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THE RECORDING INDUSTRY MAGAZINE

Mix

Interview: Hal Blaine

Tape-to-Disk
Special Issue

Listings: Mastering,
Pressing & Duplication

CD Plant Tour
AT&T Bell Labs'
Max Mathews
Mastering Forum
Ely



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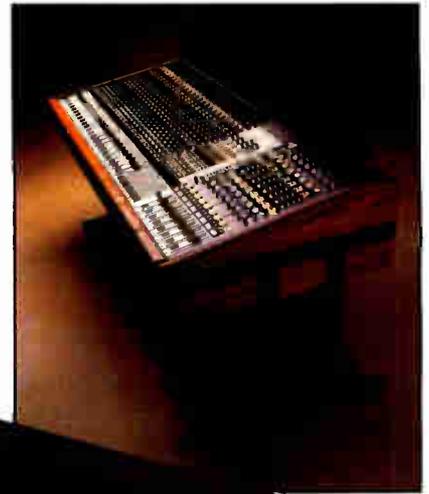
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Introducing Harrison's TV-3, PRO-7 and TV-4, the broadcast consoles you've been waiting for:

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**Harrison**



Top:
Fantasy Studios Mastering
Berkeley, CA
Photo by: Phil Bray

Bottom:
Rolling Out the CD
Photo courtesy Polygram
and Ron Foreman



With all the amazing electronic keyboards today, most of us almost take the notion of music synthesis for granted. In "Music From Mathematics," writer Larry Oppenheimer examines how the many accomplishments from Max Mathews and the Bell Labs team have influenced music over the years. Page 16.

DEPARTMENTS

- 5 FEEDBACK
- 6 CURRENT
- 8 SESSIONS
- 100 LUNCHING WITH BONZAI: HAL BLAINE by Mr. Bonzai
- 108 PREVIEW
- 151 CLASSIFIEDS
- 154 ADVERTISERS' INDEX

LISTINGS

MASTERING, PRESSING AND TAPE DUPLICATION FACILITIES

- 68 EASTERN U.S.
- 75 CENTRAL U.S.
- 84 WESTERN U.S.
- 96 OUTSIDE U.S.

VIDEO

- 140 INTERACTIVE by Carole Berkson
- 142 VIDEO NEWS by Mia Amato
- 144 MUSIC VIDEO PRODUCTION: HDTV UPDATE by Lou CasaBianca
- 148 VIDEO INTERFACE by Neil Weinstock

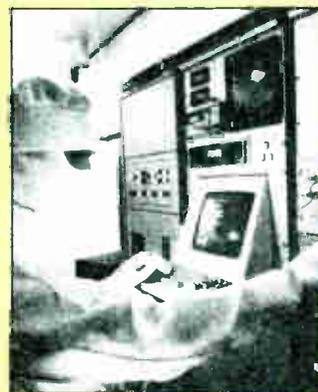
AUDIO

- 16 BELL LABS: MUSIC FROM MATHEMATICS by Larry Oppenheimer
- 30 BOB BRALOVE IN WONDERLAND by Elizabeth Rollins
- 32 RECORD MASTERING ROUNDTABLE by Tony Thomas
- 42 CBS/SONY CD PLANT by Gregory DeTogne
- 49 AUDIO APPLICATIONS by Ken Pohlmann
- 54 CASSETTE DUPLICATION IN THE '80s by George Petersen
- 64 CASSETTES VS. RECORDS: LABEL EXECS SPEAK OUT by Blair Jackson
- 115 SOUND ON STAGE by Robin Tolleson
- 118 FIELD TEST: MONSTER MICROPHONE CABLES by Bob Hodas
- 122 PRODUCER'S DESK: RUPERT HINES by Bruce Pilato

MUSIC

- 120 SESSION PLAYER by Carol Kaye
- 124 MUSIC NOTES
- 137 PLAYBACK

While still in its infancy, the Compact Disc is now beginning to show signs of becoming a potent force in the industry. Greg DeTogne tours the new CBS/Sony CD plant, page 42. Ken Pohlmann chats with Emiel Petrone of the Compact Disc Group on page 49; and on page 32, several top L.A. disk mastering engineers talk about the CD with Tony Thomas.



This issue features our annual listings of mastering, pressing and tape duplication facilities, which begin on page 68. The cassette medium is now more popular than ever, and George Petersen checks in on this growing industry on page 54, while Blair Jackson talks to label executives on the vinyl vs. cassette issue on page 64.

The times have changed, and sounds have changed as well for Texas roots-rocker Joe Ely, who recounts how computers and music synthesis changed his outlook for *Hi-Res*, his recently-released fifth album. Anthony De Curtis' conversation with this self-described "digital hillbilly" can be found on page 124.



AN AUDIO TAPE MACHINE FOR BOTH SIDES OF YOUR MIND

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Once you, the engineer, have put its servo-controlled and pinchroller-less tape guidance system through its paces, no other will do. And when the artist in you experiences the MTR-90's sound, you'll know its superlative electronic specifications will never compromise your recordings. And when the both of you need total session control, the MTR-90 is equipped with a full-function remote, and an optional autolocator.



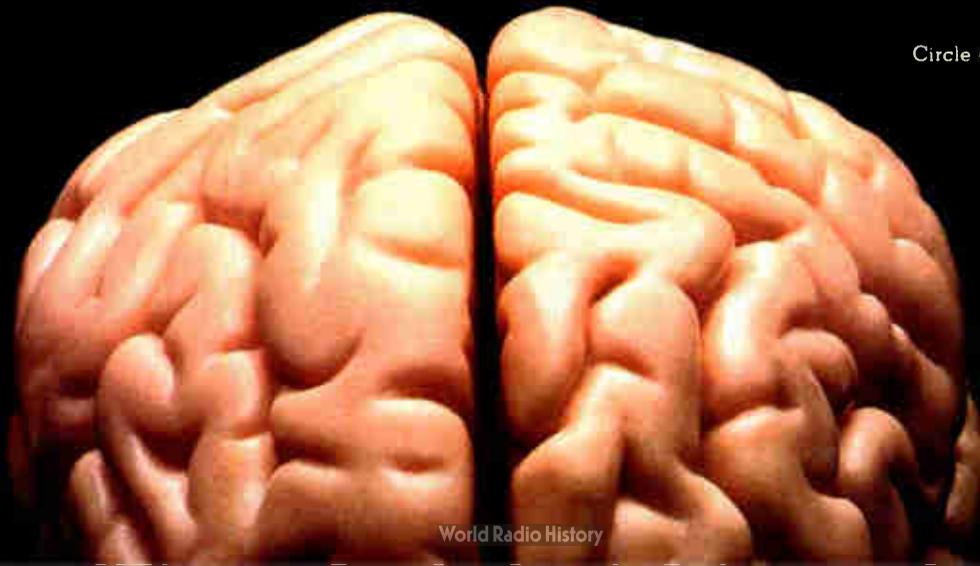
Post-Production professionals will quickly discover that the MTR-90, when equipped with Otari's new EC-101 chase synchronizer, is absolutely the finest performing tape recorder in the world—nothing else even comes close.

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Dear *Mix*:

Having just returned, exhausted, from the AES convention, I would like to mention a small problem that I encountered with some of the technical exhibits. I came to this convention with some specific equipment interests in mind, and, for the most part, found the displays and exhibit personnel very informative. However, when attempting to evaluate certain pieces of gear (digital reverberators, as an example), I was rather disappointed, and occasionally annoyed, at the demonstration material provided. In most cases, input to the reverbs came from either a cassette or reel tape—and often from a live microphone. This is perfectly acceptable. However, the *content* on some of these demo tapes was often nearly useless.

The most common problem was that the tapes did not contain musical material that reflected what users normally send to their reverb units! In a few cases, there were no percussive sounds available. In other cases, the drums were recorded as a full kit—an unlikely composite signal for a multitrack studio's reverb to see. Some tapes had no (or very poor) vocal selections, and others had no orchestral music. Still others had segments with different sounds panned to each side, or with tracks that obviously contained leakage from another source. Worst of all, one major manufacturer had tapes with audible distortion on some tracks.

If manufacturers are going to demo their wares to potential customers, the demo should be *applicable* to what those customers will be doing. Certainly I would not choose a reverberator solely on what I heard on the convention floor—an imperfect environment at best. But based on what I heard, I would eliminate some units from my evaluation, and rank others quite highly, and I cannot clearly tell whether this is due to the quality of the unit, or the quality of the demo!

My suggestion would be to follow the example of one manufacturer (remaining nameless) whose reverb units I found to be very pleasing. This company used headphones for their demos—probably the best choice in the noisy convention environment. Their display had an open mike available at each unit

And, their demo tape contained a wide variety of clean, interesting, and *pertinent* tracks. Undoubtedly some of my positive impression was due to the quality of their device. But the quality of their demo unquestionably highlighted the strengths of their product. It was easy to tell if their unit would suit my needs!

It is to each exhibitor's advantage to assemble a demonstration of this calibre. It need not be expensive, just useful. If the company does not employ someone who can do this, then I suggest a consultant be hired. I know one such consultant personally . . .

Sincerely,
Eric Wenocur
Roar Productions
Columbia, MD

Dear *Mix*:

I have just finished reading your article about the making of the film *Stop Making Sense* by the Talking Heads. I enjoyed the article very much, however, I feel I must write in to correct a few discrepancies. First of all you refer to Warner Hollywood Studios' re-recording mixer Steve Matlow. The correct spelling is Steve Maslow, one of the hottest music mixers in town, having won two Academy Awards in a row, for *The Empire Strikes Back* and *Raiders of the Lost Ark*.

Also the article mentions that Westlake Audio supplied a Magna Tech 9-F. In reality, Westlake did not supply the 9-F. Westlake supplied the BTX Shadow synchronizing equipment as well as a lot of customer support, help at a moment's notice and good vibes.

The 9-F was actually supplied by Alex Jepson of Entertainment Technology, who is Magna Tech's representative in Los Angeles, and assisted with the lock-up signal flow.

I would like to thank Chris Carey and John Sacchetti for all their help. Other names that should be included for team assistance in the project are John Bonner, chief engineer at Warner Hollywood Studios, Serge Gravel and James Lucas, both from BTX.

Sincerely,
David "Doc" Goldstein
Warner Hollywood Studios

CURRENT

Mix Establishes Pro Audio Awards

The publishers of Mix Magazine announced at the recent AES Convention the establishment of an annual awards program to recognize excellence in the professional audio industry. From the results of an industry-wide balloting procedure, Mix will present more than 50 Technical Excellence and Creativity Awards to individuals and/or organizations who have made outstanding contemporary contributions to the professional sound industry.

The Mix Magazine "TEC" Awards ceremony will be held in New York in October, 1985. In addition to the awards ceremony, a Professional Audio Hall of Fame will be announced with the names of the first 25 inductees, also to be selected from industry nominations.

Three divisions for "TEC" Awards have been established: Outstanding Technical Achievement, Outstanding Creative Achievement and Outstanding Institutional Awards. Within the first division, Outstanding Technical Achievement, there are six awards categories: Audio Recording, Film Sound, Acoustics, Sound Rein-

forcement, Broadcast Sound and Musical Instrument Technology. The second division, Outstanding Creative Achievement, includes the following awards: Recording Engineer, Recording Producer, Mastering Engineer, Film Sound Engineer, Recording Session Musician(s), Recording Session Vocalist(s) and Sound Reinforcement Engineer (live sound).

The third division, Outstanding Institutional Awards, includes awards for these categories: Recording Studio, Mastering Facility, Sound Reinforcement Company, Record Company, Recording School or Program and Remote Recording Facility.

Details on the selection of industry panel participants, nomination and voting procedures, and award time period are to be announced in subsequent issues of Mix.

PTA Urges Record Rating

The National PTA has called for all recording companies to voluntarily label records, tapes and cassettes featuring lyrics some consumers might consid-

er to be profanity, sex, violence or vulgarity. A letter sent to record companies by National PTA president Elaine Stienkemeyer asks them to "protect consumers' right to know what they are buying" by rating audio material and labeling accordingly.

The PTA is suggesting recording companies establish panels of consumers and industry representatives to determine what language might be considered objectionable to some consumers. Stienkemeyer said the PTA would willingly assist in any way it can, but would not attempt to make such determinations for the industry.

DASH Format Reaffirmed

The three manufacturers of digital audio recorders who last year agreed on one common stationary head recording format, Matsushita Electric, Sony Corporation and Willi Studer, met at the October AES Convention to reaffirm their commitment to the format and to worldwide digital audio equipment compatibility. Allaying fears that there was a split in the camp, the DASH committee announced an agreement on a revised symmetrical track geometry, "a move designed to increase the format's universality." According to Studer's Roger Lagadec, "The equipment from the different manufacturers features a healthy diversity in engineering solutions, but the prime objective of compatibility has still been maintained and achieved."

NARAS Offers Plaques for Grammy Studios

Recording Studios involved in Grammy-winning recordings may now display a special plaque noting their contributions to the award, according to a new program announced by the National Academy of Recording Arts and Sciences. The award plaques can be ordered from NARAS, 303 N. Glenoaks Blvd., Suite 140 MEZ., Burbank, CA 91502.

notes

Quad Eight/Westrex has moved into their new International Headquarters at 225 Parkside Dr., San Fernando, CA 91340, phone 818/898-2341 and has also announced the opening of their Eastern Sales office at 2400 Crestmoor Road, Suite 327, Nashville, TN 37215, with *David A. Purple* as director of sales. *Applied Research and Technology, Inc.* has been licensed with many of the former engineers and managers of the now defunct MXR corporation. ART has purchased the MXR brand name and will be located at 215 Tremont St., Rochester, NY 14608. *Flanners Pro Audio*, based in Milwaukee, WI, has opened a Chicago branch office headed by *Joe Stopka*; phone 312/451-1440. *Gary J. Stanfill* has been appointed president of *Cetec Vega*. *Sam Chavez* has been given the title of Cinema Products Administrator at *Dolby Laboratories*. *Hy James—The Audio Professionals* re-

cently held a pre-AES product preview where over 400 attendees witnessed over 30 manufacturer demonstrations. A three day recording studio design workshop, sponsored by *Synergetic Audio Concepts* was held at Acorn Sound Recorders in Nashville, September 11 through 13 centering on LEDE acoustical technology. The San Francisco chapter of the *National Academy of Recording Arts and Sciences* will be holding "Television Stereo: An Audio for Video Workshop" on December 15. Call 415/777-4633 for more details. *Philip J. DeSantis* has joined *Sony's* Professional Audio Division as national sales manager. *Paul Berliner* has been appointed teleproductions manager at *Ampex Corp.* *The Nashville Music Association* is presenting this year's Master Award, to honor studio musicians and vocalists to *The Jordanares*. ■

TAKE A CLOSER LOOK AT APPROPRIATE TECHNOLOGY



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S E S S I O N S

NORTHEAST

Loose Ends, a talented group from London, whose first album went platinum, was in at *Alpha Studios* in Philadelphia working on their second project. At the board were **Bruce Weeden** and **Al Albertini**, assisted by **Remo Leomporra** and **Richard Welter**. Jazz guitarist **Stanley Jordan** recorded his debut album for Blue Note/Capitol Records at *Songshop Recording in New York City*. **Al DiMeola** produced with **James Farber** engineering, **Kenny Florendo** assisting. At *Planet Sound* in New York City, **Gwen Guthrie** is recording her next project for Island Records, produced by Guthrie and **Steve Stanley** with Stanley at the board and **Tom Durack** assisting.

Recent activity at *Skyline Studios*, New York City, included producers **Alan Nichols** and **Ralph Shuckett** recording a soundtrack for Robert Altman's new film *O.C. & Stiggs*. Engineer **Stephan Galphus** was assisted by **Francis Manzella** and **Mario Rodriguez**. Also, British chart-busters the *Bronski Beat* recorded tracks for Polygram Records with producer **Mike Thorne**. **Carl Beatty** engineered with assistance from **David Young**. At New York City's *Unique Recording* producers **Mark Liggett** and **Chris Barbosa** cut tracks and mixed *Shannon's* second album for Emergency Records. **Peter Link**, owner of *Westrax*, New York City worked on some of the tracks for songs he has written for the new *Jenny Burton* LP on Atlantic Records. Recent happenings at Arthur Baker's studio *Shakedown Sound* in New York City included funk veteran **Juni Morrison**, formerly with the Ohio Players and P-Funk doing the final mixes of his new album *Evacuate Your Seats*. Also, **David Bowie's** 12-inch "Dancing With the Big Boys" was remixed by **Arthur Baker** and edited by the Latin Rascals **Tony Moran** and **Albert Cabrera**. Singer/songwriter **Matthew Singh** was in at *Inner Ear Recording*, Queens, New York, upcoming Christian-rock release. Also there were producers **Simino-Natale**, recording their new project *Just One More Time* due for independent release in January. *The FIXX* took a break from their American tour to return to *Workshope Recording Studios* in Douglaston, New York to work on some new material with engineer **Bob Bengston**. And producer **Marty Pekar** and engineer Bengston finished mixing the *Jive Five's* latest LP *Way Back* for Rounder Records.

Normandy Sound of Warren, Rhode Island celebrated one year of having at least one hit record on at least one Billboard Chart for 52 consecutive weeks (Tom Browne: *Rockin' Radio*, Steve Smith: *Vital Information*; Jeff Lorber: *In the Heat of the Night*, and congratulated their affiliated companies, Arnold Freedman Management and Oasis Productions, for John Catterly & the

Beaver Brown Band's album *Eddie and the Cruisers* going platinum. At *Secret Sound Studio* in New York City, **Suzy Sloane** completed tracks and was mixing for MCA Records. *Sundance* and *Dana Thomas* produced with **Warren Bruleigh** behind the board and **Jim Lyon** assisting.

SOUTHEAST

Recent activities at *JBS Studios* in Atlanta included **Duane Hoover** finishing his solo double album to be released on an independent label. At *Music Mill* in Nashville **Stan Silver** did some mixing on *Donna Fargo's* next single with **Jim Cotton** engineering and *Alabama* was in laying tracks for their new album with **Jim Cotton**, **Joe Scatfe** and **Paul Goldberg** engineering. This is a **Harold Shedd/Alabama** production. **Glen Campbell** was in Nashville's *Woodland Sound Studios* for Word Records with **Ken Harding** producing and **Rick McCollister** and **Ken Criblez** engineering. **Neil Young** was also in laying tracks with producer **Elliott Mazer** and independent engineer **Gene Eichelberger**. At Atlanta's *Songbird Studio*, **Ricky Keller** is writing and producing the soundtrack for *Summertime Blues*, a William Olsen production. **Rich Head** is engineering the sessions. And **Frank Fabiszewski & Hurricane** finished laying tracks for a demo.

At *Morrisound Recording* in Tampa, Florida, 20th Century Fox came in to record and mix part of the soundtrack for the movie *Cocoon* directed by Ron Howard and filmed in St. Petersburg. **Tom Morris** engineered. Air City recording artists *Unique Blend*, and **Ken Caincross** of HamStar Records completed single releases at the *Sound Room* in Fort Oglethorpe, Georgia. Other projects include **Jeff Day**, *Tourist*, **Tina Powers**, and **Perry Hodges**. The sessions were all handled by **Steve Mullinix** engineer/producer. Recording at Island's *Compass Point Studios* in Nassau, The Bahamas in October were RCA recording artists the *Eurythmics*...

NORTH CENTRAL

Recording activity at *Studio A*, Dearborn Heights, Michigan included **Dave Levine**, cellist for the Detroit Symphony Orchestra, cutting a self-produced track, and guitarist **Rick Rouse** continuing work on an EP. **Jim Vitti** behind the console. *Ambience Recordings* of Farmington, Michigan successfully completed projects, both locally and nationally during recent months, with chief engineer, **Gerard Smerek**. Working in conjunction with West Coast studios, *Ambience* recorded

overdubs for **Bob Seger's** "Understanding," used in the soundtrack of *Teachers*, as well as working with Bob on his upcoming album to be released soon. Also, final edits on the first *Flash Kahan* album, which was partially recorded at *Ambience*, were completed. At *TSI Recording*, Newton Falls, Ohio, the **Bob Yazz Band** completed tracks for his upcoming EP. **Mike Talanca** and **Joe Huddek** engineered and produced the project. The tracks were mixed at *EDR Beachwood*, Ohio. *Five Mighty People* recently did a remix of their tune "Love Don't Take at 3001 *Recording Studios* in Columbus, Ohio. The mix, for their upcoming video, was produced by **Jeff Gastineau** and guitarist **Ernie Lowther**. At *Chapman Recording Studio* in Kansas City **Ray Heard**, and the group *West Point* finished up their latest LP, *High Steppin*. **Larry Lacy** produced the LP. **Mike Frazier** engineered. *The Blue Wisp Big Band* of Cincinnati was in recording their fourth studio album at *QCA Recording Studio*, **Ric Probst** engineering. *Champaign* completed their third album for CBS Records at *Creative Audio* in Urbana, Illinois. It was produced by themselves with **Jonathan Pines** engineering. At *RMJ Recording Studio* in Detroit, Michigan **Thomas Whitfield** was in producing a new album on *Vanessa "Bell" Armstrong* for the Benson Company as a follow up to her Grammy nominated album with **Warren Woods** at the board. Also at HMI Capitol Records recording artist **Maze** were in doing tracking for their forthcoming album with **Frankie Beverly** producing and **John Jaszcz** engineering with **Sparky Lawson** assisting.

NORTHWEST

Transparent Recordings, of San Francisco, California, spent the month of August in Colorado, recording the Telluride Chamber Music Festival. An LP entitled *Music From Telluride* was released this fall on the *Transparent Recordings* label. **Lolly Lewis**, **Ed Chenoweth**, engineered. The action has been around the clock at *Starlight Sound* in Richmond, California recently and mostly of the heavy metal variety. *Dammaj*, *Dirty Looks*, *Castle Blak* and *Paris* were all in the midst of loud and nasty album projects. On the slightly lighter side were projects from the *Marin All Stars* produced by **Mike Blakeman** and **Gayle Marie** with talented keyboardist **Mary Watkins** producing. At *Avid Productions* in San Mateo, California were blues greats **Deacon Jones** (of the John Lee Hooker band) and **Ken Baker** (of the Mark Ford band) cutting sax tracks for an album project. The tracks quest star **Elvin Bishop** on slide guitar. At *Russian Hill Re-*

—PAGE 136

GOOD NEWS

Affordable signal processors by DOD Electronics. Our commitment to high quality, low cost signal processing equipment continues with our R-825 Compressor-Limiter, R-835 Crossover, R-845 Reverb and R-855 Mixer.



R-825 COMPRESSOR-LIMITER
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 Attack and release time controls.
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 18db/octave, state-variable butterworth filters.
 Crossover points, 100Hz to 10KHz continuous.
 Signal to Noise > 90db*



R-845 REVERB
*Four band EQ with pre-limiting.
 Wide range input and output controls.
 Adjustable drive and mix controls.
 Produces a smooth and natural sound.*



R-855 MIXER
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 Mono and stereo effects return.
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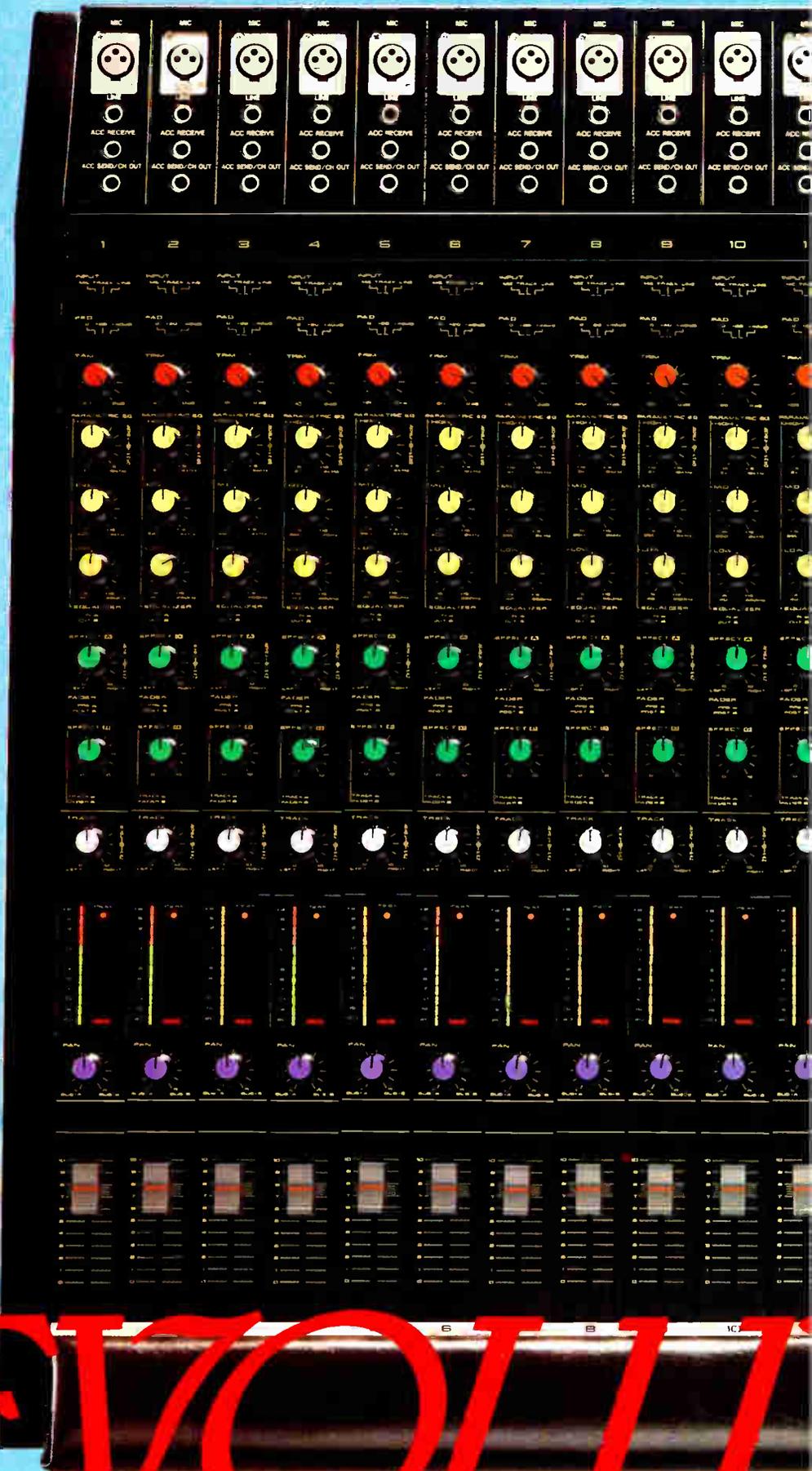
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REVOLUTION

An Open Invitation to All Mix Subscribers:

Announcing the Mix Technical Excellence and Creativity AWARDS

This is your opportunity to recognize, nominate and vote for those people, products and institutions which, in your opinion, represent the highest levels of Technical Excellence and Creativity in the professional audio industry. The "TEC" Awards, to be presented at a ceremony in October of 1985 in New York City, will be a result of your voting. We are asking you to give serious consideration to those who, in the past year, have influenced and positively affected your work and professional life in the industry.

Awards will be given in the following categories:

Outstanding Technical Achievement

- Recording Technology
- Film Sound Technology
- Acoustic Technology
- Sound Reinforcement Technology
- Broadcast Sound Technology
- Musical Instrument Technology

Outstanding Creative Achievement

- Recording Engineer
- Recording Producer
- Mastering Engineer
- Film Sound Engineer
- Recording Session Musician(s)
- Recording Session Vocalist(s)
- Sound Reinforcement Engineer

Outstanding Institutional Achievement

- Recording Studio of the Year
- Mastering Facility of the Year
- Sound Reinforcement Company of the Year
- Record Company of the Year
- Recording School or Program of the Year
- Remote Recording Facility of the Year

Please make your opinions heard. Watch for further details and the nominations ballot in your January issue of Mix.
Join us in honoring Technical Excellence and Creativity.

THE RECORDING INDUSTRY MAGAZINE

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Mix

AMPEX GRAND MASTER[®] 456

Success in the professional recording business comes from using the best—the best talent, the best music, and the best tape.

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Confidence that comes from consistency.

Proven consistency. Proven by testing every reel of Ampex Grand Master[®] 456 end-to-end and edge-to-edge, to make certain you get virtually no

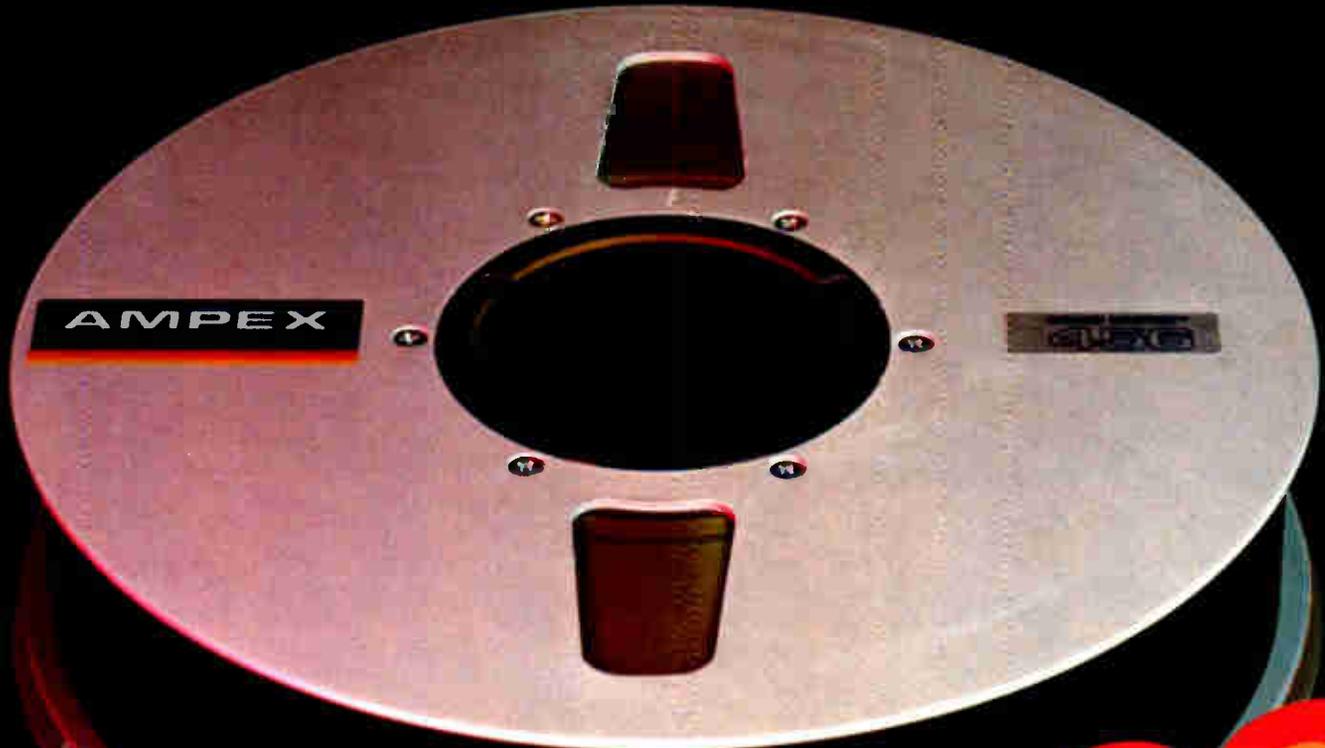
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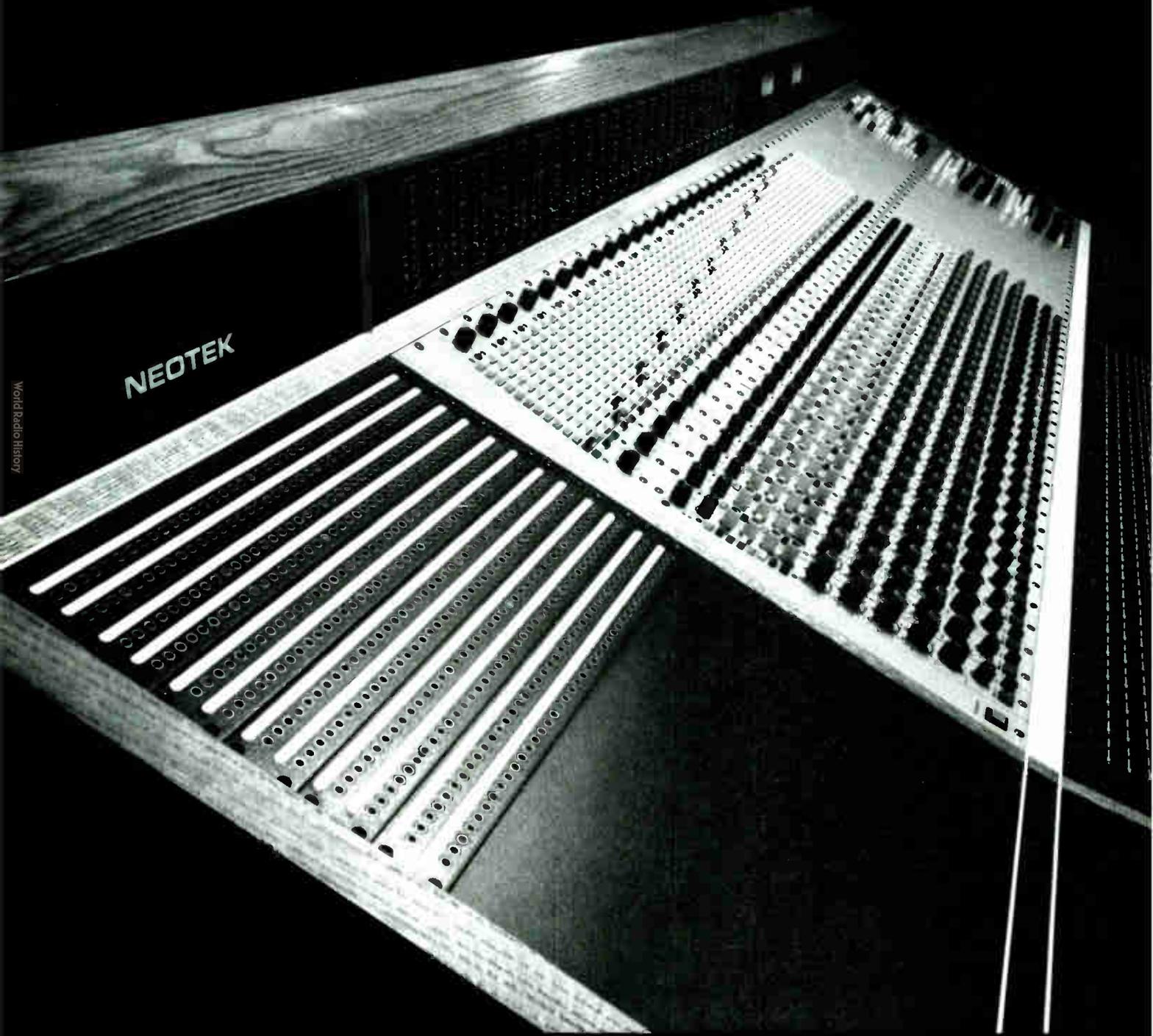
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Minimum path design NEOTEKs employ more complex circuit designs than other consoles, yet they end up with fewer components in the main signal paths. Their state variable equalizers are highly sophisticated, yet critical parameters are less sensitive to component variations than in simpler designs, they are just as quiet, and they are far more stable; the result is better sound at only slightly higher cost. Compared to a Series III, one comparable console when recording and mixing passes a track of audio through 53 more op amps, 49 more unbypassed electrolytic capacitors (none in the NEOTEK), and wastes over 106dB more excess gain. Of course the NEOTEK sounds better!

High speed circuits The rule for circuit speed is 1 volt/microsecond for each peak signal volt. NEOTEK consoles are the only ones which come close to this figure; others trade adequate speed for lower parts cost. The real trick is to achieve high speed without slew limiting, but since NEOTEKs use circuits with power bandwidth in excess of small signal bandwidth, they can never be forced to actually slew. Full output bandwidth from mic preamp input through equalizer and fader to bus out is over 40 kHz, and high frequency squarewave response shows purely exponential signal rise and fall without a trace of slewing, ringing, or other instability. The result is absence of TIM or SID, greater stability, and the clear, sweet high end which distinguishes NEOTEK consoles.

Solid state switching The Series III uses FET switches for master status control, but fear not. They are a unique design using discrete devices driven from a separate high voltage supply. At the last AES show, an internationally famous audio critic and recordist guessed that a B&K mic demo was made direct to digital two-track; it was actually made on a Series III . . . now that's transparency. The ramped FET mix mutes silently lift channels completely off the stereo buses. They are far more quiet than VCAs, relays, or mechanical switches, and leave the unweighted output noise below -96dB.

Logic controlled mutes NEOTEK consoles provide full professional features without requiring an automation system or VCAs. Series IIIs provide two logic groups for the channel mutes. There is an in-place solo mode in addition to stereo and PFL solos, and it can effect either or both groups. Another logic system sets up a limitless number of grouped mute/unmute events to be enacted by a single switch.

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Music from mathematics

THE CONTRIBUTIONS OF BELL LABS' MAX MATHEWS

by Larry Oppenheimer

You sit in wonder as you listen to your digital synthesis system run through a final 24 track playback of the composition you just finished storing onto disk drive B. Not only is it exactly the way you wanted it to sound, but you are getting the thrill that comes with knowing that you and your instrument have taken another step along the cutting edge. You ponder the synthesizer in front of you and recall that you have only had it for a few years, and it was only put on the market a year or two before that. The question forms in your mind: How long have people been making music with computers? I mean (you think), when did it first occur to someone to hook a speaker up to a computer?

In 1957, actually. But it didn't happen at some progressive university. Not in some inspired hacker's basement, either. At the time, the only computer in the world which was both powerful enough to do the job and reasonably accessible was located in a display window at IBM World Headquarters on Madison Avenue in New York. So Max Mathews rented some time on the IBM 704 in the window, took the idea which had occurred to him, and crunched some historic numbers in full view of any who cared to watch.

In 1984, he is here in Murray Hill, New Jersey, at the same AT&T Bell Laboratories building he worked at then, with an anorexic-looking violin held (and played) cello style, between the legs. He smiles and sits in wonder as he listens to his digital synthesis system run through a small segment of a score which has been prepared as a demonstration of his current musical interest: interfacing personal computers with real-time digital



Lawrence Rosler and Max Mathews (c. 1966) of Bell Laboratories compose computer music using a new graphical language they developed. The new language enables a composer to draw a musical score directly on a cathode ray tube with a light pen.

synthesizers. Back at d shelves of computers, audio gear, and objects which in one way or another resemble musical instruments fill the majority of the available space, giving the impression that the small room can't decide whether to be a research laboratory or a recording studio. Here, he is at home, after nearly 30 years of evenings and weekends spent in this room and others like it.

Max V. Mathews arrived at Bell Laboratories in 1955, straight out of graduate school at MIT. He walked into a world where the halls were no longer filled with students, but with Nobel laureates and similarly celebrated scientists. Bell Laboratories has long been recognized

as one of the world's leading research facilities, having consistently discovered new directions in tele-communications technology and virtually every conceivable related field. Often, work done at Bell Labs has uncovered ideas that go far beyond a project's original scope. Stereophonic sound, for example, was invented at Bell Labs in the '30s.

Mathews went to work under John Pierce, whom he describes as "probably the most brilliant and famous engineer ever alive in the world today," developing methods of encoding speech in the digital domain. "Those were the days when digital computers were first becoming powerful enough to use for inter-

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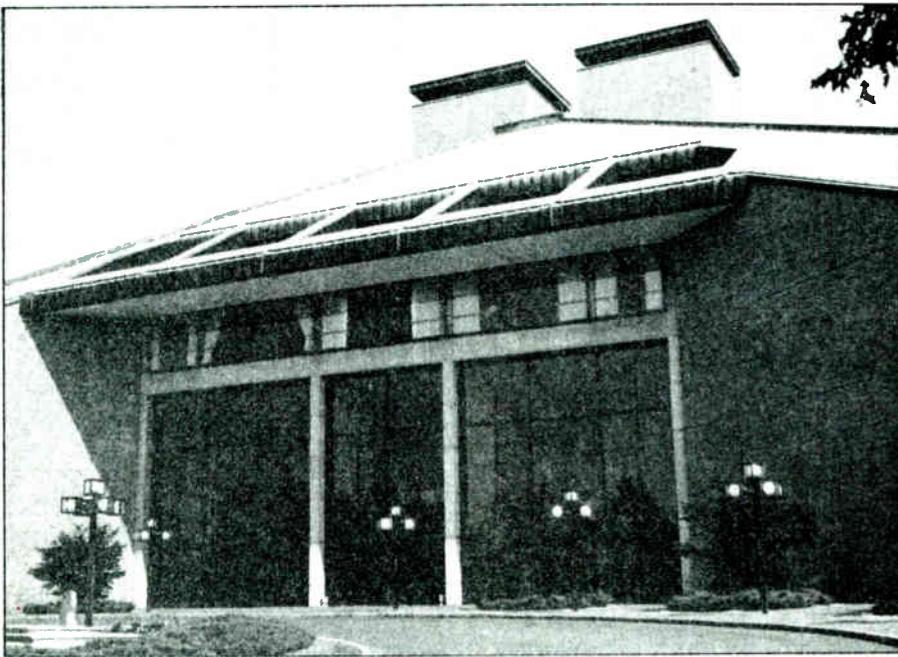
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AT&T Bell Labs in Murray Hill, NJ.

esting problems," Mathews relates. "I figured out ways to use the digital computer to simulate speech coding. The computer was just wonderful because we could study encodings in a month or two which would take us years to build the electronics to do, and you could do things that were just unthinkable to do in any other way." This was the beginning of the digital speech processing systems which now carry an increasing share of the world's speech transmissions every day.

"The computer music was an outgrowth of what was originally speech technology. The reason that it is related to speech technology is that what you need is ways of converting sound into numbers, and numbers back into sound: digital-to-analog converters and the kind of tape drives and output apparatus that will put out these numbers as a continuous stream. The technology to flow those numbers through a D/A converter and turn them into sound cleanly and without any pauses was what was interesting and difficult in those days. Nowadays, it's completely routine. *Almost* completely routine.

"Once the equipment had been made for these purposes, which was the primary thing Bell Labs was interested in, it became clear to John Pierce and I that the very same equipment could be used to synthesize music. All we had to do was write the right musical program, and this, then, was a musical instrument."

The first attempt at a music program resulted in the musically useless but experimentally valuable Music I. This program featured one voice with a triangle waveform, and three variable parameters: pitch, amplitude, and duration. A few other people, notably Lejaren Hiller at the University of Illinois (UI),

had also begun to think about applying computers to music, but these efforts were in the direction of computer-generated or -assisted composition. Music I was the first attempt to actually synthesize music with a computer. Music II followed about a year later, with four voices and a choice of 16 waveforms.

Meanwhile, over at the RCA Laboratories in Princeton, Harry Olsner and Herbert Belar were working on their second-generation analog machine, the RCA Mark II Synthesizer. The Mark II was the cat's meow in analog synthesis until 1964, when Robert Moog revolutionized the field with his introduction of the voltage-controlled synthesizer, leading to the synthesizer's ascent into the public consciousness and musical mainstream. Although analog synthesizers flourished and multiplied throughout the '70s, dominating the electronic musical instrument market, digital synthesis is coming on strong in the '80s, as digital integrated circuits become cheaper and more powerful. The great step for digital synthesis, however, came four years before Moog showed a few of his "modules" (as he called them) on a small table at the New York Audio Engineering Society convention.

"The real breakthrough was in Music III, where all sorts of concepts came along," Mathews remembers. "One concept was Unit Generators as building blocks for instruments. Unit Generators were sort of the equivalent of the Moog modules—there were oscillators, attack and decay units, mixers, aciders, and, in addition, things like multipliers which were generally not available in the analog devices. The concept of the score as a sequence of notes, which is almost too obvious to be a concept, also

was introduced at that time. A note is a sound object where you specify the starting time and the ending time of a sound, along with timbres, pitches, and whatever else you wanted." This concept continues to play a large role in many digital synthesis systems, and languages based on these concepts are becoming available for microcomputers: CMusic (written in the C language) from the University of California at San Diego (UCSD) being a prime example.

Mathews and Bell Labs colleague Joan Miller rewrote Music III to run on the newer computers that were arriving at Bell Labs, and in 1963 they released Music IV. By this time, Mathews' music programs were starting to bear fruit: several pieces of music had been composed by Mathews, Pierce, and Newman Guttman (a psychologist), and some of these had been collected and released as a record, *Music from Mathematics* (Decca DL79103). Mathews also published an article in *Science* magazine, "The Digital Computer as a Musical Instrument," which caught the imagination of a Stanford graduate student named John Chowning, who visited Bell Labs shortly thereafter and spent a month or so observing and "absorbing the technology." Researchers at Princeton and several other institutions started writing versions of Music IV to run on their own systems. James Tenney, a composer who had been studying with Hiller at UI, took a temporary job at Bell Labs at Pierce's suggestion, and started to work with the music programs. When composer/physicist Jean Claude Risset arrived in the mid-'60s as a foreign visitor with funding from the French government (one of the few people to receive funding for work done out of the country), it became clear that computer music at Bell Labs was gathering momentum.

Up to this time, the programs were all written in low-level assembly language, necessitating a complete rewrite of the program every time a new computer came along. In 1963, when Music IV was released, the IBM 7094 was the machine of choice at many institutions, including UI where one F.R. Moore was exploring computers in music. Moore, who worked with Mathews at Bell Labs for a number of years and now is director of the Center for Music Experience at UCSD, relates what led up to his first collaboration with Mathews:

"Max wrote Music IV in assembly language on the 7094. In those days, Bell Labs was trying to export Music IV, and since there were a number of other 7094s in the world, there was a potential that other people could run this program. But Music IV used the very extensive macro facilities [another concept which was new at the time] of the BSYS VII operating system, which was the Bell Labs operating system for the 7094, and in or-

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der to get the program to work you not only had to load in the program, but you had to load in the entire operating system. So they [Bell Labs] were actually in the business of giving away the Music IV program along with BSYS VII to anyone with a 7094 who was willing to face the prospect of trying to make it work. That was sufficient motivation to try to rewrite the music synthesis program in these new-fangled high-level languages. So we tried rewriting Music IV in the latest, hottest language of that day, which was FORTRAN IV. Music V was that program."

Moore, Mathews, and Joan Miller each wrote one segment of the program over the course of 1967 and '68. Because it was a much more "portable"

program (able to run on a number of different computers), it proved to have the most utility, and has seen the most use. Music V, the last of the music synthesis programs produced at Bell Labs at that time, has not only set trends in synthesis approaches, but even in music programming approaches. The bulk of the program (including most of its complexity) was written in FORTRAN as described above, but the Unit Generators were still written in assembly language. This was because the Unit Generators were computationally simple, but used often and ran fastest in assembly language. Although the Unit Generators still needed to be rewritten for different machines, they were the easiest part of the program

to write, the tough stuff all being in FORTRAN. This made adapting Music V to different machines a reasonable proposition. It is now a common programming technique to put complex control software in a high-level language and simple, repetitive software in assembly language.

With the advent of Music V, even greater numbers of composers and researchers around the globe began taking notice of computer music and the staggering possibilities that this new tool presented. Many came to Murray Hill to investigate the new instrument that Mathews and his colleagues had given birth to. The immense but inspiring task of harnessing this musical power and putting it to use fell largely onto the able shoulders of Risset. In addition to writing FORTRAN versions of the Unit Generators and producing a number of compositions, Risset conducted two major projects with Music IV and V. Perhaps the most enduring of these contributions were his studies of musical instrument tones. Previous research efforts at studying the phenomena of timbre had concentrated on the frequency spectrum of the steady-state portion of the tone. With the computer, Risset was able to study tones more completely, including the important attack transient characteristics. He used a method called "pitch-synchronous analysis," developed several years earlier by Mathews, et al, in which the tone is analyzed backwards, from the end to the beginning, as a series of individual pitch periods with a Fourier analysis of each one. Having performed this analysis, Risset used Music IV to reconstruct the sound, which could then be aurally compared to the original. By changing various aspects of the Music IV resynthesis, a determination could be made of what factors seemed to be significant in instrument recognition, and what factors were relatively irrelevant.

Risset's work (which centered on studies of trumpet tones) provided a new perspective on timbre, and was inspirational to many others in the field of perceptual studies, strongly influencing later work such as John Grey's doctoral dissertation at Stanford (See *Mix* June 1984). Around the same time as Risset's trumpet studies, Mathews, Miller, Pierce and Tenney did a similar analysis-by-synthesis (as Mathews called it) of violin tones, using an analysis of the string's physical motion (as captured by high-speed photography) instead of the pitch-synchronous analysis of Risset's study.

If Risset's timbral studies, published in 1966, were an attempt to qualify some of the salient points of instrument recognition, then his "Introductory Catalog of Computer-Synthesized Sounds" was intended to do much the same thing for the Music V program. The catalog illustrated the use of Music V by giving examples of sounds in music notation along



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16:2:1 12:4:2:1 16:4:2:1
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with the Music V scores to realize them. An accompanying record contained the sounds themselves. Unfortunately, the catalog was never published, but has circulated in computer music circles as a sort of "working document."

Although Music V was (and is) quite powerful, it did have some drawbacks; primarily the tediousness of working with it. The input process was long and slow, and computing time for a few minutes of sound could easily stretch overnight. The compositional method employed with Music V was less intuitive than composing with traditional instruments, due to the lack of immediate feed-

back from one's actions. Mathews worked for a while on graphical input schemes, but never developed one with the same degree of flexibility as the language itself. Clearly, Music V's limitation was its lack of interaction with the composer. This was the next problem to be tackled.

"Just about the time we were finishing up Music V," recounts Moore, "we started talking about the possibility of making a real-time computer music system. At that time there was no real feasibility of making sounds digitally in real-time, but we had a considerable amount of analog sound gear, and the Moog synthesizer was becoming quite

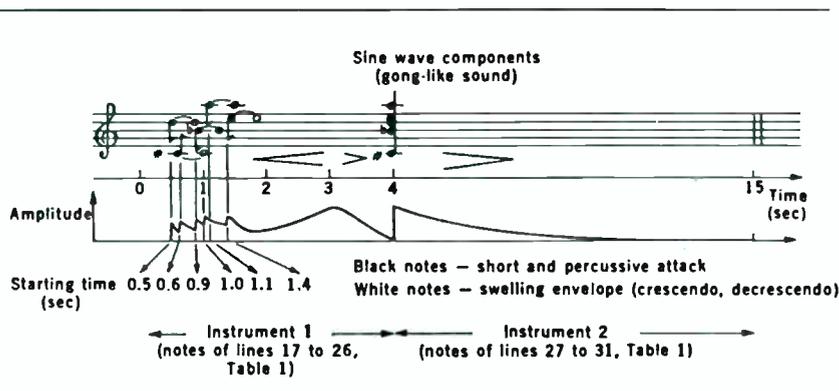
well established. It seemed like a voltage-controlled synthesizer and a bank of digital-to-analog converters was a reasonable way of getting real-time control from a computer. So we sat down and scratched our heads and that was the next main project that we worked on, which eventually became known as GROOVE."

The GROOVE system was based around a Honeywell DDP 224 minicomputer which had been connected to 12 eight-bit and two 12-bit D/A converters in order to study speech synthesis. To this was added 16 computer controlled relays, plus input devices and the analog synthesis system. The input devices consisted of a 24-key organ-type keyboard, four rotary pots, and a three-dimensional wand. The synthesis system was largely homebrew (mostly by Mathews), supplemented at different times with some Moog modules, Wavetek laboratory oscillators, and, eventually, ARP modules. The initial configuration consisted of 12 voltage-controlled oscillators, seven voltage-controlled amplifiers, and two voltage-controlled filters, plus 72 discrete (not IC) operational amplifiers to perform various other functions and signal conditioning (such as exponential conversion of control signals). All of the equipment terminated at a large patchbay which had removable patchboards, so that each user could come in at the beginning of a session and slide their own patchboard into place, thus quickly configuring the system for their choice of "instruments."

Once the synthesizer had been patched, the input devices could be used to "play" it. The computer would store all the gestures which were made, and had extensive editing software to allow any of the gestures to be modified independently of anything else. This performance could be played back and interacted with in real-time. For the first time, a computer musical instrument could actually be played and improvised on.

A number of composers worked on the GROOVE system between 1968 when it went on line and 1979 when it was finally dismantled. Moore, Mathews, and Laurie Spiegel all did a reasonable amount of work, but probably the most active user of the GROOVE system was Emmanuel Ghent. Pierre Boulez came over from France in the mid-'70s and worked with Mathews on a program known as the Conductor program, which treated the GROOVE system as an 'orchestra', and the user as a 'conductor' who did not control the content of the score which was being played as much as its interpretation. Mathews developed graphical displays of the functions stored with GROOVE, so that composers could interact with the system at a visual level in addition to the aural.

GROOVE was not, of course, without problems. "The analog synthesis



```

1 INS 0 1;
2 ENV P5 F3 B3 P9 P10 P11 P30;
3 OSC B3 P6 B3 F1 P29;
4 OSC P7 P8 B4 F2 P28;
5 MLT B3 B4 B3;
6 OUT B3 B1;
7 END;
8 INS 0 2;
9 OSC P5 P7 B3 F4 P30;
10 OSC B3 P6 B3 F1 P29;
11 OUT B3 B1;
12 END;
13 GEN 0 2 1 1 1;
14 GEN 0 3 2 0 10 10 10 10 10 0 -10 -10 -10 -10 -10
15 GEN 0 6 3 10 1 1 10;
16 GEN 0 7 4 -9;
17 NOT .5 1 .6 18 424 18 1000 .01 0 .59;
18 NOT .6 1 .6 18 727 18 1000 .01 0 .59;
19 NOT .9 1 3.6 18 424 18 1000 2.3 .1 1.2;
20 NOT .9 1 .6 18 1545 18 2000 .01 0 .59;
21 NOT 1 1 3.5 18 727 18 1000 2.7 0 .8;
22 NOT 1.1 1 .6 18 1136 18 2000 .01 0 .59;
23 NOT 1.3 1 3.2 18 1545 18 2000 1.9 .1 1.2;
24 NOT 1.4 1 .6 18 1352 18 2000 .01 0 .59;
25 NOT 1.5 1 3 18 1136 18 2000 1.9 0 1.1;
26 NOT 1.8 1 2.7 18 1352 18 2000 1.4 .1 1.2;
27 NOT 4 2 10 400 273 10;
28 NOT 4 2 7.5 200 455 7.5;
29 NOT 4 2 4.5 200 576 4.5;
30 NOT 4 2 6.5 150 648 6.5;
31 NOT 4 2 4 150 864 4;
32 TER 15;

```

An excerpt from the Introductory Catalog of Computer-Synthesized Sound. The numerical code listed is the Music V score used to realize the passage shown. Each line consists of a number of "Pfields" in a specific order. Each pfield defines one parameter value.

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equipment, particularly the oscillators, would tend to drift with time," tells Moore. "Almost any session working with GROOVE consisted of anywhere between a half-hour and an hour of calibration time, and then perhaps as much as a half-hour or an hour of working time before you had to recalibrate because of the drift of all those oscillators. I wrote a considerable amount of software which was designed specifically to allow the computer to tune the oscillators itself. It would output the minimum and maximum values, figure out the range, try different values in between, measure the pitch through an A/D converter, and make up its own table. It would take forever to tune itself up. We finally decided it was probably faster just to tune it up by hand.

"GROOVE went through two major versions; in one we attempted to design a composing language that would allow people who didn't really know much about computers to sit down and use the system. What we found out from that was that that's probably a waste of time, because every single person who used the system wanted to use it in a slightly different way. So eventually I rewrote the entire GROOVE software and separated the service routines from things which could be written in the still-choice high-level language, which was FORTRAN."

The DDP 224 itself presented problems, also. As is typical of all his musical work, Mathews viewed the problems from the artist's point of view. "The limitation to GROOVE primarily was that it ran on a big computer in the laboratory. It was not mobile; you couldn't imagine moving this computer and synthesizer to a musical stage and giving a performance with it. Well, the laboratory, in truth, is not a very inspiring place in which to make music. Although a number of composers came in and worked hard here, in the end it turned out that people didn't really want to come out into the lab and use this facility, and I think that they were quite correct in their feelings."

Finally, the stupendous rate of technological growth in the '70s caught up with the DDP 224, and it just plain got old. Moore returned to Bell Labs in the late '70s after a four year hiatus to do graduate studies at Stanford in digital signal processing, and found the situation quite different than when he had left:

"The atmosphere was one in which the DDP 224 was on its last legs. That machine was made of discrete germanium transistors, and if the temperature rose two degrees in the machine room, the machine would stop. It was getting impossible to maintain it, and things like VAX's [a more recent mini-computer] were on the horizon. The main reason that Bell Labs finally got rid of it was that it kept breaking all the time, and you couldn't get parts for it any-



PHOTO LARRY OPPENHEIMER

The Sequential Drum.

where; it was like having a Tin Lizzy on your hands. So the main real-time system was being dismantled just as I was arriving there, and Manny Ghent was working furiously just getting out his last few pieces from the system. He literally worked up until the last night before it was dismantled. I think they just retired the machine and replaced it with a chip or something. Vladimir Ussachevsky [of Columbia-Princeton Electronic Music Center] tried to get the DDP 224. He could have had it for free, until I explained that 'free' meant spending \$25 to \$30,000 for air conditioning alone, and that didn't include getting it repaired."

In 1969, shortly after GROOVE had gone on line, MIT Press released *The Technology of Computer Music*, a book authored by Mathews, with some contributions from others working at Bell Labs. The book detailed in technical terms Music V and everything else that Mathews had found up to that time. It became the definitive text on the subject, and remains essential reading for anyone seriously interested in computer music. Another record was released in 1970, called *Voice of the Computer* (Decca DL710810), which quite aptly demonstrated how far computer music had come in a little more than ten years. Although it had certainly become accepted by some of the musical community by that time, it would be yet another ten years before computers would start to figure heavily in the commercial music world. By that time, Mathews would already be working on the next step—electronic instruments that go beyond organ keyboard-type synthesizers.

"I don't consider myself a composer, I consider myself an instrument maker," Mathews reflects, and so it is

hardly surprising that his work in music has gone far beyond programming. One of his pet projects has been developing his Electronic Violin, a natural interest considering his high school studies and subsequent hobby of playing the violin. Several versions of this idea have been built, but Mathews seems fairly satisfied with the latest. The violin has strings, fingerboard, and weight that approximate acoustic violins, but the resemblance stops there. There is no body on Mathews' violin, and he plays in a vertical position with the order of the strings reversed from the norm. It is his theory that it is more physically comfortable to play the instrument in this fashion than with the traditional horizontal method which forces the player to twist the left wrist in order to finger the neck. On the bridge are mounted four ceramic microphones, one for each string, which are kept electronically separate to avoid intermodulation distortion effects. Mathews' earlier studies of violin tones had indicated that the major difference between a good sounding violin and a poor sounding one was in the strength and placement of resonances. He found that about 30 resonances could approximate the peaks found in a good violin, but this was rather a large number to try to deal with in a simple electronic fashion.

While trying different methods of dealing with this problem, Mathews delivered a paper in Stockholm in which he mentioned the Electronic Violin in the context of discussing analysis-by-synthesis. At the same conference, a paper on singing and timbre was delivered by Johan Sundberg, which pointed out a technique often used by male singers wherein they add a group of resonances at about 3 kHz (a frequency which the

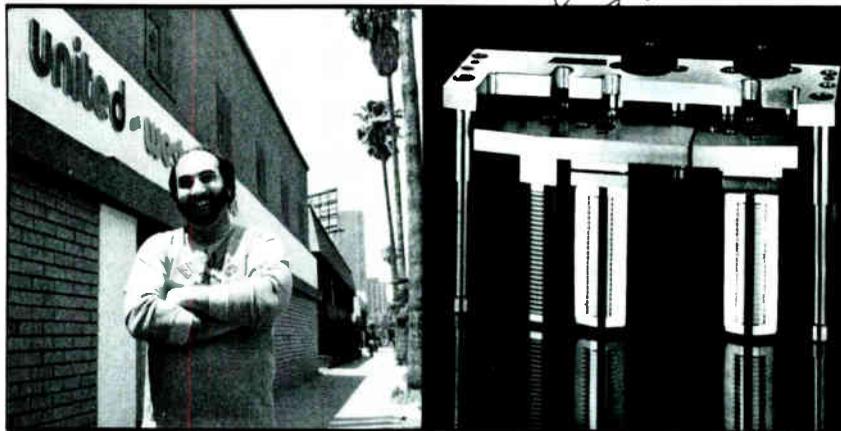
ear is quite sensitive to) in order to increase projection. Mathews tried using this "singing formant" on the strings of his Electronic Violin and found that with proper tuning, this formant alone was sufficient to provide a pleasing violin sound. His current instrument takes the sound from each string, passes it through the "singing formant" filter, and recombines it with the original sound. This combined response is then passed through a low-pass filter and sent to one of two speakers (alternate strings go to alternate speakers, i.e. the G and A strings go to one a speaker, and the D and E strings to the other); another scheme designed to avoid intermodulation effects between strings. Thus, the electronics have been kept to a reasonable level of complexity, and the result is that all the electronics (including filters, power amplifiers, speakers, and power supply) can fit in an aluminum attache case. Mathews is currently seeking someone who might be interested in manufacturing the instrument.

Another new instrument which Mathews has developed recently is called the Sequential Drum. This is a type of XYZ percussion controller, meaning that it outputs a trigger when the drum is struck, plus information on where the drum was struck and how hard. When connected with a computer-controlled synthesizer, this information can be applied in many different ways, such as controlling parameters of a score which the computer/synthesizer system actually plays. With some of the burden of technical execution lifted, a player can concentrate on the interpretation of a piece. A typical setup would be to have the trigger initiate the next event in the score (whether it be a single note, a chord, or a sequence of other events), the Z or amplitude signal control the loudness, and X and Y control the timbre in some fashion. The number of ways that these signals can be used is primarily limited by one's imagination and ability to write software.

Much of the development in the uses of the Sequential Drum came during an extended visit which Mathews made after the demise of GROOVE to Institut de Recherche et Coordination Acoustique/Musique (IRCAM) in Paris. Working with Curtis Abbott (now of LucasFilm), Mathews interfaced an earlier version of the drum with IRCAM's digital synthesis system, which is based around a DEC PDP 11/34 minicomputer and the 4C digital synthesizer. The current version of the drum resides here in Mathews' laboratory/studio, and is interfaced to a small Z80-based system which runs his latest software project: R-T SKED.

R-T SKED is a control program for a personal computer-controlled synthesis system which maintains the flexibility of Music V-like parameter specification, but gives real-time control of tim-

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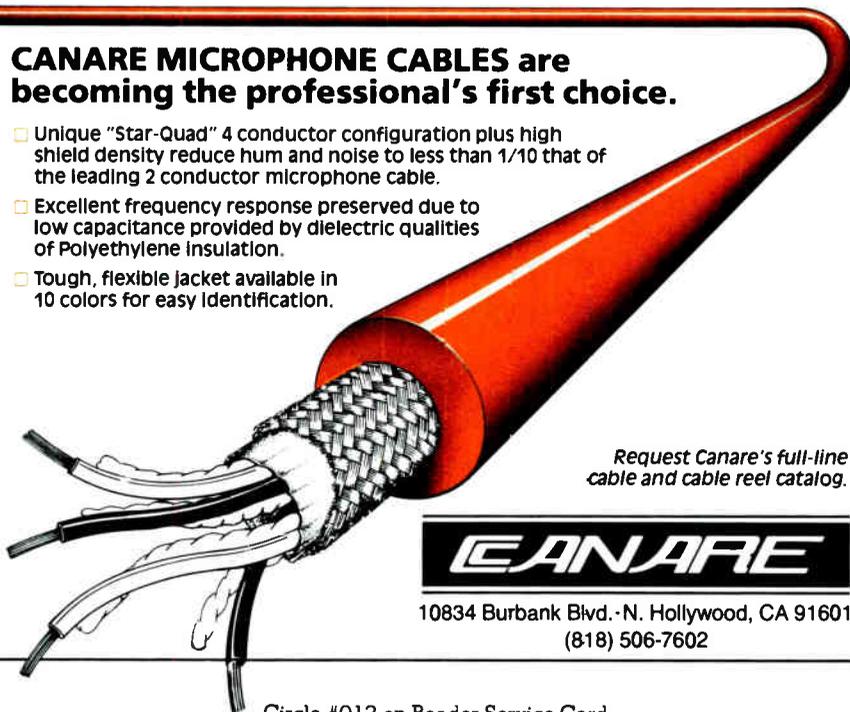
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Max Mathews in front of his current digital synthesis system.

ing. This is achieved by borrowing a concept developed by Abboot called "scheduling."

"A schedule has a bunch of lines, and each line has commands that the computer executes, and each line ends with a Wait function," he says. "What the computer does is conceptually execute all these commands instantly and then wait for the Wait function to be satisfied. Then it executes the commands in the next line and waits for its Wait function. This way, all the timing information is controlled by the Wait functions, and what the computer does is controlled by the commands; so you get a clean separation between time and commands."

The Wait function is the key to this scheme, as it can come from a previously determined score, or be dependent on: some source outside of the schedule (such as a trigger from the Sequential Drum, or even another schedule). The ability to create interactive or nested scheduling presents the potential for a good deal of complexity in applying the system. Mathews' goal with this system is to combine the versatility of Music V, the real-time control of the GROOVE system, and increase availability and affordability of personal computers and digital synthesis systems. He is striving to make powerful digital synthesis accessible to the general populace.

There is no denying the importance of Mathews' contributions to music, but they take on even a greater stature when it is realized that none of the music work done at Bell Labs was ever an actual project of the Bell System (or AT&T Bell Laboratories, which is now a unit of AT&T). "Computer music never has been an official activity at Bell Laboratories," emphasizes Moore. "Max Mat-

thews, for all his contributions to the field, has always done these things, as we always used to recount, in the evenings and on the weekends out of a personal interest; but that was never an official activity at Bell Labs."

"That's alright," says Mathews, "it's made life very, very interesting. Most musicians spend 18 hours a day working anyway." His "day job" is being the director of Acoustical and Behavioral Research at AT&T Bell Labs. "The acoustic research, now, is primarily concerned with computer speech processing; automatic recognition, synthesis, and—still—efficient encoding of speech, privacy and secrecy techniques, some acoustic questions like hearing aids and microphone arrays to pick up sounds in conference rooms and auditoria, and some fundamental work in how the ear hears things. The behavioral area concerns, first, teaching techniques; originally how to effectively teach people who were part of the Bell System to use and maintain telephone equipment. Nowadays, since AT&T is separated, the problem is how to teach both AT&T people and our customers to use the things we sell, whether they be computers or communications switches.

"Another area under behavioral research is the human engineering of telephones and computers. We now manufacture a line of personal computers, and I think that whether the computer succeeds or fails will not depend on the particular chip that does the computation, but rather on the programs and the instruction books that go with the programs which will determine whether it will be easy or hard for people to learn to use the computer."

Computer music may never

have been an official activity, but Bell Labs certainly allowed and even promoted these efforts. If there wasn't a lot of money in it (and there obviously wasn't), why would the phone company let their facilities be used? It sounds odd to say that they're just nice folks, but this is what it boils down to. "The support that Bell Labs and the Bell System gave to this work was based on the fact that the musical possibilities were a very important byproduct of the work that we did in communications, and that with very little additional support the Bell System could make this byproduct available to anyone who wanted to use it. They thought this was a socially desirable thing to do, and so they encouraged me in this work," reports Mathews.

In addition to these humanistic concerns, it is likely that Bell Labs had other reasons which may have been more practical, if less direct. It is often the case that people with highly trained and inquisitive minds function best when given some creative space. Bell Labora-

The musical possibilities were a very important byproduct of the work that we did in communications.

tories depends heavily on the ability of its people to discover and invent, and this, in turn, is heavily dependent on their ability to see the world with wonder and ask questions about it. "They let us play," is the succinct description given by Vincent DeRossi, a current Bell Labs employee. Richard Moore has an excellent example of this which concerns Hal Alles, another brilliant engineer who came to Bell Labs in the mid-'70s and worked for a while on music synthesis.

"Alles was interested in digital circuit design—making digital devices to do various things with sound. The first thing that he built as a sort of practice project was a second-order filter which was time-multiplexed by 32, and he did the most amazing thing with it. I went back to visit Bell Labs while I was at Stanford, and Max [Mathews] took me immediately to Alles' lab and said, 'Look at this,' and there was this huge heap of wires on the lab bench. He said, 'Now push this button,' and so I pushed the button, and it started playing 'Frere Jacques.' 'Well, I said, 'that's very interesting. It's a 'Frere Jacques' synthesizer.' 'No,' he says, 'it's a 128 pole (or however many it was) digital filter with its poles and zeroes

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arranged so that the impulse response of the thing is 'Frere Jacques.' 'Well,' I said, 'now *that's* very interesting, because if that's true, I should be able to put an impulse in, wait the appropriate number of beats, push the button again to put another impulse in, and play the round by superposition.' And indeed it worked. That was the first machine of Alles' that I ever saw and it was wonderful."

The concepts explored at Bell Labs stimulated the imaginations of composers and scientists, who often came here in order to get a closer look at the goings-on. This enlivened the interchange of ideas even further. Moore remembers the energy that was present then: "It certainly is true that in the late '60s and early '70s when I was there the

musical atmosphere was really quite exciting. We had a large number of people with musical interests and talents who worked there, and a considerable number of Resident Visitors like Manny Ghent. As far as the stream of general visitors, just about everybody came through at one time or another: Boulez came to Bell Labs in order to consult on his pie-in-the-sky idea of maybe building a research center for music in Paris someday [this idea became IRCAM]; (composer Iannis) Xenakis would come around and complain that we weren't drawing our oscillator waveforms and things like that; Vladimir Ussachevsky was there quite regularly working with Music V and the GROOVE system—he would occasionally have students and

colleagues of his come out and look; Bill Buxton [currently working on the Structured Sound Synthesis Project at University of Toronto] came and, I think got the initial inspiration for his later work in computer music; and on and on. It was really a very rich time in which there were a lot of interesting people around."

The real story here is the vision and perspective that Max Mathews and his contemporaries have consistently shown. In numerous articles and papers, Mathews and his colleagues have expressed predictions and speculations on the future of computers in music, which time and again have turned out to be startlingly accurate. These brave statements have not always gone unchallenged, however. Several prominent personalities in the field responded to the 1974 article by Mathews, Moore, and Risset with doubts that composers were looking for new sounds or modes of expression, or that the work at Bell Labs reflected the needs of the recording industry. With the current success of digital synthesis systems from the Synclavier, PPG, or Fairlight down to the DX-7 or alphaSyntauri, the views of the team at Bell Labs have obviously been vindicated.

So what does Mathews see now? Well, with the proliferation of computer-based instruments, one thing is obvious: "One should have a simple, standard interface for plugging things together. Maybe the MIDI; the alternative seems to be a computer standard like the RS232 interface. If we can develop a standard, simple interface then I think progress will be much more rapid."

Finally, Mathews had this to say about the general trend of the field which he launched: "I was asked to review some of the papers that were submitted [for the October 1984 International Computer Music Conference held at IRCAM], and 90 percent of the papers were all on the same topic; if you read one, you'd read practically all of them. The topic was: Take the personal computer of your choice, make an interface that would connect this onto a synthesizer—either one that you bought or one that you built—and then go off and write a program to make music on this combination. Well, the world is completely out of control in this direction now: hundreds and thousands of people doing their own thing this way. And I think this is absolutely wonderful."

"The main institutions, like IRCAM, Stanford, Bell Labs, UC at San Diego and MIT, that used to sort of dominate the direction that things were moving in are no longer going to do that. All these people are going to go their own way. Probably 95 percent of them won't get to anything interesting, but the other five percent will do some wonderful things that will lead music in new directions."



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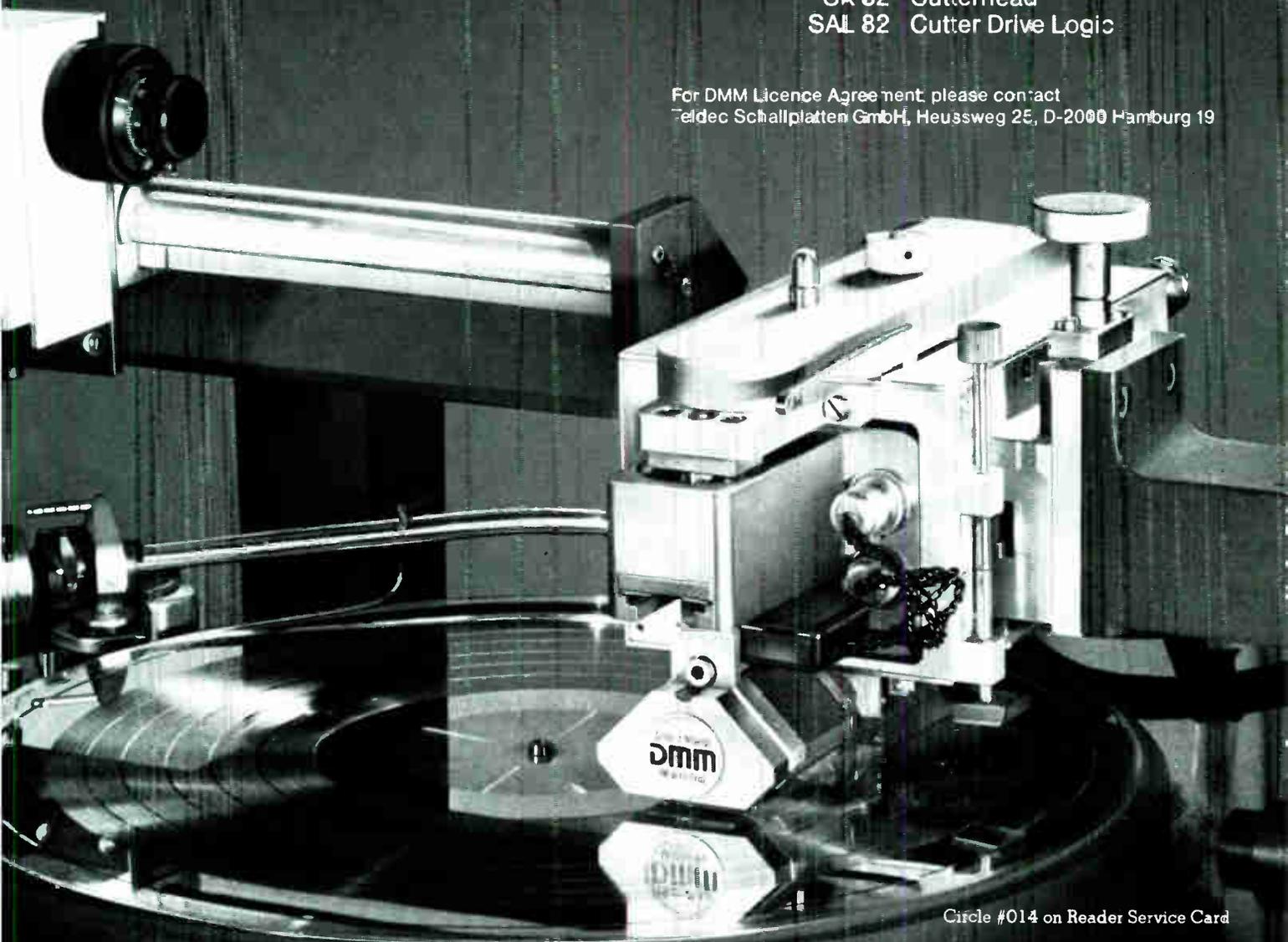
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The Computerized Adventures of Bob Bralove in Wonderland

by Elizabeth Rollins

If Stevie wonders, Bralove scratches his head, figures out how to do it, then, Stevie does it.

Wonderland must indeed be enchanted—it's the place where Stevie Wonder creates. From the outside, it's an old, somewhat down-at-the-heels Los Angeles warehouse. Inside, however, it's filled with nearly every kind of advanced toy for tinkering with hit tunes: at the moment, at least six different types of digital sampling systems—of that, six PPG's alone and an array of other digital and analog addenda. Miraculously enough, in Wonderland if you talk to these machines, chances are they'll talk back.

This is not magic of course, but the combined efforts of some of the most innovative minds in both the music and computer industries: Ray Kurzweil, Sydney Alonso, Dennis Klatt and Harry Mandell to name a few. But there is one person whose job is to coordinate all computer-related projects in Wonderland. Bob Bralove has been Stevie Wonder's in-house computer specialist

for a little more than a year. Before that he'd been writing Stevie's software for a couple of years while he was working at Osborne Computers in Hayward, California, and studying for his master's degree in film scoring at San Francisco State. "When Osborne started having trouble—he picked me up," says the soft-spoken 29-year-old Bralove.

Teaching Stevie Wonder to be self-sufficient, and thus, more fluently creative at operating all computer-interfaced equipment is one part of his job. Making sure Stevie gets any piece of hardware or software he could possibly want is another responsibility. So Bralove is in fact working on making those synthesizers talk because speech cuing is one system design that can enable his blind employer to use machines that normally send visual signals to the musician. The blink of a light becomes the exclamation of a voice to indicate what mode the Synclavier might be in.

It's a strange mix of special needs and special abilities that Bralove designs for. How many people can say this about their bosses? "He's the fastest learner I've ever met. It's really impres-

sive. . . Stevie has an intuitive understanding of machines that's hard to fathom. It's also impressive considering he's someone who's never seen a CRT."

Never seen a computer or instrument keyboard, a potentiometer or a software menu. Yet check the list of synthesizers on the soundtrack album, *The Woman in Red*: The Kurzweil 250, the Synclavier, the PPG, and Harry Mandell's custom system.

SYNTHETIC SPEECH

The Fairlight, the Synclavier, the custom-designed sampling system from Harry Mandell, and the PPG are all digital synthesizers that are meant to be used with a CRT (video screen display.) The PPG can also use an LCD readout, as does the Kurzweil 250 (often called the Electric Piano) at Wonderland. Bralove has been working closely with Ray Kurzweil and New England Digital's Sydney Alonso to come up with a way to reroute the information that is now translated visually, into a signal that a voice synthesizer can read out loud.

Nine years ago Kurzweil invented the first reading machine for the visually impaired which takes a page of text, digitizes it, then sends it through a speech synthesizer which then reads the page aloud. This invention kindled a relationship between Stevie and Kurzweil, who is himself an accomplished pianist. Years later when he'd invented the celebrated "Electric Piano" Kurzweil gave one to his pop-star friend to see how he liked it. Bralove says Stevie likes the sounds, but that to make it easier for him to use by himself, they need to continue with a plan to put a switch at the MIDI port to convert it to RS-232 and then directly feed that signal into a speech synthesizer. Plan "B" is to use a computer interface to translate the signal.

With Sydney Alonso's Synclavier II, Bralove is already hearing the

—PAGE 150



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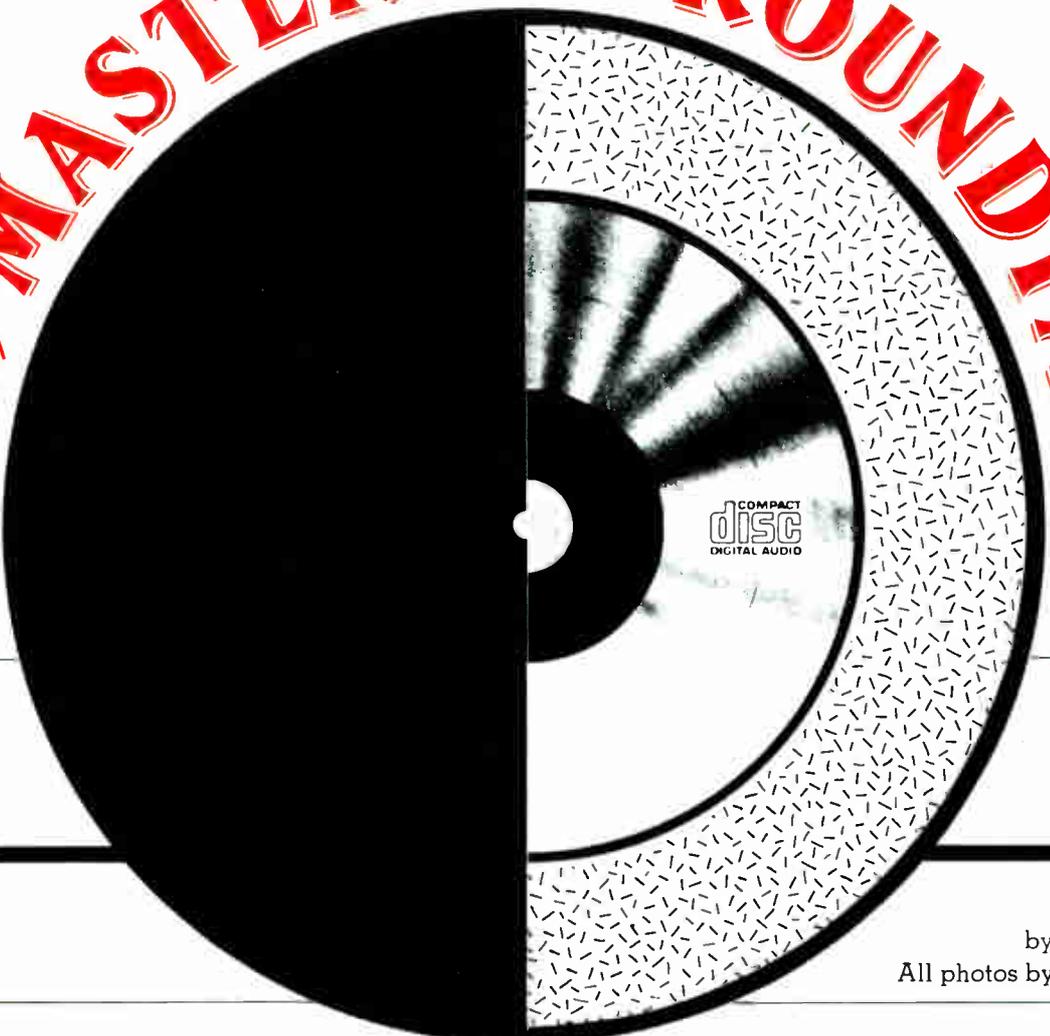
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DISK MASTERING ROUNDTABLE



by Tony Thomas
All photos by Tony Thomas

Joe Gastwirt at custom console and lathe which features a JVC quartz-lock motor and proprietary JVC cutter head. The JVC cutting system features 800W/channel threshold amps—JVC Cutting Center.



The disk mastering business currently hangs on the precipice of uncertainty, especially considering the fact that cassettes have already surpassed the analog disk in unit sales and the CD is attempting to obliterate it entirely. In view of the precarious situation surrounding the phonograph record, *Mix* decided to talk with some of L.A.'s hottest mastering engineers about the future of analog mastering and what can be done to improve vinyl product in the meantime. The engineers that we consulted represent a good cross-section of the industry, from the cutters of the hottest commercial product, to those who routinely cut audiophile disks—from the grand old men of the business to the up-and-comers. They are:

Bernie Grundman, president, Bernie Grundman Mastering: Bernie is currently one of the hottest mastering engineers in the country. His work reportedly included roughly 30 percent of a recent *Billboard* chart, and at one time in the not so distant past, four out of the five top hits in the nation. An alumnus of A&M Records, he started his own mastering operation less than a year ago. His credits include Michael Jackson (including *Thriller*, the largest selling record in the history of recorded music), Lionel Richie and Prince.

Doug Sax, president, Mastering Lab: Doug is the owner of the Mastering Lab, which is perhaps the oldest independent mastering operation on the West Coast. He is also one of the best and most respected mastering engineers in the business. His other company, Sheffield Lab, is one of the largest producers of audiophile recordings. His disk mastering credits are extensive, including such artists as Linda Rondstadt, Toto and Ambrosia, to name but a very few.



Jack E. Hunt at custom console and lathe—Mobile Fidelity Sound Lab.

Holding the Line Against the CD

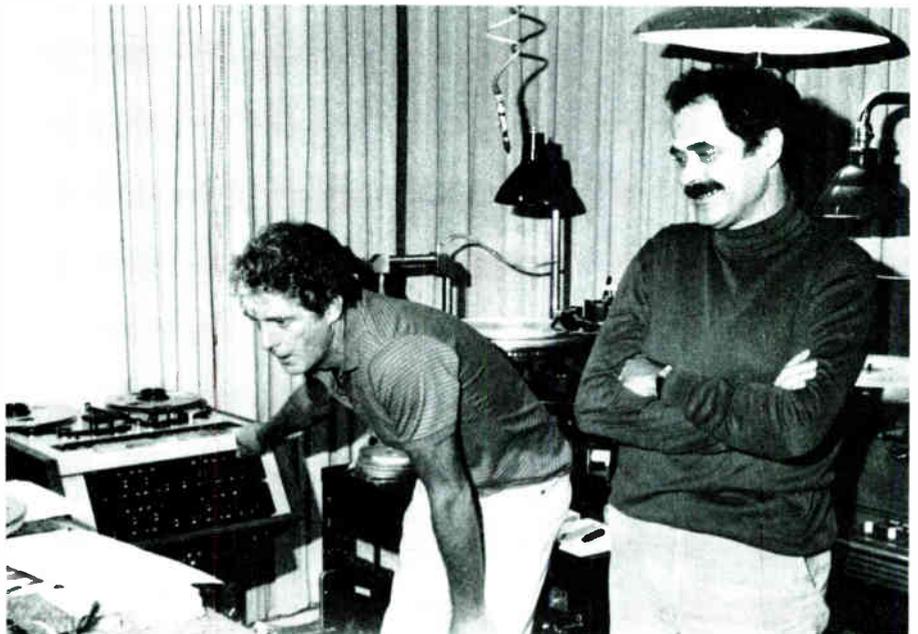
Gregory Fulginiti, disk mastering engineer, Artisan Sound Recorders: Greg started his disk mastering career at Elektra Records working with Jac Holzman. His mentor was Bob Ludwig (now at Masterdisk in New York), with whom he worked at Sterling Sound. He is regarded as one of the hottest rock and roll cutters on the West Coast, with credits that include Pat Benatar, REO Speedwagon and Rick Springfield.

Joe Gastwirt, chief disk mastering engineer, JVC Cutting Center: Joe, who also worked with Bob Ludwig, claims to have worked at more mastering facilities than anyone else in the States. At various times, he has cut for Masterdisk, Kendun, CBS, Artisan, Media Sound and Frankford/Wayne. His credits include Paul McCartney, the Isley Brothers, and Meco.

Jack E. Hunt, senior disk mastering engineer, Mobile Fidelity Sound Labs: Jack is a long-time veteran of the disk mastering business, having worked previously for JVC Cutting Center, TTG Recording Studios and the Record Plant. His credits include many of the highly acclaimed half-speed reissues in the growing catalog of Mobile Fidelity Sound Labs.

—PAGE 35

Doug Sax and Mike Reese—Mastering Lab.





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Mix: *What is the state-of-the-art of disk mastering? Where is it headed?*

Fulginiti: I think the analog disk is approaching doom. I don't think there are many more years for the analog disk as we know it. Whether cassettes, Compact Discs, or some other form of technology will supplant it, nobody really knows.

Sax: I don't think disk mastering at this time is any different than it was ten years ago. The only area in which there has been an improvement has been in the computers for the lathes. Across the board, the good houses can cut a longer side at a full level than anyone could five years ago. As for the future, I don't know where the LP is headed. Cassette sales are ahead of record sales. I *do* know there has been a slow improvement in pressing.

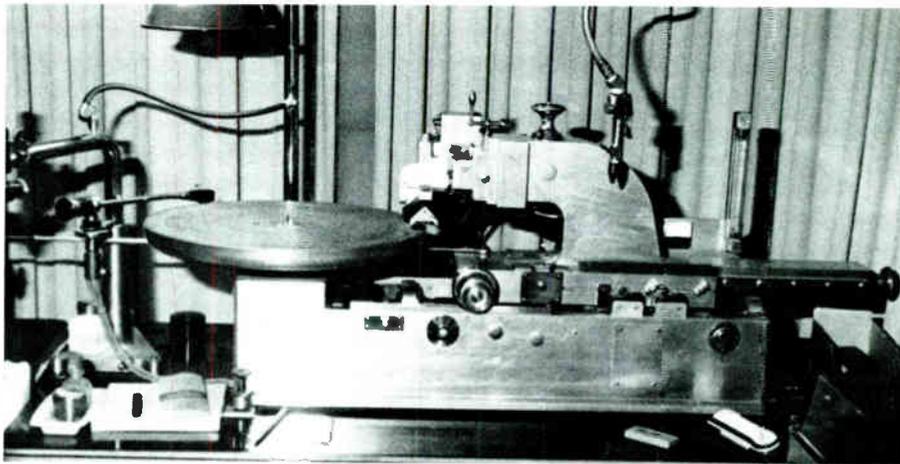
Gastwirt: There are a lot of good mastering studios and, in my opinion, only a few great ones. In the future, the middle of the road studios will slowly but surely be eliminated. Only the people that have had the money to buy digital equipment and who have been updating their rooms constantly will survive.

Grundman: I think that we've reached the limit in a few areas. With the new computers, I don't see how we can get anything more on the disk. Unfortunately, the more space we can save, the louder they want it which increases the inter-groove distortion and creates a dirtier disk.

Hunt: I feel that the state-of-the-art of disk mastering is roughly where it should be at this stage of the game. I think that it can go further if everyone involved gives more attention to detail. Optimally, I feel that the tape should be put on the pre-view machine and cut flat, taking into consideration the limitations of the equipment. I feel that the analog record is still the best method of distributing quality analog music to the consumer. But care must be taken in the choice of the equipment and the way it is maintained.

Mix: *Can current analog disk technology be improved to the point that it can thwart the takeover of the Compact Disc?*

Sax: I still feel that a well made disk is sonically superior to the same product on CD. It's interesting that digital technology is the most controversial thing in the industry. You could line up ten engineers and five would love it and the other five would say its terrible. There was a test done by a design engineer for Harmon-Kardon, and he found some people could detect the tiniest amounts of distortion and other people could not tell the difference between an undistorted and highly distorted signal. Maybe that's



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why there is this divergence on digital. I still perceive it as being more distorted, particularly on complex material.

Grundman: I don't think the public, generally, is that quality conscious. In defense of the analog disk, they have cut a lot of corners on the players and the CD is not as good as it could be. I've done comparisons and the analog disk is usually better than the CD version of the same material. It's very hard to buck the trend because the high-fidelity magazines are highly touting it. I think that it will eventually catch on, provided the price comes down. The cassette is already more popular than the analog



Bernie Grundman

disk, and the analog disk sounds better. Why, then, would anyone want a CD? You can't record on it.

Fulginiti: Unfortunately, the record business is a business, a matter of economics, and the demands of the industry sometimes sidestep the quality for the quantity of produce to be issued. They are capable of making pressings in this country which are far superior to those currently made. It takes more time, more money, and a longer wait for the records to get into the stores. Certainly Direct Metal Mastering would be a great advantage in insuring that the sound is given the best possible opportunity. That is an expensive process and with the uncertainty surrounding the analog disk, and the people that have disk mastering facilities have to have some reservations about laying out that kind of money in an industry that has no guarantee of a future.

Hunt: Right now a well made analog disk is a threat to the CD, if for no other reason than the frequency response. In the current CD machines, there is a brick wall filter at 20 kHz which makes the sound very unmusical. The current sampling rate is way too low. I feel the minimum it should be is 250 kHz with maybe a 20 bit format. Ideally, it should be 500 MHz.

Gastwirt: If you want to talk business, no. If you want to talk about what can be done technically to make a record sound better, I don't think it would offset the CD, but it would prolong its life a little bit.

Mix: What special techniques do you use to improve the tape-to-disk process?

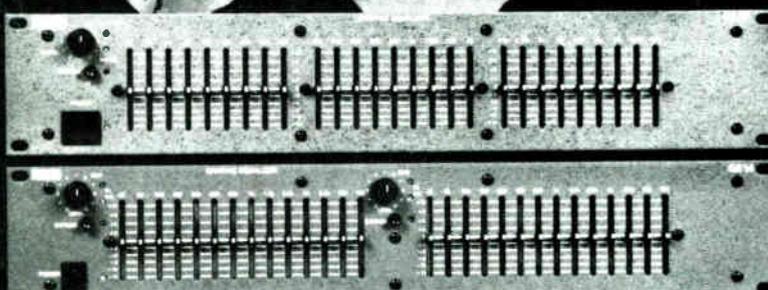
Grundman: A lot of our techniques have to do with the equipment we have built. We have really tried to build a system that doesn't alter the sound. It is really possible that when we play the tape on this system, those who made the record will hear it cleaner than they have heard it before. In our equalizers, we can punch in only those frequencies we need. Our tape electronics have step-attenuators to control the top end so you don't even have to use the board if you don't need it, except for a line amplifier.

Gastwirt: Since way back, I've been a believer in cutting very hot records so that the signal is way above the noise level of the disk. You don't want to cut it too hot, however, so it distorts. In doing this, you're actually making more work for yourself because you have to make a lot of test cuts to see how hard you can push it before it distorts.

Hunt: We are committed to half-speed mastering because it works. You cannot use a regular system, though, and cut half-speed. The equipment has to be set up for half-speed. The system we use, the Ortofon DSS-731 cutter head was de-

—PAGE 38

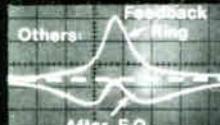
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Greg Fulginiti—Artisan Sound.

signed for half-speed CD-4 cutting. I have done work on the cutter amps to improve the bass response. All of the tape electronics are solid state class A discrete and designed for half-speed. It takes a special type of person to do half-speed, however, because it is so time consuming. We don't use any limiters. The dy-

amic range on the tape is what goes on the disk.

Sax: If one disk mastering room has an edge over another it would be a combination of having better electronics in their chain—in the tape machine, better EQ in the board, and what ability they have to correct tape problems for disk.

What the mastering rooms really do is what I would call two track mixdown. There is only one tape in 50 that the producer and engineer would be happy with if you did an accurate transfer to it. If you have better electronics, then you can get more off the tape than another room could. We've just developed new electronics that we just completed the new Toto album on, which are all tube. When they are placed into permanent service, we will be *all* tube. When tubes are done right, I think they are superior devices. They have more punch, more dynamic range, more listenability and they're better on complex material. I've spent a fortune to develop these things and they're never worse than solid state, depending on the tape, and on complex tape they're dramatically better than anything I've heard on solid state. A mastering room is like a race car. You spend a lot of money for a very small increase in quality. Whether or not our race car is perceived as better, time will tell.

Fulginiti: It is the way that I do what I do. If I were to attempt to translate it into what I do or how I do it, I wouldn't be able to give you an explanation, I couldn't do it. It's my gut feeling, the way I interact with people and the music and where we take it. I have no secrets. If anyone wanted to ask me what I did on a record, what EQ I used, I would tell them with no hesitation.

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Mix: How can the producer and engineer produce a master tape that's easy to cut?

Gastwirt: The producer and engineer should keep their eyes on phase problems, they should listen to their mixes in mono, especially if it is going to be played on the radio, to make sure that there is as little loss as possible. They should also watch out for left and right separated bass, which is almost impossible to cut.

Sax: The number one disk problem is the same today as it was 30 years ago, and that's sibilants. It's also the number one problem in recording. If the engineer mixes well and controls the sibilants, there's no problem in cutting anything. But if there are big, splattery essences, you're in trouble.

Fulginiti: The one thing that the producer and engineer must remember is that the levels that they put on tape must equate to levels that the disk can handle. Granted, there is a better S/N ratio achieved by pushing tape to a certain level, yet they must be forever aware that there are always limitations in transferring from one medium to another. You can't put high, sharp transients on tape at +3. There are limitations on dynamic range and velocity of sound. The way that the human voice is recorded poses problems, especially in the area of sibi-

lants. I try not to use a de-esser or a high-frequency limiter and only do so when there are no other options.

Hunt: I think that the mixers should understand that with 1/2-inch tape, just because the tape is wider, that doesn't mean that they can put more level on it. There should be an oscilloscope on each tape machine and the mixer should watch it for saturation. The tones on the tape should be respected. I personally feel that each mixer should start out in the cutting room learning what the limitations of the disk are. Center bass is important and the mixer should remember that the average transients, on percussion instruments particularly, are anywhere from 14 to 20 dB *above* the level on the meter. I think that every mixer should mix with the scope, because then they would see the polarity problems.

Grundman: The #1 enemy to the disk cutting system is excessive sibilants. It's very hard to do good de-essing on the final mix. If they would just use a de-esser on the vocal channel during mixing, it would solve a lot of problems. With the new computers, we can cut left and right separated bass very easily. It may be difficult to matrix and press, but we can cut it.

Mix: Where do you think you'll be in ten years?

Grundman: I have the feeling I won't be behind the board all the time. We may begin to market the equipment we designed because we have already received inquiries about our equalizers from recording studios. We may also put a cutting room in some other city, like New York.

Fulginiti: I think you can speculate, dream and guess where you're going to be, but it's hard to say. All I can say is I focus one day at a time on what I'm doing, and I try to do the best I can, develop my craft, learn all I can about it and prepare myself for when the technology changes to be right there and be ready to grow with it. What that means and where I'm going to be in five or ten years, I don't know.

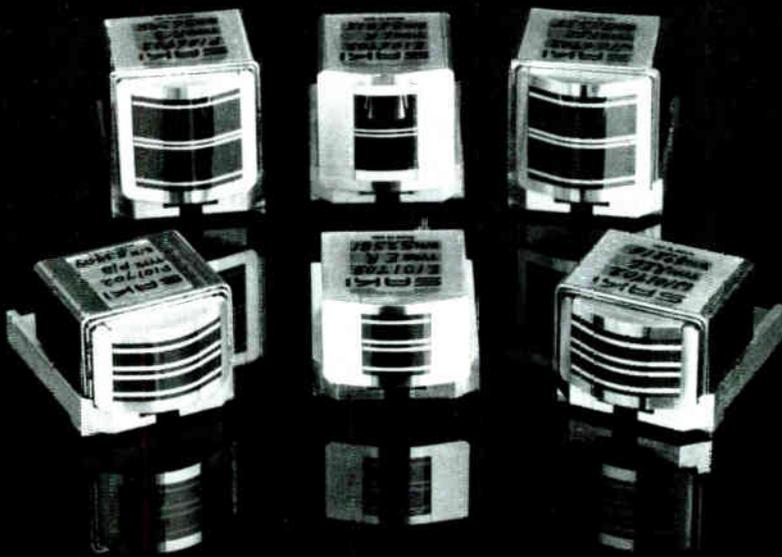
Gastwirt: I think that there may be a few mastering rooms left. I think that the analog record may not totally disappear. I may be totally off base, but I do believe that in some quantity, there will still be analog records. I also believe that the third set of the ears that the mastering engineer provides will still be needed, no matter what the medium.

Hunt: Living a very comfortable life, as we are moving our headquarters to the clean air of Northern California. I do want to say that the analog record is *not* dead, especially if care is taken to produce it.

Sax: I hope I'm retired living at 7,000 feet watching television and reading a book. ■

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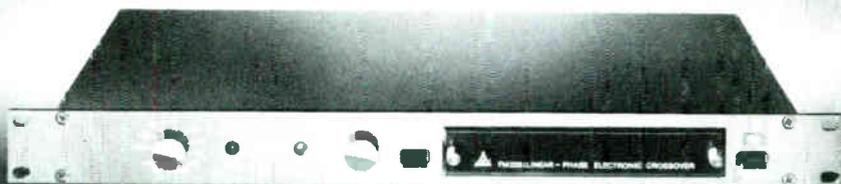
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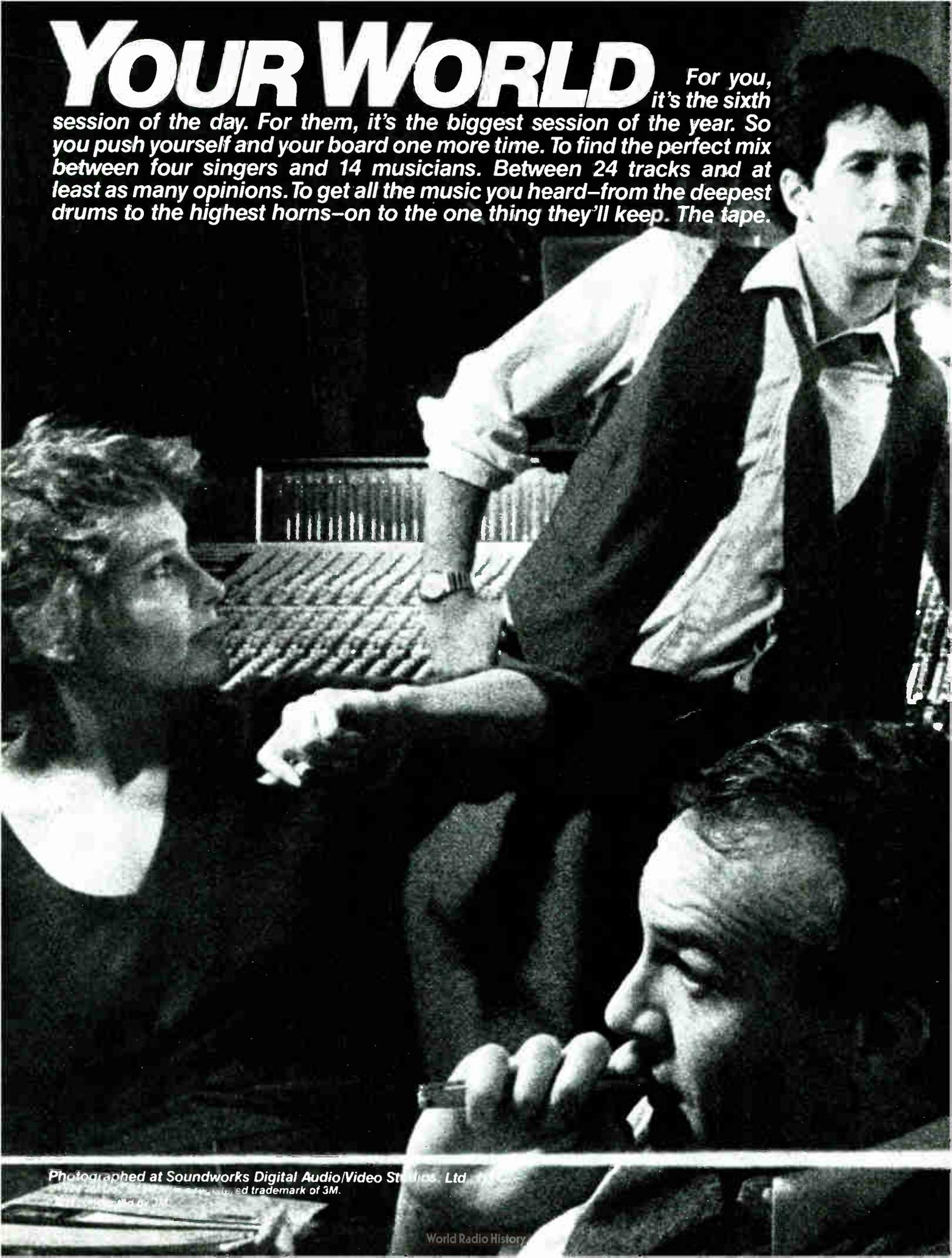


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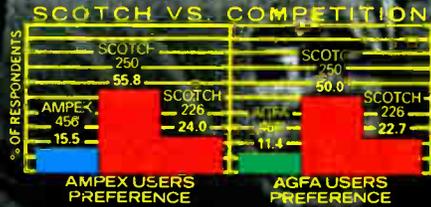


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Start the Presses! CBS/Sony

by Gregory A. DeTogne

Before I got onto the plane for Terre Haute from Chicago's O'Hare Field, I was told that the event I would soon be witnessing was destined to be a milestone in Indiana's history. Even greater in importance in fact, than last year's release of the "Little Pink Houses" video by John Cougar. Once in the air though, as I looked down at the flat, agricultural no man's land that lies between northern Illinois and Hoosierland, I began to have serious doubts that anything of social importance could actually be generated in such a region.

After an hour's flight my feet hit the tarmac at Terre Haute's Hulman Field. I immediately made my way toward the airport bar, which looked like it would have been more at home in somebody's basement rec room next to the ping-pong table. It was here, while I sat slugging down a glass of orange juice with a local rustic who was nurturing an early morning beer, that I realized I was becoming involved with something that was indeed truly important.

"Hey, you look like you're from outta town," my newfound acquaintance mumbled from his suds, trying to strike up a conversation. "Whatya here for, business?"

"I'm here for the opening of the new CBS/Sony Compact Disc manufacturing facility," I answered. "You heard anything about the place?"

"Heard about it," he shot back. "Of course I've heard about it. That plant



Opening on September 21, 1984, Digital Audio Disc Corporation (a subsidiary of CBS/Sony) became the first manufacturer of Compact Discs in the U.S.

is gonna mean jobs and international recognition for this town. Hell, someone told me the governor himself is going to show for the opening ceremonies today . . . This is a *first* in the country, for Chrissakes . . ."

I paid the bartender and headed for the door, thinking all the while that I had been dead wrong in my airborne assessment of the situation. It was plainly obvious to me now however, after having talked to someone who was aware of the CBS/Sony Compact Disc venture

even though he probably kicked sheep all day for a living, that the opening of this new pressing plant represented something that would make September 21, 1984 a significant date in the history of audio reproduction.

In order to inform the world about the opening of their new Compact Disc pressing plant, CBS/Sony commanded their New York City PR firm to orchestrate a carefully-controlled media event that would include a tour of the facility, which is appropriately named Digital Audio Disc Corporation. According to my plans of participation, all I had to do on the day of the grand opening was hang out at the Terre Haute airport and wait for a chartered jet to land that contained other journalists, an assortment of CBS/Sony execs, and the usual huddle of PR minions. Once they were on the ground, I would join the happy group, and together we would be herded onto two buses that would take us to the plant. It sounded easy—just sit back and enjoy the ride, listen to the obligatory speeches, go on the tour, attend a press conference, then have a press kit jammed into my hands and split. Isn't that what responsible journalism is all about?

As could be expected, the char-



(Left) Compact Disc manufacture starts with a specially encoded tape copy prepared in one of two identical control rooms.

Terre Haute CD Plant Opens

ter jet was late. Time was dragging by, and I was seriously contemplating going back to the bar to get poked with the native Hoosier I had met earlier. Eventually, before I could slip into debauchery, the jet landed, and a swarm of people spilled out onto the runway. On cue, I gathered up my belongings and clamored aboard one of the hired buses that was spreading its diesel stink through the air as it idled in a nearby parking lot.

Our air-conditioned transports dumped us off on the sidewalk in front of Digital Audio Disc Corporation a short time later. A huge circus-like tent had been set up for the hoopla on the front lawn to protect us from the sun while we listened to the dedication speeches by the likes of Indiana Governor Robert Orr, Sony's Norio Ohga, and CBS/Records' Walter Yentikoff. The speakers took their respective turns proclaiming that it was a "great day for Indiana" and a "giant leap forward in the history of audio engineering." At the conclusion of the speeches, there was the traditional ribbon-cutting ceremony, followed by more talk, and then we were told that the tour would begin.

Before being allowed to enter the sprawling complex, we were divided into groups of 15, and given white booties to slip over our shoes to keep from contaminating the sterile environment. Smiling employees dressed in blue smocks and brown shoes with special dust-resistant soles were on hand to spew out answers to our questions. I'd like to delve right into the details of what we



Sony's Compact Disc Master Code Cutter produces a glass master by exposing a glass plate with a photo-resistant layer to a laser beam.

were allowed to see inside, but it may be useful for clarification's sake to provide a few background notes first:

CBS/Sony was the first manufacturer to begin producing Compact Discs in Japan. After making an investment of more than \$20 million to finance the creation of Digital Audio Disc Corporation, the two audio giants also became the first owners of a major Compact Disc pressing facility in the United States.

Representing one of the most important advances in sound reproduc-

tion since electrical recording first came onto the scene, current forecasts predict that between 200,000 and 250,000 CD players will be sold in the U.S. by the end of 1984. The CD player relies upon a low-powered, solid-state laser that "reads" encoded information directly off of a single-sided plastic coated disk that measures 4¾-inch in diameter. Since the laser never physically touches the surface of the disk, there is no wear on the recording, and the coating insures that

—PAGE 44

Sony Gets Nod for Videodisc Replication Plant

An Urban Development Action Grant of \$650,000 from the U.S. Department of Housing and Urban Development has enabled Sony Corporation of America to issue industrial revenue bonds to build a videodisc replication plant in Terre Haute, Indiana.

Construction of the new plant will begin in 1984 and will be completed in the fall of 1985. The project represents an eventual investment of more than \$15 million for Sony and will employ more than 100 people in Terre Haute.

According to J. Philip Stack,

president, Sony Communications Products Company, "there is a growing need for laser disks in video and data storage applications." Stack estimated that 300,000 laser videodisc players will be in use by the end of 1984, with the market expected to grow to more than one million players by the end of 1987.

Sony's optical videodisc system is primarily being sold to business, industrial, government and educational institutions for use in computer-assisted interactive training.

One client that Sony is watching closely is the U.S. Library of Con-

gress which has begun conversion to disk of an optical videodisc program that will preserve the library's collections of prints and photographs while making them available to the public for research and reference.

The library will eventually place on videodisc 97,000 photographs from various collections, including motion pictures, motion picture publicity stills, network newscasts from the 1976 Bicentennial, paper prints of news events from the early days of motion pictures and the library's priceless collection of glass plate negatives. ■



(Above) After injection, a very thin layer of aluminum is placed over the disk's pitted surface that reflects the CD player's laser.

(Right) Quality control tests are directed by a CBS/Sony-developed computerized inspection system.

(Below) Stacked on spindles, finished CDs are placed into individual trays which are then packed into clear cases.



foreign particles and fingerprints have no effect on the quality of playback.

Sony's CD player is microprocessor controlled, which allows certain models to be programmed to play up to 99 different selections or passages in any order. Pause, repeat, and skip-track commands are standard equipment, along with a high-speed search mechanism that is perfect for locating favorite parts of songs. Read-outs on the front of the unit detail elapsed and remaining disk time, and the track selection in play. For the habitually indolent, a remote control is also available.

Audio specs for the CD player currently being produced by Sony exceed even the most advanced analog playback systems. Dynamic range easily surpasses 90 dB, while frequency response is dead flat from 20 to 20,000 Hz. As a final kicker, harmonic distortion is almost nil, and wow and flutter are unmeasurable.

Over an hour of uninterrupted music can be packed onto the disk, with the sound being stored in "pits" of digital information. After hearing the system, most agree that the CD's clear, noise-free reproduction beats the hell out of its analog brethren . . .

• • •

Now that you're armed with the necessary background info, here in a nutshell is what's going on behind the carefully guarded walls of Digital Audio Disc Corporation:

The actual manufacturing process turns out Compact Discs in a fashion similar to that used in analog recording. However, upon first observation of the plant, the most notable difference is in the cleanliness of the environment. Since the CD deals with such small tolerances and dimensions to achieve sonic accuracy, it is absolutely essential that everything remains spotlessly clean and free of contaminants.

At the outset of manufacture, a musical recording is prepared in a digital format. Specially encoded taped copy is prepared in one of two identical control rooms that feature highly sophisticated editing equipment that plant engineers are reluctant to talk about. For mastering, a device called the Sony Compact Disc Master Code Cutter is used. Basically, the system is made up of a PCM processor, CD encoder, and a laser cutter. It produces glass masters by exposing a photo-resistant layer on a glass plate to a laser beam. This is where the aforementioned "pits" are cut which form the basis of information which will later be translated into music. Glass masters are then processed into metal masters via a matrix operation that utilizes a high-speed rotary plating system designed by Sony. After this electroplating process is complete, metal mothers and stampers are produced.

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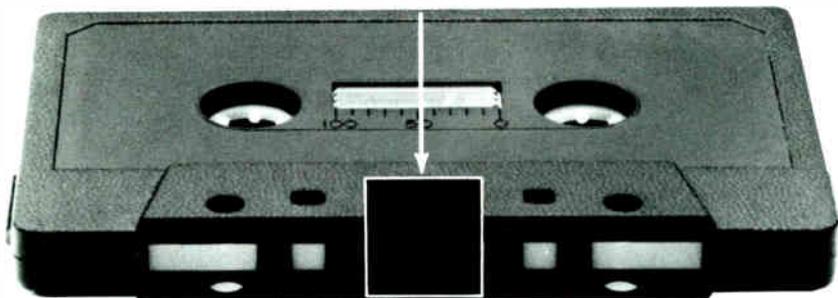
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With the molding complete, the clear CD is then placed into a vacuum chamber. While in the chamber, a thin aluminum layer is placed over the molded pits on the surface of the disk. This layer allows the player's laser beam to reflect off of the disk surface and reproduce the sound stored in the pits. An ultraviolet curing resin is then applied atop the aluminum layer for protection, and the disk is sent on to the final phases of production.

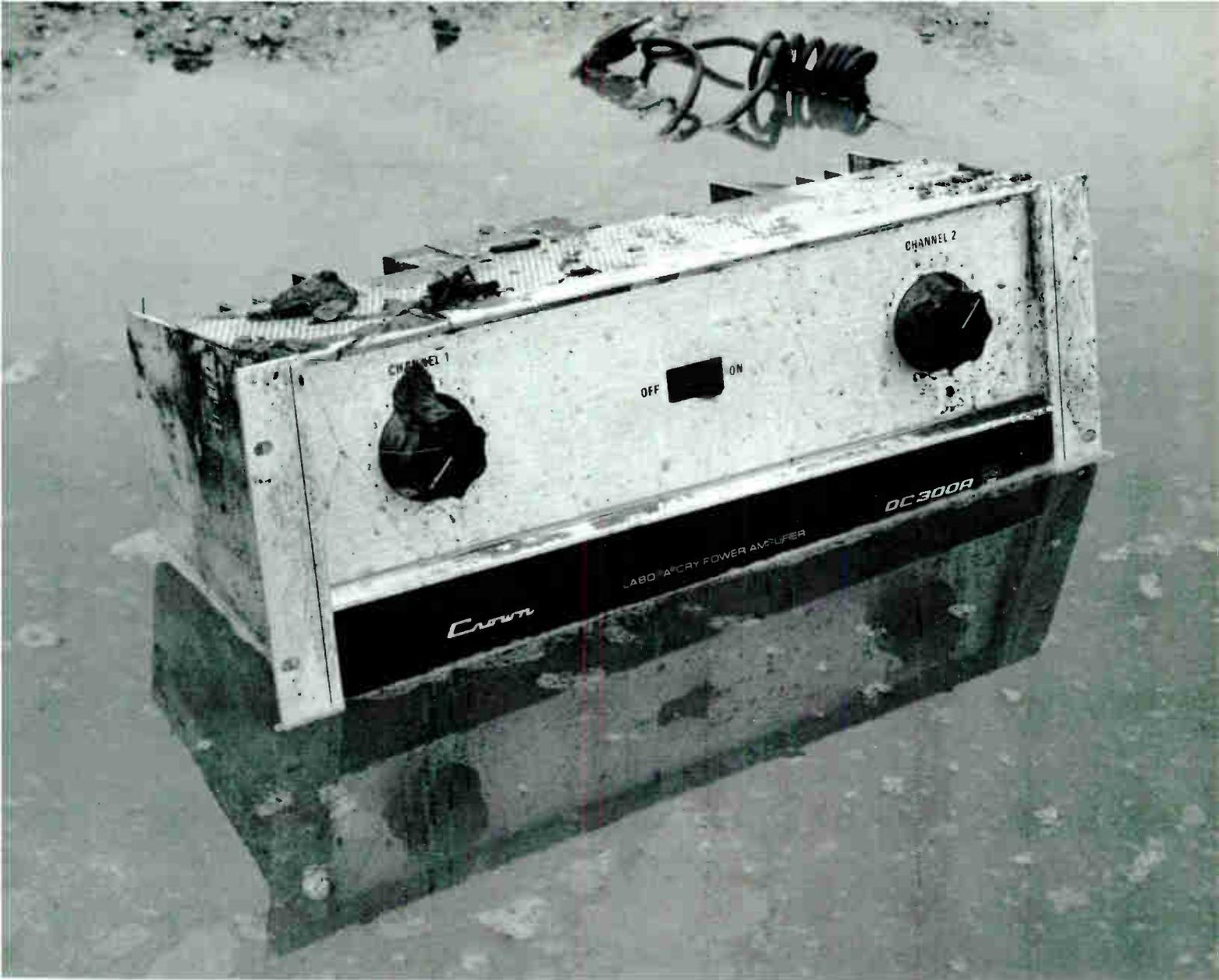
To complete the ordeal, individual labels are silk-screened onto each disk before they hit quality control. A variety of inspections are all handled by computerized robotic networks that pick out the duds before final approval. Finished CDs are placed in trays and lugged over to a group of employees who hand-package them in various formats that include shrink-wrapping and blister packaging.

CBS/Sony claims that their new plant is capable of pressing approximately 300,000 disks per month, with the possibility of doubling that figure as market demand increases.

By the end of 1983 (the CD's first year on the U.S. market), over 550 titles were introduced, and more than 1.7 million disks sold. Two thousand or more titles are predicted to be available by the end of 1984, and CBS/Sony expects this increase to generate a corresponding sales boom of between eight and nine million disks. According to their marketing surveys, the average CD consumer will collect a minimum of 25 disks each year in the not-so-distant future.

The possibilities of the system are already being expanded, which promises to stretch the CD's importance far beyond its current applications for home and professional audio. By the time you read this, Sony will have begun marketing the industry's first personal portable and car CD players. Visionaries are already imagining home CD recording, too.

My tour of Digital Audio Disc Corporation ended with a hands-on demonstration and listen to the plant's first disk, Bruce Springsteen's *Born in the U.S.A.* With a set of headphones wrapped around my ears, and the volume set at an extremely amplified level, it's readily apparent that this new technology will indeed have a bright future with the audioholic set. In fact, CBS/Sony are so sure of themselves that they have begun to herald the system as "already an audio tradition." Old ways die hard, but if this is indeed a new tradition in the making, I think you'll be seeing quite a few people pitching their old LPs into the weeds in favor of the new Compact Disc. ■



In the early evening of Sept. 17, 1973, Jay Barth was at the wheel of a 22 ft. utility truck that was loaded with sound equipment. Just south of Benton Harbor, MI an oncoming car crossed the center-line; fortunately Jay steered clear of the impending head-on collision. Unfortunately, a soft shoulder caused the truck to roll two and one half times. Exit several Crown DC-300A's through the metal roof of the truck's cargo area.

The airborne 300A's finally came to rest — scattered about in a muddy field, where they remained partially submerged for four and a half hours.

Jay miraculously escaped injury; the amplifiers apparently had not.

Unbelievably, after a short time under a blow-dryer all the amps worked perfectly and are still going strong.

The rest — and the truck, is history.



CROWN

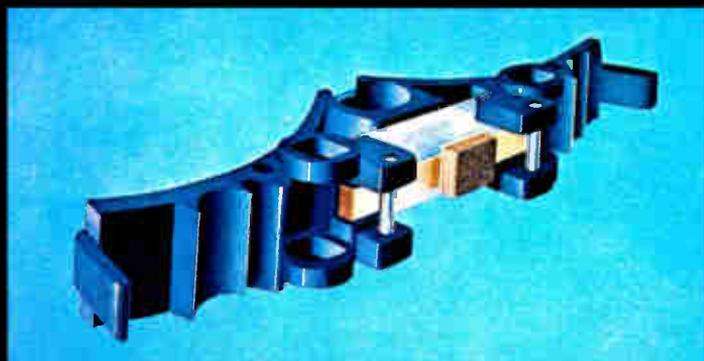
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AUDIO APPLICATIONS

“We are astonished by the reaction of consumers, and astonished by how quickly the market is growing. Because of the player’s simple operation and the increasing availability of software it has taken a very strong foothold in the market.”

Interview with Emiel Petrone

CHAIRMAN OF THE COMPACT DISC GROUP

by Ken Pohlmann

The Compact Disc is busily reshaping the business of recorded music; the entire production chain from control room to living room is adapting to the new medium. Just as any message is influenced by its dissemination medium, recorded music will undergo distinct transformations as the Compact Disc accounts for larger percentages of purchased music. Quality of recording and production, timed length of albums, and perhaps even style and content of the music itself could be affected as the CD retrains our expectations, and ears; the consumer’s perception of recorded music will be subtly altered as the medium embodying the music changes. For an insider’s account of the CD’s short history, and some educated guesses as to its future, I turned to Emiel Petrone, the chairman of the Compact Disc group and senior vice president, Compact Disc, for Polygram Records.

Mix: Could you tell us a little about your background?

Petrone: I joined Polygram Records in the ‘70s as sales manager and ran the



Emiel Petrone, senior vice president, Compact Disc, Polygram Records.

Polygram marketing company until 1980. In 1980 I became vice president of marketing for Polygram Soundtracks, and in 1982 became senior vice president of the Compact Disc division for Polygram Records. And I am concurrently chairman of the Compact Disc group.

Mix: How does the Compact Disc group fit in with Polygram?

Petrone: The CD group is involved not only with Polygram, but with every major company manufacturing either Compact Disc hardware or software. The group was a brainstorm of several individuals, basically to establish a forum among two industries which had never sat down together for the introduction of a new product and a new technology into the U.S. marketplace. Some inquiries were sent out and the idea was received overwhelmingly well by both industries. We now have membership of all companies involved with the CD, including the major hardware manufacturers and record labels, as well as accessory people.

Mix: The purpose then, is to coordinate the marketing of hardware and software.

Petrone: Yes, but specifically to coordinate the introduction of the new product, and achieve awareness of its potential on the part of the American consumer.

Mix: That implies that the CD group has a finite lifespan . . .

Petrone: That’s very possible, but with technology changing as quickly as it has been, we see the need for hardware and software to talk more often than in the

past, and so we see the group remaining in existence for awhile.

Mix: Do you intend to get involved in questions of format and standards?

Petrone: No, we are basically marketing people. Our parent companies are involved in the technical end, and they can introduce the products. Of course, when there is music involved, we would like to maintain the relationship we have developed with our counterparts in the hardware industry. In the case of the Compact Disc, it seemed like a natural because of the simultaneous standardization of hardware and software systems.

Mix: Just a point of clarification—the CD group is an American organization, with American interests?

Petrone: The CD group is incorporated in New York City, and its official name is The Compact Disc Group of America.

Mix: Let's talk about marketing. It's been about a year since the Compact Disc has been available in quantity in the U.S. How does it look so far?

Petrone: It looks very, very healthy. We are astonished by the reaction of consumers, and astonished by how quickly the market is growing. Because of the player's simple operation and the increasing availability of software, the CD

has taken a very strong foothold in what we call the "audiophile" segment and "trend-setter" segment of the market. We feel very strongly that by the end of 1984, beginning of 1985, this will definitely be a mass-market product.

Mix: What are the numbers of players and disks sold so far?

Petrone: In 1983 there were approximately 35,000 machines, and one-and-a-half million disks sold in the U.S. In 1984 there will be between 200,000 and 250,000 machines and approximately four to five million disks sold.

Mix: What are your future expectations?

Petrone: For 1985 we figure about 650,000 machines, and about 20 to 25 disks per purchased player.

Mix: That's about 15 million disks... Say! That reminds me—I saw an interview with Jim Rogers, a Wall Street trader who started with \$1,500 and retired at age 37 with \$14 million. He said he's recently had his eye on the Compact Disc...

Petrone: The growth potential looks phenomenal at this time.

Mix: Let's talk about prices.

Petrone: Many consumers are under the misconception that the players all cost \$1,000. The hardware industry has

introduced a tier price structure among different manufacturers and different player features. Thus a \$300 machine can be purchased, or an \$800 machine, or a \$1,500 machine depending on the brand concept or feature concept. All machines have microprocessor control and programmability, higher-priced models include remote control, etc.

Mix: What convinces people to buy a CD now?

Petrone: Ease of usage is a strong point, as is durability of the disk, and availability of titles...

Mix: Are there enough titles to persuade people?

Petrone: Well, we started in 1983 with under 500 titles, now we're up to 2,000 titles. And we are expecting 5,000 titles in 1985. Most major software companies are committed to selling it. And with the awareness programs we now have going, for example, the MTV campaign, the American consumer is feeling the push. Of course, each manufacturer is also pushing its own competitive edge, in its own unique fashion.

Mix: What's in store for disk prices?

Petrone: Prices are dropping at the wholesale level, to approximately \$10. You can see them retailed for \$12.98 or more typically \$14.98. Prices will diminish a little in 1985, but not as much, because the record business operates differently than other mass-produced product industries. With the CD hardware, for example, costs are amortized as volume increases, thus the manufacturing cost drops. With records, contract negotiations with the artist and other factors result in a more complicated formula. We'll be seeing retail disk prices in the \$10 to \$12 range, with further downward movement after 1986.

Mix: In other words, from a manufacturing standpoint, volume alone wouldn't lead to a staggering cost reduction in CDs.

Petrone: Right. The same thing is true with LPs.

Mix: Let's shift gears. Do you own a CD system?

Petrone: Absolutely!

Mix: Are you happy with it?

Petrone: I'm thrilled with it. It's difficult for me to listen to records or tapes anymore.

Mix: In the early days, at least, there was some severe criticism of the CD standard in terms of sampling rate. Did you ever have any doubts?

Petrone: Not really. For a while a 48 kHz sampling frequency was considered for compatibility with that of the professional

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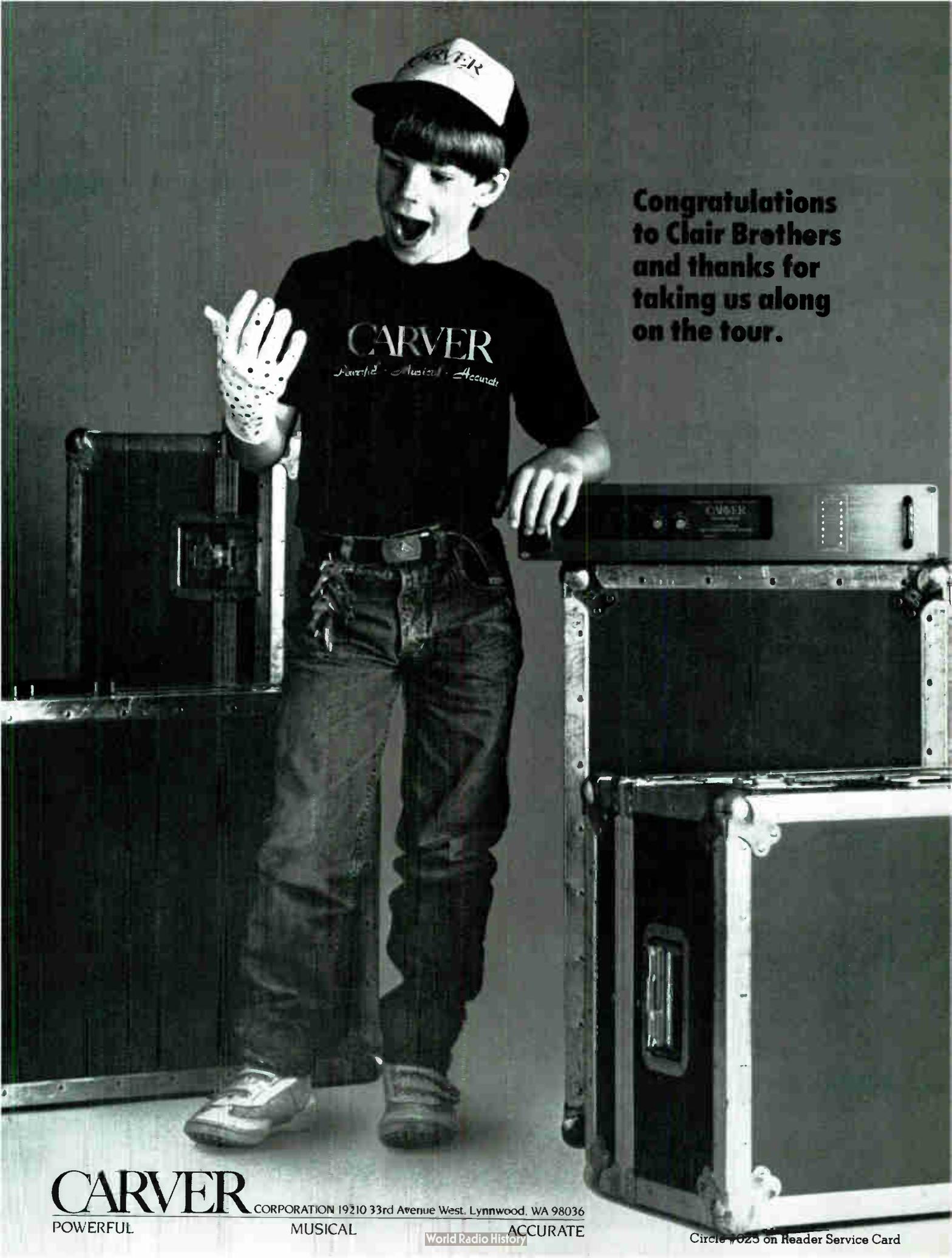
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standard, but this would have reduced the playing time of the Compact Disc. The ramifications of having a vehicle capable of carrying 60 to 70 minutes of music on one side was important. We decided that 48 kHz was suitable for recording, and 44.1 kHz for suitable for reproduction.

Mix: How is the quality control on disks? Do you have any numbers for returned disks?

Petrone: Defect disks from the consumer has been 0.3 percent. For LP's I'd say it averages around 5 percent.

Mix: That speaks well for the CD, considering that most current buyers are critical listeners.

Petrone: The quality control is an amazing breakthrough. There's nothing tricky

change it if he wants to. We guarantee that nothing happens except literal transfer.

Mix: I've heard a few horror stories about mistakes in the transfer, such as improperly decoded noise reduction on tapes, etc.

Petrone: I can't sit here and tell you there have never been mistakes; I've heard some people's questions, but I can tell you that quality control, such as that here at Polygram, is designed to specifically catch such gross mistakes. Maybe in the early days, some operators didn't realize what transfer was all about.

Mix: Are you happy with the disks you purchase?

Petrone: I have no problem with them. I haven't had a defective disk yet.

is delivering. I can get as emotional with a Compact Disc as I can with any other sound carrier.

Mix: Let's move on. When can we look forward to CD players in our automobiles?

Petrone: It was launched in Japan in September. The Sony prototype was introduced at last summer's Consumer Electronics Show. You should see it in quantities at automobile/audio specialty shops very soon.

Mix: Do you feel confident about potential problems such as vibration, warpage of disks left in the sun, etc?

Petrone: Yes. For example, we've tested the disk from a heat standpoint—you can test it yourself by putting one in boiling water, then observing correct playback. Likewise vibration testing has worked out very well. When Sony puts its product on the market, it will have the problems licked.

Mix: How about CD ROM?

Petrone: Compact Disk read only memory is limitless. There will be new markets in entertainment and publishing; at Polygram we concentrate on music, but with other manufacturers and custom pressers, we're ready for it and looking forward to it. It's the greatest data storage vehicle to be introduced in this century. As you know, a CD has data capacity equivalent to that of 1,000 floppy disks.

Mix: In the September issue of *Digital Audio* magazine, it was reported that IBM had contracted to purchase 1.5 million CD players for use in its personal computer. Can you confirm this?

Petrone: I'm not in a position to confirm that. But I'll say this—it's compatible with their system, and they certainly perceive the storage capacity, and the fact that it is already a standard is powerful persuasion. I see a bright future in the business, that is, non-musical applications of the CD.

Mix: Any other future developments such as double-sided disks?

Petrone: Not double-sided disks, but maybe a concept similar to that of a 45 rpm, or an EP, in which the total time capacity is not used. The price would drop substantially. Such a disk would also probably have graphics and lyrics for viewing on a television.

Mix: In conclusion, how about a prediction: When will the sales of CD's surpass that of LP's?

Petrone: We expect that in 1990, the worldwide sales volume of both CD and LP will be around 550 million disks each, and within five years after that, the LP will largely disappear. ■

“It's precisely the comparison between LP and CD that sells people on it. At this point, the audiophile has accepted it; the black vinyl business will be no business soon.”

involved, one merely has to master a new technology. You know, as we speak, the (Sony) Terre Haute plant is being opened, which will allow American companies without Japanese or European affiliations to press domestically.

Mix: Players and disks have been out for a few years now. Have any long term problems occurred, unforeseen in the laboratory?

Petrone: Not to my knowledge. It's here to stay.

Mix: One of the long-standing debates with the CD is this: When a disk sounds bad, is it the fault of the recording, the transfer, or the disk itself?

Petrone: Well, there's nothing tricky in the transfer, from either an analog or digital master. Whatever we receive is what you get. All tapes delivered to us undergo technical quality checks; of course, a contemporary recording is different from a 1954 Stan Getz. Once those checks are made, we don't fool with the sound or the production in any way. Whatever the artist or producer gives us, is what he gets back. There's no high-ending or low-ending or anything like that. At Polygram we have a number of technical checks between original master and first pressing to reveal mistakes; the producer is given the opportunity to

Mix: Will recording engineers have to adapt their techniques to the Compact Disc?

Petrone: They will probably develop a new sensitivity, and be much more critical of technical phenomena which were covered up on the LP.

Mix: How about those who compare the CD to the LP, and conclude that the LP sounds better?

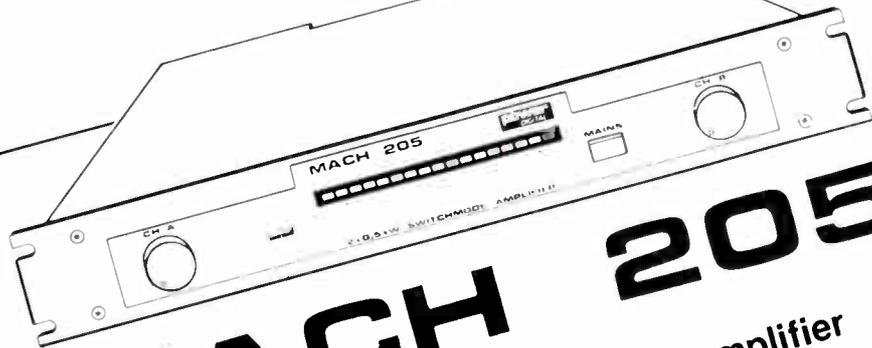
Petrone: Maybe they have cotton in their ears. I've done A-B listening and my results are the opposite. You can hear the crispness of a CD over a radio broadcast. Many people call in, and ask why it sounds so phenomenal. It's precisely the comparison between LP and CD that sells people on it—that's true in every hi-fi store. At this point, the audiophile has accepted it, the black vinyl business will be no business soon.

Mix: How about another bugaboo: those who say the CD prevents them from getting "emotionally involved" with the music?

Petrone: Maybe they should see a psychiatrist. The emotion that is expressed by an artist in an artform, and communicated to each individual person who experiences it, is not dependent on whether the carrier is black vinyl, cassette or laser disk. It is the message that the artist

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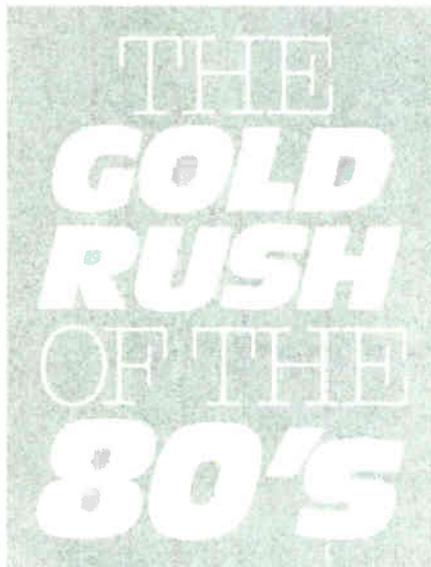
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CASSETTE **D**UPLICATION

by George Petersen



(Above photo) Technician Chris Keith monitors a few of Resolution's 400 NAD cassette decks during a real time duplication session.

After two decades of existence, the once-lowly cassette tape (which began as the "toy" tape format for the early Philips/Norelco Carry-corders) has become a giant in the industry, especially with tape sales exceeding that of albums on many major label record releases. Of course this didn't happen overnight, as many factors—simplicity of operation; mono/stereo compatibility; improvements in tape emulsions and electronics, notably noise reduction technology; the demise of the eight track cartridge as a competitive force; a general worsening of vinyl record quality; and the current popularity of auto and personal stereo systems—have contributed to the cassette's rise to the top.

Today, with the almost universal acceptance of the cassette medium for a plethora of applications, ranging from music and educational programs to music software, the need for quality duplication is at an all-time high. To meet this need, cassette duplication firms and manufacturers of both hardware and software (C-zeros, raw tape, packaging/labeling supplies, etc.) for the industry are constantly striving to keep up with the demand for better product.

Yet the eventual introduction of new forms of competition for the medium, such as the digital compact cassette, automobile and Walkman CD players, erasable Compact Discs, and other innovations yet to be unveiled, seem to pose no threat to the cassette's dominant position in the marketplace. New duplication facilities spring up seemingly

overnight, while other businesses, such as recording studios and pressing plants, are taking advantage of the possibilities of offering cassette duplication as a lucrative sideline.

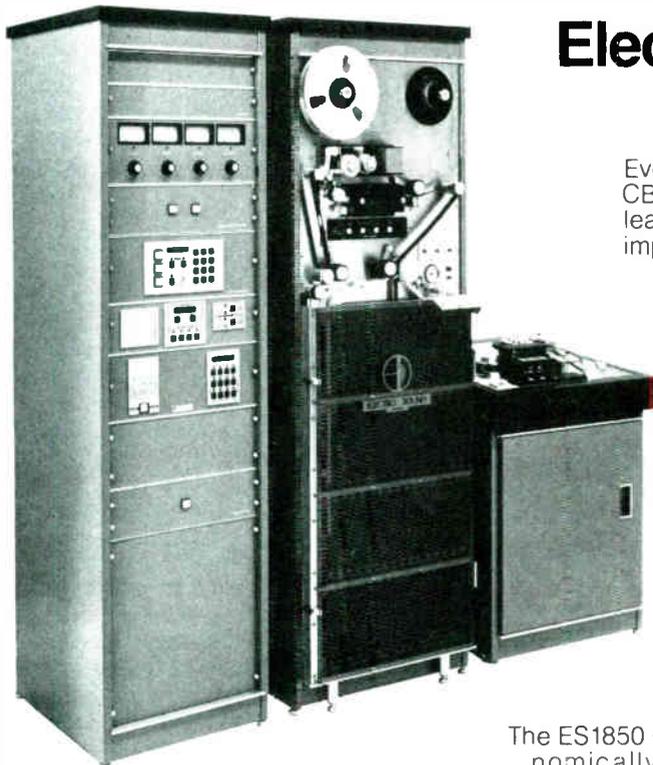
However, in spite of all the new operations now on line, there seems to be

plenty of work available in this growing industry. We polled a few of the duplication firms from those listed in this issue, inquiring as to whether this current bubble of prosperity was about to burst. None of them thought so—that is, not in the foreseeable future. And until the RIAA begins certifying million-selling cassette releases, we would have to say that the present rush for the financial gold in the cassette business is very real indeed.

Steve Sheldon, of Rainbo Records, a custom record pressing plant in Santa Monica, California, sees a bright future ahead in the duplication field. In fact, a few months ago his company installed an Audio Tech high-speed bin loop system capable of doing up to 7,000 cassettes per shift. Commenting on the jump into cassette work, Sheldon says "it was a natural step for us. Most of our album customers also want to release tapes, say 1,000 records with 500 cassettes. Now we can offer pressing, as well as duplication, printing and packaging. It's a one stop service."

Rick Schaumberger, owner of Midwest Custom Record Pressing in Arnold, Missouri, agrees: "Tapes now account for over 25 percent of custom music releases, and offering both pressing and duplication has given us a distinct advantage since we began doing cassettes in 1982." Midwest Custom uses an Electro Sound 1/2-inch bin loop system with a capacity of 25,000 tapes per day, and although tape duplication is a viable sideline, Schaumberger feels that the pressing business will remain strong for

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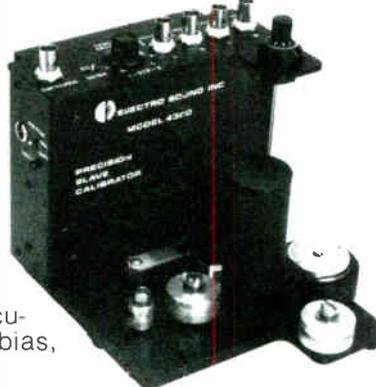
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quite a while, because "there's a 'mystery of vinyl.' Anybody can put out a cassette, but having a record is a status symbol for groups doing a custom release. Also, the number of pressing plants gets smaller every day, while cassette plants are on the increase." One of the ways Schaumberger deals with the growing pressure of competition from other cassette duplicators is to buy short end rolls of duplicating tape from major manufacturers. "It's quite a savings," he notes.

Best known for their Sound-sheet flexible records, Eva-Tone, of Clearwater, Florida, is another record manufacturer which has recently added tape capability by installing a Gauss 2400 high-speed system with seven slaves and Dolby HX Pro. A Telex 6120 in-cassette system was also put on-line for short runs. Company spokesman Larry

Johnson said the move was intended to supplement, rather than replace their Soundsheet business. "A lot of our customers, especially musicians, manufacturers and publishers, are interested in having both cassettes and Soundsheets, so we felt this was a good time to add tape duplication services." Eva-Tone is now also offering one-, two- and four-color printing for cassette inserts ("J" cards) and retail packaging.

David Porter, owner of Music Annex Recording Studios in Menlo Park, California sees the cassette's market position as remaining strong through the 1980s and into the early 1990s, when other storage media such as the digital cassette will become commonplace. Until then, he expects the audio cassette will continue as a dominant force, and the Annex has begun a duplication division,

having installed an Otari DP 80 380 ips bin loop system. The idea, Porter explains, is to cater to "independent and intermediate sized labels who need high-end music reproduction" and require runs in the 5,000-piece range, although his Otari system can handle up to 100,000 tapes per month. Not forgetting their short run clients, the Annex is now putting in a 16:1 1/2-inch bin loop system based on modified Ampex and GRT components.

The established cassette duplication firms have also been doing quite well, as a whole. Richard Berberian, president of IAN Communications in Wilmington, Massachusetts, reports his business is growing about 400 percent per year, and they have just added 5,000 square feet of space to their facility. IAN has now also expanded into floppy disk and video duplication and hopes to eventually offer CD mastering. One trend Berberian has noted is a greater awareness of quality on the part of his clients, who now usually bring tapes in with a full set of tones so the mastering deck can be aligned for the best reproduction. Another growing area is the use of digital masters for tape duplication, either brought in by the client, or made on the premises from the customer's two track analog master and copied on IAN's Nakamichi DMP 100 digital processor which uses the Sony F1 format.

An increase in customer quality awareness has also been noted by John Campbell, a spokesman for Bonneville Media Communications (Salt Lake City, Utah), said to be the largest duplicator in a 12 state area. Two full-time quality control workers are kept busy monitoring the 40,000 tape/day output of Bonneville's Gauss system, and the acquisition of a Studer 1/2-inch mastering deck has attracted more music duplication business. The firm has also been offering a free "test cassette" (which Campbell says is the tape equivalent of a test pressing) so clients can determine any possible mastering changes before duplication. This service has been especially popular with their growing number of music duplication customers, who now comprise nearly 20 percent of Bonneville's clientele.

"Business is absolutely phenomenal!" says Duane Lundeen, president of Media International in Chicago, a high-speed duplication company which also has both 16 and 24 track recording studios. Lundeen says the outlook for the cassette industry is rosy, and he expects to triple his duplication business (currently at three to four million tapes per year) over the next twelve months. While most of the company's work is in the duplication of tapes for AV clients, they have been getting more and more music work of late from publishers and small labels, who usually request chrome (high bias) tapes.

Master Digital: Diversity in Duplication

Staying at the forefront of digital audio applications and keeping pace with the industry have always been goals of Master Digital, a progressive company which started out as a real time cassette duplication facility and has now diversified into several other growth areas in the industry. The company, best known for their cassette work for audiophile labels, now offers videophile duplicating, Compact Disc master preparation, video and film production, location digital recording, complete packaging and promotional services, and pre-release cassettes for major record labels, such as CBS, RCA, Columbia, Capitol and Warners.

Paul Addis, Master Digital vice-president, sales, explained the process of producing the limited quantity, high quality pre-releases: "We're the first to get the masters, right after they are finished being mixed in the studio. We transfer them to 16-bit digital for duplication, and do the complete packaging and loading for the tapes, which are sent to A & R and promotion people for advanced airplay and other uses. These pre-release orders usually range from 300 to 1,000 pieces, depending on the act and the label."

While somewhat out of the realm of most duplication houses, Master Digital has also been active in putting together audio marketing packages for companies such as Kenwood car stereo, Maxell tape,

Saab automobiles, Sony auto sound and Radio Shack. These projects can be quite complex, involving music licensing, editing, packaging, and the creation of artwork, as well as providing quality real time duplication of the digital masters each project generates.

Master Digital's latest expansion is into the field of videophile duplication, handling either one-inch or 3/4-inch stereo masters to be duplicated onto Hi-Fi VHS and Beta tapes. Their present client list ranges from advertising agencies and record labels to film and video companies. Not surprisingly, the company has again taken their duplication capability one step further, as Addis explains: "We also do complete editing, assembly and duplication of hi-fi video products used in numerous dance clubs across the nation, including the Black Angus chain, Marriott Hotels, the Red Onion, and so forth. Every month, we select the top 15 to 30 music videos, and edit and assemble them together, adding computer-generated graphics for the heads and tails with the client's logo tag. It's almost like a monthly video magazine for them."

All of this activity has not only kept Master Digital busy, but also overcrowded, so two months ago they moved to a new location in Santa Monica, California which is four times larger. Addis summed up the secret of Master Digital's success in simple terms: "We stress the fact that we're a service company. We deliver what we say, we're state-of-the-art, and we do a good job. We're very diversified, and we try to think that we're fairly unique."

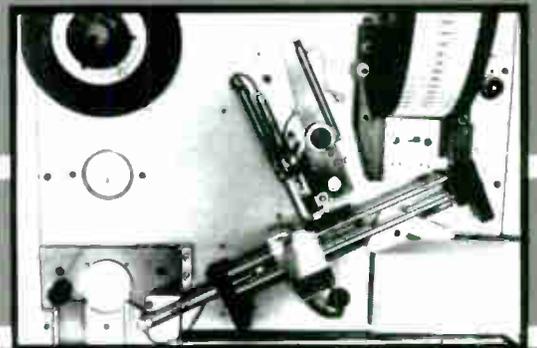
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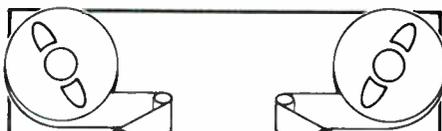
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The future for realtime duplicators also seems secure, according to Liv Khalsa of GRD in Phoenix, Arizona. His 175 recorders (mostly Denon with some Tascam) are kept busy twenty hours a day. Although real time duplication can outperform high-speed duplication systems, Khalsa is quick to point out that achieving optimum results can only be achieved by "being meticulous and constantly checking results. Real time is a very high maintenance business," he warns. "It's replacing 150 tape heads every four months, and you can't do real time right unless you're using three head machines."

William Schubart, president of Resolution (Burlington Vermont) believes his company may be the world's largest real time duplicator, with 400 customized NAD recorders available. Like Khalsa of GRD, Schubart says that quality is of the utmost importance, but added that "delivery means as much to clients as quality. When we are at capacity, we have a policy of turning away work. This gives our clients an exact shipping date we can stick to. Our clients can depend on that."

Imperial Tape, of Santa Monica, California, offers a variety of services, including both real time and high-speed duplicating, and sales of Sony in-cassette duplicators, but the main part of their business involves supplying custom length audio and video cassettes. Owner



High speed duplication system at Bonneville Media.

Howard Ganz is very concerned about the future of the duplication industry. "It's not a real healthy situation right now, because many people are more price rather than quality conscious. Duplicators need to spend more time with clients to educate them on the pros and cons so they can make an intelligent decision as to choices regarding tape and C-zeros. Duplicators would rather use a good tape like Agfa or BASF chrome, and cheap tapes aren't calendared (polished) as well and can be highly abrasive. This can hurt both the client and the duplicator in the long run. But I'm an eternal optimist. I feel there will always be clients—especially music oriented people—that appreciate quality, even though the financial pressures are on. It's disappointing when people don't look farther down the road." ■

Independent Cassette Releases— Putting It All Together

by Diane Sward Rapaport

Sales of prerecorded cassette tapes have been increasing dramatically since 1976. According to the 1984-85 *Billboard International Buyers Guide*, shipments of prerecorded cassettes in 1976 totaled \$146 million and record shipments (both LPs and singles) close to \$2 billion. In 1982, record shipments were still close to the \$2 billion mark, but shipments of prerecorded tapes had risen to a total of \$1.4 billion. And that figure is still rising steadily. At the time of this writing, many chain record stores are beginning to claim that sales of pre-

recorded cassettes have overtaken record sales. Independent labels are also reporting major increases in the sales of prerecorded cassettes, and some have given figures as high as 25 to 35 percent of total sales. A new trend, cassette-only labels, is also rapidly emerging, and with it, magazines devoted to cassette releases alone.

The chief reason for this tremendous growth is increased consumer demand—a demand inextricably linked with the growth in sales and accessibility of cassette-playback equipment and improvements in the fidelity of cassette tapes. People wired to their headphones and portable cassette equipment are found jogging, boating, fishing, driving, hiking, bicycling—or working at their offices on their new personal computers.

At the same time, overall record sales are not showing commensurate increases. The reasons attributed to this include increased sales of prerecorded cassettes, the home taping of music from records or radio, bootlegging, and the appearance of the Compact Disc, which delivers audio excellence with the compactness, durability, and portability of the cassette. Deteriorating quality control in record manufacturing is also cited

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

The new math.

480 ips bin-loop speed. 7.5 ips master speed. 64:1 duplication speed.

With these numbers, Otari's new DP-80 duplication system takes pre-recorded music out of the 1960's and into the 80's.

If you've been delivering marginal, 60's-quality cassettes to your customers, it's time to look at some new numbers for the 80's. Doubling the master speed means increased frequency response and dynamic range. It also means you can take full advantage of other new tape technologies: Extended range CRO₂ formulations and the Dolby* HX Pro headroom extension process. Without these, you may soon find your customers looking elsewhere.

The DP-80 system offers other im-

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 DP-50 Master Reproducer and Slave Recorders.

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as an important reason.

The increase in sales of prerecorded cassettes has been good news for the independent. In almost all cases, the manufacture of cassettes is cheaper than that of records, thereby requiring less initial outlay of funds and increasing the possibility for profit. With cassettes, the independent isn't committed to producing a minimum run of 500 or 1,000 copies as is common for the manufacture of records; quantities of 50 or 100 cassettes can be cost effective and profitable.

DUPLICATION PRICES

Prices for tape duplication have become extremely competitive. In 1982, real-time duplication was, without exception, double or triple the price of

high-speed duplication; the higher the speed ratio, the lower the price. And premium ferric tape was significantly cheaper than chrome.

In mid-1984, however, at least two duplication facilities offered lower prices for real-time than high-speed duplication. Prices for all ratios of high-speed duplication varied widely, and in a few cases, notably large centers of recording activity, salespeople in duplication facilities were unwilling to send out price lists and preferred that you tell them what you wanted so that they could make a bid, much as construction firms do. In quantity, premium ferric tape and chrome tape were only cents apart in price.

When researching prices, a good method is to call the duplicator and

ask for the sales representative. First describe the type of music you are reproducing in terms of its dynamic range and frequency range. You don't have to be technical: you can simply say, for example, that the music contains a lot of bass information or lots of cymbals and bells. Tell the person what type of master you are delivering (½ track; cassette, etc.), what the total running time is, and how many copies you want. Then ask the following questions:

- ▶ What kind of machines do you use for duplication?
- ▶ Do you use the in-cassette or bin-loop system?
- ▶ What type of tape would you normally use for my kind of music?
- ▶ At what speed are you duplicating (if not in real time)?
- ▶ At this speed, what are the tape's frequency response and dynamic range likely to be for my type of master?
- ▶ What type of noise reduction do you use?
- ▶ What is the price and what will it include?

If the sales rep can't answer these questions, ask to speak to a technical person or an engineer.

Here is a range of prices encountered in mid-1984 for 1,000 C-60 cassettes duplicated from a two-track master tape: Real Time, \$1.35-\$3.50; High speed (8:1), \$1.30-\$1.75; High speed (32:1 or 64:1), \$.90-\$1.50.

To add to the confusion, some prices include labels and boxes; some offer the added attraction of four-color two-panel inserts including color separations, and so on. Where a bin-loop system is used, most manufacturers will charge you a one-time fee for copying the material onto the bin-loop master.

GRAPHICS AND PACKAGING

As with album covers, an attractively designed cassette package draws attention to itself and encourages sales. Poorly designed graphics lead to suspicions that the music may also be inferior.

The most common cassette package is a shrink-wrapped box containing a labeled cassette and a four-panel insert. The insert's front and back panels, visible through the box, contain the necessary information, while the reverse sides are commonly printed with supplementary information. More elaborate cassette packages contain six- or eight-panel inserts.

Another kind of cassette package is now finding its way into the market. The boxed cassette (with insert) is being repackaged in a transparent plastic bag, approximately 4-inches by 12-inches, which can be hung from a pegboard. The larger size enables the record company to include more materials, such as a flyer, business card, postcard order form, and so on.

Electro Sound '84 Seminar: Quality is the Issue

During the latter part of August of this year, nearly 100 representatives from record labels, tape duplication firms, and manufacturers met for a seminar on cassette quality hosted by Electro Sound, a maker of high-speed duplicators. The two-day event, which was co-sponsored by Agfa-Gevaert, Athenia, BASF, Capitol Magnetic Products, Columbia Tape, Digital Entertainment Company, Dolby Labs, E.I. DuPont, Hercules, ICM, IPS, JRF, Pfizer, Saki, Shape, and Studer/Revox America, was organized by Electro Sound president Robert Barrone and focused on improvements in every aspect of the cassette medium, from tape particles to finished product.

Frank Diaz of Capitol Magnetics opened the "Magnetic Media" session with an explanation of the basics of tape manufacturing, covering options in base materials, magnetic coatings, binders, slitting and lubricants. Capitol's Joe Kempler talked about the company's new CS-1 duplication tape. Gerhardt Hartmann of Agfa-Gevaert stressed the need for material consistency by improving quality factors such as handling and personnel, and Klaus Goetz of BASF spoke of the advantages of using chrome tapes for bin masters. Donald Winquist of Hercules explained the need to look at tape particles from a price/performance standpoint. John Hudson of DuPont spoke of the widespread acceptance of chrome tapes, and their future potential for computer, digital and other high density storage applications; and Alan Lundquist introduced Pfizer's 2040-D medium coercivity duplication tape.

Saki president Gene Sakasegawa opened the "Heads and Shells" ses-

sion with a discussion of tape head manufacturing, and announced Saki's new ferrite heads formulated for high-speed chrome and metal tape duplication. Rolf Sager of ICM Limited and Willaim Prechtel of IPS stressed the importance of using quality shells, especially under the forces of high speed loading and on-cassette printing.

The session on "Master Production" included Ken Gundry of Dolby Labs explaining how the Dolby HX system works with masters of various speeds; Fred Lane of Studer/Revox talking about the Studer A80-MR mastering deck; and Tore Nordahl of Digital Entertainment Company (Mitsubishi) noted the advantages of making bin masters directly from digital tapes. He added that the future possibilities of high speed digital bin masters are still a long way off, although the DAT (Digital Audio Tape) cassette is a much more likely possibility in the next few years.

The "Electro Sound Approach" session included speakers from that company's engineering staff: Bob Wortsman emphasized the need for more industry-wide standards and better quality control; Clark McCoy focused on the need for regular maintenance, explaining how a small investment in the proper test gear can really pay off; and Robert Langevin spoke of the technical problems of developing a system with a duplication ratio of above 64:1.

The final session, held on the second day, featured audio consultant Mike Jones on "Future Directions" of the duplication industry. Here, a lot of the points of the first day's session were brought up, but with an outlook towards how tomorrow's duplicators could benefit from them. One of Jones' concluding points was to reiterate the need for quality control, especially in light of digital audio's effect on raising consumers' awareness of audio quality. ■

Just because a cassette insert is smaller than an album cover doesn't mean it will cost less to design. Creating effective graphics on a small scale makes challenging demands on a designer's skill: he or she has much less space in which to deliver a potent message. As a result, you can expect to pay the equivalent of album cover design prices to achieve good results.

You can help your graphic designer greatly by providing at the very beginning all the words to be included in your package. The graphic designer will have to design, size, and integrate the words aesthetically to make the information easy to find and read.

You can also help your graphic designer by asking the firm that will be printing the inserts to provide him or her with the layout specifications. This will ensure that the artwork is properly sized for printing.

The following checklists of information are labeled mandatory for information that must be included on your cassette package, and optional for supplementary information that can be included when and if you feel you have the extra room.

Cassette Label: Mandatory

- ▶ Cassette title
- ▶ You name (or your group's) if different from the title
- ▶ Record company name
- ▶ Record company logo
- ▶ The letters "A" and "B" or the words "Side One" and "Side Two"
- ▶ Tape playback information: type of tape; EQ setting required if different from that normally associated with the type of tape used; type of noise reduction used, if any; stereo or mono indication. Example: "High Bias Chrome, 120 EQ, Dolby, Stereo."
- ▶ Copyright notice for the songs
- ▶ Copyright notice for the cassette
- ▶ ASCAP or BMI affiliation

Cassette Label: Optional

- ▶ Song titles in sequence
- ▶ Lengths of songs
- ▶ Total length of playing side
- ▶ Address of record company
- ▶ Name(s) of song publisher(s)

Cassette Insert: Mandatory

- ▶ Front cover: Cassette title; your name (or your group's) if different from title.
- ▶ Spine: Cassette title; your name (or your group's) if different from title; name or logo of record company; cassette catalog number.
- ▶ Back cover (and/or reverse of panels): Song titles; sequence of songs; name(s) of composers; name(s) of publisher(s); names of primary musicians and instruments played; copyright notices for the songs; copyright notice for the cassette; copyright notice for the cover design;

ASCAP or BMI affiliation; tape playback information.

Cassette Insert: Optional

- ▶ Name and mailing address of your label (although this is not mandatory, it is extremely important if you are an independent)
- ▶ Mail order price
- ▶ Credits for other musicians, vocalists, producer, engineer, arranger, graphic designer, photographer, illustrator, recording studio, manufacturer, printer
- ▶ Biographical material or information about the music, lyrics and musicians
- ▶ Lyric sheets
- ▶ Other records or books you might have for sale
- ▶ Mail order form
- ▶ Cassette dedication or special thanks

Fortunately, in contrast to design prices, the cassette's smaller format does mean lower printing costs for cassette labels and inserts compared with album covers. Generally speaking, the majority of cassette-duplication firms usually quote duplication prices that include label printing (one color only) and the box (but not shrinkwrapping). Some firms also include the printing for a two-panel insert with color on the front and black and white on the back. Here are some average prices when printing prices are quoted separately.

- ▶ Cassette labels (one color): 10 cents label/side
- ▶ Shrinkwrap: 7 cents/box
- ▶ Inserts (black and white): \$90 to \$125 per 1,000

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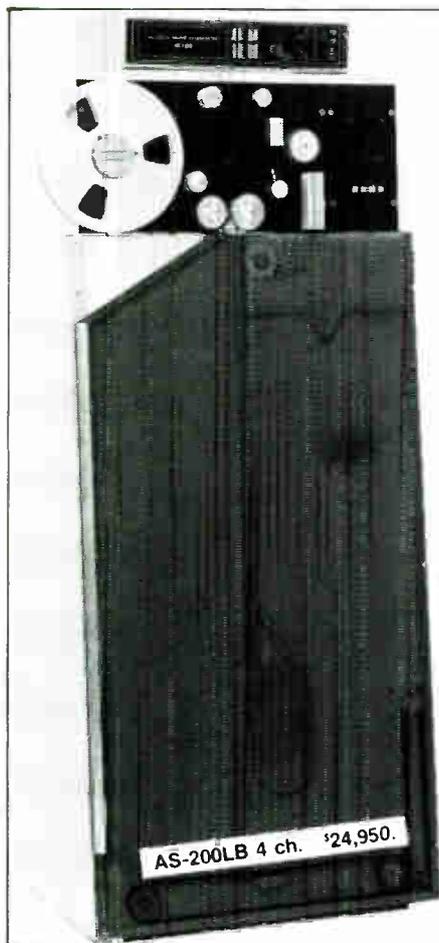
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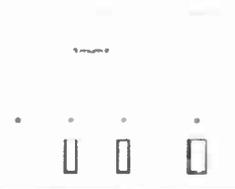
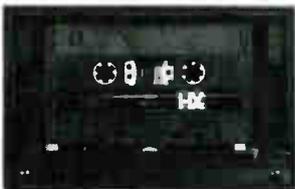


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► Inserts (full color front, black and white back, includes color separation): \$300 to \$350 per 1,000
Assembling inserts and cassettes into boxes is usually included in the price for printing and/or duplication.

Because pricing and services are highly competitive, be sure you are clear about what you will be paying for. A good method for asking for printing price quotations is first to describe the desired quantity, color, and size of insert, and then to ask the following questions:

Black and White

(or one-, two-, or three-color printing)

- Price per thousand?
- Charge for half-tones (black and white photographs that need to be converted for printing)?
- Charge for additional ink colors?
- Charge for set-up, if any?

Full Color

- Price per thousand?
- Price for color separations and/or stripping?
- Additional charges?

As with the duplication of the tape, request samples of printing, particularly if you are printing in full color.

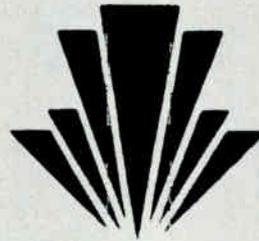
PRODUCT PRICING

Most independent cassettes are priced according to the length of the music, the amount of money spent for both recording and duplication, the type of tape, and the target market. At the time of this writing, most major record labels are asking that 45-minute cassettes retail for \$8.98. This is the standard against which you will be competing. Remember: you, not the retail store, decide on the retail price.

As an incentive for both the store and the consumer to buy, some independents sell cassettes to stores at slightly below the price commonly asked by distributors. They also use the lower prices to bargain for key display space or in-store play of the music.

Once you have set your retail price, the next step is to decide what your store wholesale price will be when you sell to record stores directly, and at what price you will sell to distributors. At this time, most distributors sell to stores at approximately 55 to 65 percent of the retail list price (or between \$4.75 and \$6.00). Distributors buy from record companies at approximately 25 to 40 percent of the retail list price (or between \$2.30 and \$3.50).

The preceding article is an excerpt from the revised and expanded fourth edition of How to Make and Sell Your Own Record by Diane Sward Rapaport. The book is available through Mix Bookshelf (see page 119), or at your local book or music store. ■



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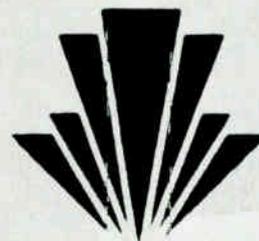
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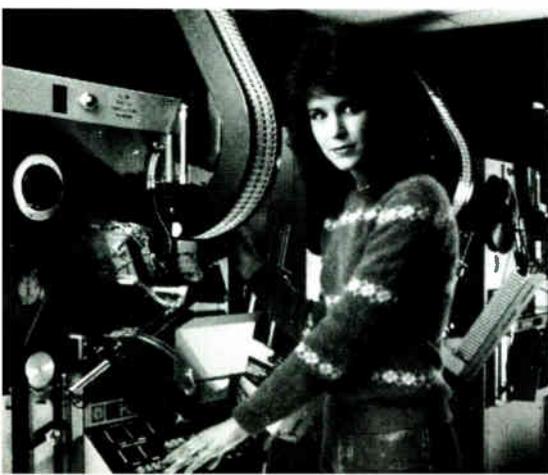
RECORD LABELS STRUGGLE TO KEEP UP IN AN AGE OF CHANGE

by Blair Jackson

When the great prognosticators first looked into their crystal balls several years ago and saw the eventual demise of the phonograph record, many people were skeptical. After all, virtually everyone owned records of some sort and, of course, the music business economy, based on these slabs of polyvinyl chloride, had mushroomed into a multi-billion dollar business. Cassettes were still considerably inferior to albums and weren't seen as much of a threat to the conventional LP, and the Compact Disc—with its technology involving digital recording and lasers—seemed like the stuff of science fiction to most, strictly James Bond stuff. The LP's only serious threat in the late '60s and early '70s—the eight track cartridge—died a slow, painful death, no doubt convincing many of the invincibility of the record.

But in the last few years a number of factors have conspired to strip the

Cassette loading operator at Bonneville Communications, Salt Lake City



plastic record of its once supreme position. Cassettes and cassette decks (for both home and car) have improved dramatically and dropped in price while records have become more expensive and, many would argue, the number of defective disks has increased. Fifteen years ago, the record industry did not really foresee the time when most cars would be equipped (either at the factory or subsequently) with cassette players, surely a major factor in the cassette's ascendancy. And, too, the personal cassette player craze has shown no signs of abating a couple of years after the introduction of Sony's Walkman player. In a mobile culture, portability is a premium, and in that regard the conventional record has nothing to offer, relegated as it must be to the living rooms, bedrooms and basements of America. And while the Compact Disc is still in its relative infancy, there seems to be little question that its impact on the music business will be enormous and long lasting. Now, when experts like Emiel Petrone say "The black vinyl business will be no business soon" (see interview in this issue) it's time to start taking the issue of the record's eventual extinction seriously.

Record companies have seen the handwriting on the wall for a number of years, mainly because they've had to. They've seen cassette sales jump year after year. This year alone, the RIAA reported that for the first six months of '84, cassette sales jumped an unprecedented 36 percent in dollar volume, while LP sales declined about 6 percent. There are now numerous artists who sell more cassettes than albums, and it's expected that the next several years will see CDs finally making a significant statistical dent



An inspection point at the injection compression machine in Polygram's Compact Disc plant in Hanover/Langenhagen, West Germany.

in both cassette and album figures. This is a wide open time in the record business, to put it mildly. Recently, we spoke with representatives from Warner Bros., Columbia and the independent fusion label GRP to find out about some of the trends they're seeing in this area, and to learn about how the companies keep up with the ever-shifting patterns of sales.

Warner Bros. Records is currently enjoying a banner year, after a bit of rough sledding the past couple of years. Two of the best selling records of the year are on Warners, Van Halen's *1984* and the smash, Prince's *Purple Rain*. According to Warners, both records are selling better as cassettes currently than albums. This is no surprise in the case of Van Halen, as heavy metal fans have long preferred cassettes by a small, but significant statistical edge. (You can't blast an album out of your Trans Am.)

According to Lou Dennis, vice president of sales for Warner Bros., the business of deciding how many records to press versus cassettes to manufacture has evolved into a meticulous science. "It's hard to predict in advance," he says. "We look at past sales history on an act, but that won't tell you everything. Many acts are now selling 1:1 albums to cassettes. Prince sells more cassettes. For our ECM line, we sell more albums than cassettes, but the ratio is getting smaller. Pat Metheny, for example, now sells 3:1, albums to cassettes. He's very

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popular. Someone like Jack DeJonette, who doesn't have quite the following, is still mainly albums.

"The record business is not a formula business, despite what you may hear. You can't predict what will be a regional hit a lot of times. When we have an album coming out, we send out suggested initial orders for albums and cassettes to our branches and then they can raise it or lower it, depending on the specifics of their market. You have to stay loose about it. One record may be happening in Detroit but not in New York. Madonna broke in New York, then became a hit on the West Coast, but it was quite a while before she sold *anything* in the Midwest. Then you'll find that record that's popular in Omaha and they don't care about it in New York."

And then there's the problem that companies dream about: having a record that is so successful that everyone has to work overtime just to keep up with the demand. Such was the case with *Purple Rain*. Over at Columbia, that might have happened with Bruce Springsteen's blockbuster *Born in the USA*, but Springsteen's LP was a sure-fire hit and so the company was ready, a good thing since it sold more than a million albums and cassettes in its first week of release.

Because home taping is still a

Preparing record blanks at Transco in Linden, New Jersey.

significant factor cutting into sales of records, increasingly bands and their labels are offering buyers incentives to purchase the pre-recorded cassette of a record (rather than a blank and then taping a friend's record) by including material that doesn't appear on the LP. In the case of the new Talking Heads live album, *Stop Making Sense*, for instance, several of the songs on the cassette are longer than the album versions. But according to Dennis, "So far we can't find too much effect. The ratio of albums to cassettes has stayed about the same, which is not quite 1:1. It's the same with the Pretenders."

Warners has moved somewhat tentatively in the area of CDs, though they have two of the medium's hottest releases, *Purple Rain*, which has sold well over 15,000 (miniscule compared to the millions of cassettes and albums) and Fleetwood Mac's *Rumours*, which has now shown legs as an audiophile record and a CD seven years after its release. According to Dennis, Warner Bros. is making its decision of what to put on CD "through a combination of the act's



potential and, really, whether the sound of the record lends itself to that." And that's why an artist like Rickie Lee Jones, who makes records of incredible clarity and definition is ideally suited to CD, even though her album sales don't compare with Warners stalwarts like ZZ Top and Van Halen. RCA Records has shown its commitment to the new technology by offering to pay extra money for many ar-

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tists to record digitally, so that the end product will be better suited to eventual release as a CD. That, of course, is good news for digitally equipped studios, too.

At New York-based GRP Records, an independent label (once affiliated with Arista) that specializes in fusion jazz, label founders Larry Rosen and David Grusin (himself a popular recording artist and film scorer) have seen the future of the business and they believe it is the CD. They have converted much of their past product of the label to CD, and now all of their releases come out simultaneously as a record, cassette and CD. (In addition, GRP recently signed an agreement with Nakamichi licensing the Japanese giant to release some GRP titles as audiophile cassettes. "These are absolutely the finest cassettes available," Rosen crows.)

"The kind of product we're making," Rosen says, "is perfect for Compact Disc because you've got a whole body of listeners who like and have actually come to expect, state-of-the-art sound. We've been recording almost everything digitally for the last five years. Jazz is perfect for CD because it takes advantage of the dynamic range and the quiet passages so beautifully. With rock and roll, if you have clicks here and there and a little noise on the record, most people don't even notice. But in a lot of jazz, which can be very open sounding, you have to have that clean background, and CD is as clean as it gets. I'm a firm believer in the Compact Disc. I just can't imagine that it's not the wave of the future."

Rosen says that many of the GRP's releases have fared well as CDs, noting that their Glenn Miller *In the Digital Mood* CD is second only to Michael Jackson's *Thriller* in CD sales domestically. Rosen says that for most of their artists they'll produce relatively few CDs initially, but on recent releases by Grusin and Dave Valentin, the company ordered 4,000 and 7,000 respectively. GRP uses three CD plants to fill their orders, the CBS/Sony plant in Terre Haute, Indiana, and Sanyo and JVC operations in Japan.

Rosen bubbles with enthusiasm for the CD, noting that new Sony players for cars and the imminent introduction of Walkman-style CD players will help open up the blossoming CD market. "When the consumer goes and buys an analog record and then transfers it to cassette at home to play in their car, they're going to be spending as much or more than if they bought a CD for \$12.98, which could then be played on CD players at home, or in their car, or jogging around. It's really getting exciting."

Bob Altschuler, vice president of press relations at Columbia, and also a big booster of CDs, says that CBS is necessarily more cautious in its CD release

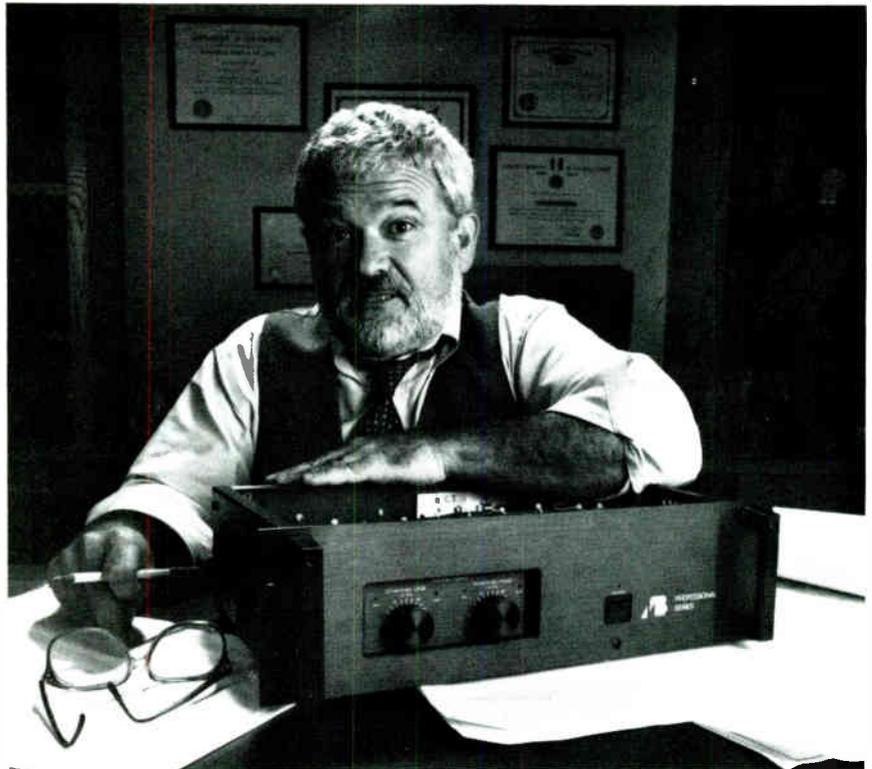
schedule. "Sales for even the most popular CDs are still very, very small by record standards," he notes, "so it's really not feasible for a company with as many acts as we have to spend the money on every single title to have it mastered for CD format. Really, the public will determine how many records we see come out as CDs by their acceptance of it."

"I'm quite optimistic. I'm a real CD aficionado, with more than 500 of them myself, mainly jazz and classical. One good sign is that the other day I was in my favorite record store [in midtown Manhattan] and there was actually a line of people waiting to go through the CD section! That tells me that the acceptance is increasing."

Altschuler remarks that Columbia, too, is finding that cassette sales are

way up, even in traditionally LP-heavy areas like jazz and classical. "Everyone's making better cassettes than they used to, and certainly there's more good cassette playback equipment available now than there ever has been before." Still, Altschuler isn't willing to seal the vinyl disk in a coffin yet.

"People still love albums, I think. When a new record comes out, we've found that in many cases, the initial sales are dominated by record buyers and that it's the second, third and fourth wave of buyers who push the percentage of cassettes so high. An album is still more of a collector's item, with the big graphics and all. A cassette is a convenient little carrier but it just doesn't have the mystique of the LP. I'm sure the LP will be here for *many* years to come." ■



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(916) 635-0890

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TAPETODISK TAPETODISK TAPETODISK TAPETODISK TAPETODISK

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

Eastern

AAA RECORDING
MASTERING, PRESSING & TAPE DUPLICATION
130 West 42nd Street (Room 552), New York, NY 10036
(212) 221-6627
Contact: Fred Vargas, owner

ALPHA RECORDS, INC.
PRESSING
1400 N.W. 65th Ave., Plantation, FL 33313 or
PO Box 15011, Ft. Lauderdale, FL 33318
(305) 587-6011
Contact: Dirk Smith, president

AMERICAN MULTIMEDIA, INC.
MASTERING & TAPE DUPLICATION
Rt. 8, Box 215-A, Tucker Street Ext.
Burlington, NC 27215
(919) 229-5559

Contact: Tim Mallard, plant manager
MASTERING
Tape machines: JVC Digital, Otari, Studer, Ampex
Monitor speakers: UREI 813, JBL 4430
Signal processing: Aphex, EXR, Prime Time, Super Prime Time, 224, 224X

Engineers: Several
Rates: Call for quotes
Credits: Upon inquiry
Other services: Complete video production, multi-track mix-downs, Grass Valley Digital Video Editor, Chyron Graphics Generator, complete assortment of UREI ORRAN dbx Processors

TAPE DUPLICATION
Duplicator: Electric Sound 8000, Gauss, Otari, total 100 slaves
Capacity: 10,000 per hour
Method of duplication: Bin loop
Mastering equipment: JVC Digital, Sony 1610, dbx 700, Sony FCM F1, Studer AFO, Otari MTR 10, Ampex ATR 100
Tape used: Upon customer request
Shell used: Upon customer request
Duplicating speed: 32 | 64 | 128 |
Type of loading: 36 King 790 types
Packaging availability/Fulfillment services: (4) complete II semann packaging lines; (4) Apex printers
Rates: Please call
Other services: Complete in-house printing facilities with (4) Heidelberg six color presses

AMP RECORDING & DUPLICATING SERVICE
TAPE DUPLICATION
307 W. Main St., PO Box 14, Maple Shade, NJ 08052
(609) 667-1667
Contact: Gerald Tyson, vice president

ANGEL SOUND, INC.
TAPE DUPLICATION
1576 Broadway, New York, NY 10036
(212) 765-7460
Contact: Sandy Sandoval, president

APEXTON RECORD MFG. CORP
PRESSING, MASTERING, TAPE DUPLICATION
44-27 Purves St., L.I.C., NY 11101
(212) 937-4038
Contact: Derek Ropiak, manager

APON RECORD COMPANY, INC.
MASTERING, PRESSING & TAPE DUPLICATION
P.O. Box 3082 Steinway Station
Long Island City, NY 11103
(212) 721-5599
Contact: Andrew Poncis, manager

PAT APPLESON STUDIOS, INC.
TAPE DUPLICATION
1000 NW 159 Dr., Miami, FL 33169
(305) 625-4435
Contact: Pat Appleton, president

ASR RECORDING SERVICES, INC.
TAPE DUPLICATION
21 Harristown Rd., Glen Rock, NJ 07452
(201) 652-5600
Contact: Larry Block, vice president sales

ASSOCIATED AUDIO SERVICES
MASTERING, TAPE DUPLICATION
181 Westchester Avenue, Port Chester, NY 10573
(914) 937-5129
Contact: D. Richard Krus, president

AUDIO CRAFT CO.
MASTERING, TAPE DUPLICATION
2701 E. Sunrise Blvd., Suite 401
Ft. Lauderdale, FL 33304
(305) 563-0553, Toll Free 1-800-432-0405 (FL)
Contact: Joe Smith or Mark Auld, managers

MASTERING

Tape machines: Nakamichi digital processing, Otari, Revox Technics

Signal processing: FXR, Burwen UREI, Orban dbx, Dolby Symetrix, Thompson, Techniques, Crown

Engineers: Mark Auld

Rates: Upon request

TAPE DUPLICATION

Duplicator: TEAC, MCI, Sony, Real time Duplication bin-loop

Capacity: Growing

Method of duplication: Cassette, bin loop

Tape used: Aola 1612, BASF Chrome

Shell used: Magnetic Media

Duplicating speed: 17864 |

Type of loading: King

Packaging equipment/Fulfillment services: Yes

Rates: Upon request

Other services: Video Duplication VHS & Beta Hi-Fi Duplication

AUDIO DIGITAL INC.
(DIV. STUDIO MAGNETICS GROUP)
TAPE DUPLICATION
12 Long Island Avenue, Holtsville, NY 11742
(516) 289-3033
Contact: Paul Glantzman, sales manager

AUDIO DUPLICATING SERVICE
TAPE DUPLICATION
915 NE 3rd Avenue, Fort Lauderdale, FL 33304
(305) 764-0333
Contact: Jody Clawson, production Manager

AUDIO MATRIX, INC
MASTERING
915 Westchester Ave., The Bronx, NY 10459
(212) 589-3500
Contact: Robert Shilman, service manager

AUDIO VISUAL COMMUNICATIONS INC.
MASTERING, TAPE DUPLICATION
435 Crooked Lane, King of Prussia, PA 19406
(215) 272-8500
Contact: Frank Matys, production manager

BEE-VEE SOUND, INC
TAPE DUPLICATION
211 East 43rd Street, New York, NY 10017
(212) 949-9170
Contact: Bruno Vineis, owner

BELL & HOWELL
COLUMBIA PICTURES VIDEO SERVICES
TAPE DUPLICATION
505 Fifth Avenue, Suite 600, New York, NY 10017
(212) 697-7355
Contact: David C. Cuyler, vice president, entertainment sales

BESTWAY GROUP (Peerless Audiophile Div.)
MASTERING & PRESSING
1105 Globe Ave., Mountainside, NJ 07092
(201) 232-8383
Contact: Paul Stevens

BURLINGTON AUDIO TAPES
TAPE DUPLICATION
106 Mott St., Oceanside, NY 11572
(516) 678-4414
Contact: David Schwartz, director of marketing

CASSETTE CONNECTION
TAPE DUPLICATION
41 Music Square East, Nashville, TN 37203
(615) 248-3131
Contact: Karen Irby

CASSETTE PRODUCTIONS, INC
TAPE DUPLICATION
109 Prospect Place, Hillsdale, NJ 07642
(201) 666-3300
Contact: Julius A. Konins, President; Wendy M. Konins, Vice President; Kevin Yalorola, General Manager; Paul Antepara, Plant Manager

TAPE DUPLICATION
Duplicator: 6 custom designed Dubbins high speed duplicators with 14 slaves each
Capacity: 100,000/wk
Method of duplication: Bin loop
Mastering equipment: Ampex
Tape used: BASF C102, BASF LHD and Ampex 406/407
Shell used: Various
Duplicating speed: 16 | 8 | 1 | 1 |

Type of loading: King 790, TTL
Packaging availability/Fulfillment services: All forms
Rates: Write for price list
Other services: Mastering from digital source (PCM-F1)

CENTRAL AUDIO VISUAL, INC.
TAPE DUPLICATION, MASTERING
 1212 South Andrews Ave., Ft. Lauderdale, FL 33316
 (305) 522-3796, FL Toll Free 1-800-432-3756
 Contact: Sheila Henderson, marketing director

DICK CHARLES RECORDING
MASTERING & TAPE DUPLICATION
 130 West 42nd Street, New York, NY 10036
 (212) 819-0920
 Contact: Dick Charles, president

COMMERCIAL AUDIO
TAPE DUPLICATION
 77 South Witchduck Road, Virginia Beach, VA 23462
 (804) 497-6506
 Contact: Alan Sawyer, manager

COOK LABORATORIES, INC.
MASTERING, PRESSING & TAPE DUPLICATION
 375 Ely Ave., Norwalk, CT 06854
 (203) 853-3641
 Contact: Emory G. Cook, president

CREST RECORDS, INC. & GOLDEN CREST RECORDS, INC.
MASTERING, PRESSING & TAPE DUPLICATION
 220 Broadway, Huntington Station, NY 11746
 (516) 423-7090
 Contact: Mack Wolfson, vice president

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, with Dolby HX
Tape used: CBS
Shell used: Data Packaging IPS
Duplicating speed: 16 1, 32 1, 64 1
Type of loading: King Electro Sound
Packaging availability/Fulfillment services: Shrink wrap custom packaging
Rates: Please call for rates
Other services: Apex on cassette printing, cassette labels, inserts, specialists in computer software duplication

CUE RECORDINGS, INC.
MASTERING, PRESSING, & TAPE DUPLICATION
 1156 Avenue of the Americas, New York, NY 10036
 (212) 921-9221

Contact: Mel Kaiser, president

TAPE DUPLICATION

Duplicator: ElectroSound (5)

Method of duplication: Bin loop

Mastering equipment: Scully

Tape used: Columbia

Shell used: Sonic seal and screw type

Duplicating speed: 120 ips

Type of loading: ElectroSound 1800

Packaging availability/Fulfillment services: Full packaging

Other services: Custom duplicating in Manhattan

CUSTOM RECORDING & SOUND, INC.
TAPE DUPLICATION
 1225 Pendleton St., Greenville, SC 29610
 (803) 269-5018

Contact: Jerry Davis, general manager

THE CUTTING EDGE
MASTERING, PRESSING & TAPE DUPLICATION
 P.O. Box 217, Ferndale, NY 12734
 (914) 292-5965

Contact: Paul Gerry, owner and chief cutting engineer

MASTERING

Cutting lathes: Scully Lathe with Westrex 3DI Cutterhead, Hansteel Audio 250 watt per channel cutting amps, video monitoring

Console: Custom built, suited for direct to disk

Tape machines: Ampex 351 specially modified for tape to disk transfer

Monitor speakers: JBL 4x11's, Auratone, Altec Voice of The Theatre

Signal processing: Fairchild 670 compressor, Ashly Para-metric EQ, Graphic EQ, Pultec EQ, UREI 1176N, Dolby A&B, dbx I and II and Aphex Exciter, Symetrix Noise Reduction, UREI 550 Filter, Fairchild Conax HFL, & other misc. outboard gear

Engineers: Paul Gerry

Rates: 12" \$90/side, 7" \$40/side, client attendance \$65.00 per hour, other services available—write for free brochure

Credits: Last available on request

Other services: Direct to disc, plating, pressing, tape duplicating, sleeve and jacket production

PRESSING

Presses (Mfg. and quantity): All 12" production is audiophile quality by an outside facility if needed

Rates: On request—also included in brochure

Other services: Labels, design and jacket production, printed sleeves—7" and 12"

TAPE DUPLICATION

Rates: On request—also included in brochure

Other services: Packaging and artwork, label and insert design



THE CUTTING EDGE
 Ferndale, NY

DEE-BEE RECORDING SERVICE
TAPE DUPLICATION
 704 9th Avenue, South, Myrtle Beach, SC 29577
 (803) 448-8091
 Contact: Stu Deppen/Pat Gernick, partners

DELTA RECORDING CORP.
TAPE DUPLICATION
 16 W. 46th St., New York, NY 10036
 (212) 840-1350
 Contact: JP. Clemente, Grand Clone Master

DISC COMMUNICATIONS LTD.
MASTERING, PRESSING & TAPE DUPLICATION
 1776 Broadway, New York, NY 10022
 (212) 246-6696
 Contact: Jerry Benish

DISKMAKERS, INC.
PRESSING & TAPE DUPLICATION
 925 N. 3rd St., Philadelphia, PA 19123
 (215) 627-2277

Contact: Paul Dony, General Manager

PRESSING

Presses (Mfg. and quantity): 10 presses Tracey Val

Capacity: 80,000 wk

Vinyl used: Kesser and Conahan

Rates: Write for price list

Other services: Mastering, plating and labels

TAPE DUPLICATION

Duplicator: ElectroSound 10 slave

Capacity: 80,000 wk

Method of duplication: Bin loop

Mastering equipment: Scully and Ampex

Tape used: CBS and AGFA

Shell used: Sharp

Duplicating speed: 16 1

Type of loading: King

Packaging availability/Fulfillment services: All types

Rates: Write for price list

Other services: Labels and insert cards

DYNAMIC RECORDING
PRESSING & TAPE DUPLICATION
 2846 Dewey Ave., Rochester, NY 14616
 (716) 621-6270
 Contact: Dave Kaspersin, owner

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

EUROPADISK, LTD.
PRESSING
 75 Varick St., New York, NY 10013
 (212) 226-4401; TWX 710 581 2034
 Contact: Wolf Hutson, production manager

PRESSING

Presses (Mfg. and quantity): Two Hamilton automatics, three Toolex Alpha automatics

Capacity: 12,000 LP's per day

Vinyl used: Teldec (imported from Germany)

Rates: Three types available: Ultimate Audiophile, Audiophile, and Europa Classical. Prices range from 59¢ to \$1.21 depending on type and quantity

Credits: All RCA digital and 5 Series, Moss Music Group digital, Telarc, Vanguard Digital, CRI, Musical Heritage digital, the Franklin Mint (classical product)

Other services: Central plating, internationally renowned, audiophile quality



EVA-TONE INC.
 Clearwater, FL

EVA-TONE INC.
MASTERING, PRESSING & TAPE DUPLICATION
 P.O. Box 7020, Clearwater, FL 33518
 (813) 577-7000, call 1-800-EVA-TONE
 Contact: James Dunne, vice president marketing/sales

EXECUTIVE RECORDING LTD.
MASTERING
 300 W. 55th St., New York, NY 10019
 (212) 247-7434
 Contact: Gene Sayet, the boss

FORGE RECORDING STUDIOS, INC.
TAPE DUPLICATION
 P.O. Box 861, Valley Forge, PA 19481
 119 Great Valley Parkway, Malvern, PA 19355
 (215) 935-1422 or 644-3266
 Contact: Warren R. Wilson, president

MASTERING

Machines: Ampex ATR-104, Scully, 3M 8 track 1"

Console: Auditorionics

Tape machines: Ampex ATR 102 1/4" & 1/2"

Monitor speakers: JBL

Signal processing: Valley People noise gates, Graphic EQ, AKG

reverb, all type noise reduction, dbx limiters

Engineers: W.R. Wilson

Rates: \$35/hour plus tape-reel & box

Other services: Label printing and packaging

TAPE DUPLICATION

Duplicator: 2-MTI

Capacity: \$10,000 per day

Method of duplication: Bin loop 64 1, 32 1 1/2"

Tape used: AGFA, Ampex, CBS, BASF, Max Media

Shell used: Max Media, IPS, Elmar, MTI, Shape

Duplicating speed: 64 1, 32 1

Type of loading: King 790

Packaging equipment/Fulfillment services: All packaging and drop shipping services

Rates: Upon request



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

**FRANKFORD/WAYNE MASTERING LABS, INC.
MASTERING**
134 N. 12th Street, Philadelphia, PA 19107
(215) 561-1794

Contact: Lynn Steele, general manager; Clara McLeod, studio manager; Tom Steele, owner; resident Nim Sarikananda, chief engineer

MASTERING

Cutting lathes: (2) Scully/Ranstelee automated lathes with block Compudisk computer and Westrex 3DIIAH/Hanstelee cutterhead drivers (1) Neumann lathe with Compudisk computer and Neumann SX 74 Hanstelee custom cutterhead driver

Console: (2) Hanstelee Audio custom with full processing and equalization facilities. One is digitally equipped

Tape machines: Sony/MCI JH 110B 1/4 and 1/2" 4M M64 2 track Technics Professional 1520 Ampex/Inovonics 400 2 custom Technics cassette Sony VO 5600 Umatic digital Sony Betamax digital F 1, Sony PCM 10100 digital processors

Monitor speakers: (2) JBL 434 4B (2) JBL 4340 (2) Altec Mastering Labs (2) JBL 4311 (2) Auratone (2) JVC Minimonitors

Signal processing: Equalizers by Sontec, UREI, Lang Sound craftsman Pro Hanstelee Audio Limiters, compressors by Sontec, CBS Labs. Digital audio processing by Ampex ADD 1 DDI, Sony PCM 101/100 F 1 processors. Noise reduction—Dolby A and B, dbx I and II CBS CX encoding/decoding. Custom proprietary audio processing equipment by Hanstelee Audio Labs

Engineers: Nim Sarikananda, Tom Steele plus one freelance
Rates: Client attendance \$130/hour LP masters \$115/side, 45 masters \$40/side 1/2" single masters \$80/side LP rels D/F \$120, 45 rels D/F \$45 Other rates including complete package pressing plans upon request

Credits: "The Sounds of Philadelphia," Gamble, Huff, Bell, Grover Washington Jr., Teddy Pendergrass, Denise Williams to name just a few

Other services: Sony PCM digital to analog and analog to digital transfers. Complete in-house Sony PCM digital audio facilities. 1/2" two-track record/playback. Direct-to-disk and half-speed mastering. CD digital master preparation. Package pressing plans for LP's and 45's

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FRANKFORD/WAYNE MASTERING LABS, INC.
New York, NY

**FRANKFORD/WAYNE MASTERING LABS, INC.
MASTERING**
1697 Broadway, New York, NY 10019
(212) 582-5473

Contact: Norvell Miller, general manager, Tom Steele, president/chief engineer

MASTERING

(5 cutting room/mastering suites,

1 digital/video preparation room)

Cutting lathes: (3) Scully/Ranstelee automated lathes with Sontec Compudisk computer and Neumann SX 74/Ranstelee cutterhead drive systems. (1) Neumann lathe with Technics Quartz motor drive, Sontec Compudisk computer and lathes with Capps computers and Westrex 3DIIAH/Hanstelee cutter systems

Consoles: (5) custom/proprietary Ranstelee Audio with full equalization and processing facilities analog and digital capable. Transformerless

Tape machines: (5) Sony/MCI JH 110M 1/4" and 1/2", (2) Sony/MCI JH 110B two track, (6) Technics Professional 1520 two track, (4) Technics cassette re-records Digital: Sony BVU-200B, VO 5800 Umatics, Sony Betamax, JVC VHS with Sony PCM-101/100, PCM-F1 and PCM-1600/1610 digital processors, Studer and Sony/MCI when available, Ampex AG-440B

Monitor speakers: (6) JBL 4350B, (2) JBL 4343B, (2) JBL 4330, (2) JBL 4311, (6) ADS 300 Mini Monitors, (4) Auratone 5C, (2) Technics 6060, (2) Altec/Mastering Labs

Signal processing: Equalizers by Sontec, UREI, Pultec, Ranstelee Audio, Technics Professional, Soundcraftsman Pro. Limiters/compressors by Sontec, CBS Labs. Noise reduction by Dolby and dbx (all formats) CBS CX encoding/decoding. Proprietary audio processing equipment by Ranstelee Audio

Engineers: Tom Steele (chief), Dom Romeo, Herb Powers Jr., Tom Coyne, Don Grossinger, Carlton Batts, plus freelance
Rates: Client attendance \$165/hour, LP masters \$115/side, 45 masters \$40/side, 1/2" single masters \$80/side LP rels D/F \$120, 45 rels D/F \$45 Other rates including complete package pressing plans available upon request

Recent credits: Laura Branigan, Force MD's, Elvis Costello, Eddy Grant, Shannon, Kashif, Newcleus, Johnny Winter, Gary U.S. Bonds, Jellybean, James Brown/Africa Bambaataa

Other services: Sony PCM digital to analog and analog to digital transfers. Complete in-house Sony PCM digital audio facilities. 1/2" two-track record/playback. Direct-to-disk and half-speed mastering. CD digital master preparation. Package pressing plans for LP's and 45's

**GEORGIA RECORD PRESSING
PRESSING**

262 Rio Circle, Decatur, GA 30030
(404) 373-2673

Contact: Keith Fields, general manager

GOLDEN CREST RECORDS

MASTERING, PRESSING & TAPE DUPLICATION
220 Broadway, Box 2859, Huntington Station, NY 11746
Toll free (800) 645-5318; NY (516) 423-7090
Contact: Mack Wolfson, executive vice president

GOODTIME SOUND RECORDING

MASTERING
101 Westchester Ave., Port Chester, New York 10573
(914) 939-1066

Contact: Judy Novy, studio manager

THE GROOVE SHOP LTD.

MASTERING
10815 Bodine Road, Clarence, New York 14031
(716) 759-2608

Contact: Robert Grotke, chief engineer

MASTERING

Cutting lathes: Neumann VMS-70/SX 74
Console: Neumann SP-272 transformerless
Tape machines: Studer A-80 transformerless
Monitor speakers: UREI 813 time aligned, Yamaha NS-10, Westlake BBS5
Signal processing: UREI, dbx, EMT, EXR, Dolby, Polyfusion
Engineers: Bob Grotke
Rates: On Request

**HAUPPAUGE RECORD MANUFACTURING, LTD.
PRESSING & TAPE DUPLICATION**

15 Gilpin Avenue, Hauppauge, New York, 11788
(516) 234-0200
Contact: Donald L. Olesen, vice president

GEORGE HEID PRODUCTIONS

TAPE DUPLICATION
701 Washington Road, Pittsburgh, PA
(412) 561-3399

Contact: George Edward Heid, owner

TAPE DUPLICATION

Duplicator: Otari (1 master & 4 slaves), Gauss (1 master & 2 slaves)

Capacity: Typical production of C-45 cassettes, 150 per hour, 1200 per 8-hr day for either system

Method of duplication: Bin loop

Mastering equipment: Ampex and Otari

Tape used: Aqta-Gevaert, Ferric and Magnetite; BASF, Ferric and Chrome

Shells used: IPS, Magnetic Media, Shape, & Data Packaging.

Duplicating speed: 16:1, 32:1 & 64:1

—LISTING CONTINUED ON PAGE 72

tape duplicator \ 'tāp \ 'd
(y)ü-pli-, kāt-ər \ *n*:

1 : a machine for making copies of audio material on magnetic tape **2** : look under **Magnifax** for a complete description of what such a machine should be.

WE WRITE THE BOOK ON DUPLICATORS

magnifax

International, Inc.

Route 1, Box 764 Rogers, AR 72756 USA Phone (501) 925 1818

—PAGE 70

Type of loading: Semi automatic and fully automatic (Otan DP2700 & King 790)

Packaging availability/Fulfillment services: Automatic labeler/graphic art & printing.

Rates: Upon request, please call.

Other services: Complete studio production available for recording, editing, and creating the original program material. Special packaging (binders, mailing containers, etc.) Mailing service available.



GEORGE HEID PRODUCTIONS
 701 WASHINGTON ROAD
 PITTSBURGH, PA 15228

*GEORGE HEID PRODUCTIONS
 Pittsburgh, PA*

HMC PRODUCTIONS
 5457 Monroe Rd., Charlotte, NC 28212
 (704) 536-0424
 Contact: Hank Poole, chief engineer

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

Eastern

HUB-SERVALL RECORD MFG. CORPORATION
 Cranbury-South River Road, Cranbury, NJ 08512
 (609) 655-2166
 Contact: Barry Hueqg, vice president sales, Jean Stembel, director customer relations
PRESSING
Presses (Mfg. and quantity): (11) 12" Tracy-Val Presses with Hamilton Automation, (7) 7" Automatic
Capacity: 25,000 per day for 12", 20,000 for 7"
Vinyl used: Keycor, Vitec
Rates: Upon request
Credits: Arista, JEM/Passport, Savoy, SQN, Shanachie, Musical Heritage, Capitol, RCA, Bruno Dean, Moss Music, Pickwick, Columbia
Other services: Plating, jackets, labels, DJ services, distributor shipping



*IAN COMMUNICATIONS GROUP, INC.
 Wilmington, MA*

IAN COMMUNICATIONS GROUP, INC.
TAPE DUPLICATION
 10 Upton Drive, Wilmington, MA 01887
 (617) 658-3700
 Contact: Richard Berbenan, president
TAPE DUPLICATION
Duplicator: Otan DP-7000 system, Dolby HX-PRO
Capacity: 8,000 units per day
Mastering equipment: Otan MTR 10-4, Otan MTR-10-2, Nakamichi DMP 100 digital
Tape used: AGFA 611, 619, 612 Magnette, 627 Chrome, BASF PRO-II Chrome
Shell used: IPS and Shape
Duplicating speed: 32 1 and 64 1
Type of loading: AVA 2001 computerized loader
Packaging equipment/fulfillment services: Fully automated labeling, boxing, cartoning, shrink wrapping, drop shipping and warehousing.
Rates: Quotation for larger run; rate card for small run (up to 5,000 units)
Other services: In-house graphics/typesetting and color print shop for labels and inserts. Wholesale blank audio and video cassettes, custom lengths. New England's largest distributor of AGFA mastering and cassette tapes. Catalog on request

INNER CITY COMMUNICATIONS
TAPE DUPLICATION
 52 Midwood Street, Brooklyn, NY 11225
 (212) 469-1655
 Contact: Roy A. Phillips, II, engineering director

INTERNATIONAL RECORDING CO.
MASTERING
 49 Desmond Ave., Bronxville, NY 10708
 (914) 337-5726
 Contact: Claire Rie, president

JAN PRODUCTIONS
TAPE DUPLICATION
 106 Mott St., Oceanside, NY 11572
 (516) 678-4414
 Contact: Jan Schwartz, president

LION RECORDING SERVICES, INC.
TAPE DUPLICATION
 1905 Fairview Avenue, NE, Washington, D.C. 20002
 (202) 832-7883
 Contact: Richard Lion, sales manager
TAPE DUPLICATION
Duplicator: Audio Tek, 12 slaves, 8 mono, 4 stereo
Capacity: 15,000 per day
Method of duplication: Bin loop
Mastering equipment: Studer
Tape used: AGFA, BASF
Shell used: Magnetic Media
Duplicating speed: 42-1
Type of loading: TTL
Packaging equipment/fulfillment services: Shrinkwrap.
Other services: Labeling, boxing, packaging and shipping.

LORANGER ENTERTAINMENT
DIVISION OF LORANGER MFG. CORP.
MASTERING & TAPE DUPLICATION
 10-48 Clark St., PO Box 948, Warren, PA 16365
 (814) 723-8600
 Contact: Robert T. Loranger, president, Paul E. Borger, marketing services

MAGNETIX CORPORATION
MASTERING, PRESSING & TAPE DUPLICATION
 770 W. Bay St., Winter Garden, FL 32787
 (305) 656-4494
 Contact: John Lory, president

MARK CUSTOM RECORDING SERVICE
MASTERING, PRESSING & TAPE DUPLICATION
 10815 Bodine Road, Clarence, NY 14031
 (716) 759-2600
 Contact: Vincent S. Morette, president

THE MASTER CUTTING ROOM, INC.
MASTERING
 321 W. 44th St., New York, NY 10036
 (212) 581-6505
 Contact: Randi Greenstein, traffic manager

MASTERDISK CORPORATION
MASTERING
 16 West 61st St., New York, NY 10023
 (212) 541-5022
 Contact: Jill Dix, general manager

MIAMI TAPE INC.
MASTERING, PRESSING & TAPE DUPLICATION
 8180 N.W. 103 St., Hialeah Gardens, FL 33016
 (305) 558-9211
 Contact: Carlos O. Garcia, president
MASTERING
Cutting lathes: Haeco computerized
Tape machines: MCI JH 110
Monitor speakers: JBL
Signal processing: Orban parametric, Dolby, dbx, Burwen, UREI limiters.
Engineers: Jorge Garcia
Rates: On request
Other services: Assembly, editing and copies. Also manufacture stampers
PRESSING
Presses: 4 SMT LP-25MT 45's fully automatic.
Capacity: 100,000 LP's and 100,000 45's monthly
Vinyl used: Kaiser
Rates: On request
Other services: Complete litho services, jackets, labels and artwork for record industry. Also color separations.

TAPE DUPLICATION

Duplicator: ElectroSound 8000 and 4000
 Capacity: 150,000 units monthly
 Method of duplication: Bin loop
 Mastering equipment: ElectroSound
 Tape used: AGFA and BASF
 Shell used: Elmar C O
 Duplicating speed: 64 1 and 32 1
 Type of loading: (2) King MK2000
 Packaging equipment/Fulfillment services: Full packaging
 Rates: On request
 Other services: Direct cassette printing Also manufacture
 8-track Dolby encoding

MUSICAL RECORDS CO.

MASTERING, PRESSING & TAPE DUPLICATION
 770 W. 27th St., Hialeah, FL 33010
 (305) 887-2638
 Contact: Alba V. Eagan, general manager

MUSICAL TAPES, INC.

MASTERING & TAPE DUPLICATION
 770 W. 27th, Hialeah, FL 33010
 (305) 887-2638

MUSICPEOPLES' STUDIOS AND TAPE SERVICE

TAPE DUPLICATION
 932 Woodlawn Rd., Charlotte, NC 28209
 (704) 527-7395
 Contact: James H. Hurd, manager/owner

MUSIC SQUARE MFG. CO.

(FORMERLY MANDRELL GRAY, INC.)
 MASTERING, PRESSING & TAPE DUPLICATION
 50 Music Square West, Suite 205, Nashville, TN 37203
 (615) 242-1427
 Contact: James E. Gray, sales manager



NATIONAL CASSETTE SERVICES, INC.

NATIONAL CASSETTE SERVICES, INC.
 Front Royal, VA

NATIONAL CASSETTE SERVICES, INC.

TAPE DUPLICATION
 PO Box 1280, 613 N. Commerce Avenue
 Front Royal, Virginia 22630
 (703) 635-4181

Contact: Ed Helvey or Mike McCool

MASTERING

Console: Tascam Model 5

Tape machines: Technics RS 1500 Revox A 77

Monitor speakers: Mesa

Signal processing: dbx limiters, Graphic equalization, audio/
 visual, sync-pulsing

Engineers: Craig Laird

Rates: \$40 per hour

TAPE DUPLICATION

Duplicator: Macnetax Intonics Pentaton Recordex Technics

Capacity: 25,000/week/shift

Method of duplication: In cassette, bin loop.

Mastering equipment: Technics, Revox

Tape used: Agfa, Mag Media, Certron Studio Macnetics

Shell used: Mag Media MT1

Duplicating speed: 24 1, 16 1, 12 1, 10 1, 1 1

Type of loading: King Automatic

Packaging equipment/Fulfillment services: Soft poly boxes,
 Norelco boxes, vinyl cassette albums, labels, inserts and shrink
 wrapping

Other services: Complete inventory, mail order fulfillment and
 dropshipping, custom loaded blank cassettes, in-cassette duplica-

—LISTING CONTINUED ON PAGE 74

RESOLUTION

VIDEO AUDIO AND FILM PRODUCTION

The Country's Largest Audiophile Cassette Manufacturer

Innovative Engineering in Both Digital and Analogue Domains

Obsessive Quality Control with Lab Standard Instrumentation

On Time Delivery

Competitive Pricing

Resolution manufactures cassettes for some of the most demanding audiophile labels in the country; all in real time, all on time. Call or write for our free brochure and price list.

Resolution, 1 Mill St., Burlington, VT 05401-1514
 (802) 862-8881

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FINEST DISC
MASTERING IS IN
HAWORTH, NEW JERSEY...**

**THE CUT IS CLEARER -
THE AIR IS CLEANER -
THE STAFF IS TOP
NOTCH AND OF
COURSE THE
EQUIPMENT
IS STRICTLY
STATE OF
THE ART.**



Let us prove it to you, mention this ad and get one hour complimentary studio time with your first 4 hour booking. Manhattan chauffeur service. Custom pressing packages also available.

TRY US...THE COUNTRY'S NEVER SOUNDED BETTER!

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 163 Terrace Street, Haworth, N.J. 07641 201-385-0940

Circle #041 on Reader Service Card

tion equipment sales and services, 1/4" full-track mono and two-track stereo high-speed duplication for the broadcast industry. Studio and editing services.

**NATIONAL RECORDING
TAPE DUPLICATION**
460 W. 42nd St., New York, NY 10036
(212) 279-2000
Contact: I. Kaufman, chief engineer

**OMNI TAPE CORP.
TAPE DUPLICATION**
11 Teaneck Road, Ridgely Park, NJ 07660
(201) 440-8846
Contact: Peter D'Antoni, vice president

**PETER PAN INDUSTRIES
PRESSING**
145 Komorn Street, Newark, NJ 07105
(201) 344-4214
Contact: Al Cohen, custom pressing sales manager

**PRC RECORDING
PRESSING AND TAPE DUPLICATION**
422 Madison Ave., New York, NY 10017
(212) 308-2300
1600 Rich Rd., Richmond, IN 47374
(317) 962-9511
Contact: David Grant, president

**PROGRESSIVE MUSIC STUDIOS
TAPE DUPLICATION**
2116 Southview Ave., Tampa, FL 33606
(813) 251-8093
Contact: Ken Veenstra, owner/manager

**QUIK CASSETTE CORP.
TAPE DUPLICATION**
250 W. 57th St., New York, NY 10019
(212) 489-7354
Contact: M. Milchman, president

**RANSTEELE AUDIO, INC.
MASTERING**
1697 Broadway, New York, NY 10019
(212) 265-5563
Contact: Thomas Steele, owner

**RECORDED PUBLICATIONS LABORATORIES
MASTERING & TAPE DUPLICATION**
1100 State Street, Camden, NJ 08105
(609) 963-3000
Contact: Ernest W. Merker, vice president engineering



RESOLUTION, INC.
Burlington, VT

**RESOLUTION, INC.
TAPE DUPLICATION**
1 Mill Street, Chace Mill, Burlington, VT 05401
(802) 862-8881
Contact: Ty Atherholt, duplication manager



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

TAPE DUPLICATION
Duplicator: NAD/resolution 400 The World's Largest
Capacity: 4,000/day, 20,000/week
Method of duplication: In cassette
Mastering equipment: PCM F1, PCM-701 ES, all formats, MCI
JH110 B (2), Scully 1/4 track
Tape used: Agfa Gevaert 611/811, 612/812, 627/827
Shell used: The best domestic made: black, white or all clear
Duplicating speed: 1:1, real time
Type of loading: King 680, King 780
Packaging availability/Fulfillment services: Label and J-card
printing, shrinkwrapping, shipping
Rates: Very competitive with high-speed rates
Other services: Drop-shipping, digital mastering, editing, 16
track studio

**RGH RECORD MANUFACTURING CORP.
MASTERING, PRESSING & TAPE DUPLICATION**
750 Eighth Ave., New York, NY 10036
(212) 354-4336
Contact: George Srolowitz, president
MASTERING
Rates: Call for prices
PRESSING
Capacity: 20,000
Vinyl used: R 600
Rates: Call for prices
TAPE DUPLICATION
Capacity: 20,000
Rates: Call for prices

**SERVISOUND, INC.
TAPE DUPLICATION**
35 West 45th Street, New York, NY 10036
(212) 921-0555
Contact: Chris Nelson, vice president

**SMITH & SMITH SOUND STUDIOS
MASTERING & TAPE DUPLICATION**
828 Orienta Avenue/Box 130
Altamonte Springs, FL 32701
(305) 339-6487
Contact: Mr. Hillary (Mel) Smith, owner

**SOUND-ARTS COMPANY, INC.
TAPE DUPLICATION**
5 Cindy Lane, Oakhurst, NJ 07712
(201) 493-8666
Contact: Frank 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 10's, Otari MX 5050 Scully
Tape used: Agfa, Columbia, BASF
Duplicating speed: 480 ips, 240 ips, 64 1, 32 1 8 1 ratios
Type of loading: King 790's
Packaging availability/etc.: Shnkk film, etc.
Rates: On request
Other services: Computer software duplication, cassette and
disk

**SOUND INVESTMENT RECORDING STUDIO
MASTERING & TAPE DUPLICATION**
Rt. 3, Box 702, Covington, GA 30209
(404) 267-8771
Contact: Steve or Linda Marcum, engineer

**SOUND TECHNIQUE INC.
MASTERING**
130 West 42 St., New York, NY 10036
(212) 869-1323
Contact: Gladys Hopkowitz, president

**SOUNDWAVE RECORDING STUDIOS, INC.
MASTERING**
2 West 45th St., Suite 903, New York, NY 10036
(212) 730-7366
Contact: Carol Baker, president

**STERLING SOUND INC.
MASTERING**
1790 Broadway, New York, NY 10019
(212) 757-8519
Contact: John Kubick, studio manager

**STUDIO 44
MASTERING & TAPE DUPLICATION**
44A Broadway, Mantua, NJ 08051
(609) 468-5772
Contact: Phil Vitale or Anne Cam, owners

**STUDIOWORKS
TAPE DUPLICATION**
1018 Central, Charlotte, NC 28204
(800) 438-5921
Contact: W.ayne, owner

**SUN PLASTICS CO., INC.
DYNAMIC LP STEREO RECORDS, INC.
PRESSING**
900 Passak Ave., East Newark, NJ 07029
NJ: (201) 482-6749; NY: (212) 349-0777
Contact: Jerry Salerno, president

**SUNSHINE SOUND INC.
MASTERING**
1650 Broadway, New York, NY 10019
(212) 582-6227
Contact: Frank J. Trimarco, president

**SUPERIOR RECORD PRESSING CORP.
PRESSING**
900 Kennedy Blvd., Somerdale, NJ 08083
(609) 784-6600
Contact: John H. Dunn, president

**RIK TINORY PRODUCTIONS
MASTERING, PRESSING & TAPE DUPLICATION**
180 Pond Street, Cohasset, MA 02025
(617) 383-9494
Contact: Rik Tinory, president

**TRACY VAL CORPORATION
RECORD PLATING**
201 Linden Ave., Somerdale, NJ 08083
(609) 627-3000
Contact: James Miller, president, Joan Miller, sales manager
PLATING
Presses (Mfg. and quantity): 32 high speed rotary plating posi-
tions
Capacity: Masters, mothers and stampers—200 per day
Rates: On request
Credits: Artista, Passport JEM, Savoy, Sine Qua Non, Capitol,
RCA Columbia Pickwick, Vox, Tommy Boy, Streetwise

**TRUTONE RECORDS DISK MASTERING LABS
MASTERING, PRESSING & TAPE DUPLICATION**
163 Terrace St., Haworth, NJ 07641
(201) 385-0940
Contact: Adrienne Rowatt, Prod. Coordinator
MASTERING
Cutting lathes: Neumann VMS 70, Scully w/Capps Varpitch II
Console: Neumann & Custom
Tape machines: Studer A 80, Studer B-67, Ampex ATR-102,
MCI JH 210R
Monitor speakers: UREI 813A, JBL, Auratone
Signal processing: UREI Pultec, Neumann
Engineers: Carl Rowatt, Phil Austin, Steve Robb
Rates: Upon request
Credits: Upon request
Other services: High quality short run pressing and cassette
duplication



TRUTONE RECORDS DISK MASTERING LABS
Haworth, NJ

VARIETY RECORDING STUDIO
MASTERING, PRESSING, TAPE DUPLICATION
130 West 42nd St., Room 551, New York, NY 10036
(212) 221-6625
Contact: Warren Allen Smith, president

VCA TELETRONICS
231 E. 55th St., New York, NY 10022
(212) 355-1600
Contact: Will Roth, vice president sales/marketing

VIRTUE RECORDING
MASTERING, PRESSING & TAPE DUPLICATION
1618 N. Broad St., Philadelphia, PA 19121
(215) 763-2825
Contact: Frank Virtue, president

WEA MANUFACTURING INC.
PRESSING & TAPE DUPLICATION
P.O. Box 321, Olyphant, PA 18447
(717) 383-2471

WILDWOOD ENTERTAINMENT, INC.
MASTERING, PRESSING & TAPE DUPLICATION
Box 114, Plank Road, Berlin, NY 12022
(518) 658-2444

WINKLER VIDEO ASSOCIATES, INC.
TAPE DUPLICATION
248 E. 48th St., New York, NY 10017
(212) 753-9400
Contact: Henry Schwartzberg

WORLD CLASS TAPE
TAPE DUPLICATION
Box 7611, Ann Arbor, MI 48107
(313) 662-0669
Contact: Patrick or Donna, managers

Central

A & F MUSIC SERVICES
MASTERING & TAPE DUPLICATION
2834 Otsego, Pontiac, MI 48054
(313) 682-9C25
Contact: Frank Merwin, manager

AARD-VARK RECORDING SERVICE, INC.
TAPE DUPLICATION
335 S. Jefferson, Springfield, MO 65806
(417) 866-4104
Contact: Bill Jacobsen, president

ACME RECORDING STUDIOS
TAPE DUPLICATION
3821 N. Southport, Chicago, IL 60613
(312) 477-7333
Contact: Les McReynolds, studio manager

TAPE DUPLICATION

Duplicator: Technics transports w/custom transformerless electronics
Capacity: 1000 C-30's per day
Method of duplication: In cassette
Mastering equipment: Technics 1500 1/4 trk/1/2 trk, dbx Type I, dbx compressors, Telegquipment scope, ADC spectrum analyzer and equalizer, E.V. Sentry 100A monitors, NAD amp, Sony & JVC quality control decks
Tape used: The current state-of-the-art
Shell used: Shape (transparent) and Mag Media
Duplicating speed: Real-time only
Type of loading: King
Packaging equipment/Fulfillment services: Typesetting, printing, insertion, shrink wrap in-house
Rates: Please call for rates and samples
Other services: High quality printing of small runs of labels (from 25 to 1,500 in house), mastering EQ and compression, EQ'd copymasters, custom packaging for small runs of cassette releases 24 hour turnaround time available, the best sounding cassettes in the business!

AMERICAN SOUND CORPORATION
TAPE DUPLICATION
25133 Thomas Drive, Warren, MI 48091
(313) 536-9100
Contact: Don Armstrong, sales manager

ARC ELECTRONIC SERVICES INC.
TAPE DUPLICATION
2557 Knapp N.E., Grand Rapids, MI 49505
(616) 364-0022
Contact: Ron Harkai, president

ARDENT MASTERING, INC.
MASTERING
2000 Madison Ave., Memphis, TN 38104
(901) 725-0855
Contact: Larry Nix, Chief Engineer
MASTERING
Cutting lathes: Neumann VMS-70 with Zuma digital computer control
Console: Neumann
Tape machines: MCI 1/2" 2 track available



ARDENT MASTERING, INC.
Memphis, TN

Monitor speakers: JBL
Signal processing: Limiters: Neve, EMT, EQ's: Neve, Neumann, Pro: Outer Ear, EXR; Noise reduction: Dolby, dbx
Engineers: Larry Nix, Al Smith
Rates: On request
Credits: Bar-Kays, Amazing Rhythm Aces, Jessie Winchester, Robin Trower, Charlie Rich, ZZ Top, Staple Singers, Paul Butterfield, Con Funk Shun, Memphis Horns, Issac Hayes, Point Blank, Tony Joe White

AUDIO ACCESSORIES CO.
TAPE DUPLICATION
38 W. 515 Deerpath Road, Batavia, IL 60510
(312) 879-5998
Contact: John Maloney, sales manager

New From Eva-Tone . . .

Unless You Fill Out This Coupon, You'll
Never Know If Eva-Tone Can Be Competitive
On Your Next Cassette Duplication Order.

If you order 100 custom-duplicated cassettes or more at a time, you really should include Eva-Tone on your bid list.

We're the people who've been producing high quality, low cost Soundsheets for more than 20 years. Now we've added high speed, high quality audio cassette duplication to our line, along with custom printing, complete mailing services, and computer list maintenance.

If you want an answer faster than through the mail, call us toll free at 1-800-EVA-TONE. (In Florida, call 813-577-7000.) You're going to like what you hear.

TELL ME MORE ABOUT EVA-TONE:

Soundsheets Cassettes Printing Mailing

Name: _____ Title: _____

Organization: _____

Address: _____

City/State/Zip: _____ Phone: _____

EVA-TONE 4801 Ulmerton Road
P.O. Box 7020-M
SOUNDSHEETS Clearwater, Florida 33518-7020

Circle #042 on Reader Service Card

AUDIOGRAPHICS
MASTERING & TAPE DUPLICATION
 13801 E. 35th St., Independence, MO 64055
 (816) 252-5010
 Contact: Jerry Riegle, director, Dennis Kaleikau, production manager

AUDIO MIXERS RECORDING COMPANY
TAPE DUPLICATION
 20 East Huron St., Suite 200, Chicago, IL 60611
 (312) 943-4274
 Contact: Studio Manager

BODDIE RECORD MFG. & RECORDING
TAPE DUPLICATION
 12202 Union Ave., Cleveland, OH 44105
 (216) 752-3440
 Contact: Louise Boddie, vice president

CASSETTE DUPLICATING, INC.
TAPE DUPLICATION
 3801 South Sheridan Ave., Tulsa, OK 74145
 (918) 664-2216
 Contact: Chuck Loop, marketing manager

PRESSING
 Presses: Various
 Capacity: 20,000/day
 Vinyl used: Various
 Rates: Various
TAPE DUPLICATION
 Duplicator: 21 ElectroSound 8000, and others
 Capacity: 60,000 C's/day
 Method of duplication: Studer masterer, Dolby Time Compression, Lexicon Noise gates, etc.
 Tape used: Various
 Shell used: Various
 Duplicating speed: 64 1/2 or 32 1/2
 Type of loading: 18 King 790
Packaging equipment/Fulfillment services: Ampex printer, Islemann inserter and skin wrap, Islemann labelers, III labelers, L sealer
 Rates: Call for quote
 Other services: Total packaging services, artwork development

CENTURY SOUND & SLIDE
MASTERING, TAPE DUPLICATION
 1018 Busse Hwy, Park Ridge, IL 60068
 (312) 696-0675
 Contact: Al Tallman, owner

CHARLIE & CO. INC.
TAPE DUPLICATION
 5500 B Crestwood Blvd., Birmingham, AL 35212
 (205) 592-3601
 Contact: Charles Colvin, president

CHUMLEY PRODUCTIONS, INC.
MASTERING, PRESSING & TAPE DUPLICATION
 2802 Foster Avenue, Nashville, TN 37210
 (615) 833-6184
 Contact: P.E. Chumley, president

CONCEPT PRODUCTIONS, INC.
TAPE DUPLICATION & PACKAGING
 2984 Triverton Pike, Madison, WI 53711
 (608) 271-2606
 Contact: Dan Geocans

CREATIVE SOUND
TAPE DUPLICATION
 9000 Southwest Freeway, Suite 320, Houston, TX 77074
 (713) 777-9975
 Contact: Edward Smith, President
TAPE DUPLICATION
 Duplicator: Otari bin loop (3 slaves), Intonics (2 slaves)
 Capacity: 2500 per shift
Mastering equipment: Ampex 2 track & 4 track
Tape used: Aola 611/811, Magnetics 12, Chrome 627 827, Ampex 607/608, 609/610, Capitol Q18
Shell used: Data Pak Pathfinder 5 screw, IPS 5 screw
Duplicating speed: 16 1/2 & 32 1/2
Type of loading: King automatic loaders
Packaging availability/Fulfillment services: Custom labels, full color caseliners, shrink
 Rates: Call for quotations
 Other services: Custom bulk tape loading to any length w/ Ampex, AGFA, Capitol. Catalog available upon request



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

Central

CUSTOM TAPE DUPLICATORS, INC.
TAPE DUPLICATION
 341 Hill Ave., Nashville, TN 37210
 (615) 256-1728
 Contact: Cliff Tant, president



DISC MASTERING INC
 Nashville, TN

DISC MASTERING INC.
MASTERING
 Thirty Music Square West, Nashville, TN 37203
 (615) 254-8825
 Contact: Randy Kling, president
MASTERING
Cutting lathes: Neumann VMS 70 lathe with SX 74 head
Console: Neumann SP75 console with Neve 2087 custom equalizers
Tape machines: Studer A 810, Studer A 80 MKII
Monitor speakers: Tannoy Super Heats (Lockwood Cabinets), Tannoy Titan system, Tannoy broadcast monitor 8s, Quad 405 amplifier
Signal processing: Neve 2087 EQ, Neve limiter/compressor, Neumann SAL 74B cutting amplifier
Engineers: Nancy Kling
Rates: Available upon request
Credits: Alabama, Chet Atkins, John Denver, Leon Everette, Elvin James, Garway, Mickey Gilley, the Glen Miller Orchestra, Vern Gosdin, Waylon Jennings, The Kinks, Christy Lane, Loretta Lynn, Barbara Mandrell, Charly McClain, Willie Nelson, Dolly Parton, The Platters, Jerry Reed, Joe Stampley, George Strait, Jimmy Sturr, Jimmy Swagart, Sylvia, The White Animals, Roger Whittaker. Digital projects on Charley Pride, Moe & Joe, and Porter Wagoner. Studio president Randy Kling was named 1984 Country Mastering Engineer of the Year by *Pro Sound News*.
Other services: Distributor for Quad products & Tannoy pro and home speakers

DIXIE RECORD PRESSING
PRESSING
 631 Hamilton Ave., Nashville, TN 37203
 (615) 256-0922
 Contact: Greg Gann, production manager

ELECTRO SOUND TAPE SERVICES
TAPE DUPLICATION
 2101 S. 35th St., Council Bluffs, IA 51501
 (712) 328-8060
 Contact: Marvin King, president

ELEPHANT RECORDING STUDIOS
MASTERING, PRESSING & TAPE DUPLICATION
 21206 Gratiot Ave., E. Detroit, MI 48021
 (313) 773-9386
 Contact: John Guier, owner

HANF RECORDING STUDIO
TAPE DUPLICATION
 1825 Sylvania, Toledo, OH 43613
 (419) 474-5793
 Contact: Jim Thomson, general manager

HIGH FIDELITY
MASTERING
 1059 Porter, Wichita, KA 67203
 (316) 262-6456
 Contact: James Stratton



HIX RECORDING CO., INC
 Waco, TX

HIX RECORDING CO., INC.
 1611 Herning Ave., Waco, TX 76708
 (817) 756-5303
 Contact: David Hix, president; Homer Hix, vice president

INDEPENDENT PRODUCERS CORP.
TAPE DUPLICATION
 1609 McGavock St., Nashville, TN 37203
 (615) 244-4236
 Contact: Jerry L. Moore, vice president, or Gail Pollock, production coordinator

INDUSTRIAL AUDIO/FILM SERVICES
TAPE DUPLICATION
 6228 Oakton, Morton Grove, IL 60053
 (312) 965-8400
 Contact: Lauren Leder, president

INFONICS, INC
TAPE DUPLICATION
 PO Box 1111, 238 Highway 212, Michigan City, IN 46360
 (219) 879-3381
 Contact: Carol Lant, president

JRC ALBUM PRODUCTIONS
(JEWEL RECORDING CO.)
MASTERING, PRESSING & TAPE DUPLICATION
 1594 Kinnery Ave., Cincinnati, OH 43231
 (513) 522-9336
 Contact: Linda York, vice president

K&R'S RECORDING STUDIOS INC
MASTERING & TAPE DUPLICATION
 28533 Greenfield, Southfield, MI 48076
 (313) 557-8276
 Contact: Bob Gajewski, manager

GRD GIVES YOU THE HOT SOUND OF REAL-TIME EVERY TIME

PHONE: (602) 252-0077

WRITE: REAL-TIME BY GRD
P.O. BOX 13054, PHOENIX, AZ 85002



CONSISTENCY

GRD sets the standards for high quality cassette duplication. Our in-house maintenance and repair department works 2,000 hours a year making absolutely sure each Real-Time cassette is perfect. Personal attention is given to each tape as it is duplicated. We listen in on each tape to maintain super-standard quality and consistency.

DIGITAL REAL-TIME

A Digital Master duplicated in Real-Time sounds incredible! There is no comparison to a Real-Time Digital cassette. GRD's Digital Mastering Service is only \$38.00 per album.

HIGH-TECH EXTRA

The GRD Real-Time system is wired with Audiophile low-capacitance cable. Your punchy projects will stay clean and punchy. Our recorders sound great. We use Denon DR-F8's and Tascam 122 studio recorders exclusively. All our Real-Time Recorders are 3 head, top performance machines.

Circle #043 on Reader Service Card



MX

Magnetics

Audio & Video Tape Manufacturers
12 Years of Proven Service
to the Audio Industry

Custom Loaded BASF
"Pure Chrome" Cassettes Any Length

C-60 as low as \$.69 1M
C-90 as low as \$.85 1M

Custom Cassette Bin Loop
High Speed Duplication

3/4" U-Matic Video Tape
Loading Re-loading

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HRC Magnetics 1611 Herring
Ulaco, Texas 76708
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USE

ZERO



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Sealed
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Tabs-out
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Black & white

C-Ø Cassettes
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INCLUDING FREIGHT

Immediate
Delivery
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Standards
Provides High
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Also Available: Blank-Loaded
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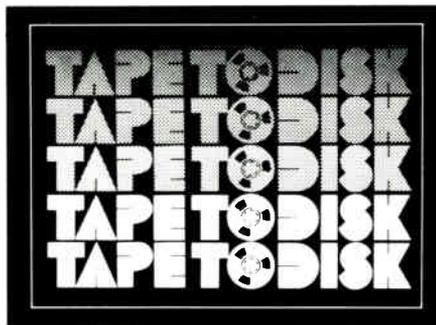


PLANTRON

(206) 854-3366

PO Box 58971 • Seattle, WA 98188

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

Central

KIDERIAN RECORDS PRODUCTIONS
MASTERING, PRESSING & TAPE DUPLICATION
4926 W. Gunnison, Chicago, IL 60630
(312) 399-5535
Contact: Ray Peck, president

KING SOUND
TAPE DUPLICATION
532 Michigan Ave., Manistique, MI 49854
(906) 341-6533
Contact: Keith Polkinghorne, owner/engineer

THE LACQUER PLACE
MASTERING
50 Music Square West, Suite 201, Nashville, TN 37203
(615) 329-4951
Contact: Nancy Westbrook, office manager

MAGNETIC STUDIOS, INC.
TAPE DUPLICATION
4784 N. High St., Columbus, OH 43214
(614) 262-8607
Contact: John Fippin, president

MASTERCRAFT RECORDING CORP.
MASTERING, TAPE DUPLICATION
437 N. Cleveland, Memphis, TN 38104
(901) 274-2100
Contact: Howard Craft, owner manager



MASTERFONICS, INC.
Nashville, TN

MASTERFONICS, INC.
MASTERING
28 Music Square East, Nashville, TN 37203
(615) 327-4533
Contact: Glenn Meadows, president
MASTERING
Cutting lathes: Room 1 (2) Neumann VMS 70 operated by
Zuma computer, SAL74B amplifiers SX74 cutter heads Room 2

Scully lathe w/Capps computer, Westrex 3DIAH cutter head,
Westrex RA1700B amplifiers
Console: Room 1 Neumann SP75 Room 2 Neumann SP72
Tape machines: Room 1 Studer A80 preview machine, Studer
A80H and B67 copy machines (2 track)
Monitor speakers: Room 1 Modified Westlake TM-1's w/TAD
drivers Room 2 John Gardner cabinets w/BL woofers and TAD
high frequency drivers
Signal processing: Sontec parametric EQ, Neve stereo com-
pressor/limiters, Sontec DRC 200 compressor limiter
Engineers: Glenn Meadows, Jim Loyd, Brian Burr
Rates: Please call for rates
Other services: Ampex ATR-102 1/2" 2 track for rent. Master
Technologies offers JVC Series 90 digital 2 track rental, editing and
mastering. Call Masterfonics for details

MASTER MARKETING CORP.
MASTERING & TAPE DUPLICATION
3801 S. Sheridan, Ste. 156, Tulsa, OK 74145
(918) 627-5772
Contact: Jett Katschurk



MASTER MIX
Nashville, TN

MASTER MIX
MASTERING
1808 Division Street., Nashville, TN 37203
(615) 321-5970
Contact: Carol, traffic manager

MASTERING
Cutting lathes: Neumann VMS 70 with Technics quartz direct
drive & Zuma audio preview computer, Neumann SAL 74B
transformerless cutter rack, SX 74 cutter head
Console: Neumann SP 77 transformerless console
Tape machines: Studer preview machine, 1/2" and 1/4" Studer
copy machine
Monitor speakers: John Meyers and Roeters powered by Times
One & Hatler amplifiers
Signal processing: Sontec & Neumann equalizers, Sontec and
NTP compressors, Dolby and dbx available
Engineers: Hank Williams
Rates: Cal, Carol
Credits: Lee Greenwood, Deborah Allen, Eddie Rabbitt, Earl
Thomas Conley, Statler Bros., Ed Bruce, Sandi Patu, Bill Gather-
Trio, and Al Green
Other services: Necam II Otari equipped remix room



MEDIA INTERNATIONAL, INC.
Chicago, IL

MEDIA INTERNATIONAL, INC.
TAPE DUPLICATION
247 E. Ontario, Chicago, IL 60611
(312) 467-5430

Contact: Duane Lundeen, president

TAPE DUPLICATION

Duplicator: Ampex, Grandy, Macnelax, Telex (6 lines total)

Capacity: 75,000 units per day

Method of duplication: In cassette bin loop

Mastering equipment: Studer & Ampex

Tape used: Aclia, BASF, Capitol, Ampex, Columbia

Shell used: Elmar, Sorco, Mac Media

Duplicating speed: From 4 1/2 to 64 1/2 depending on product

Type of loading: High speed King

Packaging availability/Fulfillment services: Shrinkwrap, custom boxes, cartons, albums, etc.

Rates: From 21 unit

Other services: Duplicating & AV equip. sales, services, design, installation—new, used, reconditioned. (Low cost financing avail on some equip.)

MEMPHIS COMMUNICATIONS CORPORATION

MASTERING & TAPE DUPLICATION

1381 Madison Ave., PO Box 41735

Memphis, TN 38174-1735

(901) 725-9271

Contact: Scot Berry, production

MIAMI VALLEY RECORDING

TAPE DUPLICATION

3777 Crow Road, Tipp City, OH 45371

(513) 698-5933

Contact: David S. Mohler, owner

MIDWEST CUSTOM RECORD PRESSING CO.

PRESSING & TAPE DUPLICATION

P.O. Box 92, Arnold, MO 63010

(314) 464-3013

Contact: Rick Schaumberger, president

MOSES SOUND ENTERPRISES

TAPE DUPLICATION

270 S. Highway Dr., Valley Park, MO 63088

(314) 225-5778

Contact: Neilson

**Mother
Dubbers, Inc.**

*MOTHER DUBBERS INC.
Dollos, TX*

MOTHER DUBBERS INC.

TAPE DUPLICATION

13626 Gamma, Dallas, TX 75234

(214) 980-4840

Contact: Arnett Peel, President

MASTERING

Console: Tapco FV 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,

dhx 157, UREI 565

Engineers: Russell Smith

Rates: \$50/hr studio mastering, \$30/hr editing

TAPE DUPLICATION

Duplicator: Infonics 200A, Macnetax 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 1/2 bin loop, 45 1/2

Type of loading: Automatic King model 700s

Packaging availability/Fulfillment services: Labeling, cassette binders, Poly & Norelco boxes, shrink wrapping—full packaging service available

Rates: Call (214) 980 4840 and ask for A. Peel

MUSICOL, INC.

MASTERING, PRESSING & TAPE DUPLICATION

780 Oakland Park Ave., Columbus, OH 43224

(614) 267-3133

Contact: John Hull, mastering engineer

NASHVILLE RECORD PRODUCTIONS, INC.

MASTERING, PRESSING & TAPE DUPLICATION

469 Chestnut St., Nashville, TN 37203

(615) 259-4200

Contact: George Ingram, Co-owner

MASTERING

Cutting lathes: Neumann, Zuma & Capps computer two

Console: Sphere & Neve

Tape machines: Studer & MCI

Monitor speakers: Electro-Voice Sentry 3's

Signal processing: Parametric & graphic EQ, reverb, limit-in-

air/compressor

Engineers: Glen Bullard, Chief Engineer; John Eberle, Studio

Man; Doug Lawrence, Engineer

Rates: \$80/per side, 12", \$30/per side, 7"

Credits: Ronnie Milsap, Amy Grant, Rick & Janice Carnes,

Richard Lee, Sha-Na-Na, Tupperware, American Airlines, U.S.

Govt., PSA, Sperry New Holland, Drivers, Bill Anderson, Dan

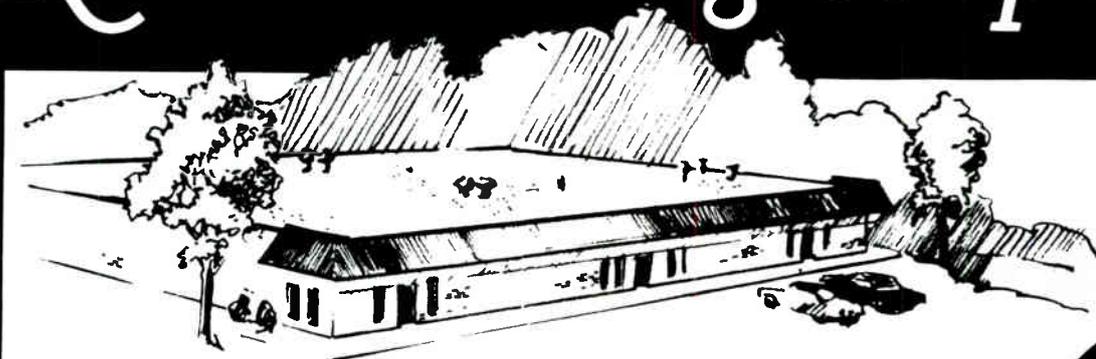
Seals

Other services: Editing, reference acetate, 1/2 speed cutting, tape

duplication, album packaging

—LISTING CONTINUED ON PAGE 80

Midwest Custom Record Pressing Company, Inc.



— COMPLETE MANUFACTURING PLANT —

Specializing in Records, Album Jackets & Cassettes. "No order too small"

Convenient Midwest Location

Write or Call for Free Brochure & Professional Assistance!

#6 Grandview Pk. Dr., P.O. Box 92

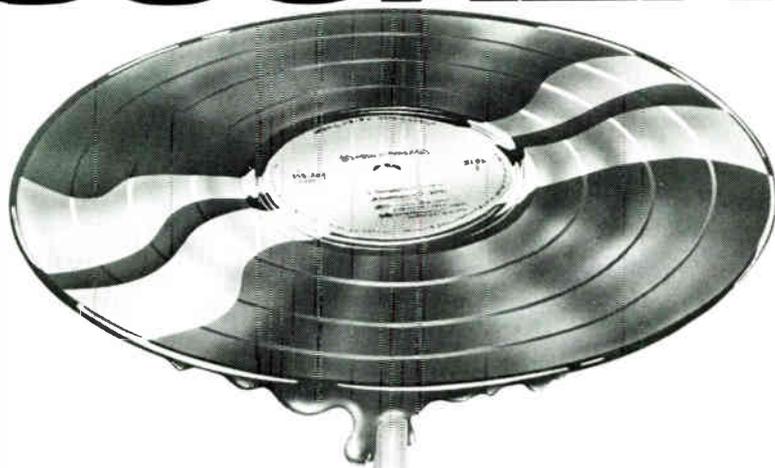
Arnold, Missouri 63010 (314) 464-3013

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They said they could handle it.
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Next time—before you find yourself
in a sticky situation—call Ardent.
Our professionals and state-of-the-
art equipment offer everything you'd
expect in recording, mastering
and video capabilities.

ARDENT.
Ahh—the sweet taste of success.

24 track & 46 track studios •
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PROSOUND INC.
RECORD PRESSING
DIVISION OF MIAMI TAPE
(305) 558-0152

UNIVERSAL LITHO & ALBUM INC.
(305) 557-2552 557-2562

MIAMI TAPE INC.
(305) 558-9211 558-9212

8180 N.W. 103 St. Hialeah Gardens, Florida. 33016

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

Central

—PAGE 79

PRESSING

Presses: 24 Southern Machine & Tool automatic LP's and 45's
Capacity: 1,000,000 per month
Rates: 58 LP / 28 45's large runs per auto
Credits: Same as mastering
Other services: Complete record packaging



NASHVILLE RECORD PRODUCTIONS, INC.
Nashville, TN

NIGHTINGALE CONANT CORPORATION TAPE DUPLICATION

7300 North Lehigh Avenue, Chicago, IL 60648
(312) 647-0300

Contact: James E. Heising, audio operations manager

NORWEST COMMUNICATIONS TAPE DUPLICATION

123 South Hough St., Barrington, IL 60010
(312) 381-3271

Contact: Mark Kirney, owner

OAK RECORDING LAB. MASTERING

8830 S. Nashville Ave., Oak Lawn, IL 60453
(312) 599-6222

Contact: Edwin Stryzak, owner

OPRYLAND PRODUCTIONS TAPE DUPLICATION

916 Twin Elms Ct., Nashville, TN 37210
(800) 554-2348, (615) 242-2483

Contact: Bill Coyne, Buddy Wilkins

PRECISION AUDIO, INC. TAPE DUPLICATION

18582 US 20, Bristol, IN 46507
(219) 295-7493

Contact: Larry Becker, production manager

TAPE DUPLICATION

Duplicator: Modified Liberty Bin stereo, Intonics mono stereo
Capacity: 120 C90/hr
Method of duplication: In cassette bin loop
Mastering equipment: Ampex 440 C 1/2"
Tape used: Ampex, BASF, CBS
Shell used: Mag Media Pro Media
Duplicating speed: 16 1
Type of loading: King 790
Packaging equipment/Fulfillment services: ITI labeling

PRECISION RECORD LABS

MASTERING, PRESSING & TAPE DUPLICATION
932 W. 38th Place, Chicago, IL 60609
(312) 225-9117
Contact: Lawrence Sherman, president

PRESCO PRODUCTIONS

TAPE DUPLICATION
4366 West 66th St., Cleveland, OH 44144
(216) 749-7244
Contact: John F. Presby, president

THE PRESSING PLANT

PRESSING
2737 Irving Blvd., Dallas, TX 75207
(214) 630-6401
Contact: Phil Kalan, general manager

BUD PRESSNER RECORDING

MASTERING, PRESSING & TAPE DUPLICATION
4839 S. Broadway, Gary, IN 46409
(219) 884-5214
Contact: Bud Pressner, owner/manager

PROGRAMMING TECHNOLOGIES, INC.

TAPE DUPLICATION
6666 N. Lincoln Ave., Lincolnwood, IL 60645
(312) 676-9400
Contact: Stanley Roy, sales manager



QCA CUSTOM PRESSING
Cincinnati, OH

QCA CUSTOM PRESSING

MASTERING, PRESSING & TAPE DUPLICATION
2832 Spring Grove Ave., Cincinnati, OH 45225
(513) 681-8400

Contact: Jim Basken, president

MASTERING

Cutting lathes: Neumann VMS 666 with Zuma Dier Computer
Console: Neuman SP177 with SAL 74 amplifiers
Tape machines: MCI 11110M
Monitor speakers: UREI 811s, Advent, Auratone
Signal processing: Sontec Parametric equalizer, EMT 156 limiters
Engineers: Todd Deasey, Jim Basken

Rates: 12" LP \$75/side, 7" 45s \$45/side, 7" 33s \$50/side. Session time \$70/hr

PRESSING

Presses (Mfg. and quantity): 7 SMT automatics
Capacity: 60,000 12" per week, 75,000 7" per week
Vinyl used: Tenaco, Keycor KC500 & KC600
Rates: Call for complete price list

QUANTITAPE DUPLICATING INC.

MASTERING & TAPE DUPLICATION
311 W. Superior St., Chicago, IL 60610
(312) 951-7270

Contact: Joe Giallani, manager

MASTERING

Tape machines: Scully, Nakamichi digital processing, Otari, Revox Technics
Signal processing: EXR Burwen, UREI, Orban, dbx, Dolby, Technics Synetrix Thompson, Crown

Engineers: Joe Giallani

Rates: Upon request

Other services: Voice impulsing

TAPE DUPLICATION

Duplicator: Teac MII Sony
Capacity: Growing, call for current capacity
Method of duplication: In cassette bin loop
Mastering equipment: Same as record mastering
Tape used: Aola 1612, BASF Chrome
Shell used: Magneta Media
Duplicating speed: 1/78 to 64 1
Type of loading: King

Packaging equipment/Fulfillment services: Yes

Rates: Upon request

Other services: Video duplication, VHS & Beta Hi-Fi duplication

Also real-time cassette duplication

RAINBOW BRIDGE RECORDING STUDIO

MASTERING & TAPE DUPLICATION
117 W. Rockland, Libertyville, IL 60048
(312) 362-4060
Contact: Perry Johnson, studio manager

RICHARDSON TAPE

TAPE DUPLICATION
#1 Collins St., Box 570A, Mountain View, AK 72560
(501) 269-3908

Contact: Aubrey Richardson, owner

TAPE DUPLICATION

Duplicator: JVC & Technics (Revox) high speed
Capacity: 400 per shift
Method of duplication: In cassette
Mastering equipment: Otari Crown, Technics Technics Digital, UREI EQ and limiter
Tape used: Ampex, AGFA, & BASF
Shell used: Mag Media
Duplicating speed: 1/78 ips (real-time) (16 to 1 high speed)
Type of loading: Audio
Packaging equipment/Fulfillment services: In house shrinkwrap and labeling. Other printing available

Rates: On request

Other services: VHS to VHS 2" mastering and high speed stereo cassette duplication (We individually check each cassette we duplicate)

RITE RECORD PRODUCTIONS, INC.

MASTERING, PRESSING & TAPE DUPLICATION
9745 Mangham Drive, Cincinnati, OH 45215
(513) 733-5533
Contact: Phil Burkhardt, production manager

RON ROSE PRODUCTIONS/RECORDING STUDIO

TAPE DUPLICATION
29277 Southfield Rd., Southfield, MI 48076
(313) 424-8400

Contact: Don Wooster, vice president

MASTERING

Console: Neotek Soundcraft Tascam
Tape machines: MCI, Otari Tascam
Monitor speakers: IRI
Signal processing: UREI Orban Eventide Lexicon-224
Engineers: Fight

Rates: Recording \$80/hour Audio Post \$175/hour

Other services: 4" video editing, commercial recording, 24 track audio postproduction for video

TAPE DUPLICATION

Duplicator: (1) Telex, (3) Magnatax
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 456 642, Aola 526, Ampex 603, 604
Shell used: Mag Media Kyrin special on request

Duplicating speed: 60 ips reel to reel, 90 ips - cassette

Type of loading: (2) King loaders

Packaging equipment/Fulfillment services: Labeling, boxing, expediting

Rates: Call

Other services: Computerized expediting and shipping

ROYAL AUDIO VISUAL

TAPE DUPLICATION
4114 Montgomery Road, Cincinnati, OH 45212
(513) 841-1267
Contact: Herb or Ivan Branenburg, owners

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The essential planning & price guide for all of your custom record and tape needs

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Now available throughout the United States, **WORLD RECORDS** Canada's largest exclusive custom record and tape manufacturer and packager gives you the audiophile pressings, glossy board jackets, chromium cassettes and service you've been searching for.

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WORLD RECORDS delivers... each and everytime, fully guaranteed to your original masters because we know how much you depend on them to promote your image. See what we've got to offer you. Then see just how fast we can deliver it.

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Neumann VMS 80 Lathe/Digital, 1/2" & 1/2" Speed/Full metal jacket

ULTRA GLOSS BOARD JACKETS

Quantities as low as 500/
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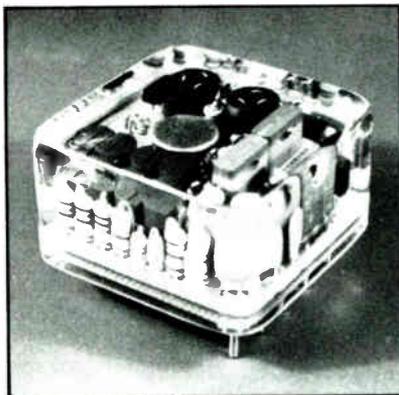
WORLD RECORDS

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L1C 3Z3
416-576-0250

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990

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*Electrical Design by Deane Jensen
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- **Fast:** 18V/ μ S @ 150 Ohms, 16V/ μ S @ 75 Ohms
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- **Powerful:** +24 dBv @ 75 Ohms (Ref: 0dBv = .775 V)

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THE HARDY CO. Box AA631, Evanston, IL 60204 (312) 864-8060

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

Central

**SOLID SOUND
TAPE DUPLICATION**
P.O. Box 7611, Ann Arbor, MI 48107
(313) 662-0667
Contact: B. Marlow, president

**SONIC SCULPTURES, INC
MASTERING**
9745 Mangham Dr., Cincinnati, OH 45215
(513) 733-5534
Contact: I. A. A. Key, president

SOUND OF NASHVILLE, INC.
A Division of Southern American Record Pressing Co., Inc.
MASTERING, PRESSING & TAPE DUPLICATION
305 11th Ave. S., Nashville, TN 37203
(615) 244-1124
Contact: Martin Evans, sales manager

**SOUTHERN AMERICAN RECORD PRESSING CO., INC
PRESSING**
305 Industrial Blvd. South, Nashville, TN 37203
(615) 256-2521
Contact: Martin Evans, Marketing Relations

**SPECIAL RECORDINGS, INC
TAPE DUPLICATION**
3020-26 East Grand Blvd., Detroit, MI 48202
1600 Woodward, Birmingham, MI 48011
(313) 873-4655
Contact: Anthony Cummings, vice president & general manager

**S & S CUSTOM TAPES, INC
TAPE DUPLICATION**
Rt. 4, Box 328-A, Church Hill, TN 37642
(615) 357-TAPE
Contact: Mike Shaffer, president
TAPE DUPLICATION
Duplicator: Electro Sound, master & 10 jaws
Capacity: 84,000 words
Method of duplication: B to 1
Mastering equipment: Studer A80 (2 track), Studer A80 (B track), Studer A80 (C)
Tape used: 4M, Ampex, Capitol
Shell used: 15 S, 1-w
Duplicating speed: 16 to 1
Type of loading: Automatic
Packaging equipment/Fulfillment services: Ampex, direct to mail, professional mail, S, individual mail, multi-speed wrapper
Rates: Call or write for quote
Other services: Full service for cassette and 8 track insert print and tape duplication, number 1-11, number 10 other duplicator

**STANG RECORDS MANAGEMENT LTD.
MASTERING, PRESSING & TAPE DUPLICATION**
P.O. Box 256577, Chicago, IL 60625
(312) 399-5535
Contact: Brian D. Lusk, owner

**STORER PROMOTIONS
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209 1/2 Emming Street, Cincinnati, OH 45219
(513) 621-6389

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1985 EDITORIAL SCHEDULE ADVERTISING DEADLINES

- **JANUARY:** Northwest Studios
- **FEBRUARY:** Independent Engineers & Producers (NAMM); Electronic Keyboards
- **MARCH:** Southeast Studios; Nashville Recording; Loudspeaker Technology
- **APRIL:** Video Production Supplement/NAB (Listings of Video Facilities)
- **MAY:** Northeast Studios; Studio Owners Digital Forum; AES Convention
- **JUNE:** Remote Recording & Sound Reinforcement (NAMM); Concert Recording Forum
- **JULY:** Southwest Studios; Audio Education/School Listings; Mixing Console Technology
- **AUGUST:** Studio Design Issue (Listings of Designers and Suppliers)
- **SEPTEMBER:** Southern California Studios; Film Sound Update
- **OCTOBER:** AES Show/New Products Directory
- **NOVEMBER:** North Central Studios; Canadian Recording
- **DECEMBER:** Tape-to-Disk Issue (Listings of Mastering, Pressing, Duplication Facilities)

Closing for Space Reservations:
7th of the month, 2 months prior to cover date.

Deadline for Ad Materials:
15th of the month, 2 months prior to cover date.

For more information; please call the Advertising Director at (415) 843-7901.

DUPLICATION SERVICES

- CASSETTES:** CUSTOMIZED DUPLICATION OF ALL LENGTHS AND QUANTITIES FOR EVERY APPLICATION — AV, EDUCATION, ENTERTAINMENT, COMPUTER, ADVERTISING/MARKETING. BLANK CASSETTES AVAILABLE IN BULK.
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- 8-TRACK:** COMPLETE 8-TRACK CARTRIDGE SERVICE INCLUDING DUPLICATING, LOADING AND PACKAGING.
- PRESSINGS:** COMPLETE PRESSING AND PACKAGING FOR 7", 10", 12" AT 33 $\frac{1}{3}$ AND 45 R.P.M.
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- LABELS:** CUSTOM DESIGN, PRINTING, APPLICATION — ALL FORMATS.
- SHIPPING:** ROUTINE DISPATCH AND BULK MAILING SERVICE
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TOTAL RECORDING DUPLICATING EQUIPMENT AUDIO

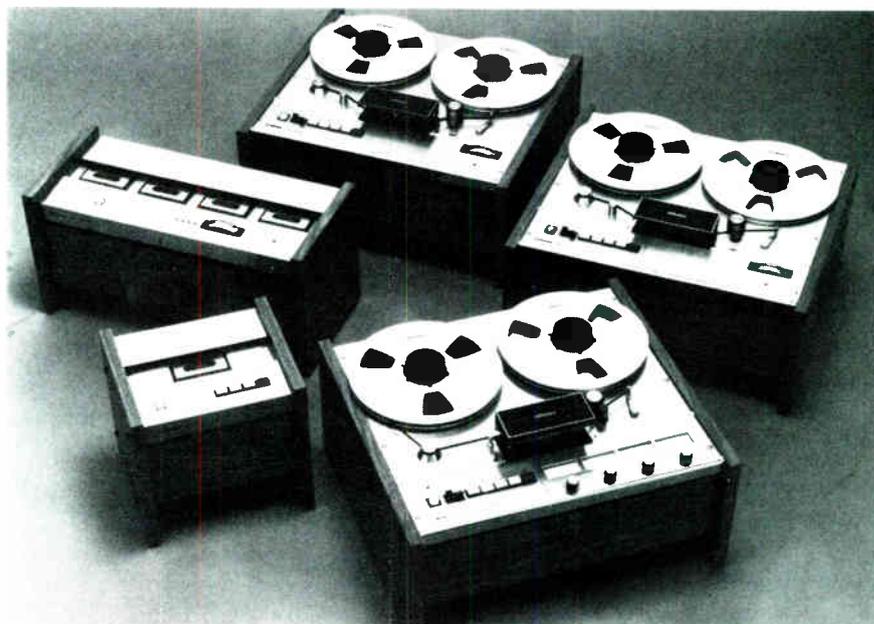
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infonics

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REEL TO CASSETTE
CASSETTE TO CASSETTE
CASSETTE TO REEL**

HIGH SPEED RECORDING EQUIPMENT



Tape Capability—CrO₂ & Fe, 70 & 120 usec EQ Frequency Response—20-20,000 Hz
Wow & Flutter—Less than .09% Distortion—Less than 0.1%
Track Format—2 Track and Four Track Switchable

(219) 879-3381 MADE IN U.S.A. TLX 233111MCI
238 Hwy 212 P.O. Box 1111, Michigan City, IN 46360

Circle #053 on Reader Service Card

COMPLETE TAPE SERVICES TO MEET YOUR DEADLINES AND YOUR STANDARDS

Mother Dubbers specializes in making "impossible" jobs possible.

We'll do what it takes to get your job done on time without sacrificing quality.

- Duplicating For All Quantities & Formats — cassette, reel-to-reel, 8-track
- Full Service Eight Track Recording Studio For Advertising, AV & Music Demo Clients
- Music & Sound Effects Library

Mother Dubbers, Inc.

13626 Gamma Road
Dallas, Texas 75234
214/980-4840

Circle #054 on Reader Service Card



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

Central

STREETERVILLE STUDIOS
TAPE DUPLICATION
161 E. Grand Ave., Chicago, IL 60611
(312) 644-1666
Contact: Tracy Woody

STUDIO PRESSING SERVICE
PRESSING
PO Box 15140, Cincinnati, OH 45215
(513) 793-4944
Contact: Beth Hyrne, president

SUMA RECORDING STUDIO
MASTERING, PRESSING & TAPE DUPLICATION
5706 Vrooman Road, Cleveland, OH 44077
(216) 951-3955
Contact: Michael Bishop, studio manager

SUPERIOR MAGNETICS
TAPE DUPLICATION
Route 3, Box 155, Blue Springs, MS 38828
(601) 869-2514
Contact: Joe Taylor



S.Y. RECORDING
Skokie, IL

S.Y. RECORDING
TAPE DUPLICATION
7876 N. Lincoln, Skokie, IL 60077
(312) 982-9693
Contact: Sarqon Youvan, owner, Robert Nozisi, manager

TANTUS PRODUCTIONS, INC.
TAPE DUPLICATION
18461 W. McNichols, Detroit, MI 48219
(313) 533-3910
Contact: Mary Ann McGrath, studio manager

TAPE 24
TAPE DUPLICATION
1244 Remington Rd., Schaumburg, IL 60195
(312) 882-2442
Contact: Mike Freeman

TAPE-FILM INDUSTRIES
MASTERING, TAPE DUPLICATION & DISTRIBUTION
640 N. La Salle St., Suite 275, Chicago, IL 60610
(312) 951-6700
Contact: Frank Communist, branch manager

TAPEMASTERS INC.
TAPE DUPLICATION
3542 Security St., Garland, TX 75042
PO Box 38651, Dallas, TX 75238
(800) 527-1227, (214) 349-0081
Contact: Jack Hennes, president

TECHNISONIC STUDIOS INC.
MASTERING, PRESSING & TAPE DUPLICATION
1201 South Brentwood Blvd., St. Louis, MO 63117
(314) 727-1055
Contact: Edw. H. Cantor, president

TRIAD PRODUCTIONS, INC.
TAPE DUPLICATION
1910 Ingersoll Ave., Des Moines, IA 50309
(515) 243-2125
Contact: Connie Skason, production coordinator

TRUSTY TUNESHOP RECORDING STUDIO
TAPE DUPLICATION
Rt. 1, Box 100, Nebo, Kentucky 42441
(502) 249-3194
Contact: Elsie Childers, owner

VILLE PLATTE RECORD MFG. CO.
MASTERING, PRESSING & TAPE DUPLICATION
120 E. Cypress, P.O. Box 10, Ville Platte, LA 70586
(318) 363-2104
Contact: Floyd Soliman, owner

VOLUNTEER RECORD PRESSING, INC.
PRESSING, TAPE DUPLICATION
P.O. Box 956, 1142 Haley Rd., Murfreesboro, TN 37130
(615) 890-3222
Contact: Jimmy Lanthorn, president

WOODLAND SOUND STUDIOS
MASTERING
1011 Woodland St., Nashville, TN 37206
(615) 227-5027
Contact: Sharon Ingram, mastering studio manager; Denny Purcell, mastering engineer
MASTERING
Cutting lathes: (2) Neumann VMS 70 SAI 74B rack, SX 74 cutterhead, VMS 66, VG 66s rack, SX 74 head
Console: (2) Neumann SP 77 (modified) Gotham
Tape machines: Studer A 80 MKIII 1/4" and 1/2" pre-listen, Mitsubishi X 80A w/ preview unit, 3M
Monitor speakers: Meyer B33 Westlake Klipsch MDM 4, Aratone
Signal processing: Sontec EQ and compression, Burwen noise filter, Orbis, stereo matrix, CBS CMA compressor
Engineers: Denny Purcell
Rates: Per hour, plus an appointment time, plus a write or call for current rates
Other Services: Digital tape, copies X 80, F 1 and 701, 1610, JVC X 80 and F 1 rental for mixing, Mastering from F 1, Outer ear, aural enhancement

Western

A&M RECORDS
MASTERING
1416 N. Labrea Ave., Hollywood, CA 90028
(213) 469-2411
Contact: Sandi Johnson

MASTERING
Cutting lathes: Scully lathes fitted with Capps computer fully redesigned by ANM
Console: Custom designed and built by A&M
Tape machines: MCI with ATH heads and modified ATH electronics
Monitor speakers: Assembled by A&M with Tannoy and FV components with H&H amps

Build your own Cabinet, Flightcase and Multicore

We have the necessary top quality hardware:
Corners, handles, catches, aluminum, extrusions, cables, connectors, vinyl and speakers.

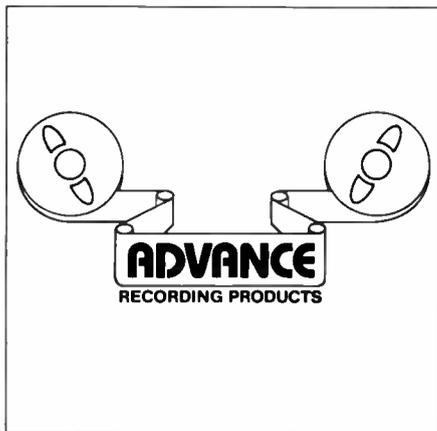
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Hawthorne, NJ 07506
Postbox 356 d
Phone: 201 423 4405

Circle #055 on Reader Service Card

Signal processing: Modified UA EQ, limiters and filters. CSG for mono disks and de-essing equipment designed by A&M
Engineers: Arnie Acosta, Frank Deluna, Bob Carbone
Rates: On request
Credits: Michael Jackson, Supertramp, Donna Summers, Herb Alpert, Prince, Brothers Johnson, Steely Dan, Quincy Jones, Gap Band, The Police, etc.

ABBEY TAPE DUPLICATORS INC.
TAPE DUPLICATION
 9525 Vassar Ave., Chatsworth, CA 91311
 (818) 882-5210
 Contact: Nick Steed, sales representative



ADVANCE RECORDING
 San Diego, CA

ADVANCE RECORDING
TAPE DUPLICATION
 7190 Clairmont Mesa Blvd., San Diego, CA 92111
 (619) 277-2540, (800) 854-1061
 Contact: Steve Smith, general manager

ALLIED RECORD CO.
PRESSING & TAPE DUPLICATION
 6110 Peachtree St., Los Angeles, CA 90040
 (213) 725-6900
 Contact: David Brown, vice president sales

ALSHIRE INTERNATIONAL, INC.
MASTERING, PRESSING & TAPE DUPLICATION
 1015 Isabel Street, Burbank, CA 91506
 (213) 849-4671
 Contact: Al Sherman, president

AMERICAN TAPE DUPLICATING
TAPE DUPLICATION
 7017 15th Avenue N.W., Seattle, WA 98117
 (206) 789-8273
 Contact: John Wehman, manager

ARCAL PRODUCTIONS INC.
TAPE DUPLICATION
 2732 Bay Rd., Redwood City, CA 94063
 (415) 369-7348
 Contact: Sal Viola, production manager

ARTISAN SOUND RECORDERS
MASTERING
 1600 N. Wilcox Ave., Hollywood, CA 90028
 (213) 461-2751
 Contact: Greg Fulaniti, chief engineer/director

ASR RECORDING SERVICES INC.
TAPE DUPLICATION
 8960 Eton Ave., Canoga Park, CA 91304
 (818) 341-1124
 Contact: Bill Dawson, vice president

AT&T RECORDING
TAPE DUPLICATION
 725 North Highland Avenue, Los Angeles, CA 90038
 (213) 933-5701
 Contact: Lesley Cohen, sales manager

AUDIO CASSETTE DUPLICATOR CO.
TAPE DUPLICATION
 5816 Lankershim Blvd. #7, North Hollywood, CA 91601
 (818) 762-2232
 Contact: Steve Katz or Steve Mitchell, owners

AUDIODYNE
TAPE DUPLICATION
 P.O. Box 825, San Jose, CA 95112
 (408) 287-3520
 Contact: L.H. Charamonte, owner

AUDIO ENGINEERING ASSOCIATES
MASTERING, PRESSING & TAPE DUPLICATION
 1029 N. Allen Ave., Pasadena, CA 91104
 (213) 798-9127
 Contact: Sam Bebee, general manager

AUDIO VIDEO CRAFT, INC.
TAPE DUPLICATION
 7000 Santa Monica, Hollywood, CA
 (213) 655-3511
 Contact: Mark Williams, manager tape duplication

THE AUTOMATT
MASTERING
 829 Folsom Street, San Francisco, CA 94107
 (415) 777-4111
 Contact: Paul Stubblebine, Mastering Engineer
MASTERING
 Cutting lathes: Scully Western
 Console: Custom
 Tape machines: MCI
 Monitor speakers: URFI 813, Rogers LS15A, JBL, Yamaha Auratone
 Signal processing: All types available
 Engineers: Paul Stubblebine
 Rates: 1/2" master \$110, 1/2" Ref \$100, 7" master \$40, 7" Ref \$40 EQ & Rndown \$125/hr
 Credits: Blue Oyster Cult, Herbie Hancock, Con Funk Shun, Translator, Holly Near, Jane Fonda, Romeo Void, Red Hot Chili Peppers, Narada Michael Walden, Angela Bofill, Stevie Nicks, Lattusaw



AWARD RECORD MFG., INC.
 Los Angeles, CA

AWARD RECORD MFG., INC.
PRESSING
 5200 W. 83rd St., Los Angeles, CA 90045
 (213) 645-2281
 Contact: Marty Ansoorian, president
PRESSING
 Presses (Mfg. and quantity): Lened automatics
 Capacity: 12,000 per day
 Vinyl used: Pure Virgin Keycor Century KC-610 & Vitec Quies
 Rates: Furnished upon request
 Other services: Printing, mastering, matrix, tapes, picture records, gold records, packaging and fulfillment

KENNETH BACON ASSOCIATES, INC.
TAPE DUPLICATION
 24 Commercial Blvd. Suite E, Novato, CA 94947
 (415) 883-5041, 1- (800) 231-TAPE
 Contact: Kenneth A. Bacon, president

—LISTING CONTINUED ON PAGE 86

Disc Mastering INC.

Every major recording center
has one mastering studio that's
a cut above the rest.

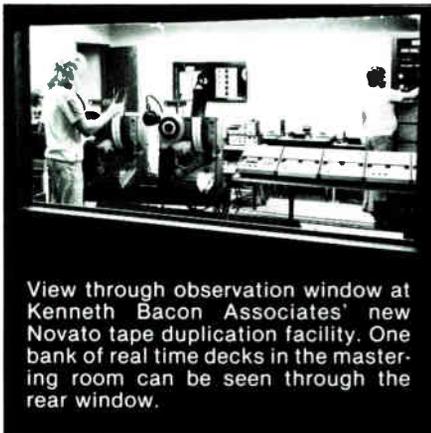
In Nashville, it's Disc Mastering Inc.

- ★ Neumann, Neve, Studer, Quad, and Tannoy equipment
- ★ Randy Kling, president—1984 Country Mastering Engineer of the Year
- ★ Represented every week this year on the national charts!

DISC MASTERING INC. • THIRTY MUSIC SQUARE WEST
NASHVILLE, TENNESSEE 37203 • (615) 254-8825

Circle #056 on Reader Service Card

TAPE DUPLICATION: Real Time - KABA Research & Development RTD-4T System. Hi Speed Bin Loop—Accurate Sound 1/2" 4-track staggered head Hi Speed In-Cassette—Otan, Alpha. Capacity: 1,500 C-60/Shift
Method of duplication: In cassette & bin loop
Mastering equipment: Otari MK 2-4 1/2"; Otari MX 5050; TEAC 40-4, AIWA & ONKYO cassette decks.
Tape used: AGFA PEM 468, PE 526, PE 619, PE 627 etc., as required by job
Shell used: Kyrac, Mag Media, Aroal
Duplicating speed: 1 7/8 ips, 3 3/4 ips; 15 ips, 30 ips; 60 ips as required by job.
Type of loading: Tape Technology Laboratory Loaders
Packaging availability/etc. Yes
Rates: Trade rates to recording studios
Other services: Custom computer and flat sheet labels, computer labels for 5" and 7" reels and reel boxes, blank label stocks, blank pre-loaded cassettes, boxes, inserts, shrink wrap, mailers. Equipment and supplies division sells most equipment and supplies used by professional duplications. Distributor AGFA-Gevaert video, mastering and cassette tapes. KABA R & D Division sells new Professional Real Time Duplication Systems.



View through observation window at Kenneth Bacon Associates' new Novato tape duplication facility. One bank of real time decks in the mastering room can be seen through the rear window.

KENNETH BACON ASSOCIATES, INC.
 Novato, CA

BAMCO RECORDS
PRESSING
 1400 S. Citrus Ave., Fullerton, CA 92633
 (714) 738-4259
 Contact: George Baker, manager

BONNEVILLE MEDIA COMMUNICATIONS
TAPE DUPLICATION
 130 Social Hall Ave., Salt Lake City, UT 84111
 (801) 237-2677
 Contact: John Campbell, sales manager

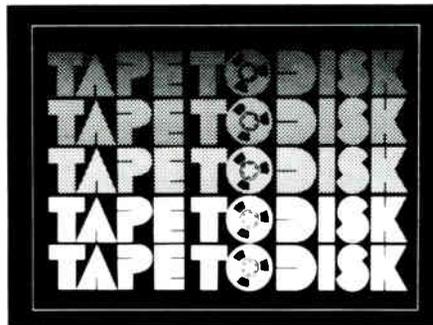
BUZZY'S RECORDING SERVICES
TAPE DUPLICATION
 6900 Melrose Ave., Los Angeles, CA 90038
 (213) 931-1867
 Contact: Maria Andreozzi

CASSETTE PRODUCTIONS UNLIMITED
TAPE DUPLICATION
 46 S. DeLacey St., Suite 24, Pasadena, CA 91105
 (818) 449-0893
 Contact: Keith Myers, vice president marketing and sales

CASSETTE PROFESSIONALS
TAPE DUPLICATION
 320 Stewart St., Reno, NV 89502
 (702) 722-6292
 Contact: Bill Stephens, owner

CHRISTIAN AUDIO TAPES
MASTERING & TAPE DUPLICATION
 3005 W. Glendale Ave., Phoenix, AZ 85021
 (602) 246-4976
 Contact: Pat & Jack Murray, owners

CREATIVE SOUND PRODUCTIONS
MASTERING, PRESSING, TAPE & VIDEO DUPLICATION
 6290 Sunset, 9th Floor, Hollywood, CA 90028
 (213) 871-1010
 Contact: Bob Cotterell



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

Western

THE CREATIVE WORD
TAPE DUPLICATION
 17885 B-2 Sky Park Circle, Irvine, CA 92714
 (714) 261-8273
 Contact: Bryan Hill, president

CUSTOM DUPLICATION INC.
TAPE DUPLICATION
 3404 Century Blvd., Inglewood, CA 90303
 (213) 670-5575
 Contact: Rick Hively, national sales manager

DAVKORE COMPANY
TAPE DUPLICATION
 1330-D Space Park Way, Mountain View, CA 94043
 (415) 969-3030
 Contact: Paul Kornthueuer, operations manager

DCT RECORDERS
MASTERING & PRESSING
 4007 W. 6th St., Los Angeles, CA 90020
 (213) 383-2155
 Contact: Pat Burnette

DYNASTY STUDIO
MASTERING & TAPE DUPLICATION
 1614 Cabrillo Ave., Torrance, CA 90501
 (213) 328-6836
 Contact: Phil Kachatanun, owner/manager

ELECTRO SOUND GROUP INC.
(MONARCH RECORD MFG. CORP.)
PRESSING & TAPE DUPLICATION
 9545 San Fernando Road, Sun Valley, CA 91352
 (818) 767-8833
 Contact: Debby Reagan, West Coast sales manager

PRESSING
 Presses: SMT-25 presses
 Capacity: 50,000 LPs/day; 36,000 7" day.
 Vinyl used: Keycor, Vitec
 Rates: Upon request — Call or write
Other services: Fulfillment.
TAPE DUPLICATION
 Duplicator: Electro-sound equip — 20 slaves
 Capacity: 35,000 per day
Method of duplication: Bin loop
Mastering equipment: Studer.
 Tape used: BASF (others upon special request).
 Shell used: Various
 Duplicating speed: 64 l
 Type of loading: Manual and automatic
Packaging equipment/Fulfillment services: Scandia
 Rates: Upon request — Call or write

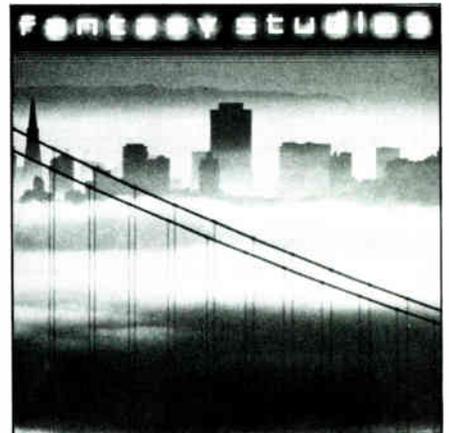
EMC PRODUCTIONS
TAPE DUPLICATION
 300 York Avenue, St. Paul, MN 55101
 6855 Santa Monica Blvd., Hollywood, CA 90038
 (612) 771-1555 or (213) 463-3282
 Contact: Ed O'Phelan, Deb Sturges, sales managers
TAPE DUPLICATION
 Duplicator: Electro Sound 6400 and 8000 duplicating lines.
 Capacity: 15,000 daily.
Method of duplication: Bin loop
Mastering equipment: MCI and Otari
 Tape used: Capitol Magnetics and AGFA

Shell used: 15 standard cassette colors.
 Duplicating speed: 32:1 and 64:1
 Type of loading: D & D automatic high-speed loaders
Packaging equipment/Fulfillment services: Complete collation, automatic boxing equipment
Rates: Pricing available on request
Other services: Warehousing and fulfillment of finished cassettes, direct offset label imprinting offering the complete range of ink colors; HX-Pro, spine imprint an option, heat-seal and pressure-sensitive labeling available, complete pulsing, mastering, insert printing also available

THE EXCEL COMPANY
TAPE DUPLICATION
 102 North Ditmar, Oceanside, CA 92054
 (619) 722-8284

Contact: Dana Berry, sales manager
TAPE DUPLICATION:
 Duplicator: Magnelax, Pentacon, Wollensak — both cassette and 1/4-inch.
 Capacity: 5,000 C-45 per shift
Method of duplication: In cassette, bin loop
Mastering equipment: Fully equipped professional recording studios
Tape used: AGFA 611, 612, Magnetic Media XM II, CD
 Shell used: Magnetic Media
 Duplicating speed: 16 l
 Type of loading: King 790 (2)
Packaging availability/Fulfillment services: Automated labeling, shrinkwrapping, printing
Rates: Please call for a pleasant surprise!
Other services: Soon real-time stereo at high speed prices! Professional multi track studio and editing mastering studios

FANFARE RECORDING STUDIOS
TAPE DUPLICATION
 110 E. Main St., El Cajon, CA 92020
 (619) 447-2555
 Contact: Carol Compton, studio manager



FANTASY STUDIOS MASTERING
 Berkeley, CA

FANTASY STUDIOS MASTERING
MASTERING
 10th and Parker, Berkeley, CA 94710
 (415) 549-2500
 Contact: George Horn
MASTERING
Cutting lathes: Neumann mastering system utilizing the Zuma audio computer; Studer tape machines
Rates: LP lacquers: \$105/side, 45 lacquers: \$45/side, mastering room run down and EQ: \$100/hr
Other services: Mastering from Mitsubishi digital master tapes. Preparation of digital masters for Compact Disc; manufacturing. Editing and equalization mastering from F1 format

F.D.S. LABS/HANK WARING DISC MASTERING
MASTERING & PRESSING
 4007 W. 6th, Los Angeles, CA (at Quad Teele Studios)
 (213) 383-2155
 Contact: Hank Waring, owner

FUTURE DISC SYSTEMS
MASTERING
 3475 Cahuenga Blvd. West, Hollywood, CA 90068
 (213) 876-8733
 Contact: Gary Rice or Steve Hall
MASTERING
Cutting lathes: Cybertonics-Zuma DM2002 FDM lathe with Or-

tolon DSSR21 cutting system

Console: Cybersonics MC2003 fully automated mastering console

Tape machines: ATR102 1/4 inch/1/2 inch mastering machine, Mitsubishi X 80/DDL 1 digital mastering system

Monitor speakers: Custom

Signal processing: Sontec equalizer and limiter/compressor

Engineers: Steve Hall, chief engineer

Rates: Upon request

Credits: Al Jarreau, Sheena Easton, Donna Summer, Jermaine Jackson, Rod Stewart, Jean Luc Ponty, Patti Austin



FUTURE DISC SYSTEMS
Hollywood, CA

THE GARAGE, AUDIO AND VIDEO
MASTERING & TAPE DUPLICATION
316 N. Foxdale, West Covina, CA 91790
(818) 337-7943

Contact: Pat Woertink owner, producer

GARRISON PUTNEY STUDIO
MASTERING, PRESSING & TAPE DUPLICATION
4635 East Anaheim St., Long Beach, CA 90804
(213) 494-4552

Contact: Clouis L. Putney owner operator



GRD RECORDINGS
Phoenix, AZ

GRD RECORDINGS
TAPE DUPLICATION
P.O. Box 13054, Phoenix, AZ 85002
(602) 252-0077

Contact: Lav Singh Khalsa Owner

TAPE DUPLICATION

Duplicator: 150 Denon DR F8 Real Time recorders, 25 Tascam 122 recorders

Capacity: Orders up to 10,000

Method of duplication: Real time

Mastering equipment: Otari Denon, Orban limiting, Lexicon reverb 16 bit digital

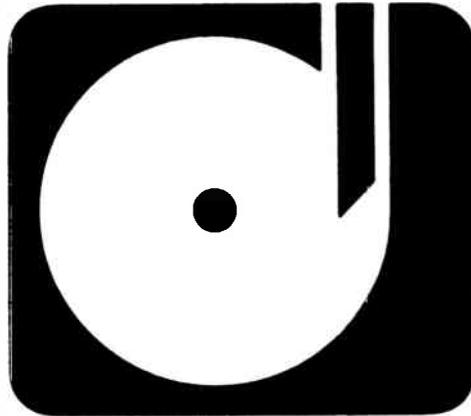
Tape used: AGFA 611, AGFA chrome, metal on request

Shell used: Mac Media and Shape

—LISTING CONTINUED ON PAGE 88

THE MASTERING LAB

AN INDUSTRY LEADER IN DISK MASTERING
SINCE 1967



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LOS ANGELES

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**You put everything you got
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the best it can be.**



But before everyone hears your work, they're going to *see* it. Let the quality of your graphics reflect the excellence they can expect to find in your music.

Stoughton can provide all of your record-related printing needs in one stop. Top-quality lithography and fabrication of jackets and sleeves for both albums and 45's, single or multi-color. Labels in all sizes and styles, including picture disks. And, of course, posters and any other graphic material you may need to promote your product.

If it's worth doing, it's worth doing right. Come to the source.

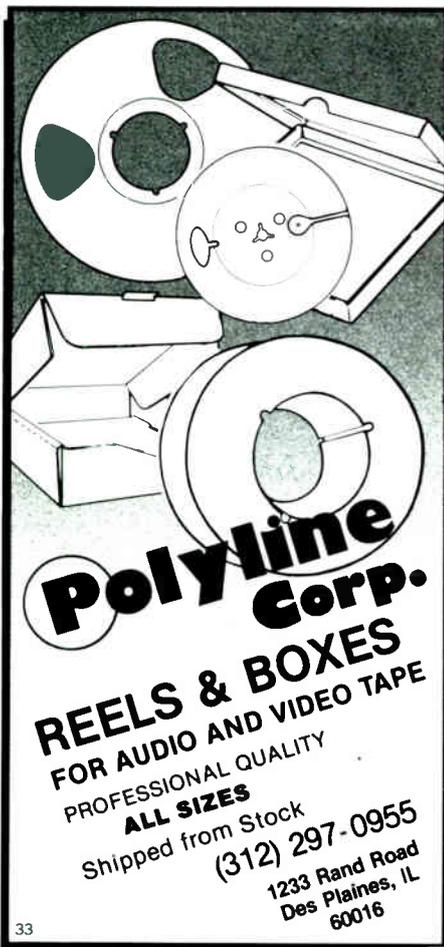
stoughton printing co.

130 N. Sunset Avenue, City of Industry, CA 91744
From Los Angeles: (213) 686-2753
(213) 961-3678

Quality Printing For The Record Industry Since 1965

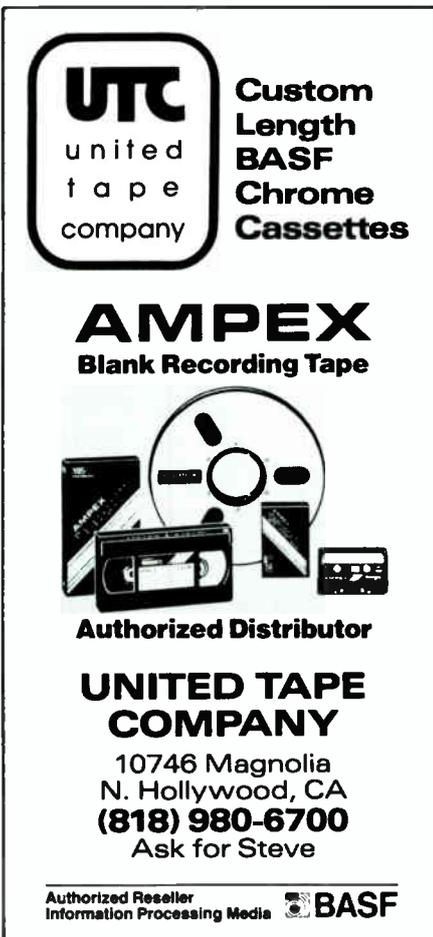
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 Des Plaines, IL
 60016

Circle #059 on Reader Service Card



UTC
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 tape
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**Custom Length
 BASF
 Chrome
 Cassettes**

AMPEX
 Blank Recording Tape

Authorized Distributor

**UNITED TAPE
 COMPANY**
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 N. Hollywood, CA
(818) 980-6700
 Ask for Steve

Authorized Reseller
 Information Processing Media 

Circle #060 on Reader Service Card



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

Western

—PAGE 87

Duplicating speed: 1/8 ips. (Real Time)
 Type of loading: Otar.
 Packaging availability/etc.: 4 color printing, labels, assembly shown.
 Rates: C45 \$1.05 each, C40 \$1.07 each, C45 \$1.12 each, C60 \$1.25 each, C75 \$1.85 each, C90 \$2.00 each, all prices incl. time, sur. ext. to finance.
 Other services: Remastering and production new music, high speed duplication for video, custom label printing, cassettes.

**HI SPEED TAPE DUPLICATING
 TAPE DUPLICATION**
 940 Howard St., San Francisco, CA 94103
 (415) 543-7393
 Contact: John Trunard, engineer

**HOT FUDGE PRODUCTIONS & MANUFACTURING
 (FLEXIBLE PICTURE RECORDS)**
 PRESSING
 9831 Oak Street, PO Box 1029, Bellflower, CA 90706
 (213) 867-4455
 Contact: Danny T. Follianus, production coordinator

**IMPERIAL TAPE CO.
 AUDIO & VIDEO DUPLICATION**
 821 9th St., Ste. 5, Santa Monica, CA 90403
 (213) 393-7711
 Contact: Howard Gans



IVC CUTTING CENTER INC.
 Hollywood, CA

IVC CUTTING CENTER INC.
 MASTERING, PRESSING & TAPE DUPLICATION
 6363 Sunset Blvd. Suite 500, Hollywood, CA 90028
 (213) 467-1166
 Contact: Warren Sawyer, studio operations
MASTERING
 Cutting lathes: Neumann VMS 70 with JVC quartz lock motor
 JVC CH 90 cutter heads and Zuma computer
 Console: IVC custom disc mastering console

Tape machines: MCI w/custom heads & playback electronics/
 JVC DAS 900, Sony, PCM 1610 2 track digital/Ampex
 ATH 102

Monitor speakers: Custom Foxtex LS 3
Signal processing: Sontec & JVC equalizers and limiters, dbx & Dolby

Engineer: Joe Gastwirt (chief mastering engineer), Dan Hersch (digital editing)

Rates: Upon request

Credits: Timothy B. Schmit, Toni Tennille, Jimi Hendrix, Mannheim Steamroller, Brainstorm, The Last Starfighter, Ronald Shannon Jackson, Kittyhawk, Joe Pass, Joe Turner, Zoot Sims, XTC, Tania Maria, Judas Priest, Eddy Grant

Other services: JVC DAS 900 and Sony PCM 1610 digital rentals, remotes, and editing. Sole distributor for Adamant JVC cutting Stylus JVC test records

PRESSING:

Pressing: JVC Custom pressing for both analog and Compact Discs

Vinyl used: JVC Custom compounds including JVC super vinyl

Rates: Upon request

Credits: Mobile Fidelity Sound Labs, Sheffield Lab, American Gramophone

Other services: Complete printing and art service, including jackets and sleeves

TAPE DUPLICATION

Duplicator: JVC Custom duplicators

Method of duplication: Pin loop

Rates: Upon request

Other services: Complete printing and art service including jackets and inserts

KDISC MASTERING

MASTERING & PRESSING

26000 Springbrook Ave., Saugus, CA 91350

(805) 259-2360 or (818) 365-3991

Contact: Sharon Summerfield, customer assistance

KDISC MASTERING

MASTERING & PRESSING

6550 Sunset Blvd., Hollywood, CA 90028

(213) 466-1323

Contact: John Golden, studio manager

MASTERING

Cutting lathes: Neumann

Console: Custom & Sphere

Tape machines: Studer, Ampex ATH

Monitor speakers: Custom JBL, Ceteo Gauss

Signal processing: Neve, API, ITI Sontec, Sphere, dbx, Dolby

Engineers: Kim Perry, John Golden, Carol Hibbs, Bill Luxhtner

Rates: Call for rates

Credits: Crusaders, Patrice Rushen, Frank Stallone, Ghostbusters, Elliott & West, Men at Work, Isley Bros. etc.

Other services: Studer 1/2" 2 track preview machine and Ampex ATH 102 1/2" 2 track record machine

KENDUN RECORDERS

MASTERING

721 S. Glenwood Place, Burbank, CA 91506

(818) 843-5900

Contact: Kent Duncan, director of mastering



KM RECORDS INC.

K M RECORDS, INC.
 Burbank, CA

K M RECORDS, INC.

MASTERING & PRESSING

2980 N. Ontario St., Burbank, CA 91504

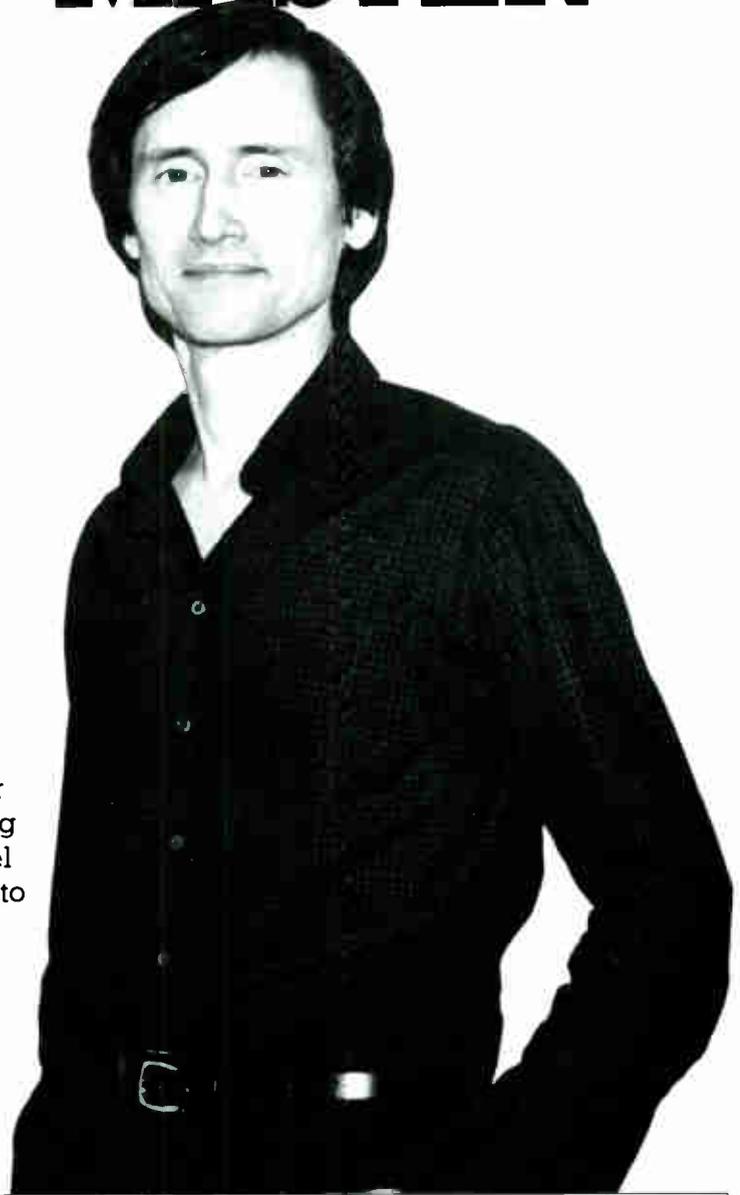
(818) 841-3400

Contact: Jim Auchterlone

—LISTING CONTINUED ON PAGE 90



The MASTER



When it comes to record mastering, Bernie Grundman wrote the book.

Over the years Bernie has cut the masters for many of the world's best selling albums, including the phenomenally successful 'Thriller' by Michael Jackson. What loudspeakers does Bernie rely on to monitor the quality of his output?

“ I've mastered successfully on Tannoy for 17 years. For my new facility I chose Tannoy again. ”

Bernie Grundman

Bernie Grundman
MASTERING

6054 Sunset Blvd. Hollywood, California 90028

(213) 465-6264

Rely on TANNOY®
The Name for Loudspeakers

Tannoy North America Incorporated, 97 Victoria Street North, Kitchener, Ontario, Canada. N2H 5C1. Telephone (519) 745 1148. Telex: 06955328.

Circle #061 on Reader Service Card

—PAGE 88

MASTERING

Cutting lathes: VMS-70 SX-74, SAL 74-B
Console: Neumann SP-7H
Tape machines: Modified MCI JH 110
Monitor speakers: Custom
Signal processing: EMT 140, API and other EQ
Engineers: Michele Stone, Jeff Sanders, Randy Green
Rates: Upon request

PRESSING

Presses (Mfg. and quantity): Toolex Alpha (G)
Capacity: 12,000/day
Vinyl used: KC 569, Teldex, Quex
Rates: Upon request
Other services: In house metal processing, printing of labels, jacket covers and liners, jacket fabrication, direct on board

LEW'S RECORDING PLACE

TAPE DUPLICATION
1219 Westlake Ave North, Suite 115, Seattle, WA 98109
(206) 285-7550
Contact: Lew J Lathrop, owner

LIGHTNING CORPORATION

TAPE DUPLICATION
7854 Ronson Rd., San Diego, CA 92111
(619) 565-6494
Contact: Mike Larson, president

TAPE DUPLICATION

Duplicator: Wollensak (FM) 10, Pentanon
Capacity: 26 cassettes/run (8,000 C 60/day)
Method of duplication: In cassette
Mastering equipment: Ampex, Otari 2 and 4 track reel to reel, BIC & Superscope cassettes
Tape used: BASF, DPS
Shell used: Magnetic Media (5 screw), white or black
Duplicating speed: 30 ips (16 I)
Type of loading: King
Packaging availability/etc.: Complete albums, boxes, labels, shrinkwrap
Rates: C 30 \$1 00, C 60 \$1 15, C 90 \$1 40
Other services: Voice studio, remote recording, video taping 1/4 and 1/2", multi media slide shows and sound tracks

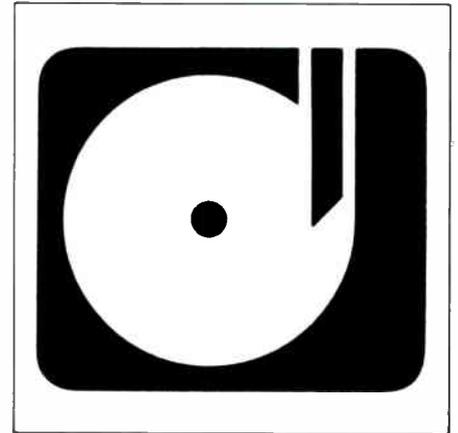


Listings of Mastering, Pressing and Tape Duplication Facilities Throughout the United States

Western

MASTER DIGITAL INC.
AUDIO AND VIDEO DUPLICATION
1749 14th St., Santa Monica, CA 90404
(213) 452-1511
Contact: Paul Addis, vice president, sales
TAPE DUPLICATION
Duplicator: 16 bit digital Sony or analog
Method of Duplication: Real-Time only

Mastering equipment: Studer B67, Sony PCM 1600
Tape used: Sony UCXS BASF chrome - custom loaded to length
Shell used: Shape, MK 10
Duplicating speed: Real Time
Packaging availability/Fulfillment services: Color stock, typeset J cards & labels
Rates: \$400 & up
Other services: Film & video production, digital audio recording, Compact Disc mastering, videophile—1 inch and 1/4 inch stereo, VHS Hi Fi and Beta Hi Fi duplication



THE MASTERING LAB
Los Angeles, CA

THE MASTERING LAB
MASTERING
6033 Hollywood Blvd., Los Angeles, CA 90028
(213) 466-8589
Contact: Susan Frickten, studio manager

Audiophile Quality and Service

The people at KM Records are masters at their craft and treat each recording as "solid gold." From tape to record the cost-effective way, because we do it all in-house: mastering, matrix electroforming, record pressing, label and jacket graphics and printing.



KM Records — always a sound choice.

2980 N. Ontario Street, Burbank, CA 91504
Tel. 213 841-3400 or TWX No. 910-498-5700



MCA WHITNEY RECORDING STUDIO
Glendale, CA

MCA WHITNEY RECORDING STUDIO
MASTERING & TAPE DUPLICATION
1516 W. Glenoaks Blvd., Glendale, CA 91201
(818) 245-6801
Contact: Frank Kejmar, Studio Manager
MASTERING
Cutting lathes: (2) VMS 70, Tandem w/Zuma computer
Console: Neumann w/custom electronics
Tape machines: Studer A80 w/custom electronics, ATR 100, Tandberg 3014
Monitor speakers: UREI 813
Signal processing: Sontec parametric
Engineers: Dave Hernandez
Rates: Upon request
Credits: Metal Blade Records, Blondie, Pat Benatar, The Knack, Barry White, Love Unlimited Orchestra, Aretha Franklin, Andre Crouch, One Way, E.T. Crusaders, Tanya Tucker, Suzie Quatro, etc.
Other services: Professional 24 track recording studios
TAPE DUPLICATION
Duplicator (Mfg. and quantity): 12 Ampex reel to reel, Otari cassette
Method of duplication: In cassette
Tape used: BASF Pro I

Circle #062 on Reader Service Card

Shell used: Magnetic Media.
Duplicating speed: 8 1/2
Packaging availability/etc.: Labelling, insert card, delivery.
Rates: Upon request.
Other services: Professional 24 track recording

MOBILE FIDELITY SOUND LAB
MASTERING, PRESSING & TAPE DUPLICATION
21040 Nordhoff, Chatsworth, CA 91311
(818) 709-8440
Contact: Pete Schutzer

Type of loading: Custom length cassettes.
Packaging equipment/Fulfillment services: Complete services available.
Rates: Competitive rates — Call for quote or price list.
Other services: Real-time duplication available.

MCCUNE AUDIO VISUAL
TAPE DUPLICATION
951 Howard St., San Francisco, CA 94103
(415) 777-2700
Contact: Don Geis, chief engineer

MOON VALLEY CASSETTE
TAPE DUPLICATION
10802 N. 23rd Ave., Phoenix, AZ 85029
(602) 864-1980
Contact: Mark Bruno, manager

MUSIC ANNEX
TAPE DUPLICATION
970 O'Brien Dr., Menlo Park, CA 94025
(415) 328-8338
Contact: David Porter or Keith Hatscheck

MIRROR IMAGE
TAPE DUPLICATION
10288 E. Jewell Ave. #45, Denver, CO 80231
(303) 751-2268

TAPE DUPLICATION
Duplicator: Otari DP-1010, multiple slaves
Capacity: 500 C-60s per hour
Method of duplication: Bin loop
Mastering equipment: Otari 5050 2 track, MX5050 4 track
Tape used: AGFA 611, AGFA 811
Shell used: Kyrac, 5-screw
Duplicating speed: 16 1/2
Type of loading: Otari automatic loaders
Packaging equipment/Fulfillment services: RZ126 19x26 off-set, 1250W offset, shrinkwrap
Rates: As low as 56 cents/C-15, 85 cents/C-45
Other services: Custom packaging, original recording, music arranging

MUSIC LAB, INC.
TAPE DUPLICATION
1831 Hyperion Ave., Hollywood, CA 90027
(213) 666-3003
Contact: Craig Durst

Contact: Chns, John or George, manager
TAPE DUPLICATION
Duplicator: Denon DRM-33, 100 each
Capacity: 5000 C-30 2 shifts
Method of duplication: Real-time.
Mastering equipment: Technics RS-1500 US
Tape used: Ampex, Agfa, BASF, Maxell, TDK, Sony
Shell used: Mag Media
Duplicating speed: 1-7/8 (Real-Time)
Packaging equipment/Fulfillment services: Packaging, shrinkwrap, etc.
Rates: As low as 88 cents for C30
Other services: Aphex processing, dbx, Dolby B & C

RAY NAKAMOTO PRODUCTIONS
MASTERING & TAPE DUPLICATION
1030 48th St., Sacramento, CA 95819
(916) 461-3400
Contact: Ray Nakamoto

MOTOWN/HITSVILLE STUDIOS
MASTERING
7317 Romaine St., Hollywood, CA 90046
(213) 850-1510
Contact: Mark Kofman, studio manager

NORTHWESTERN INC.
TAPE DUPLICATION
1224 SW Broadway, Portland, OR 97205
1 (800) 547-2252; 1 (503) 226-0170
Contact: Paul Buescher, Sales Manager

MJS MAGNETIC TAPES
TAPE DUPLICATION
2514 Seaboard Ave., San Jose, CA 95131
(408) 262-5544
Contact: Mike Steiner, owner

MR. SPEED CASSETTE DUPLICATION
TAPE DUPLICATION
5816 Lankershim Blvd. #5, North Hollywood, CA 91601
(818) 767-7333
Contact: Mr. Speed, manager of operations

MASTERING
Console: Spectra Sonics
Tape machines: Ampex ATR102-ATR 800
Monitor speakers: Altec 604
Signal processing: Spectra Sonics, Echoplex
Engineers: Gary Shannon, Bob Lindahl
Rates: \$50.00 per hr

ML TAPE DUPLICATING
TAPE DUPLICATION
6935 Valjean Ave., Van Nuys, CA 91406
(818) 988-2737
Contact: Bill Ball, owner

TAPE DUPLICATION
Duplicator: Sony high-speed equipment
Capacity: Quantity discounts — No minimum
Method of duplication: In cassette
Mastering equipment: State-of-the-art computerized equipment.
Tape used: BASF LHD
Shell used: Mag Media, 5-screw
Duplicating speed: 8 1/2

TAPE DUPLICATION
Duplicator: AudioTek 2000 BL
Capacity: 4000 per day C-45
Method of duplication: In cassette, bin loop
Mastering equipment: Ampex ATR 800-4, ATR 800-2.
Tape used: Ampex 603 and AGFA 612 Magnette.
Shell used: Kyrac

—LISTING CONTINUED ON PAGE 92

VIDEO MASTERING BY THE MASTERS

- **Four years ago, Master Digital**, using digital audio techniques, proved to the recording industry that we could consistently duplicate real-time audio cassettes that exceed the quality of records
- **Three years ago, Master Digital** pioneered the synchronization of digital audio to video, giving masters an audio dynamic range never before associated with video.
- **Two years ago, Master Digital** began compact disc mastering and has since produced the largest single compact disc order to date for the world's largest electronic retailer.
- **One year ago, Master Digital** started engineering the most sophisticated video cassette mastering facility. Now we are pleased to announce that our new facility is on line producing stereo VHS Hi-Fi, Beta Hi-Fi and U-Matic duplication. Our video mastering division has consistently produced the highest degree of video and audio quality that our broad client base has come to expect.

Based on the principles of high technology and dedicated customer service, we would like to add you to our list of satisfied customers. If your company demands the highest quality product at a more than competitive price, delivered when promised, then call our V.P. of Sales, Paul Addis, and **experience the Master Digital difference!**

(213) 452-1511



Master Digital, Inc.

1749 14th Street • Santa Monica, CA 90404

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Santa Monica, California 90404
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TWX 910-343-6862

**The ONE STOP Center
For Custom Record
Pressing and
Cassette Duplication**

-  Any Size
-  Any Shape
-  Any Picture
-  Any Color

**In-House
Mastering • Processing
Labels • J-Cards**

**Record Jackets
Picture Sleeves
Collation • Fulfillment**

(213) 829-0355



**No Order Too Large
No Order Too Small
10-Day Turn Around**



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

Western

—PAGE 91

Duplicating speed: 32:1
Type of loading: 2-King 760 automatic
Packaging availability/Fulfillment services: Shrink wrap in sets, labels
Other services: Reel to reel at speed Ampex AG 440 C 6 slaves



ORPHARION RECORDINGS
Long Beach, CA

ORPHARION RECORDINGS
TAPE DUPLICATION
PO Box 91209, Long Beach, CA 90809-1209
(213) 438-4271

Contact: Jonathan Marcus or LaVonna Hasz

TAPE DUPLICATION

Duplicator: Intonics 200A, one Reel Master two 4 position slaves. Small quantity real time with Sony TC K777s

Capacity: 1,000 C45's/day

Method: In cassette

Mastering equipment: Digital processors Audio + Design modified Sony 701ES, dbx 700 1/2 inch VHS and Beta formats Analog tape machines: Nagra T Audio 1/4 inch 30 ips AES 15 ips NAB, 15 ips Nagra master, 7 1/2 ips NAB Otari MX 5050B 1/4 inch 1/4 track record 1/2 track playback 15 ips NAB 7 1/2 ips NAB 3 1/4 ips NAB Cassette decks: Four Sony TC K777s Nakami hi ZX 4 Dolby A, B, C dbx 1 and II

Tape: 1/4-inch mastering tape AGFA 468 Cassette tape BASF CrC2 and normal bias

Shell: Data Pac, Magnetic Media, Shape

Duplicating speed: 10:67:1 or Real Time

Loader: Electro Sound

Packaging-printing rates: Call for quotes

Other services: Audiophile remote recording

OUTBACK STUDIOS
TAPE DUPLICATION
489 1/2 Cavour St., Oakland, CA 94618
(415) 655-2110
Contact: Nancy Dyer, traffic manager

PRECISION LACQUER
MASTERING
1008 North Cole Ave., Los Angeles, CA 90038

(213) 464-1008

Contact: Kate Emerine studio manager

MASTERING

Cutting lathes: Tandem CompuDisc - Ortofon

Console: Custom NTP

Tape machines: Ampex

Monitor speakers: K&H, Horrible Tones

Signal processing: NTP, UREI Ortofon Stephen's ears

Engineers: Stephen Marcussen

Rates: Call for information

Credits: Stevie Wonder Fleetwood Mac Pointer Sisters, Stevie Nicks Tom Petty Mick Fleetwood Duran Duran Barbra Streisand Tina Turner Olivia Newton John Devo U2

PRESENT TIME RECORDERS
TAPE DUPLICATION,
5154 Vineland Ave., N. Hollywood, CA 91601
(818) 762-5474
Contact: Bob Wurster

PROJECT ONE A/V
TAPE DUPLICATION
6669 Sunset Blvd., Hollywood, CA 90028
(213) 464-2285

Contact: Maria or Dalton Priddy, managers

TAPE DUPLICATION

Duplicator: 30 Tascam 122B and Technics M280, various

1/4 inch Umatic, VHS and Beta decks

Capacity: Audio 500 to 1,000 album lengths and video 200 to 500 music videos per day

Method of duplication: In cassette

Mastering equipment: ATH 102s 1/4 inch and 1/2 inch 2 track, Otari MTR1 1/4 inch and 1/2 inch 2 track, all video formats PCM-FI

Tape used: AGFA normal and hi bias custom length, or TDK, Mix-II, Scotch 4M XS AUX

Shell used: Magnetic Media Shape MK 10, TDK, Maxell, Scotch 4M

Duplicating speed: Real time Actual master and cassette deck running speed

Type of loading: King

Packaging availability/Fulfillment services: Various colors of labels and picture stock available

Rates: Depending on quantity and program time — Call for the honest, hourly real time audio or video master cassette and reel copies available

Other services: Major discount audio and video tape supply house — Call our supplies department for the lowest price possible



RAINBO RECORD MANUFACTURING
Santa Monica, CA

RAINBO RECORD MANUFACTURING CORP.
dba RAINBO RECORDS
MASTERING, PRESSING & TAPE DUPLICATION
1738 Berkeley St., Santa Monica, CA 90404
(213) 829-0355, 829-3476

Contact: Steve Sheldon, production supervisor Jack G. Brown, president

MASTERING

Form out Top mastering studios Top priority

PRESSING

Presses: 20 automatic lined 12 inch and 7 inch presses (3) dual capacity 7 inch picture records shaped records

Capacity: 45M to 50M per day

Vinyl used: Keycor Quirex

Rates: 12 inch largers two sides \$166.7 inch, \$96, two sides Processing three sides 12 inch \$164.7 inch \$120 two sides 12 inch pressing average 55.7 inch average 26

Other services: Labels in house album jackets for 12 inch, picture sleeves for 7 inch, minimum 1,000 one color lots

TAPE DUPLICATION

Duplicator: Auto Tech six slaves one master

Circle #064 on Reader Service Card

THE NEW PERSPECTIVE IN AUDIOVISION

Manufacturing & Duplication of Custom Length:

- AUDIO CASSETTES (Agfa, BASF, Magnetic Media)
- VIDEO CASSETTES (Japanese Professional High Grade)
- REEL TO REEL TAPE (Agfa, Ampex, Scotch 3M)

Audio & Video Cassette Accessories:

- Plastic Reels & Boxes
- Cassette Storage Boxes
- Labels & Inserts (ask about printing)
 - Cassette Shells (V-O's; C-O's)
 - Audio & Videotape Pancakes (hubs)

At Imperial Tape Company we are dedicated to Personal Service, Quality, Competitive Bid Pricing & Education! When was the last time you spoke with the owner of the company that supplies your audio and videocassette needs?

For more information, call person-to-person collect. Ask for Howard Ganz, owner.

Imperial Tape Company

1014 Broadway • Santa Monica, CA 90403 • (213) 393-7131

Capacity: 6,000 per shift
 Method of duplication: Bin loop
 Mastering equipment: Studer
 Tape used: BASF-LH2
 Shell used: Varies
 Duplicating speed: 32 ips.
 Type of loading: King
 Packaging equipment/Fulfillment services: Yes
 Rates: Mastering \$60, label plate \$30, J-cards \$75 (minimum for 2M 40 min 75 to 70; 50 minutes 83 to 73)
 Other services: Artwork; insert film and paste up \$200 from jacket; insert film and paste up \$250 from camera ready art. Note: All above cassette duplication prices include cassette case and cellophane wrap

RAINBOW CASSETTE STUDIO
 TAPE DUPLICATION
 P.O. Box 472, Taos, NM 87571
 (505) 776-2268
 Contact: Tony Isaacs, manager

RAINBOW VENTURES, INC.
 MASTERING, PRESSING & TAPE DUPLICATION
 2219 West 32nd Avenue
 Denver, Colorado 80211
 (303) 433-7231
 Contact: Michael Moryc, studio manager

BILL RASE PRODUCTIONS, INC.
 TAPE DUPLICATION
 955 Venture Ct., Sacramento, CA 95825
 (916) 929-9181
 Contact: Bill Rase, owner

RECORDING ETC.
 TAPE DUPLICATION
 663 Cowper, Palo Alto, CA 94301
 (415) 327-9344
 Contact: Dennis Reed, owner; Ted Brooks, manager

RECORD TECHNOLOGY, INC.
 PRESSING & TAPE DUPLICATION
 486 Dawson Dr., Camarillo, CA 93010
 (805) 484-2747
 Contact: Bill Bauer, president

RECORTEC, INC.
 TAPE DUPLICATION
 275 Santa Ana Ct., Sunnyvale, CA 94086
 (415) 962-0220
 Contact: Ed Wong, vice president

REELTIME TAPE DUPLICATION
 TAPE DUPLICATION
 125 Alena St., San Rafael, CA 94901
 (415) 459-7180
 Contact: Tony Johnson, owner
TAPE DUPLICATION
 Duplicator: Pioneer 550 (10).
 Capacity: 1 to 1,000 or more
 Method of duplication: Real time
 Mastering equipment: Pioneer 1250, Technics 1500, call regarding outboard gear.
 Tape used: TDK D, TDK SA; Custom loads of BASF chrome or Agfa normal or chrome.
 Duplicating speed: Real time.
 Monitoring: JBL 4411; Yamaha P2100; Crown IC 150
 Packaging equipment/Fulfillment services: Labels, inserts, boxes available
 Rates: Very reasonable; call for quotation.
 Other services: We specialize solely in music demo reproduction, editing services available.

REX RECORDING CO.
 MASTERING, PRESSING & TAPE DUPLICATION
 1931 SE Morrison, Portland, OR 97214
 1- (800) 547-5547 (outside OR), (503) 238-4525 (in OR)
 Contact: Gary Perman, producer

ROCKY MTN. RECORDING
 MASTERING & PRESSING
 8305 Christensen Rd., Cheyenne, WY 82009
 (307) 638-8733
 Contact: Georgia Alexander, sales

SEACOAST RECORDING
 TAPE DUPLICATION
 926 Turquoise St., San Diego, CA 92109
 (619) 270-7664
 Contact: Jack Elliott, owner

Circle #065 on Reader Service Card

Looking for Cassettes? THINK FILAM Quality Products

FILAM
NATIONAL PLASTICS INC.

CALL: BING or MIKE (213) 630-2500

13984 S. ORANGE AVE. PARAMOUNT, CA. 90723

Circle #066 on Reader Service Card

SEA HEAR INDUSTRIES
 MASTERING & TAPE DUPLICATION
 419 W. Walnut, Gardena, CA 90248
 (213) 516-0315
 Contact: Dick Kensei

SHUR-SOUND & SIGHT, INC.
 TAPE DUPLICATION
 3350 Scott Blvd., Bldg. #5, Santa Clara, CA 95054
 (408) 727-7620

Contact: Glenn Cardon, vice president
TAPE DUPLICATION
 Duplicator: Electro Sound plus five slaves, Iononics
 Method of duplication: In cassette, bin loop
 Mastering equipment: Ampex AG 440, Revox A700, Pioneer 707
 Tape used: Ampex, Alga
 Shell used: Magnetic Media
 Duplicating speed: 16:1
 Type of loading: Electro Sound (4)
Packaging equipment/Fulfillment services: Tuck automatic labeler, Great Lakes shrinkwrap
 Rates: Call
 Other services: Real time tape duplication, location recording, conferences, seminars.



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

Western



SONIC ARTS CORP. THE MASTERING ROOM
 San Francisco, CA

SONIC ARTS CORP. THE MASTERING ROOM
 MASTERING, PRESSING & TAPE DUPLICATION
 665 Harrison St., San Francisco, CA 94107
 (415) 781-6306, 957-9471

Contact: Ron Sullivan, custom accounts
MASTERING
 Cutting lathes: Neumann, fully automated and computerized
 VCI66 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
 Monitor speakers: Altec 604 w JBL woofers
 Signal processing: Parametric and graphic EQ, Inovonics
 Dolby A, and dbx noise reduction, UREI and Inovonics limiters,
 AKG echo chamber
 Engineers: Leo de Gar Kulka, Kenneth Lee (asst.)
 Rates: \$25 per 14 hr. plus lacquers 7" \$40 side, 12" \$50 side

Credits: Phillips, Warner Bros., Concord Jazz, Ralph Records,
 DEX, Cetero and many local labels
 Other services: Half speed mastering, digital mastering
PRESSING
 Vinyl used: Keycor, Teldec
 Rates: Call or write for brochure
 Other services: Jacket label and poster printing, colored vinyl
 promotional buttons, stickers, matchboxes, and T-shirts
TAPE DUPLICATION
 Mastering equipment: 4M
 Tape used: AGFA PE 611
 Shell used: Data packaging
 Packaging availability/etc.: Album art reproduction labels
 Rates: Call or write for brochure

SOUNDMARK, LTD.
 TAPE DUPLICATION
 4950-C Nome Street, Denver, CO 80239
 (303) 371-3076

Contact: Wanda Martin, David Howard, account executive



SOUND MASTER AUDIO/VIDEO RECORDING STUDIOS
 North Hollywood, CA

RECORD PRESSING & TAPE DUPLICATING

Are you wondering where you can go to get the best possible PRICE,
 SERVICE and QUALITY for a complete customized package deal for
 your record pressing and tape cartridge duplication? LOOK NO
 FURTHER!!

ONE CALL DOES IT ALL

"IT'S A SERVICE YOU WILL APPRECIATE"

JAMES TAKEDA
(818) 760-6644

SERVICES OFFERED:

Disc Mastering, Processing, Labels, Record Pressing, Album Jacket
 Layout, Designing, Color Separation, Offset Printing, Album Fabri-
 cating and Shrink Wrapping, Cassette and 8 Track Duplicating, and
 more...

SEND FOR YOUR FREE PRICE QUOTATION



Takeda
Record Service

11542 Burbank Blvd. #2, North Hollywood, CA 91601

Phone: (818) 760-6644

SOUND MASTER AUDIO/VIDEO RECORDING STUDIOS
 MASTERING

10747 Magnolia Blvd., North Hollywood, CA 91601
 (818) 650-8000

Contact: Barbara Incoldsby, studio manager

MASTERING

Cutting lathes: Cybersonics with Ortolon cutting amplifiers and head

Console: Cybersonics

Tape machines: MCI and Ampex

Monitor speakers: House

Signal processing: Everything

Engineers: Brian Incoldsby, Joe Beniche, Ken Incoldsby

Rates: On request

Credits: Elton John, Olivia Newton John, Joe Cocker, many others

Other services: 24 track automatic recording studio and full pro-
 duction video complex

SOUNDOME

MASTERING & PRESSING

17422 Murphy Avenue, Irvine, CA 92714
 (714) 474-2015

Contact: Richard Donaldson, manager

SOUND PRESERVERS CO.

TAPE DUPLICATION

911 East Fourth Avenue, Olympia, WA 98506
 (206) 352-9097

Contact: Allen Giles, owner

Circle #067 on Reader Service Card

TAPE SERVICE UNLIMITED
TAPE DUPLICATION
 3249 Grand Ave., Oakland, CA 94610
 (415) 834-6912
 Contact: Walt Lee, owner

TAPE SPECIALTY INC.
TAPE DUPLICATION
 13411 Saticoy St., North Hollywood, CA 91605
 (818) 786-6111
 Contact: Steve Feldman, president

UNI-SETTE, INC.
TAPE DUPLICATION
 5125 Marconi Avenue, Carmichael, CA 95608
 (916) 485-9534
 Contact: Rudi De Grood, president

TAPE DUPLICATION
 Duplicator: Real time only use Nakamichi LX5 three head machines 24 decks
 Capacity: Limited quantity
 Method of duplication: In cassette
 Mastering equipment: 15 ips only Scully 280B, Otari 5050 B, Tascam
 Tape used: Scotch, Agfa, BASF
 Shell used: Five screw Magnetic Media
 Duplicating speed: Real time 1 7/8 ips
 Type of loading: Custom length according to program length
 Packaging equipment/Fulfillment services: Label printing, labeling, insert printing, assembly boxing, shrinkwrap, computer printed delivery system
 Rates: Reasonable Call for quotes
 Other services: Location recording

UNIVERSAL AUDIO CORP.
MASTERING, PRESSING & TAPE DUPLICATION
 6540 E. Lafayette Blvd., Scottsdale, AZ 85251
 (602) 994-5528
 Contact: John A. Michaelson, president

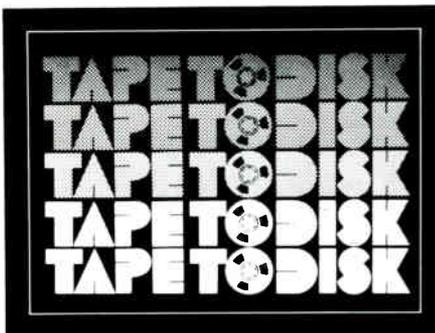
VIRCO DISC MASTERING
MASTERING, PRESSING & TAPE DUPLICATION
 700 S. Date, Alhambra, CA 91803
 (818) 283-1888
 Contact: David Chepp, engineer, general manager



WAKEFIELD MFG., INC.
 Phoenix, AZ

WAKEFIELD MFG., INC.
MASTERING, PRESSING & TAPE DUPLICATION
 P.O. Box 6037, 1745 W. Linden, Phoenix, AZ 85005
 (602) 252-5644

Contact: An account executive
MASTERING
 Cutting lathes: Neumann VMS-70, SX-74 head, SAL-74B electronics, Zuma computer
 Console: Neumann
 Tape machines: Studer A-80 MK II 1/4-inch and 1/2-inch, Otari MTR-10
 Monitor speakers: UREI 813s, JBL 4310
 Signal processing: Sontec
 Engineers: Roger Seibel
 Rates: Contact an account executive
 Credits: ECM, Flying Fish, Rounder, American Gramophone, 1750 Arch.
 Other services: Digital mastering Sony PCM-1610
PRESSING
 Presses: SMT automatics.
 Vinyl used: Vitec Quies I and II, Keycor KC-600, Teldec available.



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

Western

Rates: Contact an account executive
 Other services: Complete tape-to-disk manufacturer All printing (labels, jackets, stickers, inserts, etc.), complete matrix department

TAPE DUPLICATION

Rates: Contact an account executive
 Other services: Complete duplicating and printing services

HANK WARING DISC MASTERING
MASTERING
 4007 W. 6th St., Los Angeles, CA 90020
 (213) 393-2155
 Contact: Hank Waring

WEST AMERICAN SOUND
TAPE DUPLICATION
 8120 Webb Ave., North Hollywood, CA 91605
 (818) 768-6100

WINTER SUN
TAPE DUPLICATION
 1802 N. 23rd Ave., Phoenix, Arizona 10802
 (602) 864-1980
 Contact: Mark Bruno, manager

ALLEN ZENTZ MASTERING
MASTERING
 7083 Hollywood Blvd., Suite 302, Hollywood, CA 90028
 (213) 469-5855
 Contact: Allen Zentz, owner

Outside U.S.

AMPS
AUDIO & VIDEO DUPLICATING
 230 Don Park Rd. Unit 7, Markham, ONT L3R 4J1
 (416) 475-3676

C & L AUDIO DISTRIBUTORS
TAPE DUPLICATION
 3889 Chesswood Dr., Toronto, ON
 (416) 636-4795
 Contact: Syd Capland, Ernie Lyons

DISQUES SNB LIMITED
MASTERING & TAPE DUPLICATION
 8400 Cote de Liesse, St-Laurent, PQ H4T 1G7 Canada
 (514) 735-2271
 Contact: Sahin Brunet, president

MASTERING
 Cutting lathes: VMS 70 Zuma audio computer control
 Console: Neumann SP
 Tape machines: Telefunken (Preview & Record Play), Studer (Herod Play)
 Monitor speakers: Klein & Hummel, Tri-Amp
 Signal processing: Dolby's, dbx, Orban Parametric EQ's, NTP LJM/COMP, Neumann GV 74-B transformerless
 Engineers: Sahin Brunet, Emile Lepine, Alain LaLancette
 Rates: Mastering LP \$96, per side, 45 rpm; \$46, per side, Studio time \$80/hr. Eq's tape copy \$84. CANADIAN FUNDS

Credits: DGG, Polygram, Virgin, Arista, RSO, Phillips
 Other services: Pressing/cassette duplication (real time), eq's tape copies

PRESSING

Presses: Pressing available on demand

TAPE DUPLICATION

Duplicator: Real time duplication
 Capacity: 500 per 8 hour shift
 Method of duplication: In cassette
 Mastering equipment: AKAI/Sony
 Tape used: AGFA
 Shell used: Ampex
 Duplicating speed: Real time
 Type of loading: Semi-automatic
 Packaging availability/Fulfillment services: In-house packaging, no direct printing on cassette, complimentary printing of insert card, labels and related printing services available
 Rates: On demand

ENREGISTREMENTS AUDIOBEC CANADA INC.
MASTERING, PRESSING & TAPE DUPLICATION
 600 Ouest, Port Royal, Montreal, Quebec, H3L 2C5
 (514) 384-6667

Contact: W. Lewis, manager

MASTERING

Cutting lathes: Neumann
 Console: Custom Neve console
 Tape machines: Studer
 Monitor speakers: Tannoy
 Signal processing: Dolby, dbx, EMT compressors/expanders, Fairchild limiters, on board EQ.
 Engineers: J. Babchuk
 Rates: On demand

Credits: All major labels

TAPE DUPLICATION

Duplicator: Ceter Gauss
 Capacity: 2 million per annum.
 Method of duplication: Bin loop
 Mastering equipment: Studer, Neve
 Tape used: All major brands
 Shell used: All major brands.
 Duplicating speed: 32 l
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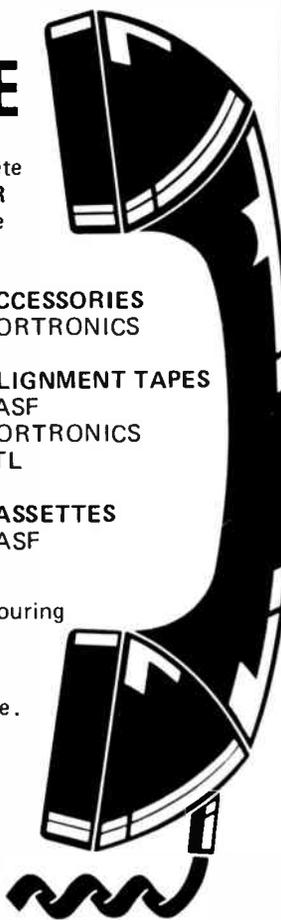
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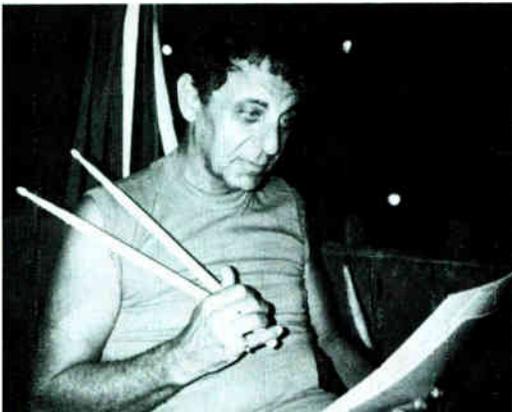
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HAL BLAINE



by Mr. Bonzai

Hal Blaine is a walking archive of drumology, a living bundle of energy that has supported 190 gold records. Chances are he is the most recorded drummer in history. His experience spans 40 years of musical upheaval, from the Big Bands through jazz to the quintessential pop sound of the '60s and '70s. He is still one of the most sought after studio pro's, currently working on the new David Grisman album. Hal is credited with two historic contributions: the monster drum kit and mid-range tuning.

As I shuffled down a dock in Marina del Rey, juggling the Beaujolais and journalist baggage, Hal waved from the deck of his cabin cruiser. He's tanned and fit, open and congenial. He got very animated when he talked about drums and where they have led him. In this transitional period in musical history where electronic drumming is rapidly altering the state-of-the-art, Hal is a philosopher, a participant and one of the endangered species of disciplined skinbeaters.

We grabbed a couple of deck chairs and started munching peanuts, wine and anecdotes.

Mr. Bonzai: Why did you end up as a drummer?

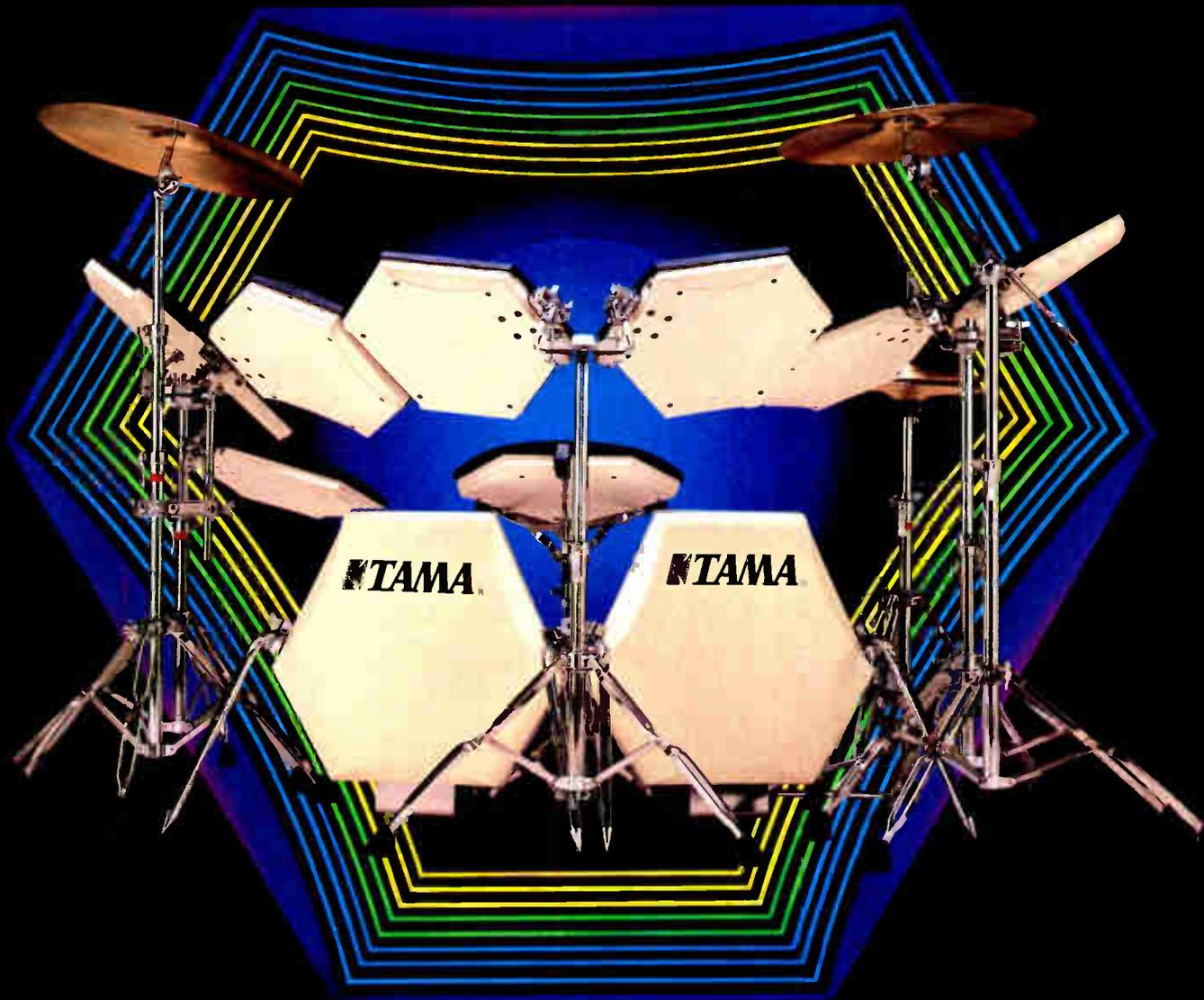


Hal Blaine: I started with some dowsing from an old rocking chair that I used for drumsticks when I was eight years old. I always knew I would be a drummer, although I don't think I had ever actually seen one. This was before television—we just had radio and records. My family lived in a Jewish ghetto in Connecticut and my father was a shoe repairman. He was a very hard working man and on Saturdays he would take me to the State Theater in Hartford, one of the last great Big Band theaters. He would

hand me my bag lunch, pay the quarter admission and leave me there for 12 hours while he worked. I would sit through about seven shows and see everything from vaudeville acts like "Buck and Bubbles" to the great bands of the day.

When I was 13 we moved to California and my sister gave me my first set of drums. We lived in a very tough housing project—it was sink or swim. A big Polack named Bob Kaminski became my friend and guardian. He watched after

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Hal Blaine (left) and Bones Howe at the Grammy Awards dinner, 1971.



PHOTO JASPER DAILEY

harmony, big bands, small bands—plus, they would bring in top drummers for us to talk with.

Bonzai: Were you working at the time?
Blaine: Yes, it was another lucky break that I was living at the Majestic Hotel. This was quite a hotel—musicians, hookers, pimps, addicts. Every form of low life lived there. I got to know a lot of strippers and one night a great drummer named Mickey Screema got sick. He was backing a stripper named Dixie Lee and she called me to fill in. It turned into a regular job and again, a great training ground. It was strictly sight reading and the strippers would work a slow song, a medium and then a fast one. You played from eight at night to four in the morning without intermissions. If the pianist had to relieve himself, I would jump down and comp enough piano for the slow tune. We would cover for each other and play all night.

When I left Chicago, some influential friends helped me put together a band for a club called The Magic Carpet in San Bernardino. It was a supper club with dance music and comedy acts. That's where I met Lenny Bruce early in his career—around '52.

Bonzai: Was he different in the early days?

Blaine: No, I don't think so. I was waiting outside the club for the new comedian and he drove up in an old beat up Dodge with smashed fenders. The upholstery looked like a cat had ripped it out. He in-

me because he didn't want anything to happen to my hands. We're still friends to this day, and he's still as tough as ever. I started my own little band and we got our first jobs near Lake Arrowhead at the Chickabunny, playing for five bucks a night and a free chicken dinner.

I learned from some great musicians: Carl Ingram, Sharky Hall, Blinky Allen, Leroy Vinegar. I was very lucky to work with such professionals when I was just a kid. I made friends with these black musicians and they used to take me to Jack's Basket, a big jam session place. You couldn't even get in the door if you were white, unless you had the right escort. It was great exposure, great training. I eventually got a steady job at a black place called J.D. Greenwood's Foserroom, on the wrong side of the tracks in San Bernardino.

When I was 16 I joined the service. This was about 1946 and we got sent to Korea. I was the only enlisted man in an all-officers band. We were the last Americans to get out of Shanghai before it fell in '47 to the Reds. It was an intriguing situation—playing music, but there was also a lot of gun time and skirmishes.

When I got out of the service, I joined a comedy band back in San Bernardino. I would sing, play drums—it was what was known as a "funny hat band." We did pantomime, did comedy routines, sometimes dressed up as women with balloons for breasts. I was lucky once again: to be thrown in with really well-trained musicians. I worked with lots of bands, got my Dixie chops down, travelled around the country backing a lot of acts.

Bonzai: Had you had any formal training?

Blaine: Well, I met a great comic and a very good guitarist named Rick Verdi. He joined a group called The Three Sons. Rick talked me into going to music school in Chicago. I thank him to this day. I moved there in '49 and went to the Roy Knapp School of Percussion—the most incredible percussion institute in the world. It was Gene Krupa's alma mater, Louis Bellson's—a lot of the great drummers went there.

Bonzai: What made it such a special place?

Blaine: It was a school with real camaraderie. We had eight hours of class every day, learning to read music, studying theory, music appreciation, arranging,

PHOTO JASPER DAILEY



Hal Blaine at his first Monster Drum kit. (1963-64).



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Jimmy Webb (left) and Hal Blaine (1966).

roduced himself and when he saw me looking at the car he said, "Listen, it's really a Porsche—I just hate their body styles." Then he said, "You look like a Jewish boy—Are you Jewish?" I said yes and he handed me a copy of Confidential Magazine, the forerunner of The National Enquirer, only a much rougher scandal sheet. He had pasted over all the words with Yiddish from a Jewish newspaper. I started laughing hysterically. We became good friends and on nights off we used to drive into L.A.

Before the opening show, I asked him if he had any music for the band. He said, no, just to play him on stage and then off, to do whatever we wanted. He came on stage that night with a big piece of a black wig stuck in his shirt and announced that he was an Italian movie star. A guy in the front row said, "Ha, Ha, Ha—very funny." Without missing a beat, Lenny came back with "Ha, Ha, Ha, your ass." This was unheard of—to say something like that to a customer. We had a lot of comics but no one had ever used the "F" word. Every once in a while he would slip it in and the audience would laugh, the band would laugh like hell, the women would titter.



PHOTO: JASPER DAILEY

Bonzai: Did he improvise his act?

Blaine: Always. He read the newspapers all day long and then used the material for the shows. When they banned incinerators in California, he came out that night and did a bit about how the cremation industry would be ruined. What the hell would they do with all the bodies? He would just get people roaring.

Bonzai: Did you see a dark side to his character?

Blaine: Well, we used to go driving at night in my car. It had a plexiglass sunroof. Lenny sat back one night and was looking up at his reflection. He said, "Hal, mar., dig this, this is exactly what I'm going to look like when I'm in my casket." It was a morbid thought, but he did it in a very comedic way.

Bonzai: How did you break into the big time?

Blaine: I started playing with some groups in L.A. and joined a band that was playing at The Slate Brothers in Hollywood, where Don Rickles was performing. He used to put everybody on the floor. He would look at me breaking up and say, "Get this guy a table," I was laughing so hard. I met a songwriter named Matt Dennis and that led to some work in Reno and Las Vegas. I was playing jazz and pop—rock and roll was just getting started. Through a series of events I met Tommy Sands, the teenage idol, and started working with him. A month in Vegas with Patti Page led to three years on the road with her. From my work with Tommy Sands I got a reputation for rock and roll and when Elvis got out of the service I got a call to do drums for "Girls, Girls, Girls" and a whole string of his movies. I also began working with the great producer H.B. Barnum and recorded with Sam Cooke, Dick and DeeDee, The Olympics. That led to Phil Spector and all the early "wall of sound" hits. Through Tommy Sands I met Nancy Sinatra, his wife at the time, and recorded "These Boots Are Made for Walking." When Jimmy Webb came to town at the age of 19 I was hired to do his first records. Around that time I became the original drummer with The Tijuana Brass and recorded the first of my

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Mel Taylor of the Ventures (1964) with Hal Blaine (right).

Records of the Year. I was also the drummer on "The Mamas and the Papas" albums, produced by Lou Adler.

Bonzai: Why were you at the center of all this activity?

Blaine: Because I had a sound. Almost every drummer I had ever known tightened his heads as tight as he could. It's like talking in a high voice all the time, which was unnatural to me. Every instrument has a range and the best quality is in the midrange. I tuned to a midrange and got a very fat tom-tom sound—boom, boom, boom, not a ticka-ticka-ticka. It created a new sound on records that was identified with the West Coast. I also designed the drum kit that drummers use today—the massive tom-toms. Generally, drummers were using four drums, sometimes five. I had eleven. I gave it to Ludwig Drums and they marketed it as The Octoplus. I wanted to be musical. Listen to the early Carpenters stuff—you'll hear the fills. We used the sound on radio spots, too. You just couldn't get that sound with only four drums.

Bonzai: It seems so obvious . . .

Blaine: I know, but it wasn't being done. It evolved from working with Terry Melcher and The Byrds and some of those early rock groups. My first gold record was for "Mr. Tambourine Man." I was strictly a side man brought in for the recording sessions. I did just about every Beach Boys record, Jan and Dean, The Monkees. We made 35 dollars in the afternoon while the groups made \$35,000 that night. But there were no animosities. Dennis Wilson, for instance, and I were very good friends. When he did his solo album he called me for the recording. Dennis was a fine drummer—for the

stage, but he wasn't really a great recording drummer.

Bonzai: What makes the difference?

Blaine: It's experience mostly. Knowing what to play on a record as well as what *not* to play. With experience you don't have to think about it—it becomes second nature. At this point I must have recorded close to 35,000 records.

Bonzai: How did multitracking affect your sound?

Blaine: Didn't mean a thing to me. They just started putting up more mikes. There is an interesting story about the first time I got called for a film. It was at 20th Century Fox and I was a little frightened. I was hired because I was known as the top rock and roll drummer, and they needed some rock music for a film. The engineers put up one mike about six feet in front of me and the producer kept saying, "Hal, we're not getting that sound you get on records." I had to explain that we used a mike in front of the bass drum, a mike on the snare, and a couple of overhead mikes. The producer told the engineers, "You better listen to this kid." It started a whole thing where they had to tear the studio apart and put in the proper lines and machinery. From then on they were always cailing me. I did a lot of TV shows—"Batman," "The Brady Bunch," "Mannix," to name a few.

Bonzai: Did you start making big money?

Blaine: I was making about \$8,000 a year when I was on the road. My first year in the studio I made \$40,000. That continued to increase until I leveled off at about \$150,000 a year for session work. There is also a union melting pot that is divided up according to the number of sessions you do in a year. I was doing

sometimes five, six sessions a day, with perhaps three songs per session. I got a check from the union in '64 for about \$3,000. By '68 it had jumped to \$25,000. This was pretty good money for a little drummer from Holyoke.

Bonzai: I've heard it said that drummers don't have the longevity of other musicians . . .

Blaine: You have to know how to handle yourself. You have to be consistent. I've never been into drugs, and that may have something to do with my long term reputation. There is also a lot of diplomacy involved. I have a knack for getting people to laugh at the right moment when a session is getting tense. I also feel that I've been creative in the drum field. I've helped to make some plain records into good records. I had also done some acting and that may have helped me to get a feel in my playing. I listen to the lyrics and fit the dynamics of my playing to the meaning of the song. You play soft, you play hard—it all depends on the song. This used to cause problems at first with engineers. They wanted me to play at consistent levels so they could adjust the volume in the control room. H.B. Barnum would tell them, "Learn how to record him the way he's playing. That's what the song is all about."

Bonzai: Do you tend to favor some engineers over others?

Blaine: I've worked with some greats: Chuck Britz, Larry Levine. . . Bones Howe was a great engineer who has become an incredible producer. It was mutual admiration, I guess. They were creative people in their own right and knew how to get the sound on tape.

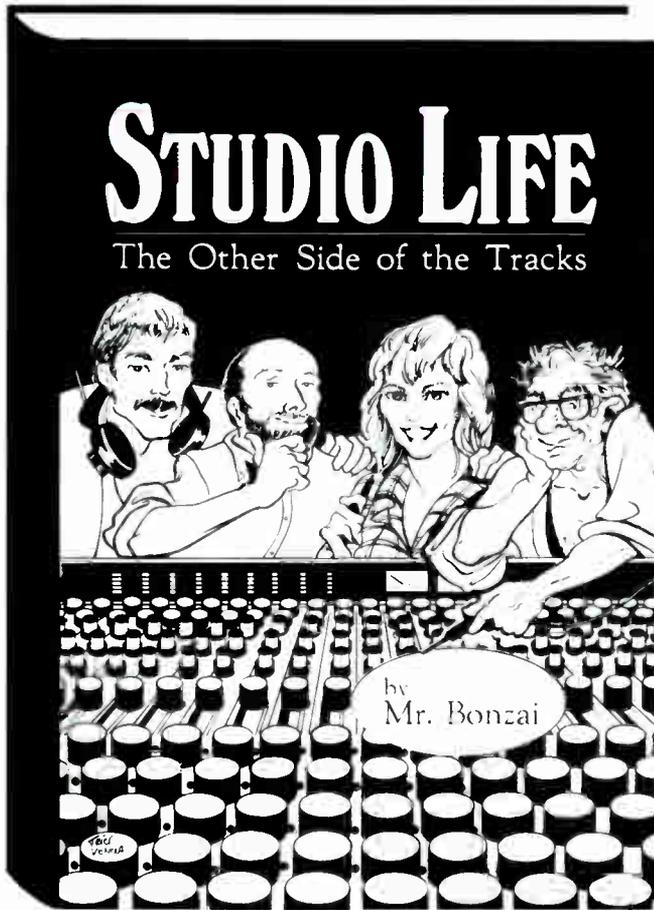
Bonzai: Do you think drumming is a dying art?

Blaine: I just don't know. You're not going to replace drummers, but you will replace what drummers are playing. The adding machine has become the calculator. Drums are going electronic and I think every drummer should be learning about it. We are just beginning to scratch the surface and things are going to change. There is an infinity of possibilities now, and I believe there is room for great feeling in electronic playing. At one time pianists only played pianos; now they are playing all sorts of electronic keyboards. There will always be live performances and drummers will be playing, with or without electronic drums. Drummers should learn keyboards to be well-rounded, especially since a lot of electronic drums are played with keyboards.

Bonzai: Do you have any advice for aspiring drummers?

Blaine: There are no losers, only winners who give up too soon. ■

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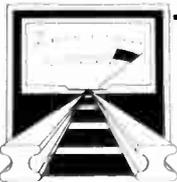
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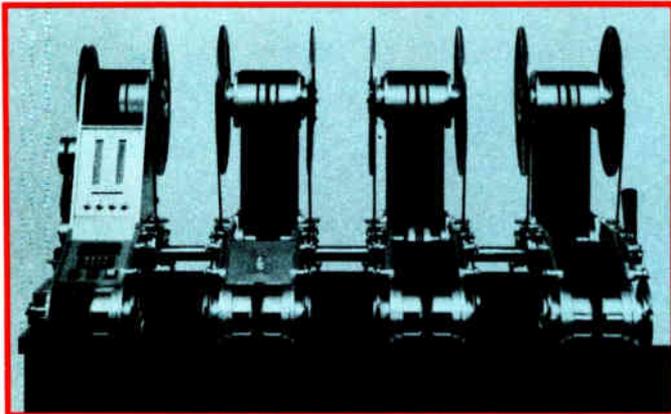
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PREVIEW



Magnefax 7000 Series Duplicators

The Magnefax 7000 Series is a line of self-contained 16:1 bin loop duplicators with seven slaves. The 120 ips unit utilizes 7½ ips masters, and provides for an output of over 6,900 C-45 tapes in a 24 hour day, including loading and cleaning time. The Magnefax common mandrel castan drive system eliminates speed variations between master and slaves, and the 7000 also features digital bargraph metering with auto-reset peak reading memory; a solid state counter/command module; a low maintenance hysteresis braking system; a shortened audio path for lower noise with all the amplifiers located on a single motherboard; and an infrared photocell stop tone detector on the bin loop master.

Circle #123 on Reader Service Card

Pakmate Automatic Soft Poly Cassette Inserter

The Pakmate is an automatic packaging system for inserting cassette tapes into soft poly boxes at 80 pieces per minute. The compact one-and-a-half by three foot table top mechanism is simple to use—load two hoppers with boxes and cassettes, and the finished products can then be removed or can feed another machine directly, such as a box labeler or mailing inserter. The unit operates on dry air, 7.5 cfm at 90 psi, features an automatic shutoff when hoppers are empty, is manufactured by Paktec Automation Inc., and is distributed by Lenco. Price is \$9,995.

Circle #141 on Reader Service Card

Lynx Time Code Module

The Lynx system from TimeLine Inc., of City Island, New York, is a high performance unit which integrates four independent functions in a single half-rack width enclosure. Each contains a wide band SMPTE time code reader, operating at 1/20th to 60 times speed at either 24, 25, or 30 fps; a generator for SMPTE, EBU, or film standards, with a sync tone frame reference frequency output (60/59.94/50/48 Hz), internal/external sync selection, and tach to time code translator; a synchronizer which can be expanded with up to 32 machines on line; and an RS-422 communications port.

The system assigns one Lynx module for each machine to be controlled—thus any machine can be selected as the master. The front panel controls are logically laid out with a comprehensive display of both hours/minutes/seconds/frames and LED operational status indicators. Optional accessories include a VITC reader board, film chain quadrature interface, and an Adams • Smith ASCII to Lynx RS-422 protocol converter. The Lynx units are priced at \$2,450 each and will be available next month.

Circle #124 on Reader Service Card

Barcus-Berry BBE 202

The BBE 202 differential load reactance compensator from Barcus-Berry Electronics, is a multi-band, program-controlled signal processor which can be employed to improve the overall sonic clarity of virtually any reproduced sound. This two channel, rack mount unit utilizes high-speed dynamic gain-control circuitry to audibly improve the reproduction of program transients. This adds brightness and presence without introducing the undesirable stridency which is so often characteristic of "equalized" sound, especially at peak levels.

Once installed between the program source and an amplifier, recorder or transmission line, all processing functions are fully automatic. Phase adjustments are primarily directed toward preventing high-frequency time lag (transient distortion) and the automatic gain changes are based on interband program amplitude ratios. Swept frequency response of the system is essentially flat from 20 Hz to 20 kHz in both the operating and electronically-buffered bypass modes. Amplitude changes are developed only in direct response to application of a spectrally-diverse program signal.

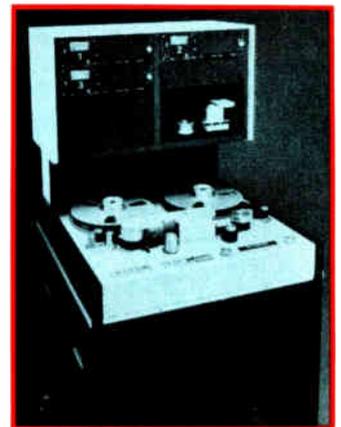
Circle #125 on Reader Service Card

Studer Video Layback Recorder

The Studer A80VU-3 LB is designed for video post-production applications, and provides high quality recording and reproduction of audio tracks on 1-inch video tapes, in either the type B or C format. Converting from one format to the other is accomplished by exchanging the headblock and the tach roller. A switch is provided to change direction on the left spooling motor.

Originally designed for 2-inch tapes, the transport is "over-engineered" to provide smooth and positive handling of tapes. The extremely stable headblock is equipped with erase, record and reproduce heads for three audio channels. Frequency response is 30 Hz to 18kHz (± 2 dB), signal to noise ratio is 65 dB (ASA-A weighted at 254 nWb/m), and wow and flutter peak value is less than 0.04 percent (DIN 45507). The A80VU-3 LB is fully compatible with popular audio/video synchronizing and editing systems, and is priced at \$13,500.

Circle #126 on Reader Service Card



Shure SM91 Boundary Mike

Shure has introduced the SM91, a low-profile condenser microphone designed for surface-mounted applications where a unidirectional pickup pattern is desirable. Like the "pressure zone" microphones in common usage, the Shure

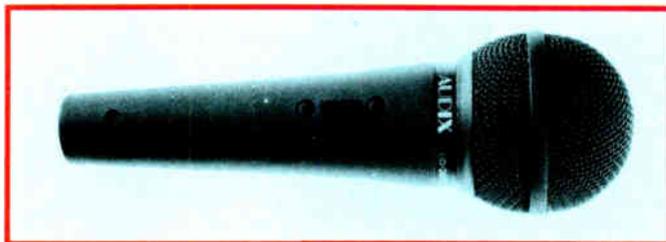
SM91 takes advantage of the well-known principle of boundary effect. Because of this principle, placing a Shure SM91 microphone sufficiently close to a barrier or boundary will cause it to perform with as much as 6 dB higher sensitivity and approximately 3 dB greater rejection of random background noise. The unidirectional pattern also allows for effective isolation without the need for physical isolation barriers often used with "pressure zone" models.

The SM91 is supplied with a small, sturdy, low-distortion, high-clipping-level preamplifier which may be powered either by two standard 9-Volt batteries or by an 11 to 52 VDC phantom power supply. The preamplifier unit also includes a 12 dB/octave low-frequency cutoff switch for response tailoring, a battery power switch, and a green LED battery condition indicator. Also included is a 25-foot, small-diameter, two conductor, shielded interconnecting cable with two three socket miniature Switchcraft connectors. The SM91 is priced at \$300.

Circle # 127 on Reader Service Card

FM 1000 Power Amplifier

The FM 1000 from FM Acoustics is a single channel amplifier which, according to the manufacturer, delivers continuous power in excess of 1,000 watts, even into the most difficult loads, with a power bandwidth of 5 Hz to 120k Hz. Input connectors are XLR balanced; outputs are both five-way binding posts and special high current 200 amp connectors. The amplifier features extensive built-in protection circuits which continuously check \pm DC offset, cooling fin temperature, transistor temperature, fan speed, and output load impedance, so the unit will perform without any limiting into a one ohm load, yet still be able to shut down should a short circuit occur.



Audix UD-260 Microphone

The UD-260 from Audix is a high output, low impedance dynamic microphone which incorporates a new air-suspension design and an integrated capsule system for easy field replacement. Designed as a rugged high-end vocal microphone for stage and live applications, the UD-260 provides a smooth response from 50 Hz to 18,000 Hz without harsh mid-range peaks, and a tight cardioid pick-up pattern for higher gain before feedback. The mike is available in black, non-reflective matte gray and six brilliant colors with matching cables. Suggested list is \$179, including protective carrying pouch and stand adapter.

Circle # 128 on Reader Service Card

Bikini Interchangeable Cassette

The Bikini cassette from the Reel Corporation in Southfield, Michigan, is a system of interchangeable mini tape reels which snap into a transparent shell for use on standard cassette machines. The tapes are packaged in a set of five reels with storage cases for each, a reloadable shell with tape-up reel, and

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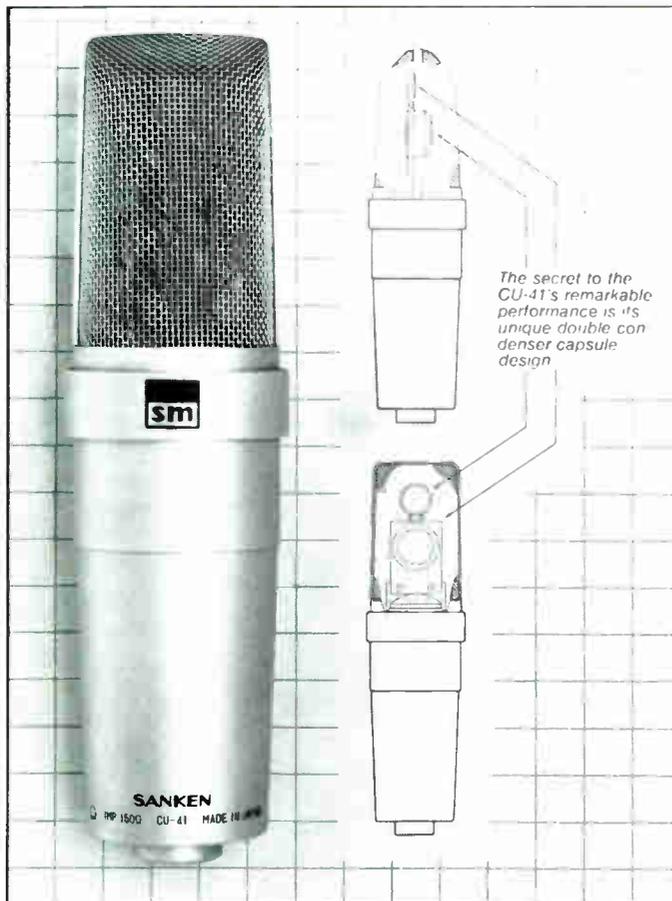
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identification labels. The system's advantages are reduced storage requirements and the ability to edit cassettes. A complete package is priced at \$24.99, and currently is only available with premium chrome 50 minute tapes, although the company plans to offer metal and normal bias formulations at a later time.

Circle #129 on Reader Service Card

LinnDrum Alternate Sound Library

Linn Electronics, manufacturers of the widely-used LinnDrum digital drum machine, now has over 200 alternate sounds in its library. Aside from the extensive set of standard drum sounds (including 16 kick drums and 37 snares), the library now includes diverse oddities such as grunts, groans, gourds, guicas, scratches, snaps, drips, barks and bass guitars that can be quickly swapped in and out and sequenced in the same manner as the drums.

Linn has also put together various complementary sounds together in economical packages, including: Electronic Drums, Rock Drums, N.Y. Scratch Set, Acoustic Studio Set, Latin Percussion, Ethno Pop Set and nine others. In the unlikely event that a needed sound can't be found in the library, Linn will make custom sound chips for as little as \$50. Single chip sounds from the library retail for \$40. Two chip sounds retail for \$60 and most of the sets retail for \$129. Demonstration cassettes are available.

Circle #130 on Reader Service Card

New Tascam 16 Track

The Tascam MS-16, unveiled at the AES Convention, is a one-inch format sixteen track recorder/reproducer with remoteable meter panel. The wide variety of features and capabilities offered include rear panel SMPTE connector with TTL logic lines for interfacing with most popular controllers, a rugged, rack mountable transport designed for remote recording and location audio applications and a full three-motor servo system for positive tape tension control throughout quick lock-ups and stops.



Amplifiers are all direct coupled for lowest distortion and optimum low frequency response. Better transient response and phase characteristics are obtained with the MS-16's first stage sync and play head amplifiers which use differential paired ultra-low noise FET's. The MS-16 also has separate low frequency compensation adjustments for record/sync and repro heads, and both +4 dBm balanced XLR and -10 dBV unbalanced RCA outputs.

Optional accessories available include a ten-point auto locator with ten-key numerical input pad, basic function remote control, CS65 console, and a dbx unit which can be connected to the MS-16's multipin connector. Although exact price information was not available at press time, the basic unit is said to be priced at approximately \$9,000.

Circle #131 on Reader Service Card

Agfa-Gevaert Digital Mastering Tape

Agfa PEM 297 D, a new highly dependable digital audio mastering tape, has been introduced by the Magnetic Tape Division of Agfa-Gevaert, Inc., Teterboro, New Jersey. The new 1/4-inch tape comes on 4,600 foot, 10 1/2-inch reels. The new material features fewer dropouts which lowers the need for error correction and reduces the possibility of program loss. Because of superior slitting, the new tape offers better winding, better handling and less chance of edge damage.

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Keysor Disk Noise Analyzer

Keysor Corporation has patented the first computerized system that can accurately determine the causes of sound discrepancies on record disks. According to Howard Hill, president, the analyzer determines whether recorded noises like "tics," "pops," and various tonal inconsistencies on disks are a result of the record material itself or imperfections in one or more of the disk fabrication steps.

Keysor's noise analyzer can isolate and identify certain kinds of noises that may be peculiar to a particular material formula. It can also determine how well a specific frequency is reproduced on various materials, from the master disk lacquers, through the metal molds, to the finished pressings.

The system operates by taking one or more sound samples from the record surface and filtering the signals to isolate individual frequency bands. The signals and their decibel levels for each frequency are then broken into specific time intervals and graphically displayed on a CRT. The samples can be simultaneously drawn on the CRT as a three-dimensional "picture of sound," or identified individually and displayed. The complete sample can be averaged and compared to others, and also weighted for statistical analysis based on differing listening standards.

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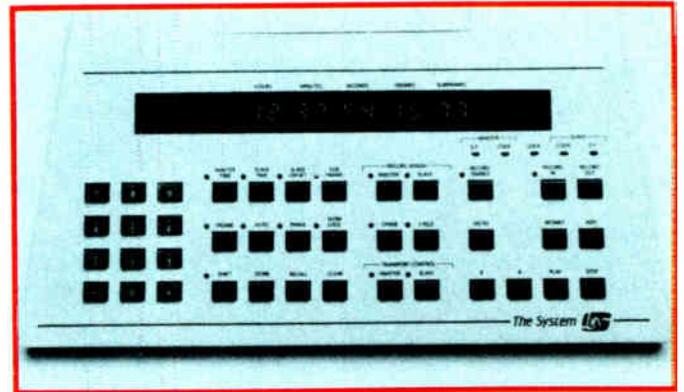
Tandberg Pro Cassette Decks

The Tandberg TCD 910 Master Cassette Recorder and TCD 911 playback-only machine incorporate state-of-the-art design and functions specifically designed for studio and professional applications. Among them are: a discrete three-head system; peak-reading, equalized meters (which respond to a two-millisecond peak with 1 dB); and built-in oscillators for bias, record current, and azimuth adjustment. The TCD 911 features a front panel playback azimuth adjustment and pitch control, allowing correct playback of tapes recorded on other decks.

Both models are also equipped with an eight-bit microprocessor with 32K of EPROM memory, which operates the LED real-time counter in minutes and seconds, as well as the

units' auto search mode, recap function, and the decks come with electronically-balanced XLR connectors, and can be optionally transformer-balanced upon request. Other options include an infrared remote control, rack mount, and an RS-232C port.

Circle #134 on Reader Service Card



New BTX Synchronizer/Controller

The latest offering from BTX Corporation is The System, which combines both controller and synchronizer in a single low-cost, compact unit, is a dual-transport controller/synchronizer that needs only an 18-inch by 18-inch space, stands 5-inches tall and weighs about 20 lbs. The built-in keyboard has 40 dedicated function keys and a ten-digit LED time code display that facilitates autolocation and editing.

The System features pre-programmed loops with optional preview, pre-programmed or "hot" master and slave record-in and -out, offsets up to 24 hours, selectable interlock speed and type, synchronization accuracy within 1/3000th of a second and a system memory, along with standard transport control and autolocation capabilities.

Circle #135 on Reader Service Card



TAC Scorpion

Shown at the AES Show and now available, the TAC Scorpion is a versatile, low-cost, high performance mixing console derived from the TAC 16/8/2 system which the Scorpion replaces. Principle features include fully modular construction in a strong welded steel frame, 16 routing busses plus a separate stereo buss, four band EQ with swept mids and selectable turn-over points, four aux sends, two assignable aux returns, and fader reverse function metering with switchable peak/VU ballistics.

The Scorpion comes in two frame sizes, a 27 position and a 43 position. A 16/8/2 with eight track monitor in a short frame retails at \$5,950. The same configuration shortloaded into a large frame retails at \$6,950. A 24/16/2, 32/8/2, or 40/2 are priced at \$8,950, and short loaded mainframes of any configuration are available. Circle #136 on Reader Service Card ■

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In its 12th year, the San Francisco Blues Festival brought a lineup to Fort Mason's Great Meadow that had a little something for every blues taste: Washington D.C.'s Nighthawks (featuring premier Japanese blues singer Toru Oki), the great James Cotton and Little Milton Campbell, an ample dose of New Orleans Mardi Gras and Louisiana zydeco music, the British blues of Bob Hall and Dave Peabody, the best of blues from California and Texas, country blues traditionalists Robert Lowery and J.C. Burris, and much more.

The official program of the festival mapped out the two days' activities, exact down to 45-minute sets and ten-minute set changes. "I did not make the schedule," grimaces Leroy Shyne of Shyne Sound, taking a break from his work at the Great Meadow the day be-

The SAN FRANCISCO Blues Festival

fore the opening of the festival. "I'm pretty good at it though. Ten-minute set changes are next to impossible, but most of them will be really close. You have to design the system so that can happen."

It's Shyne's outfit that has the responsibility of making the day run smoothly, so he has done a lot of thinking ahead. "My monitor set-up is quite a bit different from your average rock and roll set up," he says. "I use wide-dispersion monitors [Bose] and I wash the stage rather than giving real high-volume monitors with a narrow beam for each microphone and a whole lot of monitor mixes. I just make sure you can run around the stage and don't have to get right in front of a mike to hear. If the guy wants to get down on his knees away from his microphone, he doesn't have to worry about not hearing himself. If a band comes up and I really have no idea what their needs are, and we only have ten minutes for a set change, we don't have to take a half-hour to aim the

SOUND ON STAGE

monitors.

"Having been a musician for so long, I feel that I am in touch with what musicians need," Shyne says. "The whole idea is to make it sound like music rather than just getting it loud."

Randall Instruments provided amps for all the musicians at the festival, another factor in making the set changes go faster. "In the blues, you come all the way across country and say, 'Hey, is there a guitar I can play?' They can make do with anything," comments Shyne. "There is actually more resistance from the rock and rollers who say 'Oh, I don't have my '56 Strat, I can't play.' A blues player can make do with anything."

While Shyne has been involved with the Blues Festival for six years, this is the second year the sound has been entirely in his hands. Shyne Sound has also provided audio reinforcement for the San Francisco Folk Festival, the Fourth of July festivities at Chrissy Field, the Martin Luther King Day rally at San Francisco's civic center, gospel festivals and disarmament rallies. "Sometimes not only do they have five-minute set changes, but the bands only play for 20 minutes," he says. "So that's where I get my skill, to get it to sound like music in the first tune. We're working real hard for 20 minutes and the set's over. We don't get to enjoy the rest of the set and fine-tune everything."

When given the time to fine tune, Shyne takes the work seriously. "I just keep going back to the beginning, like 'Can I hear every instrument?' I follow the focus of the music and make sure that it stands out just in front of everything else. And besides that, when any one of the instruments sounds unnatural or bothers my ear, doesn't sound like music or I feel is going to bother somebody else's ear or distract their attention from the music, I have to correct that. You don't want the audience to be distracted by a real odd phenomenon of distortion or unnatural EQ. It's basically just staying right at the mixer and trying to make it sound better and better: until it's over."

Shyne was busy fine-tuning during Sonny Rhodes' set. By the end of the first number by Rhodes' band, the horns were sounding tight and well-balanced. And by the time Rhodes finished his first vocal number there was a very pleasant delay effect on his voice. "I have

two sends on my board," says Shyne. The first goes to a simple slapback delay [DeltaLab II], then returns into the board. On the return I send it out the other delay [Orban Dual Spring Reverb]. So what I have is not only a simple slapback delay that I can bring up with the fader, but a delayed reverb, which is a little more like a natural reverberation in a room. What I'm approaching is a more realistic, natural delay and reverb combination."

Beyer M600 microphones were used across the front line at the Blues Festival, for vocals and horns, for the washboards and dobros played during Robert Lowery's set, for the booming tuba in the Dirty Dozen Brass Band. In studying the Synergetic Audio Concepts of Don Davis, Shyne has become interested in the development and use of PZM microphones. "Up to now in the printed literature of how to use PZMs has always been in the recording studio. Nobody wants to use them in sound reinforcement for fear of feedback like omnidirectional microphones. My understanding of the principle of PZMs is that it's the first microphone you can record talking with at long distances and still maintain a present quality, still sound real present. Up to now in sound reinforcement it's all been close-miking. PZMs are not omni-directional mixes, they're hemispheric, so you can point them away from monitors and not get feedback. I use them in sound reinforcement for choirs, or for a drum overhead, or under the lid of the piano. That gets a real natural piano sound.

"James Cotton had his own old-time microphone running into his amp," continues Shyne. "That's Chicago style. They love those kind of handul-size, round type of old style microphones, like radio mikes. They hold the microphone and the harp in their hands and get different sounds by moving their hands around and stuff. And it usually goes into an old Fender amp. Those old Fender tweed amps with four 10s are real common in the old Chicago blues. Each harp player looks around and tries old mikes and amps until he finds the ones that really sound good."

Shyne uses a Soundcraft 20-input, five-output board, a Symetrix Model 501 Peak RMS compressor/limiter, a dbx 165 compressor/limiter, an MXR 31-band equalizer, and BGW amps. "My Symetrix is set at full limit, and acts as a



Monster Cable Microphone Cable

more spacious effect to background vocals and producing a deeper 3-D mix. The bottom was also clear and spacious.

After this listening I spoke with Ian Eales (currently engineering Al Jarreau's new album) about the cable. He had just purchased several Series 1s and was using them to record vocals and horns. Ian felt that with this cable there was no phase smear between the highs and mids, and that accounts for the pleasing clarity. He found that with instruments containing high transient content he was no longer hearing the attack ahead of the lower frequencies.

This leads me to why this cable does what it does. The conductors are made of extremely pure copper, and in the Series 1 there are three separate conductors of varying thickness. The theory is that the lower frequencies travel down the thickest strand, mids in the medium size and highs in the tiny hair-like strands. It's sort of a natural frequency dividing network, with the electrons flowing down the path of least resistance. The whole thing is much more complex than this simple explanation, but its purpose is to allow all frequencies to arrive in phase. I didn't major in physics, so theory is not my cup of tea, but a degree is not needed to hear the difference this construction makes.

Aside from the sound, Monster ProLink has the most innovative XLR connector to date. Designed by Monster Cable and built by Neutrik, it is a maintenance dream. No more screwdrivers needed with this simple assembly. A main barrel slides over the contacts and strain relief and is hand tightened by a threaded section that secures the strain relief and holds the whole thing together. Along with having no screws to deal with, this connector is a good 1 1/4 inches shorter than a normal XLR. What a beauty and a real time saver. The connector comes standard on all series cables and is also available separately. I highly recommend it for road work.

Monster Cable has also come out with a line of musical instrument studio reference cable based on the same design theory and with another trick 1/4-inch phone connector. Now you can run keyboards, bass, or guitar into an amp or D.I. with a full phase-aligned signal.

Yes, Monster's ProLink can make a big difference in sound quality. I think you'll find less desire to use EQ, as the sound in the control room will more closely match the sound in the studio.

—Bob Hodas

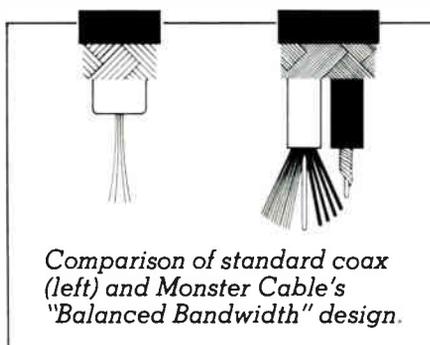
Monster Cable, the company that makes the audiophile speaker cable, has entered the pro studio market with ProLink (TM) Series microphone cable. There are three grades of cable labeled Series 1, 2, and 3, and Monster claims even the lowest grade will provide audible improvements when replacing normal studio mike cable. Stamped on the Series 1 cable are the words "Studio Reference Standard 'Multi Phase Aligned' High Resolution Microphone Cable," which clearly states the company's intentions in making this cable.

With all the wire, chips, FETs, and amps in line between the mike and tape, how could twenty feet of cable make much difference? Well, Monster Microphone cable can make a *big* difference in the quality of signal you put down on tape.

Listening tests were done at LA Record Plant Studio D using Meyer 833 monitors in the control room. A variety of microphones and cables were compared to get a solid picture of the cable's effect. The Series 1 was hooked up to kick and snare first, and immediate improvement was noticed. The signal was much more clear, attack and low end were quite distinct, with richer more abundant lows. Electric bass taken with a D.I. exhibited the same characteristics: more lows with a more clearly defined

sound. There was no desire to reach for that track saver, the EQ knob.

To better understand the sonic difference I hooked up my AKG "The Tube" mike and listened to the spoken word while changing back and forth between the different ProLink series cables and the studio mike cables. Compared to the ProLink, the standard cable sounded muddy in the lower mids and not as clean on top. There is a clear, crisp advantage even in the Series 3 (least expensive) cable. There is also an audible difference between the three series, with the Series 1 exhibiting the best low end and most transparent top. When the feed from the console was hooked up through the Meyer processor to the amp with Series 1, big changes occurred. The front-to-back mix depth opened up, adding a



Comparison of standard coax (left) and Monster Cable's "Balanced Bandwidth" design.

Catching up with Glen Campbell

by Carol Kaye

When many people think of Glen Campbell, they think of the handsome, country-pop singer who gave us hits like "By the Time I Get to Phoenix," "Wichita Lineman" and "Gentle on My Mind," and had a popular television show in the early '70s. But when I think of Glen, I think about a whole different kind of person. I think about a great guy I played a lot of sessions with. But, even more than that, I think about a guy who played more sessions than just about anyone I knew in the '60s and '70s. He played rhythm guitar, lead guitar and bass guitar for artists such as Elvis, Dean Martin, the Beach Boys, Jan and Dean, Sonny and Cher and a lot of Phil Spector sessions. Few people know that he actually joined the Beach Boys after Brian left and played bass with them on the road for about a year in the mid-'60s.

Well, Glen's been back on the country charts again with his terrific version of J.D. Souther's "Faithless Love." Recently I had a chance to speak with Glen for a few minutes and we talked about some old times and a few questions I'd never gotten a chance to ask him back when we were doing a lot of session work together.

Kaye: What made you leave Los Angeles?

Campbell: I moved to Phoenix in 1981 because I found a place here that I liked.

I liked the climate here, it's just great. I started a new family. We've got a seventeen month old boy and one more on the way.

Kaye: How did you get your start in the session business?

Campbell: When I was a child I got a guitar and started learning how to play. Later, when I moved to Albuquerque, I got into Django Reinhardt and really wanted to become a jazz player.

Kaye: Did you ever take singing lessons?

Campbell: No.

Kaye: How about guitar lessons?

Campbell: No, I never took guitar lessons. I learned to read the chord charts for the sessions, that was about it.

Kaye: Why did you break out as a singer from the successful career as a session player?

Campbell: I've always wanted to sing and play.

Kaye: How did you choose the songs?

Campbell: I picked the songs that I liked. "Gentle on My Mind" was just for the lyrics. I loved the melodies on tunes like "Wichita Lineman" and "By the Time I Get to Phoenix," and of course I really liked "Rhinstone Cowboy." When I recorded those songs I had a personal feeling for all of them and the music was

there. It was really the whole ball of wax for me.

Kaye: What do you think about today's recording techniques?

Campbell: Well, you remember we used to record on four track and then eight track came along and we thought that was great. Of course these days you record on 120! Quincy Jones and those guys will hook up three or four 24 track machines. The techniques have changed a lot. The sound is better nowadays. But maybe it's getting a little too gimmicky, with the synthesizers and all. I use live everything for my sessions here in Phoenix, and do most of my work at Pantheon Studios.

Kaye: What do you think is needed in today's music?

Campbell: I really think more live players are needed in today's music. As far as the songs, I think Lionel Richie's stuff is great. But I think we need more good songs... more lasting songs... not the ones that are here today and gone tomorrow. A lot of people are just hitting for the one-shot market.

Kaye: Do you work with a fixed band these days?

Campbell: Right now I've got a five piece band called Caledonia. I think that was the old name for Scotland. This band actually came together in 1975 and its been kind of on and off since then. This present formation of the group has been together for about three years.

Kaye: Are you doing much roadwork?

Campbell: Well, I'm leaving in the morning for Toronto and then several dates in Michigan and Champaign, Illinois. I'll be out for about two weeks. I'm doing a lot more playing now, but I've been doing concerts since about 1968. I'm really enjoying it now as much as ever. We played a show here in Phoenix last night at the Symphony Hall and it was just great. I had an orchestra for it

12 strings, brass, reeds... I really like playing with the symphony. I played with the Toronto Symphony in August, I played with the London Philharmonic, the Richmond Symphony, Minneapolis Symphony, Cleveland Symphony... I really enjoy doing that.

Kaye: What is your current recording situation?

Campbell: I've got a gospel album coming out at the end of the year. I want to start 1985 off right. I want to start it off with God. ■

Here's a shot of Glen in 1965 with session drummer Hal Blaine. (Don't miss Mr. Bonzai's interview with Hal on page 100.)



PRODUCERS-DESK



Rupert Hine

by Bruce Pilato

"The first record I recorded in the '60s as an artist was produced by the man in Britain who was notorious for turning down The Beatles for Decca Records," says Rupert Hine, leaning forward in his chair. "I said I wouldn't hold that against him and I went ahead and made a record with him anyway, and he *ruined* it! So, I knew that one day if I could ever get to be a record producer, I'd be putting one of these guys out of a job, and that would be a good thing."

Hine, indeed, did go on to become a record producer; a very successful one, at that. He is also a music video

director; owner of the Farmyard, (one of England's hottest studios) and his own record label in the U.K.; a composer and arranger with several hits under his belt in Europe; one of London's most in-demand studio musicians and synthesizer programmers; and still, a recording artist, in his own right.

Not bad for struggling musician, who like others, had every door slammed in face along the way. Today, however, Hine opens his own doors.

In the '80s, Rupert Hine has become famous, yet remained faceless. In the U.S., he is still relatively unknown (people often confuse him with Rupert Holmes, a Top 40 artist and producer best known for "The Pina Colada Song"), though that is beginning to change. Every album he has produced in the last

two years has charted. Among them are the last few albums from The Fixx, including their hit, "Deeper and Deeper," found on the *Streets of Fire* soundtrack; Howard Jones "What is Love;" the last two Chris DeBurgh LPs, including "Don't Play the Ferryman" and "High on Emotion;" and two songs which he wrote and produced for Tina Turner's *Private Dancer* record.

"I only produce the artists whose ideas are very close to the kind of ideas I have for songs," said Hine during his brief stay in New York City to speak at the New Music Seminar and to promote his newest record, *The Wildest Wish to Fly*, on Island Records. "If the songs and the ideas of the artist didn't highly interest me, then there'd be no point in doing the project."

He is constantly being asked to

produce, even by many major artists, but Hine often turns them down to work instead on unestablished acts. "They [major artists] usually get mad when I tell them I'm not interested in their work; some have even hung up on me. But, I'd rather help someone who's got a lot to say. I look for new bands all the time."

When Hine does find a project that interests him, he dives into it head first, contributing not only to the actual production itself, but to the shape of each song, the arrangements, and lately, right through to the making of the album's video clip.

Though some feel it's dangerous for a producer to have as much control as Hine does in the projects he takes on, he insists he is only giving the direction an artist wants. "That's what they wanted. That's why they came to you to produce. They don't trust A&R men; they don't like managers. They trust you."

Hine says he doesn't need to "experiment" his own production curiosities on the artists he produces, because he is able to do that on his own records. (In addition to his newest, he did two previous LPs for A&M, *Waving Not Drowning* and 1981's *Immunity*, which was one of

the same thing nearly four years ago.

"I had a minor hit in England a few years back, where I did 60 tracks of vocals and no instruments. I went through 30 filters, a harmonizer and assorted studio gadgetry." For Hine, the record was a labor of love that required hundreds of hours of trial-and-error recording. He claims, though, it is possible to reproduce nearly any instrument with the human voice if you put your mind, mouth, throat and ears to the test.

"For example," he says, talking as though he was lecturing a university class in sound engineering, "to create a really excellent bass drum sound on a record, all you need is a bass dynamic microphone, a certain kind—depending on how windy your breath is—and then you basically just find the combination between the pop made from the microphone and the pop made from your voice. And when you get the right balance, you can get an amazing sound. There's lots of little voice tricks you can do."

Hine's best known productions, of late, often incorporate striking audio imagery that is as important to the records as the melody hooks themselves. Examples of this include the "gun shot" drums and "crying" guitar lines in DeBurge's "Don't Pay the Ferryman," and the hypnotic keyboard sequencer line that runs throughout The Fixx's "Deeper and Deeper."

"That wasn't done with a keyboard," says Hine, smiling as he caught me by surprise. "We did that with a hi-hat."

His approach to video, a new field he has entered with great enthusiasm, is the same as his approach to audio production: only do it when you've got something worth saying.

"I'm very interested in video when it is a complement to the artist's song and not just because you have a single," he says pointing out that his own record may contain videos that are not necessarily the singles on the record.

"There are an awful lot of songs that lend themselves to visual interpretation, and equally, there are an awful lot that don't. We've gotten into the situation from a lot of record companies where we expect a video for a single. That's where the problem is. Not every recording artist is an actor, I directed and produced The Fixx videos because most of their songs are about interesting ideas that can be easily interpreted into visual mediums. But many artists and their songs do not.

Hine doesn't see his dual role as record producer and video director on the same project as any sort of violation of power. "During the course of making a record and understanding what we're trying to do with it, it is only logical that we should keep all of it in the same control for the video imagery."

I'm very interested in video when it is a complement to the artist's song and not just because you have a single.

Europe's biggest AOR hits.)

"I've had more artists approach me, not because of what I had previously produced, but rather, because they wanted me to make them sound like my *Immunity* album. That is the record they all like and play to death and they all want to sound like that record, but I haven't made any of them sound like that record.

Rather than inject his own ideas, Hine is more likely to take an artist's original thoughts and embellish them, using technology he has developed through countless hours of studio experimentation. "About four years ago I started to figure out all the alternative methods of sequential effects that are humanly caused," he says. "Most of the things on my own album that sound electronic are triggered by my hand slapping my knee or sometimes, by me just running in the studio.

When I mention to Rupert that the new Todd Rundgren solo album, *Acappella*, contains only voices—no instruments—put through sound sampling keyboards, he casually points out he did

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Joe Ely: Confessions of a Digital Hillbilly

"I'm really excited about these times," drawls Texas roots-rocker Joe Ely. "It's kind of out of character for me, because I grew up in the flatlands where there's nothin' but the wind, and cotton, and... *Bob Wills*. But I just see somethin' that's an answer to a lot of things that I had wished there were answers to in the first place."

Like more and more people these days, Ely's finding his answers in computer technology. But news that this 37-year-old rockabilly strong-arm man had composed all the tunes for his fifth LP, *Hi-Res*, using an alphaSyntauri/Apple computer rig raised eyebrows and hackles among rock purists. After all, aren't hard-bitten, road-toughened songwriters supposed to find answers in their souls and not in the same type of machine that sends you the gas bill?

"I thought about that," Ely confesses. "But at the same time when I get started on somethin' and get carried away with it, I get almost fanatic. Because I really dug into this whole world I was exploring, I thought I'm just gonna have to do this no matter what anyone thinks. I couldn't let tradition stand in the way. That's just what I suppose you have to do every once in a while if you're going to make a step in some direction or another rather than just standing still."

When his brother Mark first began filling Joe in on some of the Apple's capabilities, the singer responded with the yawns of the uninitiated. Ely's interest perked when he heard that the computer



could tie in with an alphaSyntauri synthesizer, making it potentially very user-friendly to a songwriter working on a closely watched budget in an eight-track home studio.

"I decided to look into it as a composing tool," Ely recalls, "and ended up becoming fascinated by what the technology was leading into, as far as typing in the recording part as well as the composing, in my case. So using the Syntauri, which is a fairly low-end machine compared to things like the Fair-

light, I found I could hear parts on songs as I was writing them, without going to tape, by just going to floppy disk and being able to overdub, punch in and punch out."

The new musical technologies first caught Ely's ear when he toured England with Merle Haggard and, later, the Clash in the late seventies and early eighties. At that point, he didn't much like what he heard. "I wasn't real thrilled with the 'techno' sound," the self-termed

—PAGE 126



The elephant's nightmare

Producer Jeff Eyrich Breaks Down Barriers

One of the marks of a good producer is that he doesn't smear the mark of an artist, and by this standard Jeff Eyrich is a very good producer indeed. Consider the evidence: The Plimsouls' single, "Million Miles Away," and their album, *Everywhere At Once*; T-Bone Burnett's *Proof Through The Night*; the second album from Rank and File, *Long Gone Dead*; the Gun Club's *Las Vegas Story*; plus the brand new Blasters album. Not exactly a list of repressed artists. When you listen to these records it is clear that Eyrich chooses his projects more for their healthy individuality than for their easy marketability, and he has had re-

markable success in capturing that sudden snap of energy as an artist shifts into a more powerful gear.

Having worked his own way up through the ranks of touring musicians and L.A. studio players, Eyrich knows exactly what it is like on the other side of The Glass. "I don't like that barrier between the producer and the band," he says. "I shouldn't be able to walk freely through the band and pick up a guitar and say 'All right, I want it like *this*.' That's not what I'm about at all. I think that the respect has to be mutual. For example, I respect Johnny Bazz in The Blas-

—PAGE 127

Danny Tate Converts to Rock and Roll

"Fuel on the flame
Gas on the fire
You've got to turn, matches to ashes

(So) Don't build a fire you can't put out."

—from the LP *Sex Will Sell*

So what's this—a new morality in rock and roll? Seems like it, from the evidence of Danny Tate, a 6-foot-4 former tight end who earned a degree in music theory and composition at Ouachita Baptist University in Arkansas before coming to rock and roll.

Up until about 1974, it was supposed to turn out very differently. Danny, fourth of David and Hazel Tate's six children, would become a Baptist minister of music like his father. But when Danny brought some black friends to church, the Christian spirit seemed to evaporate

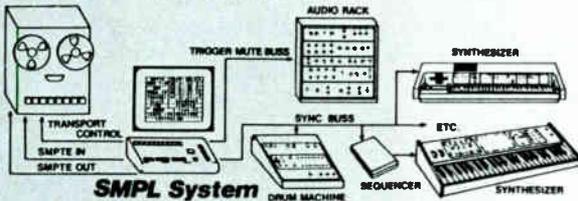
—PAGE 128



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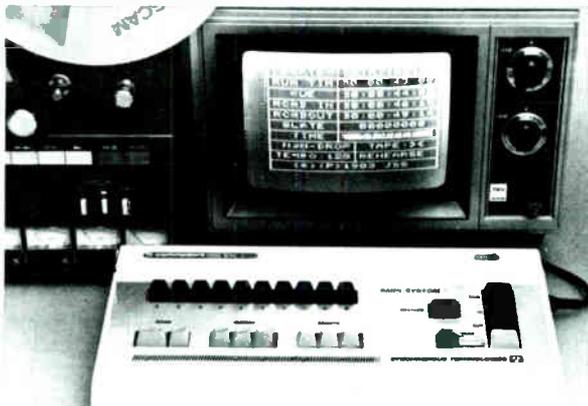
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—FROM PAGE 124, ELY

"digital hillbilly" remarks of the synth-pop brigade that dominated the air waves back then. "Now, the stuff that Thomas Dolby did, some of it is to me really masterful. Like 'One of Our Submarines.' Just the sounds in there, the way the rhythms are put together, captured my attention, especially when I started working using the computer and a drum machine.

"To me, it was just a completely different way of working than the way I always had worked, which was mainly just get a few chords, get the lyrics, and hum a melody in my head. The arrangement would come together when everybody got in and the tape was rollin'. I see all of this stuff mainly as a tool to be able to hear things, to assemble your sound *before* you go into a studio and there are suddenly big holes in your pockets."

In fact, *Hi-Res* uses hi-tech effects primarily as trappings, despite Ely's new compositional techniques and the computer graphics art work he designed and generated (under the moniker Earle Epiphone) for the album. Part of the reason for this is that his home tapes didn't quite come up to the quality he wanted:

"I been hearing about Moog tying in a synthesizer with the Apple Macintosh. And I think that, because the Macintosh has a bigger processor, it's not gonna run into that 'aliasing' of sound, when sound hits a brick wall and the frequencies can't get any higher. I think maybe with a Macintosh, it will cure that."

Another reason the record's not machine-ridden is this strange problem of techno-nightmares. "I believe I recorded every song that's on the album in my home studio," Ely states. "I really did wake up in a cold sweat in the middle of the night with this robotic drum sound marching off in my head. I'd wake up practically screaming. It got to the point that everytime I would start to record stuff with a drum machine, I would make sure that I'd speed it up when the chorus came down, *rush* it a little bit.

"But even that didn't help. It still didn't have the *feel* of a muscle moving a stick through the air and cracking on a drum head, where you can almost hear that 'whish' and you can almost hear that foot pedal 'whoosh' and crack. After a couple of months it really started bothering me, so I had to take it in there and add that muscle and sweat and bone crack-

ing against those drum-heads."

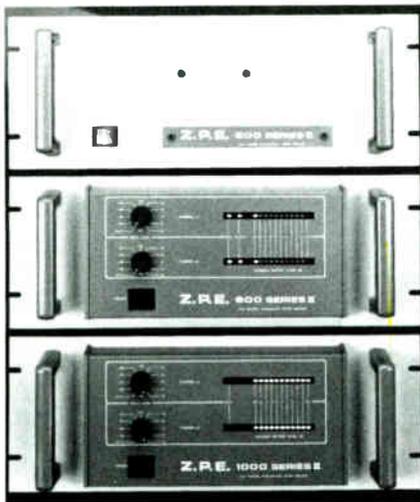
Right now, Ely's working on some new material in his studio and will resume crafting the follow-up to *Hi-Res* early in 1985, after tours of Australia and Japan. While it's too early to say for certain, Ely ventures that "The next record I'm sure will be somewhat different because I don't think I'm gonna go about recordin' it the same way."

Not that the boy from Lubbock has forgotten the lessons his new tools taught him. "I can see the possibilities for musicians in the future," Ely reasons. "Because of the way digital sound is working, I can see that in the next few years digital recording will be within the grasp of the man on the street. Once they're able to actually write to the Compact Disc as well as read it, when you're able to have somethin' available that stores that much information, suddenly the price of digital recording will drop drastically, and people will be able to make high-quality recordings on modest machines."

And if they have half the talent, imagination and restraint of Joe Ely, they'll be in business.

—Anthony DeCurtis

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Jeff Eyrich (right) with T-Bone Burnett (left) and engineer Dennis Kirk.

—FROM PAGE 124, EYRICH

ters when he plays any part at all; he is the feeling of bass for that band. But as a producer I'm at least able to give him more than some vague opinion about his part because I can play what I'm thinking rather than just talk about it. Then he plays what he plays best."

Eyrich's years as bass player in Tim Buckley's band set the stage for his future relationships with strong artists. If you were looking for fierce integrity, Buckley was practically the second Miles Davis in towns like Buena Park and La Habra, deep in County Disney in the late 1960s. Eyrich learned all about artists who live for the heart, not for the chart.

"It's true that on the one hand a record has to have songs that are going to hit the radio. This is necessary for the record company; it's their first step up into the record. I've got to be able to go to them and say, 'Here are three strong possibilities for singles,' and they really have to be that. But a strong artist, even if he's as open as possible, will not be molded. You can only encourage someone to be as artistically strong as possible, and point out compromises here and there that keep in mind the end product rather than some specific little problem.

"A lot of this process of making a record is letting things go. There are lots of these points where people have to let go of something in order to grow—sometimes it's the band, sometimes it's the producer; mostly, it's both of us. But the more a band learns about how to make a record, the better it is for them when they go in to make their *next* one. It's a totally different process than playing live, and unless a band is given the leeway to learn about a studio they're never going to be able to make a record that puts them over the top. One of the jobs of a producer is to provide as much knowledge as possible and know that the band will recognize the ideas that work well for them."

Eyrich's horizons as a producer are rapidly broadening beyond Los An-

MUSIC NOTES

geles. His next project will take him to Paris, where he is scheduled to produce a French band that has met with stone-wall resistance from French radio because they sing in English. The challenge as Eyrich sees it is not to break this band in the larger English and American marketplace, but to make a record that can finally tear down the Bastille of French radio policy. Given the energy that Eyrich has been able to capture in his other records, I'd say La Rock Francaise is in for an unexpected visit from the real world.

—Greg Copeland



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—FROM PAGE 125, TATE

right through the stained glass, and soon came official condemnation from the pulpit as well.

This year, Danny Tate wrote a song—one of nine on his debut album, *Sex Will Sell*—called "Breaking the Ice," which begins: "Love me for what I am not for what you want me to be..." And while it sounds like it might have come from Thomas Dolby or Howard Jones or maybe Red Rider, it was written for David and Hazel Tate.

"Intentionally, that had to be the last song, just to tie everything together," Tate said recently during a soundcheck in Louisville, where he and his band, East of Eden, would knock out another night behind Tate's songs. Songs about "sensual innocence" and "innocence meeting reality in the '80s," Tate calls them. And like his lyrics and his conversation, these songs are filled with fire and ice, passion and resistance, temptation and denial.

All of them, the eight Tate wrote or co-wrote and the cover of the Lieber-Stoller chestnut "Love Potion No. 9," came in a burst of creativity this spring when Tate literally moved into Memphis' Cotton Row Studios to write and record *Sex Will Sell* with keyboardist/producer Carl Marsh, who was anxious to use his training on the amazing, \$35,000 Fairlight computer musical instrument.

At the time, it was the only Fairlight in the South, though Marsh, who travels extensively for session work, has now bought his own. He already hopes to use it on Danny Tate's next album—on a major label.

Until last year Tate was one of hundreds of young songwriters pounding the pavement in Music City trying to sell his songs. Then, through a fluke, a song he'd co-written was slipped to Rick Springfield and ultimately became "Affair of the Heart." And suddenly, Danny Tate saw destiny looking him in the eye.

Sex Will Sell is being called "just a little to the left of what people normally consider right" by his own publicity firm. But the music is mainstream American power pop, meaning it's colored with Tate's soul, funk and rock and roll inputs. And the lyrics are decidedly level-headed and mature for any kind of pop.

That title track, for instance, argues *against* sex as a selling tool: "Sex will sell. You get a little dirty. You get a little more than you buy... Pardon me but it's a legal crime." And "Gravity of Resistance" argues *for* restraint in relationships—even holding out—because "the thrill is in the hunt and not the kill."

But on the other hand, Tate has

done his share of experiencing, too, else songs like "The First Taste" would lack the convincing itch of the raging hormones that inspired them.

Stan Lassiter's crunchy, rene-gade guitar rubbing up against Tate's and Doug Sisemore's synth-slides helps with the tension. Roy Vogt's fat bass lines and "Mellow" Mel Owens' funky percussion keep the itch alive. And Tate's voice, a slightly husky baritone that can turn soulful and sweet on ballads, is the glue that gives it all some human warmth.

"Can I have some of that cigarette?" a soaking wet Tate asks after finishing the last set of the night. He quit the nicotine habit a few months back but insists a couple of lungful can't hurt. Despite his tall, lanky frame and the frankly fake blonde edges on his hair, Tate's presence is that of a vulnerable, overgrown boy with disarmingly direct brown eyes and an eager, guileless smile.

He'll tell you right off that while he admires Thomas Dolby's keyboard work and always felt David Bowie as an influence as much as the Song of Solomon, his real motivations are simpler: "Being hungry will drive you to be creative."

He'll also tell you that as a minister's son, with both financial and behavioral limits a constant part of his youth, music was his weapon. "It was a way to raise myself above it all—or out of the concerns of this world entirely. And I never cared to be equal (to those around me); I always went straight for the top," Tate said.

That meant "no time to hang out and no time to be lonely," just clear, focused work and discipline. Even now, on the brink of success at 28, he seems genuinely surprised that he's never been married or even engaged, but also sure that such personal and worldly concerns will have to wait until the career's secure. Originally, he was going to call the album "Breaking Bad Habits," but now, he thinks the bad habits will take care of themselves as long as he keeps the focus tight.

So, as soon as he finished in Louisville, he was headed back home to Nashville where he's got a lot of sounds to record and feed into Carl Marsh's Fairlight. And with a hectic schedule of dates through early '85, he's suddenly become more prolific than usual as a songwriter, too. His publishers, manage-

ment firm, attorney and publicist all think his success is inevitable; they insist they are just waiting for the right label deal for Tate. And there have been several pretty interesting offers already.

Meanwhile, items and photos have been appearing in *Billboard* and *Cashbox*, and the record's been getting airplay wherever Tate plays—in Memphis and Chattanooga, Tennessee; Paducah and Bowling Green, Kentucky; and Starkville, Mississippi. In Louisville, WLRS-FM put an hour of Tate's sets on the air live, and the record's only ballad, "Don't Say Goodbye," is the top request on at least one Nashville station as presstime news.

But Tate is philosophical about the progress, too. "My music is not to set trends, and it's not necessarily what everyone's thinking or talking about. Let it be just whatever comes out—whatever's honest, you know?"

—Laurice Niemtus

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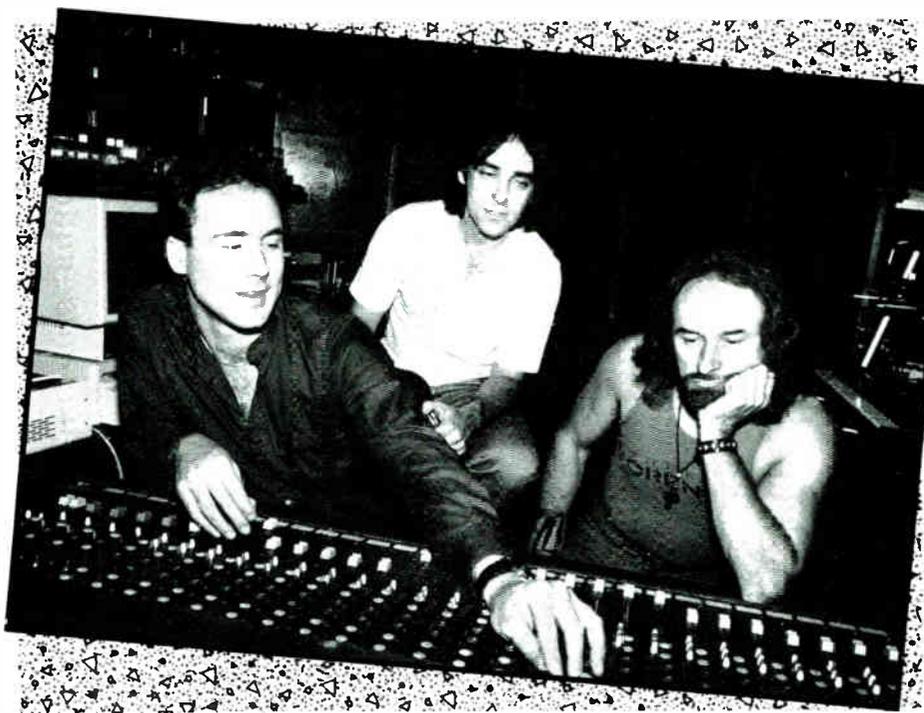
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Stan Borys: Polish Star Starts Anew

Struggling rockers who think they've got it tough grubbing for gigs in the free world should try plying their trade in Poland. State-run record companies and studios, endless streams of government censors, periodic arrests and starvation wages are typical of what your average recording star can look forward to there.

Not that Stan Borys was your average recording star in his decade-long tenure as a chart-topper in Poland. His metaphorically cloaked tirades against the Communist government, as well as his association with Lech Walesa and Cardinal Karol Wojtyla (now Pope John Paul II), kept Borys under closer-than-average scrutiny. Still, he managed to rack up a box score impressive even by Western standards: more than 40 hit singles, over 4,000 concerts performed for millions of people all over Europe,



Borys (right) with Brian Adler (left) and Dick Hansen at Boardroom Studios.

New Power Amplifiers Debut at AES

AES Conventions always bring with them dazzling products from dozens of manufacturers, but power amplifiers are among the few categories of equipment that have an almost universal appeal to everyone in the music business, from musicians and mixers to sound contractors and reinforcement people. Space limitations do not permit listing all the new amplifiers, but here briefly are several entries.



Soundcraft Electronics introduced their first line of power amps, with three models ranging from 85 to 435 watts per channel into eight ohms. These

compact units combine MOS-FET and bipolar designs, allowing the amplifiers to respond to instantaneous peaks of under five milliseconds at five to seven times their rated power. The rated power specifications (at eight ohms) and prices for the Soundcraft line are as follows: The SA150 delivers 85 watts/ch in an 1¾-inch rack space, \$749; the 3½-inch SA 600 has 150w/ch, \$949; and the 7-inch SA2000 with 435 w/ch is \$1,975.



JBL/UREI unveiled two amplifiers, the 6230 and 6260—rated at 75 and 150 watts (into eight ohm loads), and 300 and 600 watts bridged into eight ohm loads, respectively. Protection circuitry includes current limiting under improper loading/driving conditions and an output relay to guard against DC offset conditions, large low frequency transients, and provide power on/off muting.

In addition to fully complementary driver and output circuits, the amplifiers also utilize active differential inputs for transformerless balanced operation. The 6230 is priced at \$618, the 6260 is \$870.

While Crown International is certainly no newcomer to the power amp market, their new Micro-Tech 1000 turned a few heads at the show. The 3½-inch high unit puts out 280 watts per



channel or 800 watts in the bridged mono mode at eight ohms. The Micro-Tech 1000 uses Crown's "Grounded Bridge" output design which allows extreme Voltage swings without putting output transistors in series, yielding lower distortion and greater reliability. Extensive protection circuits are included as is a unique reversible airflow cooling system, so the forced air direction can be changed from front to back, depending on the dictates of each mounting situation. The Micro-Tech 1000 is priced at \$995.

—George Petersen

numerous international awards, and an estimated six million records sold. Of course, when the government's making off with 99 percent of your income, accurate figures are hard to come by. "I don't think that's right, six million," Borys reflects. "I think it's more."

Fed up with a Poland where "after ten years as me, I was tired," Borys emigrated West in 1976. After a year in New York he went to Chicago, where he currently supports his common-law wife and stepson by playing area ethnic clubs where his name is still revered.

Borys recently finished a six-song demo at suburban Board Room Recording, produced by veteran Chicago engineer Stu Walder and studio owner Brian Adler. His manager, Dick Hansen, is shipping it to major labels.

"There's a certain sensitivity of American audiences to music," says Borys, "and I think the songs I've recorded can be picked up by American listeners."

Borys began performing in Poland at the age of 17, when he joined a traveling theater group. After a stint in Polish professional theater, for which he received favorable notices from national drama critics, Borys formed his first rock and roll band, Blackout. (The group's name, notes Borys, not only refers to the wham-bam form of comedy sketch but to the insidious forces of communism. "The sun's going down, and somebody or something is trying to make you darker," he attempts to explain.)

With his Christlike locks and beard, as well as the deliverance-from-oppression tenor of his songs (cleverly masked for the government censors, of course), Borys became known as the "Jesus Christ of Polish Song."

"I was one of the only performers who wasn't smiling at the people, wearing nice clothes, and singing songs like, 'I love you baby, la la la,'" Borys says with an air of distance. "In my lyrics, from the beginning, was something absolutely different—and it was making people think."

Borys had to couch all references to Poland's communist regime in metaphor, and according to him it wasn't too hard to fool the censors, who went over every word with a fine-toothed comb.

"I couldn't write words like 'I hate Russia' or 'I hate red flat,' or I wouldn't be able to step out on the street for fear of being thrown in jail," Borys recalls. "There were officials or secret police at every concert."

What he could do was write songs like "Captured Swallow," which, with its poignant image of a bird trapped in a church, allegorically detailed the

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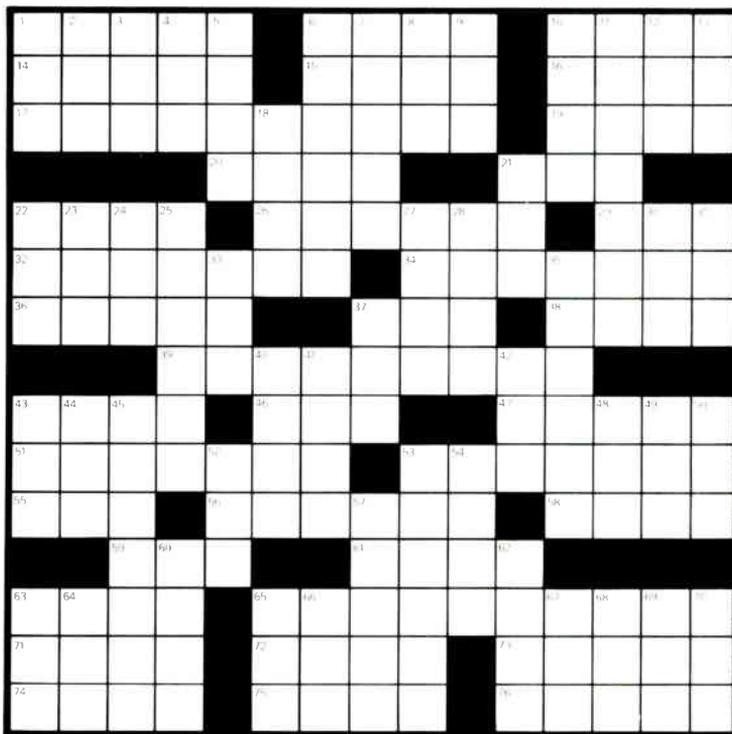
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- 1 Song
- 6 Rare
- 10 Not up
- 14 San Antonio site
- 15 Rosanna band
- 16 Hill and
- 17 Memorandi from the Titanic?
- 19 Vaporous prefix
- 20 British diel
- 21 Quantity (abbr.)
- 22 Summers at Lourdes
- 26 ladder, on a fire engine
- 29 Highest note
- 32 Ruling tapes?
- 34 Like the firmament
- 36 stand (subway option)
- 37 Tree
38. Boney prefix
- 39 Studies of certain attractions
- 43 Whale
- 46 frequencies
47. Say
- 51 Indianan
- 53 Places to find 17A
- 55 Parent
56. Middle East person
58. Bible
- 59 Orchestra
- 61 Crow's
- 63 Connect
- 65 A certain medium transfer
- 71 Axis, for one
- 72 A flop
- 73 Hebrew holy work
- 74 Sax
- 75 Ball club
- 76 Military stopover, on a march

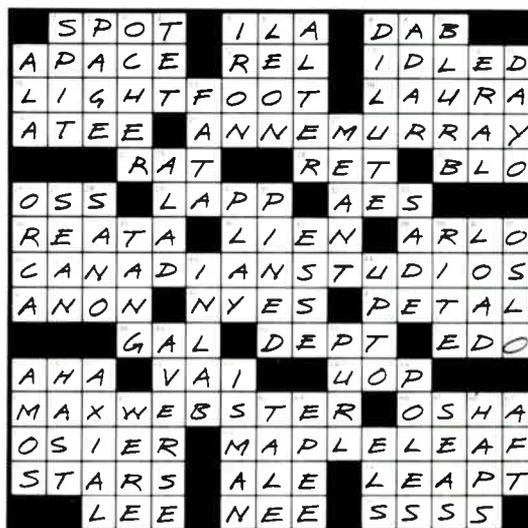
DOWN

- 1 Presidential nickname
- 2 Moslem name
- 3 Manager
- 4 Cockney abode
- 5 Over
- 6 Makes up for
- 7 Hand raiser
- 8 Follower
9. Day in May?
- 10 Common progenitor
- 11 Men at the plate
- 12 Tree
13. Italian god

18. Singer Holly
21. In the manner of
- 22 Pint measures
- 23 Siamese
24. Superlative suffix
25. Breathing pores
27. Memorex?
28. Prefix for central chambers
- 30 Rent
- 31 Sweet drink
- 33 Golden
- 35 List
- 37 Handful
- 40 Type of club
41. Mean
- 42 Particular ball
- 43 Piece of resistance
- 44 Outback critter

- 45 Disc
- 48 Power project
- 49 Shelley's disk
- 50 Alphabet trio
- 52 Door's suffix
- 53 Arabs, to some
- 54 For fear that
- 57 Console port
- 60 Division word
- 62 Carry
- 63 Resort
- 64 Amigo
- 65 Hat
- 66 Summer cooler
- 67 Girl's nickname
- 68 Outlaws of Londonderry
- 69 Fool
- 70 Famed revolutionary

Solution to November Mix Words



trauma of life under a totalitarian government. That song, now translated into English and bearing the title "Freedom Bird," is the centerpiece of Borys' new collection of songs.

As Borys' fame grew throughout the early '70s, he found himself giving concerts all over Europe, including West Germany, France, Belgium, Greece, and even the Soviet Union. At the 1973 Olympia of Songs competition in Athens, Borys performed before 100,000 people and walked off with an award for "best interpreter."

Borys kept up a killing pace during those years, frequently doing up to three concerts a day "to make enough money to keep musicians and managers, and meet road expenses," he says. (The government, it goes without saying, kept most of the touring proceeds, as well as record revenues.)

The daring rocker was arrested and questioned by the government several times during that period, once following a secret concert arranged by Cardinal Wojtyla.

Despite further career accomplishments—including appearances in films and on television, guest starring in Poland's first rock opera, *Naked*, and

carrying away "Best Interpreter" honors at an international music competition in Caracas, Venezuela—Borys decided to chuck it all and try the Free World for a change. "I had done everything in Poland," he says. "I wanted to go somewhere where I was totally unknown, and after a year of trying, I did it. I came to America."

Borys spent a year in New York, playing ethnic clubs and picking up the language. "It took me two years before I opened my mouth (in English)," he chuckles.

Now settled in a bucolic Chicago suburb called Lake in the Hills, Borys performs in ethnic clubs in the Chicago area, where, he estimates, 90 percent of the Polish population knows who he is. Working with house bands "who all know my music," Borys renders original songs as well as American pop covers encompassing anything from Billy Joel to Billy Idol. "There's so much good music on the market," he enthuses.

Borys' recently completed demo tape, according to co-producer Brian Adler, consists of "mostly music that he'd done in Polish, with a rock rhythm section and full orchestra." In order to update Borys' music to 1984, the tunes

were translated into English, and "rearranged with a techno sound," according to Adler.

The six songs were recorded on an MCI 16 track machine, utilizing Lexicon digital delay and digital reverb. A battalion of synthesizers worked by Chicago keyboardist Christ "Hambone" Cameron and including a Yamaha DX7, Memory Moog and Simmons drums, took the place of Borys' customary orchestra.

"Stan was blown away by the hi-tech stuff," remarks co-producer Stu Walder, a veteran engineer who's worked with Ramsey Lewis, Tyrone Davis, The Manhattans, and Champaign. "He had told us the two studios in Poland were huge—with staff of 250 or so people—and he was amazed that we could get this sound out of such a small place."

Working with Borys was a pleasure, says Walder, though he notes with tongue-in-cheek, "He didn't care much for our Polish jokes."

"He told us a few of his own," counters Adler with a chuckle.

Now for the hard part: getting Borys' name spread around. Manager Hansen feels it'd be easier to break Borys via the TV talk show circuit, an avenue

—PAGE 134

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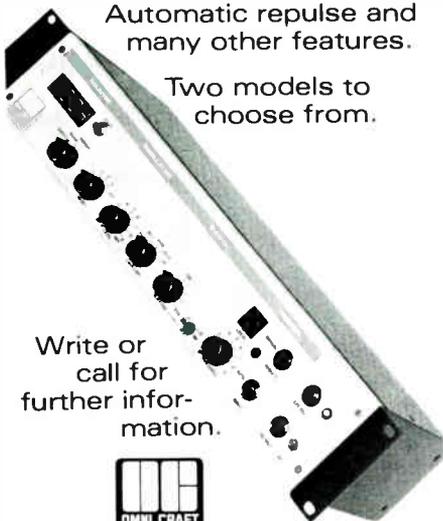
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—FROM PAGE 133, BORYS

he's pursuing while he shops Borys' tape.

Stan himself feels that his very intense brand of rock and roll is relevant not only to people of the Eastern bloc but to thinking people in general. "Songwriters and performers should be not only making people happy, but telling them what's wrong with society," he says. "You and I and other people know it's not all nice and great in American society, and I think we should talk very loud about that.

"I could write a 500-page book telling what it means to have your own thoughts and live in a system where someone is trying to make you think as they want," Borys sighs. "I want to tell what it's like to be a writer and have the system taking your hands and making you write the words they want . . ."

"Rock and roll people in American sing about freedom, but I think the only people who can express what freedom is are people like me who didn't have it."

—Moira McCormick

the early James Bond films; he became so familiar with certain effects that he could watch an old movie on TV and tell which Hollywood studio it came from just by listening to a few sound effects. "It got to the point where I thought if I heard one more Universal Studios door slam I'd go crazy," he recalls.

Another example of a well-worn sound-library item is a "thunderclap and roll" from the original version of *Frankenstein*, recorded in 1931 and used over and over again since, in everything from *Star Trek III* to Disneyland's Haunted Mansion. It's a classic recording, says McDonough, but with today's equipment it's possible to make much more effective sound cues. To illustrate, he plays a thunderclap and roll that blows the listener across the room. He made the tape himself, with a Nagra 4S (a movie industry standard for most remote recording situations) and a pair of Electro-Voice RE-20 microphones, while producing *Bradbury 13*. The lightning bolt that produced the sound "hit about a block away from me and took out some windows," McDonough says with a smile.

In addition to the RE-20s, McDonough uses Sennheiser 816s and 416s and Neumann KM-84s. He usually records at 15 ips, but for certain loud sounds—gunshots, for example—he prefers 7½ ips because it introduces a bit of natural overload and distortion.

One of the Bradbury stories required an outer-space feeling. "There's no sound in space, of course," says McDonough, "but I wanted the emotion of these guys floating through space." What he ended up using was a recording of the Mormon Tabernacle Choir warming up—many voices singing many different notes and runs. He slowed the tape down and put it through a harmonizer to get the emotion he was listening for.

Some of the sounds and feelings require unlikely combinations. McDonough combined the air cable of a scanning electron microscope, the latch of a trash compactor, an electric car window opening and the air brakes of a semi to suggest the sound of a time machine's hatch being opened. After recording the sounds McDonough spent almost a day editing them together to get the effect he wanted. He says it's not unusual to put several days of work into a segment that lasts only two or three minutes in the final product.

Though he created totally new sound effects for *Bradbury 13*, McDonough also sought to retain the '50s flavor Bradbury wrote into his stories. In "Night Call, Collect," he wanted the sound of a 1952 Chevy; he didn't want just any old

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Absent the visual effects of movies and TV, audio drama must use very specific, but very simple, sounds to induce a picture in the mind of the listener. When it came time to begin work on *Bradbury 13* at Brigham Young University's Media Productions studio—where he is employed as an engineer—McDonough decided he just couldn't use "gunky old sound effects." He got his first tape recorder at the age of eight, and began tapping into the speakers at drive-in movies with alligator clips in order to record the soundtracks. He spent hours listening to the sound effects in movies like *Journey to the Center of the Earth* and

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Bradbury 13 producer/engineer Mike McDonough on a recent ricochet recording expedition in the deserts of Utah. The microphone was placed about 100 yards away.

car. He contacted car collectors and dealers but was unable to find a car which had the original engine and transmission.

Driving home from work one day McDonough spotted a Chevy that was old and falling apart. He knew it would have the authentic sound he needed. "I followed the guy, honking at him, and he kept looking at me like I was crazy," McDonough laughs. The Chevy owner thought McDonough even more

insane when he found out why he'd been stopped. But he agreed to let McDonough record, and four days later the two men spent a couple of hours in a quiet parking lot recording stops, starts, turns, door openings and closings, and "everything else we could think of."

McDonough and his associate producer, Jeff Rader, went to record some horses in an attempt to create the sound of an angry dinosaur. They didn't have much luck until the horses' owner

showed up, pointed out that it happened to be mating season, and walked a mare past a group of stallions. McDonough and Rader got some great sounds.

The first run of *Bradbury 13* played on more than 250 stations, many of which plan to repeat the series soon. McDonough has received fan letters from all over the country, and NPR has contacted him about doing another series. He's not sure he's up to it, though, after spending two years on *Bradbury 13* from writing to the final mix. "There's no money" in producing audio dramas, he notes; movie gigs are what McDonough is shooting for.

What does a sound effects freak do in his spare time? Recently McDonough and sound engineer Ben Burt of LucasFilm spent a three-day "vacation" recording ricochets, shooting more than 800 rounds in the process. After returning home, McDonough happened to see the 1938 version of *Robin Hood* on the tube one night and decided it was time to get back to some serious work: recording "arrow swooshes." Why? "Because the sound of arrows has always fascinated me," he grins.

—Quint B. Randle



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—FROM PAGE 8, SESSIONS

cording, San Francisco, ADR work was done on *The Ewok Movie* (LucasFilm), which will be a family oriented television special aired during the holidays. *Mishima* (a Japanese film whose executive producers are Francis Ford Coppola and George Lucas with Tom Luddy as American producer) was working on its Foley sessions, and Coppola's *Cotton Club*, wrapping up in postproduction, was in recording some music. *Triad Studios* of Redmond, WA had *Agape Force Productions* completing a picture book LP project with *Ron Krueger* producing. *Uncle Bonsai* was in for overdubs and mix on LP project with *Larry Nefzger* producing. *Luther Greene* of San Francisco's *Studio C* reports that the recently mixed *The Adventures of Mark Twain by Huckleberry Finn* was screened at Disney Studios in Burbank to rave reviews. Other recent mixes at Studio C included *J. Gary Mitchell* (The Wizard of No), *Tom Valens* (To Make a Difference-Will Harvey mixing). *Beggars Banquet Recording Studios* in Santa Rosa, California have simplified their name to *Banquet Sound Studios*. Among the acts in the studio recently were *Flight of the Griffin*, *Carole Shinnete* and *David Andez*.

SOUTHWEST

Reelsound of Austin, Texas, had its 46 track remote tractor-trailer unit called in to provide audio support on the recent Neil Young *Austin City Limits* PBS television show. Producer *Elliot Mazer* brought in a Sony PCM 3324 digital 24 track machine to record the show for live album use. Working on the Reelsound crew was *Mason Harlow*, *Gordon Garrison*, *Brent Campbell* and *Malcolm Harper*. *Aarora*, an Austin-based group, recently recorded their new 12-inch EP at *Dallas Sound Lab*. All four songs were recorded and mixed digitally on a Sony 3324 24 track and PCM F-1 two track. *Russell Whitaker*, president of DSL, produced the project with *Rusty Smith* and *Ron Cote* engineering. *Richard Mullen* produced tracks for a new album by *Omar and the Howlers* at Austin's *Riverside Sound Recording Studio*. Recent activity at *Lone Star Recording* in Austin included the final mixes for an album by *Conni Hancock* of the Supernatural Family Band. The record was co-produced by *Joe Gracey* and legendary blues guitarist *Lonnie Mack*. Engineering was done by *Joe Gracey*. At *Rivendell Records*, Pasadena, Texas work continued on vocals and overdubs for *Harvest*. *Brian Tankersley* engineered the project for producer *Wayne Watson*.

SOUTHERN CALIFORNIA

Robbie Buchanan was in *Mama Jo's Recording*, North Hollywood, producing a new cut for MCA Records artist *Melissa Manchester* with *Jack Joseph Puig* at the controls with assistance by *Steve Ford*. Producer *Brown Bannister* com-

pleted mixing the new *Imperials* album for Word Records at Mama Jo's and did some overdubs on the new *Amy Grant* album. Both projects were with Puig engineering with assistant engineer Ford. At *F.M. Music's* 24 track studio in Los Angeles, *Frank Musker* (writer for Chaka Khan, Air Supply, Bette Midler among others) was in producing his own solo album with engineer *Philip Moores*. At *Skip Saylor Recording*, Los Angeles, producer *Dan Siegel* was in recording an album on jazz guitarist *Steve Narahara* for Pausa Records. Skip Saylor engineered and *Tom McCauley* assisted. Warner Brothers artist *Los Lobos* were in at *Sunset Sound* mixing their upcoming LP. *T-Bone Burnett* produced with *Larry Hirsch* engineering. *Coke Johnson* assisted. Also, CBS artist *Kenny Loggins* was in mixing for his upcoming LP, Kenny producing with *Humberto Gatica* engineering and *Stephen Shelton* assisting. Recording activity at *Larrabee Sound* in Los Angeles found producers *Jimmy Jam* and *Terry Lewis* in mixing CBS artist *Alexander O'Neil* and MCA artist *Thelma Houston* with engineer *Steve Hodge* assisted by *Fred Howard*; and *Shalamar* tracking with producer *Howard Hewett*, engineer *Dave Rideau* and assistant *Toni Greene*. *Sound Arts Recording Studios* in Los Angeles was utilized by *Greg Guiffria* of the group Guiffria to record the keyboard and final overdub phase of his first album for Camel Records. Greg was formerly the keyboard player with Angel. Before their three week tour of Japan, *Weather Report* was in at *Crystal Studios* in Hollywood recording some tracks for their forthcoming album, *Howard Siegel* engineering. A&M artist *Alan Gorrie* finished up his LP at *Conway Recording* in Hollywood. *Jay Gruska* produced. *Mick Guzauski* engineered with assistance from *Rick Clifford*. Capitol Records artists *The Motels* cut tracks for their LP with producer *Richie Zito* at *Santa Barbara Sound*, *Jack Puig* cut basic tracks for Nashville's *Imperials*, with *Terry Nelson* assisting; and *Kenny Loggins* completed with final overdubs on his upcoming CBS album. In Studio A of *Lion Share Studios* in Los Angeles *Eric Clapton* was in laying tracks for his next Warner Brothers album, produced by *Ted Templeman* and *Lenny Waronker*, engineered by *Lee Herschberg* with *Tom Fouce* assisting.

STUDIO NEWS

Workshoppe Recording Studio of Douglaston, NY has a new studio manager, *Deb Corsha*. Corsha previously managed Beethoven's, a New York Music Club. *Fred Landerl* has joined Steve Rathe's *Murray Street Enterprise* (NYC) as operations manager. Landerl was formerly assistant manager/program director of WHYY-FM (the public radio station) in Philadelphia. *Bill Lightner*, vice president of *K Disc Mastering* in Hollywood, California, reports that plans are now being finalized for their new third room, and that engineers *Phil Brown* and *Bobby Hata* (both formerly of Amigo) have been added to the staff to keep up with their growing business. *Sounds Unreel Studios*, a new 24 track recording facility

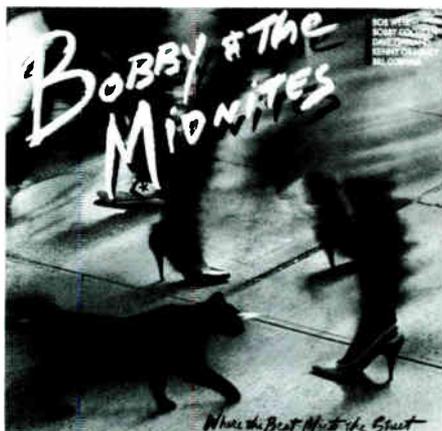
owned by Memphians *John Hornyak* and *Don Smith*, began operation in mid-April of this year. This is the first new 24 track room built in Memphis in over four years. The design work for what will eventually be a two studio complex was handled by *Phase Audio, Inc.*, a Memphis-based sound contracting firm. *Production One*, Philadelphia's newest full-service audio production house, celebrated its grand opening in mid-October. Located at 610 S. 2nd Street just off Head House Square, *Production One* offers full audio production services, specializing in jingle production and custom TV and radio commercials.

Northeastern Digital Recording of Shrewsbury, Massachusetts recently became the first fully professional two track digital recording and editing facility in New England. In October 1984 the company began offering a variety of services: digital two track mix-down, editing and mastering for phonograph record, Compact Disc, or cassette; digital recording for video postproduction and digital two track live and remote recording.

Sheffield Audio-Video Productions of Phoenix, Maryland, has just installed a new Solid State Logic SL4000 E automated console with primary studio computer and total recall computer. *Roar Productions*, of Columbia, Maryland, has purchased a new 6-foot-2 Toyo grand piano. This beautiful instrument is available for all music sessions, and will be the centerpiece of the new wood floor in studio A. Other additions include two Symetnx 522 multi-purpose processors, and additional Sennheiser 421 and 441 microphones.

Compact Video of Burbank, California, one of the West Coast's largest television and film postproduction facilities, recently took delivery of a Neve 5116 console with Necam 96 automation. Newly installed equipment at *John Wagner Studios* in Albuquerque, New Mexico includes the following: Adams-Smith System 2600 SMPTE synchronizer, 3/4-inch JVC CR8250U stereo VCR with 3rd time code channel, Panasonic VHS stereo VCR, Sony/MCI 1-inch VTR for layback, network stereo sound effects library. Austin-based *Reelsound's* owner *Malcolm Harper* announced the relocating of their east coast remote audio bus to Nashville. "The Bus," which is a 1948 F1xible, comes to Nashville with a long list of credits: two gold and one platinum record awards with album and video jobs for Ted Nugent, Genesis, Journey, ZZ Top, Dwight Twilley, John Waite, The Gap Band, Willie Nelson, Alabama, Oak Ridge Boys and others. *G.E.M. Recordings* has opened central South Carolina's first 24 track recording facility located at 2825 Millwood Avenue in Columbia, South Carolina (803-256-3413). G.E.M. has operated since 1981 as an eight track studio. The studio has installed a new MCI/Sony JH 636 console, and outboard gear to complement their existing equipment including a Lexicon 224. *Morrisound Recording* in Tampa, Florida has installed a new 32 channel automated Sound Workshop Series 34 mixing board with high resolution meters. Morrisound also added a new pair of UREI 813B monitors. *ASC Video Corporation*, and *Mark Chatinsky*, have moved to new and larger quarters at: 3815 Burbank Boulevard, Burbank, CA 91505. Their new phone number is (818) 843-7004.

Send press releases to: *Sessions/Studio News, Mix, 2608 Ninth St., Berkeley, CA 94710.*



BOBBY & THE MIDNITES
Where the Beat Meets the Street
 Columbia BFC 39276

Produced by Jeffrey Baxter; Engineered by Larold Rebhun; Assistant engineers John Boghossian, Brian Leshon, Mark Wilczak, David Ferguson; Addition overdub engineer Bobby Cochran; Recorded at Cherokee Recording Studios, Casual Sound, Tam High Recording, Cochran's Studio B; Mastered at Future Disc.

Although Jeff Baxter is listed as the producer of *Where the Beat Meets the Street*, it could be said that the record was co-produced by Bobby & the Midnites. With Baxter and the various members of the band charging off to other gigs around the globe during the making of the album, a lot of work was done in the home studios of guitarists Bobby Cochran and Bob Weir in addition to Baxter's place, Casual Sound. It is due to the engineering skills of Larold Rebhun and the open-minded collaboration between band and producer—and among the band members—that *Where the Beat Meets the Street* has a consistent sound and feeling.

Pre-production began with everyone presenting songs of their own and then going through a pile of cassettes from outside songwriters, according to guitarist Bobby Cochran. "We picked out about eight cover songs, and during the rehearsals we narrowed it down to five that we liked." That rehearsal period, at Baxter's place, also yielded a complete set of eight track demos.

The basic tracks were cut at Cherokee Recording Studios, with Larold Rebhun—who had also done the eight tracks—at the board. "It's Mr. Baxter's favorite place," notes keyboard and sax man Dave Garland. The atmosphere was sufficiently casual in that two-week period, Garland adds, that "People would walk into the studio and say, 'I'm

not working today—you guys want any help?' That happened with Jim Ehinger, who plays piano with Billy and the Beaters, and with Steve Cropper, and the Stray Cats." (The en-masse live take of "Rock in the '80s," which included the Midnites plus all the aforementioned players, was reported in the April '84 issue of *Mix*.)

Once the basics were completed, drummer Billy Cobham returned to his home in Switzerland, Weir charged off to work with the Grateful Dead, bassist Kenny Gradney hit the road with Mick Fleetwood's Zoo, etc. Slave tapes were made for Weir's, Cochran's and Baxter's home studios. "They did a mix onto eight tracks of another 24 track," says Cochran [Weir's Stephens deck was brought to LA for the transfer]. "Then we made a six track mix onto 16 track for my place, and a stereo mix onto eight track for Baxter's—all with click track and SMPTE code so we could dump tracks back onto the master reel or sync them up when we mixed."

"Jeff liked some of the sounds I had on my demos, so we knew I'd probably lay the acoustic guitars down at my place ["Studio B"] on my own," says Cochran. "When Jeff went to Australia to do some other work, Dave and I went hog wild at my place and cut everything that we thought needed to be on the album that we had time to record. We did some background vocals, a couple of lead vocals, some lead guitars, saxes and synthesizers.

"Then when Jeff came back, he listened—and he liked about 90 percent

of it. What he didn't like, we redid," Cochran adds.

At one point Cochran and Garland joined Baxter and Rebhun at Weir's "Tam High Recording" in northern California, where work was done on lead and background vocals and some saxophone parts. Baxter's house—dubbed "Casual Sound" quite appropriately, since the mixer and recorder are on the floor and patching is done "digitally" (with the fingers, that is)—was the scene of further overdubs, including the background vocals by Sherlie Mathews, Kathie Pinto and Paulette Brown.

Not all the recording situations were to everyone's liking, however. Baxter's house turned out to be a little too casual from time to time: "I remember doing a saxophone overdub in the living room, starting to get into it and looking out the window and seeing the gardener staring at me through the glass," says Garland. "Then when he got bored watching us, he'd fire up his power edger and we'd have to shut down. It was a little frustrating . . ."

Before mixdown began, everybody listened to everything and decisions were made as to what should be kept. Some things may have gotten lost in the confusion of formats and the multitude of master reels, but Cochran maintains that "less stuff got away than if we'd just had two 24 tracks. Ideas were put on those tapes that wouldn't ordinarily have been kept, but because we had more tracks available we could keep going for that *one more take*."

"We knew we had a vocal on 'I

Recording at Tam High: (left to right) Jeff Baxter, Bob Weir, Larold Rebhun.



PHOTO: DAVIDYGANS

Want to Live In America' that we could use, but I wasn't really happy with it," Cochran explains. "So while Jeff was in Australia I laid down a new vocal on my 16 track. That turned out to be better than the other ones."

Mixing presented some interesting challenges. "We lost the SMPTE code on 'Rock in the '80s' about halfway through the song," Cochran recalls. "The tune would go apeshit in the middle and start sounding like we had two of everything. Larold crammed a new time code track at really high level using a 24 track on the 16 track tape so it didn't completely wipe out the old one—and he was able to sync it up again."

In another instance, Rebhun took the synthesizer track from one of the demo tapes and transferred it to the master without benefit of time code. "Baxter's synthesizer was used for the 16th-note line on 'Ain't That Peculiar,'" Cochran explains. "When we wanted to fix a couple of mistakes, the synth had been stolen. So Larold copied the track from the demo onto a two track at 30 ips, then he played the master and started the two track when he wanted the part to come in."

No two tape machines ever run perfectly in sync, of course. "That's where the magic comes in," says Cochran. "He just played it until it got out of



PHOTO: DAVID GANS

(Left to right) Bobby Cochran, Dave Garland and visitor Joe Crowley look on as Larold Rebhun makes an adjustment.

sync, shut it off, lined it up again and re-recorded some more of it. He was able to take all the good parts we needed and just wind them in."

There were times during the distributed-processing portion of the production when various band members would return from their other gigs

and find that shocking new developments had taken place in their absence. But reason and professionalism prevailed. "We all worked hard on the album," says Garland in conclusion. "We all did the best we could, and we hope people enjoy it."

—David Gans

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ELTON JOHN
Live in Central Park, New York
 VCL/Media Home Entertainment
 VL 9003

Directed by Mike Mansfield; Produced by
 Danny O'Donovan; 59 minutes.

Elton John's 15-year solo career has included an unholy number of critical and popular ups and downs brought about by the war between the talented composer/performer and the obnoxious music-hall screamer within him. All too often the lame lamé half has won out over his demonstrably better instincts.

Live in Central Park, recorded in September of 1980, shows John at one of his low points, well before the revitalized and revitalizing LPs *Too Low for Zero* and *Breaking Hearts*. The song selection reflects his weakest hits, including "Bennie and the Jets" (featuring a ridiculous "piano solo" that utilizes none of the man's considerable keyboard skill), "Someone Saved My Life Tonight," "Sorry Seems to Be the Hardest Word," and "Philadelphia Freedom," plus non-hits "Little Jeannie" and "Get Up and Dance." Respectable if uninspired readings of "Goodbye Yellow Brick Road" and John Lennon's "Imagine" round out the tape.

According to the liner notes, *Live in Central Park* was taped using nine cameras, before a non-paying audience of 400,000 people. It's interesting that with all those cameras director Mansfield couldn't find enough of interest onstage to keep from cutting to the audience an unreasonable number of times. And the spectators shown don't seem terribly excited by the sounds coming off the stage—nor, for that matter, do the band members.

Those who remember the great music Elton John made in his early years, and those who are captivated by his recent work, will be disappointed by the clown in *Live in Central Park*. Those who were drawn to him in his garish period will find the visual wattage insufficient (even though the last of his three costumes is a Donald Duck outfit!). With a full-length conceptual video (*Visions*), a three-song Video 45 and *To Russia With Elton* available there is much more satisfactory video than *Live in Central Park* for Elton fans of all stripes.

—D.G.

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INTERACTIVE

by Carole Berkson

Team Work

Last issue we examined some of the basics of interactive video. We continue that discussion by looking into the coalition of people from different disciplines required for most interactive video projects and the steps typically needed to complete a project.

Executive producer: The executive producer directs the analysis of project objectives and manages a team of professionals in content/instructional design, media production and computer systems design.

Content specialist/instructional designer: The content specialist/instructional designer must determine the specific information content as well as the hierarchy and flow of information.

Writers: A combination of written documents is required to access the array of interactive video capabilities. An interactive video project may employ several writers, each with specialized talents for one type of writing. Once the project's content is translated into flowchart format (the project map), dialogues between the system and the user must be written to account for every possible interaction. Tests for educational achievement give the user feedback and measure the training effectiveness of the system. Surveys may be written to measure consumer perception of product as well as consumer rating of the interactive demonstration system. Video scripts for on-screen role-playing and other demonstrations are the blueprints for video production.

Computer designer/program-

mer—Disk design & control: Comprehensive flowcharts and program code are the computer system design and programming maps. The computer designer/programmer may work with the content specialist/instructional designer, the writers or both to validate the flowchart. Then, based on the flowchart, equipment control will be designed and program code will be written (or an authoring language or system can be used) to instruct the equipment about how to handle end-user input, branching (instructions to move from one sequence in a program to another), control of video screen audio/visuals, etc.

Media producers: Audio and video producers and directors produce live action sequences, and, together with editors, combine the animation and stills produced by artists and photographers.

Interactive Video Production TEAMWORK: PEOPLE AND THE PROCESS

An interactive video project is produced through the following stages:

Analysis & Design ► **Pre-Production** ► **Post-Production/Pre-Mastering** ► **Mastering** ► **Interactive Video Program Implementation**

Analysis

Overall project direction begins with responsibility for analysis and determination of the project objectives. Who is the target audience (end-users)? How will distribution be made and how long a shelf life is expected? What are the hardware and software requirements, and how will the user workstation be configured? How will performance be measured?

Design

The most effective interactive systems create the experience of a smooth dialogue and personalized re-

sponses in the interchange between system and user. The more simple the system appears to the user, the more complex is the design.

Storyboards and script are drafted, reviewed and revised to communicate information, change attitudes and behaviors, teach performance skills, and evaluate end-user performance. A flowchart is designed to map the interactivity and branching among live action, animation, video text frames, graphics and photographic stills. The computer program is designed according to the script and storyboards.

Pre-Production

Once the script is approved, the video producer and director schedule production, cast talent and select music. Based on the interactivity patterns defined by the final script, the layout of the video disk geography is planned. Disk geography positions final edited footage in order to take full advantage of interactive capabilities; the video disk must be mapped geographically such that each element's position on the disk allows the shortest possible response time.

Production

Art, photographs, print materials, video text frames and animation are produced, reviewed and approved. At the same time, location and studio live action sequences are shot. The two audio tracks can be used for stereo but often are used for separate applications (e.g., different languages or two types of instructional materials or music); two voiceover or music soundtracks may be produced. Audio and video are then reviewed and approved. The computer programming is written. If the video disk player is used as the computer manager for all media elements, then the programming will be tested and debugged.

Post-Production/Pre-Mastering

Editors make an off-line preliminary edit tape and then edit and/or order all media elements on 1-inch master videotape. In order to be mastered, all materials must be assembled in the proper order for disk mastering and must be transferred to 1-inch type C composite or 3/4-inch professional NTSC 525-line, 60 Hz video tape. Mastering companies stress the noticeably better disk image resolution from 1-inch premaster tapes. The mastering facility produces a disk-coded master tape which is reviewed and approved. Frame numbers from the master tape are entered in the computer program.

Mastering/Packaging/Implementation

Within a few days, a proof disk can be reviewed for approval. Completed video disks, including packaging, may be received between one day and a few weeks later, depending upon the quantity to be replicated. The computer programming can be debugged when the program runs on a computer external to the video disk player. Finally, the combined hardware/software video disk system can be implemented.

Producer Beware!

The promise of interactive technology is clear; entertainment, education, marketing, data storage—the possibilities are just being tapped. However, as with any new medium, producers' conceptual orientation will require some adjustment. Computers, programming languages and research on interactive production techniques will all require investments of—yes, time and money. Interactive video production is like producing an audio tape, video tape, record and book all in one; the planning and scripting stages are far more complex and time-intensive with a longer turnaround time than for linear programming. The opportunities are expanding for both producers and media production facilities to assist a whole new group of clients to take full advantage of the medium's unparalleled performance potential. ■



Tom Hannaford, Dixieland Productions, Atlanta, GA

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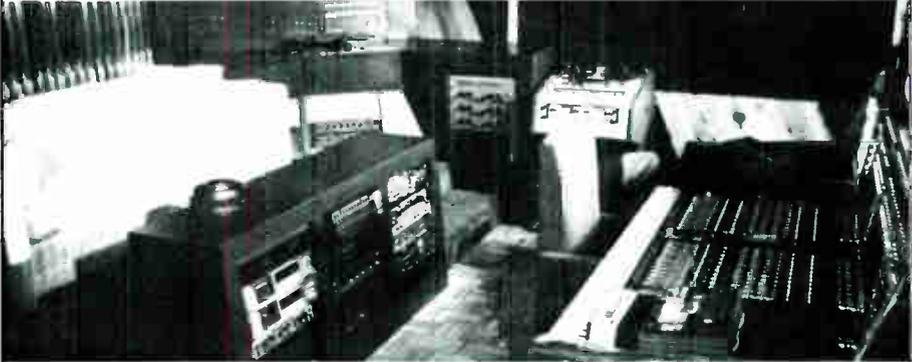
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VIDEO NEWS

by Mia Amato

TV TRIVIA/ A STUDIO REPORT

Future episodes of "Lifestyles of the Rich and Famous" will be shot entirely in the Betacam format. The series, syndicated to 150 stations, is being edited directly from the half-inch component format to one-inch Type C at *Video-works* in New York. *Russian Hill Recording* of San Francisco has been handling all the ADR work for NBC's series "Partners in Crime;" audio post supervisor *Scott Stambler* has the task of putting words into the mouths of *Loni Anderson* and *Lynda Carter*. No detective work needed to discover who created opening titles for "The Bill Cosby Show" . . . the still-frame animations are practically a trademark of L.A.'s *Homer & Associates*. The syndicated show, "This Week's Music" is currently being taped at *MTI Television City* in Manhattan, coordinated through *Shirley Abraham*. *Reeves Teletape* provided mobile fax and post for the PBS tribute to *Glenn Miller* airing this month. Produced by *Bill Siegler*, the dance concert features *Tex Beneke*, *Marion Hutton*, *Johnny Desmond* of the original Glenn Miller Band.

IN THE DANCE VIDEO ZONE

Chris Russo considers himself a music fan, and a champion of progressive sounds. And maybe he is. As a founder of *Telegenics*, he's been able to give independent label artists a leg up, into the spotlight, with his nationwide club video pool.

Each month *Telegenics* ships to 500 clubs two hour compilations of dance-oriented videos—a broad spectrum of R&B, rap, juju, not likely to be seen on television.

Like other pools, *Telegenics* carries clips from major labels, but it's almost as if the Brooklyn-based company had a mission in life to preach a regional sound with clips from *Streetwise*, *Tommy Boy* and other black independents. Along with *Wham!* and *Scritti Politti*, its reels accommodate *King Sunny Ade*, *Soul Sonic Force*, *Tavares*, even *Eartha Kitt*.

Perhaps the company's most

important contribution to the video clip industry has been an outlet for black artists. "We were the first pool to do anything with bebop music, no one else would touch it," Russo said. "I think we helped it happen as a national phenomenon." Bebop, he adds, has since been musically integrated into progressive synth-pop "with other black sounds that are the basis for most dance music. I admit I'm starting to get a little tired of the rap stuff."

Russo foresees the end of break-dance clips, a problem for someone providing videos to clubs in regions not yet jaded by the dance novelty of teens spinning on their heads. "They want more of it," he explains, "but I think it will peak there too, and far quicker, as fads usually do. As far as New York is concerned, breakdancing here is a statement. They've been doing it in the Bronx for years, and I'm sure it has even an earlier base in street-dancing, folk-dancing maybe even an appropriate turn. Long after they've stopped doing it in L.A., the kids will still be doing it here, and it will take on new significance, and new forms."

Russo also likes to inject political consciousness on the dance floor, with clips like "Rap Master Ronnie," a Reagan satire composed by *Elizabeth Swados* and "Doonesbury's" *Gary Trudeau*, and by presenting the controversial "Two Tribes," by *Frankie Goes to Hollywood* in its unexpurgated form.

"The first time I saw that clip the hair on the back of my neck stood up," he recalls. "It still gives me chills."

Telegenics began its club pool in April of 1983 with three partners. Russo has a background in band promotion. Filmmaker *Tom DeIesso* worked at MTV as a technical director. *Stephanie Shephard* has been a reporter for *Dance Music Report*.

"Tom does all the technical stuff, supervising editing and dubbing," Russo explained, "and Stephanie knows the music business the best. It took a lot of work to get it started, because *Rock-america* really had it all sewn up. We had to prove ourselves, and we worked our asses off, and *RCA* came in, and the independents."

Today the service offers two dance compilations and a pop reel covering established rock acts. Ambient footage is also available. There have

been special club promotions for *Nina Hagen* and *Culture Club*. *DeIesso* and *Russo* have also produced video clips for *The Flirts* and for *Rhett Hughes*, ("We'd like to get back into that business," *Russo* adds) and now generate a monthly newsletter filled with gossip and technical tips for club VJs.

Integral to the promotion concept is a tracking service, now computerized for their record company clients. "As part of the contract, clubs that subscribe and receive our tapes must supply us with feedback, including a top ten," *Russo* explains.

"The most important question is whether they've programmed the record before the video," he stresses. "In a great many cases you find the club programmers never heard of a tune until they saw it in video. I'd go as far as to say that 30 or 40 percent of the time they're playing the video before the record." *Russo* theorized that video offerings have more clout than record pools today because they are more expensive per cut, and so perhaps perceived as more valuable. "And video makes it more interesting," he adds. "I think a lot of records get played because of their videos."

Editing of masters and duplication are done at *VCA Teletronics* and its subsidiary, *S/T Videocassette*. "S/T has come a long way in working with us to maintain high quality in our audio," *Russo* says. They are also working with *Panasonic* to alleviate a problem many have discovered in VHS hi-fi, a problem of longitudinal tracking which often makes audio designed for VHS hi-fi sound inferior when played back on standard VHS decks.

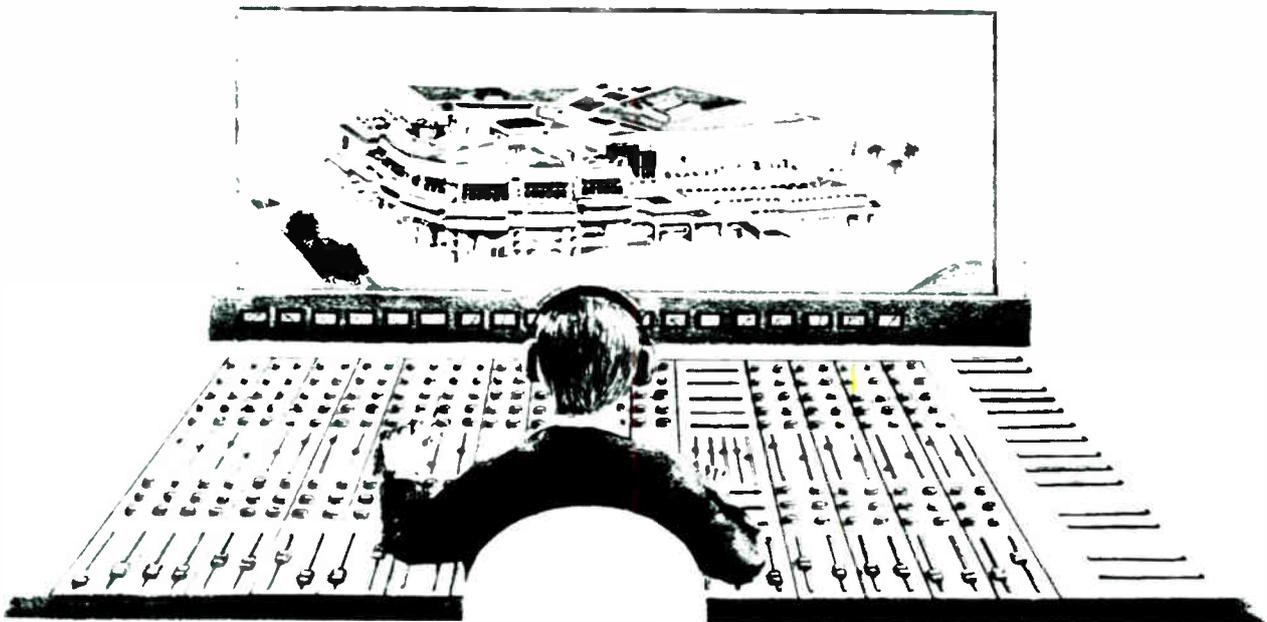
Audio for the compilation tapes is laid down separately at *Regent Recording*. "We use Dolby A noise reduction, we do a lot of audio sweetening and a certain amount of retracking," *Russo* explains. "Of course the problem still remains that you have to equalize for the individual club room. On all our tapes, we put an audio test, and we give them 30 seconds of pink noise." He recommends that clubs look into the dbx 2000 digital equalizer if they want to maintain a good tape sound with a minimum of adjustment between tunes.

The one cloud in *Telegenics*' future is pay-for-play, and *Russo* says if they have to, they will pay to acquire certain clips to get them on their reels. "I don't say it will kill the video business, but it will certainly cramp its style," he adds. "Executives are starting to look to the clubs as a money making machine, and not as a promotional tool. I think they may have the audacity to ask clubs to pay for clip play. Of course that would destroy the whole concept. The thrust is in promotion and record sales, and that's what sets the pools apart from broadcast." ■

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by Lou CasaBianca

The history of television technology will record that these are revolutionary times. Advances in satellites, cable, digital, and very large scale integrated circuits (VLSI) are opening up a whole new era of global and personal communications. Laser video, compact audio disks and stereo broadcast television are bringing audiophile sound quality to feature films and home video. Over the next 10 years we will participate in the implementation of a new technology which will generate a listening and viewing experience that will be a whole generation better than the television of today.

The new standards which will influence television as it moves into the 21st century are being formulated in Washington D.C. by the Advanced Television Standards Committee (ATSC). The committee, which in effect will be replacing the 30-year-old NTSC standards, will be making delicate and controversial decisions about which technologies will develop the fastest, be the most cost effective and still be functional for the 1990s.

The major manufacturers and broadcasters have been forced to make decisions based upon knowledge that is literally changing from month to month. Regardless of which approach is taken, the new standards must also maintain a high degree of compatibility with the existing television system and with the sets in people's homes.

DIGITAL VIDEO RECORDING

Digital TV will eliminate the current set of mixed international standards of NTSC, PAL and SECAM and establish a worldwide digital television standard, which will be convertible to the older formats as needed. There are still many variables and unknowns in the develop-

ment of the DVTR (digital videotape recorder) and critical disagreements among manufacturers.

CONTROVERSY

Among the questions under consideration are two issues that dominate the digital debate. First is setting the relationship between the cost of a single playback channel and its bit rate. The other is determining the narrowest trackwidth that will provide reliable operation under typical variations in temperature, humidity and vibration. The following is a review of the critical factors affecting the development of digital and high definition TV.

CROSSTALK

Crosstalk will effect limits in both head construction (e.g., head stacks or clusters vs. spaced heads) or in the track format (such as guard-band and multi-azimuth systems). Crosstalk from one record head to another is a serious problem because it is amplified by the record process. Record-to-playback crosstalk limits "confidence playback" quality. Crosstalk from a recorded track to an adjacent head decreases exponentially both with spacing and spatial frequency. Because crosstalk waveforms tend to be sinusoidal, as contrasted to noise, for equal values crosstalk produces less worsening of bit error rate (BER). Crosstalk levels may exceed noise levels by 5 dB or more with very little effect.

CONTINUOUS VS. DISCONTINUOUS RECORDING

Another area under consideration are proposals for discontinuous vs. continuous recording. The trade-off cost for discontinuous recording must be evaluated not only in terms of money, but in space and complexity. It requires

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more memory and by digital TV standards it is also slow, requiring as many as 32 parallel stores. Another disadvantage of discontinuous recording is that it increases the bit rate to be recorded. This generally increases the number of signal channels, both record and playback. The memory and the channel costs may be reasonable in a studio DVTR, but have serious implications in the smaller, portable machines. Other areas of controversial decision making include multiple vs. single head configurations, picture-in-shuttle problems, and drum rotation rates in 50 and 60 Hz systems.

AUDIO SAMPLING RATE

It is generally agreed that audio signals will be recorded either within the video track or on an extension of it. The optimum solution appears to be the use of common sampling rate for 50 and 60 Hz systems and the recording of an equal number of samples on each recorded track. The downside is that this will require a sampling rate of 100,000 per second. Machines will have four channels of digital audio at 16 bit/sample rate. Other parts of the studio system and the transmission circuits are much more sensitive to bit rate, and will require the use of a lower sampling rate. What is beginning to be apparent is the increasing acceptance of digital Compact Disc and the evolution of consumer standards interfacing with professional digital audio production.

NEW STANDARDS TIMETABLE

High Definition Video has been under development for more than 10 years. In addition to higher resolution, it will provide improved color rendition and stereo sound. Its wide aspect ratio is comparable to 35mm film projection. The merging of film and videotape in motion-picture production, will bring advances in flexibility and efficiency in movie production and distribution. Film producers such as Francis Coppola, George Lucas and Glenn Larson are advocates of what is being called electronic cinema. One of the by-products of video for cinema production is the expansion of the range and scope of special effects. The present day systems are NTSC with 525 lines, PAL and SECAM at 625 lines; in each case interlaced with a 4:3 aspect ratio. Higher definition TV will probably be put in place as part of a process that is likely to go through several distinct evolutionary stages.

IMPROVED TV

In the first phase the signal received at home will remain essentially the same for the short-term future, 1984-1987. Special circuitry in the receiver processes the signal to improve image quality. The circuitry could range from comb filters through digital processing

to remove noise and impairments. Another option is the use of full framestore devices in each receiver which will provide major improvements in quality and apparent resolution.

ENHANCED TV

In the medium-term future, 1988-1997, we may have "progressively scanned" video with the same aspect ratio as present day TV. At this stage, the broadcast signal would be supplemented or changed significantly. A standard NTSC-compatible television channel would be imbedded within it. Combined with signal processing techniques in the receiver, extra information in the signal will provide a wider picture which could have twice the resolution of the current NTSC standard, without a larger increase in the number of scanning lines. By making maximum use of digital signal processing particularly for progressive scanning, Enhanced TV will be able to provide a vastly improved picture. This is the technology which could provide the basis for a continuing TV boom through the 1990s.

HIGH DEFINITION TV

In the long term future, say from 1998 onwards, we will see the implementation of Ultimate TV or HDTV. It will use at least double the number of lines in the 525-line NTSC standard. Pioneered by NHK Japan and Sony, and first demonstrated in the early 1970s, this approach increases vertical resolution by increasing the number of lines to 1125. A wider screen aspect ratio and increased horizontal resolution will require that the transmitted signal have five times the standard NTSC bandwidth. While this system appears to be likely to have a role in studio production and movie distribution, the consensus is that a more efficient approach must be found for HDTV broadcast.

BROADCASTING HIGH DEFINITION TV

Proposals for Direct Broadcast Satellite (DBS) will eventually bring High Definition Television to the U.S. Work is proceeding on the assumption that HDTV bandwidth will require no more than two channels of standard definition TV, and that the signal will be compatible with standard definition sets. For DBS the, "time multiplexed component" (TMC) format for the broadcast color video signal is now generally advocated. The TMC format separates the color and luminance components of the signal by transmitting them at different times, and not simultaneously on different frequencies as is the case with current standards. The advantages are the elimination of cross-color and cross-luminance, and an improved signal-to-noise ratio. The question still remains how higher resolu-

tion will be achieved—by enhanced signal processing in the receiver, or by transmitting more scan lines.

One solution proposed by CBS dealing with the problem of near-term obsolescence is the development of a compatible two-channel system. One channel would handle the conventional 525-line, 4:3 aspect ratio NTSC signal; the other augmentation channel would carry a wider, 5:3 aspect ratio image of the same picture. The two channels would be interlaced in specially-equipped receivers producing an image of 1050 scanning lines in the 4:3 aspect ratio central region, and 525 lines at the edges. The main advantage of the CBS system is that it provides an NTSC compatible signal and a form of high definition without the need for expensive digital circuitry, such as a frame-store. However, the system would push present satellite technology to its limits, requiring more powerful satellite signals, larger rooftop antennas, and low-noise electronics.

Other proposals, by Philips and others, assume that it will be feasible to provide a framestore in the receiver, as a way to combine channels and provide higher resolution. The framestore also provides a progressively scanned image, achieved by reading the whole frame into digital memory and scanning it out in line sequence. Requiring less bandwidth, this approach will make it feasible to deliver the image within the 9 MHz bandwidth of two standard cable channels. If the projected cost reduction in framestore devices materializes as expected, the higher resolution and additional features available with the framestore approach make it look very strong.

DTV/DIGITAL TV

A hybrid of TV and computer technologies, digital sets will enable viewers to double their NTSC TV resolution of 525 lines to 1050 line HDTV image. Digital sets can memorize information, such features, as freeze frame, split screen and zoom effects which will be controlled by the viewer. While the selection of worldwide HDTV/digital TV is an essential first step, there are still many other factors that must be defined. These decisions will effect not only the television industry but also the future of sound broadcasting, professional audio production and consumer electronics.

For more in-depth information, you may want to refer to Tim Johnson's "Strategies for Higher-Definition Television," published in this country by Knowledge Industry Publications, White Plains, New York, and "Digital Video Recording Format Considerations Including Audio," by C.E. Anderson and M.O. Felix available from Ampex Corporation and "High Definition Video Systems" available from Sony Corporation in Park Ridge, New Jersey. ■

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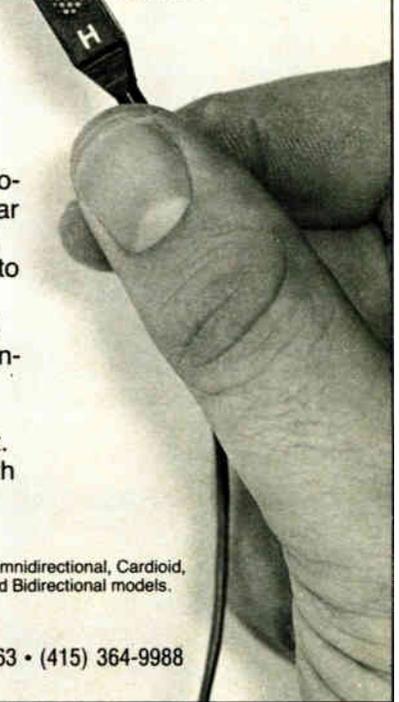
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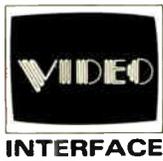
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The most significant word in the industry.

by Neal Weinstock



Going for the golden goal: preproduction financing for music videos. The obvious sources: record companies; clubs and club distributors; one's own pocket. A little less obvious: home video distributors. Subtle sources: production houses; feature productions and teleproductions and advertising agencies with a need for music segments; the tax write-off game; foreign rights. And a thousand other spaces to land on in this never-bored game with no rules. Can the canny producer put together several financing sources where one obvious source either can't provide enough, or where too much is never enough? It's being done all the time in films, dear chaps. That's what festivals and conferences are for. And this is how music videos are beginning to begin.

Scene: A beige Hilton. A journalist taking notes at a grand piano outside "The Most Significant Event in the Industry," for which a few hundred young students of movies, TV and rock and roll have each paid a few hundred dollars to a few producers who tell them how hard it is to enter their line of work. Down the hall is the eighth annual meeting of the US-USSR Friendship and Trade Commission. The journalist observes the Russians acutely, attempting to reach for a kernel of understanding about them, just as he must separate the grain of news from so many future newsmakers at The Most Significant Etc. Russians all walk as if just emerged from a men's room, he concludes, without noticing that his piano's raised lid hides the men's room door from his view. Down another hallway, International Business Machines is introducing a new child to a few friends

for a few days, accepting congratulations and requests, giving instruction and wonderful free food. A journalist could starve at The Most Signifi Etc.

Irena Uspensky is in even greater danger. A small brunette who smiles at passers by from behind a pulpit marked by the name of a video studio, she may just pass out from terminal boredom and hunger. She has been given a lunch break by her employers, but has not been given pay; her employers recognize the value she perceives in the opportunity they are providing her. And only coffee seems to be given away at The Most Sig Etc. Irena never notices the booth of the New York City Dept. of Welfare for Motion Picture Producers, distributing free apples, until it is too late: all taken by her counterparts at other booths.

A journalist observes her staggering barefoot, working heels in hand, to the water fountain near the men's room near the baby grand. He asks her name; the response confirms another expectation about the Russians—they all dress like they are from a far neighborhood of Brooklyn. Moved by cross-cultural self-interest, he offers her lunch. IBM is giving it away, anyway. So might Comrade Irena.

On the way to infiltrate the IBM crowd (who look like they are all from Westchester or Connecticut), they bump into an open-shirted man who looks like he is from Queens. He is Mersh Greenberg of Silvercup Studios.

Mersh: "We're getting so much music video business—I never would have believed it. And they're incredible: it's not the movie business, you know, it's the record business. The stars, the groups control everything. They don't care what the budget shoots up to. They'll shoot something over 100 times—there's no conception of business sense." Even so, Mersh goes on to say,

Silvercup is taking part in some innovative financing deals for music videos. "Tax write-offs," he says. "You know record companies write all of this off as promotion. Producers can, too; and they can sell the write-off to a corporation that can use it." And that's all Mersh wants to be quoted on that subject.

Besides, conversation is interrupted by a common occurrence at confabs. Enter, Mr. Persistent Vaguely-Known Best-Friend in the World. He shakes down an introduction to Mersh, proceeds to try to sell him his World's Greatest Product for Filmmakers, and Mersh is the most gracious of interruptees. Exeunt all. Over lunch a journalist's curiosity proves the death of exotic romance, and Irena is discovered to be ambitiously promoting a video in which she flexes to ditties in the public domain.

Irena: "It's getting to be too many industry conferences, I'm getting confused. All seem to have the same themes: money, blind ambition, fame and fandom. Conferences seemed to me at first to be the place to be to soak information in. So they are, but the information is not so much goal-oriented as gossip about people who wrongly think they are goal oriented; they enjoy being part of the scene much more than actually doing anything. I try to pin these people down on actually doing anything and it's not possible."

Scene: A movie palace. A days before the silver screen. Behind water pitchers sit independent filmmakers: Amos Poe, director of *Alphabet City*; Susan Seidelman, producer/director, *Smithereens*; Slava Tsukerman, director of *Liquid Sky*; Tim Ney, director of the Independent Feature Project, and others of equal but extraneous import.

Parenthetical note: If an independent of limited or unlimited means planning any motion picture production of any kind, call or see Tim Ney in New York, or get the IFP's most helpful advice book. Avoiding the IFP will be perilous to your health.

Slava Tsukerman: "A script must be written to the available budget. One investor had \$500,000, so we were able to make *Liquid Sky*. If he had more, or less, I would have written something else."

Memorable anecdotes like: Susan Seidelman all out of money for an answer print two months 'til Cannes; still she can afford breakfast at the Parker-Meridien, meets two film producers at the next table who overhear her woes and invest in the otherwise blasted *Smithereens*. "The moral is always eat breakfast at the Parker-Meridien," she says.

Overflow crowd of the dreamy-eyed ponders its own capabilities. Nobody takes notes. Same crowd as at that music video panel in Chicago, which spawned words such as, no, well, nothing memorable. Irena U. was there,

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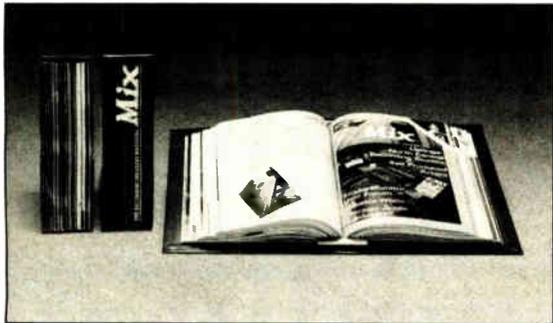
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gauging the connection between what Francis Coppola said ("Somebody should not be able to pay \$50 for my work and then rent it out as many times as they want for the next 10 years,") and the phenomenal home video prices for music tapes announced every day, in *Thriller's* wake. Vestron's near \$2 million for home video rights to old Stones clips. Media Home Entertainment's \$1.3 for Bowie's *Serious Moonlight* and \$500,000 for a *Journey* to the loss column. No, that was August, the very loveliest time for the Nevada desert, video retailers cavorting at the VSDA show. Gets even more confusing to me than to I. Uspensky. Home video prices for music are just establishing themselves; stars, so far, get overpaid, and odd bedfellows Irena and Francis underpaid. What do I. Uspensky and F. F. Coppola have in common? Nobody knows what their product is worth exactly, when it is on videocassette.

This has much to do with the average video retailer refusing not merely to stock anything other than recent movie hits, but refusing even to special-order these things for interested customers. Record stores continue to lag in handling music video, too. So there is a logjam. Obviously, the public wants music videos, and there are plenty being made. Getting rights together is a common problem, but getting past the retail rental block is a bigger one.

Production money is perhaps better defined as expected distribution income. But music home video distribution is an unpredictable, unprofitable mess. Solutions: direct marketing, or marketing tie-ins with other media, or with other video product—like the movies. What do these marketing solutions have to do with producers looking for preproduction money? "If you can demonstrate how somebody will make money," says Amos Poe, "you stand a better chance of them giving it to you." Poe says his next film (last was *Alphabet City*, remember) will be partially financed this way. You too can have a *Music Video From Streets of Fire*. Or peddle rights to a video to the ad agency world, to use in commercials, after an appropriate uncommercialized window to give the music a shot at establishing legs. Much abuzz about such strategies between tanning sessions in St. Tropez.

Or was that a beach in Chicago? I get the two places confused. There was a woman in outmoded sort of dress, no shoes, walking along a beach. Sand dunes shifting. She revels in the water particles in the air. Loud noise, camera pulls back to show tractors, plowing just behind her. "Comrade, come back to work!" shouts an employee of the Chicago Park District at Irena. That's right, it was Chicago, not St. Tropez. I get confused. "Cut!" she yells back. "Now let's set up for the backbeat retake." ■

—FROM PAGE 30, WONDERLAND

sweet sounds of success using a computer interface. Alonso designed the interface board which translates the Synclavier's output to a computer-acceptable language, and from there, the computer can make the signal understandable to the DECtalk speech synthesizer (from Digital Equipment Corporation). This DECtalk produces speech using stored word sounds called *phonemes* that are combined to form any English word using a set of 8,000 mathematical equations that make the sounds flow together as we hear them in natural speech. The DECtalk, designed by Dennis Klatt, is particularly useful because it has seven different voices that can be modified, plus an eighth that can be completely created from the user's imagination. "Voice sculpting" is the descriptive term DEC uses.

So this design can assign a separate voice for each of the eight banks of lights on the Synclavier, and changing the pitch of the voices can indicate whether, for example, a mode is on or off. Sounds confusing, perhaps, to the average ear, but as Bralove says, "That's what's so great. It doesn't matter if it's too complicated for anyone else. I'm only designing for Stevie Wonder, and he has amazing recall."

When Dennis Klatt designed DECtalk, he meant for these voices to be characters, so he made them all very distinctive with names such as "Huge Harry" with the big bad bass, and Perfect Paul whose vocal chords sound as if they've been shrunkwrapped.

Will the steady stream of upgrades mess up his work with the additional dedicated buttons and lights? Bralove says, "That's what I like about working with someone like Sydney, because the Synclavier is designed to be consistent with its upgrades," so he feels, though constant flux is a given, his work in adapting the machines to "speak" is not in vain.

INTERFACING THE FUTURE

While many musicians like the flexibility of the Fairlight—its ability to create a sound by drawing a waveform from a lightpen, then edit it with the CRT—this presents a stumbling block for Stevie Wonder, but not a dead end. "If it's a possibility, Steve will examine it," Bralove says. He hopes to design a braille system that could define the contours of a waveform so Stevie could trace it, and therefore modify the line [edit the sound]. Bralove cites the work of scientist Doug Moore who's trying to perfect a full screen braille graphics display system for the blind.

Speech recognition is another



Bob Bralove working with computer for keyboards.

frontier. Already Bralove has begun experimenting with a Votan 5000 unit, which can recognize certain key words whose waveform templates have been entered in its memory, and respond with digitally recorded speech (unlike the phoneme system of DECtalk, the quality of speech is better, but the vocabulary is more limited.)

Votan of Fremont, California has entered the American office environment with its VPC-2000 voice card for the IBM computer. For \$2,500 the user can modify his software to tell him out loud what to do next, and he can respond or give commands by talking instead of fumbling through a set of key strokes. The board allows the IBM unit to interface with a telephone, as well.

Perhaps many of the technologies that have come out of research from people such as Alonso, Kurzweil, Klatt and Bralove will not be confined to specific cases of immensely rich, gifted pop stars who are blind. Studio owners and composers may find voice or sound cueing and reading helpful in learning and using complex systems.

Since it's part of his job to make sure that Wonderland stays state-of-the-art, Bralove feels he has general knowledge to offer. He's writing software for data base management of recording studios. Because each studio's needs are different, he's decided to publish modules to address specific subjects. So far, he's got one module ready to go which helps catalogue sounds.

He's seen a lot of sounds go in a variety of machines, and come out on the radio. A faint smile and a simple statement reflect his attitude toward his job: "I'm watching the master." ■

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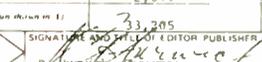
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ADVERTISERS INDEX

PAGE ADVERTISER

- 67 AB Systems
- 62 Accurate Sound
- 58 Advance Recording Products
- 21 Agfa Audio
- 10, 11 Akai/IMC
- 154 Dan Alexander Audio
- 31 Allen & Heath Brenell
- 141 Alpha Audio
- 13 Ampex
- 128 Aquarian Accessories
- 58 Arcal
- 80 Ardent
- 133 Audio Affects
- 156 Audio Kinetics
- 141 Audio Vision
- 147 Auteri Associates
- 63 Award Records
- 62 Ken Bacon Associates
- 46 Bonneville Media Communications
- 139 Caig Laboratories
- 25 Canare Cable
- 51 Carver
- 147 Countryman Associates
- 47 Crown
- 85 Disc Mastering
- 9 DOD Electronics
- 138 E.A.R. Professional Audio
- 129 East Coast Sound
- 38 Educational Electronics Corporation
- 55 Electro Sound
- 72 Europadisk
- 75 Eva-Tone Soundsheets
- 84 FCC Fittings
- 93 Filam National Plastics
- 109 Flanner's Pro Audio
- 39 FM Acoustics
- 70 Forge Recording Studios
- 103 Fostex
- 70 Frankford/Wayne
- 82 Full Compass Systems
- 131 GLI
- 123 Goldline

PAGE ADVERTISER

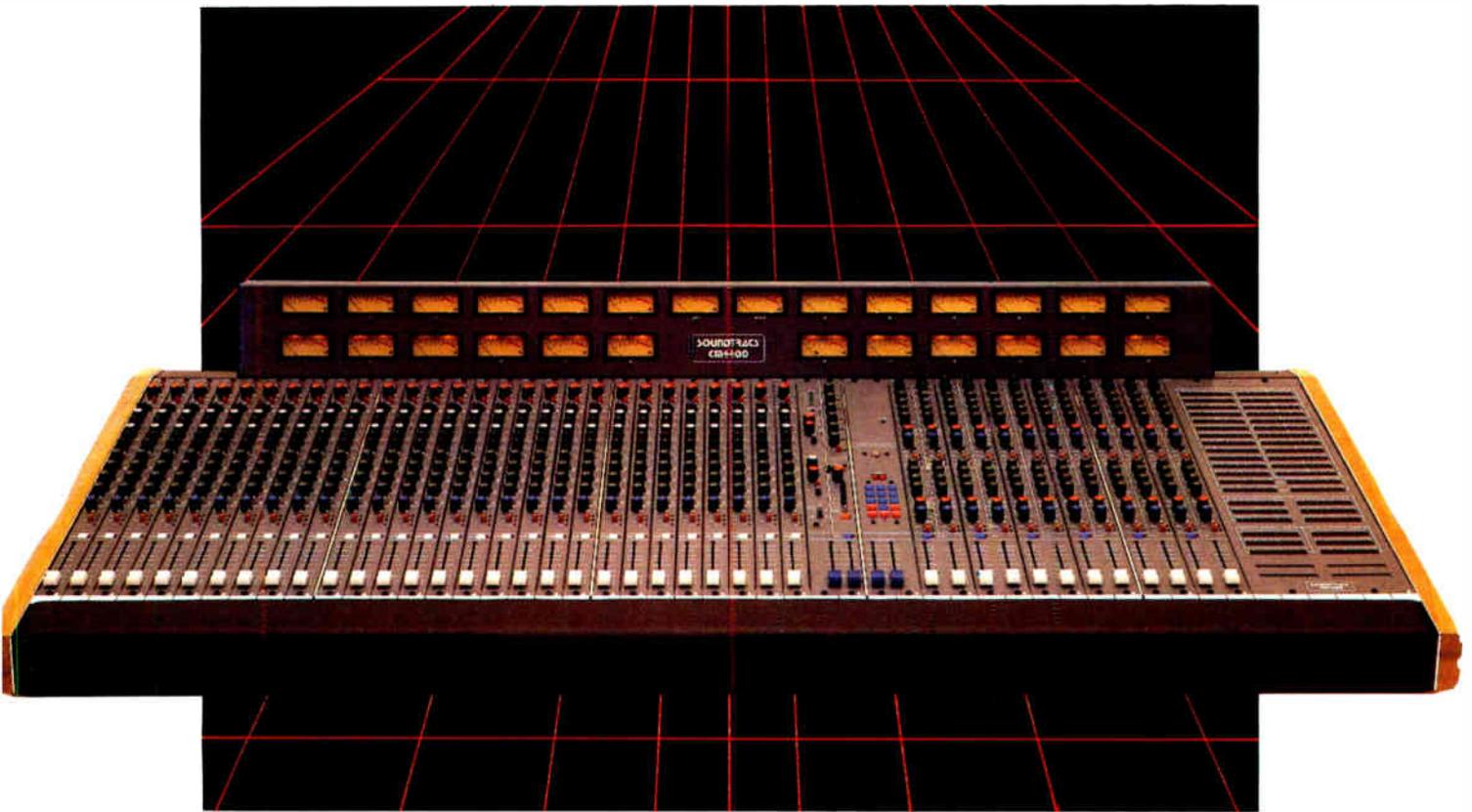
- 29 Gotham Audio
- 77 GRD
- 46 Bernie Grundman Mastering
- 82 Hardy Company
- 2 Harrison Systems
- 20 Hill Audio
- 78 HRC Magnetics/Hix Recording
- 61 IAN Communications Group
- 113 Ibanez
- 28 ICM
- 93 Imperial Tape
- 83 Infonics
- 95 K-Disc Mastering
- 90 KM Records
- 116 La Salle Music
- 123 Linear & Digital Systems
- 121 Linn Electronics
- 99 LT Sound
- 71 Magnefax International
- 91 Master Digital
- 87 The Mastering Lab
- 83 Media International
- 80 Miami Tape
- 143 Midem
- 79 Midwest Custom Record Pressing
- 84 Mother Dubbers
- 57 Music Annex Recording Studios
- 134 Music Masters
- 127 N.A.M.M.
- 14, 15 NEOTEK
- 134 Omni Craft
- 135 Orban Associates
- 4, 59 Otari Corporation
- 132 PAIA
- 37 Panasonic/Ramsa
- 111 Peavey
- 78 Plantron
- 88 Polyline
- 53, 128 Power USA
- 97 Pro Audio Systems
- 65 Professional Audio Services & Supply

PAGE ADVERTISER

- 145 Professional Audio Services & Supply/Aces
- 126 Professional Audio Services & Supply/Zetka
- 66 QCA Custom Pressing
- 19 Quad Eight/Westrex
- 92 Rainbo
- 36 Rane
- 73 Resolution
- 105 Roland
- 25, 39 Saki Magnetics
- 110 Sanken
- 48 Shape
- 117 Shure Brothers
- 131 Solid Support Industries
- 50 Sonic Arts
- 35 Sontec
- 38 Sony A/V
- 7 Soundcraft Electronics
- 155 Soundtracs
- 98 Sprague Magnetics
- 87 Stoughton Printing
- 17 Studer Revox
- 125 Synchronous Technologies
- 132 Synthonic Sounds
- 94 Takeda Record Service
- 101 Tama
- 89 Tannoy
- 45 Tascam
- 23 Telex Communications
- 40, 41 3M
- 114 TOA Electronics
- 73 Trutone Records
- 98 TTL USA
- 88 United Tape
- 146 Universal Recording
- 34 Ursa Major
- 104 Wireworks
- 81 World Records
- 27 Yamaha International

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