The Hissing of Summer Lawns* and recording an L.A. Express album for Caribou Records in 1976, the guitarist formed The Yellowjackets in 1977 along with Ferrante, bassist Jimmy Haslip and drummer Ricky Lawson.

The Yellowjackets were an immediate success, much to Ford's surprise. "All the jazz fusion stuff was a bit left field to me, but it seemed to click,

and I used the band on my first solo album, 1978's *The Inside Story*," he explains. "Then we recorded the first group album for Warner Brothers in 1982, and I worked on the second album before leaving The Yellowjackets the following year. It was just time for a change of direction for me."

Since then, Ford has worked as a distinguished sideman for artists as diverse as Miles Davis ("That man has such presence; he's music's answer to Darth Vader"), Michael McDonald and Sadao Watanabe, before getting back to his roots and cutting his second, all-blues solo album.

"It should have been out a couple of years ago, but you know how these things go," comments the guitarist. "The truth is, we went in and cut the whole of side one in just two days, so I really do work fast when I'm in the position to. But then finishing the album was a whole other story."

After taking the self-financed master-quality demos of side one to Warner Brothers, Ford and his partner and co-producer Scott Ferguson were offered a deal on the spot. "Even though it was a blues record and the potential marketplace is relatively small, they were really behind it," he reports.

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But while his record deal was being sorted out, the guitarist got a call from Miles Davis inviting him to join his band and tour Europe and the States.

"It's not the sort of offer you turn down," says Ford, "although it turned out to be somewhat of a double-edged sword. Miles has been the most important musical influence in my life, and it was a privilege and an honor to work with him. On the downside, it was extremely taxing and the people in the band weren't really friends."

While Ford spent over six months on the road with Miles Davis, his solo record languished, eventually getting completed two years after the initial tracks were laid down. "In real time, the whole project only took about a month, but it was so spread out that it became very frustrating," reports Ford. "I was pretty relieved to get the record finished in the end."

Sessions took place at various studios in the Los Angeles area. Most of the basic tracks were cut at Sounder Studios in Chatsworth, and some additional tracking was done at Chick Corea's studio, Mad Hatter. The album was engineered by Mark Creamer and mixed at One On One Studios in North Hollywood.

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The impressive results feature Ford as an accomplished singer as well as a guitarist ("I always sang until I got into jazz fusion"), with old buddy Russell Ferrante on keyboards, Vinnie Colaiuta on drums and Roscoe Beck on bass. "We recorded everything as live as possible, and though it took over two years from start to finish, I think it sounds pretty consistent throughout," says Ford, who managed to cover some old favorites for the album and who insists he had "no misgivings about making a straight-ahead blues record in an era of syn-

thesizers and computers."

"The title track, J.B. Lenoir's 'Talk to Your Daughter,' is a classic and real catchy, and we also did a pretty straight version of 'Born Under A Bad Sign,'" explains Ford. "There's a Guitar Slim song, 'I Got Over It,' a Walter Jacob number, 'Can't Hold Out Much Longer' and a great track called 'He Ain't Got Nothin' but the Blues.' Purists might quibble, 'cause we changed the arrangements quite a bit, but hopefully this record is in the tradition of what the best white artists have brought to the blues."

Ford needn't worry. *Talk to Your Daughter* is an unpretentious, direct

and refreshing dose of the blues from an artist who really understands the music. Let's just hope it's not another ten years before his next follow-up. ■

—FROM PAGE 123, ROB WASSERMAN

wouldn't allow that," says the bassist. "It had to be just me and them. Lou [Reed] originally wanted to hire somebody to play chords and do a jazzier version of his tune. When I told him he couldn't, he said, 'Well, I can't guarantee I won't trash it.' He was laughing and started singing some strange punk lyrics on the telephone. He was trying to make me a little nervous, like, 'Okay, you want to go that way? We'll see what happens.' That tune was very live. He was playing the guitar and singing, and I was standing next to him playing the electric upright. It was one of those live takes with everything leaking into the vocal mic. This whole thing had that kind of energy."

Duets was recorded at studios in Texas, London, San Francisco, Berkeley, New York and Los Angeles. Different recording engineers were used throughout, but many of the tracks were brought back to San Francisco's Russian Hill Recording, where Jeff Kliment and Gary Clayton mixed. "I recorded analog to multi-track for everything," says Wasserman, who co-engineered and produced. "But I always had a Sony F1 running as a backup, in case there was a great take and no one wanted to overdub."

Overdubbing was held to a minimum on *Duets*, and very little processing was done on the sounds. "It has a very pure and direct sound," says Grundman. "In other words it didn't sound like much processing was going on. Very few electronic devices, if any, were introduced into the signal path."

Wasserman's bass sounds warm and natural, but it's hard to believe some things you're hearing are coming from a string bass, or even a stand-up electric. As Wasserman says, "I like to try to sound like different instruments, to project myself in different roles in the band. I was thinking like a piano on certain parts. On 'The Moon is Made of Gold' I wanted to sound like a lead synthesizer/flute. So I came up with a certain way of bowing the harmonics. First you have to know what you want to sound like, then you have to spend

—CONTINUED ON PAGE 159

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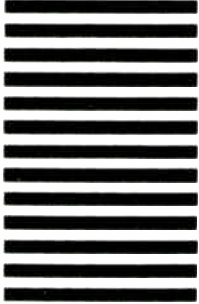
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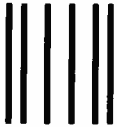
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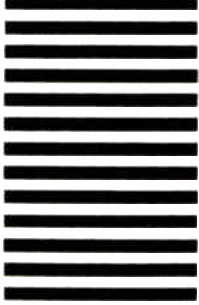
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THE TECHNOLOGY THAT PERFORMS

by Mark Herman

SOUND REINFORCEMENT NEWS

National sound reinforcement and lighting company **Electrotec Productions** of Canoga Park, CA, sold its entire lighting division. In the lighting business since the mid-'70s, Electrotec had recently been operating six large systems. **Pierre D'Astugues** said, "We sold all of our lighting equipment, and with it went the shop and touring personnel to the U.S. arm of London, England's, **SuperMick Lights**." . . . Sound reinforcement work for the company included recent U.S. tours with **Rod Stewart, Alabama, Randy Travis** and **Barry Manilow**, who finished his U.S. tour in mid-October and proceeded to Europe in November using Electrotec's UK division for P.A. . . . **Steve Winwood** was in Europe with Electrotec UK carrying 80 Lab Q cabinets for main P.A. . . . Hard rocking **Def Leppard** continued to draw well for their in-the-round show and finished in early November. "The audiences love the close proximity to the band," D'Astugues said of the Def Leppard setup. "There is a tremendous degree of excitement when the audience is literally around these huge and very elaborate sound and lighting systems. You can see it all; there is no attempt to mask any of it off. One can see the mechanics of the whole thing working. It makes you feel much more a part of the show." **Robert Scovill** engineers the house mix. . .

Relatively unknown to most, the **Marlboro Country Music** (see "On the Road") U.S. tour with multiple national acts and elaborate staging is a big event. Electrotec has been doing it for four years now. It's a five-week tour complete with large video screens and elaborate lighting. Headliners who rotated in and out included **Alabama, Randy Travis, Ricky Van Shelton, Merle Haggard, Restless Heart, The Judds, George Strait**

and others. Engineers **George Barnes** and **Mick Whelan** assisted band-supplied mixers with monitor and house sound. Electrotec's new custom single 15-inch floor cabinets were employed for monitors. D'Astugues observed, "The speciality of this show was the rapid changeovers made possible by the complete duplication of the house and monitor electronics and cabling. The stage was arranged so that much of the equipment was premixed and preset to enable us to

flip-flop from one monitor system to another. We accomplished changeovers in ten minutes, and the bands did not share any equipment. They used entirely their own regular touring equipment." The country show tour employed a flying delay system. "The whole concept with Marlboro is that

Setup for the Marlboro Country Music Festival at the Omni Arena in Atlanta.



every seat in the house is a good seat for audio. It musn't be loud in the front, either. We used a flown, full-range, 10-box cluster delay system, hung over the mixing position to cover the seats furthest from the stage."

Illinois sound reinforcement company **dB Sound Inc.** reported increased tour work this past year. Spokesman **Scott Larson** comment-

ed, "1988 was our busiest summer season ever, and it now appears that things will continue to keep us busy; there is no end of work in sight for us." dB had concert tour work with the following clients: Germany's **Tangerine Dream** along with former Police guitarist **Andy Summers**; two tour legs of **Dirty Dancing**; singer **Harry Belafonte** in Europe with

Meyer P.A., Yamaha PM3000 and Ram-sa 840 consoles; **Richard Marx's** summer tour; veteran vocalist **Eddie Money**; Christian band **Stryper**, who are carrying a dB Sound HD main P.A. system on a year long tour; **R.E.O. Speedwagon**, carrying house electronics and full monitors; and mega-star **Prince** (see "On the Road"), who took out a large system in Europe this

ON THE ROAD

SOUND COMPANIES, EQUIPMENT, ARTISTS & PERSONNEL ON TOUR

Artist Sound Company Tour Dates & Region	House Console #1 House Console #2 Monitor Console #1 Monitor Console #2 House Crossover	Main Speakers Other Speakers Subwoofers Monitor Speakers	Main Amplifiers Other Amplifiers Sub Amplifiers Monitor Amplifiers	Engineers: (B) = band (H) = house (M) = monitor (a) = assistant
AC/DC M.H.A. Audio Inc. May-Nov North America	Hill Concept 6400 48x16x2 ---- Hill M-3 32x10 ---- Hill	(90) Hill M-4 ---- ---- M.H.A. Custom	Hill DX 3000 ---- ---- Hill DX 3000	Mike Scarfe (H) Bobby Owens (M) John Batty Bruce Nelms Steve Jones Keith Suffecool
John Cafferty & Beaver Brown Band Scorpio Sound Aug-Nov Northeast U.S.	Soundcraft Series 4 40x16x2 ---- Soundcraft 800B 40x14 ---- BSS 360	(28) EAW KF-550 ---- (10) EAW SB-550 Scorpio Wedge 2x12	Crest 8001 ---- Crest 8001 Carver 1.5	Karl Rasmussen (B, H) John Muldowney (B, M) Barry LaMotte Carl Gagnon Ken Fontaine Jeff Karlson
Joe Cocker Jason Sound Industries August North America	Soundcraft 2400 42x10x2 ---- Soundcraft 500 32x12 ---- BSS MCS	(8) JSI J-62 (16) JSI J-63 (12) JSI J-1 JSI J-7, J-14	Carver 1.5 Carver 1.5 Carver 1.5 Carver 1.5	Rod Libby (B, H) George Wehrlin (B, M) Pierre-Paul Charbonneau (H) Glenn Collett (aM)
Little Feat Showco Sept-Nov U.S. Nov-Dec Europe	Yamaha PM3000 40x8x2 Soundcraft 200 16-ch ext. Harrison SM-5 32x16 ---- Showco	(12) Prism ---- (4) Prism Subwoofer Showco Custom 600	Crown PSA2, MT1200 ---- Crown MA2400 Crown MT1200	Ken Fowler (B, H) Mark Hughes (M) Bill Sheppell
Marlboro Country Music Tour* Electrotec Sept-Oct U.S. *(various artists)	Soundcraft Series 4 40x16x2 Soundcraft Series 4 40x16x2 Lab Q Soundcraft 32x18 Lab Q Soundcraft 32x18 BSS 360	(64) Lab Q ---- ---- Electrotec Custom 1x15	Crown MA1200LX ---- ---- JBL 6233, UREI 6400	Band supplied (H, M) Mick Whelan (aH) George Barnes (aM) Courtney Jones Joe Stogner
Prince dB Sound Inc. July-Sept Europe Sept-Dec North America	Yamaha PM3000 40x8x2 Yamaha PM3000 40x8x2 & Soundcraft Series 4 40x16 Midas Pro 40 36x16 E-V MTX4, Meyer *(Midas/dB custom quad 8x6)	(54) E-V MT, (16) E-V DML (32) Meyer MSL-3 ---- dB Custom 2x12 Wedge	Crest 8001 Carver 1.5 ---- Crown Delta Omega, PSA2, Crown MA2400, Crest 8001	Rob Colby (B, H) Harald Danker (M) Bruce Judd Tom Nicks (aH) Rick Cordash (aM) Guy Novack Jeff Nelson (Quad)
Scorpions Audio Analysts August-Dec U.S. Jan-March Europe	Midas Pro 40 40x12x2 Yamaha PM3000 40x8x2 Soundcraft Series 4 40x16 BSS MCS, BSS 360	(64) AA HDS-4 ---- (12) AA Subs AA 2x15, A-3 SF	Crown MA2400 ---- Crown MA2400 QSC 3800	Achim Schulze (B, H) Wolfgang Hofer (B, M) Mario Leccese Mark Jay Bob Leonard

summer and is due to finish touring North America in December.

Without a doubt, Prince is dB's biggest act. The P.A. and monitor system provided is quite extensive. Besides being in the round with 54 Electro-Voice MT boxes, there are quad points—each with an eight-cabinet Meyer MSL-3 array—for a total of 32 MSL-3 cabinets in the quad system. More than 20 of the E-V loaded custom wedges, along with additional sidefills, are used for the monitors. For the house mix, two Yamaha PM3000 40-input consoles with custom patch bays and a Midas/dB custom 8x6 quad console built for the quad mix are used. "We built a double-bay custom Midas console from a Pro 4 frame and outfitted it with Pro 40 PR41A modules, Pro 4 submaster modules and quad panners," explained Larsen. "This is probably one of the most unique and elaborate tours dB has ever done. It is staged in the round and the \$2 million hydraulic stage is very high tech. There are six P.A. cluster hangs around the stage, so you can hear stereo in every part of the room, and an additional quad speaker system. Sometimes we've stacked the quad cabinets up in the corners of the coliseums, but they are flown if possible." This tour necessitates a total of 18 trucks and requires a day in advance to set up. While in Europe this past summer, Prince doubled up on various equipment for stadium dates and was reportedly using up to 34 trucks of tour gear. One hundred and thirty crew and 120 stage hands were employed for the large venues. The entire system was air freighted both ways across the Atlantic Ocean for the European tour leg.

Recent dB equipment purchases include two Ramsa 840 consoles, an assortment of signal processing devices and 60 Crest 8001 power amplifiers (for the Prince system). dB Sound is also a pro audio equipment dealer.

Name Change: At the beginning of 1988, Maryland-based sound-reinforcement company **Malcolm Hill Associates, Inc.** changed its name to **M.H.A. Audio Inc.** to avoid confusion with pro audio manufacturer **Hill Audio**. They also have a European division in the UK: **M.H.A. Audio Ltd.** M.H.A. has four complete systems with a total of approximately 250 speaker cabinets. Touring North America with **AC/DC** (see "On the Road")

since this spring has kept M.H.A. busy. The tour actually started in February in Australia with a complete P.A. system brought from America. Ninety Hill M-4 cabinets and a massive monitor rig were transported via ship. . . . The European systems were out with **Statu Quo**, the Norwegian group **aha!** and **Gary Numan**. Regular M.H.A. arena clients in the past include **Marillion** (who are very popular in Europe) and **Gary Moore** (another act much more successful in Europe than the U.S.). . . . In the new equipment category, M.H.A. has been using the new Hill Audio Concept 6400 48-channel mixing console. They've recently purchased four Concept 6400s, with one remaining in the U.S. and three going to Europe.

Audio Analysts' concert touring schedule remained busy. Germany's rockin' **Scorpions** (see "On the Road") were out with a 76-cabinet main P.A. system on a U.S. tour that ends in December. A two-month tour leg in Europe follows. . . . Monsters of Rock headliner **Van Halen** began a U.S. arena tour in early October. . . . Other tours were with **Pat Benatar**, **Freddie Jackson**, **New Edition** and **Bryan Ferry**. . . . **Amnesty International's** Human Rights Now! tour utilized AA with stadium dates in Costa Rica, Canada and India. **Albert Leccese**, who traveled to Costa Rica, said, "It rained all the time, but it was a good show—the people loved it." Equipment-wise, this past year saw Audio Analysts build many new HDS cabinets to add to their P.A. inventory, and the introduction of the CADD digital crossover. The new crossover got its initial work on this summer's Monsters of Rock tour. Leccese stated, "We sussed out all the problems on the Monsters tour. It was functioning under the worst possible conditions in a series of outdoor stadium shows with rain, heat and humidity."

Scorpio Sound, of West Bridgewater, Mass. (near Boston), is a Northeastern regional concert sound reinforcement company that does some national touring. They've been in business nearly ten years and have worked with many national acts. One of their steady clients is **John Cafferty & the Beaver Brown Band**. They also reported recent tour work with **Rick James**. "Business-wise, 1988 was good for Scorpio. Things have been on a steady climb," said **Gary King**. For P.A., Scorpio has a flying Eastern Acous-

tic Works KF-550 full-range P.A. system with SB-550 quad, 15-inch subs. A bi-amped, proprietary-designed monitor system is available for the stage. Multi-pin wiring for the snake, sub-snake and amp racks allow for quick setup and strike. Amplifiers are Crest 8001s for the mains and Carver 1.5s for the monitors. King commented on the Crest amps, "The 8001s are working real well. We've been beating the death out of them at 2 ohms. Since they're putting out over 1,400 watts per channel at 2 ohms, we're running four 15-inch speakers off one channel. That's over 2,800 watts per amplifier, something unthinkable several years ago." . . . Consoles are all Soundcraft with a Series 4 house 40x16x2, an 800B house 40x8x2, an 800B stage 40x14, and a 400B stage 32x10. King stated, "Since we have two sets of consoles, two complete monitor rigs and 38 main boxes, we are able to run either two separate theater-size systems or a larger arena-size system." . . . The house system usually has two loaded dbx 900 frames, a Klark-Teknik real-time analyzer, BSS limiters and crossovers, and Yamaha, Aphex, Lexicon and Roland signal processing. King added, "We run most of our power distribution system, with the exception of our amp racks, through a voltage regulator and line conditioner made by Juice Goose for clean, stable voltage."

British Columbia's **Jason Sound Industries** completed a European tour with fellow Canadian and main client **Bryan Adams** in August. The equipment was containerized and shipped to Montreal via boat. Upon arriving, the gear resumed touring with new client **Joe Cocker** (see "On the Road") for a short stint in Canada and the U.S. The entire 36-cabinet main P.A. was used several times for Cocker. . . . JSI provided sound for industrial client **Toyota's** annual Canadian new car model unveiling. Held this year in Vancouver, BC, it required four stages and four sound systems at four different locations in the city. . . . Other industrial clients include Kellogg's and Molson Ale. Owner **Jeff Lilly** noted, "The industrial market will pay a higher rate for a short term rental than will concert touring clients." ■

Author Mark Herman owns Hi-Tech Audio, a sound reinforcement company specializing in console rentals.

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 September/October—1986

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TAPE-TO-DISC DIRECTORY

Listings of Mastering, Pressing, Tape Duplication and Compact Disc Facilities

The information in the following directory is based on questionnaires mailed earlier this year, and *Mix* does not take responsibility for the accuracy of the information supplied to us by the companies listed. Personnel, equipment and prices may change, so verify critical information with the companies directly.



Located in Wheaton, Ill., Disc Masters is the installation site of the first complete Neumann transformerless disc mastering facility in the U.S. Shown here is the turntable platter of the VMS-80 lathe, equipped with an SX-74 cutting head. Other equipment includes a Neumann SP-79b console and an SAL 74b cutting rack. The facility currently handles analog records, but future plans include CD premastering and real-time cassette duplication. Photo: Boschke Photo/Kenderick Graphics.

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Mix listings procedure: every month, *Mix* mails questionnaires to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a Boldface Listing (name, address, contact) and an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department, 6400 Hollis Street #12, Emeryville, CA 94608; (415) 653-3307.

Upcoming Directory Deadlines

Independent Engineers/Producers: December 15, 1988

International Directory (UK and Western Europe): December 15, 1988

Video Production/Post-Production: January 15, 1989

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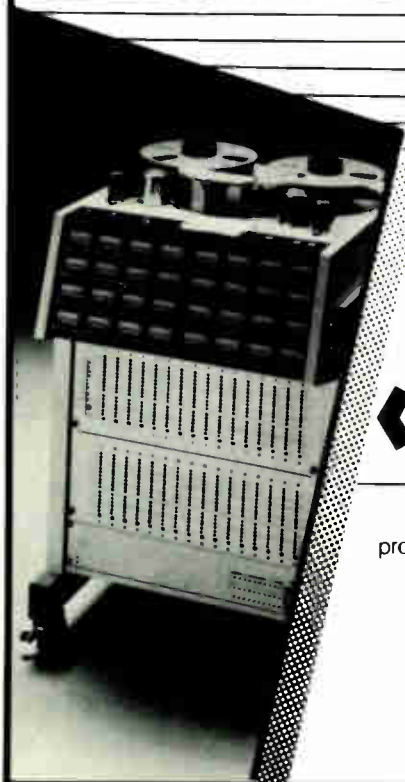
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TAPE TO DISC

DIRECTORY

Listings of Mastering, Pressing and Tape Duplication Facilities throughout the United States

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AGFA-GEVAERT, INC.; Mastering, Tape Duplication; 100 Challenger Rd.; Ridgefield Park, NJ 07660; (201) 440-2500. Contact: Joe Tibensky. MASTERING. Cutting Lathes: Cutting lathes. Other Services: Studio mastering tape products: PEM 468, PEM 469, PEM 291 D digital, PEM 369 and PEM 526 bin loop tape R-DAT cassettes TAPE DUPLICATION Other Services: Bulk audio cassette products: PE 649/949/ 1249, Mag-nelite 62, PE 6191/9191. Professional magnetic recording tape products.

AIR CRAFT RECORDING AND REAL TIME DUPLICATIONS SERVICE; Tape Duplication; Dormont Square, Pittsburgh, PA 15216; (412) 343-5222. Contact: Jon T. Armold. TAPE DUPLICATION. Duplicator: Nakamichi MR-2 professional cassette decks. Capacity: 750 album-length tapes per day. Method of Duplication: In-cassette. Mastering Equipment: Otari MX-5050, Otari MTR-1C (15 and 30 ips), Sony 3402 digital reel-to-reel, Beta/Sony PCM 1/2" digital processor, Fostex 20. Tape Used: BASF CrO₂, AGFA CrO₂, Shape, Lenco, 5-screw housing. Duplicating Speed: Real-time cassette duplication at 1 1/2 ips. Loading Equipment: Custom loading to length. Packaging Equipment/Fulfillment Services: Complete custom printing/art/application and insertion/shrink wrap/packaging. Apex printing. Rates: Call for rates. Other Services: 1/4" reel-to-reel copies.

ALIGNED AUDIO INCORPORATED; Pressing, Tape Duplication, CD Services; 151 22nd St.; Brooklyn, NY 11235; (718) 788-6969; FAX: (718) 499-0421. Contact: Inquiries. MASTERING. Cutting Lathes: Neumann VHS70. Console: Custom-built. Tape Machines: Studer. Monitor Speakers: MDM 4, Infinity Kappa 6, Quad ESL. Signal Processing: Dolby, Orban EQ, Aphex, dbx. PRESSING. Presses: Hamilton special, fully automatic. Capacity: 12,000 per 24 hours. Vinyl Used: Super quiet, dye-colored, audiophile quality. Rates: Competitive. Other Services: Plating, insert & label printing, special packaging, fulfillment, drop-shipping, DMM. TAPE DUPLICATION. Duplicator: Otari, real-time. Capacity: Bin loop = 5,000 per day; real-time = 1,000 per day. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Studer, Otari, MDM4 near-field monitors. Tape Used: BASF, Agfa, Shell. Used: Shape, Michelex, Swire. Duplicating Speed: 32:1, 16:1, 2:1, 1:1. Loading Equipment: Otari. Packaging Equipment/Fulfillment Services: Drop shipping, mailings. Rates: Competitive. Other Services: Special packaging, open-reel duplication, DAT copies, quality control. COMPACT DISC. Preparation/Manufacturing: PCM-1610 or -1630 to PCM-1630 CD master, coded and analyzed. Reduction of artwork and layout for CD graphics.

ALPHA RECORDS, INC.; Pressing; 1400 NW 65th Ave.; Ft. Lauderdale, FL 33313; (305) 587-6011. Contact: Dick Smith.

AMERICAN MULTIMEDIA, INC.; Tape Duplication; 2609 Tucker St. Ext.; Burlington, NC 27215; (919) 229-5554; FAX: (919) 228-1409. Contact: Tim Mallard. MASTERING. Console: Neve 8108. Tape Machines: Otari, Studer. Monitor Speakers: UREI, JBL. Signal Processing: dbx, Dolby A, B, C and SR capabilities, Aphex, Lexicon. Engineers: Richard Clark, Bob Farrow. Other Services: Digital processing. Sony 1610 & 1630, JVC BP-90 and Nakamichi DMP-100, Sony 1630. TAPE DUPLICATION. Duplicator: Concept Design, Electro Sound, Gauss. Capacity: 100 million annually. Method of Duplication: DAAD & bin loop. Mastering Equipment: Studer A80. Tape Used: By customer request. Shell Used: By customer request. Duplicating Speed: 64:1, 80:1. Loading Equipment: 36 Concept Design modifications. Packaging Equipment/Fulfillment Services: Apex printing, Ilesman labelers, Scandia wrappers,

AMERICAN MULTIMEDIA, INC.
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APEX MACHINE COMPANY; Tape Duplication; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 566-1572; FAX: (305) 563-2844. Contact: Bob Coningsby

ATLANTIC STUDIOS
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ATLANTIC STUDIOS; Mastering, CD Services; 1841 Broadway; New York, NY 10023; (212) 484-6093. Contact: Steven Bramberg. MASTERING. Cutting Lathes: Neumann VMS-70, Zuma, SAL-74B. Console: Neumann transformerless. Tape Machines: Studer A80. Monitor Speakers: UREI 838 w/Bryston 4B (bi-amped). Signal Processing: Sontec parametric, EMT compressor, EMT 252. Engineers: Dennis King, Sam Feldman. Credits: Bruce Springsteen, Led Zeppelin, Genesis, Foreigner, Yes, AC/DC, Rolling Stones, Carly Simon, Ratt, Mike & The Mechanics, The System. Rates: \$175/hour for mastering (including engineer); \$150/hr studio; lacquers \$50 and \$75. Other Services: Digital mastering, digital and analog

tape copying. COMPACT DISC. Preparation/Manufacturing: CD mastering and formatting: Sony 1630, DAE 1100, DMR 4000, Harmonia Mundi, Neve console, Mark Levinson Cello Audio Palette, Sony DTA-2000 and CD computer analysis. Engineers: Bobby Warner, Steve Innocenzi, Chris Stephenson, Zal Schreiber.

AUDIO ANTICS; Tape Duplication; 156 W. 94th St.; New York, NY 10025; (212) 662-8685. Contact: Susan Winthrop.

AUDIO CRAFT CO.; Mastering, Tape Duplication; 2701 E. Sunrise Blvd., Ste. 406; Ft. Lauderdale, FL 33304; (305) 563-0553; (Florida); (800) 432-0405. Contact: Lonny Kelem. MASTERING. Tape Machines: Sony, MCI, Studer/Revox, Nakamichi, Otari. Monitor Speakers: E-V. Signal Processing: Lexicon, dbx, EXR, Dolby, UREI, Symetrix. Rates: Upon request. TAPE DUPLICATION. Duplicator: Studer/Revox and Sony. Capacity: Constantly growing. Method of Duplication: Real-time. Mastering Equipment: Digital. Tape Used: Agfa and BASF Shell Used: Shape and ICM. Duplicating Speed: 8:1 and real-time. Loading Equipment: TTL. Packaging Equipment/Fulfillment Services: As required. Rates: Upon request.

AUDIO VISUAL COMMUNICATIONS, INC.; Tape Duplication; 435 Crooked Ln.; King Of Prussia, PA 19406; (215) 272-8500. Contact: John Butterworth.

AUDIOMATIC/AUDIO MATRIX; Tape Duplication, CD Services; 400 Madison Ave.; New York, NY 10017; (212) 308-6888; Telex: 126419; FAX: (212) 308-5817. Contact: Perry Jambor. TAPE DUPLICATION. Duplicator: Electro Sound, Concept Design, Infonics, Graff. Method of Duplication: Bin loop, in-cassette, digital audio analog duplication. Duplicating Speed: 128:1, 80:1, 64:1, 40:1, 32:1, 16:1, 10:1. Loading Equipment: Electro Sound. Packaging Equipment/Fulfillment Services: Apex audio, video & R-DAT cassette printers. Other Services: Sale of duplicators, loaders, on-cassette and Rotoscreen printers, Tapex plate makers, etc. COMPACT DISC. Preparation/Manufacturing: Manufacturer of electro-forming equipment for CD lathers, mothers, stampers. Suppliers of clean-room equipment and accessories. Processors of metalized glass masters into lathers, mothers and stampers.

BORDER ENTERPRISES INC. DAT DUPLICATING; Mastering, Tape Duplication; PO Box 4211; Great Neck, NY 11027; (516) 829-8162. Contact: Jack Malken

CASSETTE EXPRESS (DIV. OF AL JOLSON ENTERPRISES, INC.); Tape Duplication; 31 Music Square W.; Nashville, TN 37203; (615) 242-1766. Contact: Mark Capps. TAPE DUPLICATION. Duplicator: KABA real-time duplication system. 64 decks, 32 dual. Capacity: 720 C-45s per shift. Method of Duplication: In-cassette. Mastering Equipment: Dolby A, Dolby SR, dbx Type I, Studer A810, Nagra IV-S, Nakamichi DMP-100, Sony Super Beta. Tape Used: Agfa 649/949, BASF Chrome II, Ampex 456. Shell Used: Michelex, Shape Mark 10, Magnetic Media. Duplicating Speed: Real-time, 2:1, 8:1. Rates: Competitive rates, please inquire.

CBS RECORDS INC.; Mastering, Tape Duplication, CD Services; 49 E. 52nd St.; New York, NY 10022; (212) 975-2958. Contact: Rob Grabowski.

CLARITY REAL-TIME CASSETTES; Tape Duplication; Main Street, 1 Post Office Sq.; Waterville, ME 04901; (207) 873-3911 (Maine); (800) 458-6405. Contact: Michael Pepin, Bill Wheeler

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COOK LABORATORIES, INC.; Mastering, Pressing, Tape Duplication, CD Services; 231 Wilson Ave.; Norwalk, CT 06854; (203) 854-5900; (800) 553-2665; FAX: (203) 866-2755. Contact: William H. Irvine, Michele M.K. Kennedy. MAS-

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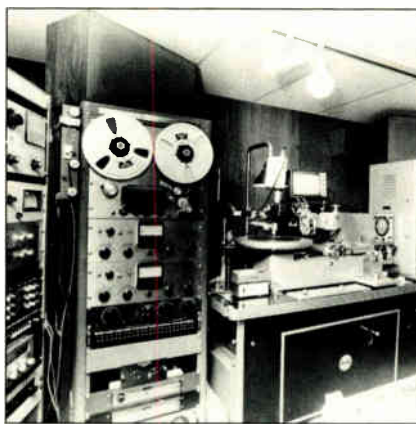
TAPE TO DISC

DIRECTORY

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TERING. Cutting Lathes: Scully. Console: Cook Instruments. Tape Machines: Scully, Ampex. Monitor Speakers: JBL, B-zak. Signal Processing: Noise reduction, Acoure processing. Engineers: John W. Gallas, Christopher S. Kuhn, Harvey E. Lentchner. Other Services: Mastering from 1610/1630, F1 and DAT formats; compact disc assembly; digital format conversions; analog-to-digital transfers; vertical phase correction, de-essing, equalizing, enhancement processing, noise reduction. **PRESSING.** Presses: Cook. Capacity: 5 million units. Vinyl Used: Oxy Chemical Corp. co-polymer resins compounded by Cook. Other Services: Mastering, plating, printing, assembly, shrinkwrapping, fulfillment. **TAPE DUPLICATION.** Duplicator: Cook ADS system. Capacity: 18 million cassettes. Method of Duplication: Bin loop. Mastering Equipment: Scully, Cook, Ampex. Tape Used: BASF. Shell Used: Lenco. Duplicating Speed: 32:1, 64:1. Loading Equipment: King. Packaging Equipment/Fulfillment Services: All. **COMPACT DISC.** Preparation/Manufacturing: Digital mastering, glass mastering, manufacturing, assembly, printing, fulfillment.

CRYSTAL CITY TAPE DUPLICATORS INC., Tape Duplication; 48 Stewart Ave., Huntington, NY 11743; (516) 421-0222. Contact: Frank Russo. **TAPE DUPLICATION.** Duplicator: Otari bin loop. Capacity: 12,000 per day. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Otari MTR-10, Otari MTR-12. Tape Used: BASF, Magnetic Media, Agfa. Shell Used: Magnetic Media. Duplicating Speed: 64:1. Loading Equipment: Electro Sound. Packaging Equipment/Fulfillment Services: Apex on-cassette print, Scandia wrapper. Rates: On request. Other Services: Video duplication 3/4", 1/2" Panasonic 6810 hi-fi stereo.



THE CUTTING EDGE
Ferndale, NY

THE CUTTING EDGE: Mastering, Pressing, Tape Duplication, CD Services; PO Box 217; Ferndale, NY 12734; (914) 292-5965. Contact: Paul Gerry.

D&G MASTERING; Mastering, Pressing; PO Box 370; Englishtown, NJ 07726; (201) 446-2411. Contact: Don Van Gorden.

DB PLUS DIGITAL SERVICES; CD Services; PO Box 694; Lynbrook, NY 11563; (516) 872-2325. Contact: Kathy Kerr. **COMPACT DISC.** Preparation/Manufacturing: Full CD master preparation; analog and digital transfers; electronic editing. Machines: Sony 1630 with Apogee filters/1100A editor/DMR 4000 tape machine/DTA analyzer. Monitor: Dahlquist DQ20 speakers with Bryston amps and Monster cable. Credits include: Carly Simon, Aretha Franklin, Grover Washington Jr., AC/DC, The System, John Coltrane and NBC's music library for the '88 Summer Olympics. Special library transfer rates available.

DIGITAL TRANSFERS

CD MASTERING

DIGITAL EDITING

CD PRODUCTION



DB PLUS DIGITAL SERVICES
Lynbrook, NY

DEMO-VOX® SOUND STUDIO, INC.; Mastering, Pressing, Tape Duplication; 1038 Bay Ridge Ave.; Brooklyn, NY 11219; (718) 680-7234. Contact: Laura B. Grassi.

BARRY DIAMENT AUDIO; CD Services, Mastering; 2728 Henry Hudson Pkwy. (#C-73); Riverdale, NY 10463; (212) 543-2079. Contact: Barry Diament, Mary Antonelli. **COMPACT DISC.** Preparation/Manufacturing: Full CD master preparation, optimized analog-to-digital transfers; digital editing. Machines: Sony 1630/1100A/DMR-4000/DTA-2000, Dahlquist DQ-20/M.I.T. and Monster cables. Call for rates. Credits include: AC/DC, Anita Baker, The Cars, The Coasters, Phil Collins, Jim Croce, Crosby, Stills and Nash, The Cult, The Eagles, Kevin Eubanks, Genesis, Guns N' Roses, Kitaro, Eartha Kitt, Led Zeppelin, Julian Lennon, Glenn Miller, Stevie Nicks, Robert Palmer, Robert Plant, The Rascals, Otis Redding, The Rolling Stones, Linda Ronstadt, Simply Red, Slayer, Steps Ahead, Pete Townshend, U2, Joseph Villa, Yes, Warren Zevon.

DIGITAL 1 DUPLICATORS; Tape Duplication; 658 Douglas Ave.; Altamonte Springs, FL 32714; (407) 682-7790. Contact: Batt Donovan. **TAPE DUPLICATION.** Duplicator: KABA decks—50 positions. Capacity: 20,000 per month. Method of Duplication: In-cassette. Mastering Equipment: SSL. Neve, full complement signal processing. Tape Used: TDK SA, Agfa 649. Shell Used: Shape Mark 10. ICM. Duplicating Speed: 1:1, 2:1. Loading Equipment: Electro Sound. Packaging Equipment/Fulfillment Services: On-cassette printing, shrinkwrap, inserts. Rates: Call. Other Services: Digital transfers, editing, mastering.

DISC TRONICS, INC.; CD Services; 4905 Moores Mill Rd.; Huntsville, AL 35810; (205) 859-9042. Contact: Cathy Goun, David Rosenblum.

DISC TRONICS, INC.; CD Services; 405 Lexington Ave., 47th floor, New York, NY 10174; (212) 599-5300; FAX: (212) 599-3227. Contact: Michael Rosenbaum.

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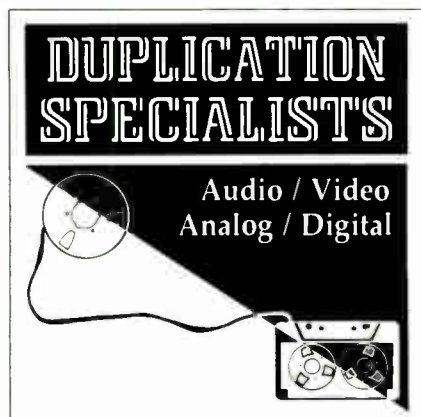
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DISKMAKERS, INC.
Philadelphia, PA

DISKMAKERS, INC.; Mastering, Pressing, Tape Duplication, CD Services; 925 N. 3rd St.; Philadelphia, PA 19123; (215) 627-2277; (800) 468-9353. Contact: Regional Sales Rep. **MASTERING.** Cutting Lathes: Scully. Console: Custom Ransseele. Tape Machines: Sony 1630, DAT, F-1; Ampex ATR-102. Monitor Speakers: JBL. Signal Processing: EQ, DDL, sibilance control, etc. Engineers: Dave Moysiadi. Rates:

Call for rate card PRESSING Presses: (9) Lined Capacity: 5 million/yr. Vinyl Used: Occidental. Rates: Call for price list. Other Services: Artwork, separations, jacket printing, shrink-wrap TAPE DUPLICATION Method of Duplication: Bin loop. Mastering Equipment: Ampex ATR-104 Tape Used: CBS Shell Used: Shape, Lenco Duplicating Speed: 32:1 64:1 Loading Equipment: King. Rates: Call for price list COMPACT DISC Preparation/Manufacturing: Design printing, A/D conversion/replication, blister packaging.



DUPLICATION SPECIALISTS
Island Park, NY

DUPLICATION SPECIALISTS: Mastering, Tape Duplication, CD Services: 4584 Austin Blvd., Island Park, NY 11558; (516) 432-7107. Contact: David Schwartz, Robert Johnson. **MAS-TERING Console:** Tangent AX1602, Ramsa WR1.33 **Tape Machines:** (2) Nakamichi MR1, (10) Nakamichi MR2, (3) Scully 280B (with 1/4" or 1/2" headstack, 7 1/2, 15, & 30 ips), Scully 280 4-track 1/2"; Foster A-8, Sony Pro-DAT 2500, Sony DAT MTC-100, Panasonic DAT 3500, Sony PCM-501ES, Sony VO-5850, Sony SLO-383, Sony SL-70, Panasonic AG1600, Technics RS1520US Monitor Speakers: JBL 4311B, Yamaha NS-10M, Bose Video Roomates. **Signal Processing:** Orban 464A Cooperator, Aphex Compellor, BBE 822 Sonic Maximizer, Orban 674A parametric/graphic equalizer, Aphex Type C Exciter, Sound Shaper programmable EQ, Dynaflex DX-2, Dolby 361 (with Dolby A, B, C & SR cards), dbx Type I & II. **Engineers:** David Schwartz, owner/chief engineer, Robert Perkins Johnson, general manager/chief mastering engineer, Robert Schuster, maintenance engineer, miracle worker & resident guru. **Credits:** Toronto Symphony, London Symphony, AT&T, Korg USA Record World stores, New York Russian Orthodox Chorus, Arista Records, Fuller Brush Company. **Rates:** \$40-\$150/hour, depending on equipment use and engineer. **Mastering rate schedule** available upon request. **Other Services:** Duplication Specialists offers digital-to-digital safety master generation of completed mastered projects as well as complete arrangements for test copies, real-time and high-speed cassette tape duplication, reel-to-reel duplication (real-time or high-speed), videotape duplication (VHS, Beta, 3/4", 1" helical) from short spots to feature lengths; standard conversions, i.e. PAL to NTSC, SECAM to PAL, etc.; digital audio tape (DAT) duplication, endless loop cassette duplication. **TAPE DUPLICATION:** Duplicator: Real-time, custom-built system containing: (40) Onkyo TA-2028 and TA-2130 cassette recorders, Onkyo TA-2056 Onkyo TA-2058, (12) Nakamichi MR1 & MR2 cassette recorders, various other assorted tape recorders (e.g., UHER, AIWA, Technics, etc.), (4) DAT machines, all with digital ports. Telex in-cassette high-speed duplicator, Electro Sound bin-loop duplicator, 5 slaves. **Capacity:** 10 to 100,000 pieces audio cassette, videocassette, audio or video open reel. Our DAT capacity is rapidly increasing. **Method of Duplication:** In-cassette, bin loop. **Mastering Equipment:** Scully 280 1/2" 4-track, (3) Scully 280B (with 1/4" or 1/2" headstack, 7 1/2, 15, & 30 ips) Foster A-8, Sony Pro-DAT 2500, Sony DAT MTC-100, Panasonic DAT 3500, Sony PCM-501ES, Sony VO-5850, Sony SLO-383, Sony SL-70, Panasonic AG1600, Technics RS1520US, Nakamichi MR-1, Orban 464A Cooperator, Aphex Compellor, BBE 822 Sonic Minimizer, Orban 674A parametric/graphic equalizer, Aphex Type C Exciter, Sound Shaper programmable EQ, Dynaflex DX-2, Dolby 361 (with Dolby A, B, C and SR cards) dbx Type I & II. **Tape Used:** TDK metal (MX), BASF chrome, Agfa 662/962 Magnetite, Magnetic Media XM II. **Shell Used:** Michelex, Shape, Lenco, I.P.S., ICM & Magnetic Media C-Os to customer preference, normal, chrome or metal notch specifiable, 5-screw for real-time, sonic weld for high-speed. **Duplicating Speed:** Real-time, 2:1, 4:1, 8:1, 16:1, 32:1, 64:1. **Loading Equipment:** (2) Electro Sound/Superscope custom modified loader, AEG fully automatic loader. **Packaging Equipment/Fulfillment Services:** Shrinkwrap, paper labels, Apex on-cassette printing, 1-, 2- or 4-color inserts with or without foldout extensions, complete art services, product distribution, warehousing. **Rates:** Schedule or quotation individually tailored upon request. **Other Serv-**

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E A S T E R N

TAPE TO DISC

DIRECTORY

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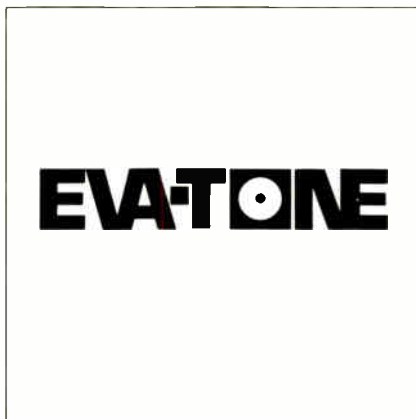
ices: Full-service videotape duplication and packaging; CD formatting and brokering; vinyl brokering and jacket printing; DAT duplication, reel-to-reel duplication COMPACT DISC. Preparation/Manufacturing: Preparation/manufacturing: Duplication Specialists offers CD mastering, preparation and formatting in-house as well as brokering of CD manufacturing. Also offered are complete art services for CD covers and insert booklets along with warehousing and distribution of the finished product. CD singles and on-CD printing available. Competitive rates for orders 500-500,000.

EASTERN STANDARD PRODUCTIONS, INC.; *Mastering, Tape Duplication*; 26 Baxter St.; Buffalo, NY 14207; (716) 876-1454; (800) 527-9225. Contact: Mark S. Mekker



EUROPADISK, LTD.
New York, NY

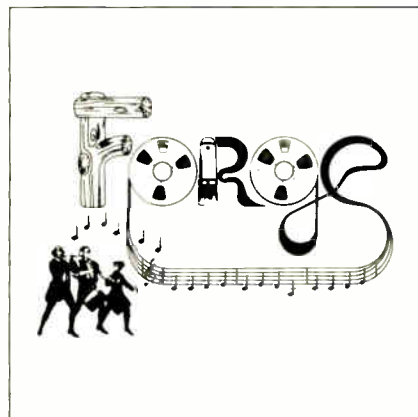
EUROPADISK, LTD.; *Mastering, Pressing, Tape Duplication, CD Services*; 75 Varick St.; New York, NY 10013; (212) 226-4401. Contact: Tom Kingman. **MASTERING**. Cutting Lathes: Neumann VMS82 DMM. Console: Neve DTC, Neumann SP79B. Tape Machines: Sony DMR & 4000, Mitsubishi X80, MCI JH-110M. Monitor Speakers: JBL 250TI. Signal Processing: Neumann, Neve DTC. Engineers: Jim Shelton, Tom Kingman, Art Kandy. Credits: Capitol, CBS, RCA, Warner, Pangea, Telare. Rates: Call for brochure. **Other Services**: In-house LP plating and audiophile pressing and cassette, R-DAT and CD manufacturing. Complete graphics services. **PRESSING**. Presses: Toolex-Alpha, Hamilton, all automatic. Capacity: 3 million per year. Vinyl Used: Teldec. Rates: Call for brochure. **Other Services**: Complete graphics, printing, packaging & shipping services. **TAPE DUPLICATION**. Duplicator: Electro Sound, Gauss. **Method of Duplication**: Bin loop. **Mastering Equipment**: PCM-1630, PCM-2500, X80, F-1, R-DAT. **Tape Used**: BASF, others Shell Used: Various. Rates: Call for brochure. **COMPACT DISC**. Preparation/Manufacturing: Call for brochure.



EVA-TONE INCORPORATED
Clearwater, FL

EVA-TONE INCORPORATED; *Mastering, Pressing, Tape Duplication*; 4801 Ulmerton Rd.; Clearwater, FL 34622; (800) EVA-TONE, outside; (813) 572-7000. Contact: John W. Ball. **MASTERING**. Cutting Lathes: Scully automated and manual. Console: Sony and Eva-Tone customized. **Tape Machines**: Sluder, Revox, Otari, MCI, Nakamichi. **Monitor Speakers**: Tannoy, Altec. **Signal Processing**: UREI, AMS, Sontec, Aphex, Orban. **Engineers**: Michael Newsome, Wayne McElhose, Alan LaVerso, Jacques Woodin, Wayne Hampson, Jerry DeClercq. **Credits**: CBS International. **Rates**: On request. **PRESSING**. Presses: Eva-Tone Design-13. Capacity: 290 million. **Rates**: On request. **Other Services**: Printing, packaging, mailing services. **TAPE DUPLICATION**. Duplicator: Cetec Gauss 2400, (4) masters, (13) slaves. Capacity: 12 million C-40 per year. **Method of Duplication**: Bin loop. **Mastering Equipment**: MCI, Sluder/Revox, Otari. **Tape Used**: Sunkyong, Capital, BASF, Agla. **Shell Used**: MRS, Magnetic Media, Shape. **Unimagnetics**. Duplicating Speed: 32:1, 64:1, 128:1. **Loading Equipment**: King 790, TTL. **Packaging Equipment/Fulfillment Services**: Labeling is Apex and Stoddard Ilseman. **Rates**: On request. **Other Services**: Printing, packaging, mailing services.

EXECUTIVE RECORDING LTD.; *Mastering, Pressing*; 300 W. 55th St., Ste. 4F; New York, NY 10019; (212) 247-7434. Contact: Lucille Sayet, Don Van Gordon.



FORGE RECORDING STUDIOS, INC.
Valley Forge, PA

FORGE RECORDING STUDIOS, INC.; *Mastering, Tape Duplication*; PO Box 861, Valley Forge, PA 19481; 119 Great Valley Pkwy., Malvern, PA 19355; (800) 331-0405; (215) 935-1422. Contact: Warren Wilson. **MASTERING**. Console: NEO-TEK Elite. **Tape Machines**: Sony system. **Monitor Speakers**: JBL. **Signal Processing**: Whatever is needed. **Rates**: \$75 per hour plus materials. **TAPE DUPLICATION**. Duplicator: MTI and Versadyne 2 x 6 slaves. Capacity: 20,000/day. **Method of Duplication**: Bin loop. **Mastering Equipment**: Ampex, Sony. **Tape Used**: Agla, BASF. **Shell Used**: Magmedia, ICM, Elmar, Swire. **Duplicating Speed**: 32:1, 64:1. **Loading Equipment**: King 790. **Packaging Equipment/Fulfillment Services**: Boxing, shrinkwrapping and album setup. **Rates**: Call for rate card and samples. **Other Services**: Drop shipping and syndication services. **COMPACT DISC**. Preparation/Manufacturing: Master preparation including P & Q encoding.

FRANKFORD/WAYNE MASTERING LABS, INC.; *Mastering, CD Services*; 1697 Broadway, Rm. 1404; New York, NY 10019; (212) 582-5473. Contact: Carol J. Steele. **MASTERING**. Cutting Lathes: (2) Neumann lathes with Technics quartz drive and Neumann SX-74/SAL-74B driver rack and Sontec Compudisk control computer. (4) Scully/Ranstele automated quartz locked drive lathe with Sontec Compudisk computer and Neumann SX-74/Ranstele cutter driver system. Console: (5) Ranstele Audio custom/proprietary DC coupled console w/full equalization and processing facilities, analog and digital capable, transformerless. (2) Ranstele/Harmonia Mundi full digital transfer console w/digital level, equalization, compressor/limiter and sample rate conversion, to/from any format, Sony/Harmonia Mundi/Ranstele custom automated CD Master preparation console. **Tape Machines**: AMS "Audio-File" hard disk recorder/editor, (2) Sony PCM-2500 Pro R-DAT recorder, (5) Sony PCM-1630 digital processor with Apogee filters, Sony PCM-601 processor, (5) Sony/MCI JH-110MB 1/4" and 1/2" play, (3) Sony/MCI JH-110C 1/2" and 1/4" recorder, (5) Technics RS-1520 pro 2-track, Scully LJ-12 stereo recorder, (6) Technics cassette recorder, Sony PCM-3402 DASH reel-to-reel, Sony PCM-3202 DASH format reel-to-reel, Sony PCM-1610 digital processor, (5) Sony PCM-10/100 digital F1-compatible processor, (6) Sony DMR-2000 digital U-matic recorder, (9) Sony DMR-4000 digital U-matic recorder, Sony VO-5800, (2) Sony BVU-800DB U-matic recorder, (2) Sony SL-2700 Beta recorder, (3) Sony SL-2300 Beta recorder, (5) Sony DTA-2000 digital tape analyzer, Panasonic Super-VHS recorder. **Monitor Speakers**: (6) JBL 4350B bi-amped, (2) JBL 4343B bi-amped, (2) JBL 4330, (2) JBL 4311, (2) B&W 701, (6) ADS 300, (4) Auratone 5C, (2) Technics

6060, (2) JBL custom subwoofer system, (2) Yamaha NS-10M, (2) E-V Sentry 100. Signal Processing: Equalizers: Sontec, UREI, ITI, Pultec, Ransteede Audio, Orban, Technics. Limiters/Compressors: Sontec, Sony, Aphex. Noise reduction: Dolby and dbx. Proprietary audio processing equipment: Ransteede Audio. Digital processing: AMS DDLs and effects, (2) Sony DAE-3000 digital editor, Lexicon, Sony PQ subcode editor, Sony DAE-1100A digital editor, AMS "AudioFile," audio-for-video. Engineers: Tom Steele, Herb "Pump" Powers, Tom Coyne, Carlton Batts, Michael Sarsfield, Chris Gehringer, plus freelancers when applicable. Credits: Evelyn Champagne King, Debbie Gibson, Keith Sweat, Rick Springfield, Sade, Barry Manilow, Al B. Sure, Billy Ocean, Whodini, Hall & Oates 12", Force MD's, Level 42, Fat Boys, Buster Poindexter, Five Star, Pepsi and Shirley, Starship, Anita Baker, Shirley Murdoch, Cruzados, Stevie Wonder, Pieces of a Dream, Kool Mac Dee, Salt-n-Pepa, Soundtracks from *Phantom of the Opera* & *Les Miserables*, Love 'n Rockets and Wet Wet Wet, to name just a few. Rates: Client attendance, \$220/hr.; LP masters, \$155/side; 45 masters, \$55/side; 12" single masters, \$125/side; LP S/F refs, \$90/side; 12" single D/F refs, \$110; 45 D/F refs, \$75. Other rates, including custom pressing packages and digital CD prepared tapes, available upon request. COMPACT DISC. Rates: CD Prep: LP under 50 minutes, \$360; LP over 50 minutes, \$425; singles, \$225; prices include tape and SMPTE and DTA analyzer logs. Other digital services and digital equipment rental rates upon request. Preparation/Manufacturing: Preparation: Complete facilities for analog-to-digital and digital-to-digital transfers from any format to any format. Full state-of-the-art digital editing suite (both digital tape and hard disk); format conversion; automated digital level control and equalization; PQ editing and logging. (See our complete equipment listings under "Mastering.")



FULLERSOUND, INC.
Miami, FL

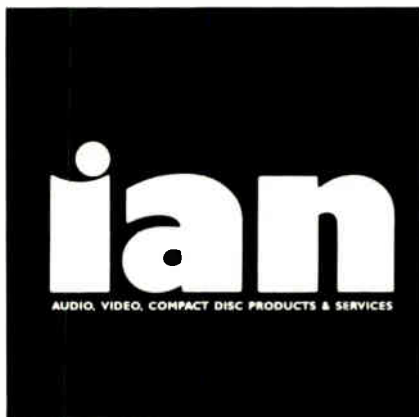
FULLERSOUND, INC.; *Mastering, CD Services;* 1755 NE 149th St.; Miami, FL 33181; (305) 945-6697. Contact: Michael Fuller. **MASTERING.** Cutting Lathes: Scully LS-76 w/Ototon DSS-821 cutter heads. Console: Custom Cybersonics automated MC2003E. Tape Machines: Analog: MCI JH-110B 1/2" and 1/4"; digital: Sony PCM-1630/DMR-4000, Sony PCM-3202, Sony PCM-601ESD, Sony DAT 2500, Mitsubishi X80. Monitor Speakers: UREI 813A, Yamaha NS-1000, Auratones. Signal Processing: Sontec MES-430B EQ, Sontec DRC-400, Ototon STL-852. Engineers: Michael Fuller, Rod Fuller. Credits: *Dirty Dancing* soundtrack, Eric Carmen, Will to Power, Billy Vera & the Beaters, Eric Clapton, Rod Stewart, Kenny Rogers, Judas Priest, Romanics, Company B, Barry Manilow, Expose, Julio Iglesias, Eddie Money, Dionne Warwick, Brailio, Bee Gees, Bellamy Brothers, Kenny Loggins, George Clinton. Rates: Upon request. Other Services: Premastering for compact disc and cassettes. COMPACT DISC. Preparation/Manufacturing: Compact disc premastering available with Sony PCM-1630/DMR-4000/DTA-2000. Digital-to-digital transfers to and from Sony 1630, Sony 3202, Sony 601. Sony DAT 2500, Mitsubishi X80 digital also available.

GEORGETOWN MASTERS, INC.; *Mastering, CD Services;* 33 Music Sq. W., Ste. 108B; Nashville, TN 37203; (617) 254-3233. Contact: Barbra Thompson, Denny Purcell.

GEORGIA RECORD PRESSING; *Mastering, Pressing, Tape Duplication, CD Services;* 262 Rio Circle; Decatur, GA 30030; (404) 373-2673; (800) 327-9212; FAX: (404) 373-0950. Contact: Kevin Carlson, Bridgid Richardson.

GRENADIER; *Tape Duplication;* 10 Parkwood Ave.; Rochester, NY 14620; (716) 442-6209; (716) 275-2942. Contact: Tom Green. **TAPE DUPLICATION.** Duplicator: Nakamichi real-time & Telex high-speed. Capacity: 800 per day. Method of Duplication: In-cassette. Mastering Equipment: Full 24- and 16-track studio and mastering facilities available, to 2-track digital or analog with Dolby A, B, SR or dbx Type I noise reduction available. **Tape Used:** Agfa. **Shell Used:** Shape, IPS. **Duplicating Speed:** Real-time 1:1 and 8:1 high-speed. **Loading Equip-**

ment: Loading to custom length. **Packaging Equipment/Fulfillment Services:** We have special packaging options that make smaller quantities of even 100 album-length real-time duplicated cassettes with 4-color inserts, labels and shrinkwrap affordable. Please inquire. Rates: Small orders welcome. Superior quality at affordable pricing. 100 real-time demo cassettes with printed labels for less than \$1 each. **Other Services:** Full-service 24-track recording studio.



IAN COMMUNICATIONS GROUP, INC.
Wilmington, MA

IAN COMMUNICATIONS GROUP, INC.; *Tape Duplication, CD Services;* 10 Upton Dr.; Wilmington, MA 01887; (508) 658-3700; (800) 433-DUPE. Contact: Richard Berberian. **TAPE DUPLICATION.** Duplicator: Otari DP-7000, Otari DP-80. Capacity: 10,000 per shift. Method of Duplication: Bin loop. Mastering Equipment: Otari MTR-10 iLX. **Tape Used:** Agfa, BASF Shell Used: Michelex. **Duplicating Speed:** 64:1 or 32:1. **Loading Equipment:** AVA 2001. **Packaging Equipment/Fulfillment Services:** Tapematic labelers and boxes. Rates: Rate card for up to 2,000 units. Larger orders on quotation basis. **Other Services:** Complete in-house facilities for graphics, typesetting, printing and wrapping. Climate-controlled warehouse and order fulfillment. **COMPACT DISC.** Preparation/Manufacturing: Editing, mastering and pressing services; printing and packaging.

ICCA; *Tape Duplication;* 429 Briabend Dr.; Charlotte, NC 28209; (704) 523-7219. Contact: J. Firestone, J. Kinley, H. Canning. **TAPE DUPLICATION.** Duplicator: Electro Sound 8000, 4 lines. Capacity: 50,000/day. Method of Duplication: Bin loop. Mastering Equipment: Studer A80, Dolby, F-1 digital, 30-ips playback. **Tape Used:** Agfa, Ampex. **Shell Used:** Lenco, Magnetic Media. **Duplicating Speed:** 64:1. **Loading Equipment:** King 790. **Packaging Equipment/Fulfillment Services:** Singles and rack packages. **Other Services:** Graphic arts design, typesetting, desktop publishing, label and insert layout.

JINGLE WORKS RECORDING STUDIO; PO Box 717; Pass Christian, MS 39571; (601) 452-2331. Contact: Rick Sierra, Marsha Daniel.

THE LACQUER PLACE; *Mastering, Tape Duplication, CD Services;* 116 17th Ave. S.; Nashville, TN 37203; (615) 244-5355. Contact: Ted Fuller, David Jones.

LAMON RECORDS INTERNATIONAL; *Pressing, Tape Duplication, CD Services;* 6816 Newell Hickory Grove Rd.; Charlotte, NC 28215; (704) 535-7263. Contact: David Moody, Bill Connor.

LORAN CASSETTES AND AUDIO PRODUCTS; *Mastering, Tape Duplication;* 10-48 Clark St.; Warren, PA 16365; (800) 633-0455. Contact: Kate Campana, Randy Britton. **MASTERING.** Engineers: Danny Imel, Brian Karda, Daryl Bergstrom. Credits: Ford Motor Co., Volvo Cars of No. America, Fujitsu Ten, Alpine, GRP, Rykodisc, Narada, Sheffield Lab, JCI, Classical Music, Sea Breeze, River Music. Rates: Call for quotes. **Other Services:** Professional DAT duplication using Sony DRD-100 units with complete table of contents encoding, custom loading and on-cassette multi-color printing. **TAPE DUPLICATION.** Duplicator: Electro Sound & Harmon Kardon. Capacity: 7 million/year. Call for current available capacity. Method of Duplication: In-cassette and bin loop. Mastering Equipment: Sony, Otari. **Tape Used:** Agfa, BASF, Loran or equivalent. **Shell Used:** Loran and other azimuth-correct shells. **Duplicating Speed:** Real-time and 64:1. **Loading Equipment:** King, Otari. **Packaging Equipment/Fulfillment Services:** Insert cards, direct print on shell, labeling, assembly, shrink-wrap, packaging and fulfillment. Rates: Call for quotes. **Other Services:** Full-service analog & digital duplicator including licensing services to handle concept through fulfillment.

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E A S T E R N

TAPE TO DISC

DIRECTORY

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LORAN

CASSETTES AND AUDIO PRODUCTS

LORAN CASSETTES AND AUDIO PRODUCTS
Warren, PA

MAGNETIC TECHNOLOGY; *Tape Duplication*; 816 18th Ave. S., Nashville, TN 37203; (615) 254-7001. Contact: Mack Evans **TAPE DUPLICATION** Duplicator: Custom-built real-time system. (40) Aiwa ADF-660 deck w/HX Pro Method of Duplication: In-cassette. Mastering Equipment: Can run 7½, 15 or 30 ips on ¼" tape and 14- or 16-bit ½" digital tapes (Beta or VHS) Tape Used: Agfa or BASF primary, others on request. Shell Used: Various, customer's choice Duplicating Speed: Real-time. Rates: Call for quotes Other Services: Digital (clone) copies to or from Beta or VHS Limited number of reel-to-reel copies

MANGUM/ALFORD RECORDING STUDIO; *Mastering, Tape Duplication*; 3524 Morton St., Jacksonville, FL 32217; (904) 737-9242. Contact: Larry Mangum, Jeff Alford

MARK CUSTOM RECORDING SERVICE; *Mastering, Pressing, Tape Duplication, CD Services*; 10815 Bodine Rd., Clarence, NY 14031; (716) 759-2600. Contact: Vincent S. Morette

MASTER MIX; *Mastering, CD Services*; 1808 Division St.; Nashville, TN 37203; (615) 321-5970. Contact: Chris **MAS-TERING** Cutting Lathes: Neumann VMS70 w/Technics quartz direct-drive and Zuma audio preview computer, Neumann SAL 74B cutter rack, Neumann SX-74 cutter head Console: Neumann SP77 Tape Machines: Studer preview machine ½" and ¼", Studer copy machine. Monitor Speakers: John Meyers and Rogers powered by Times, One and Half amplifiers Signal Processing: Sontec and Neumann equalizers, Sontec and NTP compressors, Dolby and dbx available Digital signal processing available with Harmonia Mundi digital equalizer and Sony digital limiter Engineers: Hank Williams and Ken Love Rates: Available upon request Other Services: CD and cassette preparation via Sony 1630, DAE-1100 editing system. AMS AudioFile editing also available

MASTERDISK CORP.; *Mastering*; 16 W. 61st St., New York, NY 10023; (212) 541-5022; FAX: (212) 265-5645. **MASTER-ING** Cutting Lathes: Neumann DMM lathe, (4) Neumann VMS70 lathe Console: Neve digital transfer console and (4) Neumann console. Tape Machines: Sony DMR-4000, Studer, Mitsubishi X80, Sony Beta, JVC VHS, Sony DAE-3000, Mitsubishi X86, Sony Pro DAT recorder Monitor Speakers: Sovereign 2001, Altec, Hartley subwoofers, UREI 813, Fourier 8, Yamaha, JBL. Signal Processing: Sony 1610, Sony 1630, Cello, Sontec EQ, NTP limiter, Lexicon reverb, Aphex, Pultec, Sony 501, Sony 701 Engineers: Bob Ludwig, Howie Weinberg, Andy Van Dette, Tony Dawsey, Scott Hull, Don Grosinger. Credits: Bruce Springsteen, David Bowie, Sting, U2, Run-DMC, Beastie Boys, Def Leppard, Robbie Robertson, Tracy Chapman Rates: Call for brochure **COMPACT DISC** Preparation/Manufacturing: CD tape masters

MASTERFONICS, INC.; *Mastering, Tape Duplication, CD Services*; 28 Music Square E., Nashville, TN 37203; (615) 327-4533. Contact: Margaret Meadows. **MASTERING** Cutting Lathes: SAL 74B, Zumaudio, Neumann VMS70, JVC

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Nashville, TN

CD-90, Ampex ADD-1 Console: Neumann SP-75 custom, JVC DS-DM900 automated digital. Tape Machines: Studer A80 & B67, JVC VP-900, Sony 1630, Sony F1, JVC FC901 Monitor Speakers: Kinoshita/Hidley, Yamaha NS-10M, Genelec Triamp S30, Fostex RM780, Auratone 5C, B&W All power amps by FM Acoustics. Signal Processing: JVC DS-DM900 digital mixing/EQ, Sontec EQ and DRC, Sony DAL-1000 digital limiter, Outer Ear image recovery, Dolby A and SR, BASE and custom spatial enhancement. Engineers: Glenn Meadows, Benny Quinn, Jim Loyd, Milan Bogdan. Rates: On request. Other Services: Tom Hidley-designed, 20Hz monitoring environment mix room that must be experienced to be fully appreciated. Includes SSL 4000E (with TR) 48x32 console. Otari DTR-900 digital 32-track, JVC VP-900 digital 2-track and a generous complement of outboard equipment. TAPE DUPLICATION. Duplicator: Awa F660A. Capacity: 10. Method of Duplication: In-cassette. Mastering Equipment: JVC VP-900. Tape Used: TDK SAX. Shell Used: TDK. Duplicating Speed: 1:1. Rates: On request, per size of run. Other Services: Submaster preparation for high-speed duplicating. Editing compilation services for sampler cassettes. COMPACT DISC Preparation/Manufacturing: Complete CD master tape prepara-

ration from any 2-track source. Seven years of experience with products from all major labels. Fully digital processing including compression, EQ, pre-emphasis removal, cross-fades. JVC: AE-90 digital editor. Sample accurate in-song editing.



MASTERWORK RECORDING, INC.
Philadelphia, PA

MASTERWORK RECORDING, INC., Mastering, Pressing, Tape Duplication, CD Services; 1020 N. Delaware Ave.; Philadelphia, PA 19125; (215) 423-1022. Contact: Albert Oon, Peter Humphreys. MASTERING. Cutting Lathes: Scully with Sontec "CompuDisk" system, Westrex-Ranstele driver systems. Console: Custom/proprietary by Masterwork. Tape Machines: MCI/Sony digital (1630 & R-DAT). Monitor Speakers: JBL, Yamaha. JVC, Sony Signal Processing: Equalizers/filters by Sontec, JREI, Soundcraftsman. Ampex digital delay, Sontec/Valley People limiters/compressors. Engineers: Nimitz "Nim" Sarikananda, Peter Humphreys. Credits: Grover Washington, Jr., Chuck Mangione, Levert, The O'Jays, E.U., Lou Rawls, Phyllis Hyman, Miles Jaye, Third World, Montana Orch. and many others. Rates: Available upon request. Other Services: Compact disc premastering and preparation, submastering

for cassette duplication. Custom CD and record pressing, real-time and high-speed cassette duplication.

MASTERWORKS STUDIOS; Tape Duplication; 4024 Williamsburg Court; Fairfax, VA 22032; (703) 385-1780. Contact: Lois Fritz. TAPE DUPLICATION. Duplicator: Tascam 122 real-time decks, Infonics mid-speed. Capacity: 1 to 1,000/day. Method of Duplication: In-cassette. Tape Used: Agfa, BASF. Chrome. Duplicating Speed: Real-time, double-time, mid-speed 8:1. Packaging Equipment/Fulfillment Services: Labels, inserts, shrinkwrap. Rates: Call or write for brochure. Other Services: Art design, layout. Also editing and mastering.

MIAMI TAPE, INC.; Mastering, Pressing, Tape Duplication, CD Services; 8180 NW 103rd St.; Hialeah Gardens, FL 33016; (305) 558-9211; (305) 558-9212. Contact: Carlos Garcia. MASTERING. Cutting Lathes: Haeco computerized. Tape Machines: MCI, Studer R-DAT. Monitor Speakers: JBL, Tannoy. Signal Processing: Orban EQ, JREI limiters, Burwen NR, Dolby A dbx Engineers: Jorge Garcia, Carlos Garcia. Credits: Upon request. Rates: Upon request. Other Services: Safety's, editing, EQ'd transfers. CD premastering. PRESSING. Presses: SMT automatic presses. (4) LP, (2) 45. Capacity: 3,000 LPs daily. Vinyl Used: Burlington. Rates: Upon request. Other Services: Complete packaging services. TAPE DUPLICATION. Duplicator: Electro Sound. Capacity: 200,000/month. Method of Duplication: Bin loop. Mastering Equipment: Electro Sound. Tape Used: Agfa, BASF. Shell Used: Various types available. Duplicating Speed: 32:1. Loading Equipment: King Packaging Equipment/Fulfillment Services: Complete packaging. Rates: Upon request. Other Services: Editing, Dolby B and C encoding. COMPACT DISC Preparation/Manufacturing: In-house premastering using Sony equipment, complete compact disc packages, digital editing, digital transfers, rates upon request.

MIRROR IMAGE AUDIO DUPLICATORS; Tape Duplication; 619 South Main St.; Gainesville, FL 32601; (904) 376-8742. Contact: Ray Valla.

THE MIXING BOARD; Mastering; Rt. 6, Box 543; Toccoa, GA 30577; (404) 886-9179. Contact: Steve Hartley.

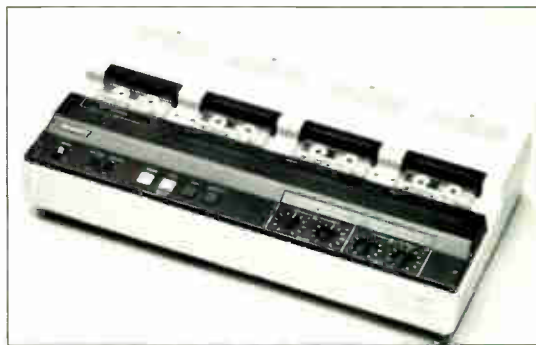
THE MUSIC CONNECTION INC.; Mastering, Pressing, Tape Duplication, CD Services; 166 Madison Ave.; New York, NY 10016; (212) 686-9595. Contact: Ira Cohen. MASTERING. Other Services: Complete analog & digital mastering services.

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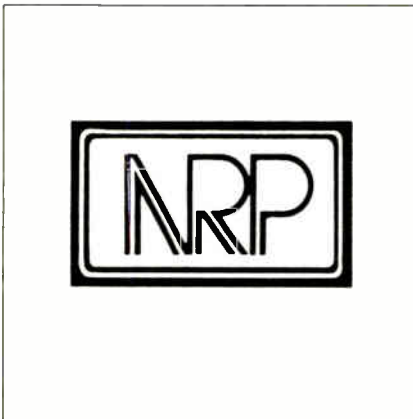
TAPE TO DISC

DIRECTORY

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PRESSING. Presses: 12", 7". Other Services: Film separations and board jacket printing. **COMPACT DISC.** Preparation/Manufacturing: All services from glass master to replication/packaging.

NASHVILLE RECORD PRODUCTIONS, INC., *Mastering, CD Services;* 469 Chestnut St.; Nashville, TN 37203; (615) 259-4200. Contact: George Ingram. **MASTERING** Cutting Lathes: Neumann, Zuma and Capps II computer. Console: Sphere and Neve. **Tape Machines:** Studer and MCI. **Monitor Speakers:** Electro-Voice Sentry 3, Yamaha NS-10. **Signal Processing:** Parametric and graphic EQ, reverb, compressor/lim-



NASHVILLE RECORD PRODUCTIONS, INC.
Nashville, TN

iter Engineers: Glen Bullard, chief engineer; John Eberle, studio manager. **Credits:** Ronnie Milsap, Amy Grant, Rick & Janice Carnes, Sha-Na-Na, Tupperware, American Airlines, Drivers, Bill Anderson, Dan Seals, Ray Price, Sammi Smith, Pat Boone, Alabama. **Rates:** \$90/side, 12"; \$35/side, 7". **Other Services:** Digital mastering: 1/2" Sony F1, 501, 701; 3/4" Sony 1610. **CD preparation, complete record and cassette packaging, LP and 45 pressing, tape duplication, editing, reference acetates**

NIMBUS RECORDS, INC., *CD Services;* Guildford Farms, Rt. 629; Ruckersville, VA 22968; (800) 451-8725 (sales); (800) 782-0778 (service); (804) 985-1100 (Virginia). Contact: Marc S. Feingold

L. NIX & CO. INC., *Mastering, Tape Duplication;* 2000 Madison Ave.; Memphis, TN 38104; (901) 725-0855. Contact: Larry Nix, Al Smith.



NORTHEASTERN DIGITAL RECORDING, INC.
Shrewsbury, MA

NORTHEASTERN DIGITAL RECORDING, INC., *Mastering, CD Services;* 12 Sadler Ave.; Shrewsbury, MA 01545; (617) 753-1192. Contact: Toby Mountain, Tracy Crane. **MASTERING.** Console: Troisi SA 200 12 x 4 x 2, full parametric EQ. **Tape Machines:** Sony PCM-1630, PCM-1610 w/Sony BVU-800DB 2-track, digital, Sony APR-5002 2-track analog, Sony PCM-F1, 701, 501. **Monitor Speakers:** Snell Type C. **Signal Processing:** Lexicon PCM70. **Engineers:** Dr. Toby Mountain, Jonathan Wyner. **Credits:** Frank Zappa, Arlo Guthrie, Ritchie Havens, Devo, Kingston Trio, Rykodisc, Rounder, A&M, Chrysalis, Bose, Polaroid. **Rates:** Digital transfers, editing, CD mastering: \$85/hr.; analog-to-digital transfers: \$100/hr. **COMPACT DISC.** Preparation/Manufacturing: Complete digital editing and premastering for compact disc using the Sony PCM-1610/30 system with the DAE-1100 digital editor. Also complete compact disc replication services.

PRCTAPE COMPANY, INC., *Tape Duplication, CD Services;* 422 Madison Ave.; New York, NY 10017; (212) 308-2300; (800) 443-2805; FAX: (212) 308-2306. Contact: Albert R. Santoro.

PROGRESSIVE TAPE CORPORATION, *Tape Duplication;* 40-H Corbin Ave.; Bay Shore, NY 11706; (516) 242-4646. Contact: Paul Glantzman.



PROJECT 70 AUDIO SERVICES, INC.
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All editing performed by Dr. Toby Mountain, PhD. Music

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Contact: Jerry L. Connell TAPE DUPLICATION. Duplicator: Ampex BLM 200 (new electronics 1987), Electro Sound 6000. Capacity: Ampex, 10 slaves; Electro Sound, 6 slaves. Method of Duplication: Bin loop. Mastering Equipment: Otari MTR-10 1/4", Ampex AG-440 1", dbx, Dolby A and Dolby B. Tape Used: Agfa, BASF and Sunkyoung. Shell Used: Mag Media, Shape Mark 10. Duplicating Speed: 32:1. Loading Equipment: King 790 w/AMI splicers and software. Packaging Equipment/Fulfillment Services: Shape labeler, Apex printing, Scandia wrapper. Other Services: Complete fulfillment services from script to mailing of finished product.

REAL TIME DUPLICATIONS; Tape Duplication; 3432 Kirby Rd.; Memphis, TN 38115; (901) 794-2164. Contact: James or Jan Vachon.

ROAR PRODUCTIONS RECORDING & MUSICAL SERVICES; Pressing, Tape Duplication; 6655-H Dobbin Rd.; Columbia, MD 21045; (301) 596-2600. Contact: Steven Rosch, Andrea Weatherhead.

RUM PRODUCTIONS, INC.; Mastering, Tape Duplication; 824 Baronne St.; New Orleans, LA 70113; (504) 522-5979. Contact: Scherri Rumsfeld.



SHAPE OPTIMEDIA, INC.
Sanford, ME

SHAPE OPTIMEDIA, INC.; CD Services; Rt. 109 and Eagle Dr.; Sanford, ME 04073; (800) 237-3472; (207) 324-1124. Contact: Paul J. Gelardi. COMPACT DISC. Preparation/Manufacturing: Mastering, electroforming, disc replication, full graphic capabilities, packaging, jewel boxes and distribution. Prices based upon volume.

STUDER REVOX AMERICA, INC.; Mastering; 1425 Elm Hill Pike; Nashville, TN 37210; (615) 254-5651. Contact: David C. Bowman.

STUDIO MAGNETICS CO. INC.; Tape Duplication; 12 Long Island Ave.; Holtsville, NY 11742; (516) 289-3400; (800) 874-2202 (outside NY). Contact: Craig Balaban, Jim Makowski.

SUNSHINE SOUND, INC.; Mastering; 1650 Broadway; New York, NY 10019; (212) 562-6227. Contact: Frank J. Trimarco.

THE TAPE COMPLEX, INC.; Tape Duplication; 4 Haviland St.; Boston, MA 02115; (617) 437-9449. TAPE DUPLICATION. Duplicator: Awa 200 decks (customized). Method of Duplication: In-cassette. Tape Used: Agfa, Ampex, Magnetic Media. Shell Used: Michelex, IPS, Magnetic Media. Duplicating Speed: Real-time. Loading Equipment: (2) King and (2) TTL. Packaging Equipment/Fulfillment Services: On-cassette printing, shrinkwrapping. Other Services: Mastering tape, blank cassettes, R-DAT recording supplies, videotape.

TRAXX RECORDING CO.; Tape Duplication; 24 Crestway KC; New Fairfield, CT 06812; (203) 746-3561. Contact: James Beck. TAPE DUPLICATION. Duplicator: KABA and Otari/50 positions. Capacity: 700 C-45/shift x 1, 1,400 C-45/shift x 2. Method of Duplication: In-cassette and from reel. Mastering Equipment: Otari, TEAC, Studer, Tascam. Tape Used: BASF Type II Chrome, BASF LHD, Ampex Chrome, Agfa 649/949, Sunkyoung and Magnetic Media. Shell Used: Magnetic Media, IPS, Shape, Michelex. Duplicating Speed: Real-time and 2:1. Loading Equipment: TTL. Packaging Equipment/Fulfillment Services: Packaging and shrinkwrap. Rates: Call for quotes and free catalog. Other Services: In addition to a fine duplicating facility, we carry a full line of recording products and custom-wound bulk cassettes and cassette accessories.

TRUTONE RECORDS; Mastering, Pressing, Tape Duplication, CD Services; 163 Terrace St.; Haworth, NJ 07641; (201) 285-0940. Contact: Adrienne Rowatti. MASTERING. Cutting Lathes: Neumann VMS70 w/Zuma computer, Scully lathe w/Capps Varipitch II computers. Console: Neumann, Studer, custom. Tape Machines: Studer A80 MkII, Studer A810, Stu-



TRUTONE RECORDS
Haworth, NJ

der B67, Ampex ATR-102, MCI JH-110B. Monitor Speakers: UREI B13, B&W 801, B&W DM-220, JBL, Yamaha, Auratone. Signal Processing: Neumann, Pultec, UREI, Sontec, Harmonia-Mundi. Engineers: Carl Rowatti, Phil Austin, Steve Robb, Ray Janos. Credits: Upon request. Rates: Upon request. Other Services: Digital editing, digital EQ; Sony PCM-630, R-DAT and F1 masters. High-quality, short-run cassette duplication and LP pressing. TAPE DUPLICATION. Duplicator: (26) KABA real- and double-time. Method of Duplication: In-cassette. Tape Used: Agfa 662. Duplicating Speed: Real-time and double-time. Rates: Upon request. Other Services: Duplication available directly from digital or analog source without running master. COMPACT DISC. Preparation/Manufacturing: Preparation/assembly of Sony PCM-1630 masters for CD.

WHITE CROW AUDIO; Tape Duplication; 19 Marble Ave.; Burlington, VT 05401; (802) 658-6475. Contact: Douglas Jaffe. TAPE DUPLICATION. Duplicator: (50) Nakamichi CR-1A deck. Capacity: 500 C-60/day. Method of Duplication: In-cassette. Mastering Equipment: Studer A80, Studer A810, Studer A820, Dolby A and SR, Sony PCM-2500 R-DAT, Sony VO-5800 3/4" VCR with Sony PCM-601ESD, Neve/GML console. Tape Used: BASF Pro-II Chrome, TDK SA Chrome, TDK AD normal. Shell Used: Shape, TDK (standard preloaded), Michelex. Duplicating Speed: Real-time, 1:1. Packaging Equipment/Fulfillment Services: Shrinkwrap. Rates: Call or write for rate card and demo. Other Services: In-house computer-generated labels, J-Card insertion. Can assist with complete design and printing services, Apex on-shell printing.

WK STUDIO; Tape Duplication; 611 Broadway, Ste. 529-531; New York, NY 10012; (212) 473-1203. Contact: Phyllis Whitehouse, Konstantine Sareyani. TAPE DUPLICATION. Duplicator: (40) Tascam 122 real-time, (7) Telex 6120 high-speed, (5) Otari DP 4050 high-speed. Capacity: 10,000/day (high-speed), up to 1,000/day (real-time). Method of Duplication: In-cassette. Mastering Equipment: Ampex AG-140, 1/4" & 1/2", Otari 5050B, Sony PCM-601 to NEC VHS deck and Sony Beta deck. Tape Used: BASF, Ampex. Shell Used: Shape, Magnetic Media. Duplicating Speed: Real-time, 8:1, 16:1. Loading Equipment: TTL. Packaging Equipment/Fulfillment Services: Labeling, shrinkwrap. Rates: On request. Other Services: 16-track recording (Ampex MM-1000/TAC), MIDI, sampling, sound effects, 64-track computer software setup.

CENTRAL

A&F MUSIC SERVICES; Tape Duplication; 2834 Otsego; Pontiac, MI 48054; (313) 682-9025; (313) 669 3100. Contact: Frank Merwin.

A TO Z AUDIO SERVICES, INC.; Tape Duplication; 21929 Lorain Rd., PO Box 26087; Fairview Park, OH 44126; (216) 333-0040. Contact: Duane Abarca, Greg Zarnoski. TAPE DUPLICATION. Duplicator: Magnefax stereo, Telex 6120 XLP stereo. Capacity: 3,000 C-60s/day. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Revox, Nakamichi, Tascam. Tape Used: BASF, Ampex. Shell Used: Shape Mark 10, Almag 5-screw. Duplicating Speed: 15 ips, 30 ips, 45 ips. Loading Equipment: (2) AMI modified, King 780. Packaging Equipment/Fulfillment Services: Shrinkwrap, imprinting, 4-color inserts, custom labels. Rates: Very reasonable. Other Services: Video duplication, Ampex reel tape, reel supplies, splicing blocks and tabs.

ACME AUDIO & RECORDING CO.; Mastering, Tape Duplication, CD Services; 3821 N. Southport; Chicago, IL 60613; (312) 477-7333. Contact: Jim Rasfeld. MASTERING. Console:

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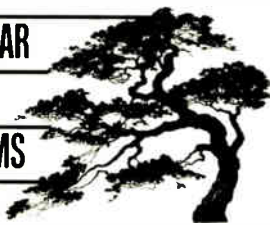
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C E N T R A L

TAPE TO DISC

DIRECTORY

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NEOTEK Series One Tape Machines: Ampex ATR-102 1/2" and 1/4", Technics 1520, Technics 1500, Technics 1506, Sony PCM-501ES, Sony PCM-1630, DMR-4000, PCM-2500 R-DAT, Nakamichi BX-300. Monitor Speakers: E-V Sentry 100A, E-V Sentry 500. Signal Processing: Brooke-Siren dynamics processor, phase-linear auto-correlator, Orban 422B, Technics SH-9010 EQ, Teletronix and dbx compressors, PCM-60, REV7, Melcor program EQ, Dolby A and SR, dbx Type I and II. Engineers: Mike Rasfeld, Bob Colton, Paul Smith, Blaise Barton. Credits: Flying Fish, Blind Pig, Red Beans, Blues R&B, Global Village, Earwig, Atlantic, Nessa and Wolf record companies. Rates: \$50/hr. for PCM-501 digital copymasters; \$40/hr editing & copying, \$125/hr CD preparation. Other Services: Compilations from any format for CD release, we specialize in digital remastering. TAPE DUPLICATION. Duplicator: (35) Nakamichi BX-300 customized. Capacity: 1,000 C-45s a day. Method of Duplication: In-cassette. Mastering Equipment: Beta, VHS, Sony PCM-501ES, Technics 1500. Tape Used: BASF Chrome, Ampex 615. Shell Used: Shape Mark 10, Michelex clear normal. Duplicating Speed: Real-time. Loading Equipment: King Packaging Equipment/Fulfillment Services: Insertion and shrinkwrap. COMPACT DISC. Preparation/Manufacturing: Remastering from any analog format to 1630 CD master.

ARS RECORDING STUDIO & TAPE DUPLICATION; Mastering, Tape Duplication; 11626 S. Pulaski; Alsip, IL 60658; (312) 371-8424. Contact: Allen Keilman, Gary Cobb

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Independence, MO**

AUDIOPHILE REALTIME CASSETTE DUPLICATION; Mastering, Tape Duplication; 13801 E. 35 St., Independence, MO 64055; (816) 254-0400; (800) 322-2832. Contact: Bob Epp. MASTERING. Console: TAC Scorpion 16x8. Tape Machines: (3) Sony APR-5000 2-track mastering machine, Sony 2500A DAT machine, Sony PCM-F1 and PCM-501 with JVC 1/2" and 3/4" videocassette recorders. Monitor Speakers: Norberg BCS-16 2-way near-field, Andante 3As. Signal Processing: UREI 1176LN, UREI 1178, Aphex Compellor, UREI 546 parametric EQ, Yamaha DEQ-7 digital EQ, Dolby A, B and SR noise reduction, dbx noise reduction, Barcus-Berry model 802 signal processor, Dorrrough loudness meters. Engineers: Bob Epp, Eric Elwell, Russ Wojtkiewicz. TAPE DUPLICATION. Duplicator: KABA real-time duplicators. Method of Duplication: In-cassette, bin loop. Mastering Equipment: (3) Sony APR-5000 2-track mastering machine, Technics 1506 1/4-track mastering machine. Tape Used: BASF TP-18/QP-12 Chrome, Agla 649/949 ferric cassette tapes, Ampex 456 and Agla 526 1/4" mastering tape. Shell Used: Shape Mark 10, Lenco, Magtek. Duplicating Speed: Real-time, 2x, 16x, 32x. Loading Equipment: (2) King 790 loader. Packaging Equipment/Fulfillment Services: In-house typesetting/layout, in-house on-cassette printing, shrinkwrapping. Rates: Quote per job. Other Services: Video duplication and packaging. 1", 3/4", 1/2", stereo, stereo hi-fi duplication.

C.D.S. CASSETTE DUPLICATING SERVICE; Tape Duplication; 444 Dimmick Ave., Cincinnati, OH 45246; (513) 851-1956. Contact: Carl J. Burkhardt.

CENTURY 21 PROGRAMMING, INC.; CD Services; 14444 Beltwood Pkwy.; Dallas, TX 75244-3228; (214) 934-2121. Contact: Dave Scott

COACHHOUSE MUSIC; Mastering, Pressing, Tape Duplication, CD Services; PO Box 1308; Barrington, IL 60010; (312) 382-5295. Contact: Michael Freeman, Theodora Vosnos

CONCEPT PRODUCTIONS, INC.; Tape Duplication; 7878 Big Sky Dr.; Madison, WI 53719; (608) 833-TAPE; (800) 792-3505, ext 340. Contact: Rod Bareilmann, Dan Geocar

**CREATIVE
SOUND**

HOUSTON

**CREATIVE SOUND PRODUCTIONS, INC.
Houston, TX**

CREATIVE SOUND PRODUCTIONS, INC.; Tape Duplication; 8383 Commerce Park Dr., #604; Houston, TX 77036; (713) 777-9975; (800) 451-7034. Contact: Edward B. Smith. TAPE DUPLICATION. Duplicator: Otari DP-80 w/HX Pro 64:1 bin loop, 2 slaves, Otari DP-1010 master/bin loop, 5 slaves, Infonics open-reel master, 3 slaves. Capacity: 10,000 per 8-hour shift. Method of Duplication: Bin loop, in-cassette. Mastering Equipment: Otari MTR-10-4 w/HX Pro, Otari 5050 Mark III-4, Ampex ATR 700; Tascam M32, Sony PCM-501 2-track digital. Tape Used: Agla 649/949, Agla 619/819, Agla 627 Chrome, Ampex 615/616. Shell Used: IPS Premium, ICM Premium, Shape Mark 10. Duplicating Speed: 16:1, 32:1, 64:1. Loading Equipment: Tapematic 2000, King automatics. Packaging Equipment/Fulfillment Services: Compugraphic typesetting, shrinkwrap, custom labels and full-color case-liners, printing, custom vinyl albums, full graphic design. Rates: Catalog available upon request. Other Services: Video duplication and packaging, all formats, custom-loaded blank cassettes, studio production and post-production facilities.

CUP OF WATER PRODUCTIONS; Tape Duplication; 13780 12th Road; Plymouth, IN 46563; (219) 936-2015. Contact: Steve Pletcher, Penny Pletcher.

DIGITAL AUDIO DISC CORPORATION; CD Services; 1800 N. Fruitridge Ave.; Terre Haute, IN 47804; (812) 466-6821. Contact: Scott Bartlett. MASTERING. Console: Sony digital mixing console K-1105, -1106, -1107, DAE-3000 digital editor and DAQ-1000 PQ editor, Grass Valley 100 switcher, Sony BVE-900 video editor, Chyron VP-1 character generator. Tape Machines: PCM-1630, DMR-4000 VTR, DASH 3202, Mitsubishi X80, Sony JH-110 1/4" and 1/2", PCM-2500 DAT, PCM-601, BVH-3000, BVH-2800 PCM and 50 DRD-100 DAT duplication. Monitor Speakers: Custom Kinoshita enclosures w/ TAD components. Signal Processing: Sony DFX-2400 SFC, Studer SFC-16, Sony DAL-1000 limiter, Dolby A, dbx noise reduction, ASI-100 DAT format converter. Rates: On request. COMPACT DISC. Preparation/Manufacturing: Complete compact disc, CD-V and DAT mastering and replication, including PQ encoding, analog-to-digital conversions, digital-to-digital conversions; digital equalization and digital editing; video editing, and CD-V master preparation.

DOMAIN COMMUNICATIONS, INC.; Tape Duplication; 289 Main Place; Carol Stream, IL 60188; (312) 668-5300. Contact: Jim Draper

BOB GREEN PRODUCTIONS, INC.; Mastering, Tape Duplication; 7950 Westglen; Houston, TX 77024; (713) 977-1334. Contact: Bob Green, Jim Spurlock, Don Fisher.

JEWEL RECORDS; Mastering, Pressing, Tape Duplication, CD Services; 1594 Kinney Ave., Cincinnati, OH 45231; (513) 522-9336. Contact: Linda York

JOR-DAN, INC.; Tape Duplication; 1100 Wheaton Oaks Ct.; Wheaton, IL 60187; (312) 653-1919; FAX: (312) 665-4966. Contact: Lynn Wallace, Ken Brown.

THE LITTLE WAREHOUSE, INC.; Tape Duplication; 4906 Van Epps Rd.; Brooklyn Heights, OH 44131; (216) 398-0022. Contact: Joe Kauffman. TAPE DUPLICATION. Duplicator: Tel-

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ABBEY TAPE DUPLICATORS, INC.
Chatsworth, CA

ABBEY TAPE DUPLICATORS, INC., *Tape Duplication*; 9525 Vassar Ave.; Chatsworth, CA 91311; (818) 882-5210 (in CA); (800) 346-3327. Contact: Bill Snow Norman Cooke **TAPE DUPLICATION**. Duplicator: Dubbing 24-slave (bin loop), KABA 50-slave (real-time). Capacity: 5,000/day Method of Duplication: in-cassette, bin loop. Mastering Equipment: MCI, Ampex, Technics, Sony, Nakamichi digital F1, R-DAT. Tape Used: BASF LHD, BASF Chrome. Shell Used: 5-screw white, black or clear, Shape Mark 10. Duplicating Speed: 36 ips and real-time. Loading Equipment: King 790. Packaging Equipment/Fulfillment Services: TI labeling, R-wal-dex imprinting, shrinkwrapping, albums, individual mailings. Other Services: Complete narration studio and audio production facilities. Editing, sequencing, equalizing, mixing. Video duplication. Reliable, personal service for over 20 years.

ADVANCE RECORDING PRODUCTS; *Tape Duplication*; 7190 Clairemont Mesa Blvd.; San Diego, CA 92111; (619) 277-2540; (800) 854-1061; (800) 858-1061 (in CA). Contact: Toni Kay Cheney.

AMERICAN MOTION PICTURES; *Tape Duplication*; 7023 15th Ave. NW; Seattle, WA 98117; (206) 789-1011. Contact: Ela Bachmann, Nick Denke.

ARTISAN SOUND RECORDERS; *Mastering*; 1600 N. Wilcox Ave.; Hollywood, CA 90028; (213) 461-2751. Contact: Greg Fulginiti.

ARTIST SOUND; *Tape Duplication*; 10011 SE Division #306; Portland, OR 97266; (503) 254-9742. Contact: Suzanne Ruiz **TAPE DUPLICATION**. Duplicator: (50) Nakamichi real-time. Capacity: 500 C-45 shift. Method of Duplication: in-cassette. Mastering Equipment: Sony F1 digital, Fostex 20 analog. Tape Used: BASF Chrome, TDK by request. Shell Used: Shape Mark 10. Duplicating Speed: 1:1. Packaging Equipment/Fulfillment Services: Shrinkwrap, labels, J-cards. Rates: \$1.55 for C-45 (tape, box, duplication) in quantities 500-999. Other Services: Digital editing (Beta format only), remastering, analog editing, 16-track recording, digital mastering.

ASR RECORDING SERVICES; *Tape Duplication*; 8960 Eton Ave.; Canoga Park, CA 91304; (818) 341-1124. Contact: Kathleen Anthony.

AT&T RECORDING; *Tape Duplication*; 501 N. Larchmont Blvd.; Los Angeles, CA 90004-1305; (213) 466-7756. Contact: Lesley Cohen.

AWARD RECORD MFG.; *Mastering, Pressing, Tape Duplication*; 5200 W. 83rd St.; Los Angeles, CA 90045; (213) 645-2281. Contact: Bill Dryden. George Abajian.

BAUER AUDIO; *Tape Duplication*; 10735 Burbank Blvd.; North Hollywood, CA 91601; (818) 763-8606. **TAPE DUPLICATION**. Other Services: Short runs requiring fast turnaround and audiophile quality are our specialty, utilizing state-of-the-art duplication and mastering equipment custom-modified by Deane Jensen and Steve Hogan. Personalized service is emphasized to match your requirements to our variety of tapes, C-zeros, packaging, in-cassette or out-of-cassette duplication processes. Complete project management available including location recording 24-hour turnaround.



BAUER AUDIO
North Hollywood, CA

CAPITOL RECORDS STUDIOS; *Mastering, CD Services*; 1750 N. Vine St.; Hollywood, CA 90028; (213) 462-6252. Contact: Barbara Hein. **MASTERING**. Cutting Lathes: (2) Neumann SAL 74B w/ Zuma computer. Console: Neve console w/ Sontec, Neve and NTP computerized equalization. **Tape Machines**: Studer A80 2-track (1/4" and 1/2"), Sony and JVC digital mastering. **Monitor Speakers**: JBL custom, Yamaha and Auratone. **Signal Processing**: Eight live chambers, digital echo. **Engineers**: Wally Traugott, Eddy Schreyer. **Credits**: The Beatles, Richard Marx, Lee Ritenour, Julio Iglesias, The Whispers, Diane Schurr, Kenny Rogers, Juice Newton, Shalamar, The Bangles, Bob Seger, Steve Miller, Crowded House, Dwight Yoakam, Poison, Stryper, David Bowie, Pet Shop Boys, Buck Owens, Peter Cetera, John Lennon and many more... Rates: Call for rates. **TAPE DUPLICATION**. Other Services: Call for tape duplication info. **COMPACT DISC Preparation/Manufacturing**: CD preparation: analog-to-digital mastering. Format conversion of all types JVC to Sony mastering. Digital

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W E S T E R N

TAPE TO DISC

DIRECTORY

—CONTINUED FROM PREVIOUS PAGE



CAPITOL RECORDS STUDIOS
Hollywood, CA

mastering engineers: Tom Ketterer, Nick Dofflemyer, Bob Norberg and Larry Walsh. Call for prices for preparation and manufacturing.

COMMAND PRODUCTIONS; Mastering, Tape Duplication; 107 Industrial Center, Harbor Drive; Sausalito, CA 94965; (415) 332-3161. Contact: Warren Weagant

CUSTOM DUPLICATION, INC.; Tape Duplication; 3404 Century Blvd.; Inglewood, CA 90303; (213) 670-5575. Contact: Rick Hively. **TAPE DUPLICATION, Duplicator:** Gauss, Otari. Capacity: 25 million annually. Method of Duplication: Bin loop. Mastering Equipment: Otari, MCI. Tape Used: Agfa Shell Used: Shape Magnetic Media. Duplicating Speed: 64, 1, 32-1. Loading Equipment: King. **Packaging Equipment/Fulfillment Services:** Total packaging. Other Services: Video duplication, computer software duplication, total turnkey operation, drop shipping, warehousing, computerized inventory reporting.

DAVKORE CO.; Tape Duplication; 1300 Space Park Way; Mountain View, CA 94043; (415) 969-3030. Contact: Ray Kaiser.

DIGIPREP; CD Services; 1425 N. Cole Pl.; Hollywood, CA 90028; (213) 461-1709. Contact: Warren Salyer

DIGITAL INTELLIGENCE SYSTEMS CORPORATION—DISC; Mastering, CD Services; 201-C West Dyer Rd.; Santa Ana, CA 92707; (714) 549-5034. Contact: Marvin Breyfogle. **MASTERING Cutting Lathes:** D.I.S.C. CDM-1 compact disc laser mastering system. Rates: Call. Other Services: Compact reference disc. **COMPACT DISC, Preparation/Manufacturing:** Mastering & compact reference discs, CD mastering systems, stamper analyzer and CD analyzer for CD production quality control.

DISCTRONICS, INC.; CD Services; 3500 W. Olive Ave.; Burbank, CA 91505; (818) 953-7790. Contact: Sue Simone, Toni Wilson, Cal Roberts.

FANTASY STUDIOS MASTERING; Mastering, CD Services; 10th & Parker Streets; Berkeley, CA 94710; (415) 549-2500. Contact: George Horn. **MASTERING Cutting Lathes:** Neumann mastering system utilizing the Zuma Audio computer. Console: Sphere console. **Tape Machines:** Studer 1/4" and 1/2" tape machines, Mitsubishi X80 2-track recorder. **Signal Processing:** Sontec. **Engineers:** George Horn, Ptil De Lancia. Rates: Call for rates. Other Services: Mastering from Mitsubishi X80 digital and from Sony 163C digital. Preparation of digital masters for compact disc manufacturing. Editing and equalization mastering from F1 and R-DAT format.

52ND STREET AUDIO; Tape Duplication; 1741 N. Ivar Ave., Suite 204; Los Angeles, CA 90028; (213) 463-5252. Contact: Stu Yarn.

FUTURE DISC SYSTEMS; Mastering, CD Services; 3475 Cahuenga Blvd. W.; Hollywood, CA 90068; (213) 876-8733. Contact: Gary Rice, Kiri Llorente. **MASTERING Cutting Lathes:** Custom Otolon and Neumann cutting systems. Con-



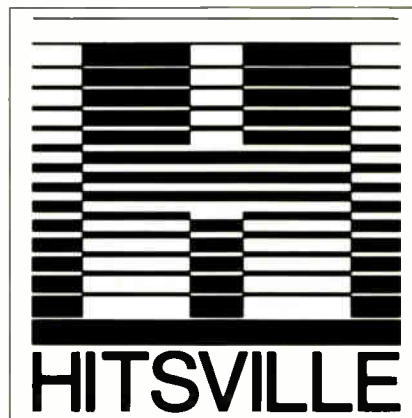
**FUTURE DISC
SYSTEMS**

FUTURE DISC SYSTEMS
Hollywood, CA

sole: Automated mastering console, Sony digital editing system. **Tape Machines:** Ampex, Studer, Mitsubishi, Sony. **Monitor Speakers:** Custom. **Signal Processing:** Sontec. **Engineers:** Steve Hall, Tom Baker. Credits: Madonna, Christopher Cross, Jody Watley, Tiffany, Thomas Dolby, Gladys Knight, Laura Branigan, The Jets, Quiet Riot. Rates: Upon request. Other Services: Complete analog and digital mastering services including digital editing for compact disc and cassette manufacturing.

GOOD VIBRATIONS RECORDING & PRODUCTION CO.; *Pressing, Tape Duplication, CD Services;* PO Box 764; Bohna, CA 92002; (619) 267-0307. Contact: Don Marshall.

BERNIE GRUNDMAN MASTERING; Mastering; 6054 Sunset Blvd.; Hollywood, CA 90028; (213) 465-6264; FAX: (213) 465-8367. Contact: Nickie Walters. **MASTERING Cutting Lathes:** Scully Compudisc. Console: Custom designed. **Tape Machines:** Studer A80 mastering decks with custom electronics, ATR-102, Yamaha K2000, Mitsubishi X86, Mitsubishi X80, Sony 1630, DAT, F1. **Monitor Speakers:** Tannoy custom. **Signal Processing:** EMT plate, dbx compressors and de-essers, Harmonia Mundi digital EQ. **Engineers:** Bernie Grundman, Brian Gardner, Chris Bellman, Mark Keller, Erik Wolf. Credits: Michael Jackson, Lionel Richie, Herb Alpert, Janet Jackson, Prince, George Harrison, U2, George Michael, David Lee Roth, Barbra Streisand. Rates: On request. Other Services: Complete preparation services for compact disc, from any digital source.



THE HITSVILLE STUDIOS
West Hollywood, CA

THE HITSVILLE STUDIOS; Mastering, CD Services; 7317 Romaine St.; West Hollywood, CA 90046; (213) 850-1510; FAX: (213) 874-1420. Contact: Ron S. Lagerlof, Debbie Jenkins.

INTERSOUND INC.; Mastering, Tape Duplication; 8746 Sunset Blvd.; Los Angeles, CA 90069; (213) 652-3741. Contact: Ahmed Agrana, Kent Harrison Hayes.

JACKSON SOUND PRODUCTIONS LTD.; Tape Duplication; 3897 S. Jason St.; Englewood, CO 80110; (303) 761-7940. Contact: L. Loughman.

KABA AUDIO PRODUCTIONS (FORMERLY KENNETH A. BACON ASSOCIATES); Tape Duplication; 24 Commercial Blvd.; Novato, CA 94949; (415) 883-5041 (in CA); (800) 231-TAPE. Contact: Toni Lynn. **MASTERING Engineers:** Gordon



KABA AUDIO PRODUCTIONS
Novato, CA

Elliott, Ted Stratton, Margaret Olney Rates: Phone TAPE DUPLICATION Duplicator: KABA 4-track real-time and 2x system, 100 positions, Accurate Sound 16x and 32x bin loop system, 5 slaves. Capacity: 3,500 C-45 on RT/2x, 3,000 C-45/day on bin loop. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Otari MTR-12-I w/HX Pro, Otari MX-505H 1/4" 2-track, 1/2" 4-track, Otari 1/2" 8-track, Nakamichi and Technics PCM, Dolby B 330, Dynaflex noise reduction, Aphex Aural Exciter, Compellor, Dominator, ADA digital delay, Yamaha R-1000 digital reverb, Tascam parametric EQ. Tape Used: BASF, Surkyong, Agfa, Shell Used: Shape, MicheleX, El Mar, EMC. Duplicating Speed: 1:1, 2:1, 8:1, *6:1, 32:1. Loading Equipment: TTL Model 515, Kronos-4. Packaging Equipment/Fulfillment Services: ITI L-1B labeler, Pack-all, shrink-wrap, Apex print on-cassette. Rates: Phone. Other Services: In-house graphics department, full packaging with paper labels or on-cassette printing, 1-4 colors, up to 300-line screen; on-cassette foil printing. Equipment for turnkey cassette duplication systems available from sister company, KABA Research and Development.

KDISC MASTERING STUDIOS: Mastering, CD Services: 6550 Sunset Blvd., Hollywood, CA 90028; (213) 466-1323. Contact: Julie Gach. MASTERING. Cutting Lathes: Neumann-DMM & lacquer. Console: Custom consoles. Tape Machines: Studer, Ampex. Monitor Speakers: JBL custom, Gauss, Yamaha NS-10M. Signal Processing: Sontec, API, Neve, Dolby, dbx. Engineers: John Golden, Ken Perry, Carol Hibbs, Bill Lightner. Rates: Call for rates. COMPACT DISC Preparation/Manufacturing: Sony PCM-1610 and -630 mastering, JAE/100 music editing, digital copies, compact disc prep, format conversion.

KM RECORDS, INC.: Mastering, Pressing, Tape Duplication, CD Services: 2980 N. Ontario St., Burbank, CA 91504; (818) 841-3400; FAX: (818) 845-6478. Contact: Jim Auchterlonie, Bill Riley, Marty Weiss. MASTERING. Cutting Lathes: (2) VMS-70, (2) SX74, (2) SAL 74B, with Zurra computer. Console: Neumann SP78, Neumann SP272. Tape Machines: (2) MCI JH-110 modified. Monitor Speakers: Yamaha NS-10. Signal Processing: EMT 140, API and other EQs, Sontec parametric. Engineers: Michael DeCuir, Dave Travis, Keith Kearns, Mike Zaret. Rates: Upon request. PRESSING. Presses: Toolex-Alpha. Capacity: 15,000 per day. Vinyl Used: KC-569. Rates: Upon request. Other Services: In-house metal processing, printing of labels, jacket covers and liners, jacket fabrication.


LAHAINA SOUND RECORDING STUDIO: Mastering, Lahaina Square H-2; Lahaina, HI 96761; (808) 667-2587. Contact: Amos Daniels.

TERRY LESSIG SOUND: Tape Duplication, 1626 N. 7th St., Phoenix, AZ 85006; (602) 255-0155. Contact: Terry W. Lessig. TAPE DUPLICATION Duplicator: Magnefax LB-72 bin loop mono, (25) Nakamichi MR-2 stereo. Capacity: 2,500/day high-speed mono, 500/day real-time. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Otari MTR-10 w/HX Pro. Tape Used: BASF Chrome, LHD, LHS. Shell Used: Shape Mark 10, ips. Duplicating Speed: 2:1 mono, real-time stereo. Loading Equipment: TTL 515-B. Packaging Equipment/Fulfillment Services: Apex on-cassette printing, shrinkwrap, inserts printed from camera-ready art. Rates: Call for quote. Other Services: Real-time 1/4" tape duplication (2-track stereo) for broadcast syndication of spots or programs.

LOCATION RECORDING SERVICE INC.: Mastering, 2201 W. Burbank Blvd.; Burbank, CA 91506; (213) 849-1321. Contact: Muriel Baker. MASTERING. Cutting Lathes: (3) Neumann VMS-70, Neumann VG66, Neumann SX74. Console: (2) Neumann SP79, Neumann MT66. Tape Machines: (4) Studer A80 MkII 1/2" & 1/4", PCM-F1, (4) Nakamichi MR-1 cassette deck, (3) Studer B6.7 Monitor Speakers: UREI 811-A. Studer A68 amps. Signal Processing: Sontec MES430 EQ, EMT 240 plate re-

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W E S T E R N

TAPE TO DISC

DIRECTORY

—CONTINUED FROM PREVIOUS PAGE

verb, Yamaha REV5 digital reverb. Engineers: Bruce Kennedy, David Ellsworth, Stew Hillner, Kevin Gray. Credits: ABC Watermark, United Stations, MCA Radio, Rick Dees Productions, DIR, MJJ Broadcasting, Premiere Radio. Rates: LP \$105/side, single \$40/side, rundown \$95/hr. Other Services: Complete printing services: labels, jackets, cue sheets, etc. Complete record productions, cassette bin loop mastering. Commercial printing.

MASTER DIGITAL, INC.; Tape Duplication, CD Services; 1749 14th St.; Santa Monica, CA 90404; (213) 452-1511. Contact: Paul Addis. TAPE DUPLICATION. Duplicator: Sony 16-bit digital, Nakamichi BX 300. Method of Duplication: Real-time only. Mastering Equipment: Studer B67, Sony PCM-1600, Ampex ATR-100, Nakamichi DMP-1000. Tape Used: TDK SAX reference series, custom-loaded to length. Shell Used: Shape Mark 10. Duplicating Speed: Real-time. Loading Equipment: King Packaging Equipment/Fulfillment Services: Color stock, typeset and printed, cards and labels, shrinkwrap. Rates: \$3 and up. Other Services: Video production, digital audio recording, compact disc mastering, video editing: 1" and Betacam, ADO, Chyron, digital audio laybacks. Videophile duplication: 1", ¾", VHS and Beta Hi-fi.

MASTER TRACK PRODUCTIONS; Tape Duplication; 1524 W. Winton Ave.; Hayward, CA 94545; (415) 782-0877. TAPE DUPLICATION. Capacity: 100,000 units/month. Method of Duplication: Bin loop. Mastering Equipment: Studer A80 MR. Tape Used: Sunkyong. Shell Used: ICM, Michelex, Magnetic Media. Duplicating Speed: 16:1, 32:1. Packaging Equipment/Fulfillment Services: On-shell printing, overwrap, paper labels, full-color inserts. Rates: Call for detailed price lists. Other Services: Complete 24-track recording studio.

MCCUNE STUDIOS; Tape Duplication; 951 Howard St.; San Francisco, CA 94103; (415) 777-2700. Contact: Jim Draper.

MELODY PRODUCTIONS; Tape Duplication; 7712 23rd Ave. NW; Seattle, WA 98117; (206) 783-8694. Contact: James A. Bostad, Sr. MASTERING. Engineers: James A. Bostad, Sr. Rates: Call for quote. Other Services: Custom loading of cassettes and quick turnaround a specialty. Complete 8-track studio with digital effects. TAPE DUPLICATION. Duplicator: Otari 4050 (high-speed), Nakamichi MR-1 & MR-2B. Capacity: 8 per pass on Otari, 6 per pass on Nakamichi. Method of Duplication: In-cassette. Tape Used: BASFLNS, LH-D Chrome & new Super Chrome. Shell Used: Magnetic Media, Shape Mark 10. Duplicating Speed: High-speed 8:1, real-time 1:1 (Nakamichi). Loading Equipment: King 790. Rates: Call for quote. Other Services: 8-track studio, video editing, duplication with effects.

MOON VALLEY CASSETTE (WINTER SUN, INC.); Tape Duplication; 10802 N. 23rd Ave.; Phoenix, AZ 85029; (602) 870-3987. Contact: Mark Bruno. TAPE DUPLICATION. Duplicator: Otari Model DP-1010 duplicating system using ¼", 4-track DP-1310 master reproducer, Model DP-1510 slave recorders and Model BL-1310 endless loop bin. Capacity: 250,000 cassettes per year. Method of Duplication: Bin loop. Mastering Equipment: Otari MX-5050 4-track, Otari MX-5050 2-track, TEAC Tascam 32-2, Sony PCM-601ESD digital audio processor. Tape Used: BASF LHD, Agla 8-11. Shell Used: Shape Mark 10 clear, premium quality, no-jam 5-screw shell. Duplicating Speed: 16:1. Loading Equipment: TTL Mod. 515 cassette loader, Otari DP-2700. Packaging Equipment/Fulfillment Services: Art design, label/insert printing and shrink-wrap services available. Rates: Call for rates.

MUSIC ANNEX, INC.; Tape Duplication; 970 O'Brien Dr., Menlo Park 94025, (415) 328-8338; 69 Green St., San Francisco, CA 94111, (415) 421-6622. Contact: Keith Hatschek. MASTERING. Engineers: Rainer Gembalczyk (mastering). Rates: \$75 per hour. Other Services: We have five audio recording & post-production studios in addition to our full-service duplication plant. TAPE DUPLICATION. Duplicator: Otari DP-80 w/Dolby HX Pro master and 5 slaves, Versadyne 1500 master and 4 slaves. Capacity: 10,000 units per day. Method of Duplication: Bin loop. Mastering Equipment: Otari MTR-10 1x w/Dolby HX Pro 7 ½ ips, ½". Tape Used: Agla, BASF, Ampex. Shell Used: Magnetic Media, Shape, ICM, EMC. Duplicating Speed: 64:1 (480 ips) master, or 32:1 (240 ips). Loading Equipment: King 790. Packaging Equipment/Fulfillment Services: Apex (on-cassette printing) or paper labels. Rates: Call or write for price lists and information.



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MUSICON; Tape Duplication; 4083 Oceanside Blvd.; Oceanside, CA 92056; (619) 945-6960. Contact: Bill Berry. TAPE DUPLICATION. Duplicator: Versadyne, Magnetax. Capacity: 25,000 per day. Method of Duplication: Bin loop. Mastering Equipment: Otari, Technics, Tascam, Ampex ½" and ¼". Tape Used: Sunkyong, Agla, BASF. Shell Used: Magnetic Media, others. Duplicating Speed: 32:1, 64:1, 128:1. Loading Equipment: All King 790. Packaging Equipment/Fulfillment Services: ITI labeler, Avery labeler, on-cassette printing, boxing and shrinkwrap. Rates: Please call.

NORWICH STUDIOS INC.; Tape Duplication; 105 South Sparks St.; Burbank, CA 91506; (818) 848-1004. Contact: Steve Parr.



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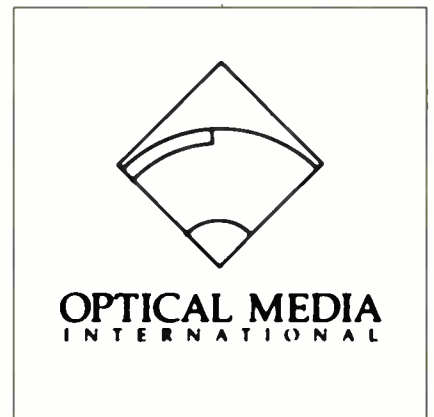


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OPTICAL MEDIA INTERNATIONAL; Mastering, Pressing, CD Services; 485 Alberto Way, Ste. 115; Los Gatos, CA 95032; (408) 395-4332; FAX: (408) 395-6544. Contact: Allen Adkins. COMPACT DISC. Preparation/Manufacturing: CD audio tape master preparation. CD audio tape premaster/encoding. CD audio disc mastering services. CD audio disc pressing in any quantity. 24-karat gold compact discs. Complete services for all CD formats: CD-Audio, CD-ROM, CD-ROM/XA, CD-I. Call for price quote.

PACIFIC CASSETTE LABORATORIES; Tape Duplication; 20655 S. Western Ave., Ste. #116; Torrance, CA 90501; (213) 618-9267. Contact: Paul Bird. TAPE DUPLICATION. Duplicator: Computer-controlled Nakamichi ZX-9. Capacity: Orders up to 5,000+. Method of Duplication: In-cassette. Mastering Equipment: Sony PCM-F1 16-14-bit digital, MCI ½", Dolby B/C encoding. Tape Used: Custom length TDK metal, SA, others by request. Shell Used: TDK reference. Duplicating Speed: 1 ½ ips, real-time. Loading Equipment: King. Packaging Equipment/Fulfillment Services: Complete packaging, labeling, J-cards, shrinkwrap. Rates: Upon request. Other Services: Please call.



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PENGUIN DIGITAL RECORDING COMPANY; *Tape Duplication;* 510 Cypress Dr., Colorado Springs, CO 80911; (719) 392-9113. Contact: Robert Berglund. **TAPE DUPLICATION:** Duplicator: (56) Nakamichi MR-2 (real-time) Capacity: Growing larger every day! Method of Duplication: In-cassette. Mastering Equipment: Sony PCM-2500 R-DAT, Sony PCM-F1 Beta/VHS MCI JH-110C 2-track 1/4" & 1/2" Tape Used: Ampex, Agfa Magnetite. Shell Used: Shape, ICM. Duplicating Speed: Real-time. Loading Equipment: King 760. Packaging Equipment/Fulfillment Services: Complete graphic services with custom J-cards/inserts, labels and shrinkwrap. Rates: Please call for quote. Other Services: Short runs demanding fast turnaround and the highest of quality, utilizing state-of-the-art duplication and mastering equipment. We can do your complete project including on-location, digital recording. We also service all DAT masters.



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PHYLCO AUDIO; *Tape Duplication;* 4697 Brooks St., Montclair, CA 91763; (714) 621-9561; (800) 525-0100. Contact: Robert E. Deates, Gail Husa. **TAPE DUPLICATION:** Duplicator: Audio/Tek, GRT, Telex. Capacity: 10,000 per day. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Tascam, TEAC, Dolby B, dbx I. Tape Used: BASF, Sunkyong. Shell Used: Elmar, EMC, IPS. Duplicating Speed: 30 and 60 ips. Loading Equipment: King 790. Packaging Equipment/Fulfillment Services: Labeling and shrinkwrap. Rates: Call for quote. Other Services: Label and J-card typeset and printing. Packaging individual cassettes and vinyl albums. Custom-loaded blanks.

RAINBO RECORDS AND CASSETTES; *Mastering, Pressing, Tape Duplication;* 1738 Berkeley St., Santa Monica, CA 90404; (213) 829-3476. Contact: Jack G. Brown, Steven E. Sheldon. **MASTERING:** Cutting Lathes: All lacquers cut at EMI Capitol. **PRESSING:** Presses: (26) Lened automatic. Capacity: 60,000 "2" per 24-hour day, 18,000 7" Vinyl Used: Keycor KC 588. Rates: Call for current rates. Other Services: Labels, jackets, sleeves, packaging and drop-shipment. **TAPE DUPLICATION:** Duplicator: Electro Sound 8000 w/HX Pro. Capacity: 40,000/24-hour day. Method of Duplication: Bin loop. Mastering Equipment: Otari. Tape Used: BASF. Shell Used: Michelex, Lenco. Duplicating Speed: 32:1 or 64:1. Loading Equipment: King 790. Other Services: Apex printing, insert card and drop-shipment. **COMPACT DISC:** Preparation/Manufacturing: Packaging only.

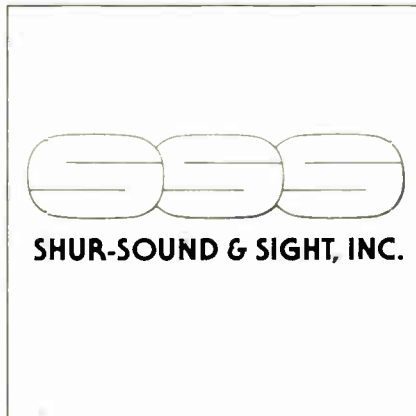


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Santa Monica, CA

RAINBOW CASSETTE STUDIO; *Tape Duplication;* PO Box 472; Taos, NM 87571; (505) 776-2268. Contact: Judy Lujan.

BILL RASE PRODUCTIONS, INC.; *Tape Duplication, Mastering, Pressing, CD Services;* 955 Venture Ct.; Sacramento, CA 95825; (916) 929-9181. Contact: Bill Rase.

REELTIME TAPE DUPLICATION; *Tape Duplication;* 125 Alena St., San Rafael, CA 94901; (415) 459-7180. Contact: Tony Johnson.



SHUR-SOUND & SIGHT, INC.
Santa Clara, CA

SHUR-SOUND & SIGHT, INC.; *Tape Duplication;* 3350 Scott Blvd., #5; Santa Clara, CA 95054; (408) 727-7620. Contact: Lonnie Cory. **TAPE DUPLICATION:** Duplicator: Electro Sound, Infonics. Versadyne 1/2" Capacity: 10 slaves. Method of Duplication: In-cassette, bin loop. Mastering Equipment: Technics 150E, Ampex AG-440, Electro Sound 505. Tape Used: Agfa, Ampex. BASF. Shell Used: Shape, ICM. Duplicating Speed: 16:1, 32:1, real-time. Loading Equipment: (4) King 790, Electro Sound. Packaging Equipment/Fulfillment Services: Tuck labels, shrinkwrap, direct shell imprinting on cassette. Rates: Call. Other Services: Real-time duplication, location recording for conferences, seminars, etc.

SONIC ARTS CORP./THE MASTERING ROOM; *Mastering, CD Services;* 665 Harrison St., San Francisco, CA 94107; (415) 957-9470. Contact: Kenneth Lee, Jr. **MASTERING:** Cutting Lathes: Neumann mastering system. Console: Custom mastering console. Tape Machines: Scully, Ampex, Inovonics, 1/2" & 1/4" mastering, PCM digital. Monitor Speakers: Altec 604 w/E.M. Long Assoc. time-aligned crossovers. Yamaha NS-10. Signal Processing: Sontec Master EQ, Inovonics compressor/limiter, Dolby A and 3R, dbx noise reduction, UREI. Engineers: Kenneth Lee, Leo Kulka. Credits: Philips, Warner Bros., Concord Jazz, Quartet Records, Ralph Records. Rates: Available upon request. **COMPACT DISC:** Preparation/Manufacturing: 1630 CD preparation, Colossus digital mastering system.

STUDIO MASTERS; *Mastering;* 8312 Beverly Blvd.; Los Angeles, CA 90048; (213) 653-1988. Contact: Larry Wood.

STUDIO Z RECORDING, INC.; *Mastering;* 1030 48th St.; Sacramento, CA 95819; (916) 456-2737. Contact: Zack Soles.

TAPE ONE HAWAII, INC.; *Mastering, Tape Duplication, CD Services;* 1620 Liona St., Honolulu, HI 96814; (808) 947-8802. Contact: Dwain H. Hansen. **MASTERING:** Tape Machines: Tascam, Otari, DAT Monitor Speakers: Tannoy Signal Processing: Orban, Symetrix, Aphex. **TAPE DUPLICATION:** Duplicator: Infonics, KABA, DAAD (2 slaves digital). Method of Duplication: In-cassette, bin loop, tapeless master. Mastering Equipment: Tascam, Otari, DAT. Tape Used: Ampex. Shell Used: Sunkyong, Lenco, Shape. Duplicating Speed: 30:1, 80:1, real-time. Loading Equipment: King. Packaging Equipment/Fulfillment Services: Insert printing, on-shell imprinting, shrinkwrap, any packaging. Rates: Competitive. Other Services: Vinyl albums and other specialty packaging (custom) **COMPACT DISC:** Preparation/Manufacturing: Preparation only.

OUTSIDE U.S.

LES INDUSTRIES MAGRA LTEE; *Tape Duplication;* 5722 St-Andre, Montreal, Quebec, H2S 2K1 Canada; (514) 272-8224. Contact: Mario Paquet. **TAPE DUPLICATION:** Duplicator: KABA dual real-time, Telex high-speed. Method of Duplication: In-cassette. Mastering Equipment: Studer B67. Tape Used: Ampex 619 CrO₂, Ampex 615 normal. Shell Used: Magnetic Media. Duplicating Speed: High-speed and real-time. Loading Equipment: AEG loader. Packaging Equipment/Fulfillment Services: Labeling, 10 shrink. Rates: On request. Other Services: Wholesalers of cassette bulk and 1/4" tape.

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R.E.P. SOUND IMAGE RECORDING LIMITED; *Tape Duplication;* 180 Sheldon Dr., Cambridge, Ontario, N1R 6V1 Canada; (519) 623-2269. Contact: Ron Penner. **TAPE DUPLICATION:** Duplicator: Electro Sound, Otari, Grandy. Capacity: 3 lines, 20 slaves, 32:1. Method of Duplication: Bin loop. Mastering Equipment: Otari, Revox. Duplicating Speed: 32:1. Loading Equipment: Tapematic. Packaging Equipment/Fulfillment Services: Standard Norelco bag, blister.

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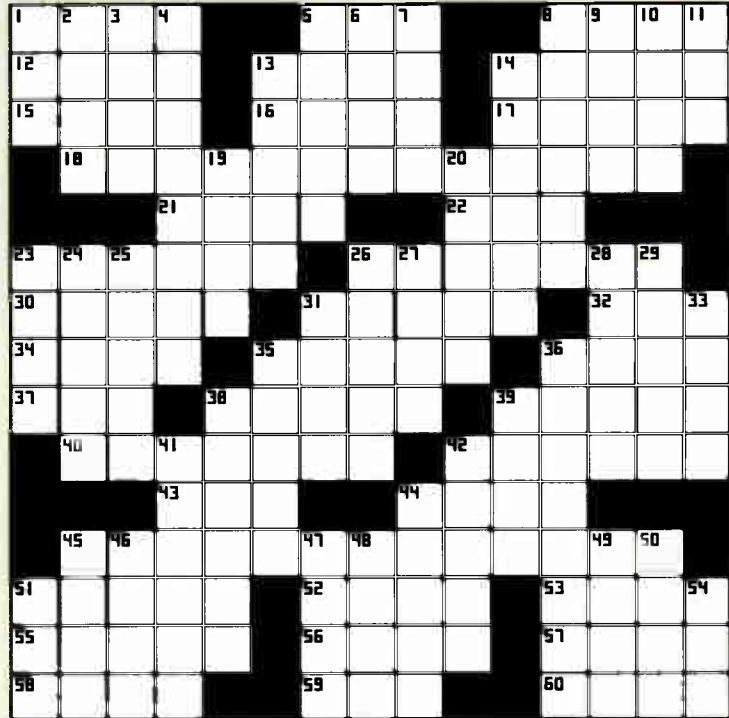
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Circle #136 on Reader Service Card

—FROM PAGE 72

Metalworks upgraded its main room with a G Series console from SSL. . . Harrison consoles have been delivered to studios in Australia and the Canary Islands. The Melbourne-based Soundfirm Pty. Ltd. has purchased a 40-position, 28-input Harrison MR-4 mixing desk for use in film and video, while producer Frank Duval's Orphee Studios, located in La Palma, Canary Islands, has taken delivery of a 50-position MR 20 board with 32 inputs . . . Solid State Logic reports recent console sales to The Netherlands (Wisseloord Studios in Hilversum, SL 4072 G Series), Brazil (Master Mix in Rio de Janeiro, SL 4056 G Series), Japan (Video Sunmall in Tokyo, SL 4048 G Series) and Norway (Bel Studios, SL 4040 E Series). . . A 48-input Soundtracs ERIC production console was recently ordered by the Societe Francais de Production in Paris for the live production and transmission of one of France's most popular shows, *Champs Elysees*. ■

MIX WORDS

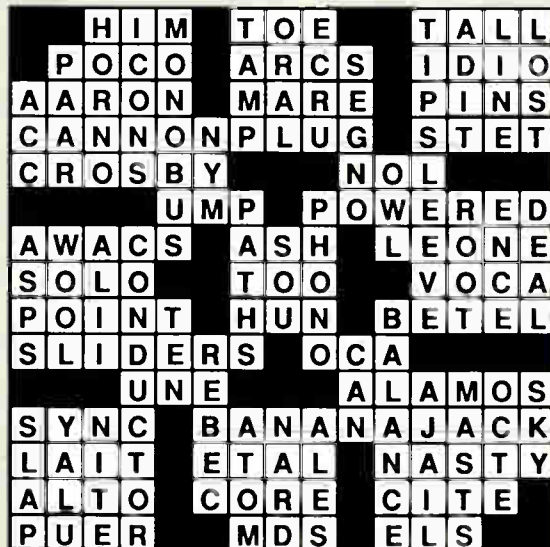


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Media Kitchen

- ACROSS**
- One of a Woodstock trio
 - Possesses
 - "Six Days on the Road" site
 - "An ill wind that no one plays well."
 - Forwarded
 - _____ register (high notes)
 - Billy with the Beaters
 - High prefix
 - Ordinary language
 - Earth station item
 - French town
 - Take sun
 - Set your heart on
 - Record
 - Do your best
 - Mark the beginning of a take
 - Neckline
 - Sherman or Stuart
 - Files
 - Swamp
 - Carney
 - Sings like Ella
 - Alive
 - Roll of tape
 - Lone Star folk
 - Trireme appurtenance
 - Word with patch or guitar
 - Famous California symphony site
 - Painted movie backdrop
 - M.A.S.H. man
 - Play your socks off
 - Took before the judge
 - Kill
 - Shade of blue
 - Recording job (abbr)
 - de deux
 - Eye problem
- DOWN**
- Fall mo.
 - Actor Vigoda and namesakes
 - Rail
 - Keeps things cool in electronics
 - Greeting
 - Not for
 - Copy
 - Dash
 - Norse edda, e.g.
 - Mix
 - Something you don't want raised
 - French drawing room
 - News item
 - Raison d' _____
 - States, in Lyons
 - Movie dog
 - An accidental
 - Famous caravan
 - Type of reverb
 - Household gods
 - Opus on the Argentine
 - Showed Lucy
 - Ret
 - Congers
 - Like a horror flick
 - Final studio sessions
 - Climbed
 - Action word
 - Actor Nick and family
 - Morning news show
 - Musical tags
 - Rabbit
 - Elevator man
 - Stinging bug
 - Spanish bowl
 - Stand by
 - Easter flower
 - Range abbr.
 - Away from the wind

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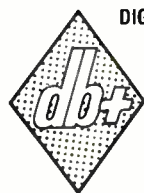
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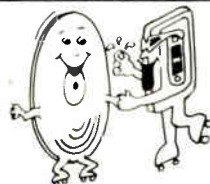
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MUSIC · NOTES

—FROM PAGE 128, ROB WASSERMAN

the time trying to figure out how to do it."

On Jennifer Warnes' tune, "Ballad of the Runaway Horse," Wasserman's part invokes the spirit of the Old West, while Warnes is lovely and breathy, adding vocal backup bursts. "I wanted the sound of a bunch of old mandolin players sitting on the prairie somewhere around a campfire, so I ended up doing what mandolin players often do: triple harmony on the chords. It was one of the hardest things I ever did, but once you get the idea you have to try to pull it off somehow," says the bassist.

Wasserman was still playing with David Grisman's band in 1984 when he did his first recording for *Duets*, "Gone With the Wind," with an uninhibited Dan Hicks. "When I got the record deal [three years later] Dan wanted to try it again," says Wasserman. "But I wouldn't let him, because I felt it had a certain wild spirit that had never been captured, and I think he's a little more sane, mellowed out now, and it probably wouldn't have come out this way."

Wasserman was cooking on all four burners during that session, too, sparing with Hicks and trading solos. "This was turning into something really important to me," says the bassist. "I didn't want any distractions, and wanted to develop my own musical career. I didn't want to be in bands anymore." He quit Grisman's band soon after and did a track for the album with singer Cheryl Bentyne, the very visible and vocally blessed member of the Manhattan Transfer.

In 1985 he met Rickie Lee Jones in

Los Angeles, and wound up recording tracks with her in San Francisco and London, still without a record label. Besides having to convince Boy George his time had run out at the London studio so he and Rickie Lee could put down a track, Wasserman discovered he'd need \$2,000 to leave England with masters of the duet with Jones. (Still, the project wasn't prohibitively expensive, according to the bassist.)

On the Bentyne tune, Wasserman makes use of his bowing and pizzicato playing, while the singer belts out blues from a whisper to a shout. "It's a showy way of doing a sad tune," says the bassist. "Sort of big and full-voiced. Just the opposite of Rickie Lee. I don't think the engineer expected that. I was worried about that tune, because we had tons of print-through on the analog, hearing her voice before it sings on the tape because of the dynamics of the triple fortes, because of 16 tracks with that kind of dynamics. The CD is probably the only way of hearing that song without print-through."

Bobby McFerrin's track with Wasserman sweeps through like a quick blast of arctic air. The two men have at least one thing in common—they both like the rush of being out there alone. "Bobby feels I have the same spirit he does," says Rob, "except it's on the bass. We're really different as people. I'm much more somber than he is; I have more of a bass personality. But we both have that 'anything goes' attitude."

Some people say that Aaron Neville's "Stardust" on *Duets* is his best performance since "Tell it Like it Is." At Neville's request, they went to Willie

Nelson's studio in Texas to record. "Aaron had worked off this lead vocal from Billy Ward and the Dominoes' version," says Wasserman. "I studied an arrangement I had heard from the late '50s and came up with different parts, a tremoloed bow that sounded like the violin section, and this rhythmical one-note part on the bass that's supposed to sound like the piano, this old '50s-sort of rock and roll ballad rhythm. Then I did some chordal strumming to fill it in."

Wasserman is content that his album will have some staying power. "Music goes in and out of style, but if singers are great they'll last forever. And bass is sort of a timeless instrument, too, so it's not dated. That's probably why an album that took four years can be current. If it's all musically relevant then it's going to last. If it had all these synth sounds that you knew were 1986 DX7 sounds, then you'd know that it was done two years ago. So to me it's good I never got into all that stuff, because it's not a current record. It can sit in time and be just as good 20 years from now. There's nothing to make it any less 'in,' and I wasn't trying to be 'in' anyway."

Says engineer Grundman, "Rob's a very good musician, and I think he understands how important it is to an artist to be able to have freedom. His motives weren't like a lot of producers—just making max money—he wanted to make a music record."

Wasserman gives the credit to his guest stars. "They just trusted me," he says. "It's not common to do things like this, and I'm still amazed at how much they put out. They had fun, and in most cases they let go more than they normally would." ■

NEXT IN MIX

JANUARY

- Music Software Developers
- Northwest Studios Directory
- NAMM Show Issue
- MIDI Rooms in Major Studios

FEBRUARY

- Special Feature: Production in the New South
- Southeast Studios Directory
- Digital Audio Workstation Update

AD CLOSING:

DECEMBER 8

MATERIALS DUE:

DECEMBER 15

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- Special Supplement: British and W. European Production Industry
- Directories: European Studios and U.S. Independent Engineers and Producers
- Understanding Microphone Specs

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TRUTH...

OR
CONSEQUENCES.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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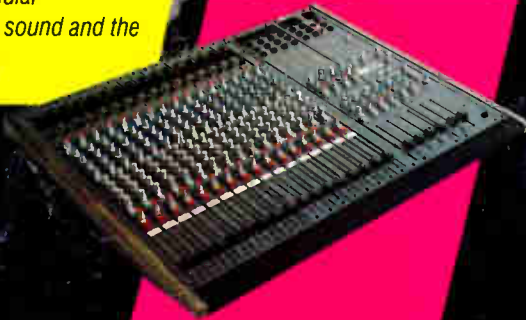
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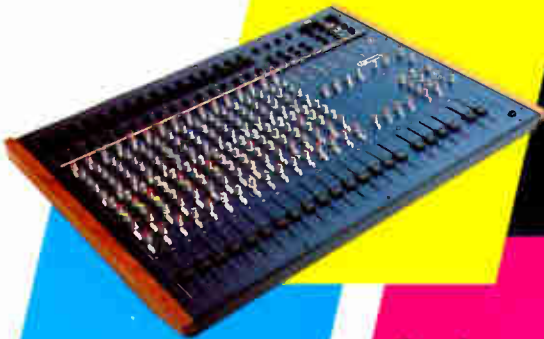
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