

DECEMBER 1986
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THE RECORDING INDUSTRY MAGAZINE

Mix

Interview: Casey Kasem

**Tape-to-Disc Issue:
Mastering, Pressing
& Duplication**

Cassette Tape Tests

**Getting Your
Project On CD**

Emerson, Lake & Powell

**Mastering Forum:
New Technology
& Techniques**

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Listening comparison of line-in to line-out on a simultaneous basis is the ultimate test of any recording process. Dolby SR consistently passes this test.

Engineers, producers and performers all over the world are already using Dolby SR to create master recordings that match the line-in signal every time. They can freely record and edit Dolby SR tapes with any professional recorder. They have also discovered the simple, efficient and rational setup, alignment and maintenance that are possible with Dolby SR. Most important, they have confirmed the superiority of the sound of Dolby SR.

*Dolby spectral recording.
The sound of line-in.*

The new master recording process

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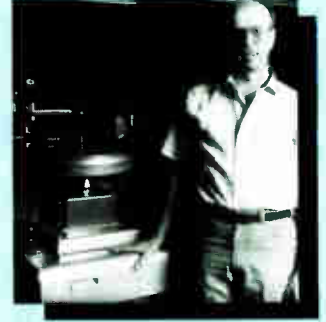
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This month's cover: Discovery Systems' new CD plant in Dublin, Ohio has a projected output of more than 6 million discs a year, with possible expansion to 10 million. At full capacity, Discovery's services will also include manufacture of CD-ROM, CD-I and 12-inch videodiscs; mastering; volume replication; and complete finishing. Pictured here is a worker in the vacuum metalizing chamber
Photo by: Keith Berr
Corner photo: Casey Kasem



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When, several years ago,

we began dedicating our December issue to the process of going from tape to disc, record manufacturing seemed to be pretty straightforward. For most cases, a 24-track tape was produced, then mixed down to a stereo tape that was used to create a lacquer master on a cutting lathe. From there, the lacquer was plated to create stampers to press the "biscuits" into good old black vinyl records. Simple enough.

There were some deviations from this process, of course, like direct-to-disc recording and half-speed mastering. And there were certainly a few alternative playback formats. But, generally, the business was centered around producing that almighty black disc.

Since change is one of the few constants in our industry, it's no surprise that this year's December issue finds the industry completely different. Between the prerecorded cassette and the compact disc, our old black vinyl friend has become an endangered species. Recording tape is also up for grabs, as more and more manufacturers try new storage devices on for size. This issue of *Mix* is all about these changes and today's state of the record/tape manufacturing art.

Black vinyl and multi-track tape... old friends on their last legs? The marketplace will decide when these old soldiers of music must hand the reins over to the Young Techs. But don't throw away your LPs and turntable. They'll make great antiques some day. Better still, they'll even remember some of your favorite tunes.

Keep reading,

David M. Schwartz
Editor/Publisher

CURRENT

Philips/Polygram Form EIM

The European counterpart to American Interactive Media has been formed by Philips International and Polygram B.V. International to pursue the European development of Compact Disc-Interactive (CD-I) software product. European Interactive Media (EIM), to be based in London, will be headed by Byron Turner, the former Director of Creative Development in Europe for Activision. EIM's strategy, according to company sources, "will be to form joint venture relationships with established content providers, principally those that have substantial catalogs of existing titles that can be readily converted and enhanced for the CD-I format."

"EIM is equipped to provide technological expertise, authoritative counsel, authoring and mastering facilities, and access to manufacturing capacity through the company's relationship with Philips and Dupont Optical. EIM also can assist in the development and execution of marketing and sales plans and provide distribution through the worldwide network of Polygram International," said Turner.

Winter NAMM Off to Big Start

The National Association of Music Merchants gathers in Anaheim, California, January 16 through 18, for seminars, workshops and a record number of equipment exhibits. Three months before the show exhibitor space reservation had already eclipsed the 206,000 square feet of display area consumed last winter. Attendance is expected to exceed last year's 28,000, composed primarily of owners or employees of retail or supplier firms in the music products industry. For more information, contact NAMM at 5140 Avenida Encinas, Carlsbad, CA 92008; phone (619) 438-8001.

Sanyo CD Plant for U.S.

The Sanyo Electric Group, based in Osaka, Japan, has established an American subsidiary "to research and

manufacture compact discs and related optical software," according to a company spokesman. The new facility, termed Sanyo Laser Products Corporation, will be headquartered in Richmond, Indiana, and is scheduled to begin production in late spring, 1987. Production capacity at the plant is projected to be five million discs in 1987, rising to 15 million by 1989. Sanyo currently presses over 15 million discs annually from their Japanese facilities.

Grey Market Laws for California

California Governor George Deukmejian has signed into law a bill that requires retailers to disclose to consumers when products they are selling are considered "grey market." The law, a strengthened version of those in Connecticut and New York, requires retailers to inform customers of the differences between "grey market" and legitimate products, including the absence of a manufacturer's warranty, English instructions, or rebate, incompatibility with U.S. frequencies or currents, non-availability of compatible accessories or replacement parts, and any other incompatibility with domestic standards. The law treats failure to label a grey market product as an "unfair trade practice" that is actionable by injured private parties, including injured legitimate sellers.

Steinberg New Ampex President

Charles A. Steinberg, former Ampex executive vice president, has been picked to replace Roy H. Ekrom as president and chief executive officer of Ampex Corporation. Steinberg joined Ampex in 1963 and has served as general manager of the audio-video systems, data systems and magnetic tape divisions, before his most previous position. He is a graduate of City College of New York and holds a master's degree from the Massachusetts Institute of Technology.

NARAS Appoints Joe Smith as Full-Time President

Joe Smith, one of the recording industry's most innovative leaders and spokesmen, has been named the first full-time president of the National Academy of Recording Arts and Sciences (NARAS).

Smith has been a formidable force in the recording field since the early '60s, first in record promotion, then in the executive ranks as president and general manager of Warner Bros./Reprise and next as chairman of Elektra/Asylum/Nonesuch Records.

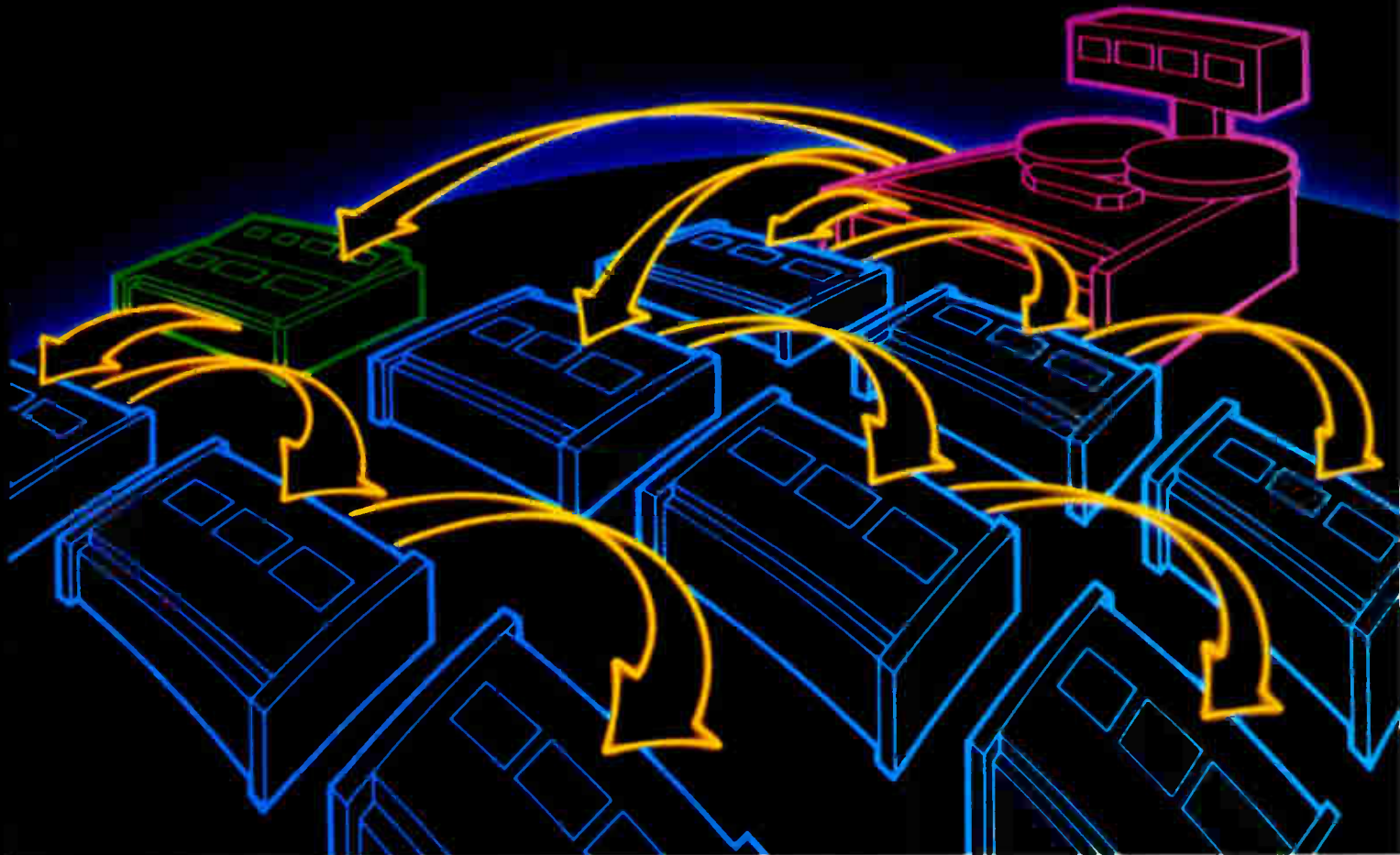
"The Academy is proud to welcome to its presidential office a man of Joe Smith's professional stature," said Michael Greene, chairman of NARAS' Board of Trustees. "From our expanded emphasis on education to the planned internationalization of the Academy, we recognize the real need for a full-time president to carry out these programs and to chart the future of the Academy with the Chairman and Trustees. The fact that we are able to attract an industry leader like Joe Smith testifies to these professional commitments on the part of the Academy."

As a record company executive, Smith chaired the dais at many industry conventions, lobbied for copyright revisions and served as government expert witness in several prosecutions against record and tape piracy. He now becomes the official voice for the Recording Academy and its members.

"First to be addressed on the agenda is the need to continue to increase the profile and visibility of the Academy, both within the music and recording business and in the eyes of the general public," Smith said.

"Our success, naturally, will always depend in large measure on how we as an Academy continue to attract the creative people in the music and recording industry, and how diligently we maintain programs of activity born of that creativity and expertise."

Smith will office at the central headquarters of the National Academy in Burbank, California. ■



Basic Building Blocks

Now you can buy a tape duplication system at a one-copy-per-pass price, and move to 4, 7, 10, or up to 28 copies, when you're ready. You get simultaneous two-sided duplication at 8:1, plus the superb sonic quality that Otari equipment is famous for.

Otari's DP-4050 Series allows you to change formats as your needs change; from reel-to-cassette, cassette-to-cassette, and 3.75 ips or 7.5 ips masters. All duplicators feature DC servo capstans for low wow

and flutter, and long-lasting ferrite record heads.

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OTARI

INDUSTRY NOTES

...**Neotek Corporation** has announced the addition of **David Ruttenberg** as sales manager... at **dbx**, **Alfred J. Menozzi** has been named vice president of marketing and sales... **Don Palmquist**, of the **Yamaha Corporation**, was elected chairman of the audio division of the **Electronic Industries Association's Consumer Electronics Group**... **Renkus-Heinz** has announced the appointment of **Irv Weisman** to the position of national sales manager, Smart Systems division... the **American MIDI Users Group** has been organized to serve as a national clearinghouse for MIDI and computer music information. For more info, call (214) 276-8902... projection television manufacturer, **Kloss Video Corporation**, has moved its offices to 42 Fourth Ave., Waltham, MA 02154, ph. (617) 890-1245... **Gene Perla** has become representative to the industry-at-large for the audio arts division of New York City's **Center for the Media Arts**... **Marina Belica** has been promoted to vice president/executive director of **Ciani/Musica** in New York City... television composer/producers **Craig Huxley** and **Jerrold Immel** have formed **Immel/Huxley Productions**, to operate out of **The Enterprise** scoring and recording facility in Burbank, CA... **Electric Shadows Corporation**, of Beachwood, OH, has acquired Cleveland-based television commercial production company **CineTech Films, Inc.**... **Todd Harrington** has joined the **Pro Audio General Store**, in Ocala, FL, in the capacity of sales representative... **Chariot Productions**, a full service music manufacturing company, has been formed by **Bill Dykes** at 1905 State St., Nashville, TN 37203, ph. (800) 843-8870 or (615) 329-1038... **Mike Shimada** has been chosen to replace **Ken Hoshino** as president of **Hoshino (USA) Inc.**... **Sound Craft Systems**, of Morilton, AK, has purchased the Dallas-based **Frazier** loudspeaker manufacturing group... **Cerwin-Vega, Inc.**

has relocated to 555 East Easy Street, Simi Valley, CA 93605... U.K. pro audio supplier **HHB Hire and Sales** has also moved to 73-75 Scrubs Lane, London NW10 6QU, with new phone 01-960 2144... **Brian Pussilano** has been appointed to the position of executive vice president and general manager of **SuperSpots** in Chicago, IL... **Phi Technologies, Inc.**, of Oklahoma City, has purchased ten percent of **Steinberger Sound Corporation**, the Newburgh, NY developer of the headless guitar design... **Music Resources**, of Franklin, TN, has added **Jack W. Ross** as executive director and marketing supervisor, and **John Slick** as a creative associate to the electronic music production arm of the company... **Meg Mackenzie** has joined **Video-Pac Studios**, the Hollywood videotape facility, as account executive... The **National Computer Graphics Association** will hold a four-day exhibition of computer graphics products and services will be held March 23 through 25, 1987 in Philadelphia. Phone (703) 698-9600 for details... **Lighthouse Productions, Inc.**, the video and a/v production company in Mt. Prospect, IL, has named **Frank Haney** as senior video editor... **Ed Tomoda** has joined the staff of San Francisco's **Varitel Video** as senior Paintbox artist/art director... **Stephen Villante** has been appointed manager of fulfillment services at **CEL Video Services**, in New York City... **Washington Professional Systems** has been formed in Wheaton, MD, by **Greg Lukens** and **Tom Peters** to provide sound contracting services for the DC area. Phone (301) 942-6800... **Tele Edit, Inc.**, of Minneapolis, MN, has named **John Gorski** president of the operation... **Pilot Productions**, of Evanston, IL, has added **Hank Grover** to its staff as account executive/producer of the video/film/multi-image production company... **Sherri Sussman** has joined **Hi-Tops Video**, of Beverly Hills, CA, as production executive...

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Westar+ COMPUMIX P.C.

The New Westar+

Need bells and whistles? The new Westar+ High Performance Music Recording Console is the only console available today with the combination of a field expandable frame design, plug-in equalizer options (4 types), 3 levels of automation option, 8 auxiliary sends, 4 different fader options (Manual, VCA, TBA and IDF), and technical and sonic performance second to none.

Studio Requirement

With cost effective digital processing consoles scheduled to be available by 1990, the profit oriented studio today needs a reliable high performance analog console to match the sonic qualities of the new digital recorders like the Mitsubishi X-850. The Westar+ is such a console system, at a price the studio can pay back by the time digital consoles become reality.

Studio Economics

Investing over \$400,000 in a digitally controlled analog console does not make sense economically, nor can such a console match the processing and automation power of the future digital consoles. The cost effective choice today is the Westar+.

Westar Studios

Westar consoles are already proven in service at leading studios around the world, in the U.S., Canada, Japan, Scandinavia, Austria, W. Germany, Colombia and England. For studios not intimidated by "the fashion console of the month," the Westar+ is the intelligent choice.

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Compumix PC is a powerful extension of the popular tape based automation system, providing storage on floppy diskettes of an unlimited number of mixes and off line editing of mix data. The Compumix PC comes complete with IBM XT compatible PC (with Dual floppy and 20 MB Hard Disk), Mitsubishi 13" color graphics monitor, custom and standard keyboard, and all cables and software.

Compumix PC is probably the most cost effective high performance automation system available today, and a perfect fit for Westar+.



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SOUTHWEST

Gospel album producer **John Lee**, of Sing-spiration, Nashville, was in *Dallas Sound Labs'* Studio A recording an Easter musical entitled *I Will Glory In The Cross*. **John Mayfield** engineered the session with DSL's **Tim Kimsey** assisting. Also, local Dallas artist **Lisa Skiba** was in Studio A mixing her latest single with Kimsey engineering. . . At *January Sound Studios* in Dallas, **Dennis Lowe** completed mixing an album for CBS Records artists *Little Joe y la Familia*. The 32-track digital project was produced by **Bob Galarza** and **Joe Hernandez**. . . At *L.A.W.* in Las Vegas, **David Copperfield** was in working on the audio track for a TV magic special and **Davey Jones** of the Monkees laid down several tracks in Studio A with engineer **Tim Bomba**, assisted by **Randy Pridemore**. . . *Radiohalo* has been burning the midnight oil at *Rivendell Recorders* in Pasadena, TX, putting some finishing touches on their new tracks. Producer **Paul Mills** and lead singer/songwriter **Kemper Crabb** have been at the helm of this project. . . *Red Headed Stranger*, the **Willie Nelson** movie slated for January, 1987 release, has had its music scoring completed in Studio A at *Digital Services* in Houston. Two Sony 3324 digital multi-tracks were locked to video for the final mixing and sweetening of the score. Nelson's sound designer, **Seve Purvis** directed the production, with **Larry Greenhill** and **Bobby Arnold** of Willie Nelson's *Pedernales Studio* along with **John Moran** and **Trent Burns** of Digital Services engineering. . . At *Studio Southwest* in Sunnyvale, TX, *Blackhorse*, was recording again with producer **Jon Early**. . . **Victor Phume**, of the South African band Victor Phume & the Syndicates, flew stateside in early September to record an album at *Lazer Production's* studio just east of Dallas in Greenville. **Sam Loy** of Lazer produced the album for Victor. . .

NORTH CENTRAL

Seagrape Studios in Chicago played host to Detroit's **Jamahl Hormes** who is doing basic tracks for his upcoming album. At the producer's desk was **Johnny Samuel**. **Joe Tortorici** engineered. . . At *Charles Brown Music, Inc.*, Cincinnati, OH, Charles Brown created original jingles and AV scores for *Shell Oil Company* and *Iams Dog Food*, the music for the Abekas demo for *Instant Replay Video and Film Productions*, and an original jingle for *Oldsmobile*—all produced on the recently installed Synclavier. . . At *Studio A*, Dearborn Heights, MI, **Palm-**

er James produced rhythm tracks on *Stan Williams* for Oberg Productions; **John Jaszcz** behind the console, **Peter Prout** assisting. And pop vocalist/songwriter **Joe Town** digitally mixed a single with producer **Joe Slanda**, **Eric Morgeson** engineering. . . At *Tone Zone Recording* in Chicago, keyboardist **Chris "Hambone" Cameron** did overdubs on *The Barrett Sisters'* LP, which was produced by **Jun Mhoon**. Also, **Tom-Tom 99** and **Goh Hotoda** were in doing overdubs with singers **Ned Fleming**, **Monty Bullard**, and **Sonny Harris**. . . At the *Northern Entertainment Complex* in Cleveland, Capitol recording artist **Melba Moore** was in with engineer **Kirk Yano**. . . At *Solid Sound*, Ann Arbor, MI, folk artists **Gemini** finished the upcoming children's album titled *Pulling Together*, **Will Spencer** engineer. . .

NORTHWEST

The Three O'Clock, on I.R.S. Records finished mixing their new album, *Everafter*, at *Granny's House Recording Studio* in Reno, NV. The album was engineered by **Ian Taylor** and produced by **Ian Brody**. . . Construction remodeling has hardly slowed studio activity at *OTR Studios* in Belmont, CA—the comedy troupe *Duck's Breath Mystery Theatre* just completed two songs there, produced by Duck's Breath members **Bill Allard/Mike Whiteley**, music by Mike Whiteley, and engineered by **Cookie Marenco**. . . At *Jopheir 12* studio in Los Gatos, CA, comedian/songwriter **Howard "Howi" Nave** completed recording his first single from the forthcoming LP entitled *Split Polar Bear*. **Jeff Tracy** was on the boards. . . At *Ironwood Studio* in Seattle, *Sundance Cruises* finished sweetening work on a promotional video for their Mexico tours with **Robert Puff** producing; and **Richard Gerber** was in mixing his new single for Suspicious Records with Puff producing and **Jay Follette** engineering. . . At *London Bridge Studios* in Seattle, **Myth** with **Kelly Grey** were in doing an LP project; **Sexx** did a three-song demo; **Relic** also did a demo—all with **Peter Barnes** engineering. . . The **Buddy Miles** album wound up at *The Plant Studios* in Sausalito, CA. Producers on the project include **Jim Gaines**, **Jeffrey Cohen**, and **Pat Craig**. Engineers on the sessions were **Robert Missbach** and **Stephen Hart**, assisted by **Rob Beaton**. . . *Sound Cat* in S.F. has kept busy doing tracks for **Allen & Dorward**, **J. Walter Thompson**, **DFS/Dorland**, **Young & Rubicam**, and **KPIX**. . . At *Montage Recording*, basic tracks were laid for *Ellipse's* new record, *Don't Come As You Are*. **Will Mullins** produced with **Jerry Merrill** engineering. . . CBS recording artist,

Chris Spheeris, recently finished mixing his project at *Music Annex* in Menlo Park, CA. This new age album was mixed digitally as well as to half-inch analog tape by engineer **Russell Bond**. Also at the Annex, **Merlene Travis** from Columbia Pictures Music was in to produce a song by Bay Area country boy **Marty Atkinson**. . .

NORTHEAST

MediaSync in Cambridge, MA is going to be providing all of the audio services for ten interactive videodiscs being produced by MIT's Project Athena. These programs will be among the first projects to encode digital audio directly onto videodisc. MediaSync will provide original music and sound effects in addition to recording, mixing and editing services. . . *Comprehensive Communications Services (CCS)* recently recorded an extensive multi-image program for Merck, Sharp & Dohme at *Sigma Sound* in Philadelphia. The two-part presentation, produced by **Tony Waltrich**, will introduce a new ulcer treatment. **John Anthony** handled the engineering for the sessions. . . *Plum Studio* in Haverhill, MA, put out two new 45 rpm singles on their record label, Plum Records: **Larry Milana's** "Let Me Come Home," and "Imagine That," by **Captain Red Slavik & the Merrimack River Band**. . . **Craig Bevan** engineered several projects at *I.N.S. Recording* in NYC for producer **Duke Bootee**. Besides some 12-inch product for Beauty and The Beat Records, they are working on album cuts by rappers **Dr. Jeckyll and Mr. Hyde** for Profile Records. . . Recent activity at *Midnight Modulation* in Saugerties, NY, included *The Phantoms* recording their first album with **Ralph E. Boy** producing and **George Cowan** engineering. And **Jean Redpath** completed her new album for Rounder with **Jean & Abby Newton** producing and **Michael Bitterman** engineering. . . After four and a half months at *E.A.R.S.* in East Orange, NJ, Columbia recording artists *Third World* have finished their long awaited new album, engineered and mixed by **Tom Zepp**, **Kevin Hedge** and **Howard Kessler**. . . At *39th Street Music*, **Ashford & Simpson** put finishing touches on soundtrack scoring for the TV movie *Society's Child*; **Stephen Guardigli**, engineer, assisted by **John Paul Cavanaugh**. . . At *Omega Studios* in the suburbs of D.C., heavy metal band *Nantucket* mixed tracks recorded live in concert with engineer **Jack Knepley**. . . **Sadao Wantanabe** was captured live at the Bottom Line, NY for an FM Tokyo Radio taped broadcast via Steve Remote's *ASL Mobile Audio Unit*. **Jim Anderson** handled the en-

NEW Studer A820: Back to the Future



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STUDER REVOX

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World Radio History

gineering and mix. And Saint John the Divine Cathedral in NYC was the setting for a **Duke Ellington Orchestra** recording engineered and mixed to 2-track digital by Remote... Producer **Peter Drake** was back at **Sound Heights** in Brooklyn, NY using the latest digital equipment and techniques for his dance re-mix version of **Kenia's** "Crusin'," for MCA Jazz/Zebra Records. Master of controls was **Vince Traina** with **Hugh Ffrench** and **Milton Green** assisting... **The System** has been working on an album at **Intergalactic Music** in NYC. **Mic Murphy** was in doing vocal tracks for the record, which is being produced by him and **David Frank**. The engineering is being done by **Jorge Esteban**... **Dan Hartman**, whose latest video, "Waiting to See You," was shot at **Greene Street Recording** in NYC, and **Billy Preston**, ex-Beatles keyboardist and current musical director of David Brenner's new chatfest **Late Night**, wrapped up the theme for the TV show at Greene Street... **Joan Jett & the Blackhearts** locked out **Broccoli Rabe's Studio A** for sessions for their new CBS associated release, **Good Music**. Joan and producer/manager **Kenny Laguna** enlisted the talents of co-producer/engineer **Mark Berry**... At **Giant Sound** in Manhattan, **Judy Collins** was working on material for an upcoming LP and **Marshall Crenshaw** finished up the music for the film **Peggy Sue Got Married**... **Highland Studios** in Delmont, PA, hosted the Pittsburgh-based band, **Eighteen Names**, who completed an album-length master tape and plan to release it in the spring of 1987. The engineer was **Mark Valenti**, assisted by **Karen Gustafson** and **Greg Hanek**... At **Evergreen Recording** in New York City, **Rob Stevens** was in producing and engineering **The Slickaphonics** new record for Blue Heron / Aspen Records; **Andrea Bella** assisting...

SOUTHERN CAL

At **Lion Share Recording** in L.A. **Lone Justice** was in mixing for their upcoming release on Geffen Records. Producing the project was **Jimmy Iovine** with **Humberto Gatica** engineering. Assisting was **Ray Pyle**... At **Reflection Sound Studios**, Charlotte, NC, **Carl Rosen** finished a new album entitled **Section 8**, produced by **Jamie Hoover** and engineered by **Mark Williams**... **Donna Summer** was in No. Hollywood's **One On One Recording** cutting her new Geffen LP with producers **Rick Chudacoff** and **Peter Bunetta**. **Daren Klein** was engineering with **Toby Wright** assisting... At **Evergreen Recording Studios** in Burbank, NBC composer **Mike Post** was in with on-going projects **Hunter** and **The A-Team** for Stephen J. Cannell Productions and **Hill Street Blues** for MTM Prods. engineering was by **John Richards**, assisted by **David Marquette**... At **Mama Jo's**, North Hollywood, CA, MCA Records artist **Jody Watley** (formerly of Shalimar) finished vocals and mixing on a new single with Wham's **George Michael**. The

single was produced by **Andre Cymone** and engineered by **Erik Zabler**. Also, **Michael Mann** completed an edit on a **Brian Ferry** cut for the new **Miami Vice** soundtrack... At **Rumbo Recorders** in Canoga Park, Studio A had **REO Speedwagon** recording their next album on the Neve 8088, with **David Devore** engineering and **Julian Stoll** assisting... At **Preferred Sound** in Woodland Hills, **Lizzy Borden** worked on overdubs for their new LP with producer **Jim Faraci**, assisted by **Scott Campbell**... The all-girl group, **Klymaxx**, was in at **Encore Studios** in L.A. tracking with producer **Joyce Irby**. **Hill Swimmer** and **Adrian Trujillo** were engineering... At **Skip Saylor Recording** producer **Yves Dessca** was in finishing a 12-inch single for Carrere Records of **Stephanie**, Princess of Monoco. **Tom McCauley** engineered with **Joe Shay** assisting...

SOUTHEAST

Writer/arranger/producer/artist **Edé** finished recording and mixing his debut single, "The Girl's With Me," for Fresh Records at **Reel To Reel Recording** in Stockbridge, GA... At **Treasure Isle** in Nashville, **Phil Naish** was in producing Sparrow recording artist **Silverwind**, with **Ed Seay** engineering. And **Greg Nelson** produced **Scott Wesley Brown**... **Ron Rose Productions**, Tampa, FL, recently completed a campaign for **Maxwell House Coffee** produced by **David Clark Enterprises, Inc.** And **Ed McMahon** was also in the studios to record voice tracks for use in the Chris Craft annual dealer boat show, held at Tampa's Harbour Island. The AV show was produced by WCO Creative Services of Tampa... At **Studio 4** in Philadelphia, Atlantic Records' group **Ladder** finished four cuts for their debut album with **Joe** and **Lou Parente** and **Godfrey Diamond** producing. **Phil** and **Joe Nicolo** engineered... **New Age Sight and Sound** in Atlanta has completed several new projects, including a project for **Coca-Cola** who recorded an audio soundtrack to be used at the national meeting of grocery chain owners in Chicago. Coca-Cola also recorded audio and video edited a promotional spot for **Piedmont Airlines** for their frequent flyer program. This was produced by **McCann-Erickson Regional Marketing** and engineered by **Bill Allgood**, assisted by **Mitchell Dorf**... At **Ardent Recording** in Memphis, **Jimmy Buffet's Coral Reefer Band** laid down tracks for a new LP using the Memphis Horns with **John Hampton** engineering. And **Stevie Wonder** recorded a harmonica track that will be mixed into a cut on artist **Terri Gore's** next LP. **Bunky Shepherd** produced the harmonica track with **Robert Jackson** engineering and **Pat Taylor** assisting...

STUDIO NEWS

The **Village Recorder** in L.A. has installed a Solid State Logic 4056E console complete

with total recall in their new Studio A. The new studio was completely remodeled to include a self-contained lounge area and separate machine room. Artists who have worked in the room thus far include **Talking Heads**, **Robbie Robertson**, **Ratt**, and producer **Michael Chapman**... On August 9, 1986, the assets of **Bullet Recording**, Nashville, were purchased from former owner Dr. Charles C. Holland, by **Tenn-Tex, Inc.**, a Tennessee corporation... **Forge Recording Studios** is billing itself the first 24-track digital studio in the greater Philadelphia area. The studio now has a Sony 3324, 24-track digital machine, along with a new NEOTEK 32 x 36 Elite console and Master Mix automation by Audio Kinetics... **Hayes Recording Studio** in Tampa, FL has incorporated a full-time in-house music production company to serve the needs of an increasing roster of clientele interested in album and commercial music projects. The new company, **Soundsmith Productions** has a large inventory of digital equipment... **Greene Street Recording** in New York City has become the first studio in the United States to receive the AMEK APC-1000 console. The desk is expected to be installed and functional in December, 1986. The console has 80 inputs and features full recall facilities, "synchronous reset" and "dynamic reset" systems and the GML Moving Fader system... **Quantum Sound Studios**, Jersey City, NJ, just opened and features the first SSL console in northern New Jersey, as well as a Synclavier and MIDI room of extensive synthesizer and outboard racks... Two of the most prestigious recording studios in South Carolina have joined forces. **Strawberry Jamm** and **Higher Skys Studios**, both of West Columbia, SC, have merged to become **Strawberry Skys**, a complete 24-track, fully automated and computer-assisted facility, the only one of its kind in the state... **Aura Sonic Ltd.** rebuilt and updated its ASL Mobile Audio/Video truck with an Automated Harrison MR-4, an Otari MTR-90 24 and MTR-10 plus loads of signal processing gear, more digital reverbs, etc... **Different Fur Recording** in SF scheduled commissioning of the SSL 4056 E Series Master Studio System with total recall for mid-December. Redesign of the studio and control room and the addition of a new machine room equipped with a Sony 3324 and Studer A-80 will also be undertaken at that time... The **Recording Workshop**, Chillicothe, OH, recently completed an upgrade to its six studios, including installation of two Otari MX-70 16-track tape recorders, two Amek Scorpion 24-channel mixing consoles, four Lexicon PCM 70s and a Fostex synchronizer system. All equipment was supplied and installed by ICB Audio, Cincinnati, Ohio, in conjunction with Recording Workshop technical staff... **CD Studios** in SF has acquired an AMS RMX-16 digital reverb... **White Mountain Recording Studio/Jangles**, Rochester, NH, took delivery of a new Soundtracs CM-4400 automated console and a Tascam MS-16 16-track. New additions for signal processing from Lexicon, UREI and many others.

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MANUFACTURING

by Ken Pohlmann

Without question, CD manufacturing remains one of the most hotly discussed topics in the record industry. Despite scores of announcements, only a few facilities have gone on-line, and the growing CD-Audio catalog, along with the slowly developing CD-ROM and promising CD-I markets, seem certain to keep pace with increasing manufacturing capacity.

In previous columns, we've examined the arcane ritual of pre-mastering, and the auto-pilot nature of disc mastering. This month let's summarize mastering, then concentrate on the completion of the manufacturing process with a look at matrixing, molding, and metalization.

A CD tape master—a U-matic digital audio cassette—carries all of the audio, subcode, and time code information to be converted to a channel

bit stream and output to the master disc recorder. The audio data is contained in the helical scan (formerly video) fields as PCM data, while the subcode and time code information is stored on the longitudinal (formerly audio) tracks.

Disc mastering begins with a glass plate, about 240 millimeters in diameter and 5.9 millimeters thick. It is washed, lapped, and polished. An adhesive is applied, followed by a coat of photoresist applied by a spinning developer machine. The plate is tested for optical dropouts, then cured in an oven and stored with a shelf life of several weeks. Then it is ready for master cutting.

The master code cutter is composed of two units: a control rack and a lathe. The control rack contains a minicomputer with video terminal and floppy disk drive, U-matic video transport, PCM audio processor, and diagnostic equipment. The master tape is loaded in the video transport, and the CD



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TRIGGERED PAN PANNING = 525ms	FREEZE A REC MODE = AUTO	FREEZE B OVER DUB
PITCH CHANGE A BASE KEY = C 3	PITCH CHANGE B 1 FINE = + 0	PITCH CHANGE C L DLY = 0.1ms
PITCH CHANGE D F.B. GAIN = 10 %	ADR-NOISE GATE TRG. MSK = 5ms	SYMPHONIC MOD. DEPTH = 50 %
STEREO PHASING MOD. DLY = 3.0ms	CHORUS A DM DEPTH = 50 %	CHORUS B AM DEPTH = 10 %
REV 1 HALL REV TIME = 2.6s	REV 2 ROOM DELAY = 20.0ms	REV 3 VOCAL LFF = 8.0 kHz
REV 4 PLATE HIGH = 0.7	EARLY REF. 1 TYPE = RANDOM	EARLY REF. 2 ROOM SIZE = 2.0
STEREO FLANGE A MOD. DEPTH = 50 %	STEREO FLANGE B MOD. FRQ = 0.5 Hz	STEREO ECHO Rch F.B. = +50 %
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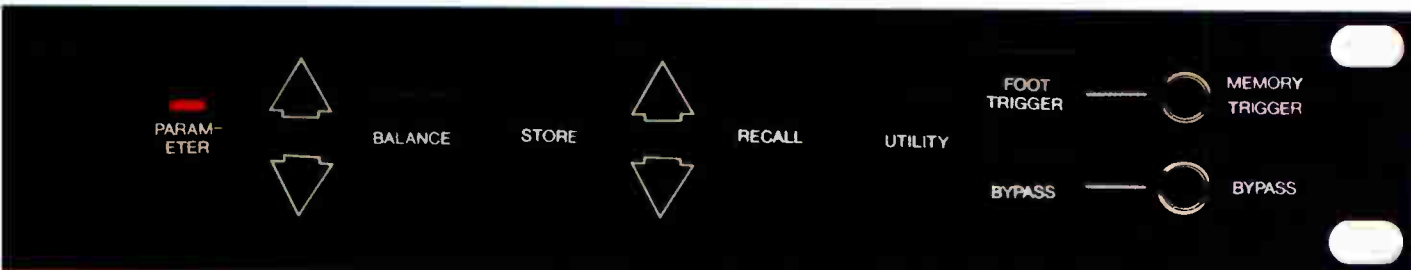
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encoder uses subcode, time code, and digital audio from the master tape to carry out multiplexing and CIRC encoding, and generates the EFM channel bit stream signal; in addition, it outputs signals used for automatic quality control.

The "cutting" laser exposes the photoresist on the master glass disc; the laser is modulated by the resulting EFM channel bit stream. After exposure in the master cutter, the glass master is developed by an automatic developing machine. The exposed areas are etched away by the developing fluid, creating pits in the resist

electric circuit. From a nickel anode (+) a nickel layer is electroformed onto the master disc. Because the disc master has a positive impression of the CD pit track, the nickel copy, called the father, is a negative impression. This CD master disc can be played on a master player system to assess aural and measured quality; it also serves as a reference to evaluate the quality of the final production discs. In cases of limited production, the father can be used to replicate CDs.

The father is then used to galvanically generate a number of positive impression mothers. Each mother can

from impurities. These characteristics can be achieved from a high-grade polycarbonate resin. However, polycarbonate material has an inferior birefringence specification especially when produced by injection molding. Birefringence measures the difference in the index of refraction in materials in which light is broken into differing refraction patterns and wavelengths. Because pit depth is designed for one wavelength, this causes reduced signal strength from the optical pick-up.

The molding of compact discs presents great challenges; the disc must be flat, optically pure, and retain an accurate impression of the data pits. Furthermore, typical molding practices result in discs with high double refraction rate (representing the internal stress in terms of molding or phase difference between incident and transmitted light). To achieve satisfactory results, disc molding requires minimized plastic resin viscosity for good fluidity. To obtain low viscosity, good fluidity, and hence lower double refraction rate, the resin temperature must be raised considerably. However, the resin is easily decomposed, resulting in color change, or bubbles. Because the disc volume is small and the amount of resin needed is small, heated resin is retained longer in typical molding machines, easily leading to degraded or burned resin. Furthermore, high-speed passing of resin causes mechanical shearing heat, another factor to be controlled.

Because of these and other problems, use of typical injection molding machines results in discs with burned plastic, hence contaminations or bubbles. If the resin temperature is lowered, this can result in strain or deformation of the disc after molding, and a high double refraction rate. After experimentation with various polycarbonate resins, different kinds of injection molding machine designs, and mold shapes, techniques for producing a single piece polycarbonate disc were achieved.

The heart of an injection molding machine is its plasticizing unit. Pellets of polycarbonate are cleaned and dried then fed into a heating barrel; a screw moves the pellets through a series of heating coils to quickly and uniformly heat the plastic to a high temperature (over 600 degrees Fahrenheit) to achieve smooth flow properties into the mold cavity during injection. When the molten plastic is injected into the mold cavity at high pressure, it conforms to the stamper's contours, producing a substrate disc with pits.

Some systems use an injection-compression molding process. The molten

—CONTINUED ON PAGE 98

CD matrixing bears a close resemblance to the corresponding stages of vinyl LP production. The master disc is transferred to an electroplating room; the plating process will result in metal molds.

surface. During development, a laser monitors pit depth and stops development when proper engraving depth has been reached.

Following development, a silver coating is evaporated onto the photoresist layer; the master plate is then ready for matrixing and replication. An important quality control check is performed to ascertain accuracy of disc formation and pit geometry. The master disc is played on a master player, and test signals are derived to measure the high-frequency signal output. Track pitch and track stability are measured by monitoring the radial tracking signal during playback. In addition, errors are counted and subcode accuracy is verified. Finally, the master disc is auditioned for audio program quality.

The next phase of CD production, matrixing, bears a close resemblance to the corresponding stages of vinyl LP production. The master disc is transferred to an electroplating room; the plating process will result in metal molds. The silvered master disc, which is electrically conductive, is placed in a galvanic nickel electrolyte bath. The master disc is the cathode (-) of an

then generate a number of negative impression nickel mold matrices, sons or stampers, for use in the replication machines. Stampers are optically checked to insure quality.

The electroplating room requires a class 1000 environment. However, the electroplating process is carried out in enclosed electroforming consoles. They are placed in class 100 laminar flow enclosures to maintain cleanliness. Submicronic filtration systems are used to insure that the chemical baths do not become contaminated. Moreover, the electroplating system must be able to produce disc molds that are flat to within ± 3 microns over the entire disc surface.

Following mastering and matrixing, the disc is ready for replication. Injection molding techniques are commonly used; molten plastic is injected into molds, producing a clear plastic disc with the pits impressed on one side. A polycarbonate material is used chiefly because of its high transparency, dimensional stability, accurate reproduction of the mold surface, minimum water absorption, good impact resistance, easy processing characteristics, low molded-in stress, and freedom



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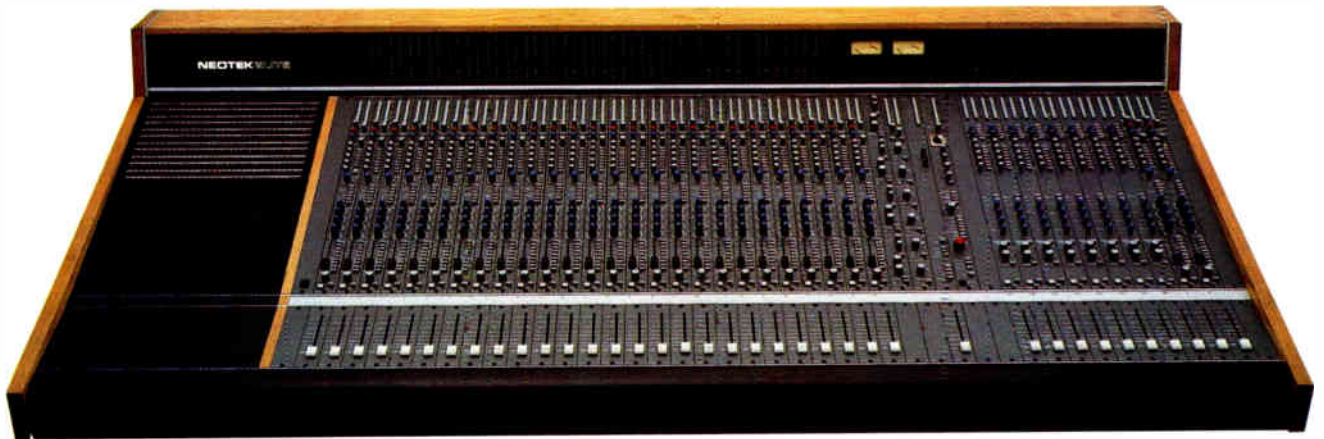
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David Holman
in his home
studio.

CDs, LPs AND CASSETTES: Producers Wrestle With Multiple Formats

by Blair Jackson

You still hear people talking about "the record industry," but these days that term is woefully inaccurate. Sales of records and cassettes have been about even the past couple of years (in some genres, like heavy metal, cassettes easily outstrip LPs) and of course, the CD continues to grab more and more of the market. This has complicated the lives of the industry's money people—what quantity should be manufactured in each category? To CD or not to CD?—and it has also put producers in an interesting position. Increasingly, producers who care about the sonic integrity of the projects they work on are taking a very active role in overseeing the transfer of their masters to the different mediums because what's good for the LP might not be good for the CD or the cassette, and vice versa. The enormous success of the CD, in particular, has made a huge impact on the producer's role. It has hastened the spread of digital recording, and also led producers and engineers back into the studio to oversee

the transfer of older analog recordings to CD.

"I'm there at the mastering of the record, and for the CD, at the transfer to digital recording," says producer David Holman, whose credits include several albums for Olivia Newton-John, the *Grease* soundtrack, and a number of up-and-coming acts, such as *Bourgeois Tagg*. "The mastering process basically takes care of both situations. You go in there and re-tailor your record. Obviously, you're putting your tracks together—mixing and matching and getting your levels and your EQ together. You do some trial run lacquers and cassettes, listen to them, and make your final judgements. Then the record company says, 'OK, we're going to do the CD now.' What usually happens with the CD is pretty similar to the album, but some of the CD people want it absolutely dead—no numbers between cuts; while some others aren't as particular.

"The only thing I have problems with in the digital process is it gets a little harsh," Holman continues. "We've done A-B comparisons between



Mike Bernicker at CTS Studios in London

analog tapes, discs and CDs, and the CD right now is definitely more harsh and lacking low end. Everything changes. You make a copy of an analog tape and you're going to get a change. You're going to get a bump down around 200 cycles and your top end will take a little noise, but stay relatively the same. You make a copy and listen to your CD and you're going to get a pretty hefty change up there around 3k to 5k. I've been told by a lot of people supposedly in the know that a lot of that really has to do not with the digital processing as much as the input amplifiers and output amplifiers and the filtering problem."

Holman believes that one of the by-products of the digital age is going to be that studio owners will have to maintain their equipment more intensively, "because if they don't care about the little things, you're going to hear it on the CDs." He does the overwhelming majority of work at his own studio in Los Angeles which boasts a 64-channel custom console designed by Bill Gazecki "out of the Producer's Workshop concept," Holman says. "They were really forerunners of the 'clean' recording. Keeping these machines in perfect condition is very time-consuming and it can seem like a pain, but it's worth it. The result is cleaner recordings all the way around."

Richie Zito, another L.A.-based producer, currently on the charts with Eddie Money's latest album (he recently recorded several tracks with another

San Francisco favorite, Eric Martin), agrees with Holman. "I try to make sure that the mastering people have the cleanest possible tapes to work off," he says, "and if it's well recorded it should translate well to any medium—record, tape or compact disc."

Like most producers today, Zito has his favorite mastering engineers—such as Howie Weinberg at Masterdisk—who he entrusts to work on his tapes. Still, he is very exacting about what he wants to hear from that mastering studio: "It should sound as good as the tapes we send. The vocals should be as crystal clear. There should be plenty of top-end and the low-end should not only be there, but be good and punchy. You know, in the old days, producers would cut refs with five different guys and then just pick the best one, but these days people seem to have one or two guys they work with most. It's nice to have someone who knows how to work with your stuff and who you know has good ears."

Zito says that so far he has not always had the kind of input he would like on the mastering of his projects for CD, in part because "the timing has been strange sometimes. They don't always release the CD and LP simultaneously," although that is usually the case these days. Other producers we spoke with echoed Zito's concern that they be able to supervise this process. There have been industry-wide complaints that record companies don't always take the care they should in transferring catalog albums CD, often not even

consulting the producer of the record.

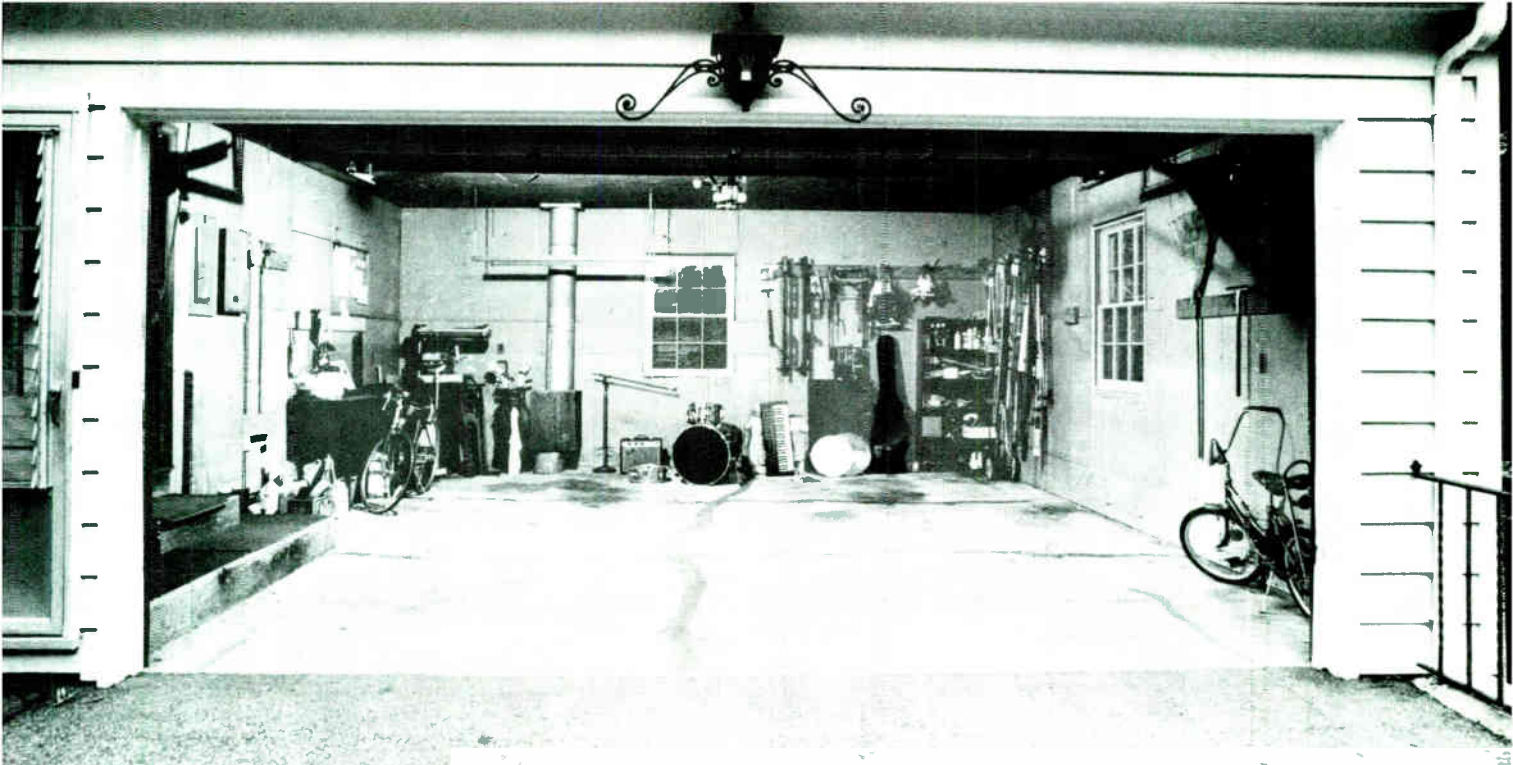
"I think it's a very, very vital question," says Mike Bernicker, the award-winning producer best known for his work with Barbra Streisand through the years, and most recently for the acclaimed *Digital Broadway* CD. "After all, a record is the result of a producer's point of view and philosophy, and no one—including another producer—can say 'This is what the original intent was.' The original producer should be able to see his work through all the way, but that's not always happening. This is something that's being discussed more and more."

"I think it's ridiculous to make a CD without talking to the people who did the record," comments Holman. "A lot of times the record companies will settle for 15 ips Dolby copies for this, and that's pretty bad a lot of the time. I was very disappointed with the CD of *Totally Hot* (by Olivia Newton-John, produced by Holman). But then I was also disappointed with the way the album was pressed. We A-B'd the final with our tapes and there was no comparison. But then I heard a Japanese re-issue, which had been re-mastered and it sounded great. But the CD was evidently done from the American release and it sounds horrible. Nobody called us, and now it's done, it's out there."

"I want to have that control" he continues. I'm tired of people putting out products of mine that I'm not happy with. It makes me furious. You work all this time in the studio and then to these people it's just dollars and cents. But for the people who are making the records, there's a certain amount of artistry involved and I think it's a shame for anyone to be able to take that away from us."

Fortunately for everyone, the trend at labels does seem to be towards letting producers re-master their older works specially for CD. Perhaps the most impressive and comprehensive project of this nature to date is the recent re-mastering of a dozen Rolling Stones albums by the group's original producer, Andrew Loog Oldham. Oldham produced the band's first six albums (up through *Between the Buttons*) but he was also given access to the original masters of such late '60s Jimmy Miller-produced classics as *Beggars Banquet* and *Let It Bleed* and his packages like *High Tide & Green Grass*, *Through the Past Darkly* and *Hot Rocks*—15 albums in all.

"The thinking behind the project was to get these tapes just right for compact disc," Oldham comments. "There have been a lot of different versions of these records to come out through the years and by now some of them don't sound much like the



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originals. So this was an opportunity to go back and see exactly what was on there. This was the first time I'd touched any of them since I did them originally."

Though the tapes were rounded up from several different sources by the project's instigator and money-man, Allen Klein, "they were in very, very good shape for the most part," Oldham says. "We really didn't run into any major problems because they were well recorded to begin with and they had been stored properly. Obviously, there's not too much you can do with some of the early mono tapes, but on some of the later things even I was amazed at what I heard. People will be quite surprised, I think. I mean there were places where I heard the vocals completing a move I'd never heard before, just because of the increased clarity."

Oldham says few significant changes were made in the music, though "there were tracks where we made them sound more like the way we made singles," by emphasizing the space in the arrangements. "The equipment we had to work with (at Polygram's Hanover, Germany CD facility) was extraordinary," he adds, "so that if something like a tambourine seemed to be taking up too much attention on an original, we were able to move it around and

put it where we wanted it.

"All in all I think we improved on just about all of the records," he says, "except maybe *Their Satanic Majesties Request* which was just brilliantly recorded. There are three things you can't correct, though—a lame song, a lame vocal and a track that doesn't move. But I can only think of maybe three or five out of the whole 150 to 170 that struck me that way. And that's not bad for six boys on the run over a period of that many years."

The release of the London Years CD series puts Oldham's recent work against some import CDs already put out by Decca, but with a big media push by Polygram and Allen Klein, Oldham's should easily supplant their British counterparts. And a series of albums on ABKCO/Polygram (mastered at Frankford/Wayne in New York City) and cassettes mean that every type of music consumer will be able to hear Oldham's new work on these prized rock chestnuts.

As more music is recorded digitally, records and CDs seem to be increasingly faithful to the master tapes, and now there are even projects which are being recorded exclusively for CD. Bernicker's *Digital Broadway* is one notably successful example of this. The album consists of original performances of various popular show tunes recorded at CTS Studios in London, the only facility in the world with both digital recorders and the new Neve DSP digital console. Bernicker talks about the genesis of the project:

"About two years ago, I started formulating and processing catalog for future CD releases (for CBS, where he is a producer/consultant), which meant in some cases going back to the original multi's and mixing them for CDs. In the course of this, I found that the dynamics we could get using the digital machine made the original dynamics more apparent. So that's what got us excited about recording a series of projects strictly for compact disc and that's how *Digital Broadway* came about.

"In putting it together, we looked for songs that would lend themselves to a great deal of dynamics as far as the writing was concerned. We did a Christmas album and used the same criteria. You have to know that the melodies have within them a certain expansiveness that you can then orchestrate accordingly."

Surely, this is one of the first instances of the choice of material being dictated somewhat by the medium in which it is presented. It is also one of the few CDs that does not have an analog record or cassette counterpart. "If one decides to do what I did, which is make a demonstratively effective

digital recording—we went out of our way to make a point of the recording process—I didn't want to make a vinyl record because by definition it couldn't show what I did," he says. "So I may be denying a lot of people this music, but in the same breath I'm saying 'This is why you should own a CD player! You have to hear the crescendi on this disc. They're enormous, and you wouldn't get the same thing on a conventional record.'"

With *Digital Broadway* selling briskly, Bernicker is planning another CD-only release—this time it's contemporary composers—as well as a number of other digital projects, including casts recordings of *Sweet Charity* and a new musical about the artist, Goya, which will be available in album and cassette form, too.

And what of cassettes? Well, the producers interviewed for this piece didn't think much of them, although there is general agreement that the quality of cassettes has improved.

"In my view, CDs and albums both sound pretty good at this point—I'm happy with both—and production cassettes are not even a close third," comments Richie Zito. "And one of the differences is that they're much more erratic. Sometimes I'm disappointed and sometimes I'm pleasantly surprised. They're getting better, though."

"Digital recording has meant an improvement in cassettes," adds Bernicker. "And Capitol has come up with a digital cassette process that I understand is still being perfected. So there's reason to hope that it will keep progressing. It has a way to go, though."

And Holman agrees that "cassettes have taken a quantum leap in the last few years. They're much, much better. I was listening to a Peter Gabriel tape the other day, and while it didn't sound like the disc, which didn't sound like the CD, it still sounded great. The noise wasn't even obnoxious, which sometimes it is."

Sonics aside, the buying public still appears to like the convenience of cassettes and, for now, the CD does not appear to really threaten their continued growth too much. (The same cannot be said of LPs, whose market share will likely shrink in the coming years.) In the end, Zito has the populist stance: "Sound just isn't the be-all and end-all of it for most people," he says. "It isn't even for me. The content will always be the most important thing. We're lucky that in 1986 we have the ability to faithfully capture performances and preserve them, hopefully, for eternity. But it's always going to be that song, that vocal, the way those instruments are played. That's where most of the magic is." ■

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MOSQUITO COAST

Chris Newman got his break in the theatrical movie business 17 years ago when Haskell Wexler learned of his reputation as an outstanding location documentary recordist and hired him to work on the 1969 docudrama *Medium Cool*. Since then, Newman has recorded 29 theatrical feature films, been nominated for three Academy Awards for Best Sound, and won two, for *The Exorcist* and *Amadeus*. Along the way he has worked with many of the English-speaking world's most respected directors: Milos Forman, Francis Coppola, Bob Fosse, William Friedkin, Hal Ashby and Peter Weir, to name a few.

Newman was excited about the prospect of working as location recordist on *Mosquito Coast* for a number of reasons, not the least of which was the team of accomplished filmmakers he would be joining: executive producer Saul Zaentz (*Amadeus*, *One Flew Over the Cuckoo's Nest*); line producer Jerome Hellman (*Midnight Cowboy*, *Coming Home*); and perhaps Australia's most distinguished director, Peter Weir (*Picnic at Hanging Rock*, *The Year of Living Dangerously*, *Gallipoli*, *Witness*).

Mosquito Coast proved to be perhaps the most physically challenging film of Newman's career. The Central American ter-

AN INTERVIEW WITH CHRIS NEWMAN

by Nicholas Pasquariello

rain of Belize was always hot, humid, muddy and dusty; there were almost no paved roads. The \$17 million film was shot during 19 weeks (17 in Belize, two in Georgia) during the first half of 1986. Newman recorded all the live (synch) sound for *Mosquito Coast*, as well as about six days of effects. In addition, Ken Weston (boom operator) and Alan Splet (post-production sound designer) recorded location effects at various times during the shoot.

Briefly, the story of *Mosquito Coast* revolves around the life of an American family who move from Massachusetts to the dense Central American jungle to escape decadent middle-class life in the U.S. and begin life anew in the spirit of early American pioneers.

Newman was the only production department head who was American; the remainder of the crew was predominantly Australian, with just a few British and American craftspeople. At Weir's insistence, the picture was cut in Australia, but sound editing and looping took place at Zaentz's Fantasy Studios in Berkeley, California. (For additional background on Chris Newman's work, see *Mix*, January, 1986).

Mix: How did you go about planning the lo-



Harrison Ford, Helen Mirren and River Phoenix leave suburbia for the jungle in *Mosquito Coast*.

PHOTO: NANCY ELLISON

Chris Newman recording on location in Belize with a Nagra IV-S

cation sound recording on *Mosquito Coast*?

Newman: What I thought I would need for that job, which also applies to other jobs, is sophisticated equipment that would be very, very ruggedly packaged and relatively small and portable. I think the first thing I did was to get rid of my older radio microphones—which were a little long in the tooth and not quite up to the most contemporary design ideas—and got a bunch of radio mics from England. They were in a packaging arrangement with antenna splitters and a little rechargeable battery pack for them, so that I could just plug in a master antenna and hook them up in a fairly straightforward manner. What you want to do to overcome the disadvantages in using radio mics is to have them available to be working as quickly as possible. I did the same thing with my mixing panels. I got a couple of Sonosax mixers and got rid of the older consoles I had. Then, one of the guys who works with me, Bob Gaulin, modified the Sonosax to make it as sophisticated as the units I was getting rid of, but in a much smaller space and much more state-of-the-art kind of design, and some-



PHOTO: F. DUHAMEL/SYGMA

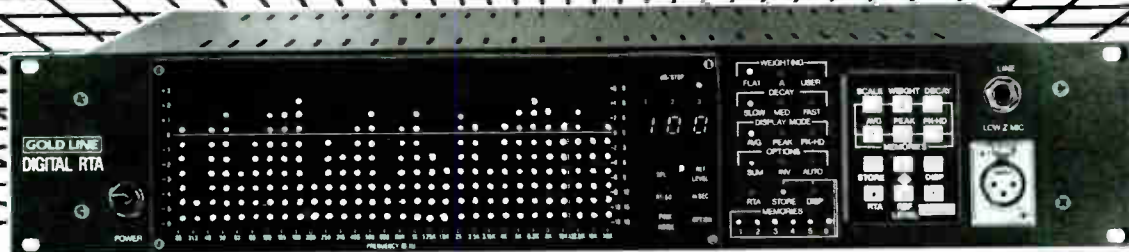
thing more suited to a job on the move in the jungle.

I also began to look at packaging of gear in terms of how to carry it: back packs, bags, waterproofing, all that kind of stuff.

Mix: What were your expectations prior to beginning this picture?

Newman: I read the script three or four times and I had read the book and I thought the movie would be very difficult, as difficult a movie as I

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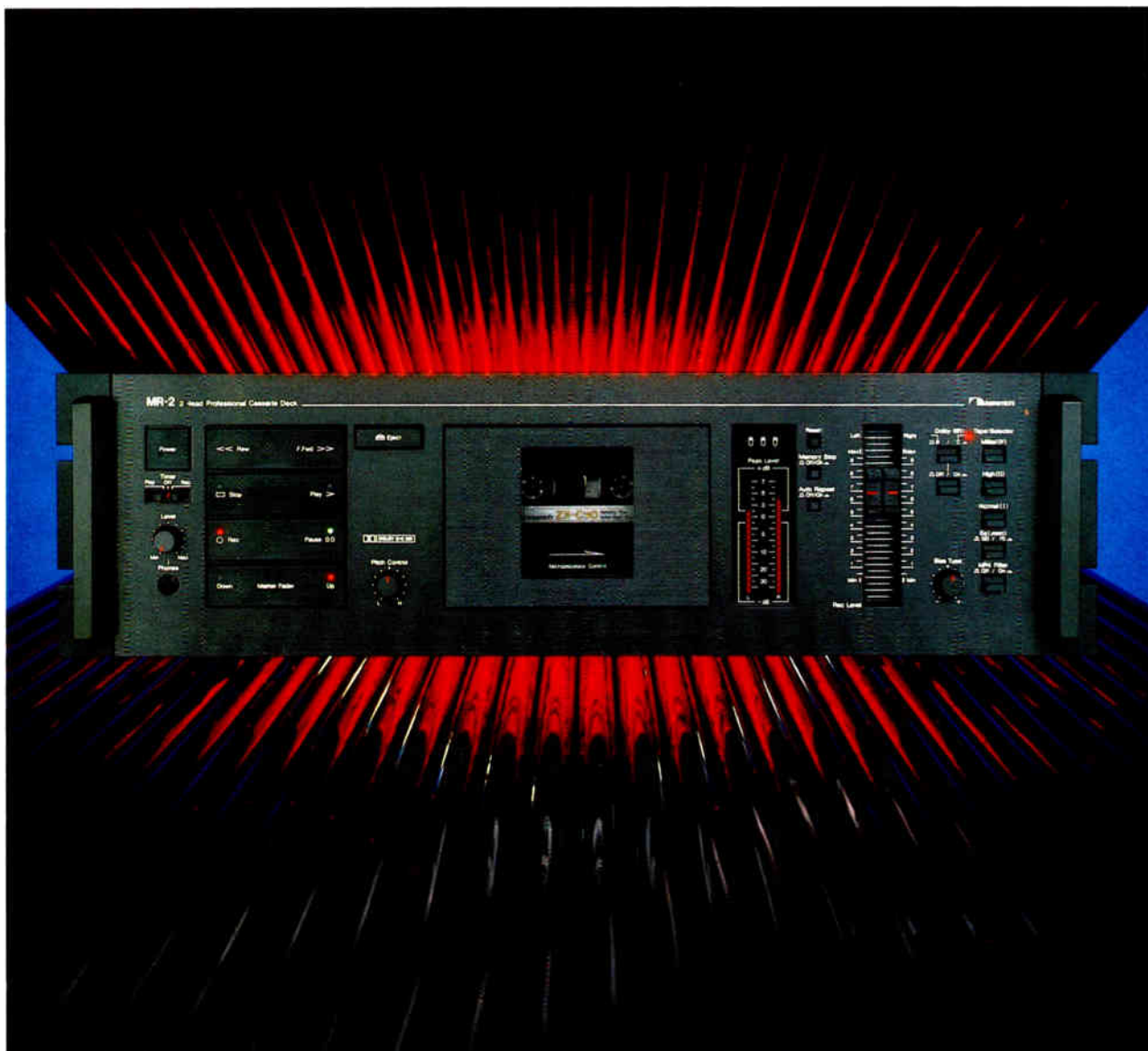
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had ever done in my entire life.

In the '60s I had worked on documentaries in Southeast Asia and I know what it's like to shoot under hot, jungle-type conditions. No one was going to be shooting at us with bullets, but hot is hot and mosquitos are mosquitos, mud is mud, dust is dust. It's all the same crap.

What it means is you slug your way through the heat and the dust and stuff and when you get to wherever you're filming, everybody still expects the sound to be perfect. And the problems are exactly the same as if you were walking into a sound studio and making a perfect recording under pristine conditions. The problem is by that time the sweat is running off your forehead down into your eyes, the bugs are biting the shit out of you.

Mix: How did the scouting trip to Belize influence your planning of the location recording of *Mosquito Coast*?

Newman: In my chats with Peter and in reading the script I thought that it would be a very good idea to actually go to Central America to see what the locations were like well in advance of the actual shooting. What they normally do is, a week or two before the shooting commences when one is already in place with one's equipment, they take all the heads of departments around and they say, "This is what we're going to shoot here and this is what we're going to shoot here."

On a studio movie or a city-oriented movie in a domestic situation that's time enough. You can say, "We're going to be here in two weeks, have that ice machine shut off and let's control traffic."

This was a different situation. I wanted to see the terrain, I wanted to see the boats, I wanted to see as much as they could show me. That scout was as exhausting as the making of the movie and really set the pace for what the movie was like. There was one day when we scouted when we were on foot, we were in vehicles, we were in motor boats—we took a two-hour motor boat ride from the mouth of the river to a small island. We then flew via small plane back to the mainland. All in a ten-hour scouting day.

The point is I got a chance to see every place where they were going to shoot. I was able to see what areas were well organized or when they were still in the process of organizing or when they seemed disorganized. I got to meet the cameraman, John Seale, who is a lovely guy and easy and terrific to work with. And I also got to establish my presence on the movie, which is very important. So already guys in the art department were saying to me, "Well, will that floor

be quiet enough or will this be quiet enough?" And in some situations I was able to anticipate, in other situations, even though I saw them, I was not able to anticipate, because I had no experience in certain kinds of problems.

Mix: What kind of microphones did you use?

Newman: I used Sennheiser shotguns, the 816s. I used a whole bunch of Schoeps, mostly Colettes and their CK series of hypercardioids. At one point I used the Sennheiser 416 for some pick-ups that I needed.

Mix: Did you work with any new equipment on *Mosquito Coast*?

Newman: We tried a tripod. For years I've been wanting to mount the mixer

that would go into the soft earth; and then I had this fellow, Gaulin, who works with me, machine a bottom plate for the mixer that would thread on to the center post of the tripod.

Mix: Had you used a tripod before on a studio set?

Newman: I had never used it anywhere. It works great and I'm going to use it now in other situations where I hadn't anticipated using it. I'm going to use it occasionally on the set.

Mix: What effect did the heat and humidity have on the quality of the recordings you made?

Newman: It didn't have much of an effect on the equipment. It had a lot of effect on the people. I lost about 15 pounds. I must have made more errors

"I know what it's like to shoot under hot, jungle-type conditions. Hot is hot, mosquitoes are mosquitoes, mud is mud, dust is dust. It's all the same crap."

and the recorder on a tripod 'cause I think it's a great way to work. If you're working on a set in a studio, for example, and you want to be in a corner of the set out of everyone's way, instead of bringing the whole sound cart onto the stage, which sometimes is fine on a ground level set, they pull a wall out and you're just sitting out there. But suppose the wall or a portion of the wall is in and you want to be able to see to make a fade or to change something—you can't bring your whole sound cart onto the stage; it's absurd. But you could bring a tripod which would not be very much bigger than the profile of the mixer and the recorder. It beats putting it on an apple box and sitting in the corner of the set because you get some elevation and you get a little control over it.

I did a little investigating: I weighed the mixer, I weighed the tape recorder, I added up their weights and added another five or ten pounds for good measure. I went to a professional photographic supply store that sold Gitzo tripods, which is a high quality tripod made in France. I was interested in a low-leg tripod where I wouldn't be expanding the legs to any great degree, that would take 45 pounds of dead weight. I got a set of point legs

on this movie than on the previous five movies that I worked on put together in terms of throwing the wrong switch or pressing the wrong button and then having to remember that I made a mistake. And I charge a lot of that up to just plain old physical fatigue of schlepping the stuff through the jungle.

Mix: Were there advantages to having soundmen on your crew who had also had mixing experience?

Newman: Yes. I'll give you an example. We started shooting material that was largely montage, consisting of the building of this town that Allie Fox (the main character) and his family have settled. They build a town from scratch in the middle of the jungle. And there were weeks and weeks of montage filming. There would be isolated little scenes where you would see the family doing specific things: welding, chopping, cutting, finding things to assemble. And some wider shots of all of this activity.

Most of this filming was done with two cameras, which presents a difficult problem for the soundman because you invariably have someone to close-up saying something and you really do want to hear what they're

saying. And then you have another camera which is shooting wide. And you don't necessarily hear the same perspective that those people are saying.

Now, if you've got six principals and a dozen supporting players all building this village, it's not possible to wire all of these people. It's a ludicrous idea, especially given the physical conditions. Think of what would have been involved in wiring 18 people, some of whom are not even wearing shirts! And then thinking about: does one bring a 24-track recorder into the jungle? If one is going to bother to wire, there's no point in trying to mix 18 microphones down into two tracks—that's a waste of time given the separation. So what's the next step? Do you go to a 16-track or an 8-track? All of those ideas are out of the question.

Mix: So how do you do it?

Newman: I started out doing it the simplest way possible, where I was working with the camera guys and Peter Weir and the actors and figuring out who was going to talk, using shotgun microphones and hidden microphones and trying to make it work so that if Allie Fox was walking around speaking very loudly and the microphone was close enough to him that not only would his voice level and quality carry for the wide shot—because the jungle is relatively quiet—it

would also carry for the closer shot.

After some of that filming, the results that we were getting using open microphones were not entirely satisfactory because we were not getting enough detail on Harrison Ford. And Kenny [Weston, boom operator], who I had talked to about this before we started shooting, came to me and said: "Listen, I know you want to do it the simplest way possible, but there are times that we're losing stuff that we don't have to lose. So why don't you think about using two tracks and putting a radio mic, for example, on Harrison and if we get stuff that's garbage we'll throw it away, we won't use it. And we'll still preserve the simpler technique at the same time." Because it turned out in practice as the filming developed, as the acting developed, as Peter's concepts developed, that Harrison Ford was doing most of the talking during the construction scenes.

So that's an example of someone who has a lot of mixing experience in addition to booming experience making a suggestion that was terrific. A lot of people in that situation would have said: "Well, I know the right way to do this, but I'm not going to tell him because I'm just the boom man, I'm not the mixer." But that was not the case. The guy transcended any of those feelings. And he *is* a mixer now.

Mix: And what would happen to the mixed tracks? Would they be used for dailies?

Newman: Yes, we would transfer to full coat and we would have three

different tracks on it: an A, B, and A plus B. And they would cut with the A plus B.

Mix: Was Weir hearing these for the dailies?

Newman: For the dailies they would hear a mixed track if it was necessary. We would decide at the time of transfer what we would give them for dailies: A only or B only or A plus B; and in what proportions, as well.

Mix: Is this common practice in your experience?

Newman: It is common practice when making multi-track recordings; it's not common practice when one is not making a multi-channel recording.

Mix: How long have you been working this way?

Newman: This is the first time I did the dailies on location, but it's not the first time I did 2-track stuff. I've been doing 2-track for almost 13 years now.

Mix: Is it unusual for the director to be hearing a pre-mix with the dailies?

Newman: No, it's not so unusual. In fact, ever since we started doing multi-track work, every other day the director is hearing one kind of mix or another. I've been doing it in different amounts. It depends on the needs of the picture. It depends on how willing people are to accept that technique. There was a time when the editors were loath to deal with multi-track techniques. They found it very confusing and it took a long time for them

On location shot from "Mosquito Coast" with Harrison Ford.



to break down their natural resistance to those kinds of things.

Mix: Would you give me some examples of when you would do a pre-mix for the dailies compared to scenes for which you would not do a pre-mix?

Newman: It depends on how the results went. For example, if you're running a lavalier radio mic on Harrison and an open mic for the rest, and you discover when playing the material back that having a small amount of Harrison's voice in the very wide shot to emphasize his character seemed appropriate, we would make a mix. A couple of times we made mistakes. There was one situation which was hilarious, where we made Harrison predominate in a scene where he shouldn't have predominated because we were too far away from him; and I thought it was the right balance. And, in fact, technically it was the right balance for the size of the shot. But in the rushes Peter came to me and he got very upset and he said, "It's too loud! It's too loud!" I said, "We'll do it again and we'll remix it." He just didn't want to hear Harrison that loud. But the beauty of that system is you go back in and rebalance and you can make it as loud or as soft as you want to make them.

Mix: How do you know what the director intends the audio emphasis of the scene will be?

Newman: You don't. If you're talking about making a mix that's exactly appropriate to the picture, you cannot do that. So you do guesswork. You're only doing something for the cutting copy. You're not doing it as a final mix. Obviously it's going to be remixed during the rerecording, and if those tracks remain in the picture—in this case there are a dozen of those tracks that are still in the picture—they will go to the mix with the full coat and they'll have three strands laid out: A, B, and A plus B. And sitting at the console at Fantasy, Mark Burger will remake that balance according to whatever Weir wants in terms of the picture.

Mix: If we could go back to your example with the tight shot on Harrison and the wide shot on 17 people—if you've got two cameras running simultaneously you don't know at any given point whether they're in for a close-up or they're out for a wide shot, and you also don't know whether Harrison is going to be loud or soft.

Newman: No, we don't, but we would ask the second camera guy—the tighter camera—"What size are you?" And he might say, "I was a bunch of sizes, but mostly I was this size, I was medium

shot size." Or "I was a big head close-up." Let's say on take one the guy says, "Well, he was full figure." So I might say, "OK, Richard for take one just combine both tracks full level so he sounds like he's close but not too close. But on take two or the next number of the setup when they go to a big head close-up of him for the 'B' camera just take the radio mic track only, and for the 'A' camera, which might be wide, take a combine that was similar to take one with both tracks at 100 percent." It's all guesswork. The point is that it doesn't really matter if you guess wrong. What matters is that you have the flexibility to change it.

Mix: Finally, I understand you field

tested a new 3M audio stock. How did it perform in the field?

Newman: We used a new experimental 3M stock called 8664, which is now going to be called 808. It will replace 208. I was very impressed with the stock. The print-through is much better. The quality control is terrific. The head room is very good, which means that the distortion is pretty low and you can lay down a hell of a lot of level on the tape. Stuff held up beautifully. So beautifully, in fact, that the 3M Company asked me to endorse the tape and I agreed, which for me is very unusual because I have never endorsed anything in my entire life. I will continue to use it. I'm going to use it on my next job. ■

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INDEPENDENT LABELS

by Rosanne Soifer

A cursory glance around the exhibition areas of this year's New Music Seminar 7 revealed a subtle yet noticeable shift in occupants from previous years. There were fewer independent labels and bands in the booths, while the number of goods and services targeted at them showed an upswing. The middlemen—the "full service" studio brokers, consultants, placement agencies and freelance marketing types—always seem to proliferate when the music industry is in a relatively stagnant period. They all compete for the independent's most precious commodities—time and money.

Those labels that manage to survive appear to spend their money only on what's of primary importance in getting their product out: pressing, distribution, and publicity. *Mix* took a look at six very different indie labels to see how they handle business in these areas. We also queried them on the compact disc phenomenon and solicited additional feedback from other professionals on such varied topics as college radio, video, the club scene, and retailing.

Their Interests and Concerns

THE LABELS

Frontier Records—Sun Valley, CA

Age: 6 years

Type of Music: Hardcore, neo-psychedelic, metal

Past & Present Artists on Roster: The Three O'clock, EIEIO, Suicidal Tendencies

Contact: Lisa Fancher, president
Profile: Fancher, who previously worked for Bomp Records, founded Frontier in order to expose original local bands ignored by the majors. Suicidal Tendencies' record, *Institu-*

tionalized, sold an impressive 80,000 copies and garnered them the honor of being the first indie band heard on *Miami Vice*.

Def Jam Records—NYC

Age: 2½ years

Type of Music: Urban, rap

Past and Present Artists on Roster: LL Cool J, Beastie Boys, Oran "Juice" Jones, Slayer

Contact: Rick Rubin, co-owner with Russell Simmons

Profile: In 1984, Rick Rubin, an independent rap producer, met Russell Simmons, producer and manager of Kurtis Blow, Run DMC, and Whodini. They went into partnership and ran their label out of Rubin's New York University dorm room. Def Jam recently signed a distribution agreement with Columbia and became an associate label. Several Def Jam acts were featured in the 1985 rap movie *Krush Groove*.

Important Records—Queens, NY (includes Combat, Core and Relativity labels)

Age: 3 years

Type of Music: Metal, rock

Past & Present Artists on Roster: Tangerine Dream, Megadeath, The Cocteau Twins, Venom

Contact: Steve Sinclair, label manager for Relativity

Profile: Several years ago, Important was one of the few companies to recognize the need for smaller subsidiary labels for developing new talents. The most successful of those acts would then eventually graduate to one of Important's main labels, where their careers could develop further.

Rounder Records—Cambridge, MA

Age: 16 years

Type of Music: "Roots" music and its

PHOTO: ERIC RUDOLPH



Def Jam hits the big time. LL Cool J shows off his gold record as label head Rick Rubin (R) and CBS' Al Teller look on.



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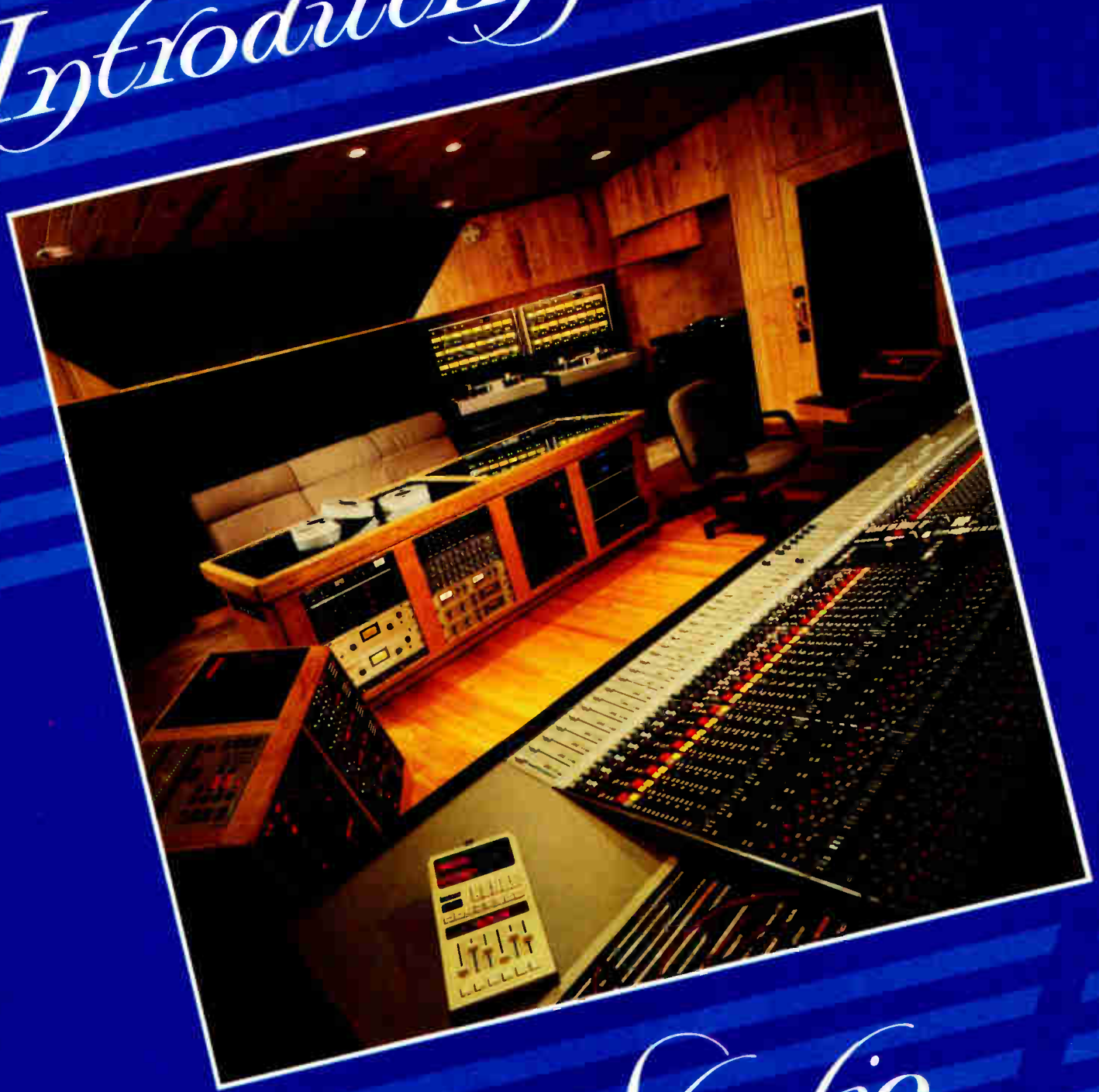
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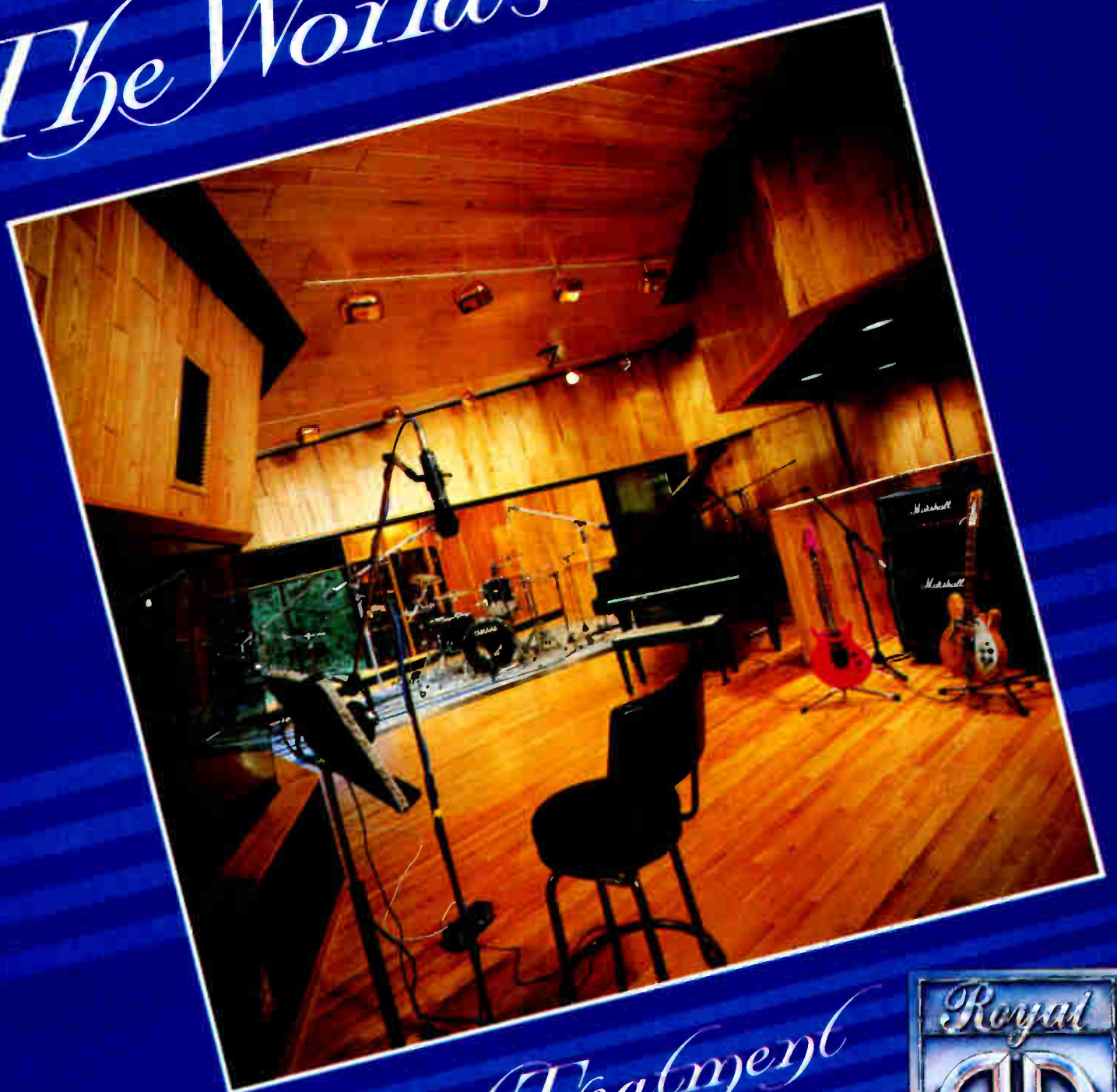
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Lisa Fancher of Frontier Records with Graham and Larry

contemporary offshoots—folk, New Orleans, acoustic new music
Past & Present Artists on Roster: Bela Fleck, True Believers, George Thorogood, John Fahey, Norman Blake, the Neville Brothers
Contact: Marian Leighton, co-owner / founder with Bill Knowlin and Ken Irwin

Profile: Rounder began in the late '60s as a commune with a \$1000 investment. It now also functions as a distribution company for over 300 other indie labels. Rounder has expanded to include Heartbeat (reggae), Varrick, and Philo (folk). The label recently entered a cooperative agreement with EMI-America to sign and develop select acts together. The company's catalog now includes over 650 titles.

Moss Music Group—NYC

Age: 46 years, (8 as Moss Music)
Type of Music: Classical, jazz, non-rock genres of "serious" music, opera
Past & Present Artists on Roster: Individual classical artists, symphony orchestras, established composers
Contact: Ira Moss, president
Profile: Moss Music was originally Vox Records, begun in 1940. The philosophy of the company's original president was to play down the artist and emphasize the repertoire. The Moss Music Group also includes the Allegro Master Series (on cassette), Turnabout, and Vox Cum Laude. Moss also holds the patent on the CD-wallet,[™] a unique storage jacket that folds out and allows ready accessibility of program notes.

Relix Records—Brooklyn, NY

Age: 6 years
Type of Music: San Francisco Sound, country rock

Past & Present Artists on Roster: Hot Tuna, Robert Hunter, Flying Burrito Brothers, Savoy Brown, Jorma Kaukonen

Contact: Les Kippel, president; Toni Brown, A&R and promotions director
Profile: Les Kippel started *Relix* magazine in 1974 as a means of communicating with other Deadheads. Grateful Dead lyricist Robert Hunter's third solo album was *Relix's* first album, and they currently have more than 25 records in print. *Relix* is also involved with licensing and merchandising such items as T-shirts, buttons and bumper stickers.

* * *

Rounder founders Bill Nowlin, Ken Irwin and Marian Leighton



PHOTO: STANLEY ROWIN

Do these labels have anything in common? Yes. While all are obviously geared to different markets, they are all quite aware that even a minor demographic miscalculation may result in major financial losses.

Each label was asked about its major concerns and priorities.

Lisa Fancher of Frontier: Our biggest stumbling block is getting the people behind the counters in the record stores educated. If the store personnel don't know anything beyond what's on Top 40 radio, the indie record will go unbought despite the concerts, ads in the trades, and the MTV push.

Rick Rubin of Def Jam: Getting paid by the distributor!

Steve Sinclair of Important: Promoting our releases through the commercial media.

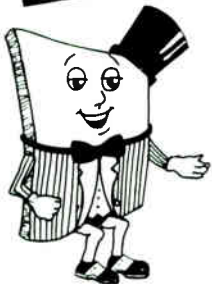
Marian Leighton of Rounder: Our biggest problem is uneducated record store personnel! They, as well as many musicians, don't know or care about music or have any conception of style or history—they just exist from Top 40 style to Top 40 style. Getting our records IN to the stores is also becoming harder, partially because of shrinking bin space due to the rise of compact discs. This all forces us to be very "cost conscious" regarding creativity. Everything on major labels must appeal to the lowest common denominator on a mass marketing level. So the indie label winds up catering to markets that are so specialized that it's hard to expand beyond their boundaries.

It was different 20 years ago with groups like the Lovin' Spoonful, The Supremes, The Beatles, and The Beach

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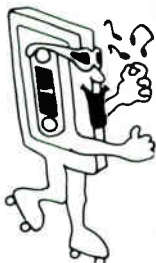
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Boys, whose music was perhaps aimed at separate segments of the market, but somehow managed to transcend that and reach a mass audience. Nowadays, the "crossover" result is very homogenized. You don't identify the sound by the artist anymore, but by the radio format instead.

Ira Moss of Moss Music Group: Classical record companies tend to live off the breadth of their catalogs, so it never really pays to re-record something. Because of the public domain of classical music—being used in commercials, etc.—we've tried to capitalize on that by releasing sampler albums of various composers and styles. But profit is severely limited. Mi Dori (the child prodigy violinist) doesn't have the impact of a young Michael Jackson; not every kid is going to beg for a violin. And the number of classical stations, programs, and reviewers is much less than in pop. Therefore, the number of classical superstars is minimal compared to pop and rock, especially since they must have a record out in order to get *anywhere*. Pop and rock acts, even if they're not chart-toppers, can make videos, play Vegas, and appear on *Miami Vice*, all without a current record out, and survive. A classical artist can't.

Les Kippel of Relix: We have to make sure we continue to fill a position in the marketplace that just wasn't there. Our artists were ignored by the majors because they can't sell 100,000 records. However, they will sell 5000...10,000...15,000...maybe even 20,000, and there are people out there who want this material. However, the biggest mistake we or any indy can make is *assuming* a record will sell and allowing yourself to be pushed into releasing it by the artist. Listen to the distributor and retail outlets instead.

DISTRIBUTION

The only things most indy labels don't handle themselves in-house is the pressing and distribution of their product. Distribution can make or break an indy label because in a sense they are at the distributor's mercy. No second release means you usually don't get the money from the first one. This, by the way, is no recent complaint. In Tom Wolfe's 1965 classic, *The Kandy Kolored Tangerine Flake Streamline Baby*, producer extraordinaire Phil Spector had a few choice remarks about record distributors: "They're a bunch of cigar-smoking sharpies in record distribution. They've all been in the business for years, and they resent you if you're young. That's one reason so many kids go broke in this business. They're always starting

new record companies—or they used to. The business is very soft right now. They start a company and pour all their money into a record, and it can be successful and they're still broke, because these characters don't even pay you until you've had three or four hit records in a row. They order the records and sell them and don't pay you. They don't pay you because they know they don't have to. You start yelling for the money and they tell you, "What do you mean? I have all these records coming back from the retailers, and what about my right to return records and blah-blah!" What are you going to do? Sue 20 guys in 20 different courts in the United States? They look at everything as a product. They don't care about the work and sweat you put into a record. They respect me now because I keep turning out hits, and after that they become sort of honest...in their own decayed way."

Moss Music and Important handle their own distribution. Def Jam and Rounder have entered full and partial agreements respectively with major labels where they enjoy the benefits of a major label's money, staff, and accessibility. Yet Marian Leighton of Rounder says, "Distribution is, and always will be, a conundrum." States Lisa Fancher of Frontier, "We've had several go out of business on us!"

Relix Records' Les Kippel echoes and amplifies on Phil Spector's comments. "We finally have acceptance with indy distributors because we've been around a while. But it's difficult trying to break into the upper level end of distribution since the distributors who handle major labels generally won't handle indys—you must get in through the back door to convince the buyers to try more if the first trial record succeeds.

"The biggest problem is getting paid by the distributor," he continues. "You have to be tough since they won't pay you unless you have additional product coming out. That's why one-artist one-record companies lose out and go bankrupt; no second record means no first record. Only when you have sufficiently strong product coming out can you convince a distributor to pay by making deals or making threats. That's why Relix has lots of different distributors of different sizes, different kinds, in different areas. That way we don't get stuck."

Def Jam knows all about getting stuck. Before they signed with Columbia, they had over \$200,000 of accounts receivable bills from a distributor. Says Rick Rubin, "They never paid us and we'll probably have to sue. No matter how well or how poorly you're doing, never let accounts receivable get that high."

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PRESSING AND MANUFACTURING

While some of the labels had more than a few chosen (and sometimes unprintable) words to say about their distributors, they appeared more charitable to their pressing plants.

Lisa Fancher of Frontier: We've been happy with Rainbo of Santa Monica.

Rick Rubin of Def Jam: Establish a working relationship with a pressing plant from the beginning and their people can become your allies. Some plants even become a partner in the record company for a percentage. Soundmakers in New Jersey are wonderful.

Marian Leighton of Rounder: We've been with Wakefield of Phoenix from the beginning.

Les Kippel of Relix: Diskmakers in Philadelphia is extremely open-minded to new companies and willing to go the extra mile. A new indie label is confronted with myriad choices such as ads in trades, the yellow pages, being bombarded at conventions etc. when trying to decide on a good pressing plant. The Billboard Buyer's Guide is a good source. The new indie should stay away from any individual selling "complete packages." He will then be subcontracting and charging you a percentage. Also, both money and credit references talk. A plant should be willing to listen particularly if you offer substantial pre-payments. Then, you should ask for a discount if you're pre-paying, because they'll have your money for two months collecting interest. Remember that pressing plants have all been burned a million times before by indys.

PUBLICITY AND PROMOTION

Raleigh Pinsky is president and founder of the Raleigh Group, Ltd. of NYC and L.A., representing all kinds of entertainments including many indie labels. She comments, "No indie wants to be reviewed in an 'other' column or 'indy' column, because it thereby gets categorized without regard to style. The major job of a publicist is to take the product out of the indie bin and make it universal."

Gail Elise King, a NYC area club DJ and member of IDRC Record Pool Business Center deals with indie releases on a daily basis. She says, "Packaging really means nothing to most DJs since great graphics don't necessarily mean great music. I tend to listen to the indie's reps—since most of them work for little or no money they *must* believe in the product. However, most indys need to do their homework a little more on the various

club DJs and record pools and become more targeted. For instance, I cater primarily to a dance music audience and not to a pop and rock one. So no matter how good a pop or indie record is, I probably can't use it, and the indie's promotional efforts should have been aimed elsewhere."

Both Frontier and Important have used outside promotion people for radio, mainly to guide them with radio's older demographics. Interestingly enough, both labels appear lukewarm on the idea of videos. Says Steve Sinclair of Important, "We are just beginning to realize that a video isn't the cure-all it once was in terms of exposing an artist. Its not automatically beneficial anymore."

Lisa Fancher of Frontier agrees: "We've done a few and found them fairly ineffective. It doesn't even seem to be mandatory anymore even for major labels. If a band just isn't interesting, a video isn't going to make them so."

Says Toni Brown of Relix, "You must sell yourself and *then* sell your artist. We have our artists do radio station ID's and our label also does a heavy business with merchandise promotion. This all helps record sales."

In the classical field however, building an artist to a viable sales level is almost impossible. Says Ira Moss of Moss Music, "It takes three to five years to build an artist and even then the cost can't be made up. Pavarotti

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and Mario Lanza are exceptions, not the rule as far as sales go. And more people heard of Maria Callas because of Onassis than because of *Aida*."

COLLEGE RADIO

College stations have become the refuge of blues, reggae, hardcore, new age and ethnic music—in short, all the small label releases that usually don't occupy commercial airwaves. Scott Byron of the *CMJ New Music Report* (a weekly publication covering college radio) has said that commercial radio stations' bottom line is money while college radio's is music.

Lisa Fancher of Frontier says, "College radio loves us, but to commercial radio we don't 'sound good'—whatever that means."

Steve Sinclair of Important sees college radio and indie labels as natural allies in the exposure of new music. But he adds, "We have a good alternative promotions department that deals with college radio, but our basic concern is finding a way to succeed in promoting ourselves through *conventional* media like rock and Top 40 radio," he says.

Rounder Records, on the other hand, is concerned mainly with what Marian Leighton calls the "pre-existing audience." She comments, "Our radio stations—alternatives, National Public Radio—are of no interest to the majors."

Several name acts who first got their start on college radio, such as U2, The Bangles, REM, The Replacements and Husker Du, are now either on major labels and/or getting mainstream airplay. However, not everyone agrees that college radio is effective in breaking new acts. According to NY-based engineer/producer Mallory Earl, currently engineering acts for MCA and CBS Associated with Emuir Deodato,



Ira Moss of Moss Music

"College radio seems to be slowly depleting as a force for indie labels. Alternative radio has lost its audience—the music has either been picked up by the majors or dropped entirely. College radio gets the leftovers. The number of acts that college radio breaks that will go on to bigger and better things is really negligible. It basically functions best as a lab for the students or as a good outlet for imports."

And a recent *Rolling Stone* article suggests that college radio, while being courted by major labels, has actually *dropped* its support for acts it once ardently backed, simply because the artists signed with majors and are now commercially successful.

COMPACT DISCS AND CASSETTES

Formerly the domain of audiophiles and "serious" music enthusiasts with large disposable incomes, CDs are now a reality with both majors and indie labels. CD-only releases are now part of the picture as well. The CD purchaser has moved from buying CDs

of records already out on LP and cassettes to rare releases and collections that are CD-only. One such company, Rykodisc, founded in 1984, licenses existing rare releases of all music genres, although avoiding mainstream pop/rock/urban contemporary.

While Frontier and Important have put out a few CDs, both believe it's too soon to tell whether CDs are viable for them. Relix agrees that CDs can be risky for independents with untried product, "but we feel our product is ripe for CDs," Kippel says. Relix currently has seven CDs available. Rounder has put out about 40 CDs that show strong sales, but the label is not sure whether the demand will remain constant.

Rick Rubin of Def Jam feels that since they sound good, people buy them, and they are selling, there's no reason not to make them. One Def Jam act is already on CD and two more will be in the near future.

Moss Music has gone into CDs full force, despite the substantial initial costs. Says Ira Moss, "The cost of making a CD and the risk is about \$4. A cassette is about \$1. But CDs offer a label new opportunities to reach the serious adult buyer. CDs are only about four years old, and the first year they came out was with snob appeal for both jazz and classical audio buffs. The number of classics sold amounted to over 50 percent of total sales. And the consumer who is convinced of the value of a CD player now has to 'buy out' his LP collection."

THE FUTURE

Founded in March 1986, the L.A.-based Independent Label Association coalesced into a formal organization of independent labels interested in achieving a common goal. Presided over by Terry Brown of Airwave Records, it hopes to function as a communication network. "We want indie labels of all types to work together in non-competitive ways such as generic 'drink milk' ad campaigns, and educating retailers about our products via a newsletter and a toll-free hotline," Brown says. "We also want to speak on behalf of the indie recording industry whenever a unified expression of opinion is warranted."

To some indys, being associated with, or distributed by, a major label is still the most desirable goal. To others, it's a sell-out. But to their record buying public, it probably won't matter as long as the labels continue to provide consumers with needed alternatives to mass culture Top 40 music. ■



Les Kippel and Toni Brown of Relix

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ARTIST STUDIOS

The 24-track studio is in a large two-story house nestled in the Burbank Hills...the extras aren't bad either, with a full kitchen and a swimming pool outside...

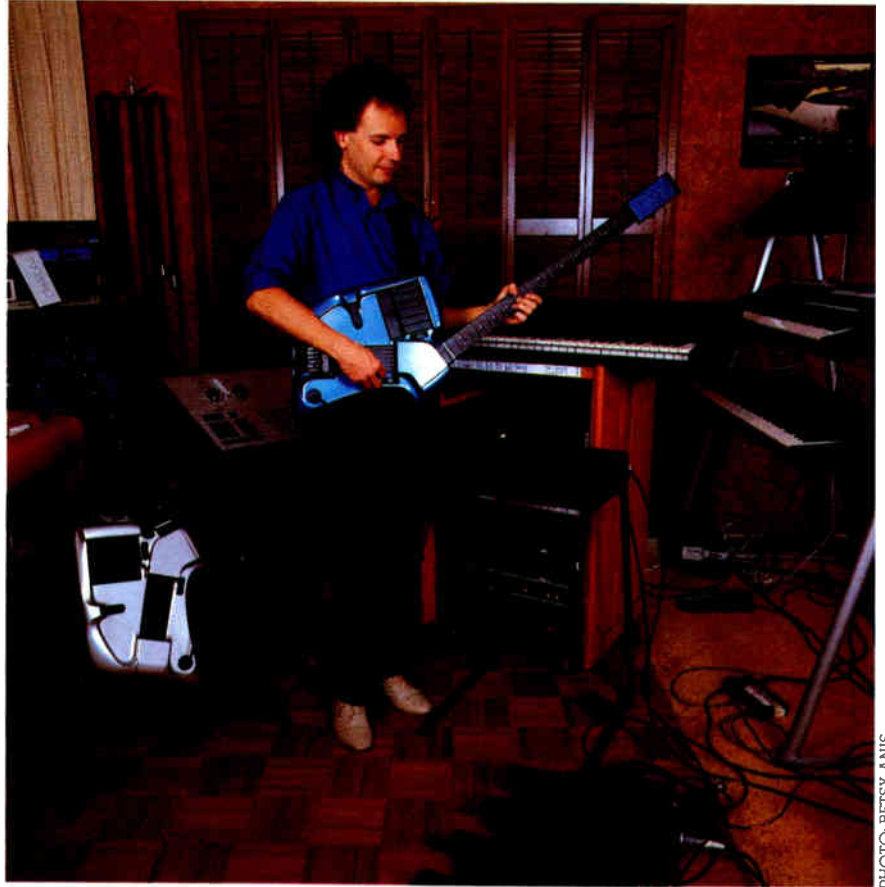


PHOTO: BETSY ANIS

LEE RITENOUR'S

STARLIGHT STUDIOS

by Robyn Flans

Lee Ritenour has a recording situation that any artist, songwriter, musician, producer, or engineer would envy. Starlight Studio is Ritenour's own 24-track studio in a large two-story house he used to live in nestled in the Burbank Hills. The extras aren't bad either, with a full kitchen and a swimming pool outside which overlooks the San Fernando Valley. The large living room supports a wood floor where he and his band rehearse and record via a video hook-up to the control room upstairs. The parquet floors and tile in the adjacent kitchen, as well as the wood and high ceiling of the living room, all add to the sound upstairs at the Trident board.

What's nice is Ritenour has the op-

tion of going home and leaving his work behind, or staying in the upstairs bedroom when he isn't up for the trek home to Malibu. It would seem to be the ideal place to rent out to some group from Iowa recording their first album for a major label, but that's much too grand a suggestion for Ritenour.

"I've kept it limited to a small number of people because it's still a house and a residential area," he says. "I try to keep a low profile on the studio. The amazing thing is nobody in this neighborhood knows there's a studio here. Many times there are a lot of cars parked out front. They know I'm a professional musician and they hear me rehearse the band downstairs because that part of the house isn't sound-proofed, but they enjoy that because

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it's like a free concert. It's such a traditional, conservative neighborhood that most people don't have a concept that a professional recording studio could be in a place like this."

In fact, Ritenour himself couldn't imagine it a professional studio capable of handling nearly all of his demands until he really used it—first on his *Banded Together* album, through *Harlequin* with Dave Grusin (for which engineer Don Murray was nominated for a Grammy) and finally, after recording and mixing his entire current album, *Earth Run*.

"I have a Studer 24-track, Studer 2-track and the Yamaha NS-10s for the little speakers. Then I've got a Q. Lock for locking up more than two 24-tracks or a video and Q. locking the Sony 3/4-inch," Ritenour says detailing the spacious control room which Dennis Eveland and Don Murray helped design. "I have the Lexicon 224X and the 200 and a PCM70. I've got all the standard dbxs, Teletronix limiters, the Kepexes, the Drawmer gates and the Lexicon Prime Times and I have a pack of the newest Dolbys, PS-3, which are real clean. I've got a Studer CD player in the rack and the usual digital delays.

"There's a Sony video setup for downstairs to have everything on screen here, and I use Yamaha amplifiers for the power. At first, I had bought a brand new set of the smaller UREIs and that was my only mistake because there wasn't enough bottom. So I had these old big UREIs from my house in Malibu and brought them over. As soon as we put them up, we realized how good it sounded. I have the usual assortment of AKG microphones and some old tube mics and whatever we don't have, we rent. There's a patch bay downstairs, a patch bay in here in the control room, and a patch bay in the next room.

"I think I've stretched the studio as far as I can," he continues. "Dave Grusin did an entire movie score here for *Lucas*, and Greg Mathieson and I wrote and produced a complete score for a movie called *American Flyers* last year. We sweetened that movie with a 40-piece orchestra, so we mixed it at Sunset Sound with a computer, but we did some remixing here. You can really trust this place mixing. The only limitations are not having a computer setup, but I wouldn't put one in here because more time is spent recording than mixing and I'd rather have the quality 100 percent clean on the recording. Mixing is changing a little bit now, too, because everybody got into this very highly computerized mixing stuff, as I did too. But from what I've been able to tell recently, everybody is starting to use the com-

puterization a little less because everything on tape is a little more organized than it used to be and that's because of the state-of-the-art of the synthesizers and sequencers. Before it gets on tape a lot of times, it's processed the way you want it now.

"This situation is great for anybody doing movie scores and TV themes, because you can demo them without too much expense. When Greg and I did *American Flyers*, there was a tremendous amount of music in the film. We got the gig, but we didn't really want to record all this stuff without them having some idea about what it was like, so we did a complete demo of this 12 minute bike race and told Joel Sill at Warner Bros. to come listen to it. He

asked if he could bring a few people and we had about 20 people up here. They're used to hearing demos for movies with someone playing a little theme on a piano. They didn't expect to see it synched up against the picture and hear it with this sound. We blew them away and they left us alone for the rest of the movie."

For Ritenour, the studio provides the time and space for his creativity.

"The technology has gotten so far that it's hard to walk into a studio that's not your own and have any real long lasting control of it," he says. "Half the time, it takes a day to set the stuff up. It was so costly to be renting studios for the amount of time I wanted to spend in them and it was much wiser to have

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C-40	5.30	2.45	2.14	1.71	1.51	1.46	1.41	1.36	1.31
C-50	5.66	2.70	2.33	1.90	1.70	1.65	1.60	1.55	1.50
C-60	5.95	3.02	2.54	2.11	1.91	1.86	1.81	1.76	1.71
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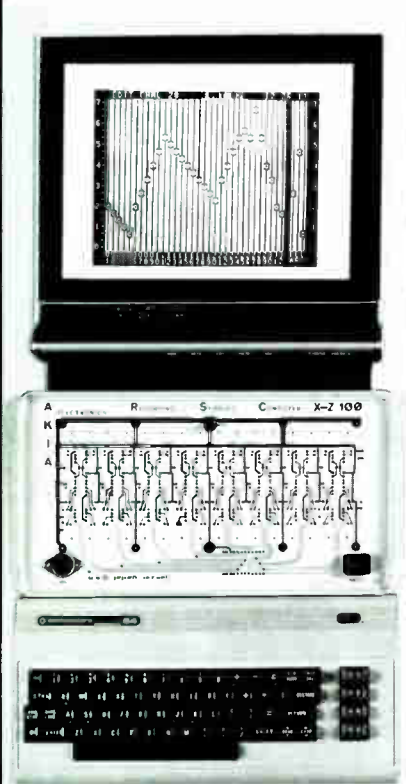
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my own. Even for the writing of the songs. Everybody has their little home studios and I started out with a little 8-track Fostex and then jumped up to this. It's a big jump, like going from a little Cessna to a 747. I do all my demos myself and actually do a lot of the recording myself, although I rely on an engineer of Don Murray's quality to bring it home.

"I wanted to be able to spend enough time to get the guitar sounds that I wanted on my records. Don Murray and I have always been nuts on guitar sounds in general. We would rent out a studio like Sunset Sound or Capitol, or even some of the more inexpensive studios years ago like Monterey in Glendale, and we could spend three or four days on one guitar part—not because I was spending so much time playing it, but looking for the sound I wanted. And the clock was ticking away and it wasn't Lionel Richie's budget.

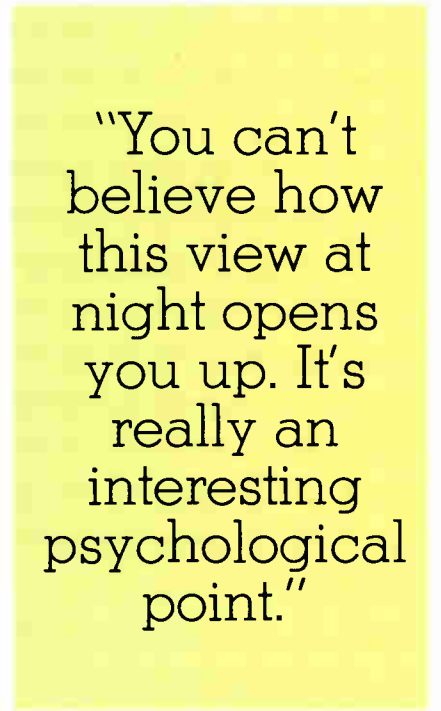
"The great thing about the studio here, is when I'm not on the road, I have all my amps and gear set up downstairs on that wood floor. The mics are all set up and I can come up here myself, also, and work on sounds. From the *Banded Together* album, on to *Harlequin* and now with the *Earth Run* album, I've been very happy with the guitar sounds. I got some foot pedals made with red, green and blue buttons. One is play, one is rewind to the number on the machine and the other is record. I can operate the 24-track with my feet.

"We'd maybe work five or six hours at getting a sound right for a song and that might entail trying my Gibson Chet Atkins Classical/Electric guitar and saying, 'No, that sound is too soft for this song. It definitely needs an electric guitar.' Then I'd try my Strat. 'Well, the Strat is a little dark. Maybe it need something brighter,' so I'd try my Valley Arts electric guitar. Maybe I'd try the Boogie Amplifiers or the Seymour Duncan amplifiers and we'd go around and around with different mics. That's a hard day. That's when you're searching for something and you're not sure what you want. You spent five or six hours getting into it and you're kind of frustrated by that point, but finally you say, 'Yeah, that's the sound that works.' Usually what I'd do on those days is send Don Murray and [second engineer] Terry Bower home and I'd take a break and have some dinner. I'd come back around eight in the evening and everything would be set and ready to go. All I'd have to do is hit record, and play. It would be so inspirational because my ears would have relaxed. I'd turn down the lights and get into a solo on that song and

usually it would go real fast at that point, one or two takes."

What adds that final touch of inspiration for Ritenour is the large window in the control room.

"If I ever build another studio from the ground up, I would make sure I had a nice big window. You can't believe how this view at night opens you up. It's really an interesting psychological point. Most of the time, if it's a



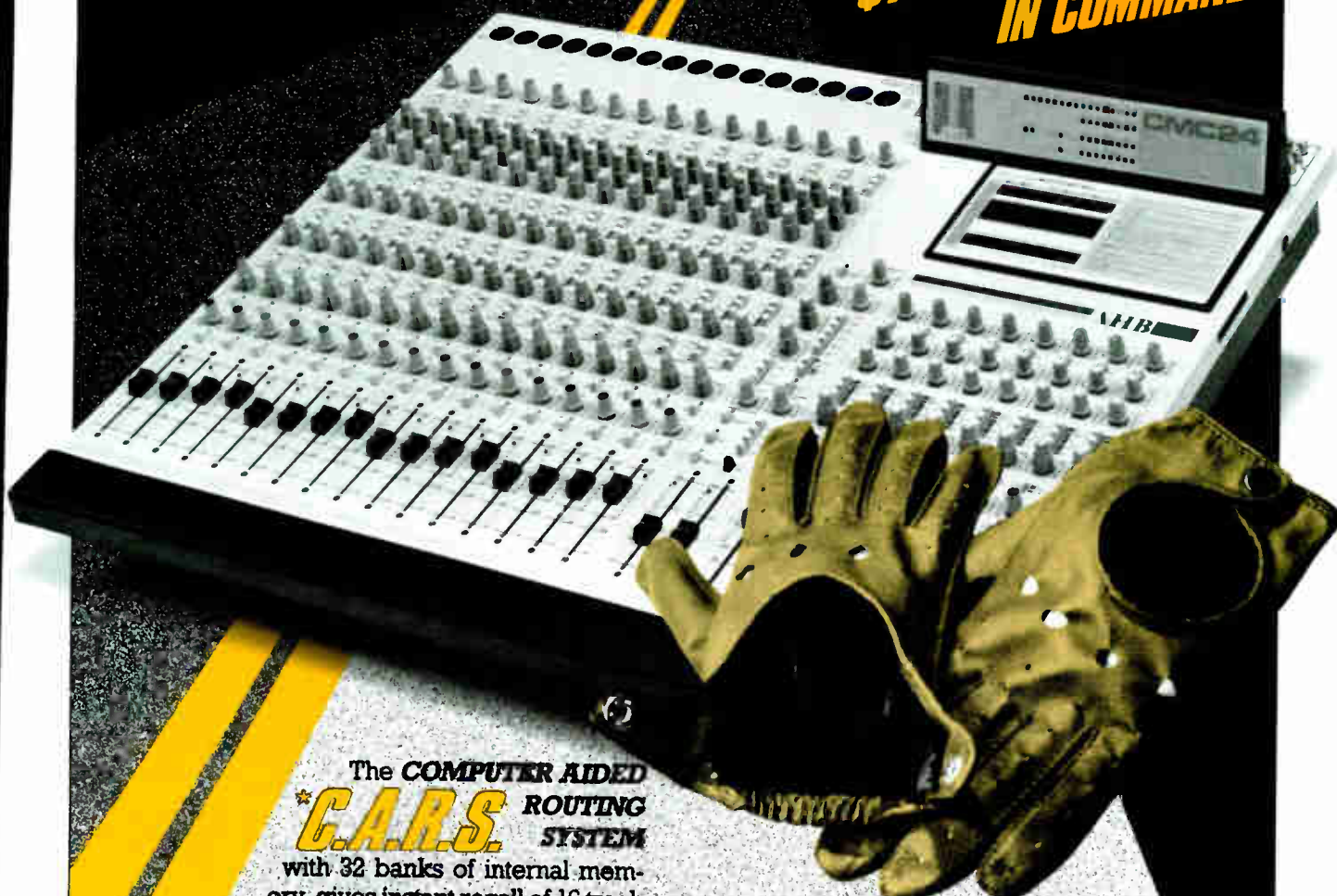
really sunny day, we'll keep the blinds shut, but come 5:30, the sun is setting over the Malibu hills out there and we'll open it up and groove on the sunset. The rest of the evening, it's open, and whether it's raining out or it's a beautiful night, the lights from the city are shining and it doesn't matter. There's something that makes you feel like you're more involved than just sitting in this tiny room."

Greg Mathieson has brought such acts as The Commodores, Sheena Easton and Deniece Williams to work at the studio. Most of GRP's West Coast records are done at Starlight, including Dave Grusin and Diane Schuur. And Trevor Vietch produced a dance record with synthesist Phil Chenel there. Even studio mavens David Foster and Humberto Gatica did some work there for Foster's own LP.

"I've just been really surprised how the sound has totally competed with anything in town," Ritenour says proudly. "The art of illusion is amazing that all this stuff could be pouring out of this house in Burbank." ■

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World Radio History

by Tony Thomas

A recording studio can be compared to a factory or manufacturing concern, whose job is to turn raw materials (blank tape) into finished goods (demo and master tapes.) As with any manufacturing business, if too much of a studio's financial resources is tied up in raw materials, its cash flow will be negatively affected, and the company may soon be unable to meet its payroll and other financial obligations. Conversely, if shortages in required raw materials develop the entire production process will be impaired or halted completely, causing logjams in related production schedules.

Determining what to buy, when to buy it and where is critical to the profitability of any business.

In larger corporations, the purchasing department fulfills several very important functions. Obtaining the highest quality materials at the lowest prices is essential for the company to remain competitive and profitable. It is purchasing's responsibility to insure that substandard merchandise is not procured and that the company does not typically overpay for the materials it uses. It is also up to the purchasing department to follow through on orders from vendors, making sure they arrive on schedule so that production deadlines are met. The purchasing department will also check inventory levels in order to establish a repurchase cycle that prevents overstocking or understocking a particular item, thus eliminating shortages or unwieldy carrying expenses.

quality of the recording project should be given priority, provided they are not prohibitively expensive.

Particularly in the studio business, time is money. Therefore, any items that will save time will eventually help to bolster profits. Similarly, anything that makes the process easier will save time, and in the end, money.

A good purchasing agent performs a pre-purchase value analysis in order to maximize each dollar spent. One of the most important objectives is to determine the least amount of money that must be spent in order to obtain the basic functions desired from the item and not pay extra for features of questionable value or significance.

One of the simplest factors that determines value is the durability of the product. For example, a product that costs twice as much but lasts four times as long represents a far better value, and in essence may only "cost" half as much. Another good indicator of value is the manufacturer's reputation. If a company has a track record of good workmanship and service, its products are usually a good value. Companies that have shaky track records may eventually go out of business, leaving the buyer stranded without a source for parts and service.

Vendor Evaluation

A fundamental function of the purchasing agent is the continual evaluation of vendors and the maintenance of good business relationships with them.

What makes a good vendor? You should deal with vendors that have the merchandise lines that you have deemed acceptable in quality for your purposes and that represent a good value for the dollars spent. Those vendors should be dependable, since meeting deadlines is imperative in the recording business. If the vendor does not meet promised delivery dates, valuable clients could be lost and the studio's profitability thereby compromised.

The vendor's product knowledge and ability to provide personalized service should also be considered. Some suppliers specialize in cutting overhead as a means of remaining competitive. As a result, they are not equipped to answer questions or provide even basic customer support.

The vendor that can consistently deliver quality goods at the lowest possible price should be given priority, pro-

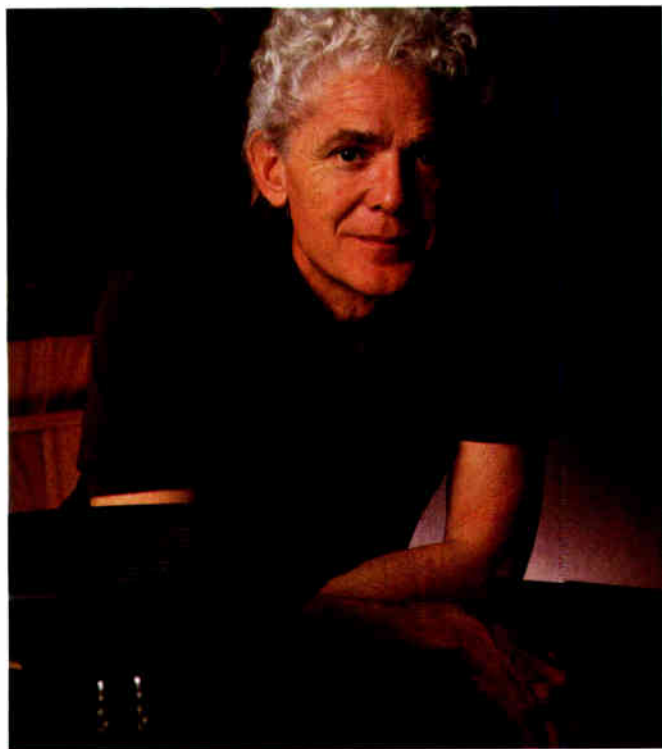
Maintaining Inventory & Supplies

Needs Assessment & Value Analysis

It is imperative for you as a studio owner or manager to keep a watchful eye on all expenses, large or small. To this end, a needs assessment analysis should be performed regularly to develop purchasing patterns that are geared towards profitability. Such an analysis should not only identify the needs of the facility, but prioritize them as well.

Since the profit margin is a primary motivating factor in any solvent business, each purchase should be made after determining its positive impact on the overall profitability of the enterprise. This is one way of filtering out unneeded items and outright extravagances. Next to profit margin, product enhancement should be the most determining factor in purchasing. Because your studio reputation hinges on the quality of the product you deliver, items that contribute to the overall

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But for Tom, that's all frosting on the cake. "At the end of the day," he says, "it's what comes out of that speaker that determines success or failure. No matter what it measures, it all comes down to what it sounds like. TAD makes the best sounding components I've ever heard."

If you're in the market for professional speaker components, for yourself or a client, we hope you'll seriously consider what Tom Hidley has to say about TAD.

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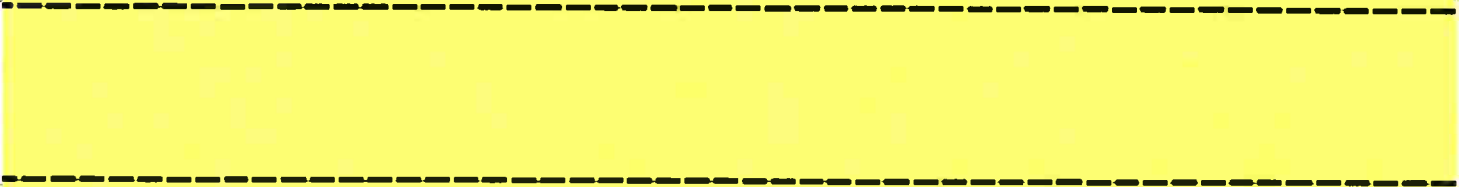
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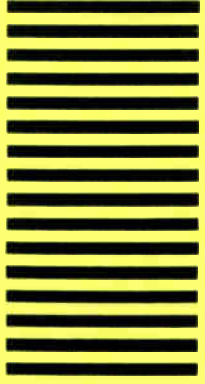
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vided all other factors are equal. If cutting costs also means cutting service, dependability or the quality of the supply, then each of those factors should be assigned a priority and weighed.

Developing an Inventory Control System

One way of eliminating supply shortages and reducing the amount of money tied up needlessly in supplies is through a workable inventory control system. Such a system should allow the studio owner or manager to quickly determine the inventory levels of each item in stock (various widths of mastering tape, cassettes, splicing tape, tape reels and boxes, etc.) and to reorder such items before they are out of stock.

Order quantities for each item must be realistic and, if possible, based upon prior statistical data. The shelf life of the product vs. its usage cycle and obsolescence rate should be taken into consideration, as well as any discounts which could be realized by ordering in larger quantities.

The reorder point is determined by several unrelated factors. They include the rate of usage, possible delays in shipment, the cost of keeping the item in stock and the ability to obtain the item locally at a reasonable cost in the event of a temporary shortfall. A reorder point for each item should be calculated and the inventory control system designed to prompt automatic reordering when this point is reached.

Safety Stock refers to the amount of stock that is kept on hand in excess of what is immediately required. The amount of safety stock you keep on hand will depend on how much cash you can afford to tie up in inventory, the turnaround time between ordering and delivery, and how critical a shortage would be to studio operation.

A logging system is a way of tracking and controlling inventory levels. Under such a system, all materials and supplies are logged in as they are received and logged out as they are disbursed. The benefits of such a logging system include the ability to instantly check inventory levels without taking a physical inventory, to track usage levels on a daily or weekly basis, and to make people using the materials accountable for them. A physical inventory should additionally be taken on a regular basis to verify the accuracy of your records and to discourage pilferage. Furthermore, an accurate inventory will be required for the completion of your income tax returns.

If you set up and maintain such controls, you will make sure that materials are continually on hand when you need them and that resources are not tied up in excess inventory. ■

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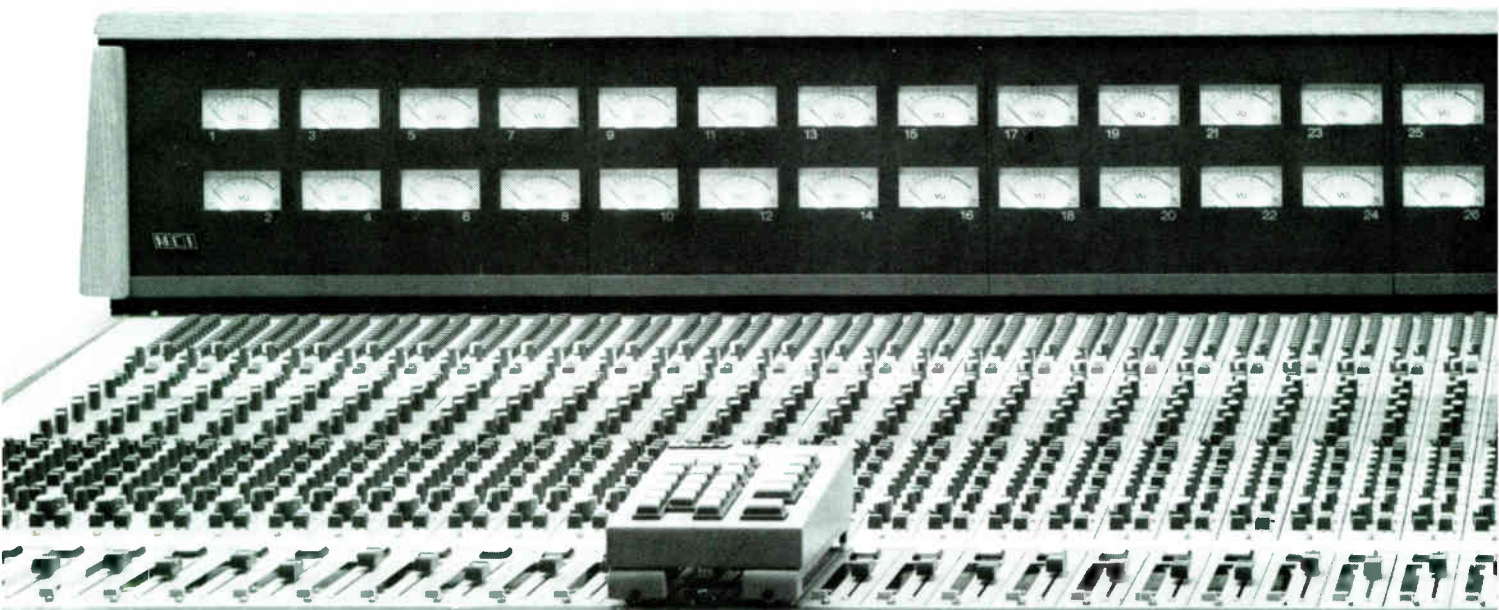
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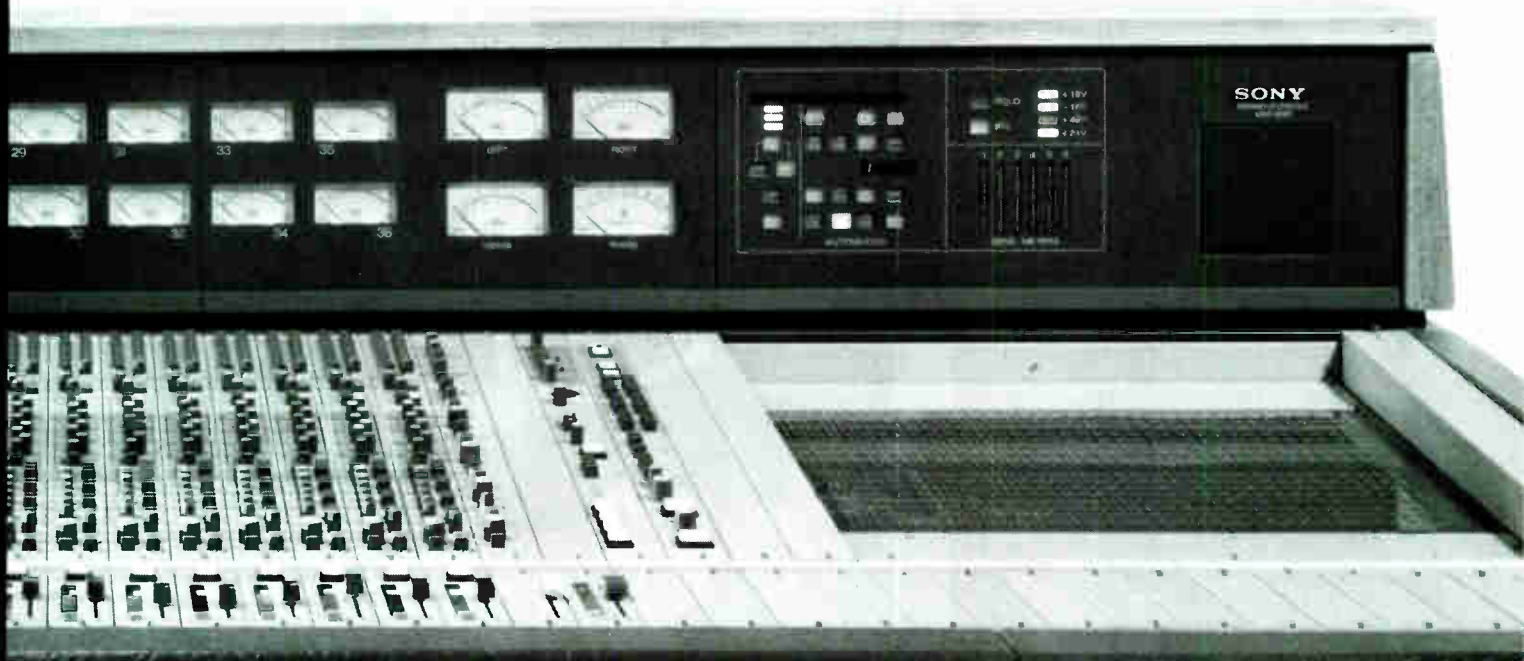
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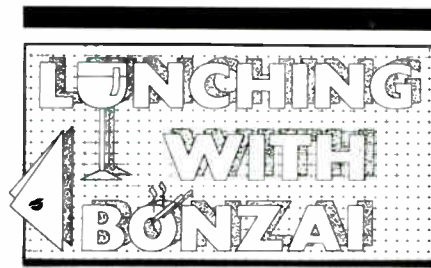
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Tuned In Around the World

CASEY KASEM

by Mr. Bonzai

When Casey Kasem phoned to schedule our lunching I was startled and tickled to hear his familiar voice. It was as if my telephone had become a personal radio show. That same friendly tone; the same relaxed, yet crisp and succinct delivery; the same voice I've heard for as long as I've been listening to radio.

It's estimated that more people hear Casey Kasem than anyone in the history of radio—something like 45 million listeners on over 1000 stations each week around the world. In addition to *American Top 40*, he does his weekly *Top Ten* television show, scores of national commercials, and is even the voice of the cartoon character "Shaggy" on *Scooby Doo*. The man knows how to work his voice.

Casey Kasem's career stretches from the days before TV took the drama out of radio, through the era of Top 40 dominance, on through the period when "underground" radio laid back the transmitters, and continues today with geometrically expanding success. To millions he is the familiar, never wavering voice of an old friend, the embodiment of the fireside broadcaster with an unending supply of stories to tell...

Bonzai: Where did it all start?

Kasem: Radio started in high school [in Detroit] for me. I just wanted to get



PHOTO: MR. BONZAI

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ing modules. Soon to be available is an electronic, programmable 2-way stereo crossover, with 24 dB per octave Linkwitz-Reilly phase-aligned circuitry, a built-in adjustable high-end limiter and balanced outputs. And more modules will be available in the near future to further help you streamline your system.

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SPECIFICATIONS: CARVER PM-350 Power: 8 ohms, 310 w/channel 20-20kHz both channels driven with no more than 0.5% THD. 4 ohms, 450 w/channel 20-20kHz both channels driven with no more than 0.5% THD. 2 ohms 450 w/channel 20-20kHz both channels driven with no more than 0.5% THD. Bridging: 900 watts into 8 ohms, 750 watts into 16 ohms. THD less than 0.5% at any power level from 20 mW to clipping. IM Distortion less than 0.1% SMPTE. Frequency Bandwidth: 5Hz-80kHz. Gain: 31 dB. Input Sensitivity: 1.5 V rms. Damping: 200 at 1kHz. Slew rate: 25V/micro second. Noise: Better than 115 dB below 350 watts. A-weighted. Inputs: Balanced to ground, XLR or TRS phone jacks. Input Impedance: 15k ohm each leg. Compatible with 25V and 70V systems. 19"W x 3.5"H x 11.56"D



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on the PA system and be an announcer. I had been in a few plays and announcing was theatrical to me. But just reading the announcements was not enough; I was also interested in sports and was the sports editor of the school paper. I asked Mr. Shapiro, who was a teacher and the sponsor of the radio club, if I could create a sports show. That's how I got my name. My real name is Kemal Kasem, which didn't sound to me like a sports announcer. People used to call me

I always felt my responsibility was to showcase the artist in the best way possible—Do it with brevity, tell the story and get on with the music.”

“Case,” so I changed it to Casey. That got me started in what I am doing today—creating stories and dramatizing broadcast material.

You know, I went to the basement the other day and read some of those old scripts and they still hold up today. They had the essence of what broadcasting is all about: a beginning, a middle, and an end; brevity and colorful, descriptive language. I tried to put people right on the playing field or in the gymnasium along with the teams. I guess I was very lucky from the beginning; maybe I had an innate ability to tell a story—and make people want to stay tuned.

Bonzai: You used to do a comedy/music radio show and then changed to your famous “teaser/bio” format—how did that happen?

Kasem: I changed my format while working in 1962 at KEWB in Oakland.

Before that I had developed a show in Cleveland where I used wild tracks: bits of commercials, clips from records, and that sort of thing. I accumulated about 300 of these wild tracks and developed a series of characters.

Bonzai: Did you do character voices?

Kasem: No, I never did that. I would create a character, like “Happy,” who I would talk to and all the responses would be from these wild tracks. I took three phrases from a hit record by Stan Freberg, called “My Prayer,” which was a take off on a Platters hit. I used the bits “You catch on fast,” “That’s right” and “Oh, no,” and built the character around them. I also took “Uh-huh, honey” and “That’s right” from “Sweet Nothings” by Brenda Lee—before it had become a hit, and created “the little girl without a name.”

My engineers would work with me for two or three hours before each show to get all the cues down perfectly. I took the idea to Buffalo and eventually I was spending eight hours a day writing a three hour radio show. Then I moved on to Oakland and Chuck Blower, the program director, required all the disc jockeys to have a complete script. All the wild tracks had to be written down beforehand. At the time, I hated myself for taking the job, but it really schooled me for what I am doing today.

Then one day about a year later, after being number one in the Bay Area, our general manager, John McCray called me in at three in the afternoon and told me that station was cutting out all the wild track programming. He had already let one guy go and was planning to fire another. So, I asked him what he wanted me to do, and he said to talk about the artists. I had no idea what I was going to do. That evening I went into the control room while “Emperor” Bob Hudson was on the air. He’s one of my best friends, but he’s very sloppy, and I used to go in under the pretense of talking with him so I could clean up the room before my show. There was a large bin for news copy and trash, left by Farley McCluth, our maintenance man. On top of the trash was a copy of *Who’s Who in Pop Music, 1962*. I started reading through it and realized I was saved. I still have the magazine. I had been working from elaborate scripts and felt totally unprepared until I found this *Who’s Who*. I found plenty of material for teasers and bios. I had done teasers in the past and the magazine had thumbnail sketches, and statistics. The next day I started collecting books and magazines and started clipping. I was a one-man operation at the time.

Bonzai: You must have quite a staff now . . .

Kasem: We have four writers, a statistician, two researchers, and a full production team. But everything gets my personal attention. We double check everything for accuracy, and the writing has to work for my voice and delivery. The radio show has never been easy to do—we put a lot of work into it each week.

Bonzai: You do the Top 40 countdown before *Billboard* hits the newsstands—how does that work?

Kasem: We get the charts on Wednesday. We pay for them for the radio and TV show. Then we start writing, and Thursday morning we tape the show. I listen to the beginnings and endings of the songs for my timing and so I can match the feeling. Then there is editing, the pressing of the discs and distribution around the world.

Bonzai: Tell me about your early radio acting—you were on *The Lone Ranger* weren’t you?

Kasem: Yes, as a teenager I had the ability to do character voices ranging in age from 12 to 30. When I graduated from high school, I worked for nothing at WDTR, the educational station in Detroit. That’s where I met my associate, Don Bustany, who has been producer of *American Top 40* since the beginning. I was the chief sound effects engineer, and got into a little acting on the air. Don suggested I try out for the part of “Scoop Ryan, Cub Reporter,” for a show out of Wayne State University. I auditioned and got the part of this young reporter who traveled around the world with his grandpop. The 15-minute show was broadcast on 50,000-watt WJR, which gave me great exposure. Shortly thereafter I auditioned for *The Lone Ranger* show and started working professionally during my first semester in college. It lasted two years and then I was drafted and sent to Korea.

In Korea, I did some disc-jockeying, and helped create a production unit that did dramatic radio out of radio station Kilroy. I also did a DJ show and called myself “Crazy Casey.” That lasted two weeks—it was too crazy. The officers in the area got together with a petition to get me off the air.

Bonzai: Who were your heroes in broadcasting?

Kasem: Arthur Godfrey, because I felt he was the first radio personality to sound relaxed and human on the air. He talked to people, and he could read a great commercial. And Ed MacKenzie, who called himself Jack the Bellboy. He was a powerful disc

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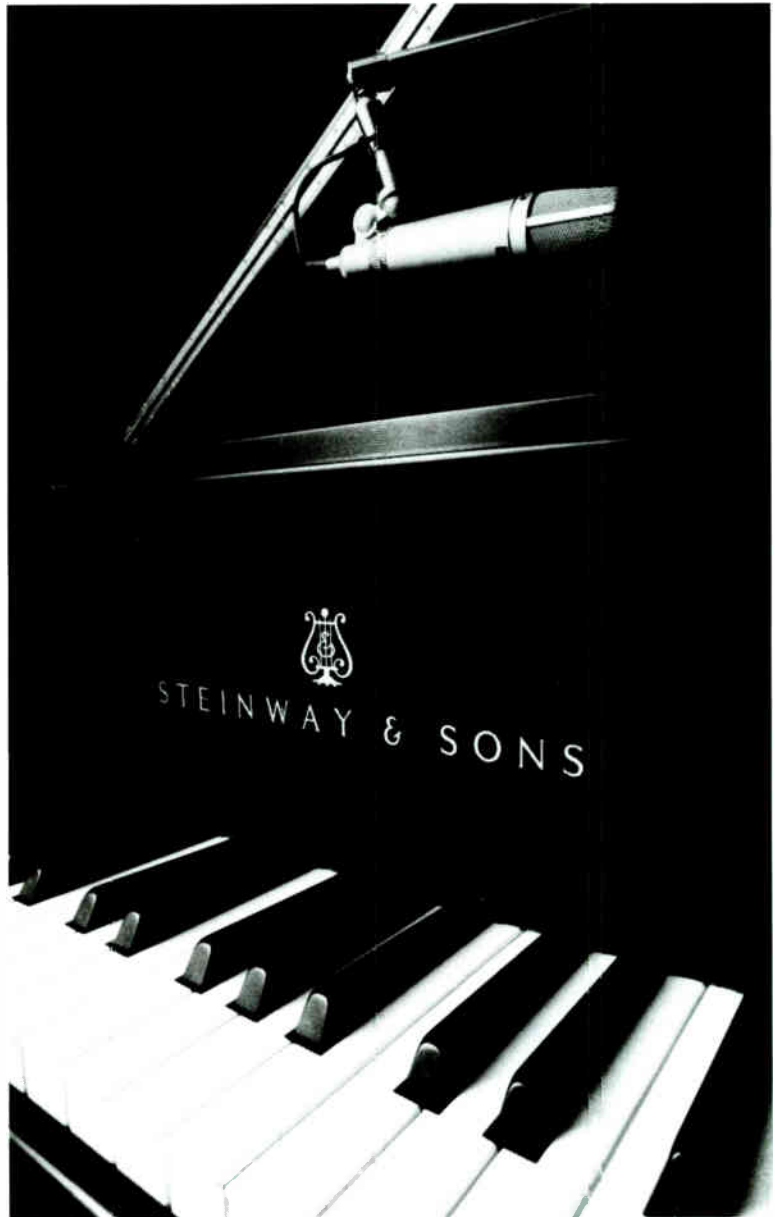
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jockey in Detroit who knew his music and read a commercial with believability. He was an engineer who became an announcer and had a very natural delivery. And there's one other person, Harry Heilman, who was batting champion for the Detroit Tigers in 1918 and 1919, I believe. In the '40s he was the announcer for the Tigers and he did something that I imitated without even realizing. Every season he would tell the same stories, about Babe Ruth's last home run, or Ty Cobb's base stealing—this sort of thing. People used to listen to him not for the games, but for his colorful stories. Sometimes people tell me they listen to my show more for the stories than for the music. I owe a lot to Harry.

Bonzai: How did *American Top 40* get started?

Kasem: I had the idea as long ago as 1949. I once listened to Eddie Chase on CKLW counting down the national Top 10. That's when I started formulating my goal of syndicating a countdown.

Bonzai: How do you schedule all your announcing work?

Kasem: Carefully. At my peak I was the voice of NBC for four years and did about 25,000 promos, plus many national commercials, three or four cartoon shows a week, the TV show, and the radio show. I worked about 17 hours a day. It wasn't easy, but that's what I wanted to do and I loved it. I never thought I would ever be the voice of a network; I didn't really think of myself as an announcer to begin with. I thought of myself as an actor who could announce. One of the reasons for my success is that background as an actor.

Bonzai: Which work is the most satisfying?

Kasem: The radio show, because it's a challenge every week. I produce, I write, and I give the best performance I am capable of. My partner, Don, is there to make sure I do my best. We've had some battles in the 16 years of the show, but we're still best friends.

Bonzai: What are the elements necessary for a hit record?

Kasem: I guess people would say the experts are people like Dick Clark, Wolfman Jack, Rick Dees, and myself. But I think the people who can pick the hits are the ones who listen to everything on a daily basis. I used to be the record librarian at a number of stations and I listened to every record that came out. If someone asked me if their record had potential, I could probably tell them if it was worth spending money on promotion. Peo-

ple used to call on me, because I had a knack for picking hits. My home was full of records.

But if you asked me today, I'd have to say my judgement is no better than anyone else's. Because of my priorities today, I listen to a lot of talk radio. I am completely committed to the peace movement and doing what I can to help. I've been working with the Peace March, the Peace Child concerts with American and Russian



PHOTO: MR. BONZAI

children, the New Jewish Agenda, the Arab-American Anti-discrimination Committee, Amnesty International, the Peace Corps. I don't need any more work now, so I give my time to creating peace. I'm trying to encourage people to do the same, to make people aware of the very real dangers of a Third World War.

Bonzai: Looking back on your career, do you have any personal anecdotes about the greats—say, John Lennon?

Kasem: I believe my worst interview was with John. I only interviewed two people while working at KRLA. One time was with Stan Freberg because he stopped by the studio and I invited him in. The other interview was with John Lennon. He called me from the Bahamas when he was on his way to Canada for the "Bed-in" for peace. I was totally unprepared, and my voice went up about two octaves. You could tell I didn't know what I was doing. John was very gracious and we talked for ten or 15 minutes, but it was a mess.

Bonzai: You don't do many interviews, do you...

Kasem: No, and there's a reason. I think what I do best is tell a story. My

experience has led me to be a fairly good storyteller. So many interviews fail to really get the essence of the artist. I always felt my responsibility was to showcase the artist in the best way possible. Do it with brevity, tell the story, and get on with the music. My show is not a documentary; it's a disc jockey show. I've never lost sight of that.

Bonzai: Of the artists of the past 30 years, who do you think will be remembered in a hundred years?

Kasem: Good question—what will the classics be? I just finished a video called *Casey Kasem Presents a Rock 'n' Roll Goldmine*, with newly discovered material and performances by The Beatles, The Rolling Stones, The Who, Janis Joplin, The Doors, and others. We worked very hard on the program and it's great to see things like The Stones performing "Satisfaction" when they were very young. You can spot that "X" quality, but it's hard to say what will survive for a hundred years. I'd guess that people will still be listening to The Beatles, Elvis, and Frank Sinatra...

Bonzai: If you had lived before broadcasting, what would you be doing?

Kasem: I'm a pretty good entrepreneur. I'm ambitious; I get along pretty well with people. I probably would have been out selling something. I think I would have been pretty successful in the grocery business if I had stayed at it.

Bonzai: You were in the grocery business?

Kasem: Well, my folks were in the business and they hit a rough period, so I left my early radio work to help straighten things out. I turned the business around and quadrupled their profits in three months.

Bonzai: You were originally a sound effects engineer...

Kasem: Yes, because I was only 18 and didn't have a big announcer's voice.

Bonzai: How did you discover the voice?

Kasem: One night I learned how to use a microphone effectively. It was about one o'clock in the morning and my voice was a little bit tired. I was doing a little announcing then, and I got about an inch away from the mic and just relaxed. I was introducing one of the top announcers in Detroit and afterwards he asked where the hell the voice came from. It was then that I realized what a microphone can do for a voice, which is essential in storytelling. You hook the audience

with "Once upon a time," but you have to do it with feeling. You have to be involved in the story as much as you want the listener to be.

Bonzai: Have you used this talent with bedtime stories for your children?

Kasem: Yes, and when I was growing up I used to tell stories to my cousins and nieces and nephews. I was a pretty good babysitter because I could tell wild stories and keep them interested. I would let my imagination go.

Bonzai: Didn't you have a kid's show on TV once?

Kasem: Yes, I was "Krogo the Clown" in Detroit, for the Kroger food store company. This was in 1956, and I wore a clown's outfit, introduced three syndicated shows: "Range Riders," "Foreign Legionaire," and "Sheena of The Jungle," and I would also do the commercials and talk to the kids.

Bonzai: Do you have any copies of the show?

Kasem: No, I wish I did. I wish I had some of the 650 *Shebang* shows we did in the '60s, but 2-inch tape cost about \$300 a roll and the station just erased them to use again. Dick Clark was the producer—a real gentleman. It took a while to make the show a success, but Dick never once came down on me. In my mind, he's really the first king of music television.

Bonzai: What do disc jockeys do while the records are playing?

Kasem: I always walked out of the studio to read the mail or talk to the receptionists, unless it was music that I could really groove with.

Bonzai: Do you have any horrendous radio memories?

Kasem: Not really. I remember once driving off to get some food while I was on the air and hearing the record start skipping while I was listening on the car radio. Oh, and once the Dodgers were playing the Yankees in the World Series. We had an eight-second delay at the station in case of bad language during phone interviews. The patch-bay had just been installed and I was chatting with a listener on the air. This guy referred to "----in' Brooklyn bums" and I patched in the delay, but it was miswired. We stopped traffic all over Detroit.

And I have a recurring dream that most disc jockeys probably have. About once a year I have this nightmare: I can't find enough records, or my arms are not long enough to reach the turntables, or the record is finishing and I can't leave the room to get another because I have to go on the air...

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by Brooke Sheffield Comer

Considering the extent that music videos, particularly club clips, sell records, it's surprising that until recently audio awareness was a negligible factor in production. It's easy to detect the problem. Take a close listen to your favorite LP or 12-inch, and compare that with the same song on MTV. Maybe your speakers aren't hooked up to your set, giving the vinyl a decided advantage. Next time you're in a video club, listen for channel drop-out, hiss and distortion. You may not find any. If so, it may be because you're hearing a video serviced by Rockamerica, the first video pool to take a stand on the audio quality issue by building an in-house, audio-for-video post facility.

A SOUND APPROACH AT ROCKAMERICA

Music Video Mastering

They are also the clients of InVue Sound's George Reisz and Francis Milano, who designed the room and help to coordinate the activities of record companies, production houses and recording engineers in an effort to maintain closer control over audio standards.

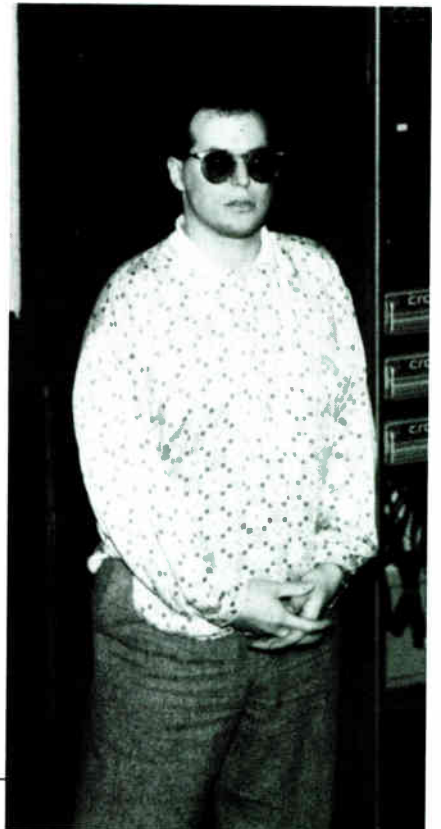
Reisz and Milano realize that video is still a relatively new industry, despite its proven ability to break acts. The network of communication between different stages of video production, from record company to production house to post facility, hasn't yet gelled. Besides, how many A&R men, video department VPs, and producers and directors (most of whom are geared to making TV commercials), understand the intricacies of audio? That's why Rockamerica's Ed Steinberg teamed up with InVue Sound.

"Atrocious audio quality on the tapes he'd get forced Ed to reject many," says Reisz. "Our solution was to set up an audio post facility to clean up the tapes, balance them, and basi-

cally try to re-build the sound so that we could take a typical video with out-of-phase, over-exaggerated high frequencies and make it sound like a 12-inch record."

But just getting a 12-inch from the record company is one of many obstacles Reisz has had to overcome. "A good 12-inch can compete with a CD if it's well mastered, and sometimes it can even sound better," he notes. "You can put a lot of dynamic range on a 12-inch, so it's a high quality source. But promotion departments, who give these records away left and right to record pools, and other marketing avenues, still don't see the validity of giving us a copy as a reference standard. We have to buy what records we can, and some are not yet on the market when we need them." But Reisz feels this attitude is slowly beginning to change, as InVue's achievements gain notice in the industry. Certainly the exposure that Rockamerica has given to high quality audio cannot hurt InVue's case.

Rockamerica compiles 60 to 70 videos on four one-hour tapes, which are sent out to more than 700 sub-



Ed Steinberg of Rockamerica



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World Radio History

scribing clubs. Now that sophisticated systems in clubs are all the rage, poor quality is magnified and drops in level within a given tape are more glaring when they're heard over 20,000 watts. And for many people out of the range of cable TV, video clubs are their introduction to new artists and tracks. If the sound is bad, it's certainly no inspiration to buy the album. Because there are no absolute audio-for-video standards, Reisz finds the quality of tapes differs dramatically from clip to clip. "The one-inch video machines are not usually optimized for audio, and that creates distortion, too much high frequency, and tapes with a muffled sound," he says.

Steinberg, who instigated his video

pool primarily as a means of promoting new bands, comes from a film background. But because of his interest in music, he kept his ears attuned to the technical quality, (and lack thereof), of the tapes he heard. "The one-inch video studio that we built to remaster audio on video tapes astounds record companies," he explains. "American video houses haven't begun to take audio seriously. Some are making an effort, but how many have audio engineers who know how to use the equipment?"

When video CDs come out, digital tracks will make sense, and digital audio will be a way of life. Steinberg eyes the future, and tells his clients to invest in digital now, "because when

videos are distributed on advanced storage devices, they won't be able to get away with poor quality audio, and they'll end up spending considerably more than the \$2000 to \$5000 that it costs now to re-do everything." InVue's current fees vary from project to project, but usually come in around \$5000 or under, including servicing and studio time. But, as Steinberg points out, new equipment costs and higher hourly rates in post facilities will escalate everyone's costs eventually.

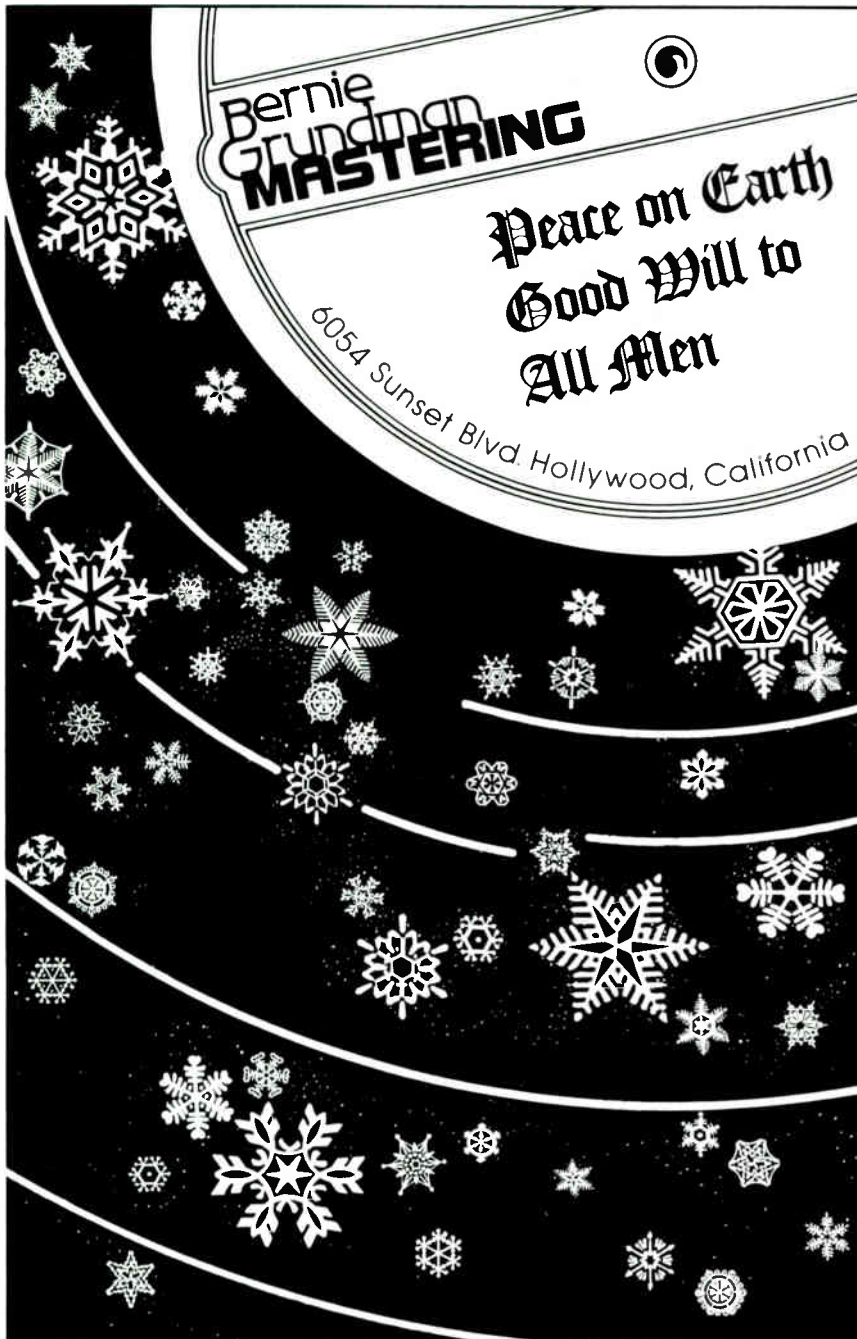
To supplement his new room, Steinberg ordered Sony's new BVH 2800 one-inch machines with two tracks of digital audio on the video, plus three tracks of analog. "They're expensive, but give us great advantages over other rooms," he notes. Building the right room was crucial to Steinberg: "Francis is an acoustician, and he understands that quality can be determined by the acoustic design of the room and what kind of monitoring the room has.

"Our concern with our client, Rock-america, was to provide a restoration facility, especially designed to meet the problem of inadequate audio quality on one-inch tapes," says Milano, designer of the leading French mastering facility, MasterLab, as well as 37 recording studios to date.

Reisz and Milano took their studio test tapes to clubs in and around New York, sometimes finding that club sound systems were at fault, thus adding new problems to the video's sound quality. "One club owner claimed his tape had no bass, but we found that his system was out of phase—but only for video sound. When his DJ played records, he'd get plenty of boom, but none on the video track," Reisz says.

One of the major obstacles lies in the design of the video machines themselves. "Audio for one-inch video machines is essentially a 10-year-old design," explains Reisz. Reisz designed the monitoring system, nonetheless, to have deep bass down to 35 cycles. "I don't think many video machines can go down that far," says Reisz, "but 12-inch records can, so we can hear what it is the videotape is supposed to represent." That's the point at which InVue began to tangle with record companies over access to 12-inches.

"Sometimes the tapes we get are in such bad condition that without the 12-inches as reference points, it makes it very difficult to restore audio to the artist's and producer's original artistic endeavor, and all the careful work that's gone into the project is degraded and changed," Reisz says. But as InVue's reputation grows, Reisz finds promotion, A&R and video departments more willing to listen and learn the facts about audio quality.



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Elektra Records is one of the companies that has come around, and Robin Sloan, director of Elektra's video department, has been getting calls from artists who didn't like the way their songs sounded on MTV. She was responsible for initiating the relationship between Elektra and InVue. "Most record company execs say that their video sound is wonderful," says Reisz, "but they still see the video more as an accessory to move a product, than a product in and of itself."

While Sloan admits that A&R departments who are unacquainted with InVue no doubt find Reisz' requests for 12-inch disks a bit bizarre, says Reisz, "People who have used InVue appreciate the difference in quality so much that they're glad to cooperate the next time."

Reisz, for example, may ask for a flat copy of a tape, and the A&R man or producer will be afraid to give it to him, fearing he'll change the mix. "Audio-for-video has different requirements than vinyl, because it has to survive a series of transfers, any one of which leaves potential for error," Reisz often explains to the labels. A flat copy is desirable because EQ'd copies have all their adjustments determined by the vinyl needs. InVue essentially does a "video mastering" job, to insure the integrity of the audio, and help it remain intact through transfers.

As audio technology in music video production expands its impact, Sloan believes that the structure of the record company video departments will change too. "When the home video market comes of age, video departments will have to grow, and become little microcosms of record companies with their own A&R departments. Promo clips in clubs don't get people's undivided attention the way home clips played on VCRs do. And the reality is that most video departments today are extremely under-staffed."

"People who've heard what we did for Star Point's 'Object Of My Desire' video know what we're capable of achieving," says Reisz. "We built the music video soundtrack direct from the master tape, utilizing all the latest technology. Then we followed the audio through the entire production process, editing included, to protect the audio quality. As a result, the song, beautifully produced by Keith Diamond, survived, quality intact." Diamond, and Star Point, agree.

Frustration is still rampant at InVue. It's not uncommon for Milano to get a call from a record company, insisting that he "fix" a Dolby encoded tape without Dolby tones, by ear. "It isn't just the tapes that are hopeless sometimes," Milano smiles. Progress always takes time. ■

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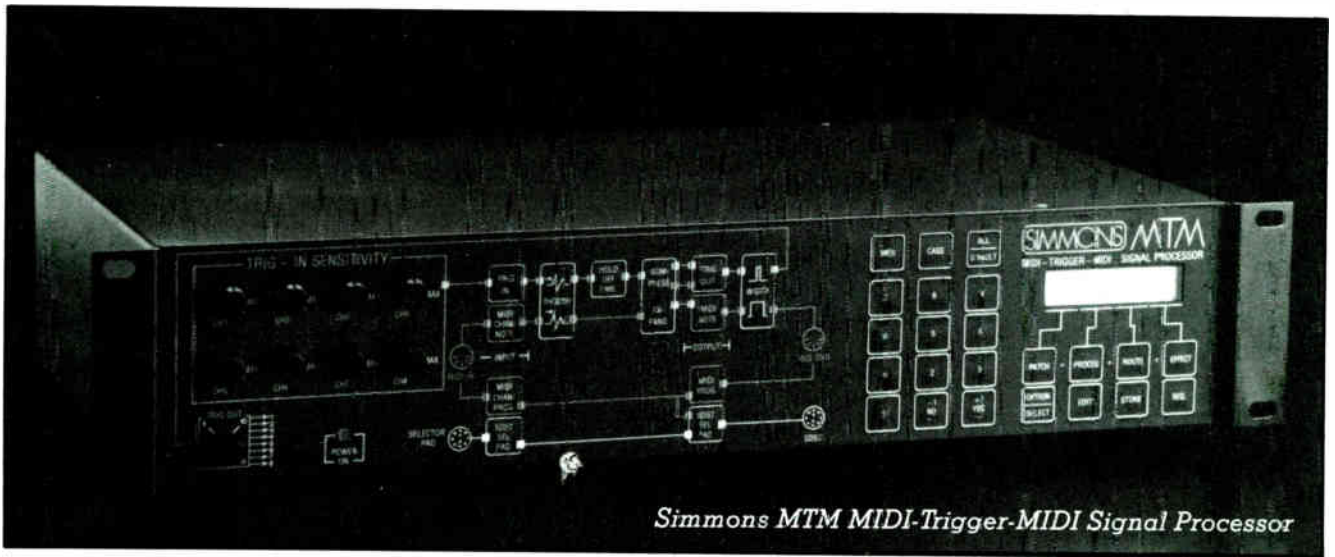
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Simmons MTM MIDI-Trigger-MIDI Signal Processor

CHECKING OUT THE SIMMONS MTM AND SDE MODULES

by Bruce Nazarian

With the advent of the first Simmons Electronic Drum units a few short years ago, it became clear that the face of modern drumming would never be the same. Judging by the rapid acceptance (standardization, if you will) of Simmons drums in contemporary drum setups, and the rush to produce sound-alike and look-alike devices, it could be safely said that this was an overwhelming success story.

Well, Simmons has done it again. With the continuing interest in merging electronic drum technology with MIDI, and the apparent desire of most drummers to do more than just play drums, Simmons now offers two nifty rack-mount solutions to two different problems.

The MTM Processor

To solve the first problem, that of integrating drums into a MIDI environment, Simmons has introduced the MTM processing module. MTM stands

for MIDI-Trigger-MIDI, which is as neat a summation of what the unit can do as you will find. It is, in fact, a multi-way processor which can interpret trigger signals and convert them into output triggers or MIDI note events, with great precision and a wealth of programmable control. You can use the MTM to convert events generated from almost any type of Simmons pad (mono jack, stereo jack or traditional XLR) or from a variety of other real-world sources. During this test, I used the MTM to process not only a full set of Simmons SDS9 pads and the direct outputs of a LinnDrum, but also live drum tracks that had been recorded on a 24-track master tape; all in all, three pretty realistic situations for the MTM to be asked to handle. And handle it did, in fine style.

A Brief Overview

Basically, the MTM is a sophisticated event-processing computer which has the necessary programming to

accept signals generated by different types of impact pads or acoustic sources, and convert these events into output triggers or MIDI note events, with full control over which MIDI note value is transmitted, and the MIDI channel on which it is sent. In addition, the MTM has extensive processing power to help change the dynamics of the incoming event, as well as an extremely flexible input/output setup.

Front panel graphics show the logic layout of the signal flow, and recessed membrane switches activate the programmable functions. DX7-type YES/NO keypads are used for option programming and data entry, as is the full numeric keypad. Back panel connections are both 1/4-inch phone and XLR, and provide enough flexibility to accommodate almost any desired input device, from tape tracks to live pads. Additional back panel connections exist for MIDI (in, out x 2, thru), trigger outputs, and various SDS7 accessories. In fact, the MTM is ideally set up for use with the Simmons SDS7, a fact which will not be lost on SDS7 owners. The MTM can be inserted into an SDS7 system with a minimum of bother, and even includes provision for remote control of the SDS7 hi-hat plus connections for using the SDS7 Kit Selector pad to assist in changing the MTM's programmed "patches."

Programming the MTM

Each of the 99 user-programmable patches on the MTM consists of three distinct items: a Process, a Route and

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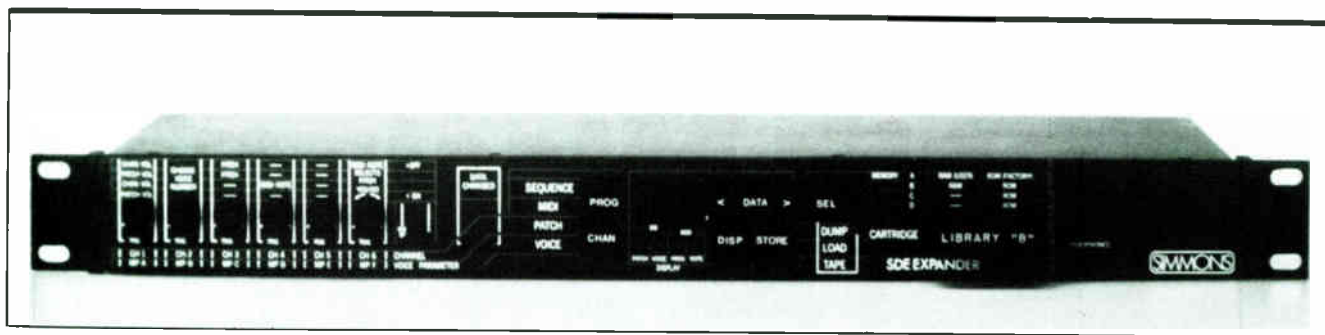
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The Simmons SDE Module

an Effect. Each Process is a set of rules that tell the MTM computer how to process the incoming event signals. This allows the unit's response to be optimized for each different type of signal that it can receive. (If you've ever done any drum replacement, then you know how much of a help this can be!) In addition to setting the level of the input and output pulses, or specifying MIDI in/out instead of trigger in/out, the process can also provide adjustments for trigger threshold and holdoff (the amount of time the unit will block any additional trigger attempts), as well as dynamics (compression and expansion) and output pulse width. The amount of control available on the MTM is extensive and may be a bit confusing at first, but once you have read the accompanying documentation and experimented for a few minutes, the adjustments soon become clear. Thoughtfully, Simmons has provided a full set of preset patches that demonstrate the MTM's various functions for most common drum configurations (even acoustic kits!).

The Route function on the MTM provides the means for the user to link the various input and outputs on the MTM. In addition to providing a standard 1-to-1, 2-to-2, 3-to-3 configuration, the programmable Route allows for many inventive cross-connections to be tried, without tedious wiring changes. It even allows you to scramble your drum kit completely: incoming signals that were meant for the kick drum can be sent to the snare, while snare events can play any other drum. I'm not sure how musically useful some of these cross-routings may be, but there are bound to be certain instances where the ability to do it could make a session go easier. Simmons should be commended for providing this type of flexibility in the unit.

Effects

Effects I purposely left for last because they are the most fun! Although the number of effects is somewhat limited if you are using trigger outputs, opting for MIDI allows an incredible array of interesting and even bizarre musical effects which can be generated from a drum stroke. Imagine one

drum hit playing an entire horn section on a sampler, with notes and duration pre-set and tuned! Of course, you can always find a more traditional use, like playing a sampled drum set to augment or replace the sound of the Simmons kit, but imagine the fun you can have linking an electronic drum kit into the world of MIDI noise-makers! The list of programmable MIDI effects is impressive: echo, chords, real time and stepped sequences, splits and layers. These are effects that percussionists could only dream of before this unit came along! A brief few minutes of experimentation here at Gnome Sound left me impressed. by hooking up the Simmons pads to the Emulator II, I could play an entire symphony of Three Stooges samples with a single pad stroke. With a few quick edit commands, I assigned one of the pads to MIDI trigger a gong sample. (It's nice not to have to haul a 6-foot gong around to the studio!) With another few edit commands, I had the MTM playing the DX7 horn section with an electronic James Brown groove!

The SDE

Taking this concept one step further brings us to the other interesting item in this month's column, the SDE—Simmons Drum Expander. Packaged in a compact, one-unit high rack-mount, the SDE is a MIDI-playable voicing unit that can be added to any MIDI drum setup. The SDE provides six additional voices that can be played via a MIDI keyboard, or from any drum event processed by the MTM. These voices can be used in conjunction with existing drum sounds, or used instead of them. Describing the voices in the SDE is somewhat difficult, but they are definitely NOT drum sounds. Instead, there are a wide variety of percussive, brassy and clangorous sounds that sound very reminiscent of a certain well-known FM digital synthesizer! The SDE is also capable of multi-timbral setups, where each voice can access a different preset sound, from a different MIDI note num-

ber, or even a different MIDI channel. The programming possibilities are quite extensive, so a careful study of the preset patches and the documentation is recommended. As an affordable voice expander, the SDE seems to fit the bill quite well, although it would have been nice if several more drum-type sounds had been provided in the preset sounds. Sometimes the FM-like brass and bell sounds just don't make it when what you really want is another tunable drum sound, but this is a personal opinion. Overall, I found the SDE produced some pretty amazing sounds from a box this easy to use. As in the MTM, programmable control of the SDE is extensive, but easily learned by spending time with the (trilingual) documentation provided. But be forewarned: the SDE is not a unit that you would want to operate without reading the manual first! After you have begun to program your own sounds, you will appreciate the SDE's RAM cartridge storage system, which allows you to save and load your own (or factory) presets with the ease of a DX7 cartridge.

Overall Impressions

I found these two devices to be quite interesting and of real use to their potential purchasers. Although I could argue for a few more personally useable sounds in the SDE, I did not have an opportunity to test all of the available factory alternate ROM cartridges. There are undoubtedly more sounds in them that are of interest. The MTM is one of the most powerful trigger processors I have seen. One of the nicest compliments I can pay to a piece of equipment is if I would buy it, after having had some hands-on experience. After just a little while of hands-on, the MTM was definitely on my list of must-haves. (I do wish they would backlight the LCD display, though. It's impossible to read in a dim control room, and certainly not readable on a dark stage!). Still, it's impossible to fault the unit when it does everything else so well. Overall high marks to Simmons as they provide two more boxes that can really help percussionists get deep into the high-tech world of MIDI. ■

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CASSETTE TAPES: A CRITICAL SURVEY

by Wesley Bulla

Engineer: "O.K. I'll make you a copy. Here, I've got some super-high-quadra-chrome Maxis. They've got killer high end. They make great cassette copies."

Client: "No. Use the Gold label XP normal cassettes, they sound more natural."

I wonder how many times that conversation has taken place. In fact, it was a similar conversation between an associate and myself that prompted this study of commercially available blank cassettes.

On today's market, there are myriad blank cassettes available. This can be quite confusing when trying to select the best tape for your needs. In our local market (Toledo, Ohio), I managed to find ten brands, each having at least

two grades of tape. One manufacturer actually has 12 different grades available on the shelf. And prices vary accordingly. From the lowest no-frills (not even a box) three for 99 cents to the fully decked out state-of-the-art metal tape with the appropriate \$7.99 list.

The catch is, after we throw away all the fancy packaging, take the cassette out of the pretty box and put it in our recorder, the only thing that really matters is how well the tape actually records and reproduces the input signal. Not whether it has "good" highs or lows, but how well it *faithfully* captures the input signal without coloration.

Coloration comes in many forms, some obvious, some subtle. To get the best possible cassette copies, we will deal with the two most obvious, if not the most important, factors: frequency response and noise level. These are two things you notice immediately but can't check out until you actually put the cassette in your recorder and run it through the ultimate test: recording and reproducing music.

The best frequency response is "flat"—free of coloration from high-end roll-off, without mid-frequency drop-outs and *sans* low-end build up. Flatness is basically the accurate treatment of all frequencies introduced to the tape. In the way of noise, we simply want the lowest possible noise floor.

The Test

Using a Technics M227X cassette recorder, a Klark-Teknik DN60 one-third octave real time spectrum analyzer and an Ivie IE-10A/IE-20B analyzer/generator combination, I tested and graphed the frequency response and noise level of each blank tape.

In order to assess the tapes' ability to record and reproduce all of the frequencies of the spectrum simultaneously, I have used a direct input of pink noise as the control input signal.

—CONTINUED ON PAGE 72

Figure 1

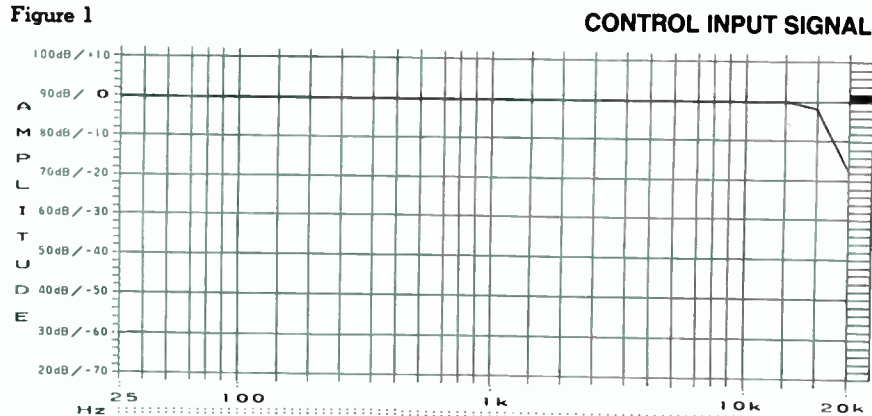
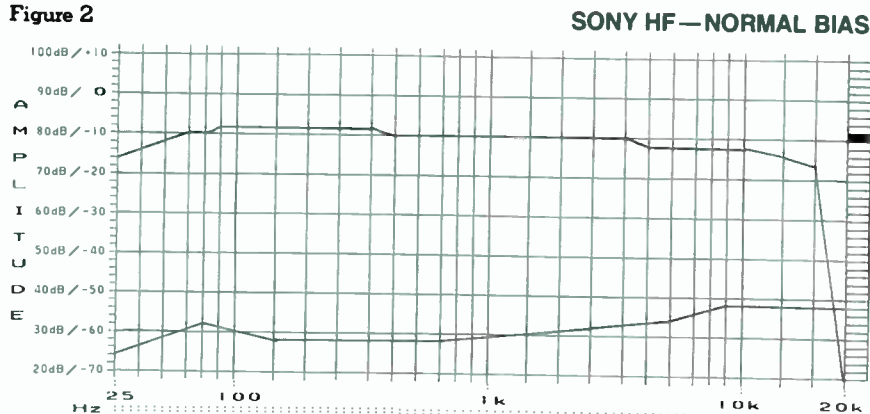


Figure 2



$$\frac{480 \text{ ips}}{7.5 \text{ ips}} = 64:1$$

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pressive numbers too: 144 C-45 s/hour/ slave, 2800 C-45 s/hour with a 20 slave maximum. These are real-life figures from a machine built for the real world. You won't find any unnecessary bells and whistles on the DP-80, just solid features for day-in, day-out production:

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**The Quest for Cassette
Quality: The Shell Game**

There are several interrelated factors which affect cassette quality. Certainly the importance of the tape formulation itself cannot be overlooked, but the lowly cassette shell is also a major contributor to overall cassette performance. No matter what tape you load, if the shell is inferior, the cassette will sound bad (see Fig. 3 on page 72 for a demonstration of this point), and the reverse is also true: a great shell does little to help the performance of a low-grade, dropout-ridden tape that sheds oxides at every opportunity.

Mechanical dilemmas, such as

tween a good and a bad shell. They're looking for a decent product, so we use Kyric and El Mar five-screw shells. I know that there are some sonic welded C-zeroes that are said to out-perform a five-screw, but I lean toward the five-screw."

Another duplicator that tends to stick to five-screw shells is A&R Records and Tapes, a custom pressing and duplication facility in Dallas. Duplication engineer Stan Getz II notes that A&R uses mostly Mag Media shells. "We stick mainly to five-screw shells," Getz adds, "and we've monitored a lot of brands from different manufacturers. We turned down a lot of shells due to poor tracking characteristics, as far as azimuth adjustments on the ma-

The sonic shells have improved greatly over the years, and the assumption that the five-screws are superior may no longer hold true.

tape jams and inefficient fast-winding are just the tip of the shell quality iceberg compared to audio misalignment and azimuth errors caused by a tape's attempt to pass through a warped or poorly machined shell. The obvious solution would be to use the best shells on all duplication jobs, but if your company is trying to deliver a 35-cent spoken-word C-60, then a 17-cent shell is clearly not the appropriate choice. The answer is finding the right shell for the job.

Shells (also known as housings or C-zeroes) generally fall into two categories: the five-screw types, which use five screws to hold the shell halves together; and the sonically welded variety, using a series of spot welds to keep the shell together. The sonic shells have improved greatly over the years, and the assumption that the five-screws are superior may no longer hold true.

Mark Bruno, of Moon Valley Cassettes, a medium-sized duplication firm in Phoenix, feels the shell question is not fully understood by most of his customers: "Clients don't get into the technical differences, but they do know the difference be-

chine, versus what's happening to the tape inside the shell itself. We try to maintain the best we can get, yet remain cost-effective at the same time."

The Music Annex, based in Menlo Park, California, uses a variety of shells for its duplication work, which is split about 60/40 between record labels (Blackhawk, Gramavision and others) and industrial jobs for clients such as Apple Computer. For music-quality duplication, the Annex prefers either ICM sonic welds or the Shape Mark 10. "We've found that the ICM's azimuth is just as good as the Mark 10's," explains Music Annex owner David Porter. "The Mark 10 has a lot of high-tech appeal and it's very saleable, but it doesn't look good when you Apex [direct on-cassette print] on it, and it's in short supply: if a client specs a Mark 10, it may take several weeks longer to complete the job."

Porter has strong feelings about the sonic versus five-screw issue: "The myth that a five-screw is better than a sonic is no longer true—in fact, it turns out that the new sonically welded shells are better than a five-screw, which have torque points where the screw comes down

and literally torques the plastic. The good sonics, with an even linear weld across the shell, are flatter, with less dimpling than a five-screw. In the old days, when sonics were spot welded at the corners, they were terrible, but the welding techniques have really improved in the past two or three years, although it really depends on the manufacturer: the Mag Media five-screws are a very good shell; their sonics are terrible."

According to Bob Stone of World Records—a Canadian duplicator/pressing plant in Bowmanville, Ontario—whose custom high-speed system has a capacity of up to a million tapes per month, "The main question we get on shells is: 'Are they clear shells, like the top-end TDKs?', which seems to be the shell a lot of people want from a cosmetic standpoint. We service both sides of the American and Canadian border, and we find that housings and brands of tape are very important to the Canadian market, while Americans tend to be more complacent about cassettes. We're using a custom shell, a variation of the Chinese type of five-screw that Capitol Records of Canada produces in-house. It's got a better tolerance than some of the other five-screws on the market and we're very pleased with them."

Moving halfway across the continent Jim Bauer of Bauer Audio, North Hollywood, California, a real time duplicator with an 82-position KABA system specializing in high-quality, short run jobs, finds that "customers want me to decide on shells for them, because we've done all the testing and use what works well for us. We do preliminary testing on each new batch by ear, because it's the most sensitive instrument we have. All the other instruments test for certain parameters, such as our Hewlett-Packard 3582 spectrum analyzer and Dale Manquin's T²DS for flutter, wow and dropout measurements. The ear tests all the parameters at once!

"We're using a variety of shells here: Shape Mark 10, QCI, and El Mar. The [higher grade] El Mars that have come out in the last year-and-a-half have been just excellent, and these new QCIs look like they're going to be a real competitor. As for me, I need something that's going to be consistent."

One duplicator that has been intensively involved in tape and shell testing is Forge Recording of Mal-

—CONTINUED ON PAGE 78

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Figure 3

CUSTOM ORDERED—Cr₂ BIAS

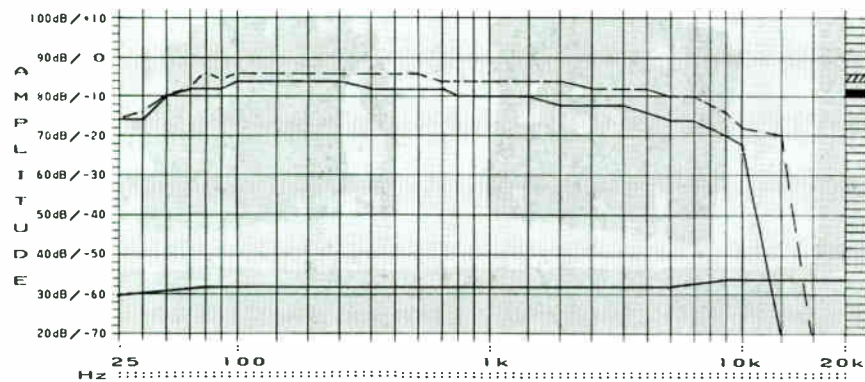
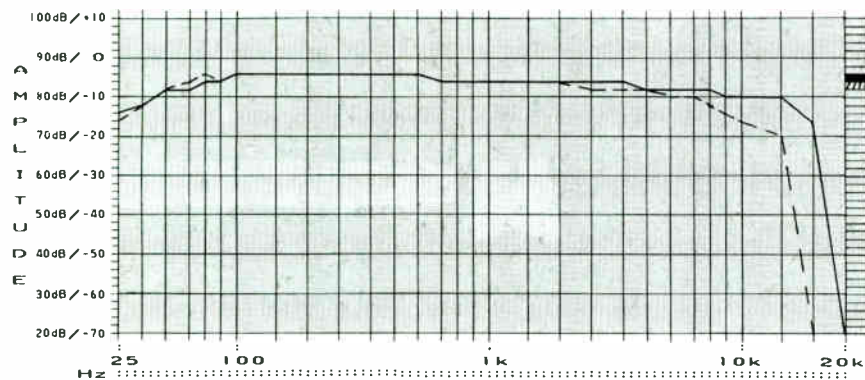


Figure 4

NORMAL—Cr₂ EXPERIMENT



we are looking for is the difference between the control input signal and the playback of the recorded signal.

I would like to note that the following graphs have been error-corrected and show only the deviation of the tape from the original input reference. Although they are not the actual frequency response of the tape, they will give an indication of the tapes' ability to reproduce an input signal accurately. We will begin our analysis with the "normal" category of tapes.

Analysis Example #1: Normal Bias Tape. Sony HF

This tape happened to be the first one I analyzed. But, after an overview of all the normal tapes, it turned out to be a good representation of a typical normal tape reaction.

The graphed analysis (Fig. 2) shows the tape has a 10 dB drop in the overall level from the control input level of +92 dB. There is a low-end roll-off that begins at about 80 Hz with a -2 dB drop to 63 Hz and a -6 dB roll-off down to 25 Hz. In the low-mid range, the tape has a flat response from 80 Hz to 250 Hz. In the upper-mid range there is a -2 dB drop at about 310 Hz with a flat response up to about 2.5 kHz. Then the tape has another -2 dB drop between 2.5 kHz and 3.1 kHz and remains flat out to 10,000 Hz. In the high-end, the tape then begins a -2 dB drop at 12 kHz out to 16 kHz with a complete roll-off above 16 kHz. There is less than 30 dB response at 20,000 Hz.

Considering the noise floor, the graph indicates that the low-end noise begins at 25 Hz and builds to about 32 dB at 63 Hz. The noise then drops 6 dB over the next octave to 28 dB at 125 Hz. The tape then has about 28 dB of noise up to about 500 Hz. At this point we see a +2 dB per octave rise in the noise up to 4 kHz with a +6 dB increase up to 8 kHz. The noise then levels out at 38 dB from 8 kHz to 20 kHz.

Now that we have read the graph, just what does it all mean?

First: Remember as we've explained earlier, we are looking for a flat response. What we are concerned with is the difference from one frequency band to the next. We have input all of the frequencies throughout the spectrum at the same level. The change from one band to the next will cause the subtle tonal changes in the overall recorded sound. Our maximum frequency response level is from 80 Hz to 250 Hz. It's the difference between these "maximum bands" and the other bands that gives the tape its quality.

Second: The tape has lost 10 dB of overall volume. Which means that if you have to crank-up your playback by +10 dB, then you will also bring

—FROM PAGE 68, TAPES

The pink noise level was set to "0" on the recorder VU meters. The spectrum analyzer was calibrated for a "0" = 90 dB reading from 25 to 20,000 Hz. Since the analyzer will read pink noise and tape noise as the same thing, I chose to use dbx noise reduction in order to avoid having any tape noise add "synthetic" frequency response to the graph results. I then recorded three minutes of pink noise onto a randomly selected space of tape. During the playback of the recorded signal, the time-averaged results give an idea of how the tape responds over a period of time.

During all recordings, the bias and equalization was set to each tape's "manufacturer's recommended" specifications.

To check the noise level of the tape, one must first find out how much inherent noise the tape itself will add. Using no noise reduction, I recorded a three-minute random sample space on the tape with no input signal, and later played back the same space while using the analyzers to graph the resulting noise floor. Since there is no input signal and no source signal noise, the result would be very similar to the inherent extra noise that is add-

ed to the soft passages during normal recording.

To ensure tape-to-tape accuracy, all calibrations were checked/or reset for each tape.

Interpreting the Graphs

The tapes are divided into three groups, each with its own price range and advertised "quality." Group number one, the "normal" tape category, has the lowest average price and advertised quality. Group number two, which is one step up in advertised quality and cost, includes the "high bias" or "chromium" (Cr₂) tapes. The individual cost of the tapes in this group range from that comparable to the normal tapes to quite expensive (\$6.99/90 min). The final "state-of-the-art" and the most expensive, up to \$9.98 for a 90 minute cassette, is the "metal" category. I could only find three samples of these available in our local retail outlets.

A look at the control input graph (Fig. 1) indicates the recorder has a flat response from 25 to 12,000 Hz with a -2 dB drop at 16,000 Hz and a -18 dB roll-off at 20,000 Hz. Averaging both sides together we have an overall cumulative level of +2 dB or reading from the bottom up, +92 dB. What

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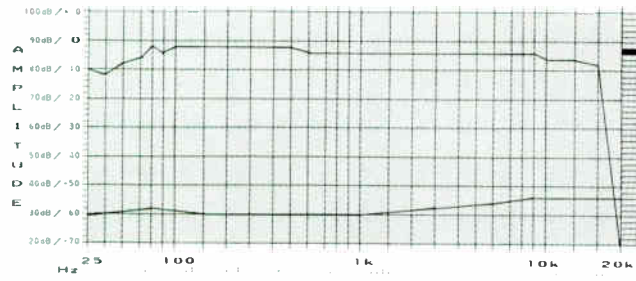
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CASSETTE ANALYSIS TEST RESULTS

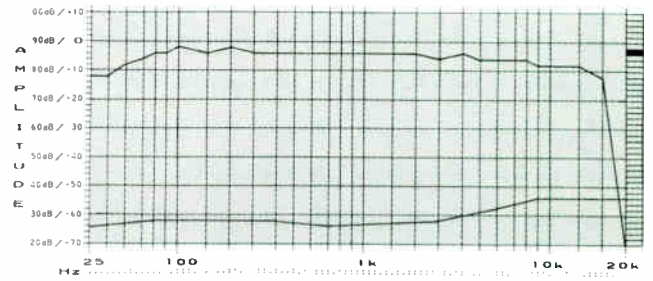
BASF LH-MI

NORMAL BIAS



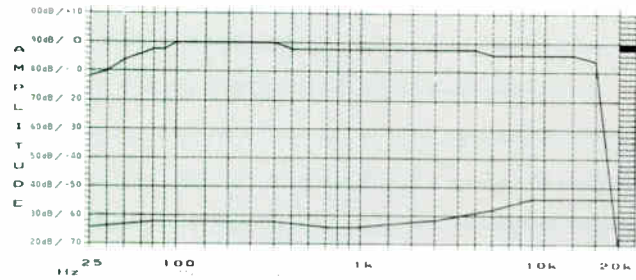
MAXELL LN

NORMAL BIAS



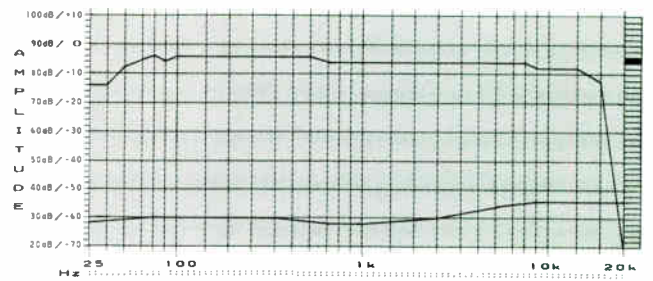
MAXELL XLI-S

NORMAL BIAS

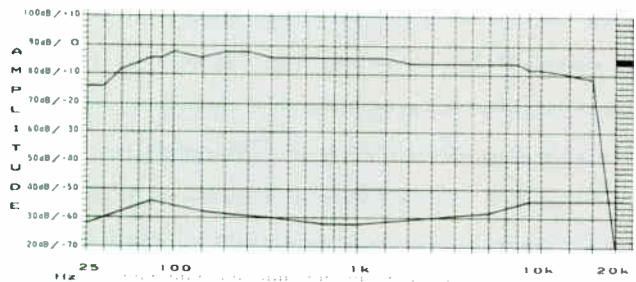


MEMOREX db

NORMAL BIAS

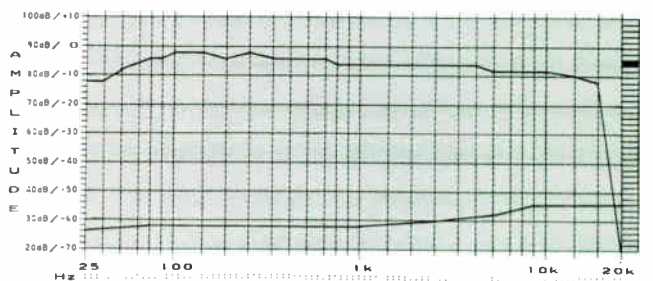


REALISTIC CONCERTAPE **NORMAL BIAS**



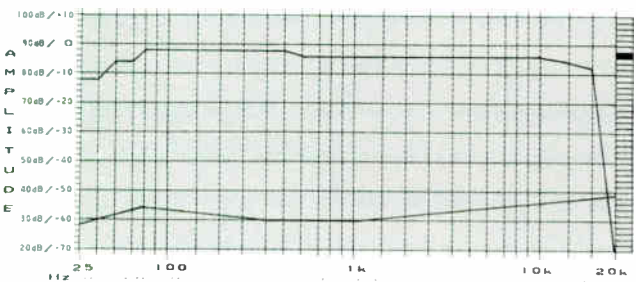
SCOTCH CX

NORMAL BIAS



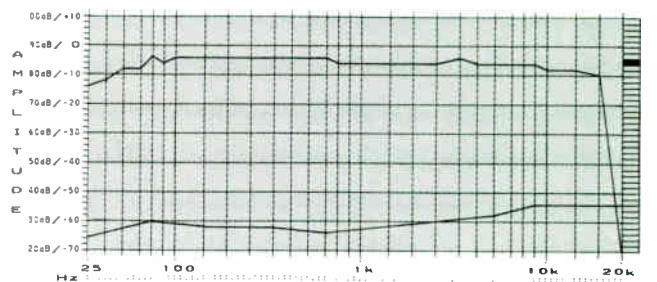
TDK AD-X

NORMAL BIAS



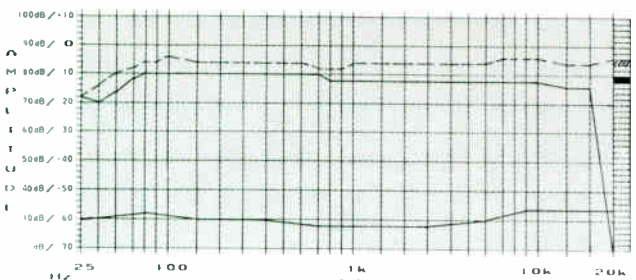
TDK D

NORMAL BIAS



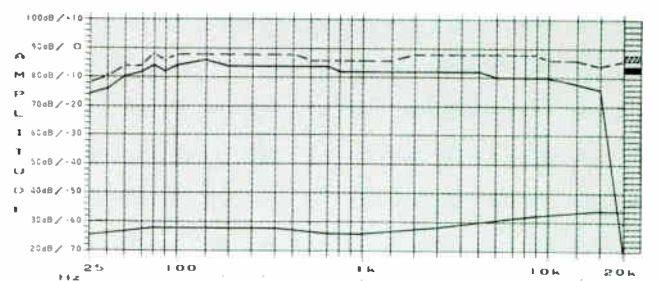
BASF CR-EII

Cr₂ BIAS



MAXELL UDXL-II

Cr₂ BIAS



with it 10 dB of noise on the soft passages. So now the peak of your noise floor has just increased to 48 dB.

Analysis Example #2: High/CrO₂, Bias, Custom- Ordered Cassettes

I have used this as an example (Fig. 3) because it is a great demonstration of the absolute worst response of the whole survey. A case of these cassettes were ordered from a wholesale supply house in an attempt to save costs on "quality" tape. I was told they were "loaded with the best chromium tape available." As you will see, in this case, I got what I paid for.

After hours of experimenting with the CrO₂, metal and normal settings on the recorder, I found there are two acceptable ways to record and playback high-bias cassettes. The first is to use the manufacturer's recommended bias/EQ settings, represented by the solid line in the graphs. The alternative was to record the input signal encoded with the CrO₂ setting and use the "normal" setting during playback, represented by the broken line in the graphs. A quick glance will show that the two methods produce considerably different results.

Using the manufacturer's recommended bias and EQ, the custom-ordered cassette's maximum bands are not much to speak of. They are contained within one octave between 100 and 200 Hz. The response then has a low-end drop which starts at 80 Hz and begins a sharp roll-off at 50 Hz where it finally levels out—10 dB later at 31 Hz. In the upper range, starting with the maximum bands, the tape has a 2 dB drop at 200 Hz. Also another 2 dB drop an octave up at 500 Hz and another at 1.2 kHz. Then at 2.5 kHz there is a 4 dB slope to 4 kHz, a 6 dB slope down to 10 kHz and finally a complete high-end roll-off with no response at 12,000 Hz.

When the same input signal was reproduced using the normal setting, the overall level is +4 dB hotter. There is also an increase of almost an octave in the maximum band coverage which now ranges from 100 to 400 Hz. There is a 2 dB drop at 500 Hz and again we have increased this band up to 1.6 kHz. At this point, flat out to 3.1 kHz with another 2 dB drop to 4 kHz. Finally there is a fairly steep roll-off of 10 dB between 5 kHz and 12 kHz. There is no response at 16 kHz.

In comparison with the other tapes' results, the noise floor is a little fat in the mid-range but is fairly typical. The maximum noise level reaches its peak at +32 dB from 8 kHz to 20 kHz.

A source vs. playback comparison

"After we throw away the fancy packaging, the only thing that matters is how the tape reproduces the input signal."

concluded that listening to a musical program recorded on this tape was unacceptable.

After experimenting with the various settings for high-bias cassettes, I was curious to see (and hear) the reaction of the same experiment on the normal-bias cassettes. The results were disappointing. In all cases, when recording on "normal" tapes using the CrO₂ or high bias and EQ mode, the results were inferior to the normal settings. The graph labeled "normal-CrO₂ experiment" (Fig. 4) is a typical example of the results. However, when I tried the same experiment on the



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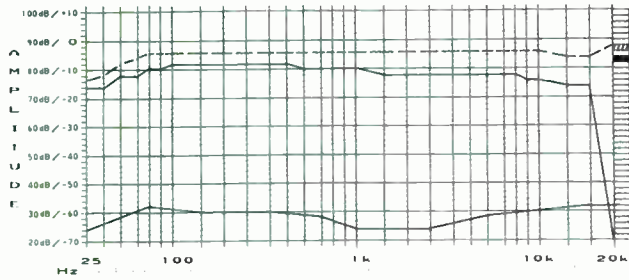
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CASSETTE ANALYSIS TEST RESULTS

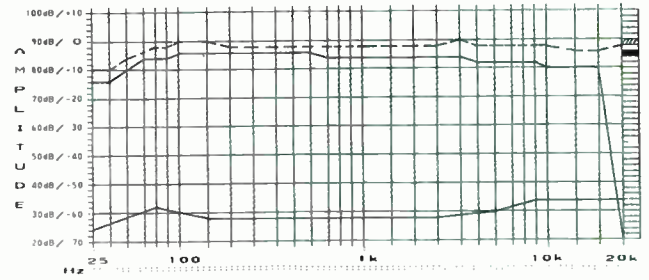
MAXELL XLII-S

CrO₂ BIAS



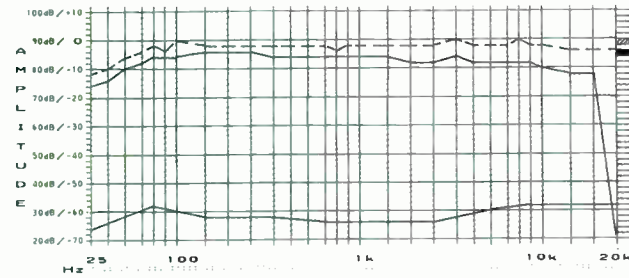
MEMOREX CDX-II

CrO₂ BIAS



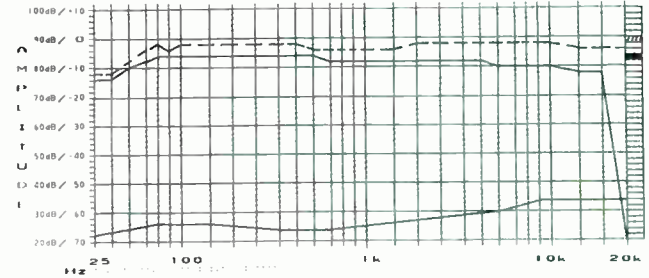
REALISTIC HI #44940

CrO₂ BIAS



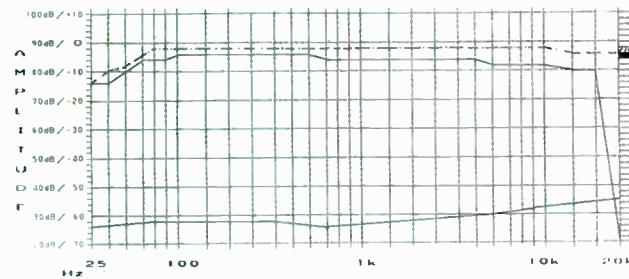
SCOTCH XS-II

CrO₂ BIAS



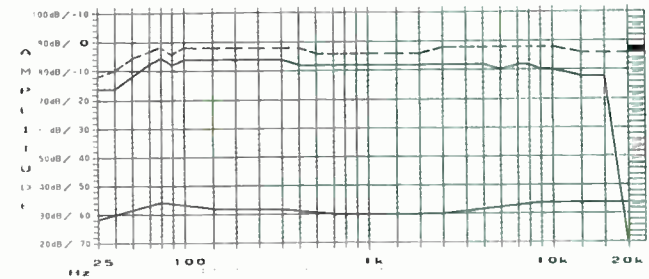
SONY UCX

CrO₂ BIAS



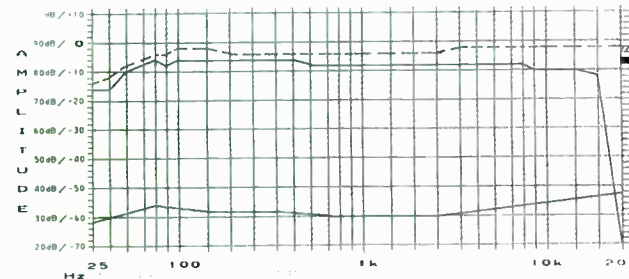
TDK SA

CrO₂ BIAS



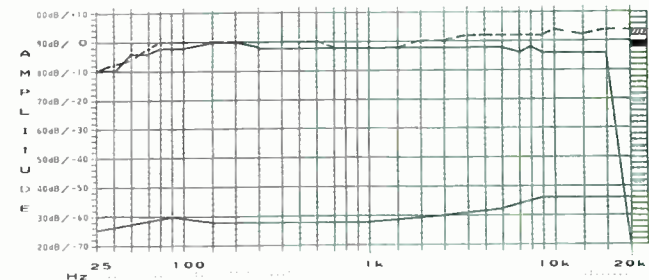
TDK SA-X

CrO₂ BIAS



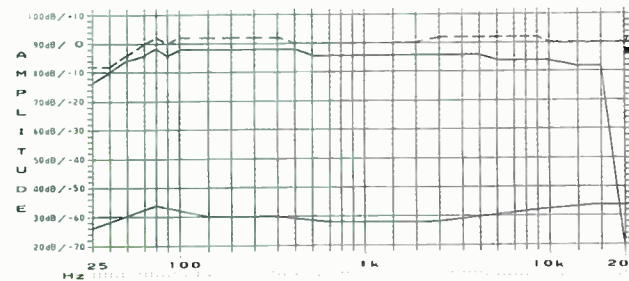
MAXELL MX

METAL BIAS



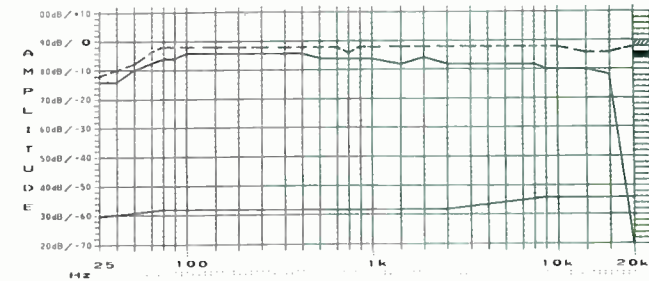
REALISTIC #44960

METAL BIAS



TDK MA-R

METAL BIAS



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—FROM PAGE 71, CASSETTE QUALITY
vern, Pennsylvania. "If we're running a music job, and looking for the best symmetry in the shell in azimuth control, we use the ICM shell," comments company president Warren Wilson. "We also run Shape, or IPS—especially if we need colors, like a bright red shell—and we use a lot of El Mar shells; they run well and have a good price."

Wilson outlines their shell testing procedure: "We random sample ten from a batch of shells and load them with Aiga Magnetite-10 from the same hub. We put them into the Tandberg 910 recorder—which has its own internal oscillators—and look at the alignment of the 15 kHz tone. We flip the tape over and read the phase and levels on the other side, repeating this for all ten shells. After that part of the test, we look at how well the shell runs after high-speed winding conditions, and what the reject rate is like after thousands of shells. Packaging is important too—how shells in the corners of the cartons survive. All of these, plus customer feedback, are important when evaluating shell quality."

—George Petersen

metal-bias tapes, their response was similar to the high-bias cassettes.

General Observations

An overview of the normal bias/EQ cassettes indicates that, as the name implies, there seems to be a "norm" response for this category of cassette tape. When compared to the response of the high-bias cassettes, the normals hold their own as long as you are using the manufacturer recommended bias/EQ. But, when using the record-in-high, playback-in-normal trick, the high-bias tapes, as a group, outperform the normal-bias cassettes.

However, referring back to the normal-CrO₂ experiment, if you have a cassette recorder that automatically sets the bias/EQ when the cassette is inserted and you cannot or prefer not to defeat the option, then the normal cassettes will perform just as well as the high-bias cassettes. The more expensive metal-bias cassettes tended to have an overall hotter response which will keep the noise level down but do not necessarily have a truer reproduction of the original signal.

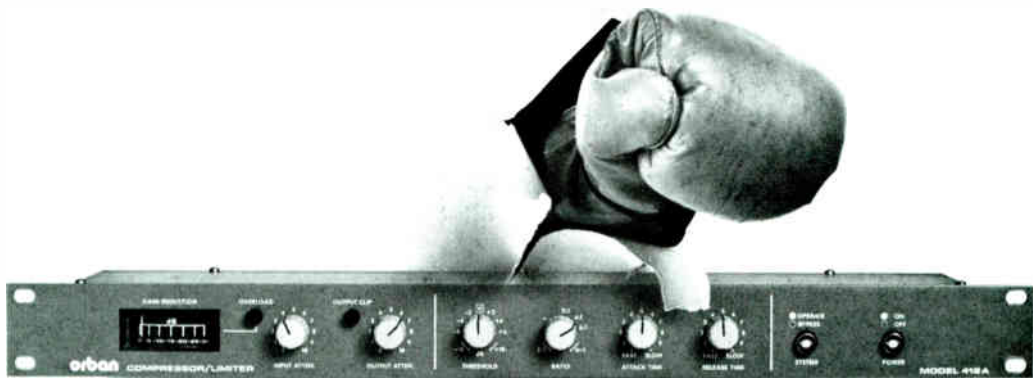
The higher priced cassettes do generally perform better than the lower priced cassettes. But, the cost does not necessarily reflect the performance. The most expensive tapes did

not out-perform the others in the same average price range.

A final note. Everyone that has seen the graphs plastered all over my living room walls and figured out what they were, eventually asked; "Well, which one is the best?" What I found was that after you reach the "top 10," even after all my research and hours of deliberation, that is still a subjective opinion.

I tend to follow the graphs and prefer the Sony UCX. One friend of mine likes the Maxell XLII-S cassettes because of the "high-end bite" (probably due to the +4 dB rise at 20 kHz); another prefers the TDK-ADX because they are as he says "cheeeep;" my wife likes all the Sony cassettes because they are pretty (so much for scientific research).

This survey started out of curiosity. I wanted to know which cassettes would perform best on my gear. Although, I have learned a great deal about which brands do maintain a truer reproduction, this is not the final word on cassette tapes. There are other factors to be considered: how the cassette shell holds up under extended use, the life span of the tape itself, and the accuracy of the tracking/alignment mechanism are just a few of the factors. And what of these? Only time will tell. ■



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GETTING YOUR PROJECT ONTO

CD

by Dr. Toby Mountain

As the compact disc gradually gains wide acceptance in the record industry, more and more people are concerned about "getting their project onto CD."

Turning your project into a compact disc involves a long and arduous technical process, but the first stage is making a CD mastertape. This involves two steps: the transfer to the Sony PCM-1610/30 standard, and digital editing/formatting for CD. Ker Pohlmann's article, "CD Pre-mastering," (*Mix*, July, 1986), describes the

formatting process in detail. I will discuss the various options and techniques for transferring some of the more common digital 2-track formats to PCM-1610/30. The art of transferring older analog masters to the 1610/30 and making them sound good is a vast subject that deserves an article on its own.

Sony PCM-F1 and other EIAJ processors

When Sony introduced the PCM-F1 almost four years ago, they didn't anticipate the tremendous interest this little machine would receive in the pro market. The F1 has been followed by a whole family of Sony digital audio processors, the 701, 501, 601, and Nakamichi's F1 clone, the DMP-100. Other EIAJ processors—with 14-bit resolution only—include the Sansui PC-X1, the JVC VP-100 and the Technics SV-100. All of these EIAJ consumer processors, which operate with any video machine, have enabled freelance recording engineers and smaller studios to make excellent digital recordings which are of "compact disc quality."

Like all transfers, the conversion to 1610/30 can be done from the F1's analog outputs to the 1610/30's analog inputs, but this presents a problem in level matching (-10 vs. +4 dB). It may also result in a loss of quality by going through another set of A/D and D/A converters. Fortunately, the process can be done digitally with the help of one of various conversion boxes which are now on the market.

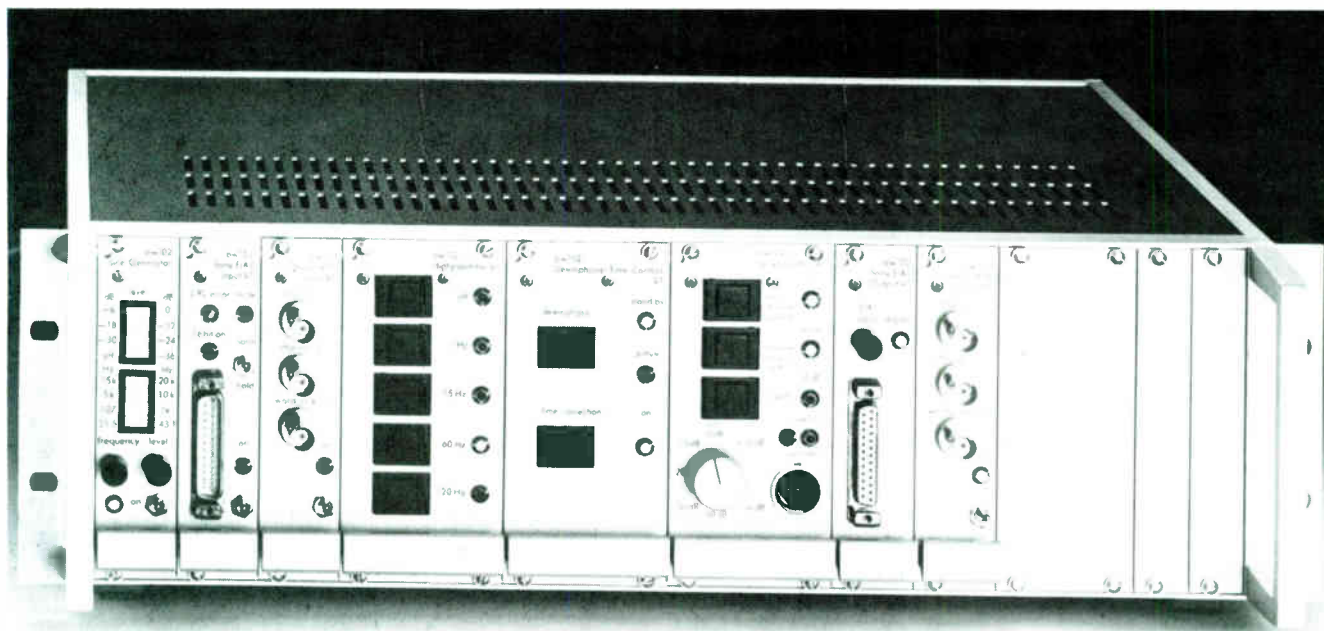
The Audio & Design Pro modification to the PCM-701 allows digital dubbing both to and from the 1610/30. A 25 pin cable connects the modified 701 to its conversion tray, from which BNC connectors for L & R channels (along with word sync) go directly to the 1610/30.

Even more sophisticated is the Harmonia Mundi bw 102, consisting of discrete modules for performing various types of digital signal processing. Simple conversion from F1 to 1610/30 involves the same connections as the Audio & Design: a 25 pin digital output connection from a modified 501 or 701 into the "EIAJ in"

—CONTINUED ON PAGE 183

Right: Audio + Design's PCM-701 mod.

Below: Harmonia Mundi Acustica BW 102 System

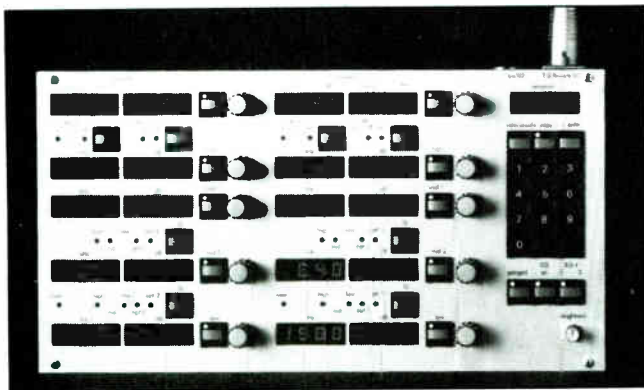




Copymaster 50 Video Duplicator

The Copymaster 50 video tape duplication system from the Dwight Cavendish Company of Wilmette, IL, simultaneously copies up to 50 video tapes from a single or multiple master source in any format. The system features a desktop keyboard providing an all-function address for controlling up to five groups of slave VCRs, and individual group VCR status is displayed via bar LED displays. Any format of slave VCR can be accommodated, and the control keyboard also includes a dual audio channel metering section with a built-in loudspeaker for monitoring the audio from any slave VCR. A 10-way interface, model VS-609, comprised of a single-input/10-output audio—video distribution amplifier with individual VCR remote outputs, is required for each group of 10 slaves and can be added as needed to expand the system.

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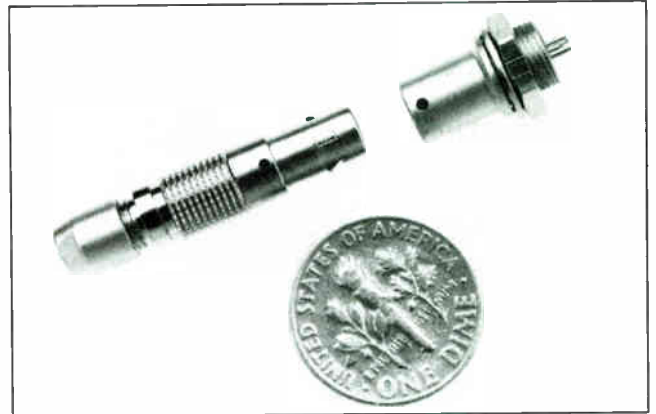


Harmonia Mundi Digital EQ

Imported to the U.S. by Gotham Audio of New York City, the bw 102/21 modular equalizer is a new plug-in module for the Harmonia Mundi Acustica bw 102 digital interface mainframe. Together with existing modules for digital level control, filtering and sampling frequency conversions, the system allows transfers in the digital domain between all machine formats. The new module allows equalization changes while remaining in the digital domain, thus eliminating the quality degrading effects of A to D and D to A conversion necessary with analog processing. The bw 102/21 features four tuneable frequency

bands with 15 dB boost and cut, variable cue controls, high pass and low pass filters with adjustable roll-off, two signal changes with independent controls for each channel and user memory for preset equalization changes during program.

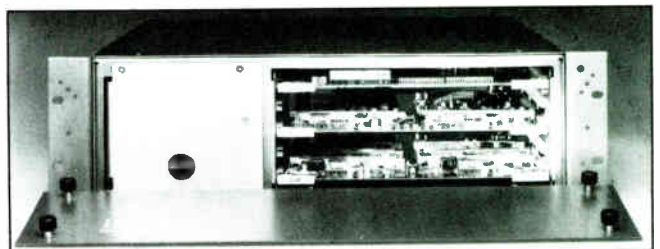
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New Lemo Audio Connectors

As a result of continuous research into miniaturization, Lemo of Santa Rosa, CA, has produced a connector series designed to replace the popular 3 contact audio connector. Capable of 500 VDC and 350 VAC at 3 amps per contact, this series measures less than 1-inch long and 1/4-inch in diameter with a maximum cable OD of 3 mm. Features include quick connect-disconnect self-latching system, screw machined precision, gold plated contacts, and a 2 contact version is also available.

Circle #147 on Reader Service Card



Laboratory Reference A/D-D/A

Integrated Media Systems of San Carlos, CA, has introduced the ADA-1000 Laboratory Reference A/D-D/A converter system for digital audio recording and signal processing applications. The self-contained system provides up to four channels of A/D and D/A conversion in one 5 1/4-inch rack cabinet complete with power supply. The ADA-1000, fully compatible with the AES/SMPTE/EBU/ANSI recommended practice, features: linear phase filters, multiple emphasis selection, multiple clipping characteristic selection, real time input monitoring, true 16-bit dynamic range, extremely smooth noise floor and flat frequency response. The ADA-1000 can be ordered with the following interfaces; AES/SMPTE, Sony 1610, or parallel port for music computers.

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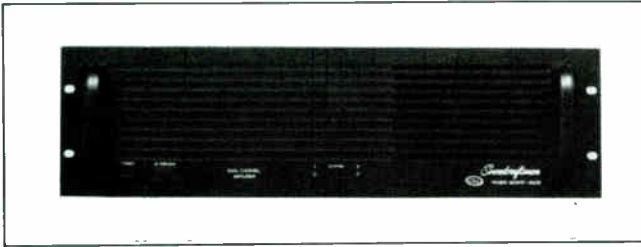
Patrick Quilter
VP/Engineering, QSC Audio.

The MX 1500 is designed for performance. To create modern music, musicians need modern equipment. Amplifying digital synths, popped bass strings and sampled percussion to concert levels — without robbing the throb from the low end, the sparkle from the highs or clipping transients beyond recognition — requires both exceptional fidelity and awesome reserves of power — that's the MX 1500. **The MX 1500 is designed to be powerful.** Though only two rack-spaces tall, the dual-monaural MX 1500 can deliver 750 watts of brute power per channel [both channels driven] into a 2 ohm load. The MX 1500 can handle virtually any load a high-performance speaker system can present. **The MX 1500 is designed to be reliable.** You might even say indestructible. Sophisticated multiple failsafe circuits are built-in to protect both amplifier and speakers. Your system is protected from open and short circuits, mismatched loads, overheating and DC faults. Dual-monaural amplifier design means if one channel fails for any reason, the other will still keep on working. QSC backs up the MX 1500 with a 3-year parts and labor warranty, and gives you the best service commitment you'll find anywhere. **The MX 1500 is ready for you.** Best of all, at only 67 cents a watt, the MX 1500 is ready to rack and roll right now. Never has so much power been packed into so little rack space. Maybe that's why the volume knobs go to 11! For more information contact: QSC Audio Products, 1926 Placentia Avenue, Costa Mesa, CA 92627 (714) 645 2540.

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Circle #043 on Reader Service Card

World Radio History

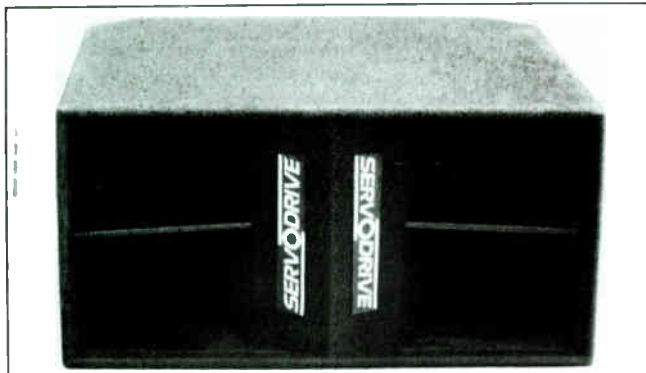


Soundcraftsmen 450X2 Amp

Designed especially for touring and recording studio applications, the 450X2 MOS-FET power amplifier from Soundcraftsmen (Santa Ana, CA) delivers 300 watts/channel into 4 ohms (20-20k Hz FTC at under 0.05% THD). The amp is also suited for driving low impedance loads, and is rated at 450 watts/channel into 2 ohms. The 450X2's front panel features "Tru-Clip" indicators that detect actual waveform distortion, thus giving an accurate indication of clipping.

Inputs are balanced or unbalanced, with XLR connectors, barrier strip and 1/4-inch jacks provided. Outputs are 5-way binding posts, and the rear panel also contains stepped input controls and a mono bridging switch for 900 watts into 4 ohms. The 450X2 is housed in a three rack-space chassis weighing only 30 pounds. Price is \$699, and a version with optional LED power meters is \$799.

Circle #149 on Reader Service Card



Intersonics SDL Subwoofers

Intersonics, Incorporated, of Northbrook, IL, have introduced the SDL "Foundation" Series subwoofers. The new SDL-4 and SDL-5 cabinets feature new, computer-assisted designs and innovative power-cooling of the high-tech servo, voice coil-less motor, providing peak outputs in excess of 139 dB at 1 meter, greater efficiency, extended frequency response, and overall high fidelity performance.

The cabinets are designed for lightweight, compact road use and easy installation. Measuring 22 1/2 x 45 x 45 inches, the SDL-5 is optimized for operating below 100 to 125 Hz, and is compatible with full range systems, or for bass, kick-drum, synthesizer and special effects. Preliminary specifications include a 24 Hz-150 Hz frequency response, 400 Watt power capacity, and a 4-ohm nominal impedance. The models are finished in 13-ply Baltic birch plywood and come standard with use-resistant carpeting and recessed handles.

Circle #181 on Reader Service Card

Tele Music

TRF Music, Inc., of New York City, has introduced the Tele Music Library to the United States market. Tele Music includes over 100 newly-recorded albums of orches-

tral and instrumental music for television, radio, film, video and A/V productions, in several categories, including industrial, rock, dramatic, electronic, children's, classical and period music. Many of the albums contain 15-, 30-, and 60-second versions following the full selections, as well as opening and closing themes. Selected albums in the collection and all future releases can be received "on approval" and special annual blanket licenses are available.

Circle #150 on Reader Service Card



Audix Assignable Console

The development of the digitally-controlled "Assignable Mixing System" from Audix Ltd., of Wenden, Saffron Walden, England, took five years from concept to reality. All functions of the Audix console are totally automated (including optional automatic faders), enabling: the memorization and recall of up to 20 console setups; the reduction of separate channel and group controls to a single comprehensive panel, for assignment to any channel or group via the touch of a button; and compactness—even the controls of a 100-channel desk are within easy operator reach.

Circle #151 on Reader Service Card

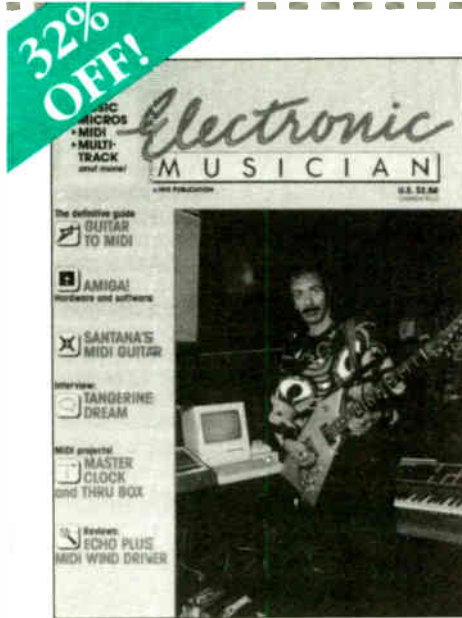


Samson Stage Series Wireless

Samson Products Corp., Hempstead, NY, has introduced the Stage Series, a cost-effective VHF wireless system with 10 available bands for simultaneous use. A variety of transmitters are offered: hand-held with Shure SM57 or SM 85/87 capsules; lavalier with Audio-Technica clip-on element; and an instrument version for bass, guitar or keyboards. The SR-1 receivers feature built-in volume/power on-off controls, telescopic antenna, and a choice of 12 VDC or AC line powering.

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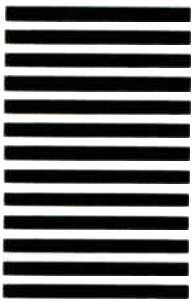
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APPLICATIONS AND BASICS

Choosing the Right Sampler by Tim Tully

It's a digital world, so let your fingers do the walking through a sampling database.

Fix it in the Mix—With a Sampling Keyboard by Craig Anderton
Salvage that track, eliminate that pop, and sharp that flat—all it takes is a sampling keyboard and the right attitude.

Secrets of the Emulator II by Michael Levine

No longer need the words "Disk Overlay Error" or "Disk Read Error" strike fear and terror into your heart.

Getting the Most Out of the S900 by Steve Cox

A grab bag of tips on sampling in general, and the S900 in particular.

Alternate Scales for Even-Tempered Samplers by Craig Anderton

Yes, you can implement alternate tunings on samplers!



CAREERS

Becoming a Service Technician by Alan Campbell

Electronic devices fail. Someone has to fix them. Sounds like a job.



INTERVIEW

Pierre Shaeffer and Pierre Henry:

Pioneers in Sampling by John Diliberto

Long before RAM, ROM, and processors, two Frenchmen were taking the world of sound apart and putting it back together again.



VIDEO

Stochastic Video Editing by Don Slepian

Video surfing on the sea of Controlled Randomness.



ELECTRONIC GUITAR

Electronic Guitarist: State of the Synth by Craig Anderton

Guitar synths may not be perfect—but they can be a lot of fun.

What Makes Pickups Tick? by Helmuth Lemme

Understanding how guitar pickups work is not difficult and can give you insight to your axe.



DO-IT-YOURSELF

Tips by Mike Butterfield, Will Hobbs, Les Penner,

Mike Sokol, and Matt McCullar

Build a PA headphone monitor, extract an output from your guitar amp, check out your MIDI control parameters, make your music sound like it does in the real world of cheap speakers, and check your continuity for a couple bucks.

Keeping Honest People Honest by James Chandler

It's a jungle out there...so here's a unique idea to help protect yourself from equipment gobbling predators.



REVIEWS

DASCH by Craig O'Donnell

Deluxe Video by Matthew Leeds



Yamaha introduces microphones for every instrument we make. And the one we don't make.

Designed to reproduce both vocal and instrumental music, the MZ Series of professional microphones were a long time in the making.

For nearly 100 years, Yamaha has been building musical instruments. Everything from piccolos to grand pianos to synthesizers.

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The diaphragms in the three MZbe models are the first to use beryllium. This rare metal's low specific gravity and exceptional rigidity permit an extended high frequency range for a sound that is both crisp and sweet at the same time.

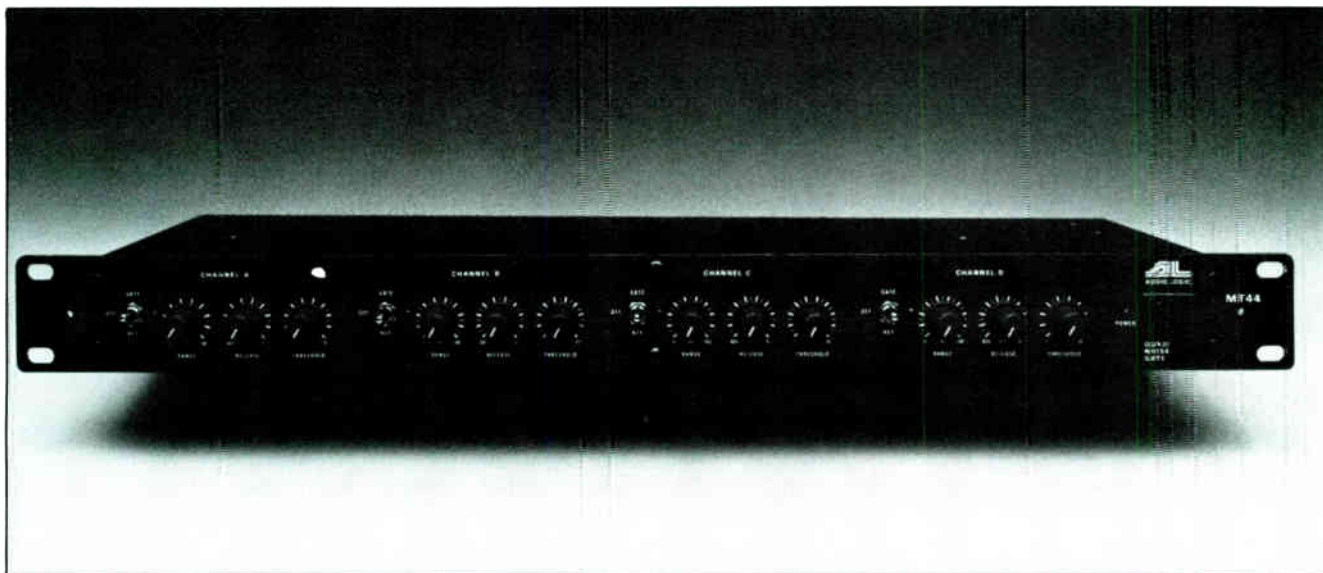
A specially developed damping and three-point suspension system for long-term stability and durability is used throughout the line. As are gold-plated connectors.

But because of Yamaha's musical experience, the real accomplishment of our new microphones is certainly greater than the sum of the parts. You might even think of them as musical instruments in themselves.

For complete information, write Yamaha International Corporation, Professional Audio Division, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont., M1S 3R1.



Circle #044 on Reader Service Card



Audio Logic MT44 Quad Noise Gate

by Mark Smith

When one thinks of pro noise gates, companies like dbx, U.S. Audio, Ashly, Valley People or Symetrix come to mind. So when one mentions Audio Logic, the question might be: "Who?" Well for those who don't know, Audio Logic is the result of DOD Electronics' move into the pro audio market.

For DOD, Audio Logic is a way to prove that manufacturers can provide pro-audio quality at semi-pro prices. Dean Stubbs, assistant marketing manager for DOD explains, "The focus of Audio Logic is to become a premium audio line. We want to show that you can get high quality pro audio gear at a reasonable cost by applying economies of scale." The MT44 Quad Noise Gate, a four-channel, expander

type noise gate listing at \$349.99, is one component in a series of pro audio offerings with which they hope to prove their point.

Noise gates typically sense audio signals above and below user selectable thresholds (dB). If the incoming signal is above the threshold level, the signal passes unimpeded to the output. If the input is below the threshold, the signal is "gated" and the sig-



nal does not reach the output.

The MT44 is an expander type gate, meaning that a range control can be used to select the amount of attenuation (gain reduction) that will take place when the signal is being gated. This is supplemented by a release control dictating the rate at which the input signal is attenuated to the maximum dB level as set by the range control.

But there's more to making an effective pro audio gating tool than the creation of a compressor in reverse. This is where the MT44 hopes to stand out. By offering more "special features" than standard gates, Audio Logic hopes to create its own market niche.

The front panel is the first indication that there is more to this gate than simple attenuation. Each of the four independent channels features a gate/off/key mini toggle to select the channel function. The gate position routes the input signal to the detector circuit and to the gain control circuit (VCA). The off position allows signal to pass through the channel with no attenuation. The key position routes the key input signal to the detector circuit and the input signal to the gain control circuit. An LED indicator lights when the input signal is being gated.

Channel features also include low-noise rotary potentiometer range, release, and threshold controls. The range control setting determines the amount of gain reduction when the signal is being gated (the signal is below the threshold). The attenuation is adjustable from 0 dB to 100 dB with claimed frequency response of 20 Hz to 20 kHz \pm 2 dB.

The release control sets the rate at which the input signal is attenuated to the maximum amount as set by the range control. Fade time is adjustable from 50 milliseconds to 4.7 seconds.

A threshold control sets the level (dB) below which the signal must fall for attenuation to occur. This control senses either the input signal or the key input signal, whichever is selected with the gate/off/key switch. The level is adjustable from -18 dBv to +6 dBv.

The back panel supports the routing of each channel's front panel selection. A 1/4-inch mono phone jack key input accepts balanced and unbalanced line level input signals. When the gate/off/key switch is in the key position, the key input signal is sensed by the detector circuit and will gate the input signal. When the gate/off/key selector is in the gate or off position, the key input is disconnected.

Input and output connectors are 1/4-inch tip-ring-sleeve handling balanced or unbalanced lines. The input

impedance is 80k ohms balanced and 48k ohms unbalanced. The signal input to this jack is the signal to be attenuated. In gate mode, the input signal is the detector signal. In key mode, the key input signal is the detector signal. The output will drive 600 ohm lines up to +17 dBm. Output impedance is 102 ohms balanced and 51 ohms unbalanced.

A unique feature of the MT44 is the control output connector. The 1/4-inch control output jack sends out a logic high (+5v) level when the detector's threshold is crossed by the presence of a signal; the control output goes low when the signal drops below the threshold and the gate closes.

Taking the MT44 to the labs of EMB and Associates, Oakland, CA, myself and lab techs Matt Boche and Jeff Welsh put the unit through a battery of unscientific yet effective audio tests. Our primary diagnostic tools were our ears and the series of tests consisted of impromptu experiments and noise introductions. Further, we performed a partial dissection of the unit.

The MT44 can be used in a variety of ways. As a standard noise gate with the switch set to gate and the range set to 100 dB, the unit will attenuate the input signal when its level falls below the threshold level. The threshold pot is labeled one to ten equating to -18 dBv to +6 dBv. This type of labeling is not as desirable as actual dBv labeling and the unit may not offer the range of dBv selection that one needs. Competitors typically offer -60 dBv to +20 dBv ranges.

The MT44 features a full 100 dB range control. By selectively setting the range control the obviousness of the gate effect can be minimized. Chop-piness and glitching can be effectively controlled and other effects, such as using the MT44 as a gain enhancer, can be obtained. With the range set at around 40 to 60 dB, most lower volume signals can pass, yet at full velocity the gate opens up creating a useful gain enhancement effect.

The keying function is identical to gating with one exception: the signal level being sensed for threshold comparison is the signal at the key input instead of the signal at the input. Therefore the signal will be attenuated dependent on the level of the signal at the key input. Keying can be used for much more than noise reduction and is indeed the basis behind many popular studio effects. The MT44 does not offer a chaining feature, although this type of effect can be achieved via patching.

We ran the gate through some cheap guitar pedals and found that indeed it is a good gating tool. The MT44 was free of the "cheap compressor" type

sounds often associated with lower cost gates. The unit responded quickly and, even though the labeling does not lend to exactitude, with seeming accuracy. Its standard gating and keying functions work as promised allowing for standard gating effects.

Upon dissection, we found the MT44 to be of superb design and quality. dbx VCA chips are used throughout as are Signetics 5532 low-noise ICs. The chips are in socket form, allowing for easy changing and servicing. Low 0 ohm resistors separate channels so that if one channel goes down the rest won't follow. The board is military spec and the housing is all steel occupying 1.75 inches of rack space.

As previously mentioned, the control output is a unique feature to the MT44. This output can be used to trigger drum machines, sequencers and arpeggiators in sync with signals being received into the input or the key input. We found it to be interesting yet of questionable value. The effect only seemed to be viable with the threshold set at maximum (10) and the release set at minimum (005). This severely limited the keying channels gating effect. It did trigger our arpeggiator as promised but was only effective and accurate at those settings previously described.

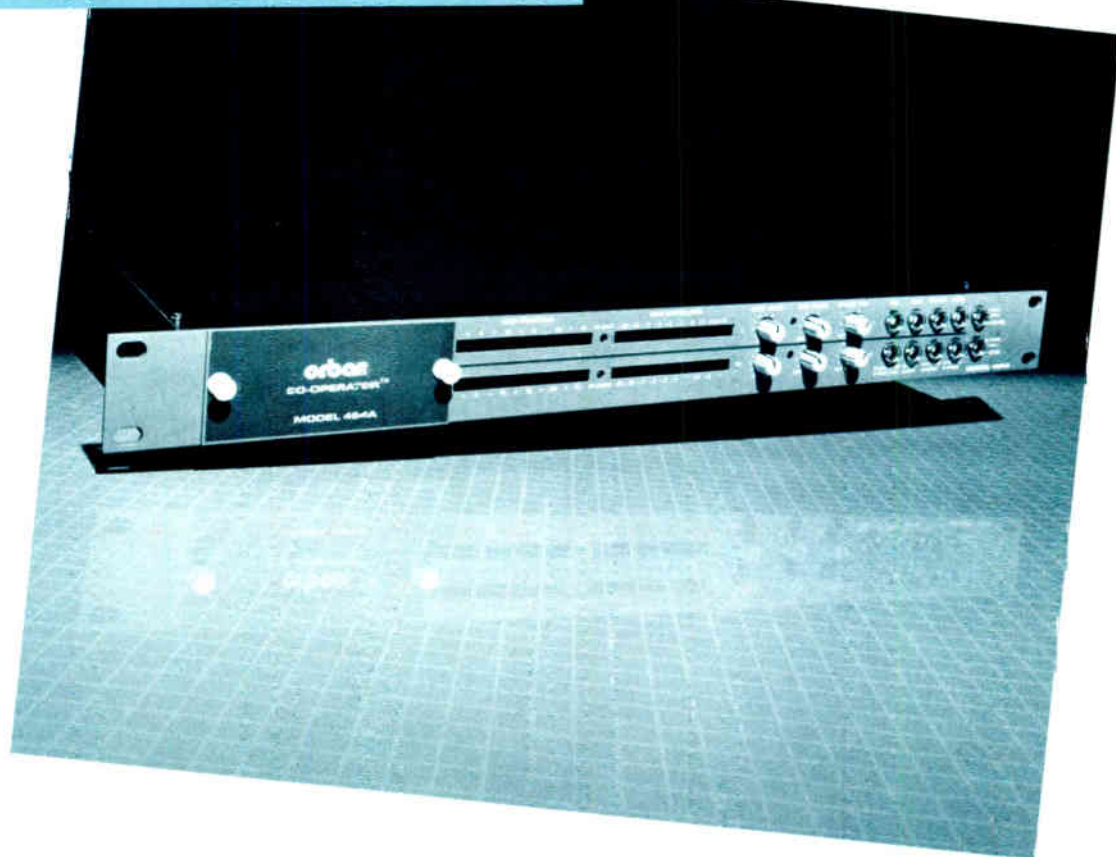
At well under \$100 a channel, the unit is surely a good buy. For those requiring simple gating and keying, it is surely a best buy. The componentry and construction is of high quality and the basic features are there. Retriggering and chattering were not evident and noise, distortion and control feed-through were nonexistent. On the other hand, the MT44 may not be enough for those requiring exactitude, advanced monitoring and a wider selection of ranges. Missing parameters are attack and ratio; while multiple LED release indicators would lead to better visual reference and longer release times would augment smoothness.

So has Audio Logic met its promise? The answer is sort of. It sports a healthy ratio of features and quality to its \$349.99 price tag. There are other quad gates in this range but they don't live up to the MT44. For smaller or home studios, as well as live applications, it's a winner. On the other hand, don't look for many MT44s to be laying around world-class studios. ■

• • •

Editor's note: In response to initial user comments, such as those mentioned by Mr. Smith in this article, Audio Logic has increased the MT44's threshold range on current production models, now -50 to +10 dBv, a significant improvement.

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Circle #045 on Reader Service Card



by George Petersen

The era of digital recording has brought with it a return to basics, as the new medium requires the utmost attention to details, precise recording techniques, and topnotch equipment. A relatively recent entry in the latter category is the Beyer Dynamic MC 740N (C), a high quality, large-dia-

phragm condenser microphone which proved to be an excellent performer for a wide variety of studio applications.

This German-made microphone is the top model in Beyer's condenser line, and features five switchable polar patterns: omnidirectional, cardioid, wide-angle cardioid, hypercardioid, and figure-eight. These are selected

via a slightly recessed switch, which prevents accidental pattern changing while adjusting mic placement; a window located below displays the pattern selected. Other provided controls include a -10dB pad, and high pass filters for rolling off low frequencies at either 80 or 160 Hz. The mic requires external phantom power 48 Volts, $\pm 4V$, from either a console supply or external source: no provision for internal power is included.

The MC 740 is packaged in a foam lined case containing the mic and a highly effective shock mount, which performed nicely in fixed applications. However, due to the small size of the elastic bands, I would use extreme caution if the mic is used in a rugged situation, such as on a fish-pole for location film/video sound. A set of spare elastics are provided with the unit, a nice touch, since finding replacement elastics can sometimes be troublesome.

In order to put the MC 740 to the test, I used it as the main microphone in a 1950s-style television jingle, recorded digitally. I began by laying down the drums, using the MC 740 in the wide cardioid pattern overhead, with only one other mic used for kick. The results were quite good, with crisp high-end reproduction of the cymbals and snare, while the toms were reproduced accurately, with good balance. Bass guitar was recorded direct. Next up was electric rhythm/lead guitar overdubs, with the mic in the omni pattern placed back in the room, a task the MC 740 handled effortlessly. Switching the mic to cardioid, I proceeded to finish up the instrumental tracks with sax overdubs; again the MC 740 provided faithful reproduction.

Investigating the mic's performance on the remaining two polar patterns was accomplished by using the MC 740 on an acoustic guitar duet and on trumpet in a multi-miked ensemble. Condenser microphones have always been my favorite choice on acoustic fretted instruments, and I used the MC 740 on the figure-eight setting as the middle microphone in an M-S stereo configuration, with favorable results.

The hypercardioid pattern was put to the test on close-miked trumpet and piccolo trumpet in a five-piece classical horn ensemble. The tight pattern provided excellent separation from the other horn players, but overload

Beyer MC 740N (C) Studio Condenser Microphone

"The MC 740 is a well-designed unit that is versatile and a solid performer from an audio standpoint: a serious contender in the area of high-end studio condenser microphones."



distortion was evident, necessitating the use of the -10 dB pad. In this situation, I also had a chance to try the optional foam windscreen (WS 740), which is priced at \$15 and is certainly a worthwhile investment.

I concluded my studio testing of the mic by finishing up the lead and background vocal overdubs on the jingle project. The MC 740 is especially well suited in this area, with smooth characteristics and somewhat of a "warm" sound, without excessive coloration. The microphone's frequency response was fairly consistent at any selected polar pattern: basically flat up to about 5kHz, and then beginning a gentle HF rise speaking about +6 dB at 10kHz.

The next stop on the agenda was taking the mic out into the field for gathering sounds for use in music sampling. So off I went, with the MC 740, my Nakamichi DMP-100 digital processor, portable VCR and mic pre-amp, and Beyer's MSB 48N(C)1 phantom power supply—an optional ac-

The MSB 48N(C)1 phantom supply is ideal for location use, since it is rugged and intelligently thought-out: it includes a belt clip and its three-way on/off/battery test switch is recessed to avoid inadvertent power-downs. The MC 740, with its switchable polar patterns is perfectly suited for sample collecting, where one can never exactly predict what sorts of environments will be encountered. In open areas, with a lack of reflective surfaces, the omni pattern worked out best, especially for ambient sounds such as crickets and frogs chirping. Here again, the WS 740 windscreen proved invaluable in reducing low frequency rumblings caused by wind noise, with only an occasional need to use the mic's built-

in 80 Hz roll off. I never experienced wind strong enough to require the 160 Hz roll off. While collecting samples, I used the mic hand-held throughout, as I never quite felt comfortable with the unit shock mounted on a fishpole. In any case, handling noise was virtually nonexistent when the mic was handled judiciously.

All in all, Beyer has come up with a serious contender in the area of high end studio condenser microphones. The MC 740 is a well designed unit of durable construction that is versatile and a solid performer from an audio standpoint. While its \$1000 price tag may dissuade some purchasers, it is definitely an entry worthy of attention from the serious user. ■

Beyer MC 740N (C) Manufacturer Specifications

Operating principle: pressure gradient

Polar patterns: omnidirectional, wide-angle cardioid, cardioid, hypercardioid, figure-eight

Frequency response: 40-20k Hz

Nominal impedance: 150 ohms

Rated load impedance: less than or equal to 1000 ohms

Maximum SPL (at 1 kHz, for maximum 0.5% THD): 134 dB, 144 dB with -10 dB pad switched in

Signal-to-noise ratio: approximately 70 dB

Phantom voltage: 48V \pm 4V

Current consumption: 1.4 mA

Weight: 390 grams

Price: \$1000

U.S. distributor: Beyer Dynamic, 5-05 Burns Avenue, Hicksville, NY 11801 (516) 935-8000

cessory. The phantom supply came in a box containing only a schematic and the unit, sans instructions. However, this didn't pose any major problems, since the operation and use of the power supply is pretty straightforward. The most difficult aspect was trying to get the battery compartment open: a coin inserted into a brass slotted screw is rotated one-eighth turn clockwise for access, which was the opposite of what I expected. Having accomplished this, I inserted the required five nine-volt batteries into the hatch and was ready to roll.

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CUTTING REMARKS

MASTERING

ENGINEERS

ON THE

STATE OF THEIR ART

by Philip De Lancie

In the music industry production chain, the mastering room serves as a crucial link between the worlds of the professional and the consumer. Weeks or months of creative labors in the studio, distilled onto 40 or 50 minutes of master tape, must be faithfully translated into a "pre-manufacturing" form as a first step toward mass production for the public. Thus, mastering engineers are not only well positioned, but well advised to keep an eye on developments in both the professional and consumer segments of the music industry. Because of the variety of projects they deal with on a daily basis, the types of changes they see in their work are, no doubt, a good indication of what is going on in the industry as a whole. At the same time, the way they respond to the ongoing proliferation and expansion of audio technologies should provide some insight into the direction our industry will be taking in the future. To explore the views and observations of those in the field, six disc mastering engineers from facilities around the country were asked to respond to the following series of questions:

Mix: Compare the role of the mastering facility today with its role in the past.

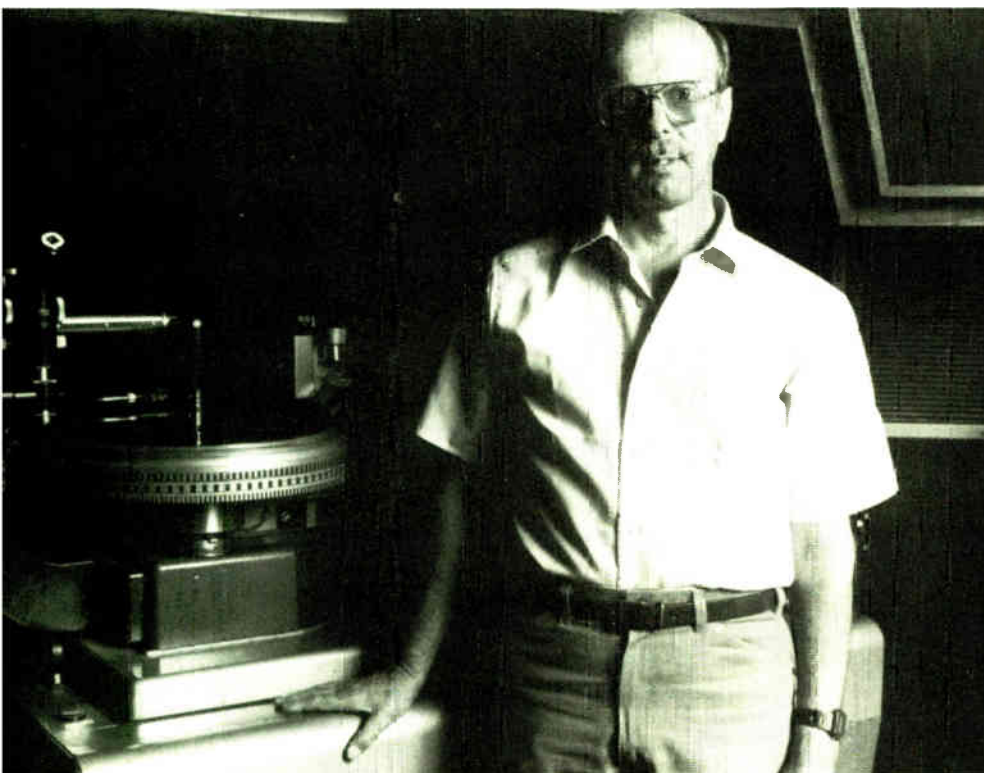
Mike Fuller, Fullersound, Miami, FL: The mastering room is utilized a lot more, in the sense of producers and engineers being a little bit more aware of and willing to use the mastering engineer's techniques and experience in giving the final overall sweetening to the product, whether it's going to vinyl, cassettes, or CDs.

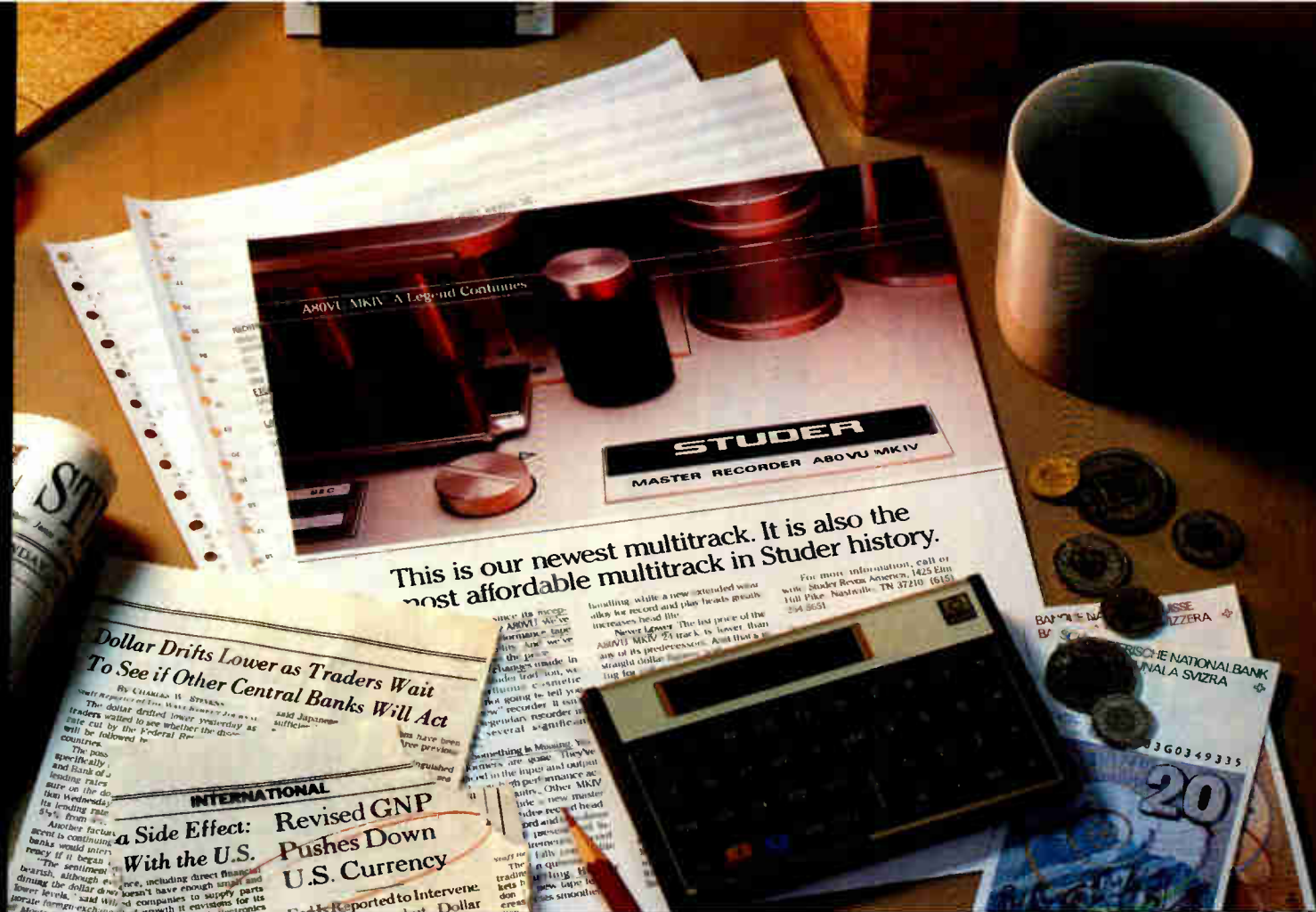
Steve Hall, Future Disc Systems, Hollywood, CA: I think mastering rooms are being relied on more heavily now for EQ, correction of masters, and as a fresh set of ears. Producers and engineers are relying more on the judgment of mastering engineers, who hear a wide variety of music all day long, as opposed to working on an album for four to six months. They have a lot more influence, outside in-



Steve Hall, Mastering Engineer—Future Disc Systems;

George Horn, Mastering Engineer, Fantasy Records





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Dollar Drifts Lower as Traders Wait To See if Other Central Banks Will Act

By CHARLES W. STEVENS
The dollar drifted lower yesterday as traders waited to see whether the dollar will be followed by other central banks.

INTERNATIONAL
a Side Effect: Revised GNP Pushes Down U.S. Currency

Another factor... banks would inter... rency if it began... The settlement... ducing the dollar down... lower levels," said... strate former-exchange... of growth it envisions for its... but Dollar

Forget the exchange rates. We're rolling back the price of a Studer 24-track one more time.

The decline of the dollar forced us to raise the price of the A80VU MKIV a few months ago. But now it's going back down!

The US dollar hit the skids. The yen, the mark, and the Swiss franc went up. And the prices of imported audio gear went up right in step.

At Studer we scrimped and squeezed to keep price hikes to a minimum. But finally we had to raise the price of our A80VU MKIV 24-track package – at an all time low for two years – back above \$30,000.

Unfortunately, that left some smaller studios in a tough spot. They wanted Studer quality and reliability. But their budget considerations forced them to look at lesser machines – which had also jumped up in price!

At Studer Revox America, we decided we did not want to lose our growing market share among smaller studios. First we placed a special quantity order from the Swiss fac-

tory. Then we shaved our own margin to the bone. Our accounting department winced, sighed, and reluctantly consented.

So now the price for a complete A80VU MKIV 24-track with autolocator and channel remote is back under \$30,000.

Remember, this is the legendary hit-making machine still used by dozens of world-class studios. Plus, it now incorporates the latest transport logic updates as well as transformerless input and output cards. Nothing has been downgraded or compromised.

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fluence, based on the variety of music they hear from different studios and producers. We're still doing quite a few records. A lot of it is promotional stuff, 12-inch single work, which is going to be around for a while until they can get the turnaround time and the cost down at the CD plants.

George Horn, Fantasy Studios Mastering, Berkeley, CA: Both the monitoring and the equalizing capabilities of mastering rooms have improved dramatically. Fifteen or 20 years ago, most mastering rooms were just cubicles with very poor monitoring. They were thought of as tape-to-disc transfer rooms. Today, they are acoustically as good as control rooms, and they have more versatile consoles and equalizing equipment.

Randy Kling, Disc Mastering Inc., Nashville, TN: Back 15 years ago when I started, the tape would come to you from the studio ready to go. The producer and the artist would last see the tapes in remix, and the next thing they knew, there was the record. So, there's been very much change. More tapes are leaving the studios "unaffected." We're doing more editing here, more sequencing, more fine tuning of the product. The artist, the producer, and the record company have this awareness that there is something magical that can be done in the mastering facility with a last time to go around with the product.

Ron McMaster, EMI America Records, Hollywood, CA: The preparation and production for compact disc has been one of the biggest changes, as well as incorporating the EQ'd copies for cassette duplication. Fewer and fewer discs are being cut, and more and more orders are being placed for digital masters and submasters. Record processing has gotten more efficient, and it doesn't take near as many parts as it used to. They can get a lot more mothers and stampers off of the discs than they could five or six years ago. But the main thing is that the sales are concentrated more in cassettes and CDs.

Jim Shelton, Europadisk, Ltd., New York, NY: I see the role changing somewhat because of compact disc. Before, the disc master was the final chance for the artist or producer to influence the sound that went out to the public. So there was a lot of fine tuning done. That has decreased, because in classical product, which is mostly what we do, most of it has already been mastered for CD. The producer has presumably already made the level and EQ changes they have in mind before I get the tape. So, in a way, it makes my job easier. I do a lot more cutting flat.

Mix: How do you expect the role of



(left to right): Randy Kling at Disc Mastering with Clarence Carter

the room to evolve into the future?

Fuller: I think more and more people who used to finish their mix, send their tape off and expect records back in six weeks are spending some time on their tape in the cutting room with an engineer. I think that will continue to grow, especially with the digital era hitting us now, because people will depend a little bit more on the mastering engineer to be familiar with that technology.

Hall: I think today's trends will continue and will carry over into CD as well. The only thing that will change with CD is that we'll be using a different master format. But the process will be basically the same.

Horn: In five or ten years, the mastering engineer won't be working as much with the lacquer disc as with either digital tape or some other form of digital memory.

Kling: I think more and more we'll have the client, the artist, and the producer in the room with us.

McMaster: I think the trends we are seeing now are pretty much the way things will continue to evolve.

Shelton: As long as there is significant LP activity, I don't see that there will be much change.

Mix: Has your facility made any significant investments in equipment that reflect your view of the direction of the mastering industry? Are any planned soon?

Fuller: We have two Mitsubishi X-80s, and we have a Sony 1610 available to us. And we have a Sony 553, the new F1 format. So we are definitely making changes toward that.

Hall: We're in the process now of putting in another room. We're moving into the 1630 CD editing system in the new room as well as another mastering system.

Horn: We've invested in digital recording equipment, such as the Mitsubishi X-80, the Sony 1630, the DMR 4000, and the Harmonium Mundi Sampling Frequency Converter. As soon as there is a practical digital console, we will invest in such a thing.

Kling: We purchased a Neve DTC-1 all-digital console for CD production. There are other brands out there, but they don't have all the facilities that the Neve console has. If a client comes into our place, he'll know that we have things we can use to make his product that much better. That along with the Sony 1630 and the DMR 4000.

McMaster: The biggest thing would be our purchase of the Sony digital equipment. We have a 1630 as well as two DMR 4000 machines and a digital preview. We got it primarily because just about 98 percent of the projects that come through here are on the Sony.

Shelton: Since we were the first DMM licensee in the U.S., we made a big commitment in that area. Also, we are getting more digital equipment all the time. We just got a Mitsubishi. We're bound to have a proliferation of digital equipment. As soon as we start getting significant demand for equipment, we have to have it like everybody else.

Mix: As far as long range goals, how would you like to see your facility equipped in three to five years?

Fuller: Over the long range, my room will probably be equipped more toward the compact disc: 1630s in the room, maybe some editing for 1630s, and of course evolving with whatever

Mitsubishi is going to be doing. We'll be moving towards more of the CD mastering preparation, which we do some of now.

Hall: I would see it as being formatted mostly for CD, with the ability to produce cassette and LP masters. CD would be the main format. I'm not sure yet about a digital console, because maybe 75 percent of the masters still come in on analog. There are still a lot of producers and engineers in the industry that prefer the sound of half-inch analog. Until that changes, I don't see the need for a digital console.

Horn: In three to five years, we will see the room with a completely digital console, digital equalizers, all digital tape machines, and probably without a lathe. The lathe may get moved out into a secondary room, and discs will be made from an EQ'd tape that is prepared by the mastering engineer for that purpose.

Kling: That gets back to the digital console and the Sony equipment, or a digital reel to reel with razor blade editing. Another factor that I see when I look at the future of the CD is in books and training and speech. The new facility that I'm planning will have something to take care of that too, including the graphics that can be put in the digital product. There is a lot that the CD is capable of doing that's

not just music.

McMaster: I would like to see us have a digital console. It would be nice to be able to offer people an option, because there are those out there who still love analog, and you want to be able to accommodate them too.

Shelton: I think a digital board would be an obvious advantage, if it does, in fact, sound better. I'm not assuming that a digital board will be an improvement over the Neumann board that I now use. But if it is, we would certainly want to add that.

The DMM CD Mastering System is a possibility, but it really depends on whether there is a market for independent cutting of CD masters. If you have a proliferation of small CD plants around, a market might develop, but right now, it certainly does not exist.

Mix: Do you see any trends in the master tapes you get from clients in terms of either tape format or overall audio quality?

Fuller: The biggest change in what people are bringing in is the analog 30 ips half-inch format. That definitely seems to be an improvement. People are taking a little more care in the overall quality of the sound.

Hall: Sixty percent of the people are coming in with half-inch 30 ips. That's probably the winning choice. I'm also

seeing a lot more F1 because that's a cheap way to make a quiet master. We usually end up transferring those over to 1610 or X-80. The X-80 is the way to go. There are definitely a lot of benefits to the X-80 system over the 1610.

In terms of audio quality, I see a great deal of difference over the last three years, especially with those studios doing the majority of work having automation. There's no excuse anymore for having mixes that aren't perfected. The quality has benefitted because it allows the engineer and the producer to spend more time on the sound.

Horn: Right now, we still see a lot of analog and a lot of F1. But I think the trend in master tape formats is going to be toward reel-to-reel digital tapes. As far as audio quality, some masters are better than the best of five years ago, but there is still a very wide variation.

Kling: Of the tapes that come in here, I'd say that right now they are about 50 percent analog and 50 percent digital in one form or another. As far as the quality of the tapes we're getting, it's better. Even the small studios, with the availability of things like F1, have greatly reduced the noise and other problems that they have.

McMaster: We see a lot of smaller budget clients bringing F1 into the picture. We also get quite a few masters on 1630, especially things that come from London or Europe. Analog masters are staying pretty much 30 ips 1/4-inch and half-inch, no noise reduction. We still have a fair amount of 15 ips, but most people, if they're not going digital, are staying with 30 ips.

The tapes are getting a little better. There is more awareness of the noise level, and projects are becoming more detailed. But you still have projects that come through that are pretty funky.

Shelton: It seems like we're getting more Mitsubishi tapes than ever. We've always had a lot of 1610. There is some use of F1, but mostly semi-professional.

Mix: Do you expect Dolby SR to have any effect on the trends in master tape formats?

Fuller: I don't know yet. I personally haven't had a chance to really listen to it, so I couldn't comment much. I have not yet had any kind of requests for the unit.

Hall: I don't think the Dolby SR thing is going to take off. Most of the people that aren't using Dolby now don't like the effect of going through another piece of gear to make their tape quieter. If they're looking for something that's quiet, they're usually using digital.

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Horn: I think it's too soon to tell.

Kling: I very much do. I was in Montreux [at the AES convention] and I heard it and I ordered mine. I've got the first units in Nashville. If you were in a room, and you didn't know what was playing, and you raised your hand for what you liked, you would have to come up with the Dolby over digital product. Digital is not something that Dolby SR is going to replace, but there are thousands of studios out there that won't be able to go digital for some time, because of the cost factor, that may use the Dolby.

McMaster: No, I don't, at the moment.

Shelton: I think all the classical product we do is going to be digital. It will be very unusual for anyone to use analog, regardless of whether it is better or not. I've heard that Dolby SR is as good or better possibly than digital in many respects. But, because of the market value of the word "digital," especially as it relates to classical product, I imagine that the acceptance of Dolby SR is probably going to be very modest.

Mix: Has the advent of the CD influenced the amount of work you do, or your approach to your work?

Fuller: It hasn't had a very big influence on my business yet. Most of the requests for CD mastering usually come from the major label projects. Producers are doing their best to get whoever is paying the bills to go the extra mile and come up with a CD master, so the mastering EQ and compression is a bit different. But I don't find it to be having a big impact at this point. Most of my work is still for vinyl records and cassettes.

Hall: Most of the time we master the album and the CD is run on a different pass. Things that we use to create a certain kind of sound on the LP are usually used on the CD. But things that were used to allow us to get more time or more level on the LP are usually omitted on the CD pass. The lacquer orders are down, but the CD related work is filling the space. It's just a change in mastering format.

Horn: The CD is increasing the amount of work we are doing. Not only are we making discs, but in most cases we are making CD masters too, which are additional work that we didn't have in the past. Also, the approach to EQ for the CD is different because we don't have to concern ourselves with the mechanical limitations of the phonograph record.

Kling: With the CD, coming in to the mastering room to put the final touches on is a big thing here. It's like the early days of stereo. People want to be here just to have something to say about it.

McMaster: The impact of CDs has

been incredible here. We've been doing a lot of catalog reissue work, and the demand is so great that there just aren't enough hours in the day.

Shelton: I see more and more long sides, in the vicinity of 33 to 40 minutes. That's getting very common for classical sides now. I think that's because of the influence of the CD.

Mix: Are you using the F1 as a production tool for copies at all in your facility?

Fuller: Just about every project now requires production copies for cassette duplication. That is done a lot of times on F1 or half-inch, which is a big improvement over what it used to be.

Hall: Occasionally. There are some

producers that come in and request F1 copies. Most of the places we're dealing with now for production masters use 1630s.

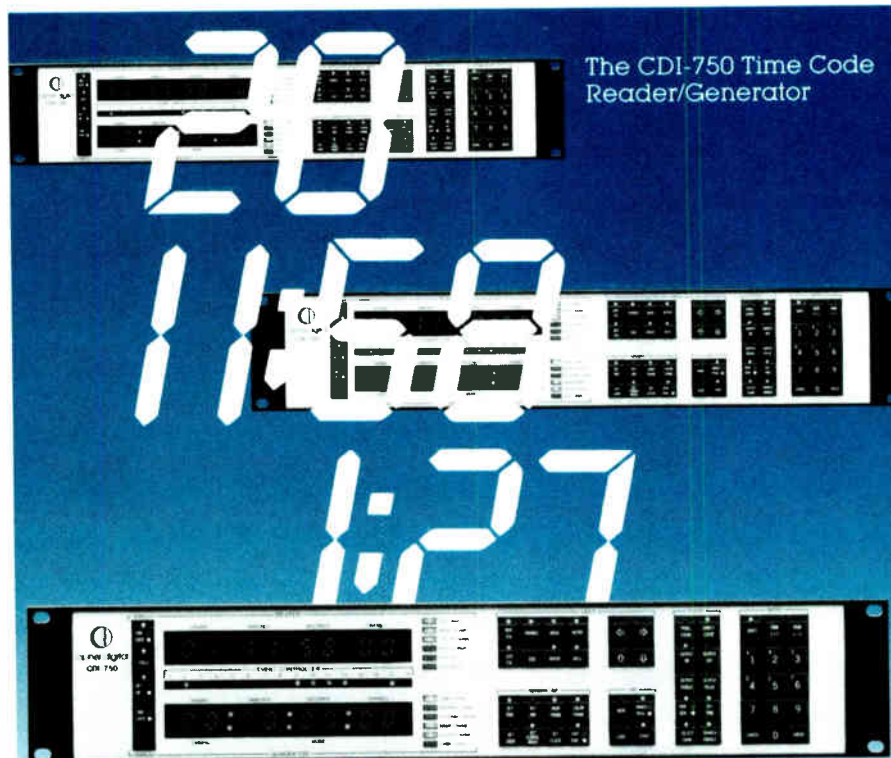
Horn: We see the F1 being used a great deal by many people in the industry. For some of our clients, we do use the F1 for simultaneous tape copying.

Kling: Yes.

McMaster: We haven't been using F1s at all in my area of production. We make our simul on analog or 1630.

Shelton: Sometimes we use F1 and sometimes 1610. The smaller companies like F1 because it's cheaper, and the quality seems to be OK for them.

Mix: Judging from the test pressings



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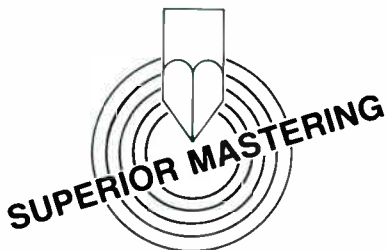
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and test cassettes you hear in the course of your work, what directions, if any, do you see in the quality of the finished product available to music consumers?

Fuller: Cassettes are definitely better, and I think the sound of records is better. But I think the typical surface noise, ticks and pops haven't made that much of an improvement. It varies with every project, every different pressing plant. In general, test pressings seem to be better than what I get when I buy what the consumer is buying off the shelf. I would say overall that the quality of pressings has gotten better, but I don't think they're perfect. **Hall:** I've seen drastic improvement in cassettes over the last four or five years. The record pressings I don't think are as good as they were a couple years ago, because the industry has been going through a major lacquer crisis for the last year and a half. Pressing plants are having a tough time plating these materials. The parts sound quiet if you play them, but it's another story to plate them.

Horn: Records can be a lot better because the cutting equipment in the last ten years has gotten a great deal better. But the vinyl is the one questionable factor. It hasn't gotten a lot better, because of certain environmental restrictions. Cassettes have made big improvements over the last ten years. They needed to.

Kling: I think that locally, and from the majors, at least from the samples we get, I can definitely see the consciousness there of quality. The reason for that, I think, is that now, when you have such an expense with the digital equipment, you've got a lot of money rolling when you're cutting, and the cost of the parts coming to the plants is proportionally higher. Fifteen years ago, I feel there was more of a relaxed situation, and there were a lot more replacement parts. Now, if they screw up the masters at the plating and pressing companies, they're going to be charged \$150 to \$300, and their profits go out the door. So the quality control of what I see and hear has gone up considerably.

McMaster: I haven't seen any great improvements in the area of pressings. We still have a lot of the same problems we've had to deal with over the years. It's up and down. Just when you think everything is OK, you run into problems.

Shelton: Ours is a vertical operation, so we do our own pressing. We've always been oriented toward doing a relatively high-cost, high-quality product.

Mix: What role do you think the various mass distribution formats will play

in the pre-recorded music marketplace of the future?

Fuller: If the availability of digital to consumers continues to come down in price, I'm sure the CD will pick up more. I don't see analog cassettes making that big of a jump over where they are now. I'm sure the vinyl record will continue to lose its place a bit, unless we have some kind of massive technology breakthrough in analog.

Hall: I think the cassette will have a strong market for quite some time because of its ease of duplication and cost. The public has accepted them, and you can play them anywhere. I see the CD phasing out the LP, but that's going to take a while, maybe five or ten years. R-DAT may take hold a long time down the road, but I don't see it in the near future.

Horn: The CD is going to grow very rapidly and do very well. Whether it will become the number one digital device for the consumer still remains to be seen. Something could replace it, and probably will eventually.

The vinyl record will probably be around for the next ten to 15 years, at least, because there are so many phonographs out there. And the cassette, too, will be around for a long time.


Kling: The LP is going downstream. Some of the clients we've had for many years are not even going to the vinyl LP anymore. The custom music clients are not going into the black record as much anymore. They are going to cassette, because the technology has gotten good, and the cost factor makes it a good product. The vinyl record will still be around, but it's going to fade. There won't be as much product out there. Eventually, with the prices of compact disc players coming down as they are, there will be a changeover.

McMaster: I think we'll see a majority of the product on CDs and cassettes, and a small part of the market being LPs. I don't think LPs will vanish completely, but I think they will be a small portion.

Shelton: It seems like the CD has carved out a place with classical music, music that has lasting value and will be played many times over many years. The LP, I think, still has a long life because it's still the best value in terms of quality versus cost. I think for the mass market that's a really important factor. The success of the cassette is based on convenience and cost: it's cheap and convenient. That shows the direction toward which the mass market heads, not toward something much better and more expensive. So I think that will limit the CD's success in the overall market. If DAT is able to make cheaper software, which seems like a real possibility, it could be a real competitor for all the other formats. ■

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—FROM PAGE 18, CD MANUFACTURING

plastic is first injected into the mold, which is not yet completely closed. The final shape of the disc is accomplished during the subsequent compression step. With injection-compression molding, molded-in stress is minimized, but cycle times are somewhat longer than conventional injection molding, perhaps 18 seconds as compared to ten seconds. On the other hand, injection-compression systems are reported to yield longer stamper life compared to injection molding.

In some systems, the center hole is formed before the disc is removed from the mold. In other systems, the center hole is punched out of the disc separately, after the top layer is applied, but before the label is printed. Following molding, the warm disc is subject to static charge; any dust particles in the air are attracted to the disc. The molding room must be kept at class 1000, often with special hoods over the molding machines themselves for even cleaner environment at the molding head.

In summary, the injection molding process requires consideration of the following concerns: environmental cleanliness and temperature control, nozzle and hopper temperature regulation, mold temperature regulation, adjustment and stability of injection volume and time, removal of flashes from mold surface, and quality of molds and stampers.

After leaving the molding machine, the disc is wholly formed, but transparent; a player's laser beam could not read the impressed data because there would be no reflected beam to convey the information. Hence, a reflective layer must be placed over the data pits. Typically a layer of aluminum is evaporated onto the disc surface to provide reflectivity. However, other metals and application methods could be utilized. The reflective layer is very thin—on the order of 50 to 100 nanometers thick.

The reflection coefficient of the metal layer including the polycarbonate substrate (note that the CD player laser must shine through the substrate to the metal layer) is specified to be between 70 and 90 percent. In addition, the metal must be chosen to be inert with the polycarbonate substrate. Three cost-effective metals qualify with the required reflectivity and stability: aluminum, copper, and silver. Reflectance values of 80 to 90 percent apply at the read-out wavelength, even with thin layers with a thickness of only a few tens of nanometers. Metalization requires a clean room of class 1000.

With vacuum evaporation (vapor deposition) as the application method, aluminum has good adherence and

is most commonly used. The evaporation is accomplished in a vacuum chamber with aluminum-coated resistance elements, and takes about 15 minutes. Large racks of discs are treated simultaneously, and a good mirror coating results. However, a major production snag is encountered as discs must be individually loaded onto the racks, then batch metalized, waiting for the pumping-down of the evaporation chamber, and re-admission of air after deposition. This is not easily integrated into the otherwise continuous disc manufacturing process. Also, any dust in the chamber, stirred up during pumping, causes pinholes in the metal layer and can be avoided only through stringent cleanliness.

A metallic mirror can also be obtained by electroless silver deposition, often called wet silvering, a process long used to produce glass mirrors. In this process, wet chemicals are combined to cause the formation of a thin layer of silver over the disc surface. Since the process is accomplished by spraying liquids, a continuous production machine can be used; the discs are placed on a conveyer belt and ride through the sequential processing stages. Wet silvering takes less time per disc than vacuum evaporation, and continuous rinsing of the disc minimizes the formation of pinholes.

Magnetron sputtering is a third metalization method used for CDs; a cold solid target is bombarded with ions, releasing metal molecules, which coat the disc. Using high voltages, a discharge is formed between a cathode target, and an anode. Powerful permanent magnets behind the cathode form a concentrated plasma discharge immediately above the target area. Argon ions are extracted from the plasma, and bombard the target surface, thus sputtering its surface. The CD is placed opposite the target, and outside the plasma region. A continuous sputtering machine with a permanent vacuum can be used for mass production. Discs are loaded at one end of a conveyer, and pass through a series of bulk heads which create pressure gradients from ambient pressure down to a vacuum, and back again. It is faster than evaporation, and allows choice of different metals or alloys.

The metal layer is covered by an acrylic layer with a spin coating machine, and it is cured with an ultra-violet light. This layer protects the aluminum layer from scratches and oxidation. The label is printed directly upon this layer. In some systems, silk-screening is used, and the paint is quickly cured by ultra-violet light. Printing may be carried out in a dirty room of class 100,000.

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Finished discs are inspected for continuous and random defects typically using both automated and human checking. Birefringence, high frequency signal, frame error rate, noise, presence of foreign particles, reflectivity, frame tracking, number of interpolations, and skew are checked on selected discs. As part of the quality control of master discs, and finished discs, CD analyzers are used. These special players display the data recorded on the disc, and provide a simultaneous print-out. The analyzer indicates total playing time of the disc, the start time of each music selection as recorded in the table of contents, and the contents of the reference sub-code. It checks for any sub-code drop-out or irregularities, noise generated by the error rate, and mistracking of the laser pick-up. All pertinent information, such as the exact location of signal dropouts, can be printed out.

In one quality control system, a rapid, automated device checks every disc for defects. The disc is rotated for two seconds under a fantail laser beam; a photo sensor registers any blemish in the reflective pattern and rejects any faulty discs. The human eye is also effective for spotting defects; under polarized light, an area of defective pits is visible as a blemish.

Following insertion into a jewel box or other packaging, and cellophane wrapping, usually accomplished with robot workers, the compact discs are ready for distribution to wholesalers.

The conventional method of injection molding of polycarbonate is inefficient in several respects: Polycarbonate is difficult to mold without introducing optical distortions, basic materials are expensive, the batch-type metalization processes are slow, aluminum coating is subject to pinholes, large space and manpower are required, and expensive clean rooms are required. Given the difficulties in conventional CD manufacturing methods, improvements and innovations in the process are inevitable; for example, increased use of robot workers, and placement of human workers outside of clean areas will dramatically increase efficiency. On the other hand, research toward alternative manufacturing processes is proceeding as well.

Site requirements are carefully specified. Clean air is critical. CD pits are among the smallest manufactured formations—about the size of a smoke particle. Thus the entire manufacturing process must be carried out in a clean room environment, with the size and number of particles in the air strictly regulated. Clean room classifications specify the number of particles and their size, present in the air. Class 100,000, for example, specifies

no more than 100,000 particles larger than 0.5 micrometers, per cubic foot of air. Temperature and humidity, as well as ambient air pollution levels must also be specified.

A clean room environment is a difficult proposition for a large room containing many machines, with operating personnel. Dust is perhaps the single largest cause of disc defects. To reduce contamination from workers (and cut labor costs), most clean rooms make extensive use of robots. In addition, many factories separate clean areas from "dirty" areas by building partitions across the machines. The disc work area can be kept clean, while the rest of the machine is left in the dirty area for maintenance. Laminar air flow is used to "wash" air through a clean room; the air enters at the top, and flows through the bottom, pushing impurities away. In addition, clean air hoods are used for critical operations.

A manufacturing facility designed to accomplish the tasks of mastering and replication represents no small capital investment; ten million dollars is approximately the minimum price of admission. Also, the time required to construct such a facility is quite substantial; a 12-month start-up would be speedy indeed.

While we have focused on conventional disc manufacturing methods, new techniques and systems are appearing on the market. DRAW mastering systems facilitate disc cutting, and alternatives to injection molding still hold promise. We'll examine this and other new technology in an upcoming Insider.

Audio Rumor Central

Sony responded to my recent attack on their pricing of spares with an acknowledgement that some of their prices were indeed "out of line." More importantly, price roll-backs are proceeding. For example, the \$7.77 diode now sells for \$1.18. The \$125 JH110 pinch roller is now \$72.09. Sony also pointed out a discrepancy in my argument. In the case of the JH500 hi/lo EQ switch, my "last year's price" was mistakenly taken from a 11/1/82 price list. The price was \$91 in the 3/1/85 price list. The current price is still \$197.50, as I reported. No hard feelings, guys. Sony still makes the best damn color TV—even though I can't afford one.

Do you have information or rumors for Insider Audio? Send it in! Contact Ken Pohlmann, University of Miami, P.O. Box 248165, Coral Gables, FL 33124, Telex 519308 or leave a message at (305) 284-2439. Just to be safe, put a handkerchief over the mouthpiece.

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Why your next console should be as difficult to hear as it is easy to operate.

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Electronic production techniques using MIDI and SMPTE sync require more control than a "wire with gain" can provide. But as functions and components accumulate, the console's signal path has grown more complex, and its audio performance has suffered. On analog recordings, higher levels of crosstalk, noise and intermodulation were an acceptable price for additional control. On digital multitrack, however, these flaws become glaringly obvious.

Crosstalk blurs the stereo image.

Now that digital recorders have virtually eliminated crosstalk, this is an especially annoying problem. *The AMR 24 matches the channel separation performance of digital multitracks* because it employs balanced buses that eliminate crosstalk the same way mic inputs do. This radical design approach takes full advantage of digital's more coherent stereo imaging.

Balanced buses also eliminate the intermodulation that plagues the sound of conventional "virtual ground" mix amps. *The AMR 24's noise floor is constant whether you route one input*

to a group, or thirty six. So you can concentrate on the music without distractions from the mixer, even on digital multitrack.

Features shouldn't degrade audio performance.

Automation widens creative possibilities — and narrows the margin for console error. For example, FET mute switches that are "silent" individually can produce audible glitches when grouped. The AMR 24's carefully controlled switching time constants eliminate this problem.

Every circuit in the AMR 24 has been calculated with equally close attention. Each stage has at least 22 dB of headroom; total dynamic range is over 100 dB. Even so, *unused stages are bypassed to produce the shortest effective signal path in every operating mode.*

Perhaps the AMR 24 is a product of extremist engineering. But as we see it, optimum audio performance, not simply a revised layout, is what makes a console automation- and digital-ready.

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The AMR 24 facilitates innovative production techniques within a classically

split configuration. Master Input Status switches select mic inputs or line returns on all input channels simultaneously. In its mixdown configuration, the AMR 24 will handle up to 60 tracks, because the 24 Track Select switch changes the monitor returns to line returns normalised to your second 24 track (or to synchronised "virtual tracks" from synthesizers and samplers). The monitor returns have aux buses, solo and mute, plus four bands of EQ and long throw faders, so this flexibility is achieved with no loss of audio quality. For additional effects returns, the Fader Reverse function creates an additional 24 patch points through the cue send faders.

Imaginative design and uncompromising construction give the AMR 24 flexibility and sonic transparency that represent clear achievements: especially clear on digital recordings. For all the facts on this innovative console, send your business card or letterhead to:

DDA AMR 24



Klark-Teknik Electronics Inc., 30B Banfi Plaza North
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Hounslow, Middlesex, UK TW3 2EB

Unveiled at last month's AES Convention in Los Angeles, the DMM CD mastering process doesn't require a clean room and is priced at under 20% of a photo-optical system.

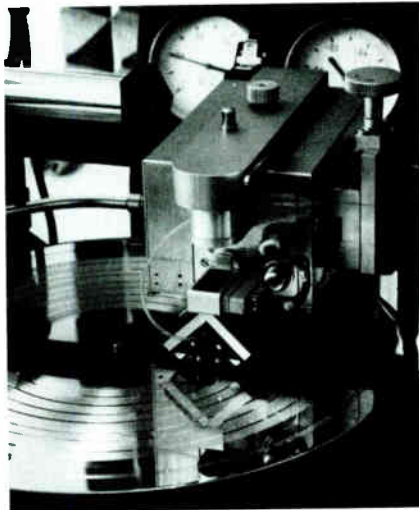
THE TELDEC · NEUMANN

by Philip De Lancie

In a move that promises to shake up current compact disc preparation procedures, Gotham Audio Corporation has announced the development by Teldec and Neumann of a CD Mastering System based on the principles of the Direct Metal Mastering process. Like Teldec's DMM system for LPs, the new technique involves "cutting" into a copper surface using a modified Neumann lathe. The system need not be operated in a clean room environment, and is expected to cost far less than the photo-optical systems now in use. These factors would allow CD mastering capability to be widely distributed and accessible to clients (as LP mastering is currently), rather than centralized at manufacturing facilities as at present. That might be good news not only for the clients themselves, but for mastering facilities whose role in a CD dominated future marketplace may have seemed uncertain.

As of this writing, specifications and other information have not been made available in great detail, pending formal product introduction at the November AES convention. But Russell Hamm, president of Gotham Audio, was able to outline the system for me in general terms, and to give his

SYSTEM



Conventional Direct Metal Mastering system shown here cuts copper mothers used in vinyl LP production.

thoughts on its significance. Our conversation follows:

Mix: Describe the physical components of the system, starting with the lathe.

Russell Hamm: The DMM CD Mastering System is based around a cutting lathe whose physical appearance is somewhat like a Neumann VMS 80 lathe. In fact, in early development that's what was used. The VMS 80 was originally developed for cutting video discs, so therefore the turntable bearings and the lead screws are all machined to the kind of precision that is needed to cut the very small pits into the surface. There have naturally been a lot of mechanical changes made, but you can recognize the VMS 80.

Mix: How is the turntable driven?

Hamm: It is a direct drive servo system.

Mix: Describe the cutter head.

Hamm: The cutter head uses a piezoelectric type element with a diamond cutting stylus. The head acts like a jackhammer, operating with tremendous force.

Mix: Is there some sort of suction system for removing the copper chip?

Hamm: The cutting process does not actually generate any chip. The cutter head embosses, if you will, the surface. It literally hits the surface so hard that it makes an indentation. So the

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"The cutterhead acts like a jackhammer, operating with tremendous force...nearly one ton..."

cutter head is flying over the surface with this "jackhammer" pounding in the pits. If a piece of dirt gets in the way, it just pounds the dirt too. If memory serves me well, nearly one ton of force is applied.

Mix: What is the flow of events in producing the CD molds using the DMM CD Mastering System?

Hamm: The system cuts in real time. You can hear it, and there is a feedback loop which looks at the pits and corrects for depth of cut and all that. The encoding electronics use the standard—EFM code, I believe it is called. You go from the 1630, into the PQ code generator, into the EFM encoder, and then into the cutting rack which actually drives the cutter head.

The head cuts into the copper surface, which has been deposited on optically flat glass (the same type of glass blanks used for conventional CD mastering, but coated with copper rather than photo resist). Once you cut the pits into the copper, you can take that piece and start electroplating directly. You do not have to develop it and silver it before starting to plate it. That stage of developing and silvering is a real tricky one in the photo optical process. It's the same tricky step that you need for processing a

lacquer LP master. You have to make it electroconductive in order to plate it. That's where you get problems with errors getting to be too high for error correction.

In the case of DMM for LPs, essentially what you are cutting is a mother. You take the mother and you stick it right in to a plating tank. This CD system utilizes that same concept. You cut a piece of copper, you have a mother, you put it in a plating tank, and you start generating stampers directly.

Mix: Is the system designed to allow the lathe to be converted back and forth between cutting for CDs and LPs?

Hamm: No. Not at all.

Mix: I assume one could master directly from an analog tape by running it directly into a digital console, processing it, and feeding the console output into the cutting system.

Hamm: Absolutely.

Mix: What is the projected price of the system?

Hamm: I think a system will probably be in the range of a half-million dollars. When you consider that photo-optical systems are \$2.5 million, plus clean room, a half-million dollars is

"DMM will put the price of CD mastering into the area where a medium-sized record company or studio can own their own CD mastering lathe."

incredible. That's less than 20 percent. That will put the price of CD mastering into the area where a medium-sized record company or studio can own their own CD mastering lathe.

Mix: Why do you feel that is particularly important?

Hamm: The way things are now, you make a digital master tape, 1630 format, and you send it off to the factory. But you don't believe that they just do a direct transfer of your tape, do you? You know they run it through a digital console, and that console has knobs. So the artistic control is in the hands of the people at the CD factory.

If I were the producer of a major album, I would be worried. I'm willing to pay to go to a mastering room and have a mastering engineer twist knobs, because I trust them and I know that the end result is going to be good, or else their career has gone down the drain. But when the equipment is at some CD factory somewhere, operated by someone I don't even know, and they decide that an album needs a little top end, or God only knows what else, and they've got a knob to do that, then I would say we're back to the dark ages of disc cutting before we got people who knew what they were doing involved.

• • •

In other CD mastering news, Optical Disc Corporation of Cerritos, California has announced the installation of its Model 530 Compact Disc Mastering System at Discovery Systems in Dublin, Ohio. According to ODC, Discovery has already produced injection molded product from masters made on the Model 530. ODC, which has been a supplier of video disc mastering systems, reports that this is the first U.S. delivery of any American-made CD mastering system.

• • •

Jim Bosken of QCA, Inc., a Cincinnati-based mastering, pressing and duplication concern, has contacted me to point out that Ni-Fi (see July's "After-Mix") is not the only lacquer mastering processing system to substitute nickel spraying for silvering. QCA, Bosken says, hasn't used silver for two or three years. Instead, their lacquers are sprayed with the nickel solution Metallume, developed by Sanford Jacobs of MFI Industries. Bosken cited several advantages of Metallume over silver, including the fact that it is slower to oxidize, forms a harder surface, allows more mothers to be made from a metal master, and is both less perishable and less expensive. An additional benefit for small quantity orders is that Metallume processing allows the metal master to be used as a stamper without the risk of degraded

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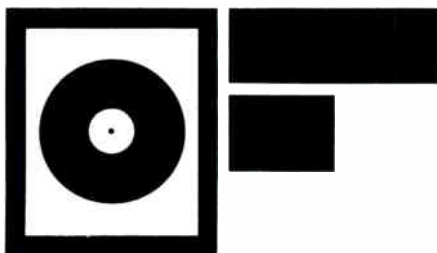
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sound quality which can result from stripping the master of silver.

• • •

R-DAT Update: In September and October, I detailed the high speed video duplication techniques favored by Sony and Du Pont, and how they might be applied to the manufacture of pre-recorded product for rotary head digital audio tape (R-DAT). At the time, solutions to R-DAT's technical problems seemed to be within reach, but unexpectedly determined opposition to the new format from powerful record industry interests now means that its political problems are just beginning. Responding to the strong concerns of the Recording Industry Association of America (RIAA), among others, five U.S. Senators have submitted legislation to impose a 35 percent duty on the importation of DAT machines not equipped with "copy-code scanners," electronic chips which prevent the unauthorized duplication of encoded recordings. Scanner equipped machines could be imported at the current tariff of 4.1 percent. Senator John Danforth (R-MO) suggested in introducing the bill that it represented no more than an interim step in the battle against copyright violators, and is intended primarily to "preserve the status quo until Congress has an opportunity to consider a comprehensive response to the home taping problem." Stronger measures, including bans on the manufacture or importation of all audio recording devices without scanners, have been proposed in both the U.S. and the European Economic Community. So far, it is unclear how the hardware manufacturers, primarily Japanese, will respond to these threats, but prospects for an early introduction of R-DAT machines to the U.S. market now seem somewhat dim.

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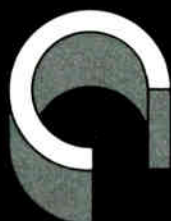
Electro Sound, Inc. of Sunnyvale, California, has become the sole sales agent for TTL USA's Automatic Cassette Loader, Tape Twist Detector and Cassette Stacker Stamper. "We feel that TTL's Cassette Loader and accessories are a natural adjunct to our duplication systems," says Mark Neve-jans of ESI. TTL's Video Loader is expected to be added to the line in the near future.

• • •

King Instrument Corporation of Westboro, Massachusetts has introduced a dual supply VHS cassette loader which makes possible replacement of empty reels while operating. The computer controlled Model 2500, with a claimed production capacity of over 800 cassettes per eight-hour shift, features an air bearing tape guide system and operator adjustable tape tension. ■



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LOOKING FOR THE HUMAN TOUCH

GEORGETOWN MASTERS

by Rose Clayton

Georgetown Masters is bringing the art of mastering into a new age—out of the clinical, intimidating metal environment into a spacious, individual-centered atmosphere. Located in the luxurious Georgetown Plaza executive condominium complex on Nashville's historic Music Row, Georgetown Masters is a tri-level facility that in-

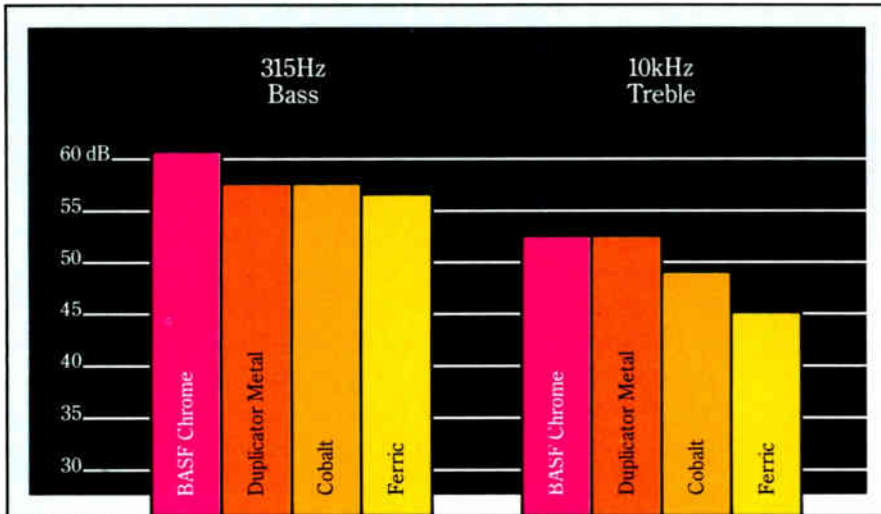
corporates all the basic ingredients one would expect in the city's leading mastering facility—qualified personnel, state-of-the-art equipment and a professional work area.

The triumvirate behind Georgetown are the visionary producer Norbert Putnum, entrepreneur Ron Bledsoe, and engineer Denny Purcell. Bledsoe, a personable man with a diplomatic

air, was a record executive, radio station owner, cable TV mogul on the way back to the recording industry. Bledsoe became involved in the Georgetown venture because he was convinced of the facility's economic viability. "When Norbert approached me, we knew the direction of the future," he comments. "We felt we had the right man in Denny, so we went



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after the right equipment. We're a team. I like to think of myself as a businessman, Norbert leans towards the creative side, and Denny has the technical knowledge." Barbra Thompson takes care of business on an hour-by-hour, day-to-day basis.

As a producer and studio owner, Putnam has a reputation for being unconventional in his approach. And Georgetown Masters incorporates some of Putnam's philosophy about the importance of the environs to the creative process. Decorated in airy tones of gray and deep blue, the angular walls zigzag through the open space like sound waves. Live plants, oil paintings, an Italian marble fireplace, and low-slung customized

modular furniture combine with the streamlined state-of-the-art machines to provide the moderne setting of the 4000 sq. ft. facility.

It's the cutting suite that's most impressive, however. "I wanted to provide the producer with a place as comfortable as his living room," comments Putnam. "He can sit on the sofa, with a coffee table in front of him and relax. We have the speakers placed in front of the glass because that's where mine are at home and it works."

The floor-to-ceiling windows that border the room were put in by Putnam to stimulate creativity—the engineers can watch the sunshine and shadows bounce off the buildings on the city's west side while listening.

Sometimes metallic, gauze-like sheers drape the windows, making the city appear in silhouette.

Why all the emphasis on spaciousness, comfort and beauty at Georgetown? "I like to stay in touch with time and nature," says Putnam. "Observing time changes the pace of things and affects mood. The mastering process is one of the most pressurized times for the producer," Putnam continues. "He's under the gun with the label screaming for the product. He's been working for months, and he could lose it all right here."

That's why David Cherry, who engineers with veteran producer Chips Moman, travels from Three Alarm Studio in Memphis to Georgetown in Nashville. In the year that Georgetown's been open, Moman and Cherry have brought them the *Class of '55* project plus the current albums of Willie Nelson, Bobby Womack, and Kris Kristofferson.

"What I try to do in mastering is get back to being an objective listener," says Cherry. "I want to listen like a consumer rather than an engineer. Georgetown has a homey feeling that allows me to do that. They have a knack for keeping the feel of a song."

Engineer Denny Purcell, who projects a calm assurance from beneath his trademark Panama hat and rose-colored glasses, is extremely proud of Georgetown's reputation. He left Woodland Mastering after 12 years, and brought with him a track record of 130 gold and platinum albums for mastering projects ranging from the Oak Ridge Boys and Barbara Mandrell to Neil Young and Kansas. There is a sign on the cutting suite door that reads "Confessions heard daily." Purcell explains, "This is the place of truth. We put on the tape and you hear a culmination of what you've been doing with your time for the last weeks or months."

Purcell says he uses the "less is more" approach. "We try to enhance a record, not change it. Sometimes people can get consumed by technology. We don't put anything in the circuit unless we need it."

"Our system is a minimum of signal processing," Purcell continues. "We go from the source to the amplifier [a Perreaux from New Zealand] through the wires to the speakers [B&W's from London]." The result is a multi-dimensional sound that hopefully embraces the listener.

"For years the people in Nashville who were the hottest were the ones who had the newest stuff," Purcell says. "So we decided to get the best, whatever it cost. The computer that drives my lathes is one of only 12 in the world. We went to New York and


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L.A. and found that the best places were the ones that didn't sound like anywhere else. So, we hired Rick McCollister to design our system, and its handcrafted proprietary signal equipment is made with our specifications in mind. We keep the 'black box,' as some people call it, in the control room that we call 'the beach.' No one is allowed to go to the beach."

"We didn't just want a studio that sounded different," Bledsoe cautions, "we wanted one that sounded real. You can screw up something and it sounds different, but that doesn't make it sound truthful."

Eric Prestigie, an independent engineer/producer whose credits at Georgetown include hitmakers like Crystal Gayle and Barbara Mandrell, agrees: "Denny will never tell you what his secrets are—how he gets the sound he does—but whatever it is he's doing, it works."

"I heard about the wiring he was doing at Georgetown, so I decided to get him a shot," Prestigie continues. "I had both Denny and the place I was using to cut a flat ref at the same level without EQ. Then I had them both cut an EQ'd ref without my help to get the different input."

"Denny's ref had better top end, the mid-range was clearer, the vocals

were brighter—more out front—there was more space around the instruments, the echo content was better perceived, and the bottom end was tighter and punchier. Overall it sounded more musical. The EQ'd version had the same superior qualities," Prestigie concludes, "so I felt that Georgetown was making better discs."

It's obvious that dedication to quality is major factor in the motivation of Georgetown's personnel. Engineer Carlos Grier demonstrated the comparison technique Georgetown uses for monitoring its work. It's a true A/B turntable that can be switched from one ref to another without having to change the disc to measure the comparison of the sound.

"The Shotout" as Purcell calls it, attracts a great deal of business, which now keeps a staff of three working an average of 16 to 18 hours a day, seven days a week. About 60% of Georgetown's product is country music, but with an impressive growth in gospel music.

With digital cassettes and CDs on the rise, Georgetown's prospects for the future are bright indeed. In addition to the complete digital signal processing services, compact disc pre-mastering is becoming an increasingly important aspect of Georgetown's

work. CD-ROM and CD-I services are available. While copying digital masters, Georgetown is also coding copy for future CD use.

Another important feature Georgetown offers is its archive. Final compact disc master tapes are verified by computer, and backup copies are made before tapes are shipped to the plant. Every step of the pre-mastering process is documented and kept with the original masters.

"It's exciting," says Purcell, "when I realize that I made over 100 sides of Willie Nelson's 'Always On My Mind,' a copy every time that they had to re-order. With digital technology, I can store the digital moves for use at any later time for various digital formats."

Mastering is like looking at music under a giant microscope," Purcell says. "You can spend as much time as you want in mastering depending on what lens you want to look through. Depending on the producer, it can take from ten to 30 hours or up to two weeks to master a project."

At Georgetown, mastering is viewed as the last creative step in making music, not as a manufacturing process. "Music is the thing," Purcell summarizes. "Equipment is just the tool." ■



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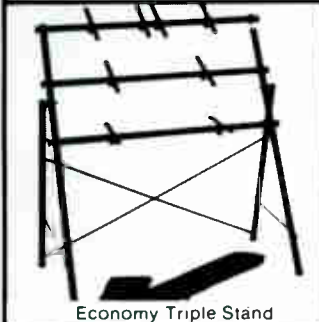
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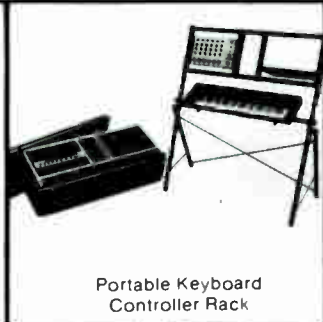
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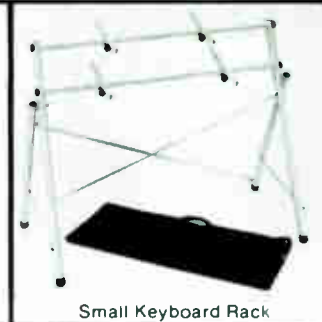
Economy Triple Stand



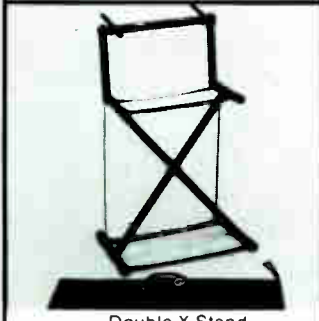
Portable Keyboard
Controller Rack



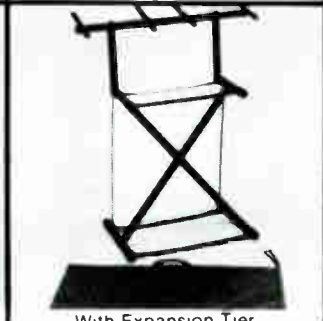
Large Keyboard Rack



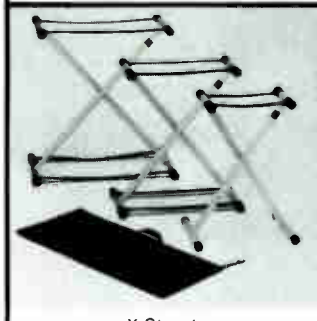
Small Keyboard Rack



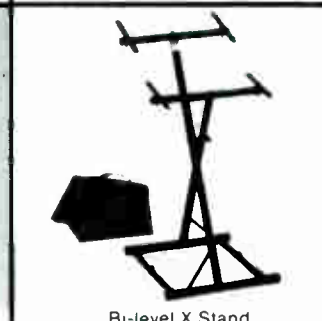
Double X Stand



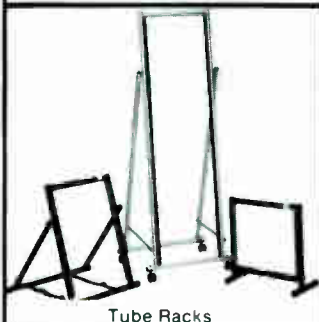
With Expansion Tier



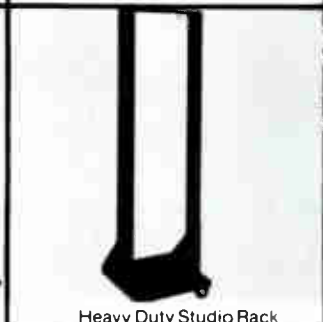
X Stands



Bi-level X Stand



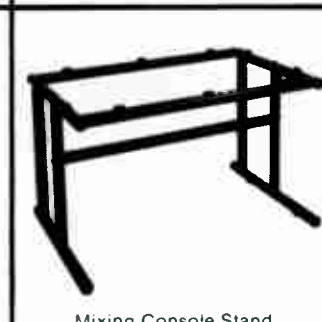
Tube Racks



Heavy Duty Studio Rack



Racking Console



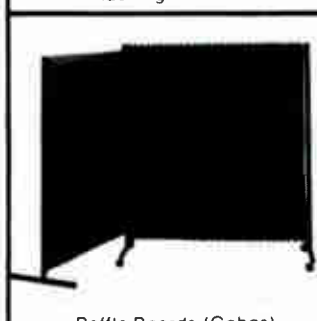
Mixing Console Stand



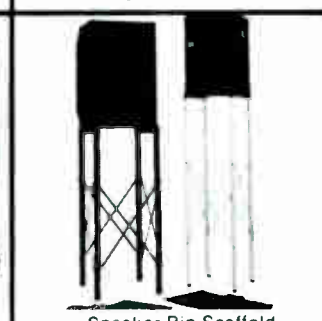
Utility Table



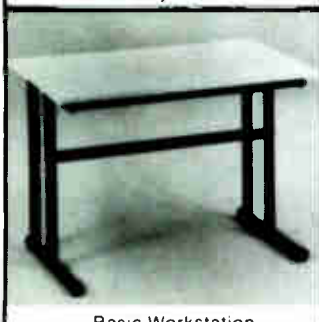
Portable Workstand



Baffle Boards (Gobos)



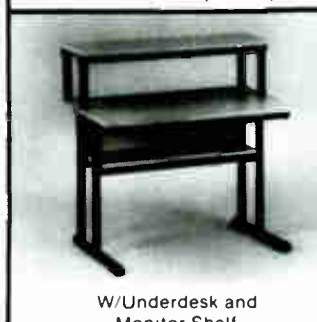
Speaker Bin Scaffold



Basic Workstation



W/Underdesk Shelf



W/Underdesk and
Monitor Shelf



Stereo Rack

TUBECRAFT

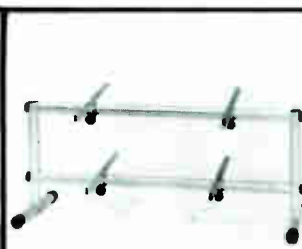
HOLBROOK, NY 11741
(516) 567-8588

ORDER NOW AND SAVE

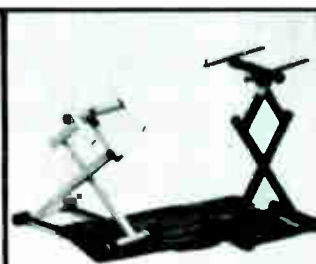
Dealer Inquiries
Welcome

-SUFFIXES (S=SINGLE, D=DOUBLE, T=TRIPLE,
U=UNDERDESK SHELF, M=MONITOR SHELF
-BLACK FINISH ADD 10%
-CASTERS ADD \$42.00

ITEM #	DESCRIPTION	RETAIL	OUR PRICE
TUBE RACKS			
TR-06	6 SP (10.5") TUBE RACK	110.00	77.00
TR-08	8 SP (14") TUBE RACK	118.00	83.00
TR-10	10 SP (17.5") TUBE RACK	124.00	87.00
TR-12	12 SP (21") TUBE RACK	164.00	115.00
TR-14	14 SP (24.5") TUBE RACK	172.00	121.00
TR-16	16 SP (28") TUBE RACK	180.00	126.00
TR-18	18 SP (31.5") TUBE RACK	190.00	133.00
TR-22	22 SP (38.5") TUBE RACK	202.00	142.00
TR-27	27 SP (47.25") TUBE RACK	218.00	153.00
TR-41	41 SP (71.25") TUBE RACK	268.00	188.00
KEYBOARD RACKS			
LK-36S	36" LARGE KEYBOARD RACK (INC 1 TIER)	158.00	111.00
LK-42S	42" LARGE KEYBOARD RACK (INC 1 TIER)	160.00	112.00
LK-48S	48" LARGE KEYBOARD RACK (INC 1 TIER)	162.00	114.00
LK-54S	54" LARGE KEYBOARD RACK (INC 1 TIER)	164.00	115.00
SK-36S	36" SMALL KEYBOARD RACK (INC 1 TIER)	158.00	111.00
SK-48S	48" SMALL KEYBOARD RACK (INC 1 TIER)	162.00	114.00
SK-54S	54" SMALL KEYBOARD RACK (INC 1 TIER)	164.00	115.00
AT-36	36" ADDITIONAL TIER	38.00	27.00
AT-42	42" ADDITIONAL TIER	40.00	28.00
AT-48	48" ADDITIONAL TIER	42.00	30.00
AT-54	54" ADDITIONAL TIER	44.00	31.00
ET-36B	36" ECONOMY TRIPLE RACK (BLK.)	194.00	136.00
ET-42B	42" ECONOMY TRIPLE RACK (BLK.)	206.00	145.00
ET-48B	48" ECONOMY TRIPLE RACK (BLK.)*SPECIAL PRICE!	178.00	125.00
ET-54B	54" ECONOMY TRIPLE RACK (BLK.)	230.00	161.00
ED-36B	36" ECONOMY DOUBLE (BLK.)	174.00	122.00
ED-42B	42" ECONOMY DOUBLE (BLK.)	186.00	131.00
ED-48B	48" ECONOMY DOUBLE (BLK.) *SPECIAL PRICE!	158.00	111.00
ED-54B	54" ECONOMY DOUBLE (BLK.)	210.00	147.00
ER-04	4 SP. EXPANSION RACK-48" WIDTH	120.00	84.00
ER-08	8 SP. EXPANSION RACK-48" WIDTH	140.00	98.00
PB-10	PIGGY BACK RACK (TIERS NOT INC.)	30.00	21.00
MS-10	MINI SCISSOR STAND	80.00	56.00
MT-30B	MIC STAND TIER + MIC STAND + MUSIC RACK (BLK.)	60.00	42.00
X STANDS			
SX-30	SM. X STAND	66.00	47.00
MX-32	MED. X STAND	78.00	55.00
LX-36	LG. X STAND	88.00	62.00
DX-32	DOUBLE X	138.00	97.00
BX-10	BILEVEL X	118.00	83.00
ACOUSTIC DIVIDERS (GO-BO)			
GB-39	(W39" x H48") GO-BO (BLU, RED, YEL, GREY)	130.00	91.00
GB-52	(W52" x H48") GO-BO (BLU, RED, YEL, GREY)	150.00	105.00
PORTABLE WORKSTANDS & TABLES			
PW-28	(28" x 18" x 30") PORTABLE WORKSTAND	90.00	63.00
PW-36	(36" x 20" x 30") PORTABLE WORKSTAND	110.00	77.00
PT-28	(28" x 18" x 30") PORTABLE TABLE	140.00	98.00
PT-36	(36" x 20" x 30") PORTABLE TABLE	160.00	112.00
UT-30	SM UTILITY TABLE	96.00	68.00
UT-36	LG UTILITY TABLE	116.00	82.00
DJ STANDS			
DJ-30	SMALL DJ STAND	90.00	63.00
DJ-36	LARGE DJ STAND	110.00	77.00
DB-36	DJ BOOTH (INC. SNAP-ON SKIRT)	500.00	350.00
RACKING CONSOLES			
RC-10C	RACKING CONSOLE/CASTERS	250.00	175.00
RS-10C	RACKING CONSOLE/SHELF/CASTERS	280.00	196.00
PARTS			
PCA-10	LOCKING CASTERS (SET OF FOUR)	60.00	42.00
PKA-10	KEYBOARD ARMS (SILVER)	22.00	16.00
PER-10	ECONOMY KEYBOARD ARMS (BLK.)	12.00	9.00
PORTABLE BIN SCAFFOLDS			
BS-05	(18" x 18" x 60") BIN SCAFFOLD/1.5" DIA. TUBE	124.00	87.00
BS-06	(18" x 18" x 72") BIN SCAFFOLD/1.5" DIA. TUBE	130.00	91.00
BS-15	(22" x 22" x 60") BIN SCAFFOLD/2" DIA. TUBE	180.00	126.00
BS-16	(22" x 22" x 60") BIN SCAFFOLD/2" DIA. TUBE	190.00	133.00
NEW PRODUCTS			
HR-06	6 FT. HEAVY DUTY ELECTRONICS RACK (BLK. ONLY)	550.00	385.00
MC-48	MIXING CONSOLE STAND (W48" x D30" x H26") OTHER SIZES CALL	250.00	175.00
WORKSTATIONS			
WS-42M	WORKSTATION-42" x 28" x 26"	196.00	138.00
WS-42M	WORKSTATION-42" x 28" x 26"/MONITOR SHELF	230.00	161.00
WS-42MU	WORKSTATION-42" x 28" x 26"/MONITOR & UNDERDESK SHELF	258.00	181.00
WS-42U	WORKSTATION-42" x 28" x 26"/UNDERDESK SHELF	218.00	153.00
ALSO IN 36" WIDTH & 48" WIDTH CALL!			
—WS TABLETOPS ALMOND, BLK., OAK, WALNUT-SPECIFY			
—WS SERIES AVAILABLE WITH LOCKING CASTERS (#PCR-10)			
—TR. PW, PT, DJ, & DB SERIES AVAILABLE WITH CASTERS			



Piggyback Rack



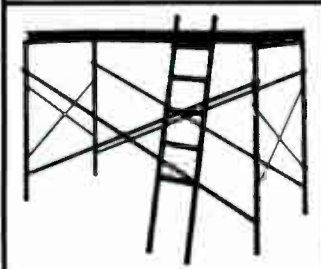
Mini-Scissor



DJ Stand



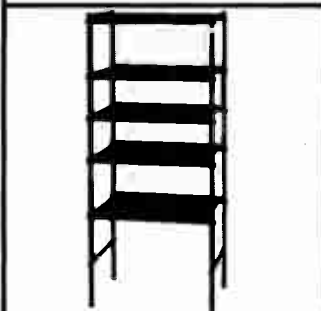
DJ Booth



Custom Steel Scaffolding



Multipurpose Mini Stand



Custom Display Rack



Custom Display Rack

MasterCard

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VISA

FM TUBECRAFT SUPPORT SYSTEMS INC.

1121-26 Lincoln Avenue, Dept. MX, Holbrook, NY 11741

List Items _____

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

CHECK FORM OF PAYMENT: VISA MasterCard
 Personal Check Certified Check Money Order

Card No. _____ Exp. Date _____

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PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
All Returns Must Have a Return Authorization Number.

Task:

Copy a few
cassettes today,
a thousand
tomorrow and
ten thousand
next week. *BK*



Problem:

Find a one-stop source for tape duplicating equipment that accomplishes the small tasks and the big ones—profitably.

Solution:

Telex—unquestionably the company with the widest, most versatile line of tape duplicating products in the industry.

Telex has a duplicator that fits your needs—today, tomorrow and next week.

Whether it's a new suit for yourself or electronics for your business, it makes sense to shop where you have the widest selection. And, if your purchase is as crucial to the profit line as a high speed tape duplicator, you shouldn't settle for a model that almost fits your needs.

Telex has models that copy as few as one cassette at a time or as many as twenty-three. Telex models are available in mono or stereo and also offer a wide variety of copying configurations such as cassette to cassette, reel to cassette, cassette to reel or reel to reel. For small to medium run cassette duplication, choose one of the new Telex CD Series, but if you need open reel capability plus larger cassette production, one of the Model 6120 configurations is probably best for you. At Telex, you can find the right duplicator at the right price, and you'll find it faster. For more information and detailed specifications, write to Telex Communications, Inc., 9600 Aldrich Ave. So., Minneapolis, Minnesota 55420, Telephone: 612-887-5531.

Call Toll Free in U.S. 800-828-6107

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medium production
runs...



The NEW
CD Series

TELEX®



The Model
6120—for
medium to
large produc-
tion runs

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Circle #068 on Reader Service Card

World Radio History

TAPE-TO-DISC

D I R E C T O R Y

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. People and equipment change, so please verify critical information with the companies directly.



Digital # duplicators at the Full Sail Center for the Recording Arts in Orlando, Florida, recently installed a three master/24 slave KABA system providing 48 record positions and a choice of real time or double speed work. Other equipment includes dbx 700 digital processors and Sony 5300 U-matic decks for digital storage of client masters and Fossex LS-2 monitors. Photo: Mr. Carol Morgan

CONTENTS

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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. Basic listings (name, address, contact) are provided free of charge. Extended listings (equipment, credits, specialization), and photographs or company logos may be included at a nominal charge. If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department, 2608 Ninth Street, Berkeley, CA 94710, (415) 843-7901.

Upcoming Directory Deadlines

Southeast Recording Studios: **December 12, 1986**
Video Production/Post-Production: **January 2, 1987**
Northeast Recording Studios: **February 3, 1987**
Remote Recording/Sound Reinforcement: **March 3, 1987**



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

Eastern

AAA RECORDING

Mastering, Pressing, Tape Duplication
130 W. 42nd St. (Room 552), New York, NY 10036
(212) 221-6626
Contact: Fred Vargas

ACE AUDIO VISUAL CO.

Tape Duplication
118 East 28th St., New York, NY 10016
(212) 685-1728
Contact: Tony Monzo

ACOUSTIC CREATION RECORDING STUDIO

Mastering, Pressing, Tape Duplication, CD Services
6307 Jasper Rd., Greensboro, NC 27409
(919) 299-6307
Contact: Kip Williams, owner/manager

AIR CRAFT RECORDING STUDIOS

Dormont Square, Pittsburgh, PA 15216
(412) 341-6830, 343-5222
Contact: Justin Brown, vice president; Bruce Marshall, sales manager

TAPE DUPLICATION

Duplicator: (20) Nakamichi MR-2, professional cassette decks
Capacity: 500 tapes per day
Method of Duplication: In cassette
Mastering Equipment: Otari MX5050, Otari MTR-10 (15 and 30 ips), half-inch Beta/Sony PCM digital processor.
Tape Used: BASF CrO₂
Shell Used: ICM 5-screw housing
Duplicating Speed: Real time cassette duplicating at 1 7/8 ips
Loading Equipment: Custom loading to length
Packaging Equipment/Fulfillment Services: Complete custom printing/art/application and insertion/shrink-wrap/packaging.
Rates: \$2.00 to \$4.50 per unit.
Other Services: High-speed duplication costed per order.

ALPHA AUDIO

Tape Duplication
2049 West Broad Street, Richmond, VA 23220

(804) 358-3852

Contact: Mary Anne Turner, studio coordinator

ALPHA AUDIO INC.

Mastering, Pressing, Tape Duplication, CD Services
39 Music Square E., Nashville, TN 37203
(615) 248-3131
Contact: Karen Irby, office manager

ALPHA RECORDING INC.

Tape Duplication
207 S. Mulberry St., Elizabethtown, KY 42701
(502) 765-7899
Contact: Jim Cottrell, Keith Pacey

ALPHA RECORDS, INC.

Pressing
1400 NW 65th Ave., Plantation, FL 33313
(305) 587-6011
Contact: Richard Smith, president

AMERICAN MULTIMEDIA INC.

Mastering, Tape Duplication, CD Services
Tucker St. Ext., Burlington, NC 27215
(919) 229-5559

Contact: Tim Mallard, plant manager

MASTERING

Console: Neve 8108.
Tape Machines: Otari, Studer.
Monitor Speakers: UREI, JBL
Signal Processing: dbx, Dolby A, B and C capabilities, Aphex, Lexicon.
Engineers: Richard Clark, president; Bob Farrow, chief engineer.
Other Services: Digital processing: Sony 1610, IVC BP-90 and Nakamichi DMP-100.

TAPE DUPLICATION

Duplicator: Concept Design, Electro-Sound, Gauss.
Capacity: 100 million annually.
Method of Duplication: Bin loop.
Mastering Equipment: Studer A80.
Tape Used: Whatever is requested by customer.
Shell Used: By customer request.
Duplicating Speed: Special process, 64:1, 32:1, 1:1.
Loading Equipment: King MK2000 King 790.
Packaging Equipment/Fulfillment Services: Apex printing, Ilseman labelers, wrappers, Sentinel blistering F-20.

COMPACT DISC

Preparation/Manufacturing: Blister packaging, inlay card printing and collating.

AMERICAN SOUND & VIDEO CORP./ATLANTA

Tape Duplication
2225 Faulkner Rd. NE, Atlanta, GA 30324
(404) 633-4577

Contact: Stan Lester, regional sales mgr.

TAPE DUPLICATION

Duplicator: Electro-Sound Models 8000, 6000, 4000.
Capacity: 15,000 per day.
Method of Duplication: Bin loop.
Mastering Equipment: Studer/Revox, Ampex, Dolby, dbx, Audioarts, Pultec, JBL.
Tape Used: Upon request.
Shell Used: Upon request.
Duplicating Speed: 64:1 mono; 32:1 stereo.
Loading Equipment: King Instruments 790, 760.
Packaging Equipment/Fulfillment Services: Scandia wrappers, Shape inserters.
Rates: Upon request.
Other Services: Video dup.: Sony BVH-2000 (2), Sony 5800, 5600, SLO-1400; Panasonic AG 6800-S. Full packaging available for audio and video.



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

AMPHION ENTERPRISES, INC.
Rockville, CT

AMPHION ENTERPRISES, INC.

Tape Duplication
P.O. Box 794, Rockville, CT 06066
(203) 871-1786

Contact: Ed Adams, Ken Carlson

TAPE DUPLICATION

Duplicator: KABA 4-track real time system: KABA RTDS-4TM, 4TS
Method of Duplication: In cassette.
Mastering Equipment: Ampex 440B 1/2-track 1/4-inch; TEAC 4-track 1/4-inch.
Tape Used: Agfa, Ampex, MagMedia.
Shell Used: IPS, MagMedia.
Duplicating Speed: 1X, 2X.
Loading Equipment: Superscope Model 1341D.
Packaging Equipment/Fulfillment Services: Collating and shrinkwrap available.
Rates: Call or write for price list.
Other Services: Custom insert and label printing, packaging, fulfillment, blank cassettes, 16-track recording studio, sound reinforcement; we also invite short runs requiring fast turnaround and any runs requiring audiophile quality.

APEXTON RECORD PRESSING CORP.

Mastering, Pressing, Tape Duplication
44-27 Purves St., L.I.C., NY 11101
(718) 937-4038, plant; (212) 221-6625, office.
Contact: Derek, Ledak, Dave

PAT APPLESON STUDIOS, INC.

Tape Duplication, CD Services
1000 NW 159 Dr., Miami, FL 33169
(305) 625-4435
Contact: Fran

ART SAPASSION RECORD & TAPES

Tape Duplication
P.O. Box 1669, New London, CT 06320
(203) 447-3438
Contact: Ken Atkins, president

ASSOCIATED AUDIO SERVICES, INC.

Tape Duplication
181 Westchester Ave., Port Chester, NY 10573
(914) 937-5129
Contact: D. Richard Kraus, president



ATLANTIC STUDIOS
New York, NY

ATLANTIC STUDIOS
Mastering, CD Services
1841 Broadway, New York, NY 10023
(212) 484-6093

Contact: Pamela Johnston, asst. manager

MASTERING

Cutting Lathes: Neumann VMS-70, Zuma, SAL-74B.

Console: Transformerless Neumann.

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.

Rates: 12-inch LP, \$135; 12-inch single, \$85; 7-inch, \$48.

Credits: Bruce Springsteen, Led Zeppelin, Genesis, Foreigner, Yes, AC/DC, Rolling Stones, Carly Simon, Ratt, Mike & The Mechanics.

Other Services: Digital mastering, direct-to-disk.

COMPACT DISC

Preparation/Manufacturing: Sony 1630, DAE 1100, BVU-800 compact disc mastering system; computer controlled compact disc analyzer.

Engineers: Barry Diament, Steve Innocenzi.

Credits: Genesis, Robert Palmer, Pete Townshend, Stevie Nicks, Mike & The Mechanics.

ATLANTIC VIDEO, INC.
Mastering, Tape Duplication
150 S. Gordon St., Alexandria, VA 22304
(703) 823-2800
Contact: Mary Kay Claus

AUDIO ANTICS
Tape Duplication
2 Park Pl., Bronxville, NY 10708
(914) 779-7000
Contact: Susan Winthrop, Nanci Hersh

AUDIO CRAFT CO.
Mastering, Tape Duplication
2701 E. Sunrise Blvd. Ste. 401, Ft. Lauderdale, FL 33304
(305) 563-0553
Contact: Mark Auld

MASTERING

Tape Machines: Sony, MCI, Studer/Revox, Nakamichi, Otari.

Monitor Speakers: E-V.

Signal Processing: Lexicon, dbx, EXR, Dolby, UREI, Symatrix.

Rates: Upon request.

TAPE DUPLICATION

Duplicator: Studer/Revox and Sony.

Capacity: Growing.

Method of Duplication: In cassette.

Mastering Equipment: Digital.

Tape Used: Aqla 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 DIGITAL INC.
A Div. of the Studio Magnetics Group
Tape Duplication
12 Long Island Ave., Holtsville, NY 11742
(800) 874-2202, in N.Y. (212) 797-1660
Contact: James P. Makowski, sales manager

AUDIO INTERNATIONAL
Tape Duplication
424 Grant Ave., Scotch Plains, NJ 07076
(201) 322-4466
Contact: Warren C. Slaten

AUDIO MATRIX INC.
CD Services
400 Madison Ave., New York, NY 10017
(212) 308-6888
Contact: Milton B. Gelfand, president

AUDIO RECORDING AND DUPLICATING
Tape Duplication
323 Santa Villa Dr., Milton, FL 32533
(904) 994-9297
Contact: Ty or Glenda Bracken, owners/mgrs.

AUDIO TRAK STUDIOS
Mastering
416 East Georgia St., Tallahassee, FL 32301
(904) 681-6775

AUDIOMATIC/AUDIO MATRIX
Tape Duplication, CD Services
400 Madison Ave., New York, NY 10017
(212) 308-6888
Contact: Perry Jambor, sales manager
Duplicator: Electro-Sound.
Method of Duplication: Bin loop.
Duplicating Speed: 128:1; 64:1; 32:1.
Loading Equipment: Electro-Sound
Other Services: Sale of duplicators, loaders, Apex on-cassette printers, Tapex plate makers, etc.

COMPACT DISC

Preparation/Manufacturing: Manufacturer of electro-forming equipment for CD fathers, mothers, stampers.

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



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and IRC Cassettes



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Umatics and 3/4 inch
Color Plus Umatics

B Burlington

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106 Mott St. Oceanside, N.Y. 11572

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- 3M Reels, Boxes & Flanges

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132 N. 12th Street, Philadelphia, PA 19107 (215) 561-1794

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

Eastern

BEE-VEE SOUND
Tape Duplication
211 East 43 St., New York, NY
(212) 949-9170
Contact: Sean Benson, Bruno Vineis

DEBORAH BEGEL PRODUCTIONS
Tape Duplication
P.O. Box 83, New York, NY 10156
(212) 685-2748
Contact: President

BENOTE PRODUCTIONS
Tape Duplication
2426 Windy Pine Way, Tallahassee, FL 32304
(904) 576-9979
Contact: Ben and Benita Tankard

CABCOTT BROADCAST PRODUCTIONS, INC.
Mastering, Tape Duplication
517 Seventh Ave., Lindenwood, NJ 08021
(609) 346-3400
Contact: Larry Scott

CAMBRIDGE MEDIA
Tape Duplication
91 Bloomingdale St., Chelsea, MA 02150
(617) 884-2826
Contact: David Titus, principal engineer

CASSETTE DUPLICATORS OF BOSTON
Tape Duplication
136 Arlington St., Boston, MA 02116
(617) 423-2541
Contact: Vincent E. Parla Jr., vice president



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

CASSETTE EXPRESS
Nashville, TN

CASSETTE EXPRESS
(Div. of Al Jolson Enterprises)
Tape Duplication
31 Music Square West, Nashville, TN 37203
(615) 242-1580

Contact: James Ramsey, engineer
TAPE DUPLICATION
Duplicator: KABA Research and Development, Denon,
Otar.
Method of Duplication: In cassette.
Mastering Equipment: Nakamichi digital mastering
processor, Studer B-67, Nagra IV-S, TEAC A-3340s, Dolby
A.
Tape Used: Aqta 611, Ampex 456, BASF Chrome II.
Shell Used: Michelex.
Duplicating Speed: Real time, 2X, 15 ips (in-shell).

CASSETTE PRODUCTIONS INC.
Tape Duplication
109 Prospect Pl., Hillsdale, NJ 07642
(201) 666-3300
Contact: Wendy Konins, vice president
TAPE DUPLICATION
Duplicator: Six custom designed Dubbings high-speed
duplicators w/14 slaves each.
Capacity: 70,000.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Ampex, Otari.
Tape Used: BASF CrO₂, BASF LHD, Ampex 406/407.
Shell Used: Various.
Duplicating Speed: 8:1, 16:1, 32:1.
Loading Equipment: King 790, TTL 515.
Packaging Equipment/Fulfillment Services: All forms.
Rates: Write for price lists.
Other Services: 1:1 Audiophile duplication; high-speed
in-cassette duplication.

CBS RECORDING OPERATIONS
(Columbia Recording Studios)
Mastering, Tape Duplication, CD Services
49 East 52 St., New York, NY 10022
(212) 975-2958
Contact: Rob Grabowski

CBS TECHNOLOGY CENTER
Mastering, CD Services
227 High Ridge Rd., Stamford, CT 06905
(212) 975-4321
Contact: Columbia Special Products
MASTERING
Other Services: Test records (CTC-300, CTC-310, CTC-
330, CTC-340, CTC-350)
COMPACT DISC
Preparation/Manufacturing: CD-I compact test disc.

CHANNELL ONE VIDEO
Tape Duplication
P.O. Box 1437, Seabrook, NH 03874
(603) 474-5046
Contact: Bill Channell, president

CHARIOT PRODUCTIONS
Pressing, Tape Duplication, CD Services
1905 State St., Nashville, TN 37203
(615) 329-1038, (800) 843-8870
Contact: Bill Dykes, president

DICK CHARLES RECORDING
Mastering, Pressing, Tape Duplication
130 W. 42nd St. #1106, New York, NY 10036
(212) 819-0920
Contact: Dick Charles, president/owner

CHESTNUT SOUND, INC.
Tape Duplication
1824 Chestnut St., Philadelphia, PA 19103
(215) 568-5797
Contact: Joseph Alfonsi, president

CINEMA SOUND, LTD.
Tape Duplication
311 W. 75th St., New York, NY 10023
(212) 799-4800
Contact: Joan Franklin, president

COOK LABORATORIES, INC.
Mastering, Pressing, Tape Duplication
375 Ely Ave., S. Norwalk, CT 06854
(203) 853-3641
Contact: Emory Cook, president and owner

CORNING GLASS WORKS
Mastering
Advanced Products Dept., MP-08-04-4
Corning, NY 14831
(607) 974-4286
Contact: Lorenzo Pitts, sr. market development specialist

CRAIG RECORDING STUDIOS
Tape Duplication
Ste. 101 Benjamin Fox Pavilion, Jenkintown, PA 19046
(215) 885-8600
Contact: Michael Gallagher, manager

CREATIVE AUDIO LAB INC.
Mastering, Pressing, CD Services
6332 Appaloosa Way, Lakeview, NY 14085
Contact: Robert Grotke
MASTERING
Cutting Lathes: Neumann/London-Decca custom designed.
Console: Custom built.
Tape Machines: Studer A80 ¼-inch and ½-inch; Sony SL-2000/PCM-F1.
Monitor Speakers: JBL 250 Ti, Westlake BBSM-6, Yamaha NS-10M.
Signal Processing: AD&R, BBE, dbx, Decca, Dolby, Lexicon, Polyfusion, Yamaha.
Rates: On request.
Other Services: Half-speed mastering, reference acetates, cassette duplication masters, format conversions, CD preparation, complete record production services.

CRYSTAL CITY TAPE DUPLICATORS, INC.
Tape Duplication
48 Stewart Ave., Huntington, NY 11743
(516) 421-0222
Contact: Frank Russo, president
TAPE DUPLICATION
Duplicator: Otari DP7500 bin loop system.
Capacity: 12,000 pieces per shift, per day.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Otari MTR-12, 2-track; Otari MTR-10 4-track w/Dolby HX.
Tape Used: BASF.
Shell Used: IPS.
Duplicating Speed: 32:1, 64:1.
Loading Equipment: King, Electro-Sound.
Packaging Equipment/Fulfillment Services: Shrink-wrap, inserts, custom labels.
Rates: Please contact Frank Russo for rates.
Other Services: Apex on-cassette printing, video cassette duplication featuring Panasonic 6810S stereo hi-fi decks with Dolby.



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THE CUTTING EDGE
Ferndale, NY

THE CUTTING EDGE
Mastering, Pressing, Tape Duplication
P.O. Box 217, Ferndale, NY 12734
(914) 292-5965
Contact: Paul Gerry, owner/chief cutting engineer

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

DARK STAR AUDIO
Tape Duplication
Baptist Hill Rd., Canterbury, NH 03224
(603) 783-9494
Contact: Jaime Saunders, owner

dbF CORPORATION
Tape Duplication
P.O. Box 900, Waldorf, MD 20601
(301) 843-7110, 645-6110
Contact: Randy Runyon, general manager

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Circle #072 on Reader Service Card

DEE-BEE RECORDING SERVICE
Tape Duplication
 704 9th Ave. S., Myrtle Beach, SC 29577
 (803) 448-8091

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

DIAMOND PROD. CORPORATION
Pressing, Tape Duplication
 161 Massachusetts Ave. Ste. 201, Boston, MA 02115
 (617) 266-3131

Contact: Raymond Fournier, president
PRESSING
 Other Services: Brokerage.
TAPE DUPLICATION
 Duplicator: Otari
 Capacity: 10,000/day.
 Method of Duplication: In cassette, bin loop
 Mastering Equipment: Scully, Otari.
 Tape Used: Agfa, Ampex.
 Shell Used: ICM, IPS.
 Duplicating Speed: 480 ips.
 Loading Equipment: Otari, Telefunken.
 Packaging Equipment/Fulfillment Services: Shrink-wrap.
 Rates: Send for catalog of rates.
 Other Services: Studio facility available; we sell any length blank tape product in reel or cassette, authorized Maxell distributor.



DISC MASTERING, INC.
 Nashville, TN

DISC MASTERING, INC.
Mastering, Tape Duplication, CD Services
 30 Music Sq. W., Nashville, TN 37203
 (615) 254-8825

Contact: Randy Kling, president
MASTERING
 Cutting Lathes: Neumann VMS-70 lathe w/SX-74 cutter head.
 Console: Neve DTC-1 digital audio transfer console; Neumann SP75 console.
 Tape Machines: Studer A-810, Studer A-80 MK II.
 Monitor Speakers: Tannoy Super Reds (Lockwood cabinets), NFM-8s, SRM-10Bs; Tannoy SR-840 amplifier; Quad 405 amplifier.
 Signal Processing: Neve: digital 4 band equalization, second order high and low pass filtering, DRC (dynamic range control) limiter/comp., expander/noise gate; Neve 2087 custom equalizers, Neve limiter/compressor, Neumann SAL-74B cutting amplifier, Dolby SR.
 Engineers: Randy Kling.
 Rates: Available upon request.
 Credits: Alabama, Chet Atkins, Elvis, James Galway, Mickey Gilley, Glenn Miller Orchestra, Vern Gosdin, Waylon Jennings, The Kinks, Cristy Lane, Loretta Lynn, Barbara Mandrell, Willie Nelson, Dolly Parton, The Platters, Jerry Reed, Joe Stampley, George Strait, Jimmy Sturr, Jimmy Swaggart. Digital projects: Charley Pride, Keith Whitley, Moe & Joe. Awards: Disc Mastering Studio—*Pro Sound News*, 1985.
 Other Services: Distributor for Quad products and Tannoy pro and home speakers.
TAPE DUPLICATION
 Duplicator: Real time: Studer A-710, Revox B-710.
 Capacity: 15 machines.
 Method of Duplication: In cassette.
 Mastering Equipment: Studer A80 MKII, Neumann SP75 console/Neve custom equalizers.



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

Eastern

Tape Used: Fuji or BASF high bias chrome.
 Shell Used: Shape MK-10, Fuji.
 Duplicating Speed: 1 x 1 real time.
 Loading Equipment: Manual loading.
 Rates: Available upon request.

COMPACT DISC
 Preparation/Manufacturing: Sony PCM-1630, DMR-4000 (digital master recorder), DAE-1100 (digital audio editor), PCM-601 ESD, SLHF 900; preparation of master tapes for compact disc product; also conversion of analog to digital with full range of digital signal processing utilizing Neve DTC-1 console; prices available upon request.

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 New York, NY

DISKMAKERS INC.
Mastering, Pressing, Tape Duplication, CD Services
 153 W. 46th St., New York, NY 10036
 (800) 468-9353, (212) 302-4140, (212) 627-2277
 Contact: Ray Kissel
MASTERING
 Cutting Lathes: Scully
 Rates: Call for price list.
PRESSING
 Presses: Tracey Val/nine.
 Capacity: 5,000,000/yr.
 Vinyl Used: Tenneco.
 Rates: Call for price list.
 Other Services: Jacket design, jacket printing fabrication, color separations, 7-inch and 12-inch sleeve printing.
TAPE DUPLICATION
 Duplicator: Electro-Sound.
 Capacity: 3,000,000/yr.
 Method of Duplication: Bin loop.
 Mastering Equipment: Ampex.
 Tape Used: CBS.
 Shell Used: Shape
 Duplicating Speed: 32:1.
 Loading Equipment: King.
 Packaging Equipment/Fulfillment Services: Apex printing, Polywrap.
 Rates: Call for price list.
 Other Services: Full color inserts.
COMPACT DISC
 Preparation/Manufacturing: All services, call for price list.

DUB CENTRE
Tape Duplication
 51 New Plant Ct., Owing Mills, MD 21117
 (800) 382-0080, (301) 363-4810
 Contact: Rona Fitzgerald

DUSTBOWL PRODUCTIONS
Tape Duplication
 Box 527, Cohasset, MA
 (617) 545-9273
 Contact: Bill Barton, owner

EAST COAST SOUND LAB
Tape Duplication
 3817 Philadelphia Rd., Baltimore, MD 21237
 (301) 574-4223
 Contact: Norman Noplock

EASTERN ARTISTS RECORDING STUDIO (EARS)
Tape Duplication
 36 Meadow St., E. Orange, NJ 07017
 (201) 673-5680, (212) 874-1358
 Contact: Howard Kessler, studio manager

EASTERN STANDARD PRODUCTIONS INC.
Tape Duplication
 26 Baxter St., Buffalo, NY 14207
 (716) 876-1454
 Contact: Mark S. Mekker, president

EDUCATORS' TAPE SERVICE
Tape Duplication
 697 Union St., Manchester, NH 03104
 (603) 668-6259
 Contact: Richard Hering, manager

E.J. PRODUCTIONS
Tape Duplication
 Industrial Rd., P.O. Box 507, Brownstown, PA 17508
 (717) 627-4633, 859-2091
 Contact: Eric W. Johnson, president

E.J. STEWART, INC. FILM & VIDEO FACILITIES
Mastering, Tape Duplication
 525 Mildred Ave., Primos, PA 19018
 (215) 626-6500, (212) 288-0525
 Contact: Bob Momyer, vice president creative services

EJM RECORDS
Mastering, Pressing, Tape Duplication
 P.O. Box 961, Bronxville, NY 10708
 (914) 738-1007
 Contact: Mike Russell, general manager

THE ENTERTAINMENT GROUP, LTD.
Mastering, Pressing, Tape Duplication
 348 Willis Ave., Mineola, NY 11501
 (516) 747-5100
 Contact: Gregg Raffa

EUROPADISK, LTD.
Mastering, Pressing
 75 Varick St. 4th floor, New York, NY 10013
 (212) 226-4401, Telex 710-581-2034
 Contact: Larry Bassman, production manager
MASTERING
 Cutting Lathes: Neumann VMS 82 - DMM (direct metal mastering).
 Console: Neumann SP-79-B disc mastering console for DMM.
 Tape Machines: Sony PCM-1610/DMR2000, Studer DAD-16, Sony 15/30 Preview.
 Monitor Speakers: James B. Lansing 250 TI.
 Signal Processing: Neumann U-473 lim/comp, OE-DUO parametric EQ, VAB vertical limit.
 Engineers: James P. Shelton.
 Rates: Call for rate card and brochure.
 Credits: Madonna, Asia, James Galway, Vienna Phil., New York Phil., Yo Yo Ma, Columbia Masterworks, RCA Red Seal, Warners, Atlantic, Sire, Island, Angel, Blue Note, Nonesuch.
 Other Services: Direct Metal Mastering central plating and audiophile LP record pressing. Equipped for all digital and analog formats.
PRESSING
 Presses: (4) Toolex-Alpha, (2) Hamilton.
 Capacity: 12,000 LPs/day.
 Vinyl Used: Teldec, exclusively.
 Rates: Call for brochure and rate card.
 Credits: RCA Red Seal, Telarc, Musical Heritage, Moss MG, Stash, New World, Arabesque.
 Other Services: The U.S.' only complete direct metal mastering (DMM) mastering, plating and pressing facility.

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EVA-TONE INCORPORATED

Mastering, Pressing, Tape Duplication

P.O. Box 7020, Clearwater, FL 33518

(800) EVA-TONE, in Florida (813) 577-7000

Contact: James M. Dunne, vice pres. mktg./sales

MASTERING

Cutting Lathes: Scully, including LS-76.

Console: Custom.

Tape Machines: MCI-Sony, Ampex, Otari, Mitsubishi.

Monitor Speakers: Tannoy, Altec Lansing.

Signal Processing: UREI, Sontec, Orban, AMS, Sony

PCM, Aphex, Westrex, Ortofon, Audio Design, Dolby, dbx,

Crown, Audimax.

Engineers: Jerry DeClercq, Wayne McElhose, Jacques

Woodin, Alan LaVerso, Wayne Hampson.

Rates: On request.

Other Services: Soundsheet pressing, audio cassette

duplication and packaging, complete commercial print-

ing, bindery and mailing services.

PRESSING

Presses: Soundsheet (flexible vinyl disc) pressing only.

Other Services: Complete commercial printing, bindery

and mailing services on premises.



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

Eastern

TAPE DUPLICATION

Duplicator: Cetec Gauss 2400 (2 systems, 10 slaves);

Telex.

Capacity: 150k/week.

Method of Duplication: In cassette, bin loop.

Mastering Equipment: MCI-Sony, Mitsubishi, Sony

PCM, UREI, Sontec, Orban, Audio Design, Dolby, dbx,

Crown.

Tape Used: Agfa, Capitol, BASF.

Shell Used: Magnetic Media, ICM, Jordax.

Duplicating Speed: 16:1, 32:1, 64:1, 128:1.

Loading Equipment: King, TTL.

Packaging Equipment/Fulfillment Services: Ilsemann

inserting and packaging.

Rates: On request.

Other Services: Complete commercial printing, bindery

and mailing services on premises.

EXECUTIVE RECORDING LTD.

Mastering

300 W 55th St., New York, NY 10019

(212) 247-7434

Contact: Gene Sayet, the boss

FAITH PRODUCTIONS

Tape Duplication

1441 Guthrie Dr., Cleveland, TN 37311

(615) 476-6252

Contact: Allan Wendt, chief engineer

FALK RECORDING SERVICE

Tape Duplication

7914 Fegenbush Ln., Louisville, KY 40228

(502) 239-1010

Contact: Gary Falk, owner



FORGE RECORDING STUDIOS, INC.
Malvern, PA

FORGE RECORDING STUDIOS, INC.

Mastering, Tape Duplication

P.O. Box 861, Valley Forge, PA 19481

119 Great Valley Pkwy., Malvern, PA 19355

(800) 331-0405, (215) 935-1422, 644-3266

Contact: Warren R. Wilson, president

TAPE DUPLICATION

Duplicator: 2-MTI.

Capacity: 10,000/day.

Method of Duplication: Bin loop 64:1, 32:1 1/2-inch.

Mastering Equipment: Ampex ATR-102 1/2-inch and 1/4-

inch, Ampex ATR-104, all types of noise reduction

available.

Tape Used: Agfa, Ampex, CBS, BASF, Mag Media.

Shell Used: Mag Media, IPS, ICM, Elmar, MTI, Shape.

Duplicating Speed: 64:1, 32:1.

Type of Loading: King 790.

Packaging Equipment/Fulfillment Services: All pack-

aging and drop shipping services, custom label printing

and packaging.

Rates: Upon request.

Other Services: 24-track digital recording studio with

Sony PCM-3324, Sony 3202, and NEOTEK Elite console.

FRANKFORD/WAYNE MASTERING LABS, INC.

Mastering, CD Services

1697 Broadway, 14th floor, New York, NY 10019

(212) 582-5473

Contact: Carol Iacune, operations manager; Jill Gins,

studio manager; Tom Steele, president/chief engineer

MASTERING

Cutting Lathes: (4) Scully/Ransteede automated quartz

lock lathes w/Block Computisk computers and Neumann

SX-74/Ransteede Cutter Drive Systems; (2) Neumann

lathes w/Technics quartz drive and Neumann SX-

74/SAL-74B Driver and Block Computisk control comput-

ers; (2) Scully Westrex lathes w/Capps computer and

Westrex 3DIIAH cutterheads and Ransteede Driver

Systems.

Console: (5) Custom/proprietary Ransteede Audio con-

ssoles w/full equalization and processing facilities; analog

and digital capable; transformerless.

Tape Machines: (5) Sony/MCI JH-110M 1/4-inch and 1/2-

inch, (3) Sony/MCI JH-110C 2-track, (6) Technics RS-1520

professional 2-track, (4) Technics cassette decks, Sony

2700 Beta Hi-Fi, (2) Ampex AG-440B 2-track. Digital: Sony

BVU-200B, Sony DMR-2200, Sony VO-5800, Sony 2300

Betamax used with Sony PCM-10/100, Sony PCM-10/F1,

Sony PCM-1600/1610 digital processors, Sony/MCI and

Studer DASH recorders when available.

Monitor Speakers: (6) JBL-3450B biamped, (2) JBL-

4343B biamped, (2) JBL-4330s, (2) JBL-4311s, (2) B&W

701s, (6) ADS 300s, (4) Auratone 5Cs, (2) Technics 6060s,

(2) Altec 604/Mastering Labs.

Signal Processing: Equalizers by Sontec, UREI, ITI,

Pultec, Ransteede Audio, Orban, Technics Professional,

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Engineers: Tom Steele (chief eng.), Herb "Pump" Powers, Jr., Tom Coyne, Dominick Romeo, Carlton Batts, Chris Gehringer, plus freelance when applicable.
Rates: Client attendance, \$190/hr.; LP masters, \$140/side; 45 masters, \$50/side; 12-inch single masters, \$100/side; LP D/F refs, \$140; 12-inch D/F refs, \$90; 45 D/F refs, \$60. Other rates, including custom pressing packages and digital/CD prepared tapes available upon request.
Credits: Sade, Billy Ocean, Thompson Twins, the Eurythmics, Whodini, Bananarama, Eddy Grant, James Brown, Dan Hartman, Jeffrey Osbourne, Phyllis Hyman, Mantronix, Keshif, Fat Boys, Missing Persons, ABC, Level 42, Shirley Murdoch, Kurtis Blow.

Duplicating Speed: Real time 1:1.
Packaging Equipment/Fulfillment Services: All printing and packaging options available.
Rates: Super quality real time duplication at high speed pricing; 100 chrome C-45s as low as 99¢ each. Please call.
Other Services: Full service multi-track recording/high speed in cassette duplication (Telex)/highest quality real time cassettes.

HUB-SERVALL RECORD MFG. CORP.
Pressing
 Cranbury-So. River Rd., Cranbury, NJ 08512
 (609) 655-2166
 Contact: Barry Ruegg, vice pres. sales; Jean Stembel, director customer relations
PRESSING
Presses: (11) 12-inch Tracy-Val presses with Hamilton automation.
Capacity: 25,000/day.
Vinyl Used: Keycor, Vitec.
Rates: Upon request.
Other Services: Plating, jacketing, labels, DJ services, distributor shipping.

HARRISON AUDIO SERVICES
Tape Duplication
 9 Birch Hill Rd., S. Hadley, MA 01075
 (413) 536-3830
 Contact: Jeff Harrison, owner

HORTON SYSTEMS COMPANY
Tape Duplication
 1268 Chesapeake Dr., Lilburn, GA 30247
 (404) 923-5825
 Contact: Fred Horton, owner.

HRM, GROUP
Pressing, Tape Duplication
 15 Gilpin Ave., Hauppauge, NY 11788
 (516) 234-0200
 Contact: Brian Wilson, vice pres. sales/mktg.

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FULLERSOUND, INC.
 Miami, FL

FULLERSOUND, INC.
Mastering
 1755 Northeast 149 St., Miami, FL 33181
 (305) 945-6697
 Contact: Michael Fuller, president/engineer
MASTERING
 Cutting Lathes: Scully LS 76 w/Otofon DSS 821 cutter heads.
 Console: Custom Cybersonics automated #MC2003E.
 Tape Machines: Digital: Mitsubishi X-80, Sony PCM-701; MCI JH-110B half-inch and 1/4-inch.
 Monitor Speakers: UREI 813A, Yamaha NS-1000, Auratones.
Signal Processing: Sontec MES-430B EQ, Sontec DRC-400 limiter, Otofon STL 852, Hine processing.
Engineers: Michael Fuller.
Rates: Upon request.
Credits: Kenny Rogers, Rod Stewart, Romantics, Bee Gees, Barry Manilow, Kenny Loggins, Eddie Money, Eric Clapton, Julio Iglesias, Trinere, America Betty Wright, Dionne Warwick, George Clinton, John Cougar, Bus Boys.
Other Services: Mastering for cassette productions; mastering for compact disc production.

GALAXY SOUND STUDIOS
Tape Duplication
 1508 Harlem Ste. 203, Memphis, TN 38114
 (901) 274-2726
 Contact: Willie Blair

GEORGETOWN MASTERS INC.
Mastering, CD Services
 33 Music Square W. Ste. 108-B, Nashville, TN 37203
 (615) 254-3233
 Contact: Denny Purcell

GEORGIA RECORD PRESSING
Pressing
 262 Rio Circle, Decatur, GA 30030
 (404) 373-2673
 Contact: Keith Fields, general mgr.

GRENADIER
Tape Duplication
 10 Parkwood Ave., Rochester, NY 14620
 (716) 442-6209
 Contact: Tom Greene, owner

TAPE DUPLICATION
 Duplicator: Nakamichi real time (also high speed).
 Capacity: 800/day, real time.
 Method of Duplication: In cassette.
 Mastering Equipment: Full 24- and 16-track studio and mastering facilities available to 2-track digital or analog including noise reduction.
Tape Used: Agfa, BASF.
Shell Used: Mag Media, ICM, others.

NOISE REDUCTION FOR UNDER \$10.

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Boeing	John Fluke Mfg.	Motorola	RCA
Capitol Records	McIntosh Labs	NASA	Switchcraft

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

Eastern



IAN COMMUNICATIONS GROUP, INC.
Wilmington, MA

IAN COMMUNICATIONS GROUP, INC.

Tape Duplication, CD Services
10 Upton Dr., Wilmington, MA 01887
(617) 658-3700, (800) 433-DUPE

Contact: Richard Berberian, president

TAPE DUPLICATION

Duplicator: Otari DP-7000; Otari DP-80 w/HX-Pro.
Capacity: 10,000 C-60 per shift.

Method of Duplication: Bin loop.

Mastering Equipment: Otari MTR-10-4-LXI w/HX-PRO.

Tape Used: Agfa 611, 619, 616; BASF chrome.

Shell Used: Michelex.

Duplicating Speed: 32:1, 64:1.

Loading Equipment: AVA 2001.

Packaging Equipment/Fulfillment Services: Tapemat-
atic automated labeling and boxing; complete packaging
and fulfillment services.

Rates: Rate card 100-2,000 units; larger orders on quota-
tion basis.

Other Services: Full in-house graphics, typesetting, and
printing. Video tape duplication—all formats and quantities.

COMPACT DISC

Preparation/Manufacturing: CD preparation and mas-
tering, manufacturing, printing and packaging. Minimum
order 2,000 units. Space available Nov. 1986. Capacity
100,000 units per month.

INDEPENDENT CLASSICAL RECORDING

Tape Duplication
170 West 73rd St., #3C, New York, NY 10023
(212) 799-0690

Contact: Dongsok Shin, director

INDEPENDENT PRODUCERS CORP.

Tape Duplication
1609 McGavock St., Nashville, TN 37203
(615) 244-4236

Contact: Jerry Moore, general manager

INTERNATIONAL CUTTERHEAD REPAIR & CONVERSION, INC.

Mastering

194 Kings Ct., Teaneck, NJ 07666
(201) 833-4421
Contact: Sharon Rand, owner

JENSEN PRODUCTIONS

Mastering, Pressing, Tape Duplication
P.O. Box 46359, Washington, DC 20050
(301) 249-4025
Contact: Phil Jensen, production manager

MIKE JONES ASSOCIATES

444 W. 54th St., New York, NY 10019
(212) 957-8386
Contact: Heather Wood

KENNEDY MUSIC AND RECORDING

Tape Duplication
5253 Montour St., Philadelphia, PA 19124
(215) 533-2380
Contact: David Kennedy, owner

THE LACQUER PLACE, INC.

Mastering
116 17th Ave., S. Nashville, TN 37203
(615) 244-5355

Contact: Ted Fuller, owner

MASTERING

Cutting Lathes: Scully w/Capps Computer and Westrex
RA-1700 cutting system.

Console: Custom transformerless.

Tape Machines: MCI 1/2-inch & 1/4-inch mastering deck.

Monitor Speakers: "Big Reds," Auratones.

Signal Processing: Compressor/limiters, parametric
EQ, filters, Dolby A, dbx 187.

Engineers: Doug Lawrence, chief engineer.

Rates: Call for rates.

Credits: Under new management with seven years
experience, and over 10,000 records to its credit. The
Lacquer Place is prepared to deliver quality product at a
reasonable price.

Other Services: Tape copies, consultation.

GERALD LEWIS RECORDING

Tape Duplication
216 S. Pershing Dr., Arlington, VA 22204
(703) 521-1871

Contact: Gerald Lewis

Tape Duplication

Duplicator: Nakamichi LX-5

Capacity: 25 decks.

Method of Duplication: In cassette.

Mastering Equipment: SL 2000 1/2-inch Beta and
Nakamichi DMP-100 digital processor; UREI graphic EQ
and limiting; Lexicon digital reverb.

Tape Used: BASF and Agfa Chrome; Agfa 611 and 612
(normal bias).

Shell Used: ICM.

Duplicating Speed: Real time duplication only.

Rates: Prices upon request.

Other Services: One to four color insert cards, printed
labels, label material printed directly on cassette shells;
shrink-wrap if desired; clear, black, white, red Norelco
boxes or opaque soft boxes.

LINDEN INCORPORATED

Tape Duplication
229 N. Henry St., Alexandria, VA 22314
(703) 549-4424

Contact: Katherine Monteith, president

MAGNETIC TECHNOLOGY

Tape Duplication
50 Music Sq. W. Ste. 506, Nashville, TN 37203
(615) 329-1875

Contact: Mack Evans, owner

TAPE DUPLICATION

Duplicator: Custom built real time system: 40 AIWA ADF-
660 decks w/HX Pro.

Method of Duplication: In cassette.

Mastering Equipment: Can run from 7 1/2, 15, 30- 1/4-inch
or 1/2-inch and 14 or 16 bit 1/2-inch 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.

MAKIN TRACKS/HAZARDOUS RECORDS

Pressing, Tape Duplication
75 Summer St., Chelmsford, MA
(617) 256-4051
Contact: Hank, engineer

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MAN FROM MARS PRODUCTIONS
Tape Duplication
 159 Orange St., Manchester, NH 03104
 (603) 668-0652
 Contact: Ed Brouder, owner

MASTER SOUND ASTORIA
Tape Duplication
 34-12 36 St., Astoria, NY 11106
 (718) 786-3400
 Contact: Kathy Boyle, studio manager

MARK CUSTOM RECORDING SERVICE
Mastering, Pressing, Tape Duplication
 10815 Bodine Rd., Clarence, NY 14031
 (716) 759-2600

Contact: Vincent S. Morette, president

MASTERING

Cutting Lathes: Neumann VMS-70/SX-74.
 Console: Neumann SP-272 transformerless, modified.
 Tape Machines: Studer, Ampex, Otari, dbx 700, Sony PCM-F1 Beta or VHS.

Monitor Speakers: UREI 813, Yamaha NS-10, Westlake BBS6, various JBL.
 Signal Processing: UREI, dbx, EMT, EXR, Dolby, Poly-fusion, Lexicon, AD&R.

Engineers: Vincent S. Morette, Bruce Leek.

Rates: On request.

PRESSING

Presses: Subcontracted.

Vinyl Used: Keycor/Teldec.

Rates: On request.

Other Services: Graphics, printing.

TAPE DUPLICATION

Duplicator: (52) Nakamichi LX-5 "Real Time."

Capacity: 400 C-60 per 8 hr. shift.

Method of Duplication: In cassette.

Mastering Equipment: All formats include dbx 700.

Tape Used: Agfa Chrome, Magnetite, BASF.

Shell Used: IPS/Shape.

Duplicating Speed: Real time 1 7/8 ips.

Loading Equipment: King.

Packaging Equipment/Fulfillment Services: Complete packaging to shrink-wrap.

Rates: On request.

Other Services: Complete graphics and printing.

MASTER MEDIA, INC.

Tape Duplication
 5097 Chamblee-Tucker Rd., Tucker, GA 30084
 (404) 491-0330
 Contact: Dave Causey, president

MASTERCRAFT ELECTROPLATING INC.
Record Plating
 801 Magnolia Ave., Elizabeth, NJ 07201
 (201) 354-4404, (212) 765-7467

MASTERDISK CORP.

Mastering, CD Services
 16 W. 61st St., New York, NY 10023
 (212) 541-5022

Contact: Jill Dix, vice president

MASTERING

Cutting Lathes: (4) Neumann lathes plus DMM lathes.

Console: Neumann.

Tape Machines: Studer, Sony 1610 and 1630, Mitsubishi X80.

Monitor Speakers: Altec C12, Hartley subwoofers, Fourier 8s, UREI 813.

Signal Processing: Sontec EQs, NTP limiters, Lexicon reverb, Aphex.

Engineers: Bob Ludwig, Howie Weinberg, Bill Kipper, Tony Dawsey, Scott Hull, Alan Moy.

Credits: Bruce Springsteen, Rolling Stones, Hall & Oates, Journey, ZZ Top, David Bowie, The Police, Musical Heritage Society, Angel and Blue Note Records.

COMPACT DISC

Preparation/Manufacturing: CD tape masters.



MASTERFONICS INC.
 Nashville, TN

MASTERFONICS INC.

Mastering, Tape Duplication, CD Services
 28 Music Square East, Nashville, TN 37203
 (615) 327-4533

Contact: Margaret Meadows, office mgr.

MASTERING

Cutting Lathes: Neumann VMS70 (3), Zuma equipped.
 Console: Neumann (2).

Tape Machines: JVC digital, Sony 1610, F-1.

Monitor Speakers: Hidley/Kinoshita Model 3 vertical, Yamaha NS-10, etc.

Signal Processing: JVC digital disc mastering console, Sontec and usual goodies.

Engineers: Glenn Meadows, Benny Quinn, Milan Bogdan, Butch Carr, Lois Walker.

Rates: Available upon request.

Credits: Available upon request.

Other Services: CD preparation, full pre-mastering services available with JVC DDM-900 digital disc mastering console, SSL/Otari DTR-900 equipped remix room available.

TAPE DUPLICATION

Method of Duplication: In cassette.

Tape Used: TDK SA-X, HXS.

Duplicating Speed: Real time.

Rates: Varies with quantity.

COMPACT DISC

Preparation/Manufacturing: Full CD pre-mastering services available with JVC DDM-900 digital disc mastering console. Full D to D format conversion from Sony 1610, Mitsubishi X-80, EIAJ to JVC and back.

MCA MGF. DIV. OF MCA DISTRIBUTING

Pressing, Tape Duplication
 Rt. 30A, Gloversville, NY 12078
 (518) 725-0604

Contact: Vice president of plant operations.

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MASTER MIX
 Nashville, TN

MASTER MIX

Mastering, CD Services
 1808 Division St., Nashville, TN 37203
 (615) 321-5970
 Contact: Kimberly

MASTERING

Cutting Lathes: Neumann VMS 70 w/Technics quartz direct drive and Zuma audio preview computer, Neumann SAL 74B cutter rack, SX-74 cutter head.
 Console: Neumann SP-77.

Tape Machines: Studer preview machine, 1/2-inch and 1/4-inch, Studer copy machine.

Monitor Speakers: John Meyers and Rogers powered by Times One and Hafler amplifiers.

Signal Processing: Sontec and Neumann equalizers, Sontec and NTP compressors, Dolby and dbx available.

Engineers: Hank Williams and Ken Love.

Rates: Available upon request.

Credits: Lee Greenwood, Eddie Rabbitt, Earl Thomas Conley, Statler Bros., Ed Bruce, Sandi Patti, Al Green, Tanya Tucker and Whiteheart.

Other Services: CD and cassette preparation via Sony 1630, DAE 1100 editing system.

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 321 West 44th Street, New York, NY 10036
 (212) 586-7376 eastern representative

Westlake Audio 7285 Santa Monica Boulevard
 Los Angeles, CA 90046
 western representative (213) 851-9800 Telex: 630645

MEDCOM ENGINEERING
Tape Duplication
6089 Johns Rd. Ste. #6, Tampa, FL 33614
(305) 297-6635, (813) 888-8956
Contact: Mr. Hillary (Mel) Smith

MEMPHIS COMMUNICATIONS CORPORATION
Tape Duplication
1381 Madison Ave., P.O. Box 41735
Memphis, TN 38174
(901) 725-9271
Contact: Scot Berry, asst. mgr. technical services

METRO RECORDING STUDIO LTD.
Tape Duplication
1422 Crain Hwy. SW, Glen Burnie, MD 21061
(301) 761-6159
Contact: Joe Jacobs

DAVID MOLDAUER
Mastering, Pressing
130 W. 42 St. Ste. 551, New York, NY 10036
(212) 221-6625
Contact: President

MOOSESHOW PRODUCTIONS INC.
Tape Duplication
1408 Hinesburg Rd., So. Burlington, VT 05401
(802) 864-6676
Contact: Bret Kenoff, president

MULTITAPE
Tape Duplication
2112 18th St. NW, Washington, DC 20009
(202) 332-1522
Contact: Bruce F. Moyer, president

MUSIC & SOUND DESIGN STUDIO
MILBRODT COMMUNICATIONS, INC.
Tape Duplication
1425 Frontier Rd., Bridgewater, NJ 08809
(201) 560-8444
Contact: Bill Milbrodt, Kathy Hart

THE MUSIC CONNECTION, INC.
Mastering, Pressing, Tape Duplication, CD Services
166 Madison Ave., New York, NY 10016
(212) 686-9595
Contact: Ira Cohen, district sales manager

NATIONAL CASSETTE SERVICES, INC.
Tape Duplication
613 N. Commerce Ave., P.O. Box 99
Front Royal, VA 22630
(703) 635-4181
Contact: Michael D. McCool



NASHVILLE RECORD PRODUCTIONS, INC.
Nashville, TN

NASHVILLE RECORD PRODUCTIONS, INC.
Mastering, CD Services
469 Chestnut St., Nashville, TN 37203
(615) 259-4200
Contact: George Ingram, co-owner
MASTERING
Cutting Lathes: Neumann, Zuma and Capps computer two.



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

Eastern

Console: Sphere and Neve.
Tape Machines: Studer and MCI.
Monitor Speakers: Electro-Voice Sentry 3s; NS-10s.
Signal Processing: Parametric and graphic EQ, reverb, compressor/limiter.
Engineers: Glenn Bullard, chief engineer; John Eberle, studio manager.
Rates: \$90/side, 12-inch; \$35/side, 7-inch.
Credits: Ronnie Milsap, Amy Grant, Rick & Janice Carnes, Sha-Na-Na, Tupperware, American Airlines, Drifters, Bill Anderson, Dan Seals, Ray Price, Sammi Smith, Pat Boone, Alabama.
Other Services: Digital mastering: 1/2-inch Sony F1, 501-701; 3/4-inch Sony 1610. CD preparation, complete record and cassette packaging, LP and 45 pressing, tape duplication, editing, reference acetates.

L. NIX & CO. INC.
Mastering, CD Services
2000 Madison Ave., Memphis, TN 38104
(901) 725-0855
Contact: Larry Nix, president



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, president
MASTERING
Console: Troisi SA 200 12x4x2 full parametric EQ
Tape Machines: Sony PCM-1610 w/Sony BVU-800DB (digital) 2-track; Sony APR 5002 (analog) 2-track; Sony PCM-701, F1, 501.
Monitor Speakers: Snell type "C".
Signal Processing: Lexicon PCM70.
Engineers: Dr. Toby Mountain.
Rates: Analog to digital transfers: \$90/hr.; digital transfers, copying, editing, mastering: \$75/hr.
Credits: Frank Zappa, Arlo Guthrie, Rubber Rodeo, Rykodisc, Musical Heritage Society, Rounder, A&M, Bose, Polaroid, Second Hearing, Newport Classic.
COMPACT DISC
Preparation/Manufacturing: Complete digital editing and mastering for compact disc using Sony PCM-1610/30 system with the DAE-1100 digital editor. Also compact disc replication services. Call for prices.

NU TRAX RECORDING STUDIO
Mastering
141 W. Ruscomb St., Philadelphia, PA 19120
(215) 456-9141
Contact: Paul Hellrich, owner/operator

P & P STUDIOS INC.
Tape Duplication
17 Viaduct Rd., Box 4185, Stamford, CT 06907
(203) 359-9292
Contact: Edgar Bernstein

PETER PAN INDUSTRIES
Mastering, Pressing
88 St. Francis St., Newark, NJ 07105
(201) 344-4214
Contact: Al Cohen, national sales mgr.

PRC INDUSTRIES
Tape Duplication
422 Madison Ave., New York, NY 10017
(212) 308-2300
Contact: David Grant, president

PRODIGITAL

PRODIGITAL, INC.
Wheaton, MD

PRODIGITAL, INC.
Mastering, Tape Duplication, CD Services
3400 Pendleton Dr., Wheaton, MD 20902
(202) 635-5588
Contact: Bill Burns, president; Alan Wonneberger, vice president.

MASTERING
Rates: Digital mastering \$90/hr., digital editing \$110/hr., analog recording/mastering \$60/hr.

PRESSING
Other Services: Custom record pressings, mastering and packaging services.

TAPE DUPLICATION
Duplicator: (50) Akai CS F14, modified; Pentagon hi-speed.

Capacity: 2,500 C60s (real time).
Method of Duplication: In cassette.

Mastering Equipment: JVC VP900 digital mastering system with AE 900 editor, JVC VP101 digital proc., Otari 2-track analog.

Tape Used: Agfa chrome and 611, TDK SA, Fuji metal.
Shell Used: Sunkyong.

Duplicating Speed: Real time and hi-speed.

Packaging Equipment/Fulfillment Services: Labeling, packaging, shrinkwrapping, artwork.

Rates: Call for rates.

Other Services: Studio and location digital and analog recording, archival transfers (78 rpm and wire recordings), music composing and arranging services, JVC digital audio and pro video sales and rentals.

COMPACT DISC
Preparation/Manufacturing: Digital audio mastering, editing, format conversions, digital EQ, certified CD pre-mastering. Can supply CDs in jewel box with labels and packaging.

PROGRESSIVE MUSIC STUDIOS
Tape Duplication
2116 Southview Ave., Tampa, FL 33606
(813) 251-8093
Contact: Ken Veenstra

PROGRESSIVE TAPE CORPORATION
 (formerly The Dub Centre East, Inc.)
 Tape Duplication
 40 H Corbin Ave., Bay Shore, NY 11706
 (516) 242-4646
 Contact: Paul Glantzman, president



PROJECT 70 AUDIO SERVICES, INC.
 Atlanta, GA

PROJECT 70 AUDIO SERVICES, INC.
 Tape Duplication
 777 Lambert Dr., Atlanta, GA 30324
 (404) 875-7000
 Contact: Paula Vest-r, customer services

QTI, INC. (Subsidiary of RCA/Ariola)
 Tape Duplication
 108 Monticello Rd., Weaverville, NC 28803
 (704) 658-2000
 Contact: Maxenals manager

QUIK-CASSETTE CORP.
 Tape Duplication
 250 W. 57th St., Ste. 2101, New York, NY 10107
 (212) 977-4411
 Contact: Chief engineer

RAINBOW AUDIO
 Tape Duplication
 P.O. Box 89, 1 Maple St., N. Springfield, VT 05150
 (802) 886-8422
 Contact: Terry Ruppert

RECORDED PUBLICATION LABORATORIES
 Mastering, Pressing, Tape Duplication
 1100 State St., Camden, NJ 08105
 (609) 963-3000, (800) 235-COPY
 Contact: George "P.J." Laudon, director of marketing

THE RECORDING ARTS STUDIOS 48 TRACK
 Mastering, Tape Duplication
 140 Hempstead Ave., West Hempstead, NY 11552
 (516) 485-6301
 Contact: Joseph Tufariello

REFLECTION SOUND STUDIOS
 Tape Duplication
 1018 Central Ave., Charlotte, NC 28204
 (704) 377-4596
 Contact: Mark Williams, studio mgr.

RESOLUTION, INC.
 Tape Duplication
 1 Mill St., The Chace Mill, Burlington, VT 05401
 (802) 862-8881
 Contact: Linda A. Citro, vice president

ROAR PRODUCTIONS INC.
 Mastering, Pressing, Tape Duplication
 6655-H Dobbins Rd., Columbia, MD 21045
 (301) 596-2600
 Contact: Gary Zeichner, chief engineer

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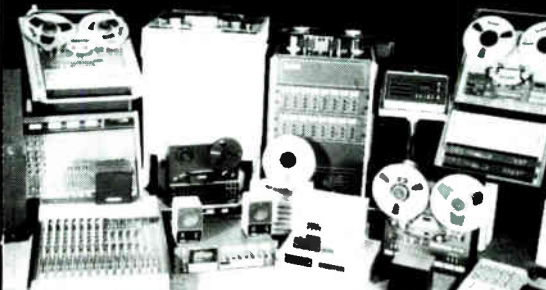
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9 HENEARLY DRIVE,
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Listings of Mastering, Pressing and
Tape Duplication Facilities
Throughout the United States

Eastern

RODEL AUDIO
Tape Duplication
1028 33rd St. NW, Washington, DC 20007
(202) 338-0770
Contact: Renee Funk



ROMABA RECORD CORP.
Brooklyn, NY

ROMABA RECORD CORP.
Mastering, Pressing
33 34th St., Brooklyn, NY 11232
(718) 499-3060
Contact: Theodore E. Kolsky, president
PRESSING
Presses: (8) Hamilton presses.
Capacity: 90,000 LPs per week
Vinyl Used: Tenneco/Oxydental 100% pure vinyl.
Rates: We make competition—not meet it. *Same day delivery.
Other Services: Disco jackets and jacket printing.

RON ROSE PRODUCTIONS, INC.
Tape Duplication
3409 W. Lemon St., Tampa, FL 33609
(813) 873-7700
Contact: Mike Stram, studio manager/chief engineer

S&S CUSTOM TAPES, INC.
Tape Duplication
Rt. 4 Box 328-A, Church Hill, TN 37642
(615) 357-TAPE
Contact: Mike Shipley, president

ST. MARY'S COLLEGE OF MARYLAND
Tape Duplication
Music Dept., Rt. 5, St. Mary's City, MD 20686
(301) 862-0226
Contact: Susan E. Sloan, technical assistant

SANDCASTLE RECORDING STUDIO
Tape Duplication

Wade Hampton Mall, Ste. 109, Greenville, SC 29609
(803) 235-1111
Contact: Christopher Cassels, manager

SECOND HEARING DIGITAL
CD Services
45 Knollwood Rd., Elmsford, NY 10523
(914) 347-5200
Contact: Craig Dory
COMPACT DISC
Preparation/Manufacturing: Complete preparation service for CD manufacturing from any source. Digital editing, location digital recording, digital post-production, CD pressing capacity and packaging. Also, graphic design and printing. Second hearing compact discs: please call for pricing.

SELECT SOUND RECORDING STUDIO
Tape Duplication
2315 Elmwood Ave., Kenmore, NY 14217
(716) 873-2717
Contact: Chuck Mandrell

SERVISOUND INC.
Mastering, Tape Duplication
35 W. 45th St., New York, NY 10036
(212) 921-0555
Contact: Chris Nelson, vice pres.; Dave Teig, studio manager.

MASTERING
Rates: Call for rates.
Other Services: Recording studios: (5) music & post-production w/video (audio) layback facilities.

TAPE DUPLICATION
Duplicator: Electro-Sound 5 slaves, Ampex 4 slaves, Otari 5 slaves.
Capacity: 2,500 C-30/day; 2,000 C-90/day; 500 30 min. reels/day packed and shipped.
Method of Duplication: In cassette, bin loop
Mastering Equipment: 1/4-inch and 1/2-inch tape 15, 7.5, 3.75 ips, Kexep, dbx comp, de-esser.
Tape Used: Reels: Ampex 642; cassette: Ampex 614, 615 high bias, Ampex 610.
Shell Used: Black/White C-0.
Duplicating Speed: 32:1.
Loading Equipment: Superscope cassette winders.
Packaging Equipment/Fulfillment Services: Complete fulfillment service.
Rates: Please call for rates.
Other Services: Complete video post services from 1-inch and 3/4-inch, 1-inch Studer video layback, voice to picture, 1/2-inch up to 2-inch 24-track mixing facilities.

SHAPE OPTIMEDIA, INC.
The CD Source™

SHAPE OPTIMEDIA, INC.
Kennebunk, ME

SHAPE OPTIMEDIA, INC.
CD Services
Alewife Rd., P.O. Box 920, Kennebunk, ME 04043
(207) 985-3388
Contact: William Peck, general manager
COMPACT DISC
Preparation/Manufacturing: Mastering, replication, packaging, jewel boxes, distribution, artwork preparation. Prices based on volume.

SORIN PRODUCTIONS, INC.
Tape Duplication
Freehold Executive Center, 4400 Rt. 9 S
Freehold, NJ 07728
(201) 462-1785
Contact: David Sonn

SOUND-ARTS COMPANY, INC.

Tape Duplication
5 Cindy Lane, Oakhurst, NJ 07712
(201) 493-8666
Contact: Frank M. Gspann, vice president

TAPE DUPLICATION

Duplicator: Otari DP-85, Otari DP-7000, DP-4050 (26 slaves).
Capacity: 30,000/day.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Otari MTR-10s, Otari MX-5050, Scully.
Tape Used: Agfa, Columbia, BASF.
Duplicating Speed: 480 ips, 240 ips, 64:1, 32:1, 8:1 ratios.
Loading Equipment: King 790s.
Packaging Equipment/Fulfillment Services: Shrink film, etc.
Rates: On request.

SOUND OF NASHVILLE

Mastering, Pressing, Tape Duplication
305 11th Ave. S, Nashville, TN 37203
(615) 256-2521
Contact: Marsha Ivanits, sales mgr.

SOUND STAGE

Tape Duplication
2042 N. Rio Grande Ave. Ste. F, Orlando, FL 32804
(305) 849-9767
Contact: Dan Franklin, president

SOUND TECHNIQUE INC.

Mastering
130 W. 42nd St., New York, NY 10036
(212) 869-1323
Contact: Gladys Hopkowitz, president

SOUND INVESTMENT CO., INC.

Tape Duplication
Bldg. 34-A P'Tree Dekalb Airport
Chamblee, GA 30341
(404) 458-1679
Contact: Doug Wilmer, president; Lou Simmons, sales mgr.

TAPE DUPLICATION

Duplicator: (10) Aiwa 350-20.
Capacity: 300/day depending upon length.
Method of Duplication: In cassette.
Mastering Equipment: Otari 5050 MK II, Aiwa PCM-80 digital, Technics RSM-85 II.
Tape Used: Mag Media, TDK, Maxell, Denon, Agfa 611-811, Fuji.
Shell Used: Shape and Mag Media.
Duplicating Speed: 1 7/8 ips—real time, mastering: 15 and 7 1/2 ips.
Rates: Based on length.
Other Services: PCM editing, sequencing, EQ, audio editing, broadcast and industrial production.

SOUNDS, REASONABLE!

Tape Duplication
10209 Bent Tree Lane, Manassas, VA 22111
(703) 631-6376
Contact: Owner

SOUNDTRAX AUDIO DUPLICATION

Tape Duplication
315-C Howard Ave., Rockville, MD 20850
(301) 279-0666
Contact: Leonard Schmitz, president

SOUNDWAVE RECORDING STUDIOS, INC.

Mastering
2 West 45th St. Ste. 903, New York, NY 10036
(212) 730-7366
Contact: President

SOUTHERN AMERICAN RECORD PRESSING CO.

Mastering, Pressing, Tape Duplication
305 11th Ave. S, Nashville, TN 37203
(615) 256-2521
Contact: Marsha Ivanits, sales mgr.

SPECTRA COMMUNICATIONS

Tape Duplication
P.O. Box 621, Pt. Washington, NY 11050
(516) 883-3395
Contact: Lee Kalinsky

SPECTRUM MAGNETICS, INC.

Tape Duplication
Marsh Creek Corporate Center, Lionville, PA 19353
(800) 441-8854, (215) 363-6300
Contact: Bill Rickard

STAMPER MAKERS

Mastering, Pressing, Tape Duplication
130 W. 42nd St., New York, NY 10036
(718) 706-6012
Contact: Derek Popiak

THE STAR STUDIO

Tape Duplication
75 Webster St., Worcester, MA 01610
(617) 756-8890
Contact: Tracy Raphaelson, studio mgr.

STARSTRUCK AUDIO/VIDEO SERVICES

Tape Duplication
P.O. Box 161, Hicksville, NY 11801
(516) 931-7231
Contact: Pete Durso, owner/operator

STUDIO B

Tape Duplication
1119 Bell St., Montgomery, AL 36104
(205) 834-6881, 269-5957
Contact: Jayonn Bearden, vice president

STUDIO 55 PRODUCTIONS

Tape Duplication
42-55 Colden St. Ste. 11P, Flushing, NY 11355
(718) 762-1264
Contact: George Lerner, owner/manager

STUDIO K GOSPEL RECORDING

Tape Duplication
P.O. Box 177, 79 Lewiston St.
Mechanic Falls, ME 04256
(207) 345-9073
Contact: Stephen D. Kilbreth, director

Electronic

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Forget about paper labels. Print over 7,000 units per hour. Save time, money, trouble, space. Eliminate inventory problems, costly label overruns. Save 4¢ or more per cassette.

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new york, new york 10017 u.s.a.
telephone: (212) 308-6888
telex: 12-6419

Circle #083 on Reader Service Card

Eastern

**SUN PLASTICS CO. INC. /
DYNAMIC LP STEREO REC. PRESSING CO. INC.**
Pressing
900 Passaic Ave., E. Newark, NJ 07029
(201) 482-6749, 349-0977
Contact: Vicky Salerno

SUNSHINE SOUND, INC.
Mastering
1650 Broadway, New York, NY 10019
(212) 582-6227
Contact: Frank J. Trimarco, president

SUPERDUPE
Tape Duplication
295 Madison Ave., New York, NY 10017
(212) 683-6854
Contact: Keith Gordon, president

SUPERIOR MAGNETICS CO.
Tape Duplication
Rt. 3 Box 155, Blue Springs, MS 38828
(601) 869-2514

THE TAPE COMPLEX INC.
Tape Duplication
4 Haviland St., Boston, MA 02115
(617) 437-9449
Contact: Peter Cecere, president; Kathryn Torda, V.P.
TAPE DUPLICATION
Duplicator: Aiwa models 350 & 660.
Capacity: 100 copies per run.
Method of Duplication: In cassette.
Mastering Equipment: 1/2-track, 1/4-track, digital, cassette.
Tape Used: Ampex GM I & II, Agfa 627 and 662.
Shell Used: 5-Screw Magnetic Media & IPS, Shape Mark 10.
Duplicating Speed: Real Time.
Loading Equipment: TTL 515B.
Packaging Equipment/Fulfillment Services: 48-hour service; outboard gear available.



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



THE TAPE COMPLEX INC.
Boston, MA

Rates: According to length & quantity.
Other Services: Custom cassette loading (blank), mastering tape, accessories for mastering, cassette accessories, video duplication.

TAPEX CORPORATION
Tape Duplication
2999 NE 12 Terrace, Ft. Lauderdale, FL 33334
(305) 565-1617
Contact: A sales executive
MASTERING

Other Services: Tapex has in stock the new T-8 water soluble plate makers which are used to make the printing plates for the Apex printers.

TAPE DUPLICATION
Other Services: Tapex Corp. has in stock high and low grade C-0 cassette shells and Norelco boxes at excellent prices.

TELSTAR RECORDING
Tape Duplication
2074 17th St., Sarasota, FL 34241
(813) 365-0337
Contact: Rick Moulton

THE TIME MACHINE RECORDING AND DUPLICATION
Mastering, Tape Duplication
1312 Alhambra Way S., St. Petersburg, FL 33705
(813) 867-0312
Contact: Steve Repetti, president

TODAY VIDEO, INC.
Mastering, Tape Duplication
45 W. 45th St., New York, NY 10036
(212) 391-1020
Contact: Beverly Seeger, president

TOP CAT SOUND STUDIOS INC.
Tape Duplication
120 W. 28th St. 4th Fl., New York, NY 10001
(212) 807-9494
Contact: Mark Kreider, Wade Birdwell

TRACY-VAL CORPORATION
Record Plating
201 Linden Ave., Somerdale, NJ 08083
(609) 627-3000
Contact: Joan or James Miller

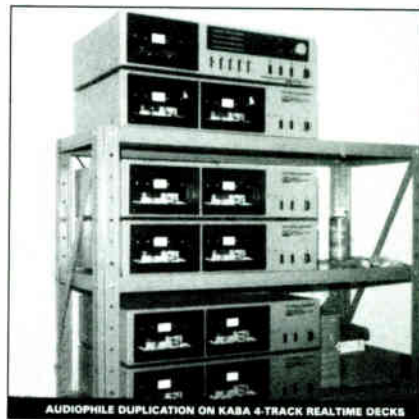
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New Fairfield, CT

TRAXX RECORDING PRODUCTS
Tape Duplication
24 Crestway KC, New Fairfield, CT 06812
(203) 746-3561
Contact: Jim Beck, owner
TAPE DUPLICATION
Duplicator: KABA 4-track real time duplicators
Capacity: 900 C-45 ON-2X per shift.
Method of Duplication: In cassette.
Mastering Equipment: Otari 5050 2-track.
Tape Used: Ampex, BASF, Agfa, Magnetic Media
Shell Used: Mag Media, IPS, Tr Tec.
Duplicating Speed: 1X, 2X
Loading Equipment: TTL Model 515 and Audico's.
Packaging Equipment/Fulfillment Services: Tuck labeler.
Rates: Call for brochure.
Other Services: 8-track Tascam/Sound Workshop recording studio available for mastering. We also carry a full line of recording products and cassette accessories.

Circle #084 on Reader Service Card

TRUSTY TUNESHOP RECORDING STUDIO

Mastering, Tape Duplication
Rt. 1, Box 100, Nebo, KY 42441
(502) 249-3194
Contact: Elsie Childers, owner/producer

VOICES & OTHER MEDIA

Tape Duplication
16 East 48 St. 5th Fl., New York, NY 10017
(212) 935-9820
Contact: Ralph Nicastro, production manager

Rates: Upon request.

Credits: Yellowman, Dennis Brown, Carlene Davis, Sly & Robbie, Culture, Audrey Hall, Leston Paul, Winston Soso, Calypso Rose. Average 65% of W.L.I.B. top 20 chart.
Other Services: Custom pressing.

V.P. RECORDS INC.

Mastering
170-21 Jamaica Ave., Jamaica, NY 11432
(718) 291-7058
Contact: Christopher Chin, vice president
MASTERING
Cutting Lathes: Neumann VMS 70 w/Zuma digital computer control, Neumann SAL 74B transformerless cutting rack and SX-74 cutter head.
Console: Neumann SP 79C transformerless mastering console.
Tape Machines: (2) Sony/MCI JH-110M-B 1/4-inch and 1/2-inch, Otari MTR-12, Ampex ATR, Nakamichi MR-1 and Technics cassette decks.
Monitor Speakers: JBL 4430s, JBL 4313s and Auratone.
Signal Processing: Equalizers by Neumann, Orban, Klark-Teknik and Pultec. Limiter/compressors by Neumann, dbx and EMT, noise reduction by Dolby and dbx.
Engineers: Christopher Chin and Christopher Scott.

WK STUDIO

Tape Duplication
611 B-Way, New York, NY 10012
(212) 473-1203
Contact: Phyllis Whitehouse, Konstantine Saregani

WRS MOTION PICTURE AND VIDEO LAB

Tape Duplication
210 Semple St., Pittsburgh, PA 15213
(412) 687-3700
Contact: Steve Russell, Ed Jarrow, Jack Napor



TRUTONE RECORDS
Haworth, NJ

TRUTONE RECORDS

Mastering, Pressing, Tape Duplication, CD Services
163 Terrace St., Haworth, NJ 07641
(201) 385-0940

Contact: Adrienne Rowatti, studio mgr.

MASTERING

Cutting Lathes: Neumann VMS-70, Scully w/Capps Variable Pitch II.

Console: Neumann, Custom, and Studer.

Tape Machines: Studer A-80, Studer A-810, Studer B 67, Ampex ATR-102, MCI JH-110B.

Monitor Speakers: UREI 813, JBL, Yamaha, Auratone.

Signal Processing: Neumann, Pultec, UREI, Sontec.

Engineers: Carl Rowatti, Phil Austin, Steve Robb.

Rates: Upon request.

Credits: Upon request.

Other Services: Compact disc masters, high quality short run pressing and cassette duplication. Sony PCM-1610 and F1 mastering.

COMPACT DISC

Preparation/Manufacturing: Assembly and preparation of Sony PCM-1610 tapes for CD.

TWELVE OAKS STUDIO

Tape Duplication
3830 S. Cobb Dr., Smyrna, GA 30080
(404) 435-2220

Contact: Randy Bugg, owner

UNDERWOOD AUDIO

Tape Duplication
Bldg. 34A, DeKalb/Peachtree Airport
Chamblee, GA 30341
(404) 457-1268

Contact: Hamilton Underwood, owner

UNITED RECORDING LABORATORIES

Tape Duplication
681 Fifth Ave., New York, NY 10022
(212) 751-4660

Contact: Anita Adams

USC SOUND ENTERPRISES

Tape Duplication
P.O. Box 11211, Memphis, TN 38111
(901) 682-7002

Contact: Rodney Peppenhorst

VARIETY RECORDING STUDIO

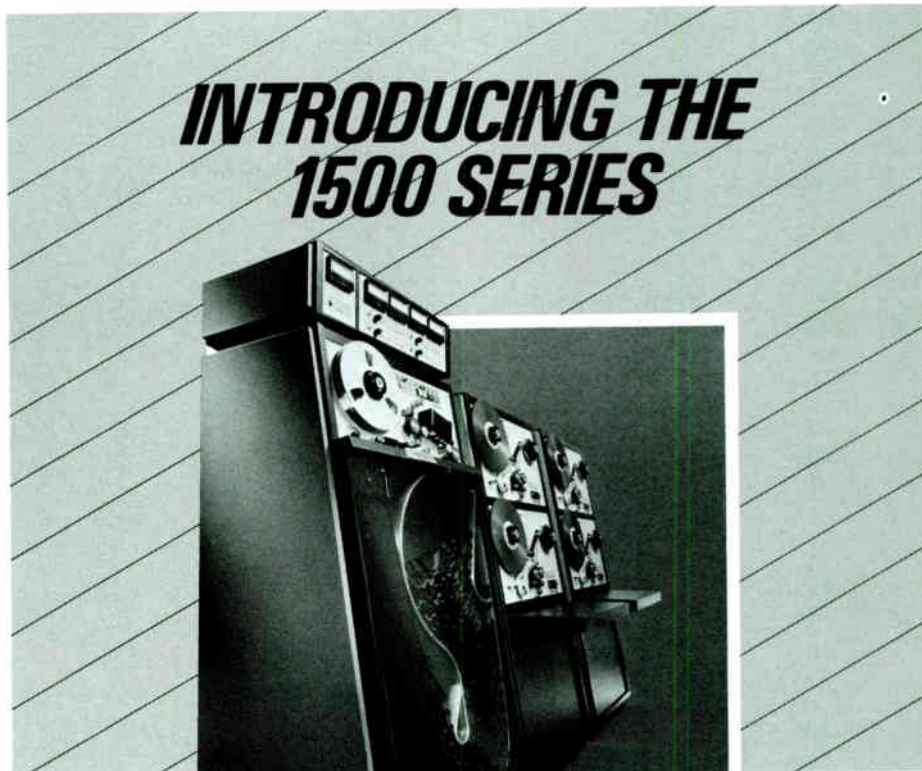
Mastering, Pressing, Tape Duplication
130 W. 42nd St. Room 551, New York, NY 10036
(212) 221-6625

Contact: Warren Allen Smith

VILLE PLATTE RECORD MFG.

Mastering, Pressing, Tape Duplication
P.O. Drawer 10, Ville Platte, LA 70586
(318) 363-2104

Contact: Ronnie Soileau, mgr.



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A & F MUSIC SERVICES

Tape Duplication
2834 Otsego, Pontiac, MI 48054
(313) 682-9025
Contact: Frank Merwin, owner

A&R RECORD & TAPE MANUFACTURING CO.

Mastering, Pressing, Tape Duplication
902 N. Industrial Blvd., Dallas, TX 75207
(214) 741-2027, for sales call (800) 527-3472
Contact: Richard Sobel, president

MASTERING

Cutting Lathes: Neumann VMS70 w/SX74 cutter head/
SAL 74B cutting rack.

Console: Custom console.

Tape Machines: Studer A80, Studer B62.

Monitor Speakers: Crown.

Signal Processing: Sontec parametric EQ, Valley People DSP 415, PDM compressor, EMT156, Ortofon correction amplifier CPS691, Master-Room echo chamber, Dolby A & B and dbx Type 1 noise reduction.

Engineers: Stanley P. Getz II, John Jamison.

Rates: Quote by phone.

Other Services: Mastering and metal processing (Europa disk plating system).

PRESSING

Presses: (7) Lined fully automated presses.

Capacity: 14,000 per day.

Vinyl Used: Keycor-505

Rates: Quote by phone.

Other Services: Jackets printed, fabrication, and all related album work.

TAPE DUPLICATION

Duplicator: Otari DP6300

Capacity: 2500 per day.

Method of Duplication: Bin loop.

Mastering Equipment: See mastering list, above.

Tape Used: Agfa.

Shell Used: Customer request (normally 5-screw).

Duplicating Speed: 32:1 or 64:1.

Loading Equipment: King.

Packaging Equipment/Fulfillment Services: Custom packaging.

Rates: Quote by phone.

Other Services: Custom loading of blanks.

A TO Z AUDIO SERVICES INC.

Tape Duplication
21929 Lorain Rd., P.O. Box 26087
Fairview Park, OH 44126
(216) 333-0040

Contact: Duane Abarca, Greg Zarnoski

TAPE DUPLICATION

Duplicator: 4-track Telex 300 (reel and cassette masters and slaves), Recordex 330II 1 to 15, Magnetax LB72 mono hi speed bulk duplicator.

Capacity: 2000 C-60s/day, 2 or 4 channel stereo reels dependent on format.

Method of Duplication: In cassette, bin loop.

Mastering Equipment: Revox, Nakamichi, Tascam.

Tape Used: Mono: BASFLNS; stereo: BASFLHD and Pure Chrome.

Shell Used: Shape Mark 10 (3-piece, 5 screw, clear), black, white, smoke or grey, 5 screw, chrome notch, tab in/tab out.

Duplicating Speed: Mono: 30 ips; stereo: 15 ips.

Loading Equipment: King, AMI updated.

Packaging Equipment/Fulfillment Services: Blank and printed labels, inserts, boxes and albums, shrink-wrap available.

Rates: Please call for pricing info. (Best prices on bulk blank cassettes!)

Other Services: Duplicator repairs. Video duplication.

AARD-VARK, INC.

Tape Duplication
335 S. Jefferson, Springfield, MO 65806
(417) 866-4104
Contact: Bill Jacobsen, president

ACME DISTRIBUTORS

Mastering, Tape Duplication
Box 8123, Kansas City, MO 64112
(816) 444-8123
Contact: Sales manager

ACME RECORDING

Tape Duplication
3821 N. Southport, Chicago, IL 60613
(312) 477-7333
Contact: Jim Rasfeld



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

ALTM PROFESSIONAL SERVICES

Tape Duplication
P.O. Box 330271, Ft. Worth, TX 76163
(817) 346-1012
Contact: Tim Hood, owner

AMERICAN SOUND & VIDEO CORP.

Tape Duplication
25133 Thomas Dr., Warren, MI 48091
(313) 536-9100
Contact: Paul Hayes, vice president

AMP SOUND, INC.

Tape Duplication
2936 N. 33rd St., Lincoln, NE 68504
(800) 835-7427
Contact: Todd Beers, sales manager

ANGEL RECORDING STUDIO

Tape Duplication
4435 Mayfield Rd. Ste. 6, So. Euclid, OH 44121
(216) 382-6036
Contact: Toni Duncan, vice president, sales

APPLIED COMMUNICATIONS

Tape Duplication
50 Commerce Park Dr., Dayton, OH 45404
(513) 233-0070
Contact: Stephe Wilson, audio dept. head

ARC ELECTRONIC SERVICES INC.

Tape Duplication
2557 Knapp NE, Grand Rapids, MI 49505
(616) 364-0022
Contact: Ron Harkai

ARS RECORDING STUDIO

Tape Duplication
11628 S. Pulaski, Alsip, IL 60658
(312) 371-8424
Contact: Allen Keilman

AT THE TOP AUDIO & VIDEO DUPLICATION

Tape Duplication
3330 Earhart Ste. 208, Carrollton, TX 75006
(214) 980-7671
Contact: Chad Witmeyer, general manager

AUDIO GRAPHICS

Tape Duplication
1516 Ferris Ave., Royal Oak, MI 48067
(313) 544-1793
Contact: Edward J. Wolfrum

AUDIO MIXERS RECORDING CO., INC.

Tape Duplication
30 E. Huron St., Chicago, IL 60611
(312) 943-4274
Contact: S. Schwartz

AUDIO TAPE PRODUCTIONS

Tape Duplication
413 W. Cherry St., P.O. Box 428, Pottsville, PA 17876
(517) 645-7561
Contact: Dean Bredwell, owner

AUDIOCRAFT

Tape Duplication
915 W. 8th St., Cincinnati, OH 45203
(513) 241-4304
Contact: E.T. Herzog, Jr., president

AUGUST RECORDING STUDIO

Mastering
Lindenhurst, IL
(312) 356-7134
Contact: Henry Robison, owner/engineer



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

BENSON SOUND, INC.

Oklahoma City, OK

BENSON SOUND, INC.

Tape Duplication
3707 S. Blackwelder, Oklahoma City, OK 73119
(405) 634-4461

Contact: Larry Benson, president

TAPE DUPLICATION

Duplicator: KABA (Kenneth A. Bacon Assoc.)

Method of Duplication: In cassette.

Mastering Equipment: MCI 2-track, Sony and Revox cassette decks.

Tape Used: Agfa 611/811.

Shell Used: Mag Media.

Duplicating Speed: Real time and 2X.

Rates: Upon request.

BUCKINGHAM ENTERPRISES

TAPE DUPLICATION
604 Bradfield Dr., Trotwood, OH 45426
(513) 837-5130

Contact: Karl E. Buckingham

CAVALIER PRODUCTIONS

Tape Duplication
3412 Erie Ave., Cincinnati, OH 45208
(513) 871-8818
Contact: Ed Fost.

CENTURY 21 PROGRAMMING, INC.

CD Services
4340 Beltwood Parkway, Dallas, TX 75244
(800) 582-2100, (214) 934-2121
Contact: Dave Graichen, Dave Scott

CLAYTON STUDIOS, INC.

Mastering, Tape Duplication
1126 S. Big Bend, St. Louis, MO 63117
(314) 781-6200
Contact: Richard Ulett

CLOCKWERKE SOUND STUDIO, INC.

Tape Duplication
1328 Linda St., Cleveland, OH 44116
(216) 331-2210
Contact: Greg James, president; Tom Gagen, vice pres.

CONCEPT PRODUCTIONS, INC.

Tape Duplication
2984 Triverton Pike, Madison, WI 53711
(608) 271-2606
Contact: C. Dan Geocaris, production dir.

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October 9, 1986

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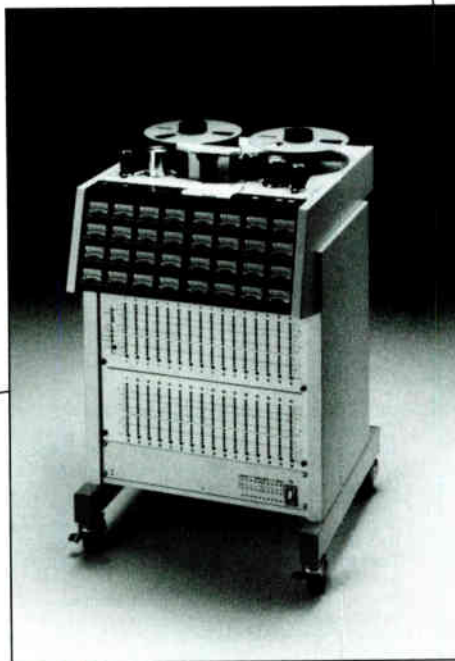

David Roudebush
National Sales Manager

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 Indianapolis, IN 46219
 (317) 542-6427

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**TAPE
 TO
 DISC**

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

Central

JOR-DAN, INC.
Tape Duplication
 1100 Wheaton Oaks Ct., Wheaton, IL 60187
 (312) 653-1919
 Contact: Bob Atkins, production mgr.

K-LARR BROADCASTING NETWORK DIVISION
Mastering, Tape Duplication
 P.O. Box 3842, Houston, TX 77253
 (717) 440-9224
 Contact: Dr. Lawrence Herbst

KAYRON, INC.
Tape Duplication
 641 Madison St., Oak Park, IL 60302
 (312) 386-0464
 Contact: Hal Kaitchuck, president

KERYGMA PRODUCTIONS
Tape Duplication
 Rt. 3 Box 104, Terrell, TX
 (214) 563-5937 in Terrell; 490-7114 in Dallas
 Contact: Reginald P. Brown, Paul F. Scott

KOZIN INTERNATIONAL, INC.
Mastering, Tape Duplication
 836 Greenwood Ct., Carpentersville, IL 60110
 (312) 428-2495
 Contact: John Kozin, president

THE LITTLE WAREHOUSE, INC.
Tape Duplication
 4906 Van Epps Rd., Cleveland, OH 44131
 (216) 398-0022
 Contact: Director of marketing and sales
TAPE DUPLICATION
 Duplicator: Telex 300, 6120, CD Series; Magnefax LBC
 82-QT, LBC 82-TT, TM81-FT.
 Method of Duplication: In cassette, bin loop.
 Mastering Equipment: Studer/Revox PR99, Otari
 MX5050B, Ampex ATR 700, Tascam 35-2, Tascam 3440.
 Tape Used: Agfa 611, 616; Magnetite, BASF Chrome,
 others available.
 Shell Used: Mag Media 5 Steel Screw, Shape Mark 10.
 Duplicating Speed: 16:1, 8:1, 24:1.
 Loading Equipment: (2) King 790s.
 Packaging Equipment/Fulfillment Services: Shrink-
 wrap.
 Rates: Quote on request.
 Other Services: In-house printing of labels and inserts.
 Full color photo-sert inserts.

MAJESTIC AUDIO DUPLICATION
Tape Duplication
 1186 Lancaster Ave., Box 472
 Reynoldsburg, OH 43068
 (614) 864-6145, 861-6076
 Contact: Mark Rentzel

MEDIA INTERNATIONAL, INC.
Tape Duplication
 247 E. Ontario, Chicago, IL 60611
 (312) 467-5430
 Contact: Duane Lundeen

MIDWEST CUSTOM RECORD PRESSING
Pressing, Tape Duplication
 P.O. Box 92, Arnold, MO 63010
 (314) 464-3013
 Contact: Rick Schaumberger

MORNING STAR AUDIO
Mastering, Tape Duplication
 2415 Carrick #207, Farmers Branch, TX 75061
 (214) 484-7827
 Contact: E.L. Garcis Jr.

**Mother
 Dubbers, Inc.**

MOTHER DUBBERS INC.
 Dallas, TX

MOTHER DUBBERS INC.
Mastering, Tape Duplication
 13626 Gamma, Dallas, TX 75234
 (214) 980-4840
 Contact: Arnett Peel, president
MASTERING
 Console: Tapco-EV 12 x 4 x 2 x 1.
 Tape Machines: Ampex 440, MCI JH-100B, TEAC 80-8,
 40-4.
 Monitor Speakers: ADS 810s
 Signal Processing: UREI LA-3A, UREI 1176LN, Crown
 EQII, dbx 157, UREI 565.
 Engineers: Russell Smith.
 Rates: \$50/hr. studio mastering; \$30/hr. editing.
TAPE DUPLICATION
 Duplicator: Infonics 200A, Magnefax bin loop.
 Capacity: How many would you like? We'll meet your
 deadline!
 Method of Duplication: In cassette, bin loop.
 Mastering Equipment: Ampex, MCI.
 Tape Used: Agfa PE 611, BASF, CBS, Ampex.
 Shell Used: Magnetic Media, Lenco and data packaging.
 Duplicating Speed: In cassette, 10:1; bin loop, 45:1.
 Loading Equipment: Automatic King model 700s.
 Packaging Equipment/Fulfillment Services: Labeling,
 cassette binders, poly and Norelco boxes, shrink-wrap-
 ping—full packaging service available.
 Rates: Call (214) 980-4840 and ask for A. Peel.

MTES CORPORATION
Tape Duplication
 3275 South I-35W, Burleson, TX 76028
 (817) 477-5353

MUSICOL INC.
Mastering, Pressing, Tape Duplication
 780 Oakland Park Ave., Columbus, OH 43224
 (614) 267-3133
 Contact: John Hull

NEW ORIENT MEDIA
Tape Duplication
 126 W. Main St., W. Dundee, IL 60118
 (312) 428-6000
 Contact: Bob Tonge

NIGHTINGALE—CONANT CORPORATION
Tape Duplication
 7300 N. Lehigh Ave., Chicago, IL 60648
 (312) 647-0300
 Contact: James E. Reising, vice president/audio oper-
 ations mgr.

NORWEST COMMUNICATIONS INC.

Tape Duplication
123 S. Hough St., Barrington, IL 60010
(312) 381-3271
Contact: Mark Karney

OAKRIDGE MUSIC

Mastering, Tape Duplication
2001 Elton Rd., Haltom City, Ft. Worth, TX 76117
(817) 838-8001
Contact: Homer Lee Sewell, president

OHIO STATE UNIVERSITY

O.L.R. RECORDING STUDIO
Tape Duplication
164 W. 17th Rm. 63 Denney Hall
Columbus, OH 43210
(614) 422-9689
Contact: David Jones, manager

OPLAND RECORDING

Tape Duplication
Rt. 7 Box 403, Sioux Falls, SD 57103
(605) 335-5940

PETERS SOUND RECORDING SERVICE

Tape Duplication
240 E. 242nd St., Euclid, OH 44123
(216) 731-4171
Contact: Michael G. Peters, owner

PLAYBACK SOUND SERVICES

Mastering, Tape Duplication
2000 S. Clinton St., Defiance, OH 43512
(419) 784-2877
Contact: Michael C. Winners, owner/operator

PRECISION AUDIO, INC.

Tape Duplication
18582 US 20, Bristol, IN 46507
(219) 295-7493
Contact: Larry Becker, production mgr.

TAPE DUPLICATION

Duplicator: Modified Liberty bin, Infonics, Telex.
Capacity: 20,000/week.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Ampex 440C 1/2-inch.
Tape Used: Ampex, BASF, Columbia Magnetics, Agfa.
Shell Used: Mag Media, Elmer.
Duplicating Speed: 16:1, 32:1.
Loading Equipment: King 790.
Packaging Equipment/Fulfillment Services: ITI Labeler.

PREMIER FILM, VIDEO & RECORDING CORP.

Mastering, Pressing, Tape Duplication
3033 Locust St., St. Louis, MO 63103
(314) 531-3555
Contact: Grace Dalzell, Wilson Dalzell

PRESCO PRODUCTIONS

Mastering, Tape Duplication
4366 W. 66th St., Cleveland, OH 44144
(216) 749-7244
Contact: John F. Presby Jr, owner

THE PRESSING PLANT

Pressing
2727 Irving Blvd., Dallas, TX 75207
(214) 630-6401
Contact: Dewayne Elery, general manager
PRESSING
Presses: SMTs, fully automatic.
Capacity: LP: 7200 daily; singles: 8400 daily.
Vinyl Used: Pure virgin vinyl.
Other Services: Laser scanned color separations, jacket printing, promotional printing.

BUD PRESSNER RECORDING SERVICES

Mastering, Pressing, Tape Duplication
4839 S. Broadway, Gary, IN
(219) 884-5214
Contact: Bud Pressner, owner/mgr.

PRODUCERS TAPE SERVICE

Tape Duplication
2601 W. 14 Mile Rd., Royal Oak, MI 48073
(313) 549-3500
Contact: Dave Miller, William Gutherie

PROGRAMMING TECHNOLOGIES, INC.

Mastering, Tape Duplication
6666 N. Lincoln Ave., Lincolnwood, IL 60645
(312) 676-9400, (800) RECORD-1
Contact: William P. Bennett, president

MASTERING

Console: Tascams.
Tape Machines: Otari.
Monitor Speakers: Infinity & Genesis, Auratone
Signal Processing: Dolby, dbx, UREI, MXR, Orban, Eventide, Studio Technologies, Inc.

Engineers: Three.

Rates: Studio: \$50/hr.; control room: \$35/hr.
Other Services: Music and sound effects library

TAPE DUPLICATION

Capacity: 100 slaves.
Method of Duplication: Open reel, common mandrel.
Tape Used: Ampex, BASF
Duplicating Speed: 32 ips.
Loading Equipment: 24 King loaders.
Packaging Equipment/Fulfillment Services: Shrink-wrap and special packaging.
Other Services: Studio recording, mixing, music and sound effect library.

Q.C.A., INC.

Mastering, Pressing, Tape Duplication
2832 Spring Grove Ave., Cincinnati, OH 45225
(513) 681-8400

Contact: Amber E. Hines, sales rep.

MASTERING

Cutting Lathes: Neumann VMS 66 w/Zuma disc computer.
Console: Neumann SP 172.
Tape Machines: MCI JH-110M, Otari MTR-10.
Monitor Speakers: UREI 811s, Eastern Acoustics.
Signal Processing: UREI LA-3As, Sontec parametric EQ.
Engineers: Todd Deasey.
Rates: LP, \$90/side; 7-inch 45, \$37.50/side.

PRESSING

Presses: (5) SMT automatic 12-inch presses, (2) SMT automatic dual 7-inch presses.
Capacity: 15,000 LPs per day; 15,000 7-inch per day.
Vinyl Used: Vitec, Quieq.
Rates: Call sales department.
Other Services: Typesetting, color separations, jacket and sleeve printing, packaging, shrink-wrap.
TAPE DUPLICATION
Duplicator: Cetec Gauss 2400 w/Dolby HX Pro.



Q.C.A., INC.
Cincinnati, OH

Capacity: 9,000 per day.
Method of Duplication: Bin loop.
Mastering Equipment: Neumann SP172 transfer console, Otari MTR-10-4LX.
Tape Used: Agfa Magnetite.
Shell Used: Shape Mark I or Shape Mark 10.
Duplicating Speed: 32:1, 64:1.
Loading Equipment: King 793.
Packaging Equipment/Fulfillment Services: 4-color insert printing, packaging and wrap.
Rates: Call sales department.

**RAINBOW RECORDING STUDIOS/
RAINBOW PRODUCTIONS-OMAHA**
Mastering, Tape Duplication
2322 S. 64th Ave., Omaha, NE 68106
(402) 554-0123
Contact: Nils Anders Erickson



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ROME PRODUCTION
Pressing, Tape Duplication
1414 E. Broad St., Columbus, OH 43205
(614) 253-4418
Contact: Jack Casey, owner/operator

REAL TO REEL STUDIOS INC.
Tape Duplication
2545 N. Fitzhugh, Dallas, TX 75204
(214) 827-7170
Contact: Deb Rooney

RICHARDSON TAPE
Tape Duplication
107 Collins St., P.O. Box 570-A
Mountain View, AR 72560
(501) 269-3908
Contact: Aubrey Richardson, owner
TAPE DUPLICATION
Duplicator: (51) Nakamichi.
Capacity: 700 per shift.
Method of Duplication: In cassette.
Mastering Equipment: Otari, Crown, Technics, Technics digital, Technics, DOD, UREI, dbx, Aphex.
Tape Used: Ampex, Mag Media, BASF, Agfa, (chrome on request).
Shell Used: Mag Media.
Shell Used: Real time.
Loading Equipment: Audico.
Packaging Equipment/Fulfillment Services: Black and white to four-color inserts, Norelco boxes and shrink-wrap.
Rates: 300 4-color w/ side 1 and 2 labels \$525, complete.
Other Services: Each cassette is individually checked before it is packaged. Also available: demo copies in small quantities, call for prices.

RON ROSE PRODUCTIONS LTD.
Mastering, Tape Duplication
29277 Southfield Rd., Southfield, MI 48076
(313) 424-8400
Contact: Don Wooster, VP
MASTERING
Console: NEOTEK, Soundcraft, Tascam.
Tape Machines: MCI, Otari, Tascam.
Monitor Speakers: UREI, JBL.
Signal Processing: Valley People, Aphex, Orban, Lexicon, Eventide.



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

Central

Engineers: Nine.
Rates: Recording \$90, audio post \$190.
Other Services: 3/4-inch video editing, commercial recording 24-track audio post-production for video, 1-inch and 3/4-inch.
TAPE DUPLICATION
Duplicator: Telex 6120, 300 Magneflex 1/4-inch & 1/8-inch.
Capacity: 3,000 C-60 per day, 2,500 reel to reel per day (3-min.)
Method of Duplication: In cassette, bin loop.
Mastering Equipment: MCI, Otari, Tascam.
Tape Used: Ampex 456, 632; Agfa 619, 819, 611, 811; BASF TP-1BCR.
Shell Used: ICM, Mag Media, Shape Inc.
Duplicating Speed: 60 ips reel to reel, 90 ips-cassette 1:1/16:1.
Loading Equipment: (2) King loaders.
Other Services: Labeling, boxing, expediting.
Rates: Call.
Other Services: New studio and duplication in Tampa, FL (813) 873-7700. Computerized expediting and shipping.

RSVP INC.
Tape Duplication
840 N. 3rd, Milwaukee, WI 53203
(414) 276-7787
Contact: Linda Radtke, vice president

SOLID SOUND, INC.
Tape Duplication
P.O. Box 7611, Ann Arbor, MI 48107
(313) 662-0667

SONIC SCULPTURES
Mastering, Pressing
636 Northland Blvd., Cincinnati, OH 45240
(513) 851-0055
Contact: Lan A. Ackley, president

SOUND RECORDERS, INC.
Tape Duplication
4031 Guadalupe, Austin, TX 78751
(512) 454-8324
Contact: Miles Muller, president; Tim Doot, production manager
TAPE DUPLICATION
Duplicator: Electro-Sound 8000, Magneflex
Capacity: Thousands per day.
Method of Duplication: Bin loop.
Mastering Equipment: Studer and Ampex. All in a correct acoustic environment.
Tape Used: Agfa, BASF and others.
Shell Used: Various.
Duplicating Speed: 64:1, 32:1.
Loading Equipment: King and Tapematic: all fully automatic.
Packaging Equipment/Fulfillment Services: in-house printing, packaging and shrink-wrapping.
Rates: Nationally competitive.
Other Services: A lot of extra care and quality.

SOUND RECORDERS INC.
Mastering, Tape Duplication, CD Services
206 S. 44th St., Omaha, NE 68131
(402) 553-1164
Contact: Clele Baker, engineer

SOUND TRAX+
Mastering, Tape Duplication
1000 W. 17th St., Bloomington, IN 47401
(812) 332-7475
Contact: Joe Wilson

SOUND-VIDEO IMPRESSIONS, INC.
Tape Duplication
110 River Rd., Des Plaines, IL 60016
(312) 297-4360
Contact: Bill Holtane

THE SOUNDMAKERS
Pressing, Tape Duplication
1000 E. 80th Pl., Merrillville, IN 46410
(219) 769-1515
Contact: Dick Hutter, managing director

SOUNDVISIONS
Tape Duplication
P.O. Box 2055, River Grove, IL 60171
(312) 453-1829
Contact: Bruno Strapko

STAGE 3 SOUND PRODUCTIONS INC.
Tape Duplication
1901 W. 43rd St., Kansas City, KS 66103
(913) 384-9111
Contact: Don Warnock, president

STARBEAT RECORDING STUDIOS
Tape Duplication
9 East Larkdale Dr., Deerfield, IL 60015
(312) 945-3555
Contact: Steve Cronen, president; Tom Graham, vice president

STUCKY AUDIO SERVICE
Tape Duplication
1412 W. 5th St., Newton, KS 67114
(316) 283-7597
Contact: Homer Stucky, owner

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Milwaukee, WI 53201 USA
Telephone (414) 961-6073 or (414) 332-8100
Telex 26-677 FAX (414) 332-2887

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STUDIO SOUND SERVICE
Tape Duplication
3404 Greenview Dr., New Albany, IN 47150
(812) 949-7001
Contact: Frank Fendley, president

THE STUDIO-32 TRACK
CD Services
8431 Lydia, Kansas City, MO 64131
(816) 523-8199
Contact: Evan Smalley, owner/chief engineer

SUMA RECORDING STUDIO
Mastering, Pressing, Tape Duplication, CD Services
5706 Vrooman Rd., Cleveland, OH 44077
(216) 951-3955, 352-9802
Contact: Michael Bishop, studio mgr.

SUNSET STUDIO
Tape Duplication
117 W. 8th, Hays, KS 67601
(913) 625-9634
Contact: Mark Meckel

SUTTMAN PRODUCTIONS
Tape Duplication
P.O. Box 72, Dayton, OH 45409
(513) 278-4601
Contact: Eric Suttman, owner

TAPE 24
Tape Duplication
1244 Remington Rd., Schramburg, IL 60195
(312) 882-2442
Contact: Michael Freeman, mgr.

TAPETRONICS
Tape Duplication
750 E. Mandoline Ave., Madison Heights, MI 48071
(313) 588-8281
Contact: John H. Dunn

3G'S INDUSTRIES & RECORDING STUDIO "55"
Tape Duplication
5500 Troost, Kansas City, MO 64110
(816) 361-8455
Contact: Eugene Gold

TIN MAN ENTERPRISES
Tape Duplication
2800 Yellow Brick Rd., St. Louis, MO 68129
(314) 464-4046
Contact: Al Bussen

TRACK ONE AUDIO/VIDEO RECORDING
Tape Duplication
P.O. Box 2775, Country Club Hills, IL 60477
(312) 799-8096
Contact: Morris Jones

TRIAD PRODUCTIONS
Tape Duplication
1910 Ingersoll Ave., Des Moines, IA 50309
(515) 243-2125
Contact: Richard Trump, president

TRINITY UNITED SALES
Tape Duplication
214 W. Houston, Sherman, TX 75090
(214) 893-7464
Contact: Eddie Ring, owner

WESTMARK PRODUCTIONS
Tape Duplication
8345 Duluth St., Golden Valley, MN 55427
Contact: DuWayne Kloos

HOWARD WHITE AUDIO PRODUCTIONS
Tape Duplication
214 N. Fourth Ave., Ann Arbor, MI 48104
(313) 662-2503
Contact: Barbara Brown, custom production
TAPE DUPLICATION
Other Services: We specialize in runs of 50 to 5,000 requiring fast turnaround and audiophile quality, utilizing our state-of-the-art KABA real time duplication equipment. Personal service and high quality control are emphasized in an effort to match your requirements to our variety of tapes, c-zeros, packaging and in-cassette duplication processes.

WORLD CLASS TAPES
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P.O. Box 7611, Ann Arbor, MI 48107
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DISC MASTERING INC. IS EXPECTING!

We're soon to be the proud parents of a Neve DTC-1 Digital Transfer Console. It's the world's first standard-production DIGITAL audio console for the preparation of master tapes for compact discs. The DTC-1 has three stereo channels; two digital and one analog for real-time cross-fading. Plus 4-band DIGITAL Format Spectrum Equalization with special curves ideal to mastering, limiting/compressing/gating/expansion capabilities for stressing or de-essing without leaving the digital domain, 200 snapshot time code-driven INSTANT RESET with built-in memory... and much more.

For more information on how our new baby will continue our family tradition of being the best facility for you and your baby, call or write:



(615) 254-8825 30 Music Sq. W., Nashville, TN 37203

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There are many reasons why L.D. Systems recommends the SCD6000. The most important, of course is improved sound: The single magnet MF/HF driver results in a monitor without match in terms of imaging and exceptionally smooth phase and frequency response.

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467 W. 38th Street, Houston, Texas 77018, (713) 695-9400

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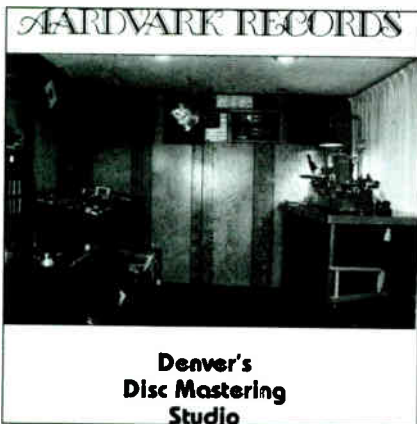
Western

A & G ASSOCIATES, INC.
Tape Duplication
 433 Fairview Ave. No., Seattle, WA 98109
 (206) 621-9222
 also: 109 Minna St. Ste. 557
 San Francisco, CA 94105
 Contact: Tape Duplicating Dept.



AAPEX TAPE DUPLICATION
 Santa Rosa, CA

AAPEX TAPE DUPLICATION
Tape Duplication
 350 E. Todd Rd., Suite A, Santa Rosa, CA 95407
 (707) 585-1132, out of state, call (800) 323-AAPX, in
 Northern Calif., call (800) 327-AAPX
 Contact: Theresa Stoops, acct. executive
TAPE DUPLICATION
 Duplicator: (103) Nakamichi MR-2B (real time).
 Capacity: 1,000-1,500 per day.
 Method of Duplication: In cassette.
 Mastering Equipment: MCI JH-10 2 track, 15 and 30
 ips; Sony PCM-501ES digital; Sony Super Beta VCR.
 Tape Used: Mastering: Agfa 469; duplication: Agfa 611
 normal and BASF chrome.
 Shell Used: Mag-Media, ICM and Shape (upon request;
 additional charge).
 Duplicating Speed: 1:1 (real time only).
 Packaging Equipment/Fulfillment Services: X-Rite
 shrink-wrap machine and Auto-Label automatic labeller.
 Rates: Rates upon request, please call.
 Other Services: Sonic enhancement, analog-to-digital
 mastering, full graphic design and printing services
 offered; full mixing, mastering and recording at our 24-
 track recording studio, Banquet Sound Studios.



AARDVARK RECORDS
 Denver, CO

AARDVARK RECORDS
Mastering
 4144 Zenobia St., Denver, CO 80212
 (303) 477-AARD, 477-2273
 Contact: Paul Erekus, owner
MASTERING
 Cutting Lathes: Scully/Westrex 3D11H head, RA 1700
 amps.

TAPE TO DISC

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

Console: Custom designed around Ranstele VPC-1980
 computer.
Tape Machines: Ampex AG-440-B ¼-inch and ½-inch
 tape, 7.5/15/30 ips.
Monitor Speakers: UREI 809 studio monitors.
Signal Processing: UREI 1176-LN limiters, UREI 545
 EQs, Orban 536A de-esser, dbx, Dolby.
Engineers: Paul Brekus and "Bo" Bohannon.
Rates: 12-inch 33⅓: \$75/per side. 12-inch 45: \$50/per
 side. 7-inch 45 or 33⅓: \$35/per side.
Credits: Bo's credits include: The Amazing Rhythm Aces,
 Bar-Keys, Issac Hayes, Richard Pryor, Otis Redding,
 Staple Singers, Rufus Thomas, Robin Trower, and ZZ Top.
Other Services: Pressings and jackets available. Digital
 F1 format, plus various outboard equipment on notice.

ABBEY TAPE DUPLICATORS, INC.
Tape Duplication
 9525 Vassar Ave., Chatsworth, CA 91311
 (818) 882-5210
 Contact: Nick Steed, sales rep.

ALLIED RECORD CO.
Pressing, Tape Duplication
 6110 Peachtree St., Los Angeles, CA 90040
 (213) 725-6900
 Contact: David M. Franco, plant manager

ALSHIRE INTERNATIONAL, INC.
Mastering, Pressing, Tape Duplication
 1015 Isabel St., P.O. Box 7107, Burbank, CA 91510
 (213) 849-4671, (818) 843-6792
 Contact: Al Sherman

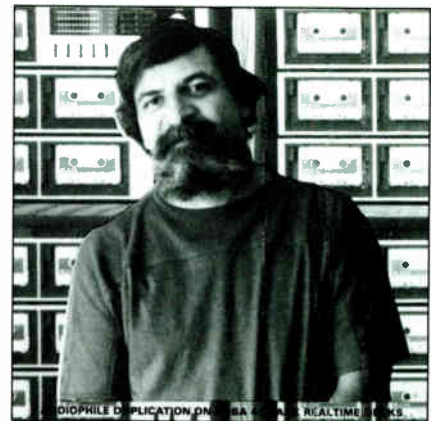
ALTA VISTA RECORDING STUDIO
Mastering, Pressing, Tape Duplication
 P.O. Box 12754, Albuquerque, NM
 (505) 836-5747
 Contact: Herman Martinez, owner/operator

AMERICAN TAPE DUPLICATING
Tape Duplication
 7023 15th Ave. NW, Seattle, WA 98117
 (206) 789-8273
 Contact: Ella Bachman

ANNEX STUDIOS
Mastering
 1041 N. Orange Dr., Hollywood, CA 90038
 (213) 463-9944
 Contact: Thorne Nogar, owner

ARCAL PRODUCTIONS
Tape Duplication
 2732 Bay Rd., Redwood City, CA 94063
 (415) 369-7348
 Contact: Sal Viola, production mgr.

ARCHON CASSETTE DUPLICATION CO.
Tape Duplication
 1831½ Pearl St., Boulder, CO 80302
 (303) 444-5035
 Contact: John Arcotta, owner
MASTERING
 Console: Soundcraft Model 200 16x8.
Tape Machines: Crown, Ampex, Sony digital.
Monitor Speakers: Rogers.
Signal Processing: Aphex Aural Exciters, Dynaflex 2B,
 UREI.



ARCHON CASSETTE DUPLICATION CO.
 Boulder, CO

Rates: \$35/hr.
 Credits: AT&T, Air Force Academy.
TAPE DUPLICATION
 Duplicator: (100) Sony recorders real time, KABA.
 Capacity: 500 per 8 hr. shift (real time); 3,000 (high-speed).
 Method of Duplication: In cassette.
 Mastering Equipment: Sony digital DMR-2000, PCM-100.
 Tape Used: BASF chrome, TDK, Sunkyong.
 Shell Used: Sunkyong, Shape Mark 10, Shape F-R.
 Duplicating Speed: Real time and 16:1.
 Loading Equipment: Electro-Sound.
 Packaging Equipment/Fulfillment Services: Clamco,
 shrink-wrap.
 Other Services: In-house printing, digital on-location 2-
 track recording; DMR-2000; Sony PCM-100; AKG tube
 microphones.

ARTIST SOUND
Tape Duplication
 12311 NE Glisan #254, Portland, OR 97230
 (503) 254-9742

DUPLICATION
 Duplicator: (20) Nakamichi.
 Method of Duplication: In cassettes.
 Mastering Equipment: Digital: Sony PCM-501, Sony
 HF900; analog: Pioneer RT1050; Beta Hi-Fi; Sony HF 500.
 Tape Used: BASF CrO₂ Type II international reference;
 Sony Pro X (digital and Beta Hi-Fi) masters.
 Shell Used: Shape Mark 10, high bias.
 Duplicating Speed: 1:1 real time.
 Packaging Equipment/Fulfillment Services: Inserts,
 labels, shrink-wrap.
 Rates: Variable—EQ 45 min. tape = \$1.7C (tape, case,
 labor); digital add 25¢.
 Other Services: Digital editing, full service recording
 studio for re-mastering, editing, etc., no minimum order
 required.



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

AT&T RECORDING/DUPLICATING
 Los Angeles, CA

AT&T RECORDING/DUPLICATING
Tape Duplication
 501 N. Larchmont Blvd., Los Angeles, CA 90004
 (213) 466-7756
 Contact: Lesley Cohen, sales mgr.
TAPE DUPLICATION
 Duplicator: Ampex (hi-speed), KABA (real time).
 Capacity: 1-25,000 (¼-inch or cassette).

Mastering Equipment: Studer, Audionics, Dynaflex, dbx, etc.
 Tape Used: Full line of Agfa or BASF.
 Shell Used: Shape, Data-Pac, Mag-Media.
 Duplicating Speed: 1:1, 2:1, 8:1, 16:1.
 Loading Equipment: King.
 Packaging Equipment/Fulfillment Services: Label printing, application, shrink-wrap.
 Rates: Vary with quantity, call for quote.
 Other Services: ¾-inch, VHS, Beta video dubs; 8-track recording studio.

AUDIO CASSETTE DUPLICATOR CO.
Tape Duplication
 12426½ Ventura Blvd., Studio City, CA 91604
 (818) 762-2232
 Contact: Steve Katz, Steve Mitchell

AUDIO DESIGNS
Tape Duplication
 P.O. Box 15501 Wedgwood Stn., Seattle, WA 98115
 (206) 325-9286
 Contact: Ric Vaughan, owner

AUDIO EXPRESS
 Div. of Worldwide Communications
Mastering, Tape Duplication
 320 Stewart St., Reno, NV 89502
 (800) 322-4422, (702) 322-6292
 Contact: Bill Stephens, cassetologist

AUDIO PRODUCTION STUDIO
Tape Duplication
 7404 Sand Lake Rd., Anchorage, AK 99502
 (907) 243-4115
 Contact: Bruce Graham, Ginni Davlin

AUDIO RECORDERS
Tape Duplication
 3843 Richmond, San Diego, CA 92103
 (619) 296-6355
 Contact: John Mullen, owner

AUDIO VILLAGE
Tape Duplication
 555 S. Palm Canyon 110A/P.O. Box 4692
 Palm Springs, CA 92263
 (619) 320-0728
 Contact: Wayne Gunn, manager

AUDIODYNE
Tape Duplication
 P.O. Box 825, San Jose, CA 95106
 (408) 287-3520
 Contact: L. Chiamonte

AVID PRODUCTIONS
Tape Duplication
 235 E. 3rd Ave., #215, San Mateo, CA 94401
 (415) 347-3417
 Contact: Peter Nixon, client services

AWARD RECORD MFG., INC.
Mastering, Pressing, Tape Duplication
 5200 W. 83rd St., Los Angeles, CA 90045
 (213) 645-2281
 Contact: Marty Ansoorian, president

Electronic
MUSICIAN

... the first magazine devoted exclusively to the new technology that's revolutionizing the industry, covering MIDI, computer music applications, SMPTE/synchronization, video, music sampling/synthesis, and much more! See page 83 for complete information.

A Mix Publication



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- In house labeling and direct to cassette printing.
- 40 years experience in the business.
- But here's the real reason Sound Recorders can't be copied *anywhere*: SERVICE. Each order, whether it's for 100 or 100,000 cassettes, is personally handled by owner Miles Muller or production manager Tim Doot. We stay on the job and in touch with you until your order is sealed and delivered.

SR

SOUND RECORDERS, INC.

4031 Guadalupe
 Austin, TX. 78751

512-454-8324

Hands on service. On our cassettes it's a difference you can plainly hear.

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Alex Guinness

Alex Guinness & the Worlds Records

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665 Harrison Street San Francisco, CA 94107

Circle #098 on Reader Service Card



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

KENNETH A. BACON ASSOC.
Novato, CA

KENNETH A. BACON ASSOC.

Pressing, Tape Duplication

24 Commercial Blvd. Suites E-G, Novato, CA 94947
(415) 883-5041 (CA), (800) 231-TAPE (outside CA only)

Contact: George Rosenfeld, account executive

PRESSING

Presses: Lened automated and modified.

Capacity: 20,000 per week (8 hr. shift)

Vinyl Used: Custom blended high temperature virgin vinyl.

Rates: Call for prices.

Other Services: Typesetting, jacket printing/fabrication, complete packaging, logo and jacket design.

TAPE DUPLICATION

Duplicator: 100-position KABA 4-track real time system: KABA 4-TM and 4-TS; Otari OM/C2/23 (8 slave); Alpha 2000M and 2000S (15 slave); bin system 16X/32X (5 slave).

Capacity: 2,000 real time and 2,000 high-speed per 8 hr. shift (C-45).

Method of Duplication: In cassette, bin loop.

Mastering Equipment: Otari MX 5050 1/4-inch 2-track; 1/2-inch 4-track; Otari 1/2-inch 8-track, Nakamichi and Technics PCM.

Tape Used: Agfa, Ampex, BASF, Scotch, Sunkyoung.

Shell Used: Elmar, Shape, Lenco, Film.

Duplicating Speed: 1X, 2X, 8X, 16X, 32X.

Loading Equipment: TTL Model 515.

Packaging Equipment/Fulfillment Services: ITI L-1B labeller, Pack-all shrink-wrap.

Rates: Call for catalog.

Other Services: KABA 4-track real time duplication system sales and service, Ampex, Agfa and Scotch mastering tape, complete cassette graphics and packaging, including books-on-cassette packaging, custom labels and box liners, binders, fulfillment, 8-track recording studio, narration, location recording, pro equipment, sales and service, editing supplies.

BAMCO RECORDS

Pressing

1400 S. Citrus Ave., Fullerton, CA 92633
(714) 738-4257

Contact: George Baker, technical services

BATISH RECORDING ENTERPRISES

Tape Duplication

1310 Mission St., Santa Cruz, CA 95060
(408) 423-1699

Contact: Ashwin Batish, Ravi Batish, owners

BAUER AUDIO

Tape Duplication

10735 Burbank Blvd., North Hollywood, CA 91601
(818) 763-8606

Visitors by appointment only

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-zeroes, packaging, in-cassette, or out-of-cassette duplication processes. Complete project management available including location recording.



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

Western



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

BAUER AUDIO
North Hollywood, CA

BUSINESS PRODUCTS, INC.

(Division of Business Products Inc.)

Tape Duplication

21 Federal Blvd., Denver, CO 80219

(800) 431-5954, (303) 937-9170

Contact: Tim Skyrdahl, division manager

MASTERING

Tape Machines: Otari, Technics, Tascam, ADC.

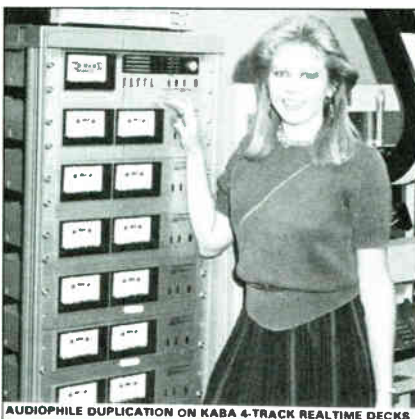
Engineers: Mark Scardello, Russ Harrist.

Rates: Voiceover studio time: \$35/hr; editing time: \$20/hr.

Other Services: Video recording/post-production, editing, duplication 1-inch, 3/4-inch VHS, Beta.

TAPE DUPLICATION

Duplicator: (2) Magnetax bin loop systems; (2) KABA in-cassette stereo, 16 slaves; (12) Wollensak mono.



AUDIOPHILE DUPLICATION ON KABA 4-TRACK REALTIME DECKS

BUSINESS PRODUCTS, INC.
Denver, CO

Capacity: 250,000 C-60/month-3 shifts.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Otari MX-5050, Technics 1500, (reel-to-reel).
Tape Used: Ampex, Agfa.
Shell Used: Kync.
Duplicating Speed: Wollensaks: 30 ips, Magnetax: 90 ips/master, 45 ips/slaves.
Loading Equipment: (2) King 790, (1) King 760.
Packaging Equipment/Fulfillment Services: III cassette labeller, automatic cassette boxing, shrink-wrapping (in-house).
Rates: Ampex C-60 blank .59, Ampex C-90 blank .69, stereo dupes using Agfa 611/811 \$1.65 ea., quantity discounts.
Other Services: Full-service video recording/production, post-production, duplication, 1-inch, 3/4-inch, VHS, Beta.

CAPITAL COMMUNICATIONS

Tape Duplication

P.O. Box 481, Olympia, WA 98507

(206) 943-5378

Contact: Jerry Lamb, product consultant



CAPITOL RECORDS STUDIOS
Hollywood, CA

CAPITOL RECORDS, INC.

Mastering, CD Services

1750 N. Vine St., Hollywood, CA 90028

(213) 462-6252

Contact: Barbara Hein, office manager

MASTERING

Cutting Lathes: Mastering Room I: VMS-70 w/SAL-74B

w/Zuma; Mastering room II: VMS-70 w/SAL-74B.

Console: Custom Neve.

Tape Machines: Studer A80 1/4-inch and 1/2-inch, 2-track JVC or Sony digitals (both rooms).

Monitor Speakers: Custom TAD/IBL

Signal Processing: I: Sontec EQ, Sontec compressor,

NTP EQ. II: Ortofon HF limiter, Neve EQ, Sphere EQ.

Engineers: Wally Traugott, Eddy Schreyer.

Rates: Call for rates.

Credits: Bob Seger, Dwight Yoakum, Diane Schuur, Maze, Stryper, Great White, The Bangles, Air Supply, Pet Shop Boys, Oingo Boingo, and many many more...

Other Services: Direct-to-disc recording.

CASSETTE PRODUCTIONS UNLIMITED, INC.

Tape Duplication, CD Services

5796 Martin Rd., Irwindale, CA 91706

(818) 969-6881

Contact: Keilh Myers, vice president

CASSETTE TECHNOLOGIES

Tape Duplication

34310 9th Ave. S. Ste. 107, Federal Way, WA 98003

(206) 874-2185, 952-5055

Contact: Dean Hart, director of client services

CASSETTE WORKS

Tape Duplication

12 S. Raymond Ave., Pasadena, CA 91105

(818) 796-1895, nationwide (800) 423-TAPE

Contact: Michael D. McKinney

CHAMPAIGN SOUND

Mastering, Tape Duplication

P.O. Box 7003, San Jose, CA 95150

(408) 252-4536

Contact: Ted Champaign, owner/engineer



— SINCE 1939 —

WORK DIRECTLY WITH THE WEST'S LARGEST
INDEPENDENT RECORD AND CASSETTE DUPLICATING
FACILITY FOR MAJOR LABEL QUALITY AND SERVICE.

RAINBO RECORDS & CASSETTES

1738 Berkeley Street, Santa Monica, CA 90404

— LIMITED OFFER —

* RECORD PRICES

*** 1000 12" FULL-COLOR PACKAGE \$1666⁰⁰**

Lacquer mastering — 3-step metal plating — 8 test pressings — 2-color labels (including type) — full-color jackets — white sleeve — shrink wrap — test within 5 working days — completion 10-15 working days after test approval.

*** 1000 12" ONE-COLOR PACKAGE \$1444⁰⁰**

Same as above package except One-Color Jacket. 10 to 15 working days.

1000 7" 45's \$555⁰⁰

Lacquer mastering — 3-step metal plating — 8 test pressings — 2-color labels (including type) — white sleeve — completion 10 working days.

1000 7" 33¹/₃ \$575⁰⁰

As above

CASSETTE PRICES \$888⁰⁰

*** 1000 FULL-COLOR CASSETTES**

Cassette mastering test cassette — Apex printing direct on cassette — label plate — full-color inserts* — 1000 additional inserts for reorder — Norelco box — cellophane wrapped

REORDER

\$1222⁰⁰
FULL-COLOR
PACKAGE AS ORIGINAL
10-12 working days

\$999⁰⁰
ONE-COLOR
PACKAGE AS ORIGINAL
10 working days

\$333⁰⁰
As Original
7-10 working days
7" 45

\$333⁰⁰
As Original
7-10 working days

\$777⁰⁰
As Original
7-10 working days
*1000 full-color inserts

** Does not include composite negatives.*

Lacquer Mastering by: EMI America, Capitol Records, Inc.

Pressed with: KEYSOR 588 Translucent Select Quality Vinyl

Tape: BASF-LHD Audiophile Music Quality—State-of-the-Art Bin Loop—HX PRO

Pressing Credits: Capitol Records for the Beatle Releases in the early 1960's, Enigma, Rhino, CBS, RSO, Casablanca, Twin Tone, Tommy Boy, SST, United Artists, Greenworld, Frontier, Pausa, Palo Alto, Celluloid, Metal Blade, Shrapnel, Warner Bros., Elektra, and many, many more including the recently completed MCA's *Miami Vice*.


Special Projects: Include Shaped Records, Picture Records, and other premium record products that must remain anonymous.

(Please mention "LIMITED OFFER" when ordering)

(213) 829-3476 (213) 829-0355

SMALLER QUANTITIES AVAILABLE

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when *QUALITY* matters
and *PRICE* counts...

- Blank cassettes in any lengths
- Reel to reel tapes
- Agfa, Ampex, Basf, Sunkyoung
- C-0 cassettes
- Norelco-style boxes
- Blank & custom printed labels
- Telex duplicating equipment

ARCAL, INC. (415) 369-7348
2732 Bay Rd., Redwood City, CA 94063

Circle #100 on Reader Service Card

THE PRESSING PLANT
2727 Irving Blvd. • Dallas, Texas 75207

SPECIAL OFFER

**500 - FULL COLOR
CUSTOM ALBUMS**
— AND —
**300 - CASSETTES with
FULL COLOR
INSERTS**

\$1795.⁰⁰
FREE Test Pressing

Mention this Ad and Receive
Similar Savings on
Your Project.

**CALL FOR ADDITIONAL
INFORMATION
(214) 630-6401**

Circle #101 on Reader Service Card



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

Western

CHESHIRE CATALYST
Mastering, Pressing, Tape Duplication, CD Services
2192 DuPont Ste. 102, Irvine, CA 92715
(714) 752-5188
Contact: Al Fowler, director of customer service

CHRISTIAN AUDIO TAPES
Tape Duplication
3005 W. Glendale Ave., Phoenix, AZ 85051
(602) 246-4976
Contact: Rita Hauke, Pat Murray

CIRCUIT RESEARCH LABS INC.
Mastering
2522 W. Geneva Dr., Tempe, AZ 85282
(800) 535-7648
Contact: Ray Updike, director of marketing and sales

COMMAND PRODUCTIONS
Mastering, Tape Duplication
Custom House P.O. Box 2223, San Francisco, CA
(415) 332-3161
Contact: Warren Weagant

COMMUNITY PRODUCTIONS
Tape Duplication
2502 E. Louise, Phoenix, AZ 85032
(602) 971-9518
Contact: Donald Fisher, owner

COVENANT RECORDINGS INC.
Mastering, Tape Duplication
1345 S. Major St., Salt Lake City, UT 84115
(801) 487-1096
Contact: Chris Jensen, manager

COZY DOG RECORDING STUDIO
Tape Duplication
603 SE Morrison Rd., Vancouver, WA 98664
(206) 694-1845
Contact: Ted Suckling

CREATIVE SOUND
Mastering, Pressing, Tape Duplication, CD Services
6290 Sunset Blvd. Ste. 1026, Hollywood, CA 90028
(213) 871-1010
Contact: Sales representative

THE CREATIVE WORD
Tape Duplication
17885 B-2 Sky Park, Irvine, CA 92714
(714) 261-8273
Contact: Bryan Hill, president

CUSTOMCRAFT RECORDINGS
Tape Duplication
5440 Ben Ave., No. Hollywood, CA 91687
(818) 509-9649
Contact: Dean Talley, owner

DAVKORE CO.
Tape Duplication
1300-D Space Park Way, Mountain View, CA 94043
(415) 969-3030
Contact: Paul Korntheuer, operations mgr.
TAPE DUPLICATION
Duplicator: Magnefax, Sony, Electro-Sound.
Capacity: 4,000 per shift.
Method of Duplication: In cassette, bin loop.
Mastering Equipment: Revox, TEAC, MCI.
Tape Used: Sunkyoung, Agfa, BASF
Shell Used: QCI, Shape
Duplicating Speed: 32:1.
Loading Equipment: King 790.
Packaging Equipment/Fulfillment Services: Full service.
Rates: Please call for a quote.
Other Services: Complete large-run video duplication services.

DETROIT SOUND STUDIOS
Mastering, Pressing, Tape Duplication
P.O. Box 43609, Los Angeles, CA 90043
(213) 299-5002
Contact: Frank H. Jackson, Jr.

DIACOUSTIC LABORATORY
Mastering
22923 DeKalb Dr., Calabasas, CA 91302
(818) 888-8010
Contact: Mickey Knight, owner

DIGITAL BROTHERS
Tape Duplication
1731 Bonaire Way, Newport Beach, CA 92660
(714) 645-9702
Contact: Ben or Bryan Shaw

DOLBY LABORATORIES
Mastering, Tape Duplication
100 Potrero Ave., San Francisco, CA 94103
(415) 558-0200
Contact: John Schell, tape duplication manager

DON'S CASSETTES
Mastering, Tape Duplication
7898 Ostrow St. #1, San Diego, CA 92111
(619) 576-0291
Contact: Don Nuzzo, owner
MASTERING
Engineers: Don Nuzzo, Donny Bogtong.
Rates: \$20/hr. mastering.
Credits: Rodrigo—Flamenco Guitar, Love Monsters "I Like Girls" "Gypsy Passions".
Other Services: Real time duplication: 5 at once, \$15/hr.
TAPE DUPLICATION
Duplicator: (11) Telex, (12) Otari, (8) Otari.
Capacity: 2,000+ per day.
Method of Duplication: In cassette.
Mastering Equipment: Kyocera D-801.
Tape Used: Sunkyoung CR and SH, Agfa 612.
Shell Used: Sunkyoung standard, MagMedia Cr notch.
Duplicating Speed: 16:1, 8:1, real time.
Loading Equipment: (2) Concept design/King loaders.
Packaging Equipment/Fulfillment Services: Apex on cassette printing/shrink-wrap.
Rates: Send for complete price sheet.
Other Services: Custom orders are as easy as standard ones so call for those special length tapes.

DOWNTOWN SOUND
Mastering
418 Bunting St., Billings, MT 59101
(406) 252-9603
Contact: Rod Nielsen

DUNCAN STREET STUDIO
Tape Duplication
240 Duncan St., San Francisco, CA 94131
(415) 285-9093

THE DUPLICATOR
Tape Duplication
1404 Franklin St. #410, Oakland, CA 94612
(415) 832-5171
Contact: Glenn Davidson, chief engineer

ECHO RECORDING CO.
Tape Duplication
19 Bel Air Dr., Orinda, CA 94563
(415) 254-2995
Contact: David Mears, owner

EMI AMERICA RECORDS

Mastering
 6920 Sunset Blvd., Hollywood, CA 90028
 (213) 461-9141, ext. 307
 Contact: Tina Hopkinson, studio production mgr.

MASTERING

Cutting Lathes: Scully-Westrex lathe w/Capps computer.
Console: Custom EMI-Abbey Road mastering console.
Tape Machines: Sony PCM-1630, DMR 4000 2-track digital w/Harmonia-Mundi BW 102 preview; Sony MCI JH-110M mastering 2-track, ATR 102.

Monitor Speakers: Altec 604E w/Mastering Lab cross-overs, Yamaha NS-10M; Augspurger room design.

Signal Processing: Cybersonics HFL-2 and Westrex hi-freq. limiters.

Engineers: Ron McMaster

Rates: 12-inch lacquers, \$110; 7-inch lacquers, \$50; EQ and rundown, \$85/hr. Other rates available upon request.

Credits: Sheena Easton, Kenny Rogers, Peter Wolf, Talk-Talk, Kajagoogoo, Stray Cats, George Thorogood, David Bowie, complete Blue Note catalog, Pet Shop Boys, Kate Bush.

Other Services: Simultaneous EQ tape copies 1/4-inch or 1/2-inch; 15 ips or 30 ips; 2-track.

THE EXXEL COMPANY

Tape Duplication
 102 N. Ditmar, Oceanside, CA 92054
 (619) 722-8284

Contact: Bill Berry

TAPE DUPLICATION

Duplicator: KABA, Magnefax, Pentagon, Wollensak.
 Capacity: 1 to 1,000,000.

Method of Duplication: In cassette, bin loop.

Mastering Equipment: Fully-equipped recording studios.

Tape Used: Magnetic Media, Agfa, Ampex Chrome.

Shell Used: Magnetic Media, Sunkyong.

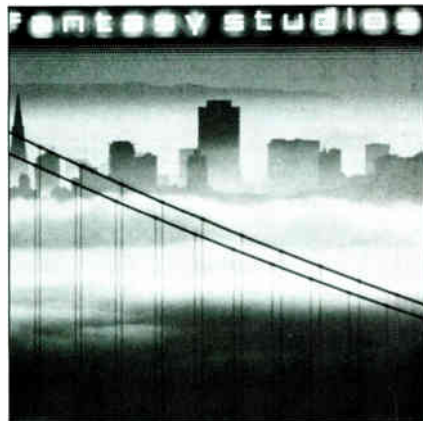
Duplicating Speed: 1:1, 2:1, 16:1.

Loading Equipment: King 790 (2).

Packaging Equipment/Fulfillment Services: Shrink wrapping, automated labeling, blister card.

Rates: Please call.

Other Services: Multi-track recording studio, electronic music production, spot and jingle production.



FANTASY STUDIOS MASTERING
 Berkeley, CA

FANTASY STUDIOS MASTERING

Mastering, CD Services
 10th & Parker Streets, Berkeley, CA 94710
 (415) 549-2500

Contact: George Horn, chief engineer

MASTERING

Cutting Lathes: Neumann mastering system utilizing the Zuma Audio computer.

Console: Sphere console.

Tape Machines: Studer 1/4-inch & 1/2-inch tape machines, Mitsubishi X-80 2-track recorder.

Signal Processing: Sontec.

Engineers: George Horn, Phil De Lancie.

Rates: Call for rates.

Other Services: Mastering from Mitsubishi X-80 digital and from Sony 1630 digital. Preparation of digital masters for compact disc manufacturing. Editing and equalization mastering from F1 format.

FAR EAST MARKETING

Agent for Shey I Plastics, Taipei, Taiwan, R.O.C.
CD Services
 312 E. 1st St., #500-D, Los Angeles, CA 90012
 (213) 680-3866

Contact: Tammy Uyehara Feng

COMPACT DISC

Preparation/Manufacturing: Taiwan manufacturer produces jewel boxes using the precision quality of the plastic injection molding process. Price: \$0.45 per box including tray. Minimum quantities apply. No initial molding charges. On-line mid-late 1986. Contact: Tammy Feng. Standard jewel box specifications.

FULLER SOUND A.V. RECORDING

Tape Duplication
 P.O. Box 65051, Los Angeles, CA 90065
 (213) 660-4914
 Contact: Mike Fuller



FUTURE DISC SYSTEMS
 Hollywood, CA

FUTURE DISC SYSTEMS

Mastering, CD Services
 3475 Cahuenga Blvd. West, Hollywood, CA 90068
 (213) 876-8733
 Contact: Gary Rice

MASTERING

Cutting Lathes: Cybersonics-Zuma DM2002 lathe w/Ortolon DSS821 cutting system.

Console: Cybersonics MC2003 automated mastering console.

Tape Machines: Ampex ATR-102M, Mitsubishi X-80 digital, Sony BVU 800DB/1610 digital system.

Monitor Speakers: Custom.

Signal Processing: Sontec equalizer and limiter/comp.

Engineers: Steve Hall, chief eng.

Rates: Upon request.

Credits: Madonna, Jermaine Jackson, Peter Cetera, Rod Stewart, The Jets, Quiet Riot, Al Jarreau, New Edition, George Howard, etc.

Other Services: Complete analog and digital mastering services for compact disc and cassette manufacturing.

THE GARAGE AUDIO AND VIDEO

Mastering, Tape Duplication
 West Covina, CA 91790
 (818) 337-7943
 Contact: Patrick Woerink, owner

GENERATION ORGANIZATION

Tape Duplication
 4840 Brookwood St., Eugene, OR 97405
 (503) 484-9087
 Contact: Lew Thorne, president

GLOBAL VISION CORP.

Tape Duplication
 3255 Cahuenga Blvd. W., Hollywood, CA 90068
 (213) 851-1190
 Contact: Jim Hardy

GOLDEN TEMPLE ENT.

Tape Duplication
 1605 Robertson Blvd., Los Angeles, CA 90035
 (213) 274-0963
 Contact: D.S. Khalsa, production manager

Kdisc mastering

6550 Sunset Boulevard
 Hollywood, California 90028
 (213) 466-1323

COMPLETE SONY DIGITAL MASTERING SYSTEM INCLUDING MUSIC EDITOR

TANDEM VMS 80 NEUMANN LATHES

Circle #102 on Reader Service Card

BERNIE GRUNDMAN MASTERING STUDIO
Mastering, Tape Duplication, CD Services
6054 Sunset Blvd., Hollywood, CA 90028
(213) 465-6264
Contact: Denise Porter, office mgr.

HEADWIPES
P.O. Box 1125, Burbank, CA 91507
Contact: Kenyon Zahner, owner

H.M.E.A.'s "STATE-OF-THE-HEART" STUDIO
Tape Duplication
P.O. Box 453, Lakewood, CA 90714
(213) 423-0273
Contact: Duane Everts, manager

HOERNER AUDIO PRODUCTIONS
Tape Duplication
P.O. Box 27090, Seattle, WA 98125
(206) 362-2611
Contact: Clint Hoerner, owner
TAPE DUPLICATION
Duplicator: Otari DP-4050 C2 & Z3 Expanders.

Capacity: 11 per pass; 800 C-90s per day, 4,000 C-90s per week.
Method of Duplication: In cassette.
Mastering Equipment: Tascam 58; 40-4, 32; 122 cassette w/Dolby or dbx; 520 Mixer.
Tape Used: Music quality: TDK ZD, Agfa 812, BASF, CSI. Voice quality: CSI.
Shell Used: TDK standard; custom mil-spec; Mark 10; Mag Media.
Duplicating Speed: 15 ips, both sides in stereo at same time.
Packaging Equipment/Fulfillment Services: Shrink-wrap, inserts, custom labels and package.
Rates: Vary with brand, quantity and length.
Other Services: Audio mixdown and sweetening, VHS or Beta video duplication, audio and video recording studio, on location recording A/V, special effects equipment.

HOLLYWOOD VAULTS, INC.
Secure Film & Tape Storage
742 North Seward St., Hollywood, CA 90038
(213) 461-6464
Contact: David Wexler, president

INFAL RECORDS CO.
Mastering, Tape Duplication
2217 Champa St., Denver, CO 80205
(303) 295-1500
Contact: Victor

INFOTRONICS
CD Services
11657 Erwin St., North Hollywood, CA 91606
(818) 761-1988
Contact: Kenny Smith

INGALLS STREET TAPE
Tape Duplication
329-A Ingalls St., Santa Cruz, CA 95060
(408) 423-1849
Contact: Todd Thal, manager

JACKSON SOUND PRODUCTIONS LTD.
Tape Duplication
3897 S. Jason St., Englewood, CO 80110
(303) 761-7940
Contact: Joseph Jackson
TAPE DUPLICATION
Duplicator: MTI 1
Mastering Equipment: 3M, M70
Tape Used: BASF.
Shell Used: MagMedia.
Duplicating Speed: 64:1.
Loading Equipment: King 790, 780.
Packaging Equipment/Fulfillment Services: Complete packaging.
Other Services: Video duplication—hi-fi stereo; real time cassette duplication.

JESTER SOUND STUDIO
423 Kuhlman Dr., Billings, MT 59105
(406) 248-5896
Contact: Bob Hale, owner/engineer

JVC AMERICA INC.
(Formerly JVC CUTTING CENTER, INC.)
CD Services
6363 Sunset Blvd. #500, Hollywood, CA 90028
(213) 467-1166
Contact: Warren Salyer, studio operation manager

KDISC
Mastering, Pressing
26000 Springbrook, Saugus, CA 91350
(805) 259-2360
Contact: Sharon Summerfield, sales and customer service

KDISC MASTERING STUDIOS
Mastering, CD Services
6550 Sunset, Hollywood, CA 90028
(213) 466-1323
Contact: Daneen Conroy, studio mgr.
MASTERING
Cutting Lathes: Neumann.
Console: Custom consoles.
Tape Machines: Studer, Ampex.
Monitor Speakers: Custom JBL, Cetec-Gauss, Yamaha NS-10M.
Signal Processing: Sontec, API, Neve, Dolby, dbx.
Engineers: John Golden, Ken Perry, Carol Hibbs, Bill Lightner.
Rates: Call for rates.
Credits: Dazz Band, *Ghostbusters* soundtrack, King, Billy Crystal, Minutemen, Men At Work, Dan Fogelberg, Tim Weisberg.
COMPACT DISC
Preparation/Manufacturing: Sony PCM-1610 and 1630 mastering, editing, digital copies, compact disc prep.

KENJO AUDIO, INC.
Tape Duplication
607 E. Belmont, Fresno, CA 93701
(209) 266-9681
Contact: Glen Becker

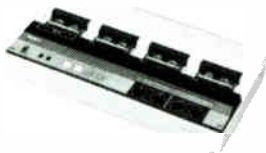
KM RECORDS, INC.
Mastering, Pressing
2980 N. Otario St., Burbank, CA 91504
(818) 841-3400
Contact: Jim Auchterlonie, Bill Riley
MASTERING
Cutting Lathes: VMS-70, SX-74, SAL 74-B.
Console: Neumann SP-78.
Tape Machines: Modified MCI JH-110.
Monitor Speakers: Custom.

WHILE EVERYONE ELSE WAS PROMOTING YESTERDAY'S SOUND, SONY PERFECTED *THE NEXT GENERATION*

SONY's NEW line of high quality full-featured duplicators will meet all of your audio cassette duplication needs; whether voice or music, monaural or stereo. SONY systems can reproduce from 1 to 43 copies in a single pass while being simple to use. Further, they include features such as short tape indicator, audio end detect, A or A+B selection, manual or fully automatic duplication, and superior frequency response.

And only SONY duplicating systems carry a full TWO YEAR WARRANTY against head wear. All in all, SONY high speed duplicating systems last longer, cost less and produce superior reproductions...THE NEXT GENERATION of duplicating systems has arrived.

SONY
AV PRODUCTS



NATIONAL DISTRIBUTOR

educational electronics corporation

P.O. Box 339 • Inglewood, CA 90306-0339 • 213-677-8167

Circle #103 on Reader Service Card

Signal Processing: EMT 140, API and other EQ.
Engineers: Michele Stone, Jeff Sanders.
Rates: Upon request.

PRESSING

Presses: Toolex-Alpha Lened.
Capacity: 15,000 per day.
Vinyl Used: KC 569, Teldec.

Rates: Upon request.

Other Services: In-house metal processing, printing of labels, jacket covers and liners, jacket fabrication, direct board printing cassette.

KORELICH ENG. & MFG. CO.

Mastering, Pressing

6331 Santa Monica Blvd., Hollywood, CA 90038
(213) 462-2545

LANE AUDIO & RECORDS

Mastering

P.O. Box 29171, Los Angeles, CA 90029
(213) 469-8007
Contact: Michael R. Lane, owner

LASERVIDEO

CD Services

1120 Cosby Way, Anaheim, CA 92806
(714) 630-6700

JAMES G. LEE RECORD PROCESSING

(Matrix Services)

145 W. 154th St., Gardena, CA 92801
(213) 321-2187
Contact: Edward Tobin, Jr., general manager

TERRY LESSIG SOUND

Tape Duplication

1626 N. 7th St., Phoenix, AZ 85006
(602) 255-0155
Contact: Terry W. Lessig, president

LEW'S RECORDING PLACE

Tape Duplication

1219 Westlake Ave. N. Suite 115, Seattle, WA 98109
(206) 285-7550
Contact: Lew Lathrop, owner

LIGHTNING CORPORATION

Tape Duplication

7854 Ronson Rd., San Diego, CA
(619) 565-6494
Contact: Mike Larsen

LIL OAK SOUND

Mastering, Tape Duplication

2028 SW "G" St., Grants Pass, OR 97526
(503) 479-3205
Contact: Rosie Moore, owner

LOCATION RECORDING SERVICE INC.

Mastering

2201 W. Burbank Blvd., Burbank, CA 91506
(213) 849-1321

MAD DOG STUDIO

Tape Duplication

1715 Lincoln Blvd., Venice, CA 90291
(213) 306-0950

TAPE DUPLICATION

Duplicator: Denon DR-M44-HX audiophile recorders, custom distribution amp.

Capacity: 22 per pass.

Method of Duplication: In cassette.

Mastering Equipment: Ampex ATR, Sony F1, other.

Tape Used: BASF chrome or other upon request.

Shell Used: Shape, or other.

Duplicating Speed: Real time.

Packaging Equipment/Fulfillment Services: Labels, J-cards, boxes.

Rates: Upon request.

Other Services: 24-track studio on premises, full production and recording services. Will coordinate full packaging of cassettes from simple B&W to 4-color w/shrink-wrap.

MAGNETIC INK

Tape Duplication

31625 Tennessee, Yucaipa, CA 92399
(714) 794-3582
Contact: Doug Cross, owner

MASTER CASSETTE & DUPLICATING

Mastering, Tape Duplication

3919 So. 28th St., Phoenix, AZ 85040
(602) 243-3023, (800) 228-8919
Contact: Jack Murray

MASTER DIGITAL INC.

Tape Duplication, CD Services

1749 14th St., Santa Monica, CA 90404
(213) 452-1511

Contact: Paul Addis, VP, sales

TAPE DUPLICATION

Duplicator: 16 bit digital Sony or analog Sony decks.

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, MK 10.

Duplicating Speed: Real time.

Loading Equipment: King.

Packaging Equipment/Fulfillment Services: Color stock, typeset and printed, cards & labels, shrink-wrap.

Rates: \$3.00 & up.

Other Services: Video production, digital audio recording, compact disc mastering, video editing: one-inch and Betacam, DVE, Chyron, digital audio laybacks. Videophile duplication: one-inch. ¾, VHS and Beta Hi-fi.

COMPACT DISC

Preparation/Manufacturing: Full CD prep.

MASTER TRACK PRODUCTIONS

Tape Duplication

1524 W. Winton Ave., Hayward, CA 94545
(415) 782-0877

Contact: Linda Rebeck, office mgr.

TAPE DUPLICATION

Capacity: 100,000 units/month.

Method of Duplication: Bin loop.

Mastering Equipment: Studer A80 MR.

Tape Used: BASF, Sunkyong.

Shell Used: ICM.

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.

THE MASTERING LAB

Mastering

6033 Hollywood Blvd., Los Angeles, CA 90028
(213) 466-8589
Contact: Annie Butkiewicz, studio manager

MATRIX ASSOCIATES, INC.

CD Services

15115½ Sunset Blvd. Ste. A
Pacific Palisades, CA 90272
(213) 459-6913

Contact: Ed Koeppe, president

MCCUNE AUDIO/VIDEO

Tape Duplication

951 Howard St., San Francisco, CA 94103
(415) 777-2700

Contact: Studio production coordinator

MCF RECORDS

Mastering, Pressing, Tape Duplication

3361½ Cahuenga Blvd. W, Hollywood, CA 90068
(213) 850-7751

Contact: Orrin Beckwith, sales and marketing mgr.

MELODIC SERVICES

Tape Duplication

P.O. Box 393, Loveland, CO 80539
(303) 669-1525

Contact: Brian Salyards, owner

MELODY PRODUCTIONS

Tape Duplication

7712 23rd Ave. NW, Seattle, WA 98117
(206) 783-8694

Contact: James A. Bostad Sr.

MIRROR IMAGE

Tape Duplication

8505 E. Temple Dr., Stony Brook 447
Denver, CO 80237

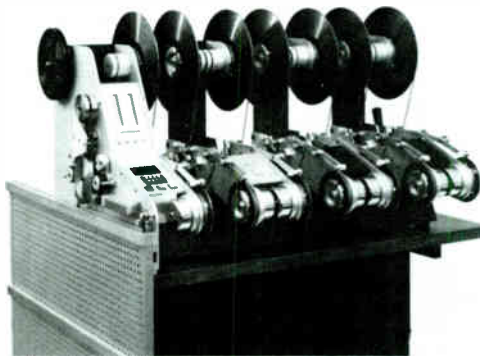
(303) 694-6642

Contact: George

We Listened To You...

For years, through our customers and market research, we have been listening in order to find out what you like and what you dislike about your tape duplicating equipment (ours or theirs) and to know what features you would include in the tape duplicator of your dreams.

The result is the 7000 Series by Magnefax



but don't take our word for it.

Listen To Us

magnefax

International, Inc.

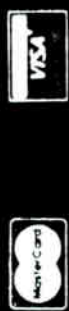
Route 1, Box 764 Rogers, AR 72756 USA Phone (501) 925-1818

Circle #104 on Reader Service Card

THE DALLAS RECORD PRESSING PLANT SINCE 1967!



A+R RECORD & TAPE MFG. CO.
902 North Industrial Blvd.
Dallas, Texas 75207
214-741-2027

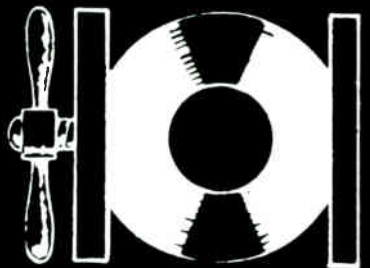


**RECORD PRESSING
IN HOUSE**

- Custom Albums • 45 RPM Singles
- Stereo Mastering with Neumann VMS70 Lathe & SX74 Cutter
- Plating with Europa Film Equipment
- 1000—7" 45 RPM Record Package • \$419.
- 1000—1 color • 12" Album Package • Records & Printed Covers • \$1372.

**TAPE
DUPLICATION**

- Any quantity, large or small
- Custom Packaging
- Demo tapes (real time copies)
- Blank tapes—ANY length needed



Circle #105 on Reader Service Card



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

Western

MIX MASTER STUDIOS
Mastering, Tape Duplication
13755 Bayliss Rd., Los Angeles, CA 90049
Contact: Wallace Todd, president

ML TAPE DUPLICATING
Tape Duplication
6935 Valjean, Van Nuys, CA 91406
(818) 988-2737
Contact: Bill Ball, owner

MOBILE FIDELITY SOUND LAB
Mastering, Tape Duplication
1260 Holm Rd., Petaluma, CA 94952
(707) 778-0134
Contact: Megin Krinard, technical director



MUSIC ANNEX, INC.
Menlo Park, CA

MUSIC ANNEX, INC.
Tape Duplication
970 O'Brien Dr., Menlo Park, CA 94025
(415) 328-8338
Contact: Keith Hatschek, dir. of client services

TAPE DUPLICATION
Duplicator: Otari DP-80 w/Dolby HX-Pro master and 5 slaves.
Capacity: 5,000 C-60 per shift.
Method of Duplication: Bin loop.
Mastering Equipment: Otari MTR-10 w/Dolby HX-Pro, 7 1/2 ips, 1/2-inch.
Tape Used: Agfa, BASF
Shell Used: Mag Media, Shape, ICM.
Duplicating Speed: 64:1, 480 ips master.
Loading Equipment: King 790s.
Packaging Equipment/Fulfillment Services: Apex (on-cassette printing) or paper labels.
Rates: Call or write for price lists.
Other Services: Complete graphics, boxing, inserts, shrink-wrap and drop ship services. Client master may be either digital or analog.

NORTHWESTERN INC.
Tape Duplication
1224 SW Broadway, Portland, OR 97205

(800) 247-2252
Contact: Paul Buescher



PACIFIC CASSETTE LABORATORIES
Torrance, CA

PACIFIC CASSETTE LABORATORIES
Tape Duplication
19701 S. Vermont Ave., Torrance, CA 90502
(213) 538-8150, (800) 421-2313 outside CA
Contact: Michael Strange, sales and marketing director
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 1/2-inch, Dolby B, C encoding.
Tape Used: Custom length TDK metal, SA; others by request.
Shell Used: TDK Reference.
Duplicating Speed: 1 7/8 ips, real time.
Loading Equipment: King.
Packaging Equipment/Fulfillment Services: Complete packaging, labeling, J-cards, shrink-wrap.
Rates: Upon request
Other Services: Please call.

PACIFIC LUTHERAN UNIVERSITY/AUDIO SVCS.
Tape Duplication
121st St. and Park, Tacoma, WA 98447
(206) 535-7268
Contact: Bob Holden, director of audio svcs.

PARADISE SOUND INC.
Tape Duplication
218 Index Ave., Index, WA 98256
(206) 793-2614
TAPE DUPLICATION
Duplicator: (6) Otari 4050; (10) Nakamichi 300.
Capacity: Up to 1,000 high speed/500 real time.
Method of Duplication: In cassette.
Mastering Equipment: Nakamichi Dragon, Otari MTR-12.
Tape Used: Ampex, Agfa.
Shell Used: Magnetite.
Duplicating Speed: 8:1 high speed and real time.
Packaging Equipment/Fulfillment Services: Postage and labeling included.
Rates: 30 min. high speed (over 10) \$1.25; 30 min. real time \$3.
Other Services: 24-track recording w/Harrison MR4 28 channel; Otari MTR-90; Lynx Time Line (\$45/hr.)

PHANTASMA SOUND
Tape Duplication
7935 Fremont Ave., Ben Lomond, CA 95005
(408) 336-2494
Contact: Errol Specter, engineer

PHASE ONE
Tape Duplication
Tucson, AZ
(602) 743-7361

PHYLCO AUDIO
Tape Duplication
4709 Brooks St., Montclair, CA 91763
(714) 621-9561, (800) 525-0100
Contact: Robert Deates, general manager
TAPE DUPLICATION
Duplicator: Audio TEK, GRT, (17 slaves).
Capacity: 10,000 daily.

—LISTING CONTINUED ON NEXT PAGE

MIX READER INQUIRY SERVICE

ISSUE: DECEMBER 1986/CARD EXPIRES APRIL 1, 1987

Name _____ Phone _____
 Company _____ Title _____
 Address _____
 City _____ State _____ Zip _____

PLEASE CIRCLE ONE ENTRY FOR EACH CATEGORY:

- Principle activity of your business:**
 - Recording Studio
 - Sound Reinforcement
 - Equipment Supplier
 - Equipment Mfg.
 - Record/Tape Processing
 - Video Production
 - Video Post-Production
 - Broadcast
 - Record Company
 - Production Company
 - Contractor/Installer
 - Studio Design/Acoustics
 - Recording/Music School
- Job Title**
 - Owner/Manager
 - Sales/Marketing
 - Producer
 - Engineer
 - Technician
 - Consultant
 - Student
 - Musician/Performer
- How many other people read your copy of *Mix*?**
 - One other
 - Two others
 - Three others
 - Four others
 - Five others
 - More than six others
- No. of years in industry:**
 - Less than 1
 - 1 - 3
 - 4 - 7
 - 8 - 12
 - 13 or more
- What is your annual budget for equipment?**
 - Under \$50,000
 - \$50,000 - \$149,000
 - \$150,000 - \$249,000
 - \$250,000 - \$499,000
 - Over \$500,000
- This inquiry for:**
 - Immediate purchase
 - Files
- Purchasing authority:**
 - Recommend
 - Specify
 - Approve
- Where did you get this copy of *Mix*?**
 - Personal subscription
 - Recording studio/Production facility
 - Newsstand
 - Audio/Video retailer
 - Other

Check each advertisement or editorial piece for corresponding number and circle below. (Maximum 20 items).

001	031	061	091	121	151	181	211	241	271	301	331
002	032	062	092	122	152	182	212	242	272	302	332
003	033	063	093	123	153	183	213	243	273	303	333
004	034	064	094	124	154	184	214	244	274	304	334
005	035	065	095	125	155	185	215	245	275	305	335
006	036	066	096	126	156	186	216	246	276	306	336
007	037	067	097	127	157	187	217	247	277	307	337
008	038	068	098	128	158	188	218	248	278	308	338
009	039	069	099	129	159	189	219	249	279	309	339
010	040	070	100	130	160	190	220	250	280	310	340
011	041	071	101	131	161	191	221	251	281	311	341
012	042	072	102	132	162	192	222	252	282	312	342
013	043	073	103	133	163	193	223	253	283	313	343
014	044	074	104	134	164	194	224	254	284	314	344
015	045	075	105	135	165	195	225	255	285	315	345
016	046	076	106	136	166	196	226	256	286	316	346
017	047	077	107	137	167	197	227	257	287	317	347
018	048	078	108	138	168	198	228	258	288	318	348
019	049	079	109	139	169	199	229	259	289	319	349
020	050	080	110	140	170	200	230	260	290	320	350
021	051	081	111	141	171	201	231	261	291	321	351
022	052	082	112	142	172	202	232	262	292	322	352
023	053	083	113	143	173	203	233	263	293	323	353
024	054	084	114	144	174	204	234	264	294	324	354
025	055	085	115	145	175	205	235	265	295	325	355
026	056	086	116	146	176	206	236	266	296	326	356
027	057	087	117	147	177	207	237	267	297	327	357
028	058	088	118	148	178	208	238	268	298	328	358
029	059	089	119	149	179	209	239	269	299	329	359
030	060	090	120	150	180	210	240	270	300	330	360

Circle number 360 for 12 monthly issues of *Mix* and we will send you subscription information.



READER SERVICE PAGE

To receive more information on the products and services advertised in this issue of *Mix*, circle the corresponding numbers on the attached reader service postcard, detach and mail promptly. Please supply all information requested.

*Important notice to readers: reader service inquiries are mailed directly to the advertiser, who is solely responsible for sending out product information. *Mix* does not process inquiries or guarantee advertiser response.

MIX READER INQUIRY SERVICE

ISSUE: DECEMBER 1986/CARD EXPIRES APRIL 1, 1987

Name _____ Phone _____
 Company _____ Title _____
 Address _____
 City _____ State _____ Zip _____

PLEASE CIRCLE ONE ENTRY FOR EACH CATEGORY:

- Principle activity of your business:**
 - Recording Studio
 - Sound Reinforcement
 - Equipment Supplier
 - Equipment Mfg.
 - Record/Tape Processing
 - Video Production
 - Video Post-Production
 - Broadcast
 - Record Company
 - Production Company
 - Contractor/Installer
 - Studio Design/Acoustics
 - Recording/Music School
- Job Title**
 - Owner/Manager
 - Sales/Marketing
 - Producer
 - Engineer
 - Technician
 - Consultant
 - Student
 - Musician/Performer
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 - Two others
 - Three others
 - Four others
 - Five others
 - More than six others
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 - 8 - 12
 - 13 or more
- What is your annual budget for equipment?**
 - Under \$50,000
 - \$50,000 - \$149,000
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 - \$250,000 - \$499,000
 - Over \$500,000
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 - Files
- Purchasing authority:**
 - Recommend
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030	060	090	120	150	180	210	240	270	300	330	360

Circle number 360 for 12 monthly issues of *Mix* and we will send you subscription information.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 217 CLINTON, IOWA

POSTAGE WILL BE PAID BY ADDRESSEE

Mix Magazine
P.O. Box 1960
Clinton, Iowa 52735



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 217 CLINTON, IOWA

POSTAGE WILL BE PAID BY ADDRESSEE

Mix Magazine
P.O. Box 1960
Clinton, Iowa 52735

Special Today

Ensoniq Application Note #3

Ensoniq Sound Library Combs - Three tasty new diskettes

- #21 - "Ah", "Eum", "Ho", "Oo", "Ya" vocals
 - #22 - Sordid, Pizzicato and tremolo strings
 - #23 - Acoustic guitar, banjo, mandolin, fiddle
- Individual diskettes . . . \$19.95

Sound Diskettes

Sound Composer's Series
K-Muse, Inc.
18653 Ventura Blvd., Suite 359
Tarzana, CA 91356

Sampleware
P.O. Box 182
Demarest, NJ 07627

Mirkas Sound Disks
Postfach 1620
5047 Wesseling
Germany

Visual Editing

Sound Lab
Blank Software
1034 Natoma St.
San Francisco, CA 94103
(415) 863-9224

Vision
Turtle Beach Softworks
1912 Alcott Rd
York, PA 17402
(717) 741-4972

Synthassist
Northeast Visions
68 Manor Dr
Glenmont, NY 12077
(518) 439-0015

Sonic Editor
Sonus Corp.
21430 Strathern Suite H
Canoga Park, CA 91304
(818) 702-0992

Sound Designer
Softsynth
Digidesign
920 Commercial St.
Palo Alto, CA 94303
(415) 494-8811

Oasis
Hybrid Arts
11920 W. Olympic Blvd.
Los Angeles, CA 90064
(213) 826-3777

Atari ST Mirage Editor
R.K. Aufpass
Dieselweg 52
2900 Oldenburg
Germany

C-64 Mirage Editors
G.C. Geerdes
Guerickestrasse 43
1000 Berlin 10

Steinberg Research
BND 228
2000 Hamburg 28

Special Information

TRANSONIQ HACKER
5047 SW 26th Dr.
Portland, OR 97201
(503) 245-4763

PAN
P.O. Box 162
Skipack, PA 19474
(215) 489-4640-Voice

Mirage Net
On-line sign-up
(503) 646-2095

Music Net
Box 274
Beekman, NY 12570
On-line (914) 727-4006

All products are trademarked.

MIRAGE DINER

Mirage owners seem to be a hungry bunch. They want more sounds, more information and more software. So welcome to the Mirage Diner . . . Bon appetite!

Original Visual Editing—The dish that started it all. From Ensoniq's own kitchens, the Visual Editing Systems for the Apple IIe/II+ and Commodore 64/128 set the standards for all other editing programs.
Apple IIe/II+
Commodore 64/128

Sound Composer's Series International Casserole—From the world-famous kitchens of K-Muse comes five sets of sounds inspired by the world's music capitals. Each set served in 10 diskettes of 24 programs each.
Set of 10 diskettes \$299.95
Set of 50 diskettes \$149.95

Sampleware for Seven—Prepared by chefs who have cooked up sounds for some of the greatest names in music, in seven assorted diskette flavors.
Individual diskettes \$199.00

Sound Lab Macintosh Nouvelle—A full-course repast for the heartiest programmer's appetite. Specially developed for Apple Macintosh cookware, Sound Lab provides hundreds of appetizing ways to prepare Mirage waveforms and program parameters.
Macintosh software and manual \$24.95

Vision à la Turtle Beach—A robust and full-featured sampling and programming dish from Turtle Beach Softworks. Specially created for the IBM PC, XT, AT, Vision lives up to it's name. There's even a 3-D screen for a close look at all the ingredients of the samples.
IBM software and manual \$399.95

Sauteed Northeast Synthassist
IBM software and manual \$349.95

Sonic Editor with Hot Sonus
Commodore software and manual \$299.00

Sound Designer—Digidesign Deli Style
Macintosh software and manual \$175.00

Oasis Atari Chef's Salad
Atari 130XE software and manual \$395.00

Softsynth Club on Rye—The Dagwood sandwich of digital synthesis software. Softsynth will make your Mirage behave like a 32 oscillator-per-voice digital additive synthesizer.
Software and manual \$187.87

Transoniq Hacked Chicken—Stuffed with the freshest Mirage information and seasoned with tasty tips on how to get the most from your Mirage, the TRANSONIQ HACKER is an independent publication aimed specifically at Ensoniq owners.
One year subscription \$295.00

PAN-fried Modem—Prepared by the on-line chefs of the Performing Artists Network, PAN gives you access to a vault of Mirage information through your modem-equipped personal computer. Available 24 hours a day.
Membership—Special to Mirage owners \$15.00

ensoniq

ENSONIQ Corp, 263 Great Valley Parkway, Malvern, PA 19355

Circle #106 on Reader Service Card

—LISTING CONTINUED FROM PAGE 146

Method of Duplication: Bin loop.
Mastering Equipment: Ampex, TEAC.
Tape Used: BASF, IPS, Sunkyoung.
Shell Used: Elmar, IPS, Mag Media.
Duplicating Speed: 16:1, 32:1.
Loading Equipment: Kings
Packaging Equipment/Fulfillment Services: ITI labeler, shrink-wrapping.
Rates: Depends on quantity, length and type of packaging. Call for quote.
Other Services: RF (radio frequency) blister heat sealed packing.

PRECISION LACQUER

Mastering, CD Services
1008 N. Cole Ave., Los Angeles, CA 90038
(213) 464-1008

Contact: Carroll Marnil, desk #2

MASTERING

Cutting Lathes: Tandem CompuDisc, Ortofon.

Console: Atwater-Kent.

Tape Machines: Webcor-Recordio.

Monitor Speakers: Mark IV Flamethrowers.

Signal Processing: Body by Fisher.

Engineers: Stephen Marcussen, Schmoll Fershur

Credits: Stevie Wonder, Barbra Streisand, Eurythmics,

Tina Turner, Chicago, Tom Petty, Stevie Nicks, Mr. Mister,

Patti LaBelle, Pointer Sisters, Don Johnson.

Other Services: Good food, great coffee.

COMPACT DISC

Preparation/Manufacturing: Sony 1630, DMR 4000,
Sony DTA 2000.



PROJECT ONE A/V
Hollywood, CA

PROJECT ONE A/V

Tape Duplication
6669 Sunset Blvd. "Crossroads of the World."
Hollywood, CA 90028
(213) 464-2285
Contact: Maria Priddy

GARRISON PUTNEY STUDIO

Mastering, Pressing
4635 E. Anaheim St., Long Beach, CA 90804
(213) 494-4552
Contact: Clovis L. Putney

QUAD TECK STUDIO/F.D.S. LABS INC.

Mastering, Tape Duplication, CD Services
4007 W 6th St., Los Angeles, CA 90020
(213) 383-2155
Contact: Joani Wannig

RADIOACTIVE RECORDS

Tape Duplication
170 SW 139th Ave., Beaverton, OR 97006
(503) 626-2331
Contact: Mark Hannah, president

RAILROAD RECORDS & TAPE DUPLICATION

Tape Duplication
P.O. Box 10175, Lahaina, Maui, HI 96761
(808) 661-0931
Contact: David and Meredith Russell, owners



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

Western



RAINBO RECORD MANUFACTURING CORP.
Santa Monica, CA

RAINBO RECORD MANUFACTURING CORP.

dba Rainbo Records & Cassettes
Mastering, Pressing, Tape Duplication
1738 Berkeley St., Santa Monica, CA 90404
(213) 829-0355, (213) 829-3476

Contact: Steve Sheldon, prod. supervisor; Jack G. Brown,
president

PRESSING

Presses: 26 Lened automatic 7-inch & 12-inch presses, 4
semi-automatics
Capacity: 70M per day.

Vinyl Used: Keycor, Quiex.

Rates: 12-inch Lacquers 2 sides, \$175; 7-inch 2 sides,
\$102; processing 3 stage 12-inch, \$164; 12-inch pressure
average, 55¢; 7-inch average, 26¢

Other Services: In-house: labels, album jackets for 12-
inch and printed sleeves and inserts for 7-inch, minimum,
1,000 lots

TAPE DUPLICATION

Duplicator: Audio Tech (6 slaves/1 master), VR pro (1
master, 5 slaves), Electro-Sound 8000 w/HX pro (5 slaves,
and 1 master).

Capacity: 10,000 per 8 hr. shift.

Method of Duplication: Bin loop.

Mastering Equipment: Otari.

Tape Used: BASF-LHD, BASF Chrome.

Shell Used: Varies.

Duplicating Speed: 32:1, 64:1.

Loading Equipment: King

Packaging Equipment/Fulfillment Services: Scandia.
Apex printer, fulfillment.

Rates: Mastering, \$50; label plate, \$30; J-cards, \$80
minimum for 2000; 40 minutes .75-.70 average; 50
minutes .73-.83; in-house CD fulfillment.

Other Services: Artwork, insert film and paste up, \$250-
\$200; includes duplication, cassette case and wrap.

RAINBOW CASSETTE STUDIO

Tape Duplication
P.O. Box 472, Taos, NM 87571
(505) 776-2268
Contact: Judy Lujan

RAJNEESH PUBLICATIONS, INC.

Tape Duplication
P.O. Box 1510, Boulder, CO 80306
(303) 665-6611
Contact: Swami Prem Purushottama



BILL RASE PRODUCTIONS, INC.
Sacramento, CA

BILL RASE PRODUCTIONS, INC.

Tape Duplication
955 Venture Ct., Sacramento, CA 95825
(916) 929-9181

Contact: Bill Rase

MASTERING

Console: Audio Arts "Wheatstone" 32 in x 8 out.

Tape Machines: Otari MX 70 16-track; Otari MTR-12 2-

track, 9 others.

Monitor Speakers: JBL 4311 E.V. Sentry 100.

Signal Processing: DeltaLab delay, Art dig. rev, Orban

para EQ.

Engineers: Wayne Johnson, Esther Marcrott

Rates: \$50/hr. Package rates available.

Credits: Hundreds of thousands of cassettes and manu-

records.

PRESSING

Other Services: We handle record manufacture.

TAPE DUPLICATION

Duplicator: KABA System for "real time" stereo cassette

duplic. Magnafax bin loop for mono duplic.

Method of Duplication: In cassette, bin loop.

Mastering Equipment: Otari, Ampex, etc.

Tape Used: Various brands.

Shell Used: Various brands.

Duplicating Speed: Real time and 90 ips.

Loading Equipment: King loaders.

Packaging Equipment/Fulfillment Services: All cas-

sette binders, etc.

Rates: Call.

Other Services: From duplication to custom packaging.

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9582 Mirage Ave., Garden Grove, CA 92644
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Contact: Randall Smith, owner

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486 Dawson Dr., Camarillo, CA 93010
(805) 484-2747
Contact: Don MacInnis, gen. mgr.

RECORDING ASSOCIATES

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5821 SE Powell Blvd., Portland, OR 97206
(503) 777-4621
Contact: Jay Webster, Bob Stoutenburg

THE RECORDING CHAMBER

Tape Duplication
18912 SE 133rd Pl., Renton, WA 98056
(206) 235-TAPE
Contact: Dennis Palmer, owner

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 (415) 327-9344
 Contact: Ted Brooks, general mgr.

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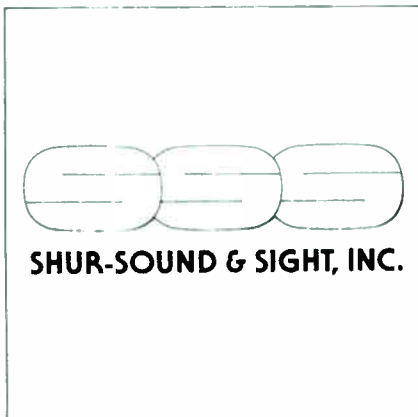
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 Contact: Danny Berg, operations manager

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 (509) 522-0438
 Contact: Bud Ruther, owner

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Tape Duplication
 8650 Hayden Pl., Culver City, CA 90232
 (213) 559-6704
 Contact: Trevor J. Boyer, director/mktg. and sales

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 1200 W. Artesia Blvd., Compton, CA 90220
 (213) 537-5830
 Contact: Mr. Hideo Nakai
COMPACT DISC
 Preparation/Manufacturing: Mastering charge: \$1,150 per title. Disc pressing charge (FOB Compton, CA): \$2.95 per piece. Annual capacity: 15 million at Gifu, Japan. CD-ROM disc pressing is available. Plant in USA will start in June, 1987.

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 Contact: Lonnie Cory, sales manager
Tape Duplication
 Duplicator: Electro-Sound, Infonics.
 Capacity: 10 slaves.
 Method of Duplication: In cassette, bin loop.
 Mastering Equipment: Revox A-700, Technics 1506, Ampex AG440
 Tape Used: Agfa, Ampex
 Shell Used: Magnetic Media, ICM.
 Duplicating Speed: 16:1, 32:1, real time.
 Loading Equipment: (4) King 790, Electro-Sound.

Packaging Equipment/Fulfillment Services: Tuck labeller, shrink-wrap.
 Rates: Call.
Other Services: Real time duplication, location recording for conferences, seminars, etc.

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 Cutting Lathes: Neumann, fully automated and computerized VG66 amp w/Neumann SX-68 cutting head.
 Console: Custom.
 Tape machines: Neumann, Telefunken, 3M, Inovonics, Ampex, featuring 1/2-inch 1/2-track mastering and PCM digital mastering.
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 Rates: Available upon request
 Credits: Phillips, Warner Bros., Concord Jazz, Ralph Records, DDG, Cafero, and many local labels.
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PRESSING
 Vinyl Used: Keyser, Teldec.
 Rates: Call or write for brochure.
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TAPE DUPLICATION
 Mastering Equipment: 3M.
 Tape Used: Agfa PE 611
 Shell Used: Data packaging
Packaging Equipment/Fulfillment Services: Album art reproduction, labels
 Rates: Call or write for brochure.

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 (801) 375-7333
 Contact: Michael K. Jensen

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Contact: Barbara, studio manager

MASTERING

Cutting Lathes: Cybersonics with Ortofon cutting amplifiers and head.

Console: Cybersonics.

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Signal Processing: Everything.

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Contact: President

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Contact: Dwain H. Hansen, president

TAPE DUPLICATION

Duplicator: Electro-Sound 8000, Intonics, Sony, KABA real time.

Capacity: 8000, 2400 shift; others 1500, shift.

Method of Duplication: In cassette, bin loop.

Mastering Equipment: Tascam 4400, Otari MTR-10, Dolby A, B, C.

Tape Used: Agfa, BASF.

Shell Used: ICM, MagMedia.

Duplicating Speed: 16:1, 32:1, 64:1.

Loading Equipment: King.

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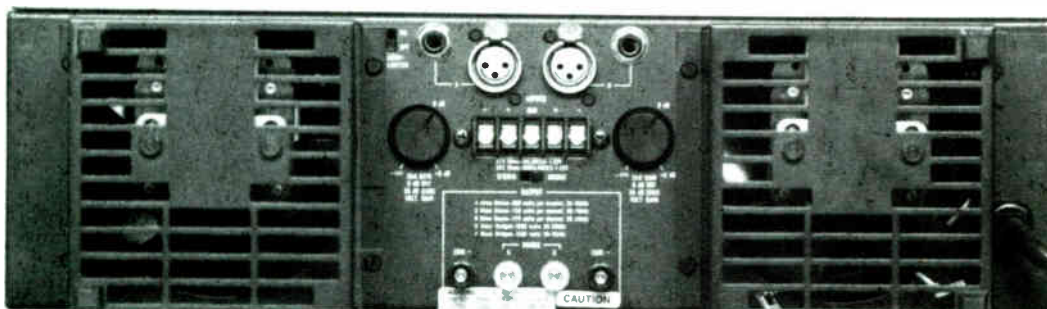
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(206) 623-5934
Contact: General manager

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(408) 286-9840
Contact: Gracie O'Neal

UNI-SETTE, INC.

Tape Duplication
1854 Fulton Ave., Sacramento, CA 95825
(916) 485-9534
Contact: Rudi DeGroot, president; Cher Ottmann

TAPE DUPLICATION

Duplicator: Nakamichi three head cassette decks (stereo); Telex (monaural).
Capacity: 500 C-45/day (stereo).
Method of Duplication: In cassette.
Mastering Equipment: Scully, Otari, Sony digital F1.
Tape Used: Agfa, BASF.
Shell Used: Magnetic Media 5 screw.
Duplicating Speed: Stereo: real time; monaural: high-speed.
Loading Equipment: Electro Sound.
Packaging Equipment/Fulfillment Services: Direct on cassette printing and/or high-speed label application; full-color insert cards; shrink-wrap.
Rates: Price list on request.
Other Services: Custom loaded blank cassettes, mail-out service.

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Contact: Howard Valentine, owner

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Contact: Robert M. Seeburger, production director

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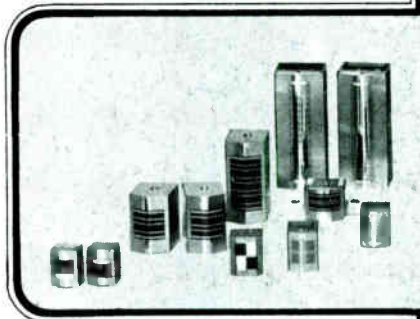
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Contact: R.B. (Bob) Kerr, president

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Tape Duplication

Duplicator: (2) Electro-Sound 5000, Electro-Sound 4000.
Capacity: 18,000 cassettes daily
Method of Duplication: Bn loop.
Mastering Equipment: Studer 1/2-inch master recorder
A80-MR-MKII, with Dolby HX-Pro, Studer 1/4-inch A810.
Tape Used: Ampex-Delta.
Shell Used: Auriga-Prosonic C.O.
Duplicating Speed: 16:1, 32:1.
Loading Equipment: Electro Sound
Packaging Equipment/Fulfillment Services: Marden-
Edwards (Apex printing).
Rates: On request.

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Contact: Studio manager

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SOUND ON STAGE



Ira Stein's stage complement consisted of acoustic grand piano, Yamaha DX7, Sequential Prophet-600, Oberheim OB-1, and Roland MSQ-700 sequencer.

PHOTO A JOHN HELYAR

ON TOUR WITH THE STEIN • WALDER

by Larry Oppenheimer

It all seemed so easy at first. After all, how hard could it be to do sound reinforcement for a piano/oboe duo? But in fact, it turned out to be the most...well, maybe I better start at the beginning.

Background

Ira Stein and Russel Walder met in 1981 at Naropa Institute in Boulder, Colorado, where both had gone to study with members of the group Oregon. Stein, then 18, was a promising young keyboardist, trained equally in classical and jazz, with some rock band experience (just to round things out), who wanted to further develop his compositional skills. Walder, then

GROUP

21, was a classically-trained oboist (is there any other kind?) who, after studying at most of the country's major conservatories, was looking to expand his horizons by studying with Oregon's Pauli McCandless, virtually the only true oboe virtuoso working outside of the classical field. The free atmosphere at Naropa led to a great deal of openness among the students, so it was not terribly surprising when Stein and Walder hit it off in a duet improvisation workshop and began

choosing each other as improv partners regularly. Nor was it so shocking when they decided to make a demo tape together of piano/oboe duets. However, it was a bit of an eyebrow-raiser when Windham Hill Records founder and president Will Ackerman offered them a contract sight unseen only a few months later. In fact, this was only slightly less unlikely than the fact that the call from Ackerman came the day after he got the tape from Walder, who followed him into the bathroom of a San Francisco club and slipped it into his shirt pocket while they were both conducting their essential business.

Stein and Walder's first album, *Elements*, came out in 1982 and con-



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Modern Recording Magazine

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Surprisingly, an AKG D12E turned out to be the ideal microphone to capture the subtleties of Russel Walder's oboe on stage.

PHOTO: A. JOHN HELYAR

tained six piano/oboe duets. The album did well, and the duo began to consider their next move. Around this time, the two began to be intrigued by the possibilities presented by technology: synthesizers, drum machines, digital reverb. They worked and reworked demo tapes of new material, increasingly incorporating these new influences, and beginning to use them in their live act. After nearly three years, they began work on their second album, which not only featured synthesizers and effects, but even a percussionist (Kurt Wortman) on a few tracks. Wortman had played in groups such as Group 87 and Rubisa Patrol with Windham Hill trumpeter/synthesist Mark Isham, who was producing a cut on the Stein/Walder album.

It was at that point I encountered Walder at a party, where we discovered that we were clearly old friends who had merely never met before. With the completion of that album, titled *Transit*, Stein and Walder geared up for performing, enlisting Wortman on percussion and myself to handle the

technical direction and mixing duties. As the first few concerts unfolded, the challenge of providing quality sound reinforcement for the group became evident. Summertime came, and the Stein/Walder Group undertook a tour of the East Coast, with Jim Sagebiel replacing Wortman (who was on tour with Eberhard Weber, Jan Garbarek and David Torn) on percussion. This article, then, details the problems encountered and solutions implemented in reinforcing this oboe/piano/synthesizer/electronic percussion/digital signal processing amalgamation known as the Stein/Walder Group.

Instrumentation

The basic difficulty in reinforcement of the group lies in the combination of electronic and acoustic instruments. In spite of all the additional instrumentation, the oboe and piano are still typically the primary focus. To fill out the sound, Stein has a DX7, which is typically used for the percussive sounds it does so well, a Prophet 600 for string, organ, and other sustained instrument sounds, and an Oberheim OB1 for bass. At most points in the

show one or more of these instruments are under MIDI control from a Roland MSQ700 sequencer. As the OB1 dates back before MIDI, a J.L. Cooper MIDI-to-CV box is used to interface it to the sequencer. Walder plays only his oboe, modified heavily by signal processing, which is discussed below.

In Wortman's original appearances with the group, he used a combination of acoustic percussion (including large concert toms, snare drum, Octobans, a log or slit drum, and cymbals) and a Roland Octapad driving an E-mu SP-12 sampling drum machine via MIDI. In the small- to medium-sized venues (4000 seats) we were playing, however, the large acoustic drums would consistently overwhelm the other instruments. It was decided that the acoustic drums had to go, so they were replaced with Simmons pads that fed the external pad inputs of the Octapad. The Octapad converted the Simmons pad triggers to MIDI, thus allowing the SP-12 to be driven from both the Simmons pads (which were assigned to standard drum sounds) and Octapad (which drove "effects" sounds sampled by Wortman). The log drum, Octobans, and cymbals then became the only acous-



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PHOTO: A. JOHN HELLMAR

Percussionist Kurt Wortman.

tic percussion in use. Sagebiel used a slightly different setup: Simmons pads driving a Simmons SDS7 (which has both sampled and regular analog-synthesized Simmons sounds) for standard drum sounds, an Octapad driving an SP-12 with "effects" sounds, and acoustic cymbals. Additionally, Sagebiel carried his own 12-input mixer, which enabled him to create an onstage submix.

Inputs and Interfaces

Naturally, the acoustic and electronic instruments both presented problems in getting their signals to the mixing console. Just as obviously, the most important instruments, the piano and oboe, were the most difficult. There were several reasons for this.

The oboe is an instrument that is not often required to be amplified. And rightly so. You see, the oboe, a double reed instrument, has a rather delicate tone typified by a large amount of spectral content in the upper mid-frequency region. Unfortunately, most microphones have a presence boost in their frequency response in exactly that area. Furthermore, the majority of sound reinforcement systems use horn-loaded components for this part of the spectrum which, to my ears, often have a somewhat harsh "honk" around 3 to 5 kHz. The net effect on the oboe is to make it sound pinched and thin at best, and grating and edgy at worst (which is more often the case).

When I first began working with

Walder, he was using a Countryman Isomax condenser microphone on a small arm which was clipped onto the oboe such that the microphone was along the side of the instrument near the holes. Aside from the fact that the Isomax exhibits the aforementioned presence boost, the placement was also problematic. The oboe develops most of its high end from the holes, but the warmth and body of the sound seems to come largely out of the bell. As with most acoustic instruments, the oboe is intended to be listened to from at least a few feet away, so that these components can mix acoustically. The placement and response of the Isomax made the oboe sound horrible, although it afforded Walder a great deal of freedom of movement, which he very much enjoyed. Unfortunately, the visual aspect had to be secondary to the sound, so away went the Isomax. Do not take this to mean that I think the Isomax a bad microphone, just that it was the wrong application. In fact, the Isomax turned out to be the perfect solution to the also difficult problem of miking Wortman's Octobans, as I will discuss later.

Now the search was on for the right microphone. In the studio, Walder used an old tube microphone, but good tube mics are generally quite expensive and not very roadworthy. So, I started to try almost any reasonably-priced mic I could get my hands on, including: AKG 451, Beyer M160, M380 and M69, Shure SM57 and SM81, Sennheiser 421 and 441, E-V PL20,

even a Neumann KM84. I knew that the key was to find a microphone without a rising high end and so I looked at first for flat response mics. After a few concerts, however, I noticed that even with supposedly flat mics I was still having to do pretty drastic high- and mid-frequency equalization to get rid of the harshness. It stood to reason that a large diaphragm microphone might exhibit a nice, gentle rolloff. I found the answer on a hunch, but was still surprised at the winner: the AKG D12E, a bass drum mic! It had the gentle roll I wanted in the high end, and since the oboe has nothing in its spectrum below about 300 Hz, I simply rolled off the low end completely, and viola! a sweet, warm oboe tone. I doubt that this will be my choice in the studio, but it seems to work quite well live.

The piano was the next problem. When I came on the scene, it was being miked in a standard fashion: with the lid raised and two high-quality condenser mics placed inside. This undoubtedly works fine in a piano/oboe duo, but with the bands extensive use of electronics, this configuration presented two serious problems. The first and most significant was gain before feedback. It was simply impossible to make the piano heard over three synths, an oboe, and percussion without getting feedback. The second was leakage: the musicians can only hear the electronic instruments through their monitors (since they have no acoustic output), and the percussion and DX7 (which is often used by Stein for sequenced ostinatos), being the most prominent instruments in the monitor mixes, would leak horribly into the piano. I had no choice but to do away with open microphones. This grieved me greatly, as we often work with beautiful grand pianos which would without a doubt sound best with a pair of nice mics (if they had to be amplified at all), but the circumstances forced my hand. A Helpinstill or Countryman pickup was not viable because of the time involved in mounting and dismounting it (we were unable to travel with our own piano at this time.)

Finally, I settled on the C-ducer, a condenser (capacitive) pickup in the form of a pair of 8-inch strips and a stereo preamplifier. (Mono and multi-channel C-ducer configurations are also available, but stereo was the best choice here.) The strips are attached to the underside of the piano and taped on. The placement of the strips is critical to the sound, with the manufacturer recommending that they be placed near but not crossing the high and low bridges of the piano. It took me several concerts to get the hang of

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looking in the top of the piano to find the bridges and then placing the strips in the proper spots underneath. At first my results were poor, but when I was able to follow the manufacturer's suggestions the C-ducer sounded clear, clean, and LOUD, although not as airy as good mics. Fortunately, this slight deficiency was not usually evident in the context of ensemble playing, and, with judicious EQ, was not objectionable even in exposed sections like oboe/piano duets or even piano solo sections.

I experienced two difficulties with the C-ducer. The first was minor, and that was that the manufacturer recommended the use of very thin double-sided tape (a roll of which was supplied with the unit) to affix the strips. This tape did not hold very well, and, in fact, the strips actually fell off in performance once, making a very loud bang as they hit the floor. My solution was to use three thin pieces of duct tape perpendicular to the strip in addition to the double-sided tape: one at the end of the strip, one just inside the small plastic housing where the output wire connects, and one on the other side of the housing, taping the wire to the piano and thus strain relieving it. A small strip of paper was placed between the strip itself and the duct tape to avoid glue buildup on the strip. (The double-sided tape did leave glue, which I removed with periodic isopropyl alcohol cleanings.) The other problem was that every piano is built differently, and some pianos made it very difficult and sometimes impossible to properly place the strips. The worst case came when trying to place the strips on a baby grand, because the dimensions are reduced. Compromise and EQ were the only solutions available on this tour. C-Tape Developments (the manufacturer) does make 3-inch strips, and I intend to get a pair of those for use on baby grands instead of the 8-inch.

Once Wortman replaced the concert toms and snare with electronics, there was much less problem dealing with the acoustic percussion. In most venues it was not necessary to amplify the cymbals at all, and the log drum was happy with a Shure SM57 close miking it from above. The only remaining difficulty was the Octobans. Octobans are small diameter (around 6 inches) drums which are very deep (about 36 inches). Wortman used a cluster of four Octobans, arranged in a very tight square. Miking from below missed the transient of the stick striking the head, which is an important component of the sound, and miking from above tended to create a physical obstacle for Wortman and yet one more visual obstacle for the audience.

Both methods failed to pick up all four drums evenly. This was the perfect application for the Isomax, which I taped to a rod in the center of the four drums. Placing the mic at about the level of the heads, it was not in Wortman's way and didn't get hit, but it got an even balance of all the drums. Plus, the rising high end response accentuated the stick transient, which was desirable. Since that time, Wortman has incorporated an additional Isomax for the log drum.

Dealing with the electronic instruments was, in theory, an easier task. All of the electronic instruments had high-impedance, unbalanced outputs, so it was necessary to balance and impedance transform them for the cable run to the mixing station. Due to the exceptional amount of transient and low frequency content that synthesizers and electronic percussion instruments are capable of, I prefer to use active direct boxes over inexpensive in-line transformers. Rather than trust that the sound companies we worked with would all have the large number (12 to 15) of high quality direct boxes that we needed, I felt it was best to carry our own and be that much more self contained. The prospect of buying and carrying a dozen or so individual DIs was depressing, so I looked into multiple DIs in a rack-mount package. There were several models on the market with four DIs in a box, but most of them were beyond our budget considering that we had to buy three of them. Finally, I found the DB4 from Stewart Electronics, which was priced reasonably and had some nice features, including: input sensitivity and output level switching, ability to power several units from one supply or from phantom powering, ability to rack-mount two units (eight channels) in a single space and, of course, ground lifting and paralleled input jacks for looping through. We purchased the units, but found them to have hum problems which the manufacturer was unable to correct. Eventually, we got two units that did not hum, and they have functioned fine. The sensitivity and output level features have been particularly useful with the electronic percussion, which is capable of very high peak output levels.

Monitoring

The onstage combination of acoustic and electronic instruments requires special considerations in monitoring. The largest problem again came with the oboe. Walder, naturally, needed to hear himself over all the rest of the instruments, but attempts to put substantial amounts of oboe through a traditional monitor speaker system

produced a drastic gain-before-feedback problem. It was simply not possible to put much oboe in the monitors without encountering both leakage and feedback problems long before levels satisfactory to Walder were obtained. This was exacerbated by the fact that Walder had begun to use signal processing as a primary component of his sound and needed to hear a great deal of delay and reverb on his oboe in the monitor, in proportions which may not be suitable for the house mix. To solve this problem, Walder uses a DOD R855 six-input mixer onstage, and monitors through one side of a set of Sony earphones, which fit in the ear, making him look a bit like an unshaven Dan Rather. The output of his oboe mic and all his signal processing is split, with one feed going to the house console and the other to his mixer, thus allowing him a mix and level independent of the mix that the audience receives. (For the one vocal tune that Walder performed on the tour, his vocal mic was split in the same fashion, so that it was never in the monitor speakers either.) Unfortunately, the Sony phones, which are made for consumer and not professional use, cannot handle levels or low frequencies needed without distortion. Nevertheless, the result is superior to using monitor speakers. I have been unable to locate any such in-the-ear-phones designed for professional use, but believe it would be a useful product. The rest of the instruments are sent to Walder in the traditional monitor mix/slant speaker fashion.

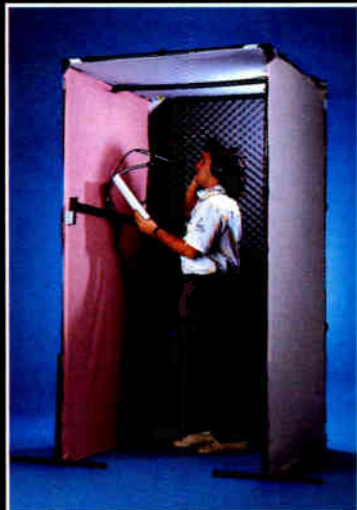
A similar solution has been applied to the percussionist, who requires high-level monitoring of a click and any sequenced ostinatos to remain synchronized with the machines. (At this writing it is still very difficult to reliably drive a sequencer from a human drummer.) Thus, the percussionist uses another set of the same Sony phones, fed by a mix of the click and ostinato signals, with the rest of the instruments coming through a mix/speaker setup. The use of the C-ducer on the piano all but eliminates feedback problems, so Stein was able to use a slant monitor placed directly behind him. This setup necessitated at least two independent monitor mixes, one for Walder and one shared by Stein and the percussionist.

Signal Processing and MIDI Networks

Shortly before my entrance into the group, Stein and, in particular, Walder, had begun to discover the joys of modern digital processing. When I joined the parade, I brought my proc-

—CONTINUED ON PAGE 196

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EMERSON, LAKE AND POWELL



by Bruce C. Pilato

IT could be argued that one of the major trends in '80s music is reunions. Not that they're anything new; they've been happening as long as bands have been breaking up. But recently, it seems as though there has been a rash. Few have resulted in albums and tours that offer much in the way of substance. Most suffer

—CONTINUED ON PAGE 164

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Keith Emerson

—FROM PAGE 162, ELP

from the absence of key original members and ultimately give consumers little more than a wobbly trip down memory lane.

So when it was announced last year that Keith Emerson and Greg Lake were putting ELP back together with a new drummer, Cozy Powell, a few eyebrows were raised. The band went out with a whimper back in 1980, and since then Emerson has kept a very low profile. Lake was in the "supergroup" Asia and has had an unspectacular solo career. And Cozy Powell made his name as a drummer in heavy metal bands. All in all, it didn't sound too promising.

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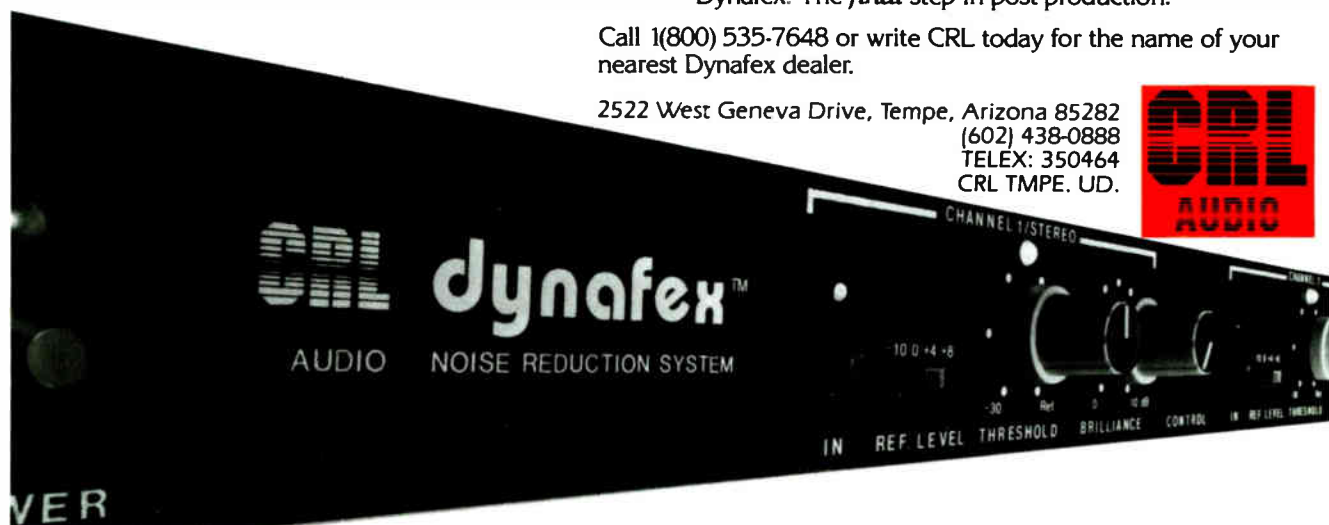
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**Bruel & Kjaer
Instruments, Inc.**

outside of London, in rural England, Keith Emerson and Greg Lake talked at length with *Mix* about the new band and album and their involvement with new musical technology.

Mix: How does it feel working with each other again?

Emerson: It's really fine. I think we've got a fresh understanding of each other now, not that the understanding of before was tainted at all. It's really good. It's nice and relaxed and a very happy atmosphere to be working in. Lake: We're very pleased with the results we've got and we're having a good time. The main thing is the enthusiasm is strong and we feel positive about it.

Mix: The new album was produced by Greg and your engineer, Tony Taverner. Was there ever any talk of bringing in an outside producer like Trevor Horn or even Phil Collins?

Emerson: There was, in fact. We considered a whole number of producers for it actually. But, we ended up using Tony Taverner.

Mix: Was he associated with you in the past?

Emerson: No, he wasn't associated with us at all. We admire Trevor Horn and all the other contemporaries in that field, but from my point of view, I was a bit concerned. I felt that some of the sound that he had done with Frankie Goes to Hollywood had washed over onto the Yes album, and that Trevor definitely had his own style of production. What we tried to achieve was our sound that we had back in the '70s. We didn't want to break any new barriers, as far as production was concerned. We wanted to put across that here was a band that played and these are real drums and there is nothing sampled—you know, that type of heavily gated production that is sort of the mode these days. We sort of skipped around that. It's got more of a live feel.

Mix: What instruments are you using now, in the studio and on the road?

Emerson: Well, at the beginning of making the album, I had my choice of all the new keyboards. We had so many there in the studio. We tried out all the new things. I just thinned them all down to the ones I ended up using permanently—the Kurzweil system, primarily. We had two of the 250s. And Kurzweil has also designed me a MIDI board, from which I can control all the other synthesizers, such as the Korg range. And in the Korg range I'm using the 8000, the 6000, the Poly 800. You know, in the Korg range

where you can hold the chord, but you lose the polyphony by doing that? Well, I sampled a lot of stuff like that into the Kurzweil so now it's possible to play that polyphonically. The GX-1 which I used a lot of on *The Works* album in the '70s, has been MIDI'd by Shelton Systems here in London. And I have the Hammond C-3, which also has been MIDI'd. So, I guess you can say I'm MIDI'd to the max!

Lake: I'm playing a Spectre bass. All my acoustic guitars are made by Takamine. I use a Fender Stratocaster with a MIDI shadow interface with the guitar into a Kurzweil Sampler. In fact, all my guitars are MIDI'd into the sampler.

Mix: Even your acoustic guitars?

Lake: Yeah, they're all MIDI'd, too. Everything is. The bass is MIDI'd. Of course, with the Kurzweil, the whole world of sampling is opened up to you.

Mix: And you're to take all this on the road with you, correct?

Lake: Oh yeah.

Mix: You must have a guy who just handles your MIDI programming right?

Lake: We have three or four technicians, who just look after the sampling and the computer end of the group. We're running three or four computers back there at the same time.

Mix: Keith, MIDI must have opened a whole world for you.

Emerson: Yes, it is exciting. It's quite odd at the moment to be playing a Hammond organ and getting a piano sound out of it sometimes. It just seems a bit alien to be playing that keyboard, especially after having played it so long before, and suddenly you play the same keyboard and no matter what you program it to do, it plays! What the technology has done, especially in the confines of a three-piece band, is to expand the sound and make it much bigger. In the past, I used to overdub in the studio the same line twice or three times. For an example, a number like "Tarkus," where you've got that ostinato left hand 5/4 figure going, I played that on the Hammond and I overdubbed on the grand piano to get that sound. But, obviously when it came to playing that live in the '70s, it wasn't possible to recreate that sound. But now, having MIDI'd up that Hammond organ to the Kurzweil grand piano sound, I can get that sound that I want.

Mix: Have you been involved in the development of any new keyboards, since the work you did with Bob Moog



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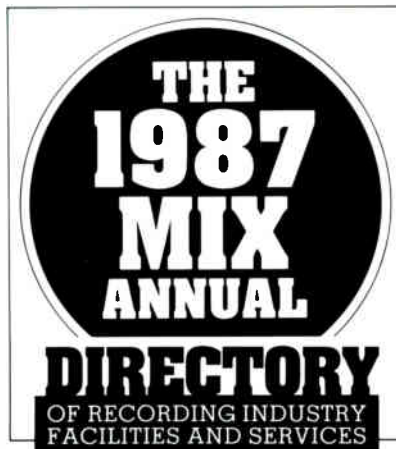
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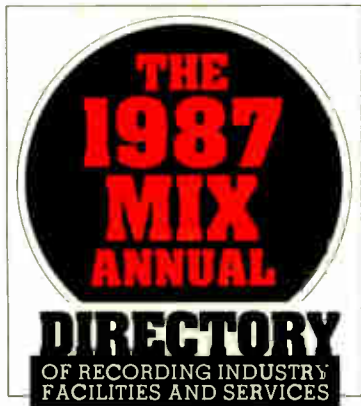


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on the original MiniMoog?

Emerson: The closest to that really is the relationship I have with Kurzweil. They've been very good and have designed me a MIDI keyboard controller, which has helped me out an awful lot. And I have a very good relationship still with Korg. In fact, I flew over there about three years ago, with the view of them making me a custom keyboard design, but sadly that didn't come about. I think they got sidetracked with other production designs.

Mix: *In the heyday of British progressive rock, the keyboards, especially the early synthesizers and mellotrons, were the main focus of the music. Today, however, keyboards are often used to provide rhythms and simple background fills. How do you feel about that?*

Emerson: Well, you know, whatever it takes to achieve what is needed in the music. I have nothing against it, but I think it is sad that there aren't many soloists developing out of this field because things now are easier to do. I think it's a great way to fill out any small band.

Mix: *From its first record, ELP has always seemed to put as much emphasis on production as on the songs and arrangements themselves. Has that changed for the new album?*

Emerson: As I said before, with the production of this album, I don't think we've broken any new ground. We kind of thought that people didn't want us to do that; they wanted to hear the way we were and that possibly the more contemporary production is too synthetic. There is a severe absence of human feeling about it. But, we strived for getting a clean production, nevertheless. It was a live feel. We strove for a clean sound and what that meant, really, was restricting Cozy Powell from using too many of the cymbals that he would have liked to use. They do tend to swamp the drum sound.

Tony Taverner, is a very thorough producer, and anything that wasn't very tidy in the mix had to go, straight away. There was tidyness and clarity, rather than going for any new effect. We tended not to put too much in that was sort of flowery or superfluous. That was certainly our intention, anyway.

Lake: I don't think we ever really put as much emphasis on production as people think. It was just that the music itself was synthesizer-based and classically influenced, and therefore it sounded very produced. But, in fact, it's just the sound of the three-piece band. We don't do a lot of overdubbing. Everything that's on this record

Greg Lake



now, for instance, we can play live. If you think we use a lot of stop/start production effects on the record, we don't.

Mix: *With the new album I was surprised at how much of that characteristic ELP sound you were able to retain.*

Lake: I've said this before and I'll say it again: apples never fall far from the tree. You know, it's the same people making the music so it's going to sound similar. Obviously, the technology is more advanced than the old ELP albums, so it's also going to sound a lot better. But the essential writing ingredient is the same. The real difference between the sound of the old ELP and the new ELP is Cozy Powell. There is a distinctive, powerful style to his playing.

Mix: *Keith, you've listed your influences as Charlie Parker, Dave Brubeck, and old time Chicago blues. How about the classical masters and who in rock and roll has influenced you?*

Emerson: In rock and roll, I like Floyd Cramer a lot. I don't think he's referred to as rock and roll pianist; he's more of a country pianist. I think he played piano with Elvis Presley. I like Booker T.; I like Jimmy Smith. On the classical side, I didn't have any particular soloists that I liked. There are particular classical pieces that I like to listen to and composers—Bach, all of them really. I'm pretty wide on my musical appreciation.

Mix: *Greg, were you influenced initially by classical music?*

Lake: No. My earliest influence was rock and roll. I really got to get involved with classical music when I started to work with King Crimson.

Mix: *Keith, what comes to your mind when you think about The Nice these days?*

Emerson: Oh, great affection. I still get in touch with the guys in that band and we still speak occasionally. I have fond memories. It was really great.

They realized that I had to go on and do something else and I really admired them for that. They're my best friends at the moment, they really are.

Mix: *Greg, what are your feelings now about the old King Crimson? Some feel that in its own way, In the Court of the Crimson King was a landmark album in the same way that Sgt. Pepper was. Do you agree?*

Lake: I think it was an important record, now that I look back. I think it did influence the music of that time. And so I suppose in that way it had an influence on music all the way through. But it's very difficult for me, as someone who was a part of the creative process at that time, to look at it objectively and to say how much of an influence it actually was. I mean, I only say that I think it was an influence because other people say so.

I think also that albums are connected to certain periods in your life. They identify a point in your life. And I think for a lot of people, the King Crimson album was their first exposure to serious music in a rock and roll form. I think it was also the pioneering album for technology in the sense of the mellotron and where orchestral sounds were brought into modern rock music. And, also, the attitude of progressive avant-garde type of ideas. We would play things deliberately out of tune and in time signatures that didn't work. We had solos where there was no key.

Mix: *Briefly, could you explain why you ended your association King Crimson and began work with Keith back in 1969?*

Lake: What happened was that Mike Giles and Ian McDonald basically had become fatigued with touring and they wanted to leave the group for a more restrained type of recording career. And Bob [Fripp] wanted to continue along with King Crimson and get some more people in to play. But I felt that it

—CONTINUED ON PAGE 197



Optical Media Systems' CD-ROM sound bank for the Emulator II offers 512K bytes of optical memory retrieval.

Towards the Massive Musical Memory

by Craig Anderton

With the pervasiveness of computers in musical electronics, it's not surprising that developments in the music world parallel those in the computer world. Back in the mid-'70s, when the first personal computers came out, the typical machine had about 1K (or in a full-blown version, 4K) of RAM. This was considered more than adequate for most applications back in those days; in fact, when I was writing the owner's manual for a company's 8K memory board, I remember several people wondering just what type of person would ever need *that much memory* in a machine.

But give a computer more memory, and people will figure out what to do with it. Programs now have more programming "overhead," operating systems have become more complex, and now we see "personal" computers with a previously-unheard of 1

Megabyte of RAM. One of the hottest items in the computer is memory expansion, and as one might expect, the music business is following suit.

Synthesizers are logical candidates for memory expansion. The battery-backed RAM that stores programs is fairly expensive, although prices have diminished somewhat over the years. Still, popular instruments like the Korg Polysix and DX7 allow for storage of only 32 patches at a time, considered a fair amount when these keyboards were first introduced but no longer deemed adequate by most users. The MIDI spec provides for identification of 128 programs, and already people are clamoring for 256! As a result, there have been a number of expansion boards designed for the DX7 and other prominent synthesizers that increase the available number of patches. For example, the E! board for the DX7 from Grey Matter Response, in

addition to several other features, provides storage for 256 instead of the usual 32 patches. Expanding existing RAM is one of my favorite approaches to mass storage, because it requires no outboard gear, and access time is instantaneous.

Another interesting DX7 product is the Voice Vault from Harmony Systems. This "black box" stores MIDI data, just like a computer patch librarian program, but dispenses with the computer altogether and stores patches in battery backup RAM. Since you can store 512 patches (and arrange them in sets) for about \$400, this represents a cost-effective alternative to RAM cartridges or carrying around a computer system with your DX7.

The floppy disk drive is another popular form of mass storage. Many instruments already include built-in disk drives (I particularly like the 3.5-inch disks for musical applications due to their durability), but there are options for those that don't. J.L. Cooper makes an external disk drive that stores data for a variety of instruments, and of course, if you can hook a computer up to your instrument, patches, samples, and other forms of data can often be transferred from the instrument to the computer, and thence to disk. The SP-12 drum machine from E-mu is an interesting case in point, as four different memory expansion options (three involving disk storage) exist. The first option is to add more RAM, thus turning the stock SP-12 into the "turbo" version with extra memory. A second option is to add a Commodore disk drive, which costs little and is widely available. The only drawback—a pretty serious one—is that the Commodore drive is slower than rush hour on the Long Island Expressway. For the speed demons in the crowd, you can hook up J.L. Cooper's drive, or if you have a Mac, Blank software makes an SP-12 software support package that takes advantage of the Mac's disk storage capabilities.

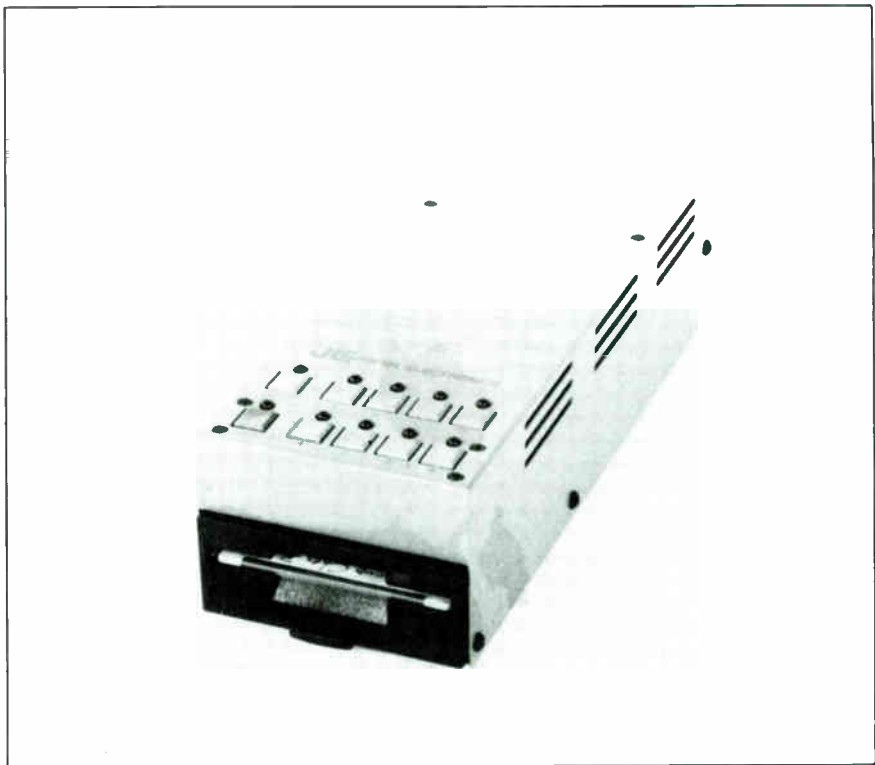
While we're on the subject of E-mu, the Emulator II is another device that demonstrates the usefulness of memory expansion. When first introduced, the Emulator offered one bank of sounds (about half a megabyte of memory) and a choice of single or dual disk drive versions, either of which takes about 25 seconds to load a bank into memory. Current Emulators have an extra half-meg of RAM,

**J.L. Cooper Electronics Midi Disk:
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thus offering two banks of sound (although not simultaneously). There's also a hard disk option, which cuts the load time for a bank down to two seconds, and Digidesign's Mac software lets you store samples and such on disk. Perhaps most interestingly of all, Optical Media International now offers a CD-ROM accessory with the potential to store the equivalent of over 1,000 floppy disks worth of sounds (although the current version only contains about 600 disks worth of stuff), with faster access than a standard floppy disk drive.

Now that floppy disks are commonplace, we can probably expect to see more hard disks showing up in equipment. Most musicians are familiar with floppy disks, but I still hear some confusion about hard disks—are they fragile? how easily do they blow up? and so on. Actually, only a short time ago, hard disks were anything but road-worthy. Once safely installed in a climate-controlled office, they were fairly reliable, but even they could be finicky. Newer hard disks are much more sturdy, although caution is still indicated. For example, a hard disk's life is finite, and it *will* wear out. For this reason alone, it is imperative to back up all the information on your hard disk on floppies. Also, should power to the hard disk fail during a write operation, you could be in big trouble as the head goes crashing into the disk. As a result, a hard disk should always be thought of as semi-volatile storage—assume that it could blow up at any minute, and even though it probably won't, at least you'll be prepared if it does.

The most exotic mass storage systems are the giant mainframe computers that hold the databases for on-line services such as PAN, Esi, Synth-Bank, Synth-Net, MusicNet, etc. These services often have samples and patches available for downloading, either for free if the data is contributed by members or at a nominal charge if the data is from established artists. Before leaving for a road trip, for example, you could upload all your patch data and samples to your particular user workspace on one or more on-line services (in the same spirit as backing up your hard disk, I would recommend saving your data in at least two different services that use two different computers). Should anything go awry, you would simply plug your portable computer into the phone lines, dial up the telecommunications service, and download your patches. Well, subject



to sitting by a pay phone for 13 hours as you download all your Emulator II samples at 300 Baud. . .

What's next? Biological memories, new forms of optical memories, and I'm sure trusty old semiconductor

technology is bound to have a few more tricks up its sleeve as well. We'll know we've arrived when samplers can sample three minutes on each key, and DX7 retrofit boards can store 256,000 patches! ■

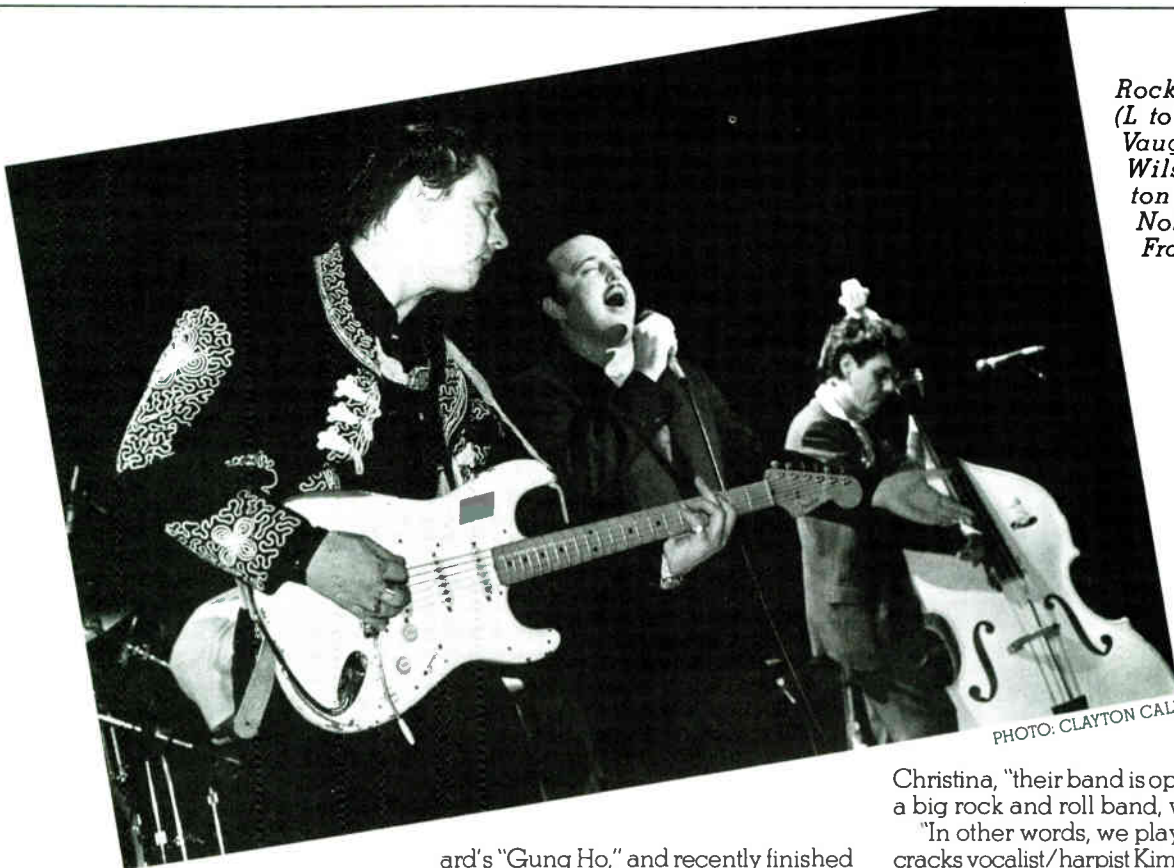
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Mix



Rockin' T-Birds (L to R): Jimmy Vaughan, Kim Wilson, Preston Hubbard. Not pictured, Fran Christina

PHOTO: CLAYTON CALL

T-Birds are Cruisin'

by **Moira McCormick**

After a decade-plus of slogging around the national bar circuit, critical praise ringing in their ears but bona fide stardom always just out of reach, the Fabulous Thunderbirds have finally come into their own. The Austin, Texas-based roadhouse blues-cum-tuff r&b-cum-two-fisted rock and roll foursome scored chart hits with the swaggering single, "Tuff Enuff," and album of the same name (their fifth, and first for CBS Associated). They rode the FM airwaves all summer with more album cuts, like the irresistibly lazy-spirited "Why Get Up," the raunchy Sam & Dave cover "Wrap It Up," and rock'n'boogie "Look At That, Look At That."

The T-Birds also launched themselves deeper into movie soundtrack work, as sure a shot at renown as there is these days. Having already contributed tunes to earlier films *Tex* and *Porky's Revenge*, the Thunderbirds had "Tuff Enuff" placed in Ron How-

ard's "Gung Ho," and recently finished recording an original song for the upcoming film *Streets of Gold*. The band appears as itself in a concert sequence during Paul Schrader's latest effort, *The Light of Day*, starring Michael J. Fox, Joan Jett, and Michael McKean as struggling rockers in Cleveland.

"In our scene," says drummer Fran

THE FAR SIDE By GARY LARSON



"Mr. Ainsworth ... Calling Mr. Aiiiiinsworth ... If you're within the sound of my voice, Mr. Ainsworth, please give us some kind of sign."

Christina, "their band is opening up for a big rock and roll band, which is us."

"In other words, we play ourselves," cracks vocalist/harpist Kim Wilson, who also writes the bulk of the T-Birds' repertoire. For *The Light of Day*, Wilson and crew knocked off a brand-new number called "Twisted Off" (Texas argot for "wild and crazy") between gigs in Australia last spring. They'd been touring Down Under opening for Stevie Ray Vaughan, younger brother of T-Birds' guitarist Jimmie Vaughan (who, though less flashy than his sibling S.R., is considered by many the superior axe-wielder) when they got the call from *Light of Day's* producers.

"I had a few ideas for lyrics," says Wilson of "Twisted Off," "and I kinda pieced together a few things, but we really only rehearsed it for three hours in Perth . . . Being under the gun is our specialty."

While Wilson supplies most of the basics for T-Birds tunes, the finished product is a collaborative effort. "What happens is," Wilson describes, "I get the melody and lyrics down, and the basic kind of beat for it, the bass lines, a little rhythm guitar here and there. I kind of have it in my mind, and I say okay, here it is, in my caveman-type way of thinking—"

"He brings it to the doctors," continues Christina, whimsically referring —CONTINUED ON PAGE 180

The True Stories of Talking Heads

by Bruce C. Pilato

True Stories, the new Talking Heads LP, was recorded during the mixing of the band's 1985 release, *Little Creatures*.

"Tina [Weymouth] had the idea that instead of sitting around and falling asleep on the couch in the control room we should rehearse a bunch of songs in the studio while we were mixing," drummer Chris Frantz explains. "David [Byrne] had these songs on demos, so we practiced them while ET [engineer Eric Thorngren] was mixing *Little Creatures*. When he finished mixing, he just put the mics back up and away we went into this one."

"Because we had been playing so much during *Little Creatures*, we really had gotten our chops back together," adds keyboardist/guitarist Jerry Harrison. "A lot of these songs were first takes."

"It took five days to record it and nearly six weeks to mix it," laughs Frantz.

Songwriter, vocalist and de facto bandleader David Byrne spent many of those weeks in Texas directing a film, also called *True Stories*, which

PHOTO: AMY ETRA



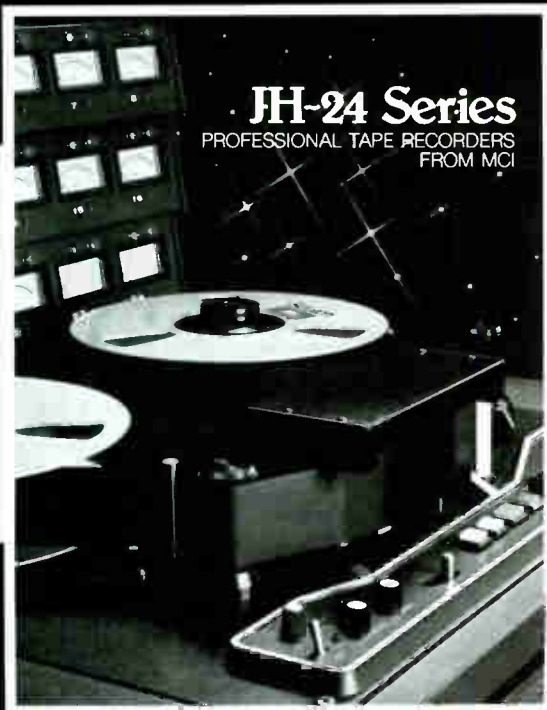
Talking Heads '86: (L to R) Tina Weymouth, David Byrne, Jerry Harrison, Chris Frantz.

was released a few weeks after the Heads' LP. The songs on this record are used in the film, but they are performed by the actors rather than by

Byrne, Frantz, Weymouth and Harrison. (An album of those performances is also in the works.)

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which *True Stories*—and *Little Creatures*, for that matter—was recorded is in contrast to the elaborate, aleatoric, loopy approach the Heads have used since teaming up with Brian Eno in 1978 for *More Songs About Buildings and Food*.

"I think it was a natural progression," says Frantz. "If you're at all conscious about what you're doing, you can't help but pick up on things and learn things. I guess some people never get past a certain level, but most people continue to grow if they're exposed to things."

It is possible to overdo it, Frantz adds. "You can put just too many little delays on something, and then it starts to sound like an MTV band. That was one reason why the mix for this album took so long: we tried to keep from sounding too slick."

Byrne's absence has allowed Frantz, Harrison and Weymouth to take more active roles in production and learn how to use the studio to its fullest. "Each of us has his forte," says Frantz. "Tina and David are really good at details, like keeping track of who did what, which takes of songs are better, and so on. Mine is just walking in and saying, 'It sounds great' or 'No, you've overworked it.' Jerry's forte is more technical."

In addition to being the liaison between the band and the world of digital sampling, Harrison has taken an active role in overseeing the mastering of Talking Heads records. "It first happened when we were doing *Speaking in Tongues*," he explains. "I was the only [band member] in New York—everyone else had left town—so I took the album through its final steps. I took it from the mastering to making sure the cassettes had no problems—talking over tape types, rejecting three or four cassettes and masters until things were right. 'Let's boost this,' 'Let's do that.' I really got to know it."

Things have not always gone smoothly for Talking Heads. "Tina and I have been working with David for 12 years and Jerry for ten years," says Frantz, adding that it almost came down to a choice between the band and his marriage (to Weymouth) at one point. "Imagine if you had to work with the same three people for that length of time. You can just imagine all the things that can go wrong, and they do go wrong. But somehow we've managed to weather all those things. It's an accomplishment, believe me."

"You can't be together this long without having some major arguments," adds Harrison. "There are times when it is really difficult, but we all came into this a little older than some other bands are. We didn't have a preposterous goal; we didn't try to

be larger than life. We weren't living a rock and roll fantasy. Not that we wouldn't have found being like the Beatles or the Stones exciting, but we were doing it on our own terms because we never thought we could do it any other way. That rationality and reasonableness has helped us maintain over the rocky points."

"It's like family life," says Frantz. "A lot of families have patterns of behavior that keep repeating themselves—people get pissed off at each other and they don't know how to deal with it. Sometimes they go to a counselor; sometimes it works and sometimes it doesn't."

For Frantz, the hardest times being a member of Talking Heads were not during the early years, but recently—after the group had broken wide open commercially with the film *Stop Making Sense*. "I really had a hard time dealing with the music business," he admits, "so much that I even went into counseling for it just to keep from getting beaten."

Beaten? "Oh, you know—if the last thing you did was really great then there's this constant pressure to one-up yourself. That really got to me."

"I thought the film [*Stop Making Sense*] and that tour were really good. I thought we'd had a really great triumph in pulling that off, but then there's...almost like a post-partum blues that comes after. David immersed himself in his film, which was a smart thing to do, and I just sort of went sailing off on my sailboat. Everything was real groovy for a while, but then I started thinking I was just riding on the success of the last thing we'd done and that I was no longer happening. But you know, these things happen to you."

Frantz credits counseling with putting things back into the proper perspective and with helping him "respond to old problems in a new and different way." He also claims that taking time out with Tina to have a family has filled a great void in his life. "I know it sounds corny, but if you haven't got that, you've got nothing." The couple's second child was born while *True Stories* was being mixed.

"I would say we communicate better now than we ever did. I would also say that we speak to each other less. We have what you call—quality time," he laughs.

Like families, Talking Heads has grown older and the members have become more independent. Byrne is constantly working on projects outside the band, and the other Heads admit the group is now just another cog in the Byrne machine.

"I'd have to say it's just one part of
—CONTINUED ON PAGE 182

The Good-Looking Sound of Gene Loves Jezebel

by Josef Woodard

While North America is just being initiated to the bold new romantic rock of Gene Loves Jezebel, the band has been something of a chart phenomenon on the continent for the last few years. It is a group based on brotherly love; the Gene and Jezebel in question are *nom de plumes* for the twin brothers Michael and J. Aston. Originally from Porthcaw, Wales, the pair trekked northward to London, started a musical unit and rather promptly made an imprint with two independent LPs. Their third and latest effort, *Discover*, might well be called *Discover America*; the Geffen debut has done well stateside—especially the hit "Heartache"—and affirmed the band's status as one of this year's notable show boat people from the U.K.

You'd think that Wales—not a typical breeding ground for rock stars—would be rightfully proud. But according to Michael, "London was really where we began and that's where we're the heroes. Wales doesn't really

know too much about us. We could play a gig there and most of the people wouldn't be conscious that we were Welsh."

It is not the intention of the brothers Aston to deride their homeland, but their attitude is a bit ambivalent. "Wales has had a big influence on us," said Michael from his hotel room in Caesar's Palace, Las Vegas. "It must. In our music, there's a real desire to transcend, to get out, to escape. There's this motion within our music that is evident in the Welsh experience. The Welsh people have been suppressed and destroyed by the English."

Listening to the grandiose, reverberant guitar sound and vocal wail of the band's new album, one is reminded of the sloganeering, clarion northern U.K. sound of U2, Big Country, and Simple Minds. Yet there is a distinguishing emphasis on simple hedonistic fun from swinging London; the Astons have an "it's-only-rock-and-roll" approach that accents entertainment over the big statement.

Michael doesn't mince words on music from the North: "It reminds me of the patriot, beating his chest and shouting out, speaking in terms of blood and lust and game and victory and conquering. In actual fact, all you're doing is making a record with a bit of emotion and maybe you can

dance to it—which is a very big thing. Sometimes I see U2 or Springsteen on TV and I want to be sick, you know?"

A cosmetic stamp was important to the Aston brothers from the outset. "We always cared about how we looked," reports Michael. "We didn't think that much about the music. On a musical level, we wanted to just arrive at something that would sound like Gene Loves Jezebel."

Contrary to the alleged dangers of sibling rivalry, Michael claims that the kinship factor works in the band's favor. "It helps, because you can be frank and get things done more quickly and honestly. You are competing, ultimately. But it really works as a spur, being twins in a band. We've come up on situations where, if it had been another group, we would have split a long time ago."

The pair co-write songs, with increasing help from band members, and sing in tandem. Although the basic band sound is straightforward in arrangement and approach—with little technological assistance—they tend to hash out ideas in the confines of the studio. By Michael's account, the studio is "a place to experiment. It can be a real exciting and precious thing. Although we're not reluctant to use whatever technology is available in the studio, we're pretty much sold

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on the idea of a *band*—five people creating something.

"We're not that keen to embrace Fairlights. We want to make it a band, to have that feeling, that bond that is crucial just to get by on this planet. That should go into the music, too. We need each other and support each other. It's so fallible, anyway, just like *Star Wars*," Michael says of techno overkill in the studio. "People assume that if they see a lot of bright lights, they can generate anything."

As it turned out, *Discover's* progress was nearly impeded by a very human intervention: producer Gary Lyons suffered a mild stroke just after commencing on the project and had to bow out. "He had curious ways of staying awake," comments Michael. "It ultimately caught up with him. I was disappointed with his attitude in that respect. I suppose other bands, when they go into the studio, do nothing but drugs, get wasted, which I think is a sinful waste. I'm sorry he was ill, but I'm glad we were left to our own devices, because we were allowed, in the end, to produce our own record."

Despite their fruitful experience at

the production helm, the Aston clan is not sold on the value of autonomy. "We're finding that if you spend time worrying about production, you've got less time to think about your actual songs," ventures Michael.

Recently, they worked with producer Peter Walsh (Simple Minds) on a dance single of "Desire" and found the exchange much to their liking. "Bands say that producers translate the band's ideas. That rarely happens, really. But it happened for us with John Lackey, who produced us early on. Peter Walsh is of the same ilk, where he's a genius at the desk, getting sounds. You can get other producers, like Trevor Horn, who have a powerful role in the music. It's more than just their stamp—you don't even get to play on it."

The band hopes to procure Walsh's production services for the next album. Just now, though, their sights are set mainly on traversing the American landscape and making their presence felt. Peering out over the high-tech tack of the Las Vegas skyline, Michael reflects on this new territory: "We're in love with America at the moment." ■



The Nails with leader Marc Campbell in the fringed jacket.

The Nails Drive the Point Home

by Dan Daley

Marc Campbell, lyricist and singer of the Nails, lit out from his D.C. home at the age of 15 and ended up a freelance poet in the Haight-Ashbury in the late '60s. In that infamous love enclave in that memorable era, Campbell learned that the poet's life involves

more than words and emotions. "I met this creative writing teacher, a Hungarian poet, who was living with a high school girl. He was twice her age," Campbell recalls. "I thought, this guys is twice my age and look at the lust for life he has."

Still, poetry is "a miserable occupation," Campbell avers upon reflection. "It doesn't pay well and it costs emotionally and physically. But it's certainly not any different in rock and roll."

The Nails, fronted by Campbell and

fueled by his candid and forceful lyrics (*not* poetry, a distinction he stresses), began ten years ago as a reggae band in Boulder, Colorado, where Campbell had been doing readings in bookstores, lending his presence to the Naropa Institute's Jack Kerouac School of Disembodied Poetics, and reviewing music for Denver newspapers.

Two years later, the band moved to New York City and stabilized its personnel: Campbell, Douglas Guthrie on sax, David Kaufman on keys, Steve O'Rourke on guitar and Mike Ratti on drums. There was a period of cult success, and opening for acts like Madness and the Members earned the Nails a niche in the East Village art-rock scene. But reggae became "too constricting" for the band, and a 1981 independent release called *Hotel for Women* evidenced their shift toward rock and roll.

One track in particular, "88 Lines about 44 Women," brought the band to a wider audience and got them signed to RCA, which put out the Nails' first LP, *Mood Swing*, in 1983.

This summer, RCA released the second Nails LP, a psychodramatic *tour de force* called *Dangerous Dreams*. The ten vignettes, which Campbell calls "little fictions," are ingenuous and at times emotionally brutal, with Campbell's cinematic imagery layered upon a churning musical canvas.

The lyrical intensity and hedonistic impulse of Campbell's songs have gotten him in hot water here and there. Let's go back to "88 Lines" for a moment. At first listen, it appears to be a clever little ditty that neatly summarizes female stereotypes: "Deborah was a Catholic girl/She held out to the bitter end/Carla was a different type/She's the one who put it in." But the song has drawn charges of misogyny, and not just from feminists. "One music weekly refused to have anything to do with the album," Campbell recalls. "I challenged them to debate me at any time about my sexual politics.

"I don't know what's misogynistic about a man wanting to talk candidly about sex. I don't hear anything hateful in '88 Lines' at all. When it first came out, there was an editorial by a woman in the *Aquarian*, a really lousy little New Jersey weekly. I really thought she projected a lot of her own sexual anxieties onto the song..."

Campbell finds that the graphic language and strong male point of view in his songs are unsettling to both men and women. His motivation in writing "88 Lines" had more to do with a lexicographic challenge than a statement of sexual politics. "My intention was to be funny and startling and have dirty

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words in it," he laughs. "It wasn't supposed to be about my political feelings about women or me boasting about my sexual prowess. . . . If women can't take a joke, well. . . ."

In his own defense, Campbell notes that he has a 13-year-old daughter and that he has had "a number of long-term relationships."

He also has a more urgent preoccupation at the moment: promoting the new Nails record. Rock history has a strong—albeit slender—thread of artists who've put quasi-poetic imagery, powerful content and high decibels together, Patti Smith and Jim Carroll being the most notable exemplars of the style. These artists' careers have been erratic; even the Doors' biggest success came post mortem. An art band on a major label has precious little job security. Regarding the Nails' future with RCA, Campbell is concise: "We'll see how long *that* lasts."

It was fortune that got the Nails there in the first place, Campbell concedes. The band was signed by RCA A&R staffers Bruce Harris and Greg Geller, the latter having already shown his proclivity for taking chances during his tenure at CBS when he signed the Clash and Elvis Costello. Harris and Geller "heard '88 Lines' and signed us," Campbell declares.

However, the singer notes biliously, "Bruce has since left and Greg has been busy digging through the RCA vaults releasing old Elvis and Sam Cooke records—and the rest of RCA has been sitting here wondering how the Nails got on the label and what they're going to do with us."

It's frustration and exasperation, not anger, that animates Campbell's speech. "I don't feel abandoned at all, because RCA is doing all they can for us. They're not accustomed to dealing with a band like the Nails. They're coming up against a lot of walls because of the state of radio these days."

Radio. *That* is the nub, the very pebble in the shoe of the Nails. "There's this new format they call 'classic rock,' geared to the over-25 yuppies. . . . who have the moolah to buy the products," growls Campbell, who is 35 himself. "They're geared to a crowd that doesn't know the Nails or the Cure or the Smiths even exist. They still listen to Led Zeppelin and the Grateful Dead and don't realize anything has happened to music since 1972. I'm pissed off at my own peer group."

Mentioning contemporary beer commercials would just be baiting a guy like Campbell, but what the hell: "That really does a lot for the integrity of bands like the Long Ryders and the Del Fuegos. I can't listen to their shit ever again without thinking of beer. It's really a shame that some bands

are willing to sell themselves that cheaply."

(Campbell reports that a Suzuki motorcycle commercial used a song similar to one the Nails had recorded—so similar that the Nails sued. According to Campbell, Suzuki offered them cash for the right to continue using the music, but the band refused. "I didn't want the kids to think we're that kind of band," he says.)

Getting back to radio, "The Nails aren't a hardcore thrash band doing some kind of complex noise like the Swans or Live Skull or any of the Lower East Side art bands. Our music is rock and roll, and accessible. It's only radical in the context of how *square* radio is." It seems pointless to ask Campbell whether he's looked inward for a solution.

Campbell has decided to make it a fight to the finish. "We're going to keep storming the barricades of radio," he declares. "It's up to artists and record companies in tandem to send the message to radio that it's a parasite killing its host. Without rock and roll, there'd be no radio. As long as they keep relying on acts that are 50 years old like the Stones and Grace Slick, who is a middle-aged housewife from Marin County. . . . when these people are dead—which is inevitable—who's gonna be there to pick up the slack?"

Gee, doesn't all this investive amount to biting the hand that feeds him? Au contraire, says Campbell: The record companies "have lost sight of the fact that it's the bands that are providing *them* with product." But after a reflective pause, he sums it up another way: "I look at RCA like a government grant that's funding my art. I'd like to return the favor by making them some money."

"But in order to do that, we both have to send a message to radio." ■

—FROM PAGE 174, *T-BIRDS*

to himself, Vaughan, and bassist Preston Hubbard, "and we say, 'well, we're gonna cut this piece out here, we think this is a little cancerous' . . . pat him on the back and say, 'this is genius' . . . So we toss it back and forth."

"It's like throwing the song in a Cuisinart. Kim goes to the market and finds the vegetables, and then he comes and sticks them in our Cuisinart. We get in arguments and cuss each other out, and in the end we come up with a song."

"Then we go have lunch," Wilson says with an uproarious laugh.

Songwriting for the Fabulous Thunderbirds can also be quite a spontaneous affair. "When we were playing clubs," recalls Christina, "50 percent of the night was improv. Kim would turn around and say, 'Okay, blues shuffle in

G, and we'd start playing, and he would make up stuff as we were going along. We'd do it a few times, and if we liked it, it stuck. If we didn't, it would just kind of fizzle away."

"You wouldn't believe the stuff I've forgotten!" exclaims Wilson.

That throw-it-against-the-wall-and-see-if-it-sticks approach applies to the studio as well. "I'm tellin' ya," says Wilson, "sometimes we go in the studio and the song's really raw—which is nice too. When we did 'Wrap It Up,' we'd just heard the record once. We went and did it—no rehearsal, nothing. We did that with a couple of the songs on the record."

Besides the T-Birds themselves, the person most responsible for *Tuff Enuff's* snappy, relaxed-but-tight, bright'n'punchy sound is producer Dave Edmunds. Edmunds' erstwhile partner Nick Lowe had tried his own fabled "basher" approach on a previous Thunderbirds effort, 1982's *T-Bird Rhythm*, but it never got off the ground commercially. "Nick did a great job," observes Christina. "That album could've been as strong as this one. Musically, I think it is. Dave just happened to be the one working on this one."

The Fabulous Thunderbirds had first met Edmunds and Lowe in 1980 when they toured Britain with Rockpile. Edmunds went on to produce the T-Birds' contribution to the *Porky's Revenge* soundtrack, which Wilson terms "kind of a warm up for [*Tuff Enuff*]."

"He did put something a little extra into it," says Wilson of Edmunds. "I think the material's more consistent on this one, but the sound in general—"

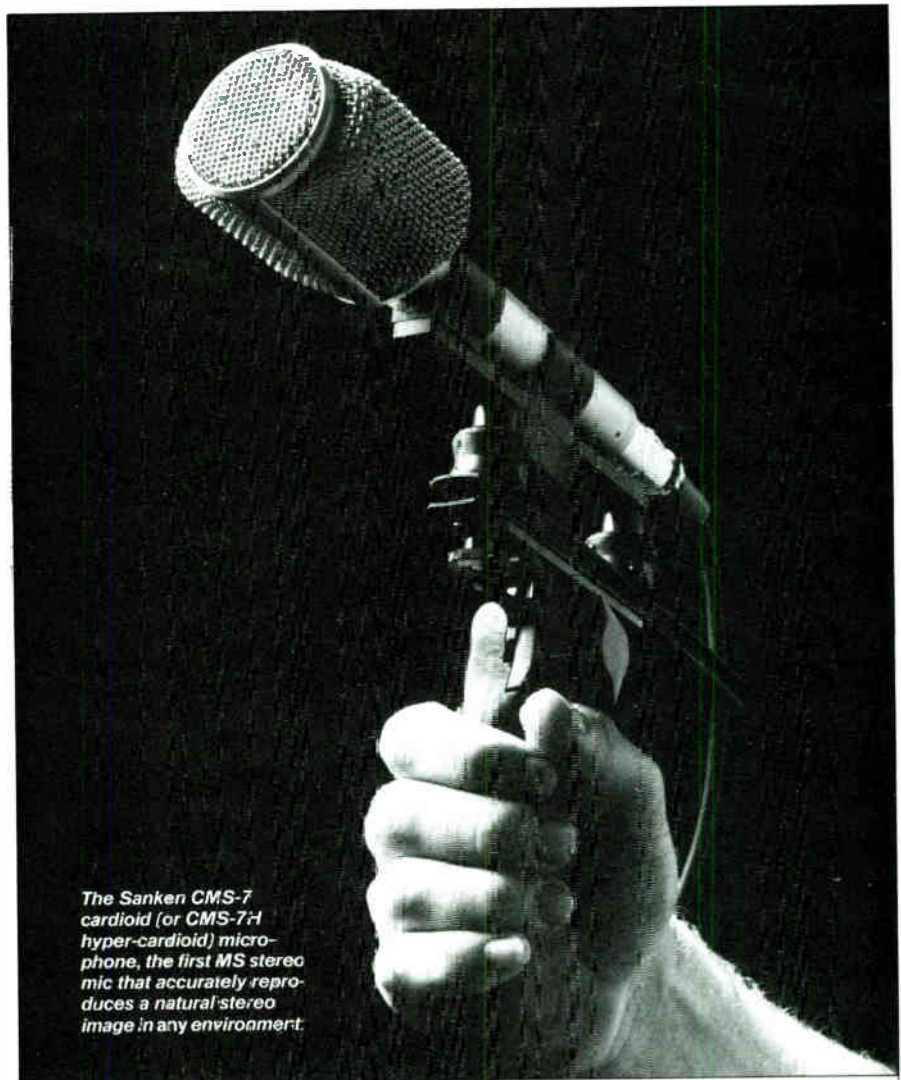
"We've always been working on trying to get that live feel without getting a garage sound," puts in Christina, "and Dave really succeeded in that."

Edmunds' input was fairly unobtrusive during the recording, according to Wilson. "He's very low key," he says. "There's no real heavy pressure or anything, which is great. If you weren't quite getting it, he'd just go, 'Well, I think you could do that one better.' Or else he'd just stop the tape if it was that awful, and say, 'Okay, again.' That was pretty much it."

Tuff Enuff was recorded in a slambang 13 days. "It was all live," says Wilson. "We always went for a live take, including vocals—no scratch vocals. We've always tried to do that, and it didn't always work out that way."

Overdubs were minimal, only employed "if I screwed up a vocal, or part of it. Same with guitar. Bass and drums we pretty much kept every time. Those are the two building blocks of life," Wilson laughs.

While he admits that he's "horrible with the technical end" of making rec-



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ords ("and I think that's what makes the recordings come out so well," he chuckles), Wilson does cite the use of an unusual studio technique that allowed him to hear only his own voice during a session. "I used a little tiny monitor right in front of my face," he relates, "and it was put out of phase, I think, to where the only thing I heard in playback was the vocal. It enabled me to sing more relaxed; I could hear myself really well."

Wilson rarely uses full headphones, preferring sometimes to wear only one, or even to hang the headset on a microphone stand in front of him, so that he barely hears the tinny feed of the instrumental tracks. "Or I'll stick 'em on my head, above my ears," he says. Wilson's bluesy, just-ruff-enuff baritone stretches out much easier when it's unencroached upon by the full blast of the music. "It gives you a little bit of power, and a lot of freedom," he says.

As for guitarist Vaughan, at Edmunds' behest he "overdubbed more this time, just for the fullness of it," according to Wilson. "He would always lay down a live track, but it would usually be a rhythm track. And he would layer stuff, like a six-string bass, maybe another extra rhythm piece. There could be four to six guitars on the track, and you wouldn't even tell."

The T-Birds are hoping to work with Edmunds again on their next album, which is due to begin production in early 1987—that is, after the Thunderbirds have completed their U.S. tour, movie work, and jaunts through Europe and Japan. "We were on the road 320 days from October last year through September," sighs Wilson, "and it's not over yet."

Welcome to the big time, guys. Are they certain it's all that much fun? "Sure it's fun, of course it is," says Wilson. "But it all happens right together. Like the *Streets of Gold* thing—I'd get out of a gig, work till eight in the morning on that, go to bed on the bus heading for the next place, wake up at five or six, and head for sound check." He laughs. "So that can be draining. I'm used to working that way, actually—it's just that working that way on five different things at the same time is tough."

As the T-Birds reap new admirers and become more in demand, they're aware that tried and true followers might accuse them of the cardinal sin, selling out. "I don't think we could do that if we tried," counters Christina. "We've just always believed that what we were doing would fit as well as anything else. It's just a matter of making people aware of it. So that's all that's happening, really."

"I'm sure a lot of our old elitist rhythm and blues fans, the hardcores, are gonna scream, 'Oh, they're going commercial.' That's baloney. Just because more people hear you, and you're selling more records, that means you're commercial? That's not where it's at. And if that's what they think, well hey." ■

—FROM PAGE 176, TALKING HEADS

his career," says Frantz. "Although it might be an important part, he's clearly been bitten by the Hollywood bug. He likes films and I like films, too, but I sure wouldn't want to go through what David has gone through these past couple of years trying to get his film made. But, to his credit, he did get it made and it's pretty good. The music is fabulous and I'm glad to have been a part of the soundtrack. But frankly, I'm happy *not* to have been part of the rest of the project."

It has been difficult keeping the momentum going while working around Byrne's schedule and dealing with his expressed disinterest in touring. "David has been very prolific and has had a lot of success in other things he has tried," says Harrison. "It's been quite inspiring, actually. There are times when I say it's great to be working with all these other people, but it's great when we get back together and work with the band. I think we all feel that."

"It would be unfair for us to think David was hanging us up," counters Frantz. "If we wanted to be lazy and not do anything and blame it on David, we might say, 'We had to wait six months!' But quite frankly, there is plenty for us to do."

While Byrne continues to hug Hollywood, the other Heads keep hopping. Frantz and Weymouth have a new Tom Tom Club album in the works, which Frantz says is "a cross between heavy metal and flamenco music," and Harrison is at work on a second solo album. Both Harrison and the Tom Tom Club are at work on (separate) film soundtracks.

"For David," says Frantz, "this film is a dream come true. He's done it, so more power to him. However, we would like to continue with Talking Heads and I think it's safe to say we *will* continue. When a tour will come about, I'm not really sure. We're supposed to sit down and talk about that soon."

Byrne has said in recent interviews that he has no desire to tour with Talking Heads and that the band may even have recorded its last album. "I'm sure David is going to want to do another movie," says Harrison, "but I'm sure we're going to continue and that projects will come up. The thing we do best is make music. We'll continue to make records and see where it goes." ■

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—FROM PAGE 79, CD TRANSFERS

module and two L & R channels along with the word sync connection (all BNC) from the 1610 output into the 1610/30. Optional internal modules of the bw 102 allow the engineer to negate certain anomalies of the F1 format in the digital domain: DC offset, emphasis, and the 11.34 microsecond delay between channels. Let's discuss these.

DC offset is an inaudible, low frequency (4-10 Hz) which may be generated by off-balanced buffer amplifiers prior to A/D conversion within the F1. If the F1 tape is digitally transferred to the 1610/30, the DC offset will remain and (when no program is present) be visible as a standing signal on the meters or as static stripes on the video monitor. If the amount of offset is quite large (-30 dB or more on the 1630 meters), it is advisable to fade-in and *not* cut-in any soft program material from digital silence during digital editing. Cutting-in may produce an audible thump at the edit point. For example, if you access a specific musical point within a track of CD which has significant DC offset, you will hear this same "thump" at the point where the music begins. Generally, if the DC offset is reasonably low, it should never be audible and should not cause any problems.

A digital transfer to the PCM-1610/30 will also leave the emphasis intact. Many people have different opinions about emphasis, but the trend seems to be, if possible, *not* to use emphasis on a recording destined for CD for the following reason: Some of the cheaper CD players on the market may have inferior filtering circuits built into their de-emphasis section. It is possible that the sound of a recording with emphasis may be compromised when played back on such a player. However, I have not witnessed this enough to warrant spending a lot of money and time removing the emphasis from your F1 recording.

Your F1 tape also has an 11.34 microsecond delay between channels, caused by the A/D conversion. This is corrected at the analog outputs, but will remain in any digital transfer to the 1610/30. In stereo playback, this delay is audibly insignificant, although some engineers may try to convince you otherwise! It is the equivalent of a 42° azimuth error at ten kHz on an analog machine, or the movement of one of your loudspeakers a fraction of an inch! In mono playback, however, this delay will cause phase cancellation and "a slight lopping off" of the high end. Before you let this upset you, remember that mono broadcast of CDs is rare and any station that

does broadcast in mono may have a limited high frequency bandwidth anyway. Also, phase discrepancies from stereo microphone placement may cause more serious cancellations. At any rate, if you are deeply concerned about this delay or any of these other F1 anomalies, all can be corrected either with an analog transfer or a digital transfer using the Harmonia Mundi box with the appropriate modules.

When a project recorded on an F1 involves a great deal of editing, it is economical for the engineer to create what is called a "pre-edit" F1 copy. This is a Beta or VHS tape, created from the "copy out" connector of the F1, which has all of the desired takes/mixes sequenced in order from the original session tape. When doing this, it is very important to record at least ten seconds of "lead-in time" (stable video) before the desired edit-point of each take. When the digital transfer to 1610/30 is made, this will give the 1610/30 plenty of time to sync up to the external clock source of the F1, without cutting off the beginning of your take. Also make sure when you are making the copy that the resolution switch is set at 16 and not 14 bit, otherwise your F1 pre-edit tape will become 14 bit.

If your original tape is only 14-bit, don't expect the digital transfer to give you 16-bit quality. The two empty LSBs will simply be recorded as 0s on the 1610/30 tape. So don't be surprised to see thin black stripes representing the last two "empty" bits of each digital word on the 1610/30 video monitor. Have no fears, however, a 14-bit master can be made into a CD.

Mitsubishi X-80

Because of the convenient razor blade editing feature, the Mitsubishi X-80 has become a popular 2-track format, particularly for mixdowns in studios. For the most part, Mitsubishi X-80 to 1610/30 transfers are done in the analog domain. But the transfer, with sampling rate conversion, can be effected digitally using either the Studer SFC-16 sampling rate converter or the Harmonia Mundi box. Since the X-80 uses *only* the 48 kHz sampling rate, the conversion to 44.1 kHz is necessary.

One important thing to consider is the leadering of the Mitsubishi tape. If you use leader right up to the beginning of each track, it is possible that the initial attack of your track will be cut-off during playback and lost during any sort of transfer. Apparently, it takes a split second for the digital circuitry to kick-in following the absence of any signal. The solution is to record digital silence on blank tape and use

a section of that prior to the beginning of each track.

Mitsubishi X-86 and PRO-DIGI

The Mitsubishi X-86 can use either 48 or 44.1 kHz for recording and playback. It is envisioned that digital transfers to the 1610/30 will occur via the optional AES/EBU digital interface (XLR connection) with or without an extra box for the sampling rate conversion.

Sony PCM-3202 and DASH

Digital dubbing from the Sony PCM-3202 to the PCM-1610/30 can be done directly without an external box. The BNC connectors marked "digital out" in the back are fed directly into the digital inputs of the 1610/30. Again, the clocks must be synched, with sync out of the 3202 sent to the word sync of the 1610/30. The 3202 tape *must* also be recorded at the lower sampling rate, 44.1 kHz. If the higher 48 kHz sampling rate is used, a sampling rate converter is necessary. The AES/EBU digital interface offers another possibility for digital transfer, but only to a PCM-1630 equipped with the optional I/O boards (DABK 1631).

dbx 700

The transfer from a dbx700 to a PCM-1610/30 can *only* be done in the analog domain. No one has yet invented a signal processing algorithm that can translate delta modulation code into PCM code. Although the analog transfer may be quite straightforward, there is one problem worth noting. The dbx700, unlike the 1610/30, has no output clock to lock its VCR to a steady playback rate. Some VCRs, most commonly 3/4-inch, may have a tendency to vary slightly in speed (2-3%), causing the dbx to drift in pitch. The remedy for this is to lock the playback VCR feeding the dbx to the 1610/30's sync out.

Conclusion

It is evident that several digital audio formats will prevail for quite some time. This makes "getting your project to compact disc" that much more complicated. The initial transfer is a critical stage which should be taken seriously and carried out with great care. And unless EQ changes are necessary, I believe it is always preferable to make the transfer digitally, if possible.

Author's note: There are several engineers who work with these problems every day. It is my hope that they can share their experiences and perhaps update or correct any information that may appear here. ■



L to R: Tim Gorman, Slick Aguilar, Marty Balin, Paul Kantner, Jack Casady, Keith Crossan, Darrell Verducco

KANTNER-BALIN-CASADY BAND

by Derk Richardson

Paul Kantner went into the recording studio for the first time in 1966, to record the first Jefferson Airplane album. Picture the mop-topped Kantner, Marty Balin, Jack Casady, Jorma Kaukonen, Skip Spence and singer Signe Anderson, trapped in the studio with clean-cut, strait-laced RCA recording technicians. The record company's roster had included Kay Starr, Perry Como, and Dinah Shore, and its notion of rock and roll had started with Elvis Presley and stretched about as far as Neil Sedaka. "The people we were working with at RCA didn't even know how to talk to rock and rollers," Kantner remembers. "So we'd be sitting around and the board would be literally smoking, God knows why, with things exploding and microphones blowing up. We had to do it ourselves and it was a long learning process."

Twenty years later, having disembarked from the Starship band which grew out of the Airplane, Kantner was in the studio again, with a new band of old comrades—KBC, featuring fellow Airplane founders Marty Balin and Jack Casady. This time around, at The Plant in Sausalito, California, the recording process was governed by high-tech efficiency and guided by experienced and expert producers

John Boylan and Jim Gaines. But Kantner hadn't forgotten the agonies of trying to capture that seminal San Francisco rock sound on vinyl two decades earlier. "It was very frustrating at first," he says, settling back in the kitchen that's tucked between the studios at The Plant. "It was just maddening pounding your head against the wall. Sooner or later you get people who actually know how to do it to help you. You don't try to do it yourself unless you know how to do it. To turn up the guitar, it's not just 'turn up the guitar.' There's a whole lot of planning and mathematics involved."

Over the course of recording such Airplane and Starship albums as *Surrealistic Pillow*, *Volunteers*, *Red Octopus* and *Freedom at Point Zero*, and such solo efforts as *Blows Against the Empire* and *Sunfighter*, Kantner still regards the studio as somewhat foreign territory for a music whose essential magic is found in live performance. But he has come to appreciate the finer aspects of studio craft that must be mastered in order to put out a decent record. "[The Airplane's] *After Bathing At Baxter's* (1967) is probably one of the worst recorded albums in the history of music," he remembers. "That's when we just took the reins ourselves and tried every machine in the studio. It took seven

months. The first record took ten days. The second one took two weeks from beginning to end. The assistant engineer had to go to a rest home after we were done with him."

For the recording of the KBC's debut Arista LP, Kantner was returning to studio with his old Airplane pals, singer Marty Balin and bassist Jack Casady. Balin quit the Starship for the second time in 1978, and has since recorded two solo albums and performed regularly around the Bay Area with his own band. Casady has been long gone from the old outfit, working with Jorma Kaukonen in Hot Tuna and in new wave bands SVT and Yanks. Kantner's final falling out with the Starship, largely over the unabashedly commercial direction the group was pursuing, was the most acrimonious of the lot. He sued his former band and won a sizeable settlement which included the group dropping the name "Jefferson." "Basically it's all over and done with," he says. "Grace is pushing a few revenge suits against me, and every once in awhile I'll leave little notes for her, 'Tired? Hungry?,' because she once wrote a song called 'Never Argue with a German if You're Tired or Hungry.' But you can't be satisfied with leaving a family sort of situation, bitterly, or rather, ruefully."

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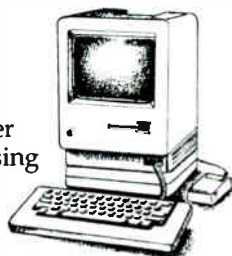
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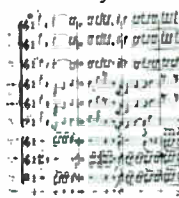
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and Casady, Kantner says, "We just fell into it. Marty and I had been writing songs even before I left the Starship, for no coherent purpose. We just sort of gravitated together every five or ten years for a fling, and it seemed a natural place to go after I was unemployed. Marty says the best part of a band is when you're putting the stuff together and you're in that sort of experimental, cauldron stage." The new band is a blend of old and young firebrands, filled out by a relatively youthful brigade featuring lead guitarist Mark "Slick" Aguilar, saxophonist Keith Crossan, keyboardist Tim Gorman, and drummer Darrell Verduco.

And if the early Airplane was ill at ease in the studio, the new KBC band seemed to be cruising right through the recording of its debut album, especially under the professional guidance of John Boylan, whose credits include Boston, Little River Band, Charlie Daniels, and the *Urban Cowboy* and *Footloose* soundtracks. Kantner, for one, has come to appreciate the adjustments a band must make to come across well on vinyl. "Recording is an art unto itself," he muses. "It's like painting, almost. If you wanted a photograph, you wouldn't need a painter who expresses something to make it other than reality. Recording is another reality. If you try to make it real, it just sounds wimpy. You have to overdo it. So when you go through all those processes, hopefully, something moving or exciting or funny comes out. In the studio, everything's played back at five million dB and sounds like 400 orchestras, and when it gets down to a record, it's like, hmm hmm hmm hmm."

While Kantner is philosophizing in the kitchen, Slick Aguilar is busy in the adjoining studio, punching in his guitar solos on "Sayonara," a last-minute ballad addition to the album. Marty Balin has been sitting at the back of the booth, looking bored as he thumbs through a paperback novel. The song is especially important to him because he discovered it at a Japanese song festival in Tokyo and negotiated doggedly to have it included on the record. But he seems remote and detached from the process of getting it down on tape. "Recording is odd to me," the singer says in a rare interview. "I don't like taking so much time. I like to go in and get it done while it's fresh. After a while, it gets too thought out. When you cut a track and it's perfect, and it's really a rockin' track, and then you go back in and overdub everything, I think that's stupid, a waste of time."

Kantner has already confirmed that Balin was never pleased with the requirements of recording. "We always used to say Marty isn't happy unless

he's unhappy, sort of like the tortured artist," he says. But Balin's discomfort in the studio comes from his singer's passionate commitment to the spontaneity of performance, a commitment he feels technicians don't understand. "They want every note to be right up front in your ears," he says, "but people don't play like that in the first place. There are inflections in the way you sing, in the way you play."

"I believe that people listen with their hearts first. They don't listen with their ears. Only engineers and executives listen with their ears. In other words, they don't hear too much. But people who listen with their hearts, like people in the audience and people who make music, know there's a whole other way of hearing things. So to me, it's all kind of boring, this process of being in the studio."

Fortunately, to facilitate the birth of KBC on record, Arista president Clive Davis assigned the efficient and sensitive John Boylan. After hearing the first tapes, Davis wanted more of the band's rock sensibility to come through, and he wanted to be sure that the record could spawn a hit single. So he sent in Boylan with Van Stephenson and Phil Brown's "It's Not You, It's Not Me," and the task of wrapping up the album in a month. "I wouldn't say there is really any challenge working with a bunch of guys as experienced as this," Boylan says, taking a short break while his engineer sets up Gorman's keyboards for the next round of overdubs. "The only challenge is to get it done on time—the pressure."

Boylan came into the project with the kind of respect for the musicians that makes sessions flow with minimum friction between the artistic and technical sensibilities. "I feel that production is an obstetric art. You're supposed to deliver the brainchild, you're not supposed to mess with it. You try to create the perfect artistic climate for the project to come to fruition." And his appreciation of Balin as premiere vocalist was enough to smooth the ruffled feathers of the sensitive songbird. "Marty's one of the great rock and roll singers," Boylan says, "one of those voices you put on the radio and everybody knows whose it is."

Before long, the admiration was mutual. Balin, who just wants to sing, found that the producer was sympathetic. "John Boylan was really good," Balin says, almost grudgingly. "He said, 'Well, show me what you do, go ahead and show me how you would do it.' So I did and he said, 'Great! That's what we want. That's why I'm here.' He let me sing, and he goes for the emotional aspect of the performance. I feel real comfortable with the

guy. He made me feel a lot better. Clive is real smart," Balin continues. "He sent somebody who understands the performance. There's more to singing than just hitting the notes, you have to get something else across that's not just the note."

Here, in that elusive "something else," beneath the shimmering high-tech gloss of the recording process, is what binds Balin and Kantner in their new project. Kantner may say they "just fell into it," and Balin may casually sum up his participation as "Paul asked me to help him out, he was in dire straits, and I thought it would be fun." But the pair obviously shares an essential faith in the musical spirit that was more palpable when they started out 20 years ago. "I think music is a form of God, actually, I really do," Balin says. "The soul, the metaphysics of it is what interests me. If it's right, it can tear a place apart. I only do it for one reason, because I get so goddamn healthy from it."

Likewise, Kantner talks about the spiritual uplift he gets from a live rock and roll performance. In San Francisco, he's one of the few major rock stars who can be regularly seen in all the nightclubs, checking out new bands of every stripe. "That's where we get our chord changes," he laughs. "That's where it comes from, the interchange of seeing other musicians. And not just musicians, but the whole whatever-you-call-it that goes on at a rock and roll show. It's as close as I've been able to get to what they say happens in church. For me, it's never happened in church, but it's happened at rock and roll concerts often enough that I want to return."

And that attraction has been strong enough to draw Kantner, Balin and Casady back into the studio after all these years, recapturing a little of the old magic while updating it with a tight cross-generational band. It's even enough to break down Marty Balin's curmudgeonly aversion to both the trappings of rock stardom and the technical demands of the studio. "All the ego and money doesn't mean a thing to me," he says. "I just want to get up and play. But to get a song from my living room to the guy who's walking by my house out on the street is the hardest job in the world. Unless I just walk outside and play it for him. The bullshit that you have to go through with record people and managers and promoters and agents and studios and everything else, to get that song to the guy just walking by my window is the most gigantic job in the world." But somehow it gets done, and KBC is out on the airwaves and in the record racks. "Really," Balin shakes his head, "it's amazing." ■

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Circle #137 on Reader Service Card

by Elizabeth Rollins

During the past year we saw stirrings of a digital video awakening at major American post houses. The Abekas A-62 digital disk-based system appeared in editing suites, and Quantel heralded the Harry/Encore

combo as the heart of their remarkable 4:2:2 component, all-digital graphics studio concept. Nineteen eighty-seven is already booked with a major advancement in the evolution of digital post production. Sony's 4:2:2 component digital video/audio tape recorder, the DVR-1000 is sched-

uled to ship more than 50 units in March, according to Sony product manager Curtis Chan. (See last month's "Video News.")

How do facility engineers envision using a component digital VTR that doesn't yet have a digital switcher to go with it? Various houses have their opinions about where the DVR-1000 fits in. Read on for what management has to say from Miami's Limelite Video, New York's Editel Video and L.A.'s The Post Group, and Modern Videofilm.

SPEAKING OUT ON DIGITAL VIDEO

Sony DVR-1000 digital videotape recorder.



Limelite Video, Miami

Marcos Obadia, chief engineer at Limelite Video, a 100,000 square foot facility opening early in '87 in Miami, welcomes the D-1 format. He says he's got seven machines on order (although Sony reports that first run machines are in short supply—in other words, who knows how many each house will actually take delivery on?). But Obadia also cautions, "It's not for everybody—especially because of the prohibitive price tag (\$120,000)," he says with a slight Venezuelan accent. "It's for certain post houses that do graphics and special effects." Limelite has a full-blown computer graphics department, complete with Mirage, Paint Box and the Quantel Harry with Encore digital effects.

Since Harry is also based on the component 4:2:2 format, Obadiah is excited about how interfacing the DVR-1000 will allow storage for Harry graphic output. (Quantel demonstrated this interface at recent NAB and SMPTE shows.)

Another great advantage with the DVR-1000 is that "it's also got four channels of digital audio. There's been no interface between digital audio and video like that until now," Obadiah points out.

The Post Group, Los Angeles

Tony Redhead, newly-landed art director at L.A.'s The Post Group, sees a distinctive niche for D-1 tape at the facility's new Computer Graphics Division cottage. The Australian-born Redhead—whose hair is decidedly brown—recently departed The Home of The Harry. Not surprisingly, he also sees the Harry DVR-1000 interface as a leap ahead for graphics archival assist.

Post Group senior VP, Rich Thorne confirms that three of the machines

are on order, but also notes that for the moment, they're still fairly impractical because of that missing link: the component digital switcher. Looking to the future he says, "We'll probably stick to the 4:2:2 format. Between Sony and Quantel, that's just what it's going to be. Any manufacturer who thinks otherwise is fooling himself," says Thorne. The Post Group has other non-D-1 digital equipment: "At this point, we've got as many Abekas' as we're going to get," says Thorne, referring to the two A-62 digital disc recorders the company uses mainly in on-line editing suites.

Modern Videofilm, Los Angeles

Just down the street from the Post Group in Hollywood, Modern Videofilm is expecting shipment on two DVR-1000s by mid-'87. Chief engineer Al Hart says that since his facility cranks out a tremendous amount of television work, the D-1 format will supply an important service: digital video masters from film. Modern Videofilm's four Rank Cintel Mark III telecines are constantly transferring 35 mm dailies to PAL and NTSC standard one-inch tape for post, since "...studios ship tape—they don't ship any film," according to Hart. It's certainly a great improvement to

have digital masters, says Hart, but he concurs that until the switcher comes out, not that much actually changes. "The D-1 format machines can fill a niche right now—it's an evolution—not a revolution," he summarizes.

Editel, New York City

Editel New York's chief engineer Tom Eyring has cast his lot with D-1, again mainly for use with Harry: "It's a natural for the Harry because of the 89 second storage limitation it has internally," says Eyring. "Many jobs can be done from day to day and now you can store it, leave it on the shelf until you're willing to go back to that job—whenever that ends up being."

Eyring says that perhaps because he's seen so many changes in the industry over the years, he supports D-1 but that it's still hard to project how significant it will be. "Everybody agrees that digital is here to stay—not only for quality, but for all that flexibility. It's too early to tell, of course, but it may change the course of video tape editing for the future," says Eyring.

"The course that Montage took may now be coming into its own," Eyring ventures. "The reason Montage hasn't done all that well is because it's a relatively slow system based on an inexpensive Beta machine. Though

the concept was great, the implementation wasn't so great." Eyring says digital represents the capability of non-linear editing at a higher, more efficient level; but as for which specific format will win the battle for universality—he's still not sure. "I think that this will be the year that we see something we didn't expect."

Looking to the future for a moment, Limelite's Marcos Obadia is bolder, perhaps because he's at the technical helm of a facility that is making its maiden voyage in the age of digital: "One of the most severe limitations right now is a 30-year-old NTSC system," he says. "While it will be with us for many years to come—let's get the NTSC out of the way and get going with the new SMPTE digital world. It's all different—it's really number crunching. It could all be done—editing, special effects, audio, everything—in one machine." Maybe that's the "something we didn't expect" that Eyring has an instinct about for this next year. But whether it's this dream digital dynamo or not—one thing seems certain. In 1987 we'll be seeing essential expansion—more products that will enable the 4:2:2 format to realize its promise of full digital manipulation from film/video transfer to end-user cassette tape or disc. ■

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TEAC LV-200A

OPTICAL DISC RECORDING FOR SOUND AND VIDEO

by Lou CasaBianca

The audio recording studio control room has been slowly and increasingly invaded by video technology. SMPTE time code, video monitors and playback decks, synchronizers, and PCM machines laying digital audio to half-inch or 3/4-inch video cassette recorders have become standard gear for many media-oriented post-production rooms. Recently, a new breed of high tech devices, led by the CD player, are pouring out of the labs and into the production workspace.

Audio and video tape to disc recording and mastering direct to optical disc represents a new incarnation of what today seems like a primitive technology. The lathe stylus cutting into the surface of the master disc has been supplemented (replaced?) by a laser beam encoding sound and/or images frame by frame. In the case of mass replication systems made by manufacturers like Sony, Pioneer and others, master discs are made of optically ground and polished glass. A membrane of light sensitive photores-

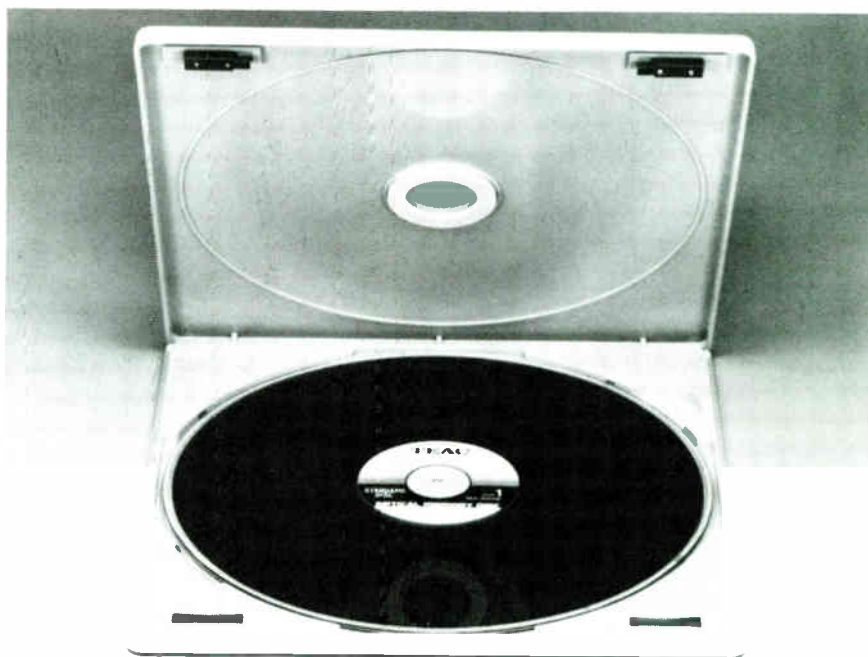
ist .1 micron thick is laid over this to form the photographic foundation for the recording stage. The master is "cut" by a laser beam which incises a pattern in the membrane, modulated by the signals recorded on the master tape. This is photographically developed to produce the pattern of shallow pits along a track which is the heart of the reflective optical disc system.

Recordable Disc

The recordable disc design is similar to the replicatable disc. It is sealed within a chemical layer, such as PMMA (polymethylmethacrylate), under a hard polymer topcoat surface. The groove or track is stamped on an inner layer of polymer hardened by ultra-violet light during the manufacturing process; within this lies a recording layer of heat-sensitive tellurium suboxide. Strings of "dots" which comprise the video signal are recorded in a phase change process. The recording layer starts out in an amorphous state, and under intense heat from a semiconductor laser within the recorder, its physical properties crystallize, solidify, take on a geometric structure, and become reflective. The laser beam used in playback is about one-tenth the strength of the recording laser.

—CONTINUED ON PAGE 192

TEAC MA-200W



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After comparing the ATM33R, several testers suggested they could now duplicate their studio sound on the road, where studio condensers were too expensive to risk. Others could see the advantage of four or

more ATM33R microphones in a demo studio, at no more investment than one expensive condenser.

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DRAW
(Direct-Read-After-Write)

When first introduced, mass replication laser disc recording systems were priced in the hundreds of thousands of dollars and required a large facility with a staff of technicians trained and dedicated to handling its operation. Several manufacturers have introduced proprietary-but incompatible DRAW (direct-read-after-write) optical recording systems. These systems can be used in a variety of applications from check-disc testing for interactive video disc and data storage, to random access editing and digital audio storage. For years, the case against video discs has been that "you can't record with them." Slowly, over the last several years, the recordable disc has surfaced in the industrial market. The first system was released in the United States by Matsushita, under the

Panasonic brand name, in the summer of 1983, as the Optical Memory Disc Recorder. Hitachi, Toshiba and Thomson-CSF have developed systems designed primarily for electronic storage and retrieval. The latest entry in the recordable video disc arena is from the TEAC organization.

TEAC Video Disc System
LV-200A

The LV-200A is a new optical recording tool, a laser video disc system, capable of recording and playback. It uses special constant angular velocity (CAV) model MA-200W, or constant linear velocity (CLV) model ML-200W long playing optical discs. The MA-200W can store up to 108,000 still pictures (54,000 per side), or one hour of moving video (total on both sides) at 340 lines of horizontal resolution. The CAV disc revolves continuously at 1800 rpm, making each frame of the

disc addressable. In the extended play mode the ML-200W can store up to two hours of moving video on both sides and maintains a consistent length for each frame, enabling longer playing time for each side. In this case, frame addressability is eliminated and locations are referenced by minutes and seconds.

Video/Audio Specs

The video signal is at a SN: 47dB (standard disk, center) and 42dB (long play disk), using weighting per CC1R Report 410-1. The system is equipped with terminals for inputs from a video camera, industrial-type VTR or consumer-type VCR, and incorporates a built-in time base corrector. The unit also uses an internal dropout sensor which interrupts the recording process, thereby alerting the user to any serious dropout error which would later be unacceptable for playback. The camera input terminal may be connected to a Film Video Processor, model VY-420, for NTSC recording (as still pictures) of slides (positives) and negatives. At \$3900 the film processor uses a CCD that delivers 300 lines of resolution and allows zoom, focus and minor color correction capability. The audio SN: is 68dB or more (400Hz, 100% modulation, 1HF A network, with noise reduction). Frequency response is 50Hz-20kHz ±3dB. Distortion (THD): .5% or less (1kHz, 75% modulation). The system also has two channels of audio input.

GENERAL SPECIFICATIONS FOR
OPTICAL DISC RECORDING

INPUT SIGNAL	Camera	VTR1	VTR2	Mic
Video/Audio/MIC				
Video Signal	NTSC std. (camera out)	:<-- (TBC out)	:<-- (std VCR out)	: :-
Video Level	.5 - 2v p-p,	75ohm unbalanced,	sync neg	
Video Connector		BNC		
Audio	2 channels			
Audio Level	-6dBs + 1dBs (22K.ohm, 100% mod.)			
	-70dB (VRmax input)			
800ohm				
Input Impedance	4.7K.ohm	22K.ohm		
Audio Connector		RCA pin jack		Mic jack
Usable Mic				800ohm
External Sync:	Composite Sync			
	4Vp-p, 750hm, negative sync			
	fH: 15.734kHz + or - 3Hz			
	Level (on/off)			
External Control:	Interface: EIA RS-232C/JIS C 6361			
RS-232C:	Data Rate: 1200/2400/4800/9600 bps switchable			
	Data Length: 8bit			
	Parity: none			
	Stop Bit: one bit			
	Delimiter: CR, LF			
	Sync method: non-synchronous duplicated			
OUTPUT SIGNAL				
VIDEO				
System:	NTSC standard video			
Output Level:	1Vp-p + or - 1-%, 750hm, unbalanced, negative sync (with standard video input)			
Output Connector:	BNC			
AUDIO				
No. of Channels:	Two			
Output Level:	-6dB + or - 1dBs (100% mod, 47kohm load)			
Output Impedance:	2kohm			
Output Connector:	RCA pin jack			
Headphone Output:	100mV (80hm) at max volume			
External Sync:	Shunted output of external sync input, 75ohm termination with on/off switch			
ENVIRONMENTAL OPERATING CONDITIONS				
Operational:	+5 to 35°C, 30 to 80%RH			
Storage:	-20 to +80°C, 30 to 80%RH			
POWER SOURCE				
Voltage:	90 to 132VAC, 50/60Hz			
Consumption:	Approx. 100w			
DIMENSIONS/WEIGHT				
Dimensions	Approx. w 17in. (435mm) x h in. (197mm) x d in. (535 mm)			
Weight:	Approx. 55 lbs.(25Kg)			

Optical Discs Media

The MA-200W and ML-200W optical discs are 300mm(11.8-inches) in diameter with a thickness of approximately 4mm, with custom designed high sensitivity recording film which permits high density recordings, even at a rotational speed of 1800 rpm. Low run-out acrylic base plates are used for high precision dyeing processes, for maximum performance and longer life. The longest dropout is estimated to be ten micro seconds, equivalent to one to 30 micron horizontal line. The CAV and the CLV disc deliver 300 and 240 lines of horizontal resolution respectively. Record and play time on a standard disc with moving pictures is 30 minutes per side. It will hold 54,000 still frame pictures per side; the long play disc moving picture one hour (per side). Search time on the MA-200W is approximately one second (frame search). Chapter search on the ML-200W is about ten seconds. The access time in the CAV mode is from frame 1 to frame 54,000 in less than a second. The recording film is the "distraction" type, which provides reliable performance in high speed searches for images out of large data

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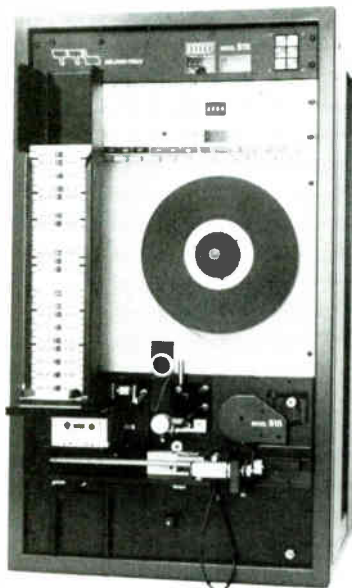
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files over extended periods of time. TASCAM will deliver the disc in aluminum storage cases to protect stability.

The systems optical source is a semiconductor laser with an estimated life of 10,000 hours. The projected cost of the disc is \$150 per side. There are similar systems made by Hitachi and Panasonic which can record a maximum of 13 min. 20 secs. on one side only. The system can record on both sides of the disc, and at about \$24,950, full TEAC recordable video disc package is in the same price range as similar systems.

Operations

TEAC designers have considered the requirements for a variety of applications. In doing so they have built special capabilities into the record and playback modes. The record mode provides for interval recording, which can be used to record single frames or sequences at random locations on the disc. The single frame capability is unique, as only specially modified 3/4-inch and one-inch machines have this capability. The recorder has been provided with an automatic program recording function that can be used for such operations as time lapse recording. The CAV can search or scan at 60 times normal speed, and can be programmed to playback at ten times normal speed in 76 selectable steps. The CLV mode requires that a minimum of three minutes be recorded at one time and can record full program length. The system can superimpose time display (using a built-in clock) or time code window with frame or chapter. A time code controller, VY-520 is available at \$1995.

As a standard, the unit will lock to house sync. The SG-500, a composite video sync generator, is also available (at \$995). The playback mode, step/still playback, variable speed playback, interval playback, scan playback are all possible in addition to the normal playback mode. Control of the LV-200A can be done by switches on the unit, by a wired or wireless remote control, or through a computer. Discrete control of frame record or search requires the use of the wired remote control. The system can be computer controlled through an RS-232 interface which is a standard feature. The data rate is at 1200, 2400, 4800 or 9600 baud per second switchable.

Applications

This system will be able to be used in a number of interesting applications. According to a recent survey, there are close to 100,000 POP video disc machines in the marketplace. They are being used in coin-operated appli-

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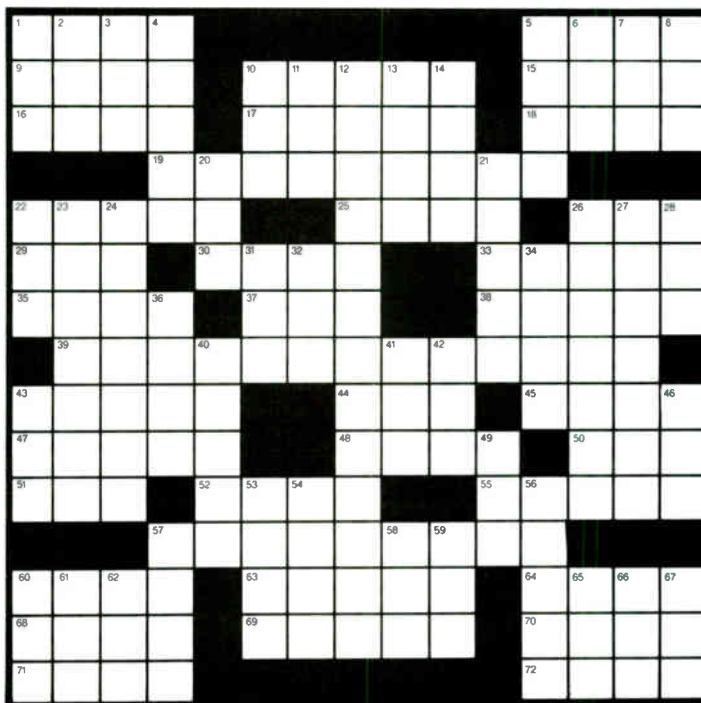
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MIX WORDS

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cations, research and development, government, medical training, hospitals, libraries, museums, and as a storage medium for sound effects libraries. The two most apparent uses for the LV-200A are for check disc mastering prior to mass replication, and for point-of-purchase (POP) test marketing. In both situations, a limited run of from one to a dozen discs can be used to check programming cues or content, as well as reaction in the field, in the case of point-of-purchase. When the disc checks out, the master tape can then be sent to a replication facility for the glass master replication process. Film and video editing that can benefit by the incredible 30-minute search time of one second is another obvious market for this technology. Systems like the DroidWorks' Editdroid will be able to use TEAC to dump video tape to disc, and edit from time coded discs. An edit decision list can be developed, which can then be used in on-line video or for traditional film editing. The LV-200A can also serve as a test bed for development of CD-ROM and CD-I discs.

Another innovative application is using it as part of a four-channel digital recording system developed by a company called By The Numbers. The LV-200A can insert audio into the video section serving as 4-track audio recorder. The system's trade name is Colossus, a portable audio processor at 16-bit digital PCM 60 KHz. The target markets for Colossus are surround sound four-channel digital audio for theaters, four-channel digital audio mastering, and digital audio motion picture sound effects libraries. The LV-200A serves as a storage and retrieval device working with the Colossus which provides digital encoding and decoding. The Record Group, A&M Records, Warner Bros. Films and Universal Pictures have all previewed the system. The Colossus will be able to deliver 30 minutes per side, one hour of stereo, or two hours in mono. The LV-200A will also work with other digital audio systems.

In the case of a sound effects library, four channels of audio can be encoded to NTSC, delivering two hours of audio effects per side. It is possible to link units so that, in the case of a regular TV series, all of the standard effects as well as new audio material could be randomly accessed by the system for the quick turn around creative audio editing usually required by television schedules. The LV-200A brings cost-effective recordable video discs technology to the audio and video marketplace in a clean, well-conceived and executed functional package. Delivery on the system is scheduled for February 1987. ■

"MAKE NOTE"

ACROSS

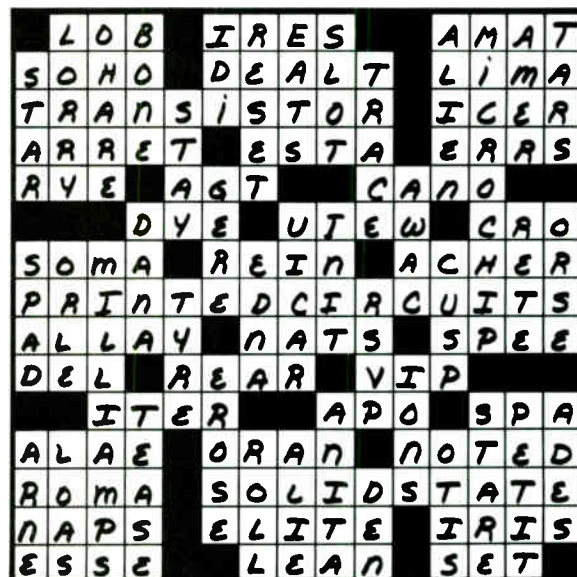
1. Record v/o for film
5. Support
9. Border
10. _____ test
15. Something to grease
16. "I've _____ Around,"
Fats Domino song
17. Colorado Music Festival
18. Bigfoot
19. Makers of 12D & 39A
22. Old dept. of France
25. S.A. monkey
26. Type of relief
29. Pod denizen
30. Musical syllables
33. Their ST computer has a
MIDI port.
35. Drummer Grady _____
37. Wood sorrel
38. Unspoken
39. Output of 19A & 57A
43. Metric measure
44. "_____ Waldmadchen,"
early Weber work
45. Jabba, et al
47. Did a forester's job
48. Beer buzz word
50. _____ de deux
51. Miles Copeland label
52. Noted Hun (variation)
55. "Red _____ for a Blue
Lady"
57. More makers of 12D & 39A
60. Something to do projects
on
63. Behind
64. Dies _____
68. Speaker baffle opening
69. Billiard shot
70. Times immemorial
71. Same as 27D
72. Pulled apart

DOWN

1. Toss
2. Raw material
3. "_____ Miss"
4. Brit. coins
5. Edit and patch
6. Devon river
7. Ht.
8. Old coin

10. Songstress Tillis
11. Cleo's end
12. More output of 19A & 57A
13. Black-fin snapper
14. Dill
20. East, in E. Berlin
21. Lariat
22. Suitable
23. Nuclear pressure-cooker
24. Soaps
26. Type of vocals (pl.)
27. Same as 71A
28. "_____ Yourself
Down," Stephen Stills tune
31. Asian soldier
32. _____ Frehley, former
Kiss guitarist
34. Motor speed indicator
36. The "Old Sod"
40. Famed Lebanese tree
41. _____ Chi
42. Alphabet trio
43. Sequential Inc, formerly
(abbr)
46. Draft grp.
49. Stray
53. British microphone maker
54. Zhivago's girl
56. Weaving willow
57. Opening _____ (they
come before the headliner)
58. What "Jumpin' Jack Flash"
is: A _____
59. Previous, palindromally
60. Baden-Baden
61. _____-MIA
62. Sea bird
65. Caviar
66. Singer _____ Wilson
67. Id _____

Solution to November Mix Words



FEEDBACK

Dear Mix:

I read with interest Peter Bergren's comprehensive article on the use of the Synclavier and the Fairlight III in post-production effects work for film and video. These devices are setting new standards in the industry for efficiency, flexibility, and scope of creative options. Any sound editor with \$200k to \$500k loose change would be crazy not to have one of his very own. I find no fault in Mr. Bergren's coverage of the capabilities of the instruments in the focus of his piece—only in the omission of less costly and equally as useful options that are presently in much wider use.

In my capacity as a freelance sound effects designer, I have been using an Emulator E-II+HD coupled with a Macintosh/Sound Designer to accomplish the majority of the tasks the higher priced systems perform—with equal (or greater) speed and ease of use—for a capital outlay ten to 25 times less.

Yes, there is a difference in sound quality... but I defy you to hear it on a broadcast television program, or even in the midst of a multi-layered film soundtrack. Yes there is less memory available—but that only becomes a problem with lengthy nonrepetitive sounds such as traffic backgrounds, and those are easily recorded and re-played using a Sony PCM-F1. No, there is no provision for internal digital multi-tracking, but digital or analog multi-track tape recorders are a ubiquitous commodity (for the present) and are compatible from studio to dub stage to sweetening room.

There is no doubt that Synclavier or Fairlight can boast more features than the system I endorse, but until the age of a Fairlight-on-a-chip arrives to make these features accessible to the working editor, I submit that there is a very viable alternative for the creation, storage, retrieval, and performance of sounds—ranging from the ordinary to the impossible—within the

budget of most post houses (and many individuals).

Options such as OMI's CD-ROM for the Emulator, and the upcoming SMPTE Q-Sheet from Digidesign further narrow the gap in system power. But the machinery is, after all, only a tool in the hands of an artist. None of these machines are capable of making great sounds on its own—a high degree of skill will produce remarkable results on any of these gizmos.

I thank Mr. Bergren for pointing out the possibilities inherent in this type of sound work. I wanted to be sure that your readers didn't think that using this technology was the privilege of only those with ample financial resources.

Sincerely,
Bill Koepnick
Zound FX
North Hollywood, CA

Dear Bill,

In all fairness, Mr. Bergren's two-part article (which began in the April

—FROM PAGE 160, STEIN-WALDER

essing rack with me, which was warmly greeted by Stein and Walder, who gave me total freedom to use it as I wished as long as it was musical and appropriate to the context. Including processing already in use by Stein, Walder, and Sagebiel, the inventory for the tour consisted of: two Lexicon PCM70s, one Eventide SP2016, two ART DR1s, one Lexicon PCM41, one Yamaha SPX90, and a DOD R-910 DDL. Of these, all but the SPX90, the DOD delay, and one of the DR1s were under my control at the console. Most of these units had dedicated uses, although a few floated during the course of the concerts. More specifically: one DR1 and the PCM41 was for Walder's oboe, the DOD delay performed chorusing on the Prophet 600, one PCM70 provided enhancement (typically rhythmic delays) for DX7 synthesizer ostinatos, the SPX90 was used for Sagebiel's Simmons sounds, and the SP2016 was mostly for piano and Prophet 600 reverb. The second PCM70, second DR1, and sometimes the SP2016 were used for effects on different instruments. (More details on the applications of these instruments can be found in my upcoming article for *Electronic Musician* on using digital signal processing in sound reinforcement.)

Most of these devices are MIDI con-

trollable, which is what enabled me to use such a large number and still keep things reasonably under control. The PCM70s and the DR1 at the console were under control of a Yamaha MCS2, a very small and lightweight MIDI control station with a number of wheels, sliders, footpedals, and buttons that are assignable to virtually any MIDI controller number. At the time of the tour, the SP2016 had no MIDI capabilities (I have since received a MIDI update for it), and the DR1 was only capable of program changes. (ART has now released software that allows real time parameter control of the DR1 via MIDI.) My use of the MCS2, therefore, was to change programs on the PCM70s and the DR1, and to control parameters of the 70s in real time. The PCM41 was used as a very long, recirculating reverb predelay for Walder's DR1, which yielded a spacey, Pat Metheny-esque sound. At various points in the concert the unit was manipulated to alter the effect or create bizarre sounds. The use of these processors developed to the point that Walder and I performed an improvised duet of oboe and signal processing on several dates. The need to redirect a limited number of effects sends numerous times during the show remained an unwieldy point, and I hope in the future to incorporate a MIDI-controlled

audio patchbay, such as that made by Ibanez, to ease the situation. Obviously, a great deal of advance programming work was required to implement this setup.

Onstage, MIDI was also in heavy use, as is described above. The only application not already noted there was that Stein's MSQ700 sent program changes to Walder's onstage DR1 in addition to controlling his keyboard setup.

Conclusion

The extensive use of electronic instruments, signal processing, and especially, MIDI in live performance, presents some special problems, but allows a number of things hitherto not possible in such a context. Electronic drums are definitely much easier to deal with than miking acoustic drums. However, mixing acoustic and electronic instruments onstage presents a formidable challenge requiring substantial analysis and experimentation to overcome satisfactorily. It is certain that some of the subtleties of acoustic instrument sounds are lost in this context, but their basic strengths of expression remain and can be enhanced by the musical use of modern technology; and expression, after all, is the bottom line in any live music performance. ■

—FROM PAGE 196, *FEEDBACK*

'86 *Mix* and concluded in the September '86 issue) focused on Sound-Droid, Fairlight and Synclavier—three admittedly high-end systems. However, lest you think we have ignored some of the more cost-effective sampling routes, check out tests of the Emulator II/Sound Designer package (January '86) and the Mirage/Sound Lab system (June '86), as well as our intensive sampling primer that appeared in the May and June issues. However, your point is well taken: in any creative endeavor, the human element is far more important than the technology involved. Note: Bill Koepnick is the owner of Zound FX, whose credits include 1986 feature films *Last Resort* and *Killbots*; commercials and promos for Cannon Films; and *Dumbo's Circus* for the Disney Channel.

—FROM PAGE 171, *ELP*

wasn't right because Mike Giles and Ian McDonald were such a substantial part of the creative form of the group, that I felt it would never really be the same again. So I chose at that time to move on to do something else. And it was at that time that I met Keith. He also was at the point where he wanted to move on and do something else. So, it was good timing.

Mix: *I heard once that Emerson, Lake & Palmer was going to work with Jimi Hendrix and that the band was supposed to be called H.E.L.P., but, of course, Hendrix died before it could happen. Is that true?*

Lake: That is, in fact, true, yes.

Mix: *That's amazing. Did you ever get to rehearse or jam with him?*

Lake: There was a rehearsal set up to take place, but unfortunately, Jimi died just before it, so that was that. It was very sad because it could have been a great thing.

Mix: *How do you look back today on the heyday of ELP and the tours of '73 and '74. Your tours were always such wild rock spectacles.*

Emerson: There was a hell of a lot going on. There was just so much to get done, it seemed at that time. And suddenly, everything seemed to be possible because I was playing with musicians that could handle whatever I put at them. And we were a very competitive band; I think that's reflected in some of the music. I think now the latest stuff is a lot more calm and a lot more direct. And if I had to criticize the earlier stuff, it's that I think we were trying to do too much too soon.

Get it all in there, you know? The accent now is really on control. The most memorable things are the ones with the least notes in them.

Lake: Well, I don't look back on them; I look forward to them, because I believe the pinnacle of this group has not yet arrived. I'm sure it hasn't. Some of the stuff we're doing is nothing short of staggering. I'm sure it'll shock people and give them a great deal of pleasure at the same time.

Mix: *Why did the group break up after Love Beach?*

Emerson: It didn't really break up, so much as it dissipated. We finished doing the *Love Beach* album in the Bahamas and nothing was really said. I mean, we didn't sit down or fall out or have a huge, big argument. Carl went back to England. I stayed in the Bahamas a bit and Greg went back to England and did a solo album. I chose the time to get into film scores and to get into another new musical career.

Lake: I think we were the victims of overexposure and over touring. We just did too many live shows and we wanted to stop, but at that time the record company didn't want us to stop, they wanted us to keep recording. And we were basically pressured into making that record, which we didn't want to do.

Mix: *Keith, outside of the Nighthawks soundtrack, what else did you work on between Love Beach and this album?*

Emerson: I did a solo album for the Italian market called *Honky*. I did two Italian film scores—one called *Inferno* and another thing called *Murder Rock*. And another one in Japan. I thought *Nighthawks* was quite good.

Mix: *Greg, why did you leave the band Asia so quickly?*

Lake: The story was that they had thrown out Johnny just before this live Japanese satellite broadcast [*Asia In Asia*]. And they called me up in a panic and told me it was too late to cancel the show, they had to do it, and asked would I play for them and do the show. And I agreed to do it, because Carl called and said, "Look man, we've got a problem here and we need some help." Out of friendship to Carl, really, I went and did the show for them. And then it was discussed whether I would join the band or be in the band, and basically my attitude toward that was that they were going in a very unhealthy direction musically. That is, they were following this sort of corporate rock, commercial hit single type direction. And I basically didn't want to move in that direction with them. And we fell out at that point.

Mix: *How long did you work at reforming ELP?*

Emerson: I guess about six months or so. Originally Greg and I were working on compositions of mine. Greg was writing the lyrics and we were in the studio and we were using session musicians to start off with. But, it soon became obvious to us that you don't get the loyalty with session musicians. So, we began looking for a more permanent setup. I'd known Cozy for a long time, but I'd never played with him. And he made it known, through a third party, that he was becoming disinterested in the band that he was in. What attracted us was his double bass drum technique, which, for a three-piece band, can fill out the sound, a lot.

Mix: *Cozy has a much different style than Carl. Was it hard for you to get used to his playing?*

Lake: No. He's a very feelingful drummer and a very good technician.

Mix: *In Cozy's case, one might say that less is more. . .*

Lake: That's true. That's a very good observation. He probably plays a lot less than Carl, but it's done more powerfully.

Mix: *All three of you have done solo albums. Will this trend continue within the framework of the band?*

Emerson: I think it's very unlikely. I've got all that out of my mind, so to speak. I've done my solo albums and I've done my film scores. I may consider a film score in the future, if the timing is right within the framework of the band. But, it would have to be a good film. I got a little disenchanted with all the movies which were coming out. They were really a load of rubbish.

Lake: I don't think so, but we may entertain doing a musical of sorts. We may do it and tour it. A touring musical may be something we're interested in.

Mix: *Do you see Emerson, Lake & Powell as a band that will stay together for a long time?*

Lake: We hope so. We see this as a project that at least we could do as long as we feel like doing it. We're not only one of those one album, one tour, wonder things. We're already thinking of our next album at this point.

Emerson: Well, I hope so. We didn't get together to make one album. We got together to make records and play and to tour. And I think as long as we appreciate each other's space, then the band could last quite some time. ■

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DECEMBER 15

MARCH

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- Southeast Studios Directory
- Equipping the Digital Studio

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JANUARY 7

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JANUARY, 1987

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THE SHURE WIRELESS



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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