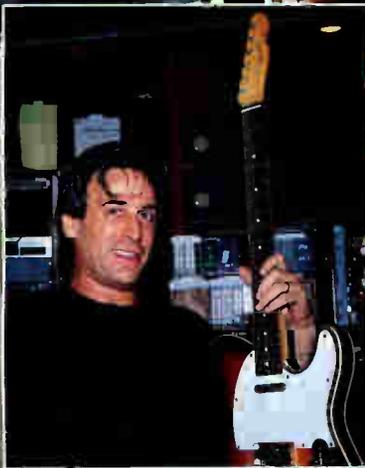


MIX

**Mastering Engineers
Discuss Their Consoles**

**Putting Up "The Wall"
in Berlin**

THE RECORDING INDUSTRY MAGAZINE



**Producer/Musician
Danny Kortchmar**

**Directory:
Mastering,
Pressing
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**2-Track Mastering
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World Radio History

MIX

THE RECORDING INDUSTRY MAGAZINE

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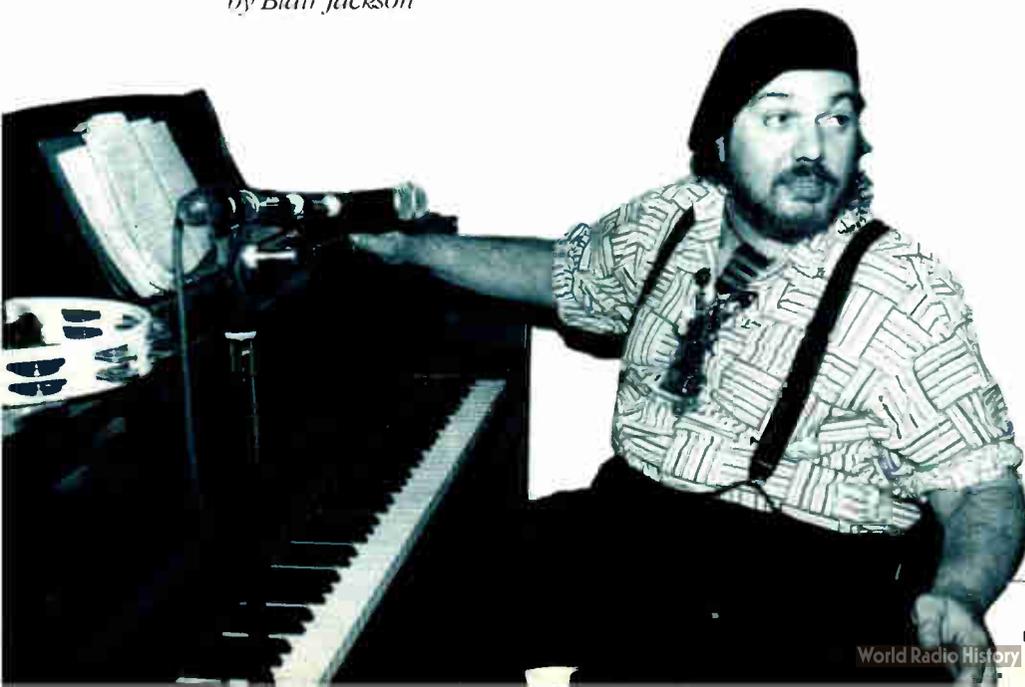
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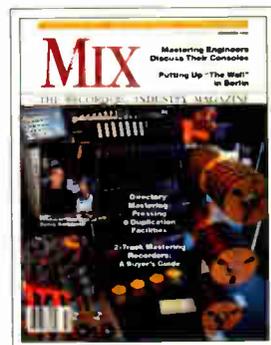
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Cover: In one of the final stages on the assembly line, a tape-slitting machine prepares 2-inch rolls of the recently introduced 996 formulation audio mastering tape at 3M's professional and consumer audio/video manufacturing facility in Hutchinson, Minnesota.
Photo: Jerry Taube.



48-TRACK TECHNOLOGY:



Photo courtesy of David Hewitt's Remote Recording Services.
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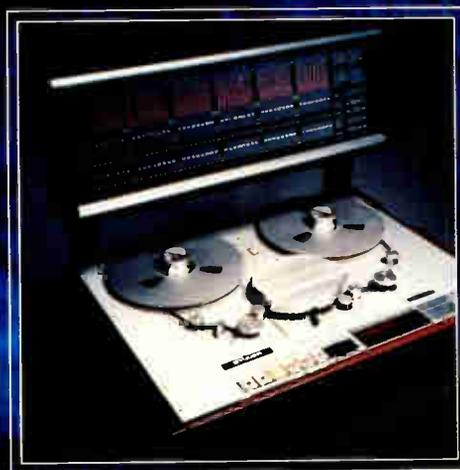
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FROM THE EDITOR

Where is the action in today's recording industry? For years it was in the pursuit of high fidelity. Then it was the quest for more recording tracks. Next it was more sophistication in signal processing. From there it became the computer's role in audio production. And through all of these changes, the area that seemed to be the most stable, unchanging and, yes, even boring, was mastering. Sure, mastering had its moments, such as direct-to-disc, half-speed mastering, and even the quad scare of the '70s. But, by and large, mastering has been a rock-steady part of the process.

Well, surprise, surprise! Mastering has finally become an area of excitement. Thanks to such issues as digital editing and signal processing, CD re-releases of archival material, new and upcoming release formats, and the copy-protection situation, mastering engineers are finding themselves in the center of the action. Now, I don't mean to imply that mastering engineers have had a cushy job all these years, just spinning the lathe and peeling off mother discs. I've met quite a few of these folks, and they are anything but featherbedders. Most of them work outrageous hours and maintain a level of perfection that would impress many NASA engineers. But today, finally, this line of work has begun to move into the spotlight.

Not coincidentally, this is our Tape and Disc issue. This month we talk to mastering engineers about their changing world and, more specifically, about the advanced mastering consoles and the demands created by living in both the analog and digital worlds. Hosting this forum is Linda Jacobson, whom we welcome back to our pages after a stint as managing editor for *EQ Magazine*.

While we have been dedicating our December issue to the tape and disc arena for the past ten years, we have more recently been maintaining a monthly editorial department to keep track of the rapid changes in mastering, pressing and duplication. Phil De Lancie edits our monthly section on tape and disc issues, and keeps in the thick of things as a mastering engineer himself at Fantasy Records.

Working on many of the CD reissues from Fantasy's glorious catalog of historical jazz recordings has kept Phil up-to-date on the latest concerns and developments with regard to end-product. Phil's interest in future release formats, multimedia developments and new tools for record production keeps him envisioning what tomorrow's record industry will bring. We're proud to have Phil on the *Mix* team and urge you to check out his monthly column if you aren't already plugged in.

Keep reading,



David Schwartz
Editor-in-Chief

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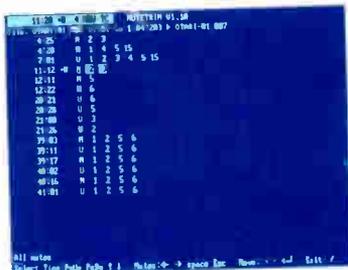
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The highly versatile DISKMIX 3 software is combined with the latest in motorized fader technology from Penny & Giles to create a high quality yet affordable fader/mute automation system.

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DISKMIX 3 is designed with a user-interface very similar to that of current VCA-based automation systems. So if you are already using automation systems, DISKMIX 3 will be a quick study. In fact, the entire system is easy to understand and to use. It keeps you abreast of what's happening during all phases of mixing and gives you constant feedback in all modes of automation.

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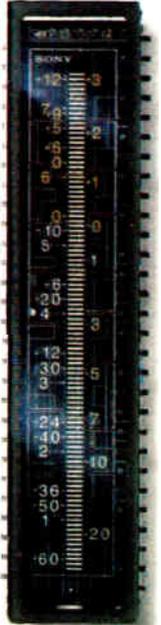
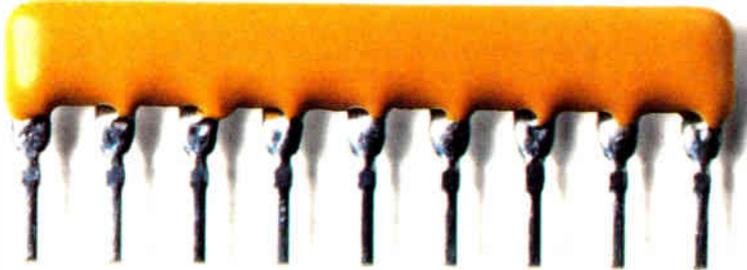
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They make beautiful music together.

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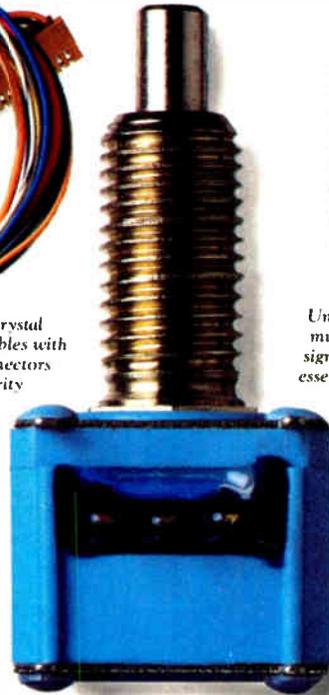


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Sony marries superior components and intelligent engineering to create the MXP-3000 series consoles.

The result is consoles that offer the same high level of sonic excellence as our digital multitrack recorders, as well as unsurpassed reliability.

To achieve this, we selected only parts that meet the highest standards. Often, this required creating unique components.

This dedication to quality extends throughout the MXP-3000 series. From our "minimal signal path" architecture to our advanced metal frame

construction. It's why the MXP-3000 delivers performance that satisfies even the most critical users in hundreds of facilities worldwide.



Call us at 1-800-635-SONY, to learn how you and the MXP-3000 series can make beautiful music together.

SONY

BUSINESS AND PROFESSIONAL GROUP

CURRENT

SMPTE Lite

This year's SMPTE Conference, held at New York's Jacob Javits Center October 13-17, underscored the increasing difficulty manufacturers face trying to maintain a profile at numerous trade shows in a tightened economy. Exhibitor attendance at this year's SMPTE show was down about 25% from last year, with 187 companies showing wares. Visitor attendance was pegged at roughly 12,000, down 20% from last year.

Coming on the heels of AES less than a month earlier and the IBC exhibition in London, SMPTE apparently bore the brunt of trade-show burnout. The Manhattan location also may have contributed to the truncated attendance. Aside from the city's intrinsic high cost and the distance from hotels to the hall, the Javits Center holds bad memories for some exhibitors of a show there two years ago, among them Sony, whose booth caught fire, and Ampex, whose power went down during product demonstrations.

Several exhibitors privately expressed desires that SMPTE combine its show with a related organization, either the Audio Engineering Society or the National Association of Broadcasters.

Nonetheless, SMPTE public relations coordinator Nancy Engel said that exhibitors were pleased that the smaller attendance was made up of what they felt were a more focused group of viewers. She added that they were also happier with the Javits Center's execution of the show this year.

Engel noted that 122 companies have already reserved space for next year's Los Angeles show, including Abekas, a major video manufacturer that stayed away this year. Also this year, a new product introduction room was added; 16 companies

used it, including Avid Technology and AMS.

Nagra introduced the Nagra D Professional Self-Contained Digital Audio Recorder, a 1/4-inch, 20-bit, rotary-head recorder that samples at three rates and has a longitudinal time code track. It can be configured for either 2- or 4-track recording.

Quantel introduced the first production model Harriet. The unit offers Harry-style graphics capability at a lower price. VTR control and effects have been modified: Clips can be laid back to tape with frame accuracy using time code, and a pressure pen has been added to control jog and shuttle. A prototype of the Harriet had been displayed at NAB in April. —*Dan Daley*

More SMPTE Notes

Plans are underway to form a SMPTE Japan Section following talks between SMPTE president Maurice French and Itoh Tsuguyoshi, executive director of the Motion Picture and Television Engineering Society of Japan.

During the past 16 months, SMPTE has realized tremendous international growth, with sections opening in Italy, Scandinavia, Germany and the Soviet Union. There are currently 25 SMPTE sections: 17 in the United States, three in Canada, and one each in Australia, Italy, Germany, Scandinavia and the Soviet Union.

RIAA on Digital Audio Transmission

A few months back we reported on Digital Cable Radio, a General Instruments company sending radio signals out over satellite to local cable operators. Because the signal travels through cable lines, DCR did not have to apply to the Federal

Communications Commission for bandwidth approval.

Then in October the National Association of Broadcasters set up a 12-member task force to study potential uses of digital audio broadcasting, hoping to alleviate concerns from local broadcasters that digital audio broadcasting would harm local market shares.

Now the Recording Industry Association of America has entered the DAB dialog by expressing its concern over the potential for copyright infringement with the new technology. The RIAA has requested that the FCC fully protect the copyright interests of record producers and artists with respect to digital transmission of their music. Specifically, "the RIAA has requested that the Commission prohibit digital audio services from transmitting anything more than an individual selection from a particular album during a limited time period unless they have secured the express consent of the owner of the copyrighted sound recording."

The RIAA request was made in comments filed with the FCC, in response to the Commission's "Notice of Inquiry into the Establishment and Regulation of New Digital Audio Radio Services." This is the Commission's first such inquiry into digital audio services.

Audio Production 1990

Mix's annual Audio Production Facilities' Survey for 1990 shows that despite the overall economic uncertainty in the country, the outlook for the recording industry is optimistic. In fact, 65% of those surveyed indicate that revenues from the past 12 months showed slight-to-substantial increases, while 80% expect revenues to increase further in 1991.

INDUSTRY NOTES

California Lawyers for the Arts will present The Music Business Seminar on Saturday, December 8, in building F of the Fort Mason Center in San Francisco. This all-day conference will cover copyright and publishing, roles of managers and agents, record deal negotiation and more. For more information call (415) 775-7200.

...**Personics Corporation** of Redwood City, CA, announced the appointment of **Steven M. Cristol** as vice president of marketing. Personics developed the Personics System for in-store production of custom music cassettes...**Berklee College of Music** alumni **Douglas E. Boughter** of Fullerton and **Anthony Dec** of Mission Viejo have been appointed executive and associate producer, respectively, of audio programming services at **Sony Trans Com Inc.**, Irvine, CA. ...**Eastern Standard Productions Inc.** announced the appointment of **Gary N. Mayo** to director of engineering and quality assurance...**Ronald Graham** was recently named a vice president of **Mark IV Audio**, where he will be involved with management of human resources...**Al Craig**, formerly of Nashville, is currently residing in Sydney, Australia, where he accepted the position of senior audio engineer at the **Sydney Convention and Exhibition Centre**. ...Sound designer and engineer **George Johnsen**, of **EFX Systems** (Burbank, CA), has been named chairman of the post-production advisory council for **New England Digital**, according to director of marketing, **Ted Pine**. Johnsen will chair a six-person council charged with providing input on software and hardware development with particular emphasis on user interface and PostPro™ workstations. Also at EFX, **Paul Rodriguez** has been named to the post of vice president and general manager...**Bernhardt Weingartner**, founder and CEO of **Neutrik Ag** (Lakewood, NJ), announced plans for the acquisition of a 22,000-square-foot facility on the Isle of Wight, England...**Dick Ravich**, president of **AKG Acoustics**

Inc. (San Leandro, CA), announced the acquisition of controlling interest in **BSS** and **Turbosound**. **Dave Talbot** will be marketing and sales manager for the two new divisions...**Lexicon Inc.** (Waltham, MA) has appointed **Dick Trainor** as vice president of operations. Trainor will be directly responsible for overseeing all manufacturing, customer service and field service of Lexicon's professional and consumer product lines...**Digital Dynamics** has opened a West Coast office in Burbank, CA, to handle sales and support for its Pro-Disk-464 digital workstation line...**Klark-Teknik** has moved to a new facility at 200 Sea Lane in Farmingdale, NY. After celebrating its first decade in business, Klark-Teknik's expansion of its core business and the acquisition of several new product lines prompted the move to the much larger facility...**Promusic Inc.**, of Fort Lauderdale, FL, has been chosen as the sole U.S. agent for the **Studio G** music library and is the only company entitled to license use of these recordings...**Joe Ogburn** recently joined **Video Post & Transfer** (Dallas) as the new chief engineer. Ogburn comes to VP&T from Tele-Image (also of Dallas), where he served four years as assistant chief engineer...**Hill Audio** has announced the signing of **Wilson Audio Sales** (main offices in Nashville) to represent its lines of mixing consoles and power amplifiers in the Southeast...**Patrick M. Griffith** has gone independent in Hollywood as an audio post-production supervisor, though he will continue working with his former employer, EFX Systems...**Andrew Delle** has joined **Varitel Video** (Los Angeles) as director of engineering, where he will oversee equipment acquisition and orchestrate the expansion into digital post-production...**LaBov & Beyond Music Productions** (Fort Wayne, IN), along with **Brymer Advertising** of Louisville, have been named national winners in the Silver Microphone Awards for 1990. The competition selects the best radio commercials in the U.S. ■

Audio Production 1990 is a survey of randomly selected recording studios, remote trucks, post-production facilities, mastering houses and music production/MIDI facilities. The average revenue for these facilities over the past year was \$244,179 (median: \$53,522). In turn, they expect to spend an average of \$43,099 (median: \$11,487) over the next 12 months on equipment purchases.

A full report on Audio Production 1990 will be included in the January *Mix*. If you would like a copy of the four-page service questionnaire with complete results, contact Elise Malmberg at (415) 653-3307.

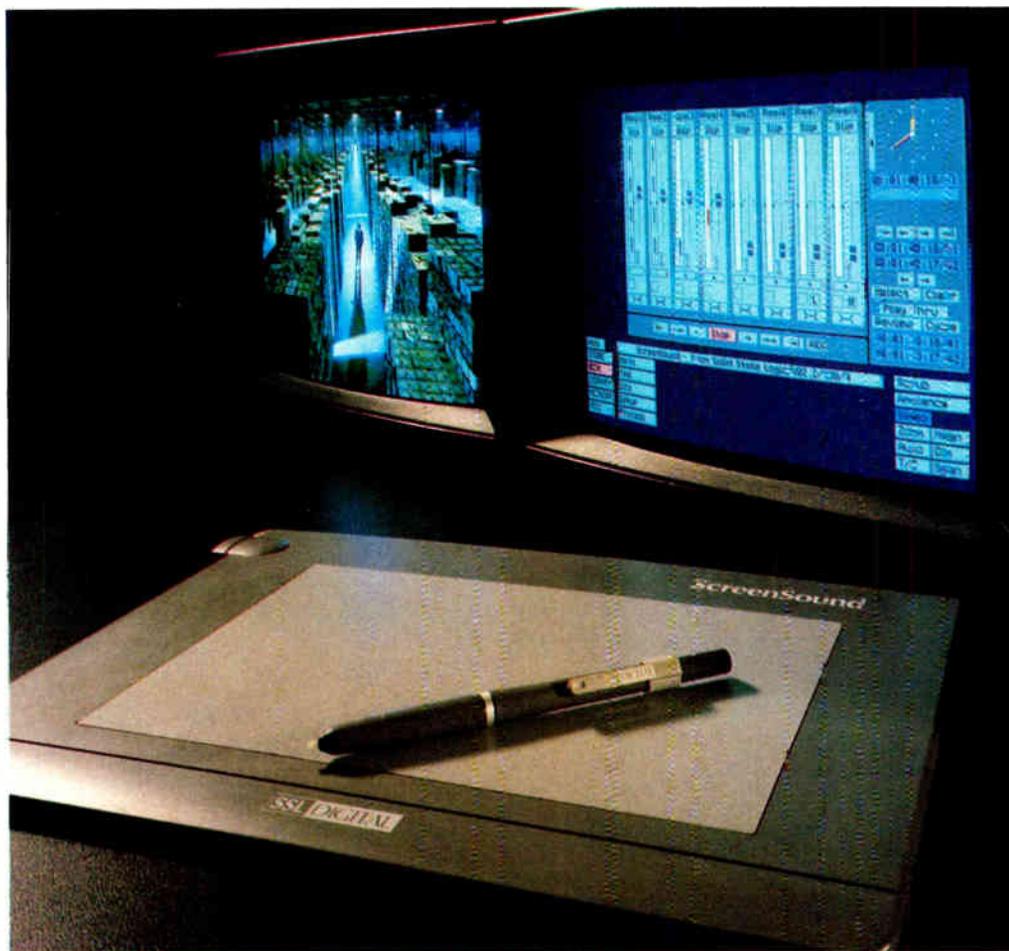
Convention News

Winter NAMM, the more popular of the two shows, has added a fourth day and will now run from January 18-21 at the Convention Center and Grand Ballroom (Marriott Hotel) in Anaheim, Calif. According to executive director Larry Linkin, it should be the biggest NAMM ever, with more than 310,000 square feet of reserved space for exhibitors. Contact Jerry Derloshon at (619) 438-8001 for more information.

The National Association of Broadcasters and the city of Montreux, Switzerland, will jointly host and conduct the NAB/Montreux International Radio Symposium and Exhibition in early June 1992. The European Broadcasting Union has enthusiastically endorsed the project and agreed to be a patron. NAB '91 will be held in Las Vegas April 15-18; Radio 1991 will be held in San Francisco. Contact Susan Kraus or Walt Wurfel at (202) 429-5350 for more information.

MIDEM 1991, the international record and music-publishing event, will be held in Cannes, France, January 20-24. This year marks the 25th anniversary. For more information, contact Barney Bernhard or Laura Ketay at (212) 689-4220. ■

ScreenSound. A fully integrated audio for video editing suite



Post production facilities need to take advantage of the efficiency offered by today's technology. Speed and creative flexibility are essential to commercial success. Digital sound quality is no longer a luxury.

ScreenSound is a fully integrated audio for video editing suite. It combines digital audio storage and editing with machine control of multiple VTRs, Laserdisc or film reproducers. It also interfaces with Quantel's digital video editor, Harry.

Simple to learn and fast to use, a cordless pen, tablet and RGB monitor provide control of all ScreenSound functions.

Multiple sound reels enable music,

dialogue and effects to be laid back to picture and synchronised to the exact video frame.

Edit, review, time offset, track slipping, cross fades and many other production techniques are available at the touch of a pen. Gain and stereo pan controls can be automated to timecode.

AES/EBU interfacing keeps digital audio transfers free of analogue distortions and losses, preserving the highest audio integrity through to the final format.

Above all, ScreenSound is a dedicated system - purpose-built to bring the advantages of hard disk sound manipulation to audio post production.

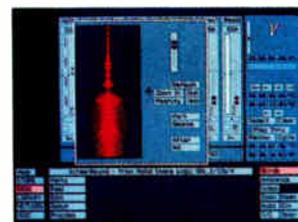
AUDIO STORE

The hard disk store of sound clips gives title and duration, in addition to powerful search and sort routines.



SCRUB EDITOR

Provides accurate edit marking and scrub of audio waveform.



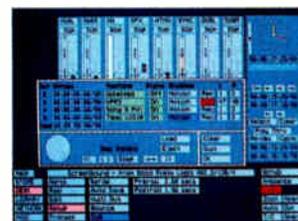
OPTICAL LIBRARY

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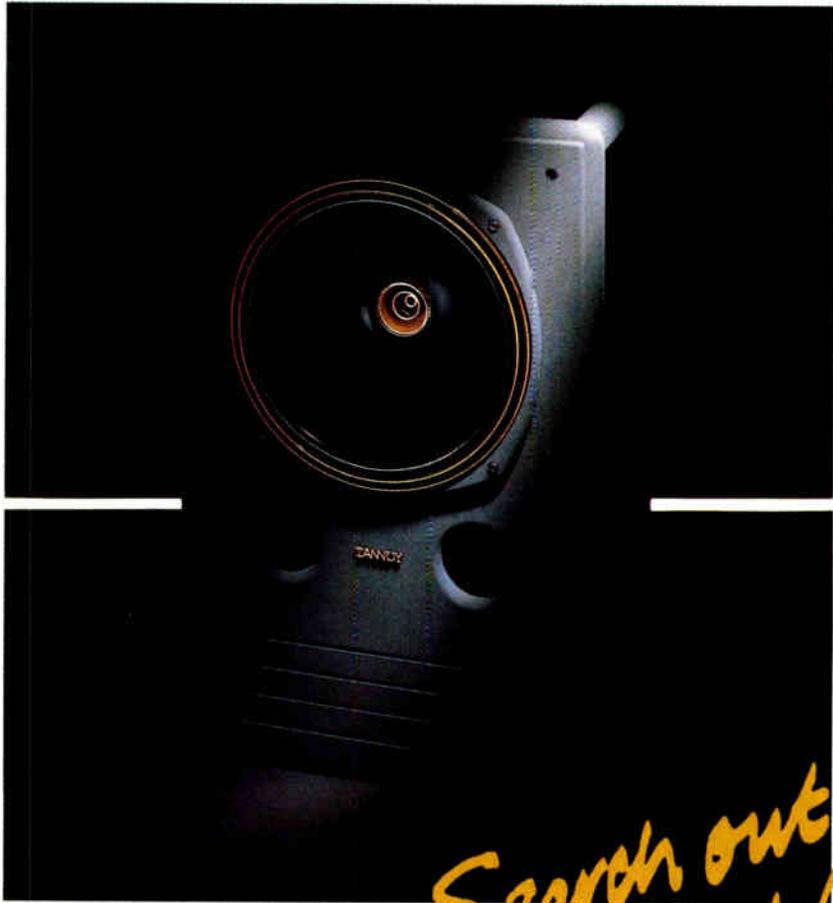
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REPORT FROM THE AES FLOOR

I'm reporting to you live from the floor of the Audio Engineering Society's 89th convention. It's a hot 85 degrees today in downtown Los Angeles, and it's not much cooler here in the convention center. Traffic has been heavy on the floor throughout the morning, but appears to be tapering off just a bit now that lunchtime is approaching. Still, we're going to have a hard time fighting our way into the more popular booths.

Using my patented search method endorsed by all major manufacturers, let's start our tour with a look at some of the major manufacturers. New England Digital is debuting its DSP option, which adds processing power and mixing to the system architecture, as well as a platform for a multi-user, multitasking environment called MultiArc. The Motorola DSP system features a 32-bit data path with 24-bit audio resolution, 5-band parametric,

onscreen mixer, multichannel rate conversion and multi-event crossfades. Also drawing crowds here is the SoundDroid software, a new NED/LucasArts audio editing system designed for film and video post applications, operating like a multitrack digital Moviola.

Neve is showing its VRP post-production console with Flying Faders automation. This 60-input console features mixdown buses that handle up to four stereo pairs for simultaneous mixdown of dialog, music and effects, recall for channel strips, as well as master status, returns and auxiliary masters. In addition, Neve is showing its DTC-2 digital transfer console. It features new A/D and D/A converters, switchable dither and an A/B store for comparing two settings.

Solid State Logic has unveiled a production version of the multi-user SoundNet, a digital audio network sys-

The author (37th person on the left) checks out some of the hot technology debuting on the AES show floor.

by Ken C. Pohlmann

tem. Interfacing with ScreenSound, SoundNet allows up to seven operators to share and copy work, and provides central mass storage of audio and database information. The multiple ScreenSounds can be slaved to one master, providing 56 channels of playback. Up to 16 SCSI devices can be resident to the system, including a combination of hard and optical drives. By carrying out backup and restoration as offline functions, the efficiency of the hard disk system is increased.

Let's push our way through the students and take a look at the Sony booth. The MXP-2900 Series console is being introduced as the successor to the MXP-2000 Series. Aimed at broadcast needs in production and post-production applications, the consoles come in 8-, 16-, 26-, and 36-input sizes. All models are equipped with a video editor interface for the BVE Series video editors. New APR-24 firmware adds new control capabilities through the serial 9-pin bus. The APR-24 can control a Sony VTR for audio sweetening and provides integrated control of preview, edit and review operations. The BVG-200 is a portable time code reader/generator designed to operate



Audio Animation Paragon

with the PCM-2000 portable DAT; another plus is the BVG-200's battery, which extends the running time of the PCM-2000 to 120 minutes. The family of Sony time code DATs also made an appearance: the PCM-7010, PCM-7030 and PCM-7050 write time code according to the newly ratified IEC standard. In addition, the RM-D7300 permits full edit capability.

The number of digital processing stations continues to multiply. Audio Animation is debuting Paragon, a digital broadcast transmission processor. Its touchscreen allows control of a digital wide-band AGC, 4-band com-

pressor and 4-band limiter. It features control over attack times, release times, crossover frequencies, density, mix levels, compression and limiting.

Audio Processing Technology's apt-X 100 is a digital audio data compression system. It compresses 16-bit PCM data into 4-bit samples in real time using sub-band ADPCM. Satellite and land-based broadcasting, ISDN and even DAT and CD storage are possible applications.

A relative newcomer to the field, Euphonix was showing (and is now making deliveries) of its Crescendo digitally controlled analog production console. There are no audio signals in the console work surface, only controlling signals; all microphone, line, buffer, mixing amplifiers, and 4-band equalization are in the mainframe, placed up to 100 feet away. An entire console setup can be reset in 30 milliseconds. Fifty-six mono/stereo faders, with full EQ/auxiliary sends routing to 24 output groups, fit in a console 4-1/2 feet across, at a cost of less than \$100,000.

Many DAT recorders are in attendance across the floor. Stellavox is showing the first production model of StellaDAT, a portable DAT that includes a climate-controlled tape well. Interestingly, a StellaDAT with synchronization will cost less than an analog Stellavox with synchronization. The Fostex D-20, the first DAT with time code (it can be upgraded to the IEC time code standard) is showing a new option: an 8310 video recorder emulation card. The option allows the D-20 to emulate a BVU-950 or BVH-2000 so that a video editor can be plugged into the D-20.

To help keep all this precious gear running smoothly, Audio Precision is showing its Portable One, a streamlined version of its System One test set. The Portable One weighs in at 17 pounds, performs 12 measurements from pushbuttons and displays the results via a super-twist LCD. It even has the look and feel of its desk-bound daddy.

The plastic pocket-protector crowd is dense around the Motorola booth. This semiconductor giant has recently aimed its sights on the audio industry both in terms of its DSP chips and, more recently, its sigma-delta converters. Two new chips have just

been announced. The DSP56ADA16 is a 16-bit sigma-delta A/D and D/A converter (codec) operating at rates up to 50 kHz. A complete stereo system can be constructed with two DSP56ADA16s and one DSP56001 processor with no additional glue logic. In addition, the AES/EBU/CP-340 digital audio transceiver provides a single-chip transmitter and



Audio Precision Portable One

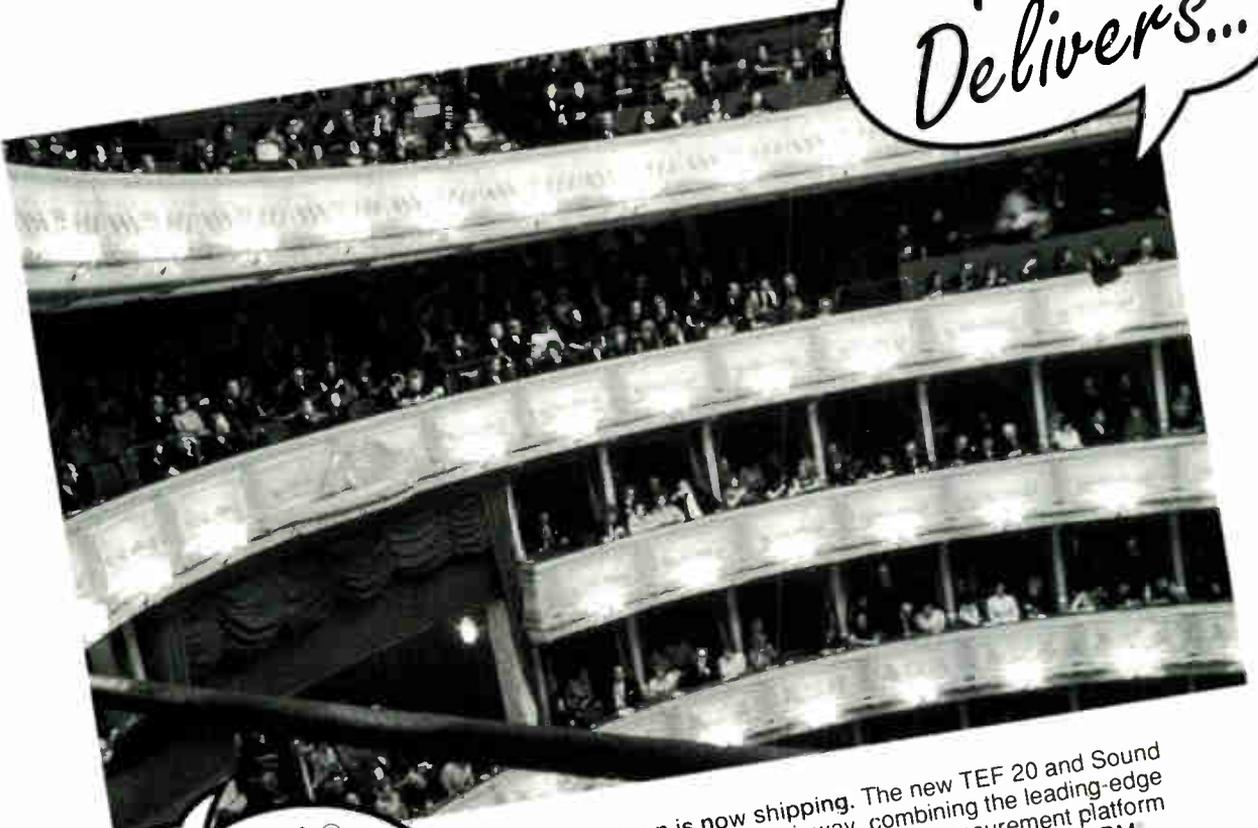
receiver. One transceiver with two DSP56ADA16s provides a complete analog-to-AES and AES-to-analog system.

Other heavy-duty chips and boards are weighing in at other booths. UltraAnalog is showing the DEMO-1, a complete A/D and D/A stereo evaluation board holding two ADC 20048 20-bit A/D converters, a NPC SM5803 digital filter and a DAC D20400 dual D/A converter. Crystal Semiconductor is showing a number of new chips: The CS8401 and 2 are AES/EBU transmitters, and the CS8411 and 2 are AES/EBU receivers. These chips support both professional and consumer formats. The CS5336 is a budget sigma-delta A/D converter, with output rates up to 50 kHz; this stereo part contains the entire system on a 28-pin chip. The CS5346 and 9 are 16-bit stereo A/D sigma-delta converters, requiring only a single +5 volt supply. In addition, Crystal is offering the CS4328, the world's first sigma-delta D/A converter, a stereo, 18-bit part.

Momentum Data Systems is demonstrating a workstation sure to warm the hearts of DSP engineers. It can be used to work on filter design and analysis, code generation, development tools and data acquisition projects. There are cards available for the Macintosh, IBM and Sun; DSP56001, DSP96002, DSP56000ADS, TMS320C25 and DSP32C DSP chips are supported.

Spectrum Signal Processing is showing its DSP96002 system board, used for developing PC-based applica-

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tions on the Media Engine. In addition to the DSP96002, the board contains up to 4,352 Kb of SRAM, stereo, 16-bit, sigma-delta A/D and D/A channels, and an expansion connector. Software development tools include a monitor debugger, cross assemblers, linkers and simulators, and C compiler.

Red Book CD recorders are thicker than the L.A. smog outside (which is actually pretty light today). Kenwood is debuting its DA-7000 encoder, DD-7200 recorder and software controller for IBM compatibles. The encoder logic

has been squeezed onto a single LSI chip, and the system can automatically generate subcode information through the editing software.

OptImage is showing its system based on the Yamaha PDS recorder; it is available to audio OEMs. The PDS is also incorporated in Gotham's CD recorder.

Both Sonic Solutions' Sonic System and Optical Media's TOPiX workstations employ Start Lab's CD Maker. This system uses an encoder and recorder manufactured by Sony, and media manufactured by Taiyo Yuden. In case you're wondering, the record-

once media has a projected lifetime of more than ten years.

However, any CD will contain errors. It is the job of Enterprise Corporation's (of West Des Moines, Iowa) CDCATS system to ferret out problems. The IBM-based system checks physical dimensions, data integrity, HF signal quality, tracking signal quality, and can even verify integrity of the PQ subcode on any CD.

The Digidesign booth has been crowded all afternoon. A Version 2.0 upgrade to Sound Designer II is being shown; it provides a compressor, limiter, expander, noise gate, pitch shifting with time correction, 2:1 and 4:1 data compression, continuous SMPTE re-synchronization, dithering, support for the J.L. Cooper CS-1, and other goodies such as the ability to nudge regions and make selections on the fly. The company is also demonstrating its Pro Store 660MB hard disk and SampleCell, a 16-voice sample playback card for the Mac II. Finally, the busy Digidesign folks announced that Sound Tools has been integrated into the Macintosh TOPiX workstation, supporting the CD-DA, CD-ROM, CD-ROM/XA and CD-I formats.

Of course, all that records is not round. Tape is still alive and well, especially at the 3M booth. A new analog mastering formulation, 3M 996, is being demonstrated. It achieves an operating level of +9 with an S/N ratio of 79.5 dB, and is bias-compatible with 3M 226. Meanwhile, Agfa is introducing a chrome cassette tape designed for studio reference. The SR-XS is a type II tape, with MOL of +6 dB, SOL of -7 dB and S/N of 67.5 dB. Agfa is also showing its new DAT tape, packaged in a case complete with retractable hook for storage.

Hey, it's late afternoon already and the show is closing. That's all the products we have time for today, and we've barely scratched the surface. Ken Pohlmann with the story here at the 89th AES convention: So many booths—so little time. Now back to you, Barbara. ■

Ken Pohlmann was presented an Audio Engineering Society Fellowship award at the 89th convention for his "outstanding work educating both the public as well as the engineering community about digital audio, media and formats, through articles, publications, books, and teaching at the University of Miami."

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by Mel Lambert

TAPE (NOT TAPE) STORAGE METHODS

Winding and Storage Temperature

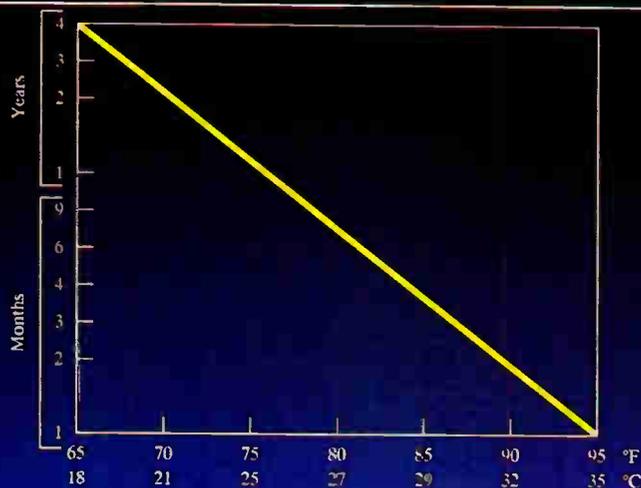


Figure 1

It should be readily apparent to anybody in this industry that recording tape is a fragile medium. After all, a ribbon of oxide-covered polyester 2,100 feet long and between 2 and 3 millimeters thick needs to be protected if we plan to reconstitute the magnetic-domain patterns into audio waveforms.

Stored correctly, our analog and digital multitrack/stereo masters should last at least 20 to 25 years. The leading tape manufacturers spend a great deal of time determining what represents the "best" storage conditions. Here are some guidelines:

1. For long-term storage, ensure

Fig. 1: Rewind Frequency vs. Storage Temperature. Fig. 2: Effects of Temperature and Humidity on Tape. (Taken from the Ampex booklet, "Care & Handling of Magnetic Tape.")

that the temperature remains around 65° F (18° C), with 45% relative humidity.

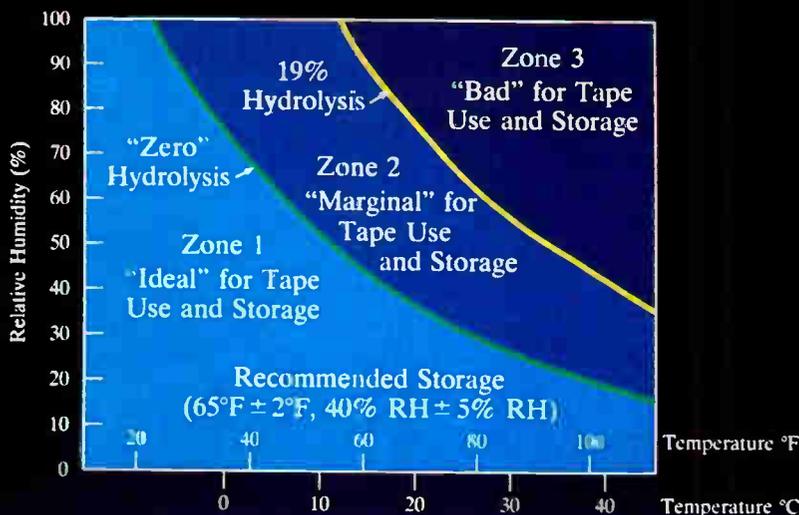
It should be emphasized that these figures be kept as constant as possible; certainly, the temperature should be maintained within 2° degrees of this optimal value, and the humidity within ±7% of the mean.

2. Ensure that the air within your tape library or storage vault is adequately filtered.

And, keep your tapes away from sources of strong magnetic fields, such as monitor loudspeakers, video monitors, electric motors and so on.

3. Always rewind reel-to-reel 1/4-inch, 1/2-inch, 1-inch and 2-inch

Figure 2



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master tapes carefully before storage, and check pack uniformity.

Also, store your tapes tails out (to reduce print-through) in a dust-proof container. A tight-sealing box not only protects the tape from dust particles and other airborne nasties, but it also allows for vertical storage so that they will be supported by the hub and not the flange edge. (And, when loading and unloading tape reels—and removing/replacing them in their storage boxes—remember to handle them only by the hub. Bent

flanges should be replaced immediately to prevent tape-edge damage.)

⊗ **For optimal long-term storage, rewind your tapes every one to five years to relieve stresses in the pack.**

Periodically reviewing the contents of your tape store is a good idea; it not only allows you to keep an eye on the condition of tape housings and their contents, but it also gives you an opportunity to sort through and label all those outtake reels, copies and duplicate safety masters that you meant to index.

⊗ **Allow several hours for your tapes to acclimatize to the tem-**

perature and humidity of the control room after removal from the tape vault.

This is particularly important in subtropical climates, where moisture and condensation can be problematic. While the tape manufacturers specify a *minimum* of eight hours for this reconditioning period, in the real world it's often difficult to have tape available a day in advance of the session.

It is worth pointing out that at least two major tape manufacturers have developed neat solutions to the traditional problem of what to do about those "cheap cardboard boxes that absorb moisture and shed dust and fibers onto your valuable master tape." Ampex now uses a tight-fitting, molded plastic tray and folded-box design for all of its 400 Series tapes. The tray ensures that each reel is held securely in place during storage, while the Tyvek protective layer applied to the three-layer shipping/storage box is described as a "tough, abrasive-resistant coating that provides maximum durability and creates a superior moisture barrier." The Tyvek layer also prevents debris and raw cardboard from coming into contact with the tape.

3M now offers a new TapeCare Library Box that features a "blow-molded, impact-resistant, double-wall plastic construction." The moisture-resistant package is said to reliably seal out dust and humidity, and includes four raised, interlocking, stacking buttons on each side of the box to ensure "non-slip" stacking and carrying. In addition, a special hub support system is described as eliminating cinches by allowing the reel to rotate freely in the case. The cases are made of recyclable, high-density polypropylene, with a built-in carrying handle at one corner and a locking system to prevent accidental opening during transit or storage. A double-hinge design allows the top and bottom halves of the box to lay flat when open, for easy tape reel removal and replacement.



I'd like to spend the remainder of this column addressing the media storage needs of the coming workstation generation. Sure, analog and digital reel-to-reel tape (plus DATs, floppy disks and other oxide-based media) will be around for the next

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decade or so, mainly because we will still be replaying archive material from the vaults, and also because DASH and PD digital transport offer a great deal of storage capacity per square inch of tape surface.

More to the point, however: What are we going to do about all of the information generated by the current and next generation of random-access digital recording and editing workstations?

In the good ol' days, a 2-inch reel of tape needed to be accompanied by a track sheet, details (hopefully)

of the alignment tones and not much else. We all knew how to interpret the hieroglyphics on the box and could have the tape replaying at the correct reference level, replay EQ and whatever, within several minutes. Punch up a couple of solo buttons to check the track designations, and we're in business.

Contrast that situation with a pile of magneto-optical disks from a workstation-based sweetening session. The caddy envelope says that the contents comprise the track elements for a 32-channel remix to Dolby Surround, with both final and composite DME LCRS stems, plus Lt-

Rt data. If we now want to touch up the mix, or replace the English dialog elements for a foreign language release, how are they to be reassigned across the available inputs?

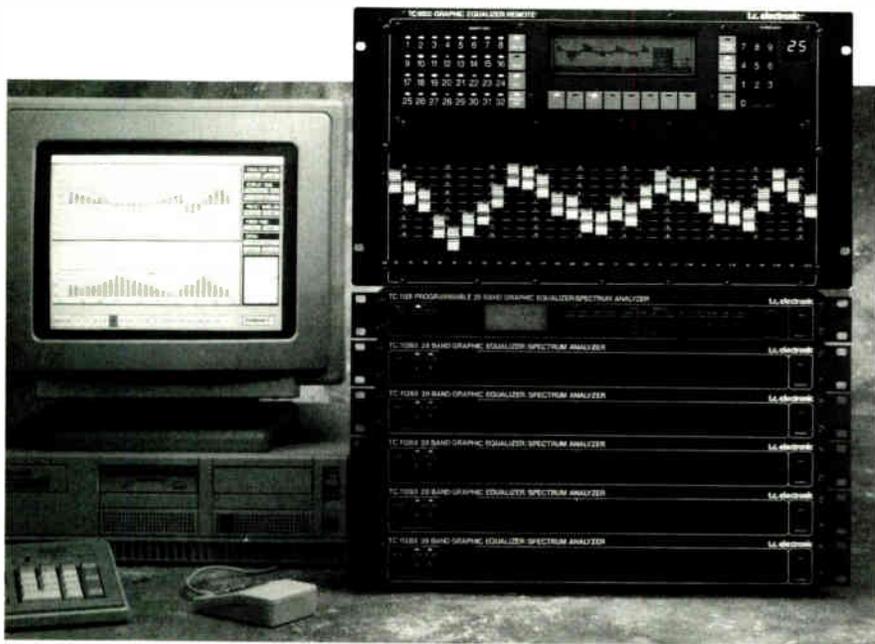
Were the sound files stored here re-recorded from the original production and in-studio Foley, ADR, effects and music elements, or are they raw sound files? Are they referenced to their original time code "birthdays" tracks, or are they synchronized to the master time code? If the data represents the intermediate mix balances plus snapshot EQ and dynamics changes for the mix, where are the constituent sound files stored, and in what format? Also, is the audio on the MO disk data compressed, and if so, what algorithm was used?

It has been said that if you want to see complete confusion within a sound editing facility, re-recording stage or sweetening studio, simply remove any paperwork you might find lying around. During the coming transition to an all-digital, workstation-dominated environment, a virtual information explosion will lead to a dramatic and fundamental change in our working habits. Computer-controlled editing stations will streamline the way we can cut and assemble audio to picture or time code, and the labeling of the material used during such sessions will be of paramount importance.

No industry-wide standards exist regarding the types of information that should be stored along with each individual sound file. In upcoming columns I plan to consider the outstanding work being done now by the various SMPTE and AES committees analyzing the complex issue of standardized file structures and labeling schemes. Meanwhile, give some thought to the ways in which you might need to access the data stored on the Exabyte, Data-DAT, WORM or magneto-optical archives from your favorite workstation, and how fast you could reload the various elements and touch up a couple of track balances, or slip a stereo dialog track by 15 frames. ■

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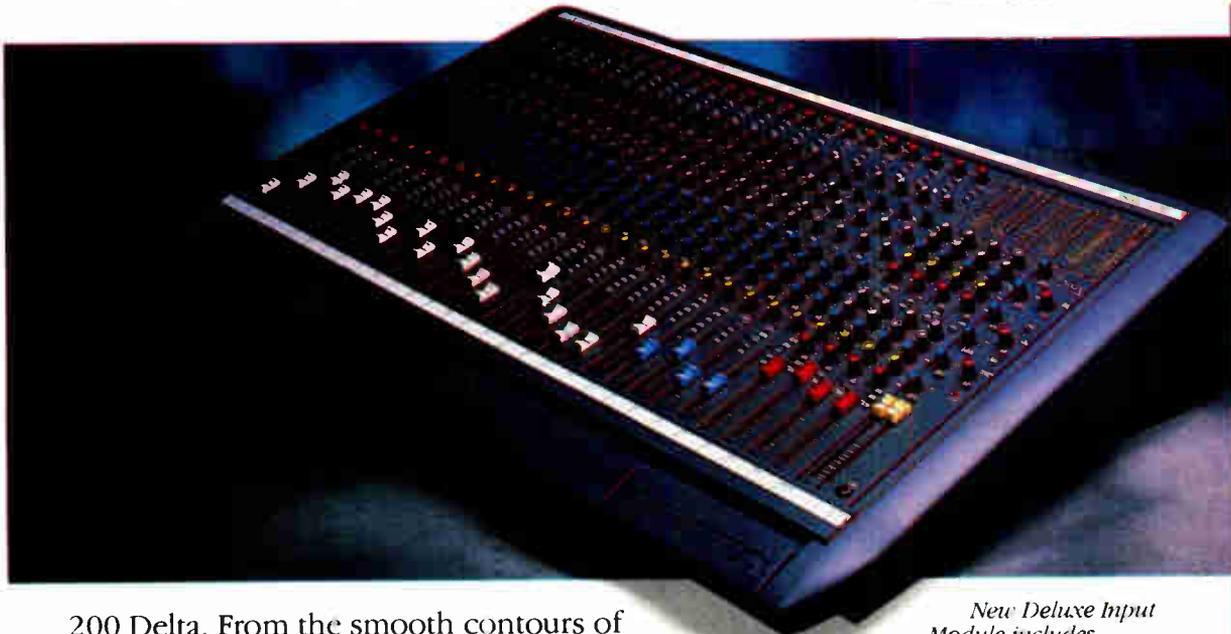
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With over a dozen years of active involvement with professional audio on both sides of the Atlantic, Mel Lambert now heads up Media&Marketing, a high-tech consulting and marketing service for pro audio firms and facilities.

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New Deluxe Input Module includes expanded 4-band EQ with two mid sweeps, high pass filter and post-fader direct output. The rackmount Delta, shown below in a 12x2 version using Deluxe Inputs, can be expanded to 24x2 using Dual Line Inputs. Both the streamlined consoles and rackmount models are built to withstand the demands of recording and sound reinforcement.



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Live
from
Seattle,

IT'S THE Goodwill Games

BY
RICHARD
MADDOX

It's 4:45 p.m. on a hot, sultry Sunday in Seattle. In exactly 20 minutes the final broadcast of the 1990 Goodwill Games—Ted Turner's international sports extravaganza—will start, and last-minute changes to the broadcast's show routine are

being passed out to the crew. Everyone working the games is up for this broadcast; it's the home stretch.

For the broadcast crew this is the 23rd show. Over the past 17 days they've done almost 90 hours of live TV: daily four-hour shows from 5:05 p.m. until 9:05 p.m. and additional three-hour broadcasts from 12:05 until 3:05 p.m. on Saturdays and Sundays.

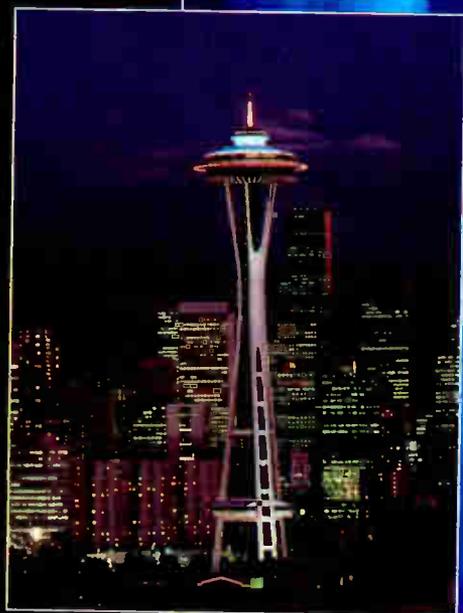
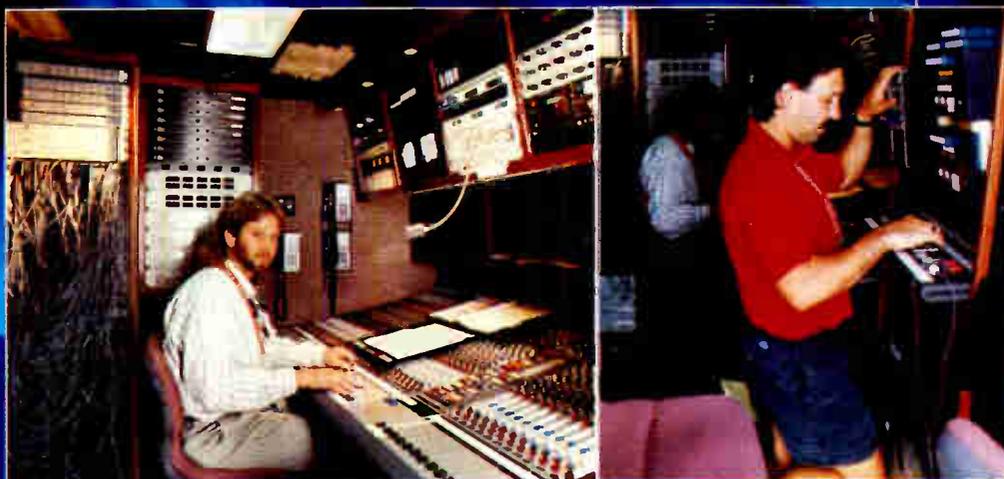


PHOTO: BILL ROSS/WEST LIGHT

At right: Klaus Landsberg, the main audio mixer, and (far right) Vic Ortiz, the video assistant in action at the TBS broadcast of the Goodwill Games.



PHOTOS: RICHARD MADDOX

Even for those who work TV productions on a regular basis, this schedule amounts to an audio and video marathon. Klaus Landsberg, the A1 (audio first engineer), states, "I live here. I basically get out of here at 10 p.m., go to the hotel, have a salad, go to sleep and come back first thing in the morning. I never get a chance to really leave the truck because we're always editing or faxing [facilities checking] the venues, getting ready for the day's broadcast."

The truck he's referring to belongs to NEP, a Pittsburgh-based company that does sports re-

notes for TBS on a regular basis. NEP's brand-new, 45-foot remote truck wound up as TBS Master Control. The front third of the truck is the videotape machine room, the mid-section is master control, and the back serves as the audio room.

Since TV audio is still a second-rate cousin to video, the thirds aren't very equal. The space allotted to audio control is barely large enough to fit the Neve board, the patch bay and all the outboard gear, let alone the audio crew.

Klaus Landsberg, who has been "chained" to the Neve board throughout the broadcasts, works



PHOTO: LAWRENCE MANNING / WEST LIGHT

Fiber Optics at the Games

Most of the video and audio sent to and from the various venues to the International Broadcast Center traveled through fiber optics using standard AM or FM fiber transmission techniques. Lester Audio Labs of Dallas ran a beta test of its new DAS 2000 fiber optic snake at the Seattle Center Coliseum, where boxing and basketball were held. Of course,

—CONTINUED ON PAGE 31

BACKGROUND: EPIC CURRY / WEST LIGHT



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World Radio History

(assistant audio engineer), and Linda Wendell, music coordinator. All three are freelancers out of L.A. who regularly work TV productions.

How does one get the main A1 gig, running the board at an event like the Goodwill Games? In Landsberg's case it was through a phone call from TBS, over a year before the event, asking him if he was available.

He currently does sound for the TV shows *Night Court* and *Wings*. He has also worked on specials and other series (like *Growing Pains*). But the biggest selling factor was his experience doing major sporting events, especially the 1988 Seoul Olympics for NBC and the 1984 L.A. Olympics for ABC.

He's a self-described industry brat (his mother was a record producer)

who got his start at the Soundhouse and at Wally Heider's in L.A. doing studio recording and concerts with bands like Molly Hatchet, Peter Frampton and Van Halen. He then joined Pacific Video Industries as a remote truck maintenance engineer.

Through the contacts made at Pacific Video, Landsberg was able to go freelance full-time. "As in anything,

—FROM PAGE 29, FIBER OPTICS

with a product that costs about \$40,000 and does what it can, the proper description for the DAS 2000 is that it's a "fiber optic audio transmission, distribution and routing system."

The DAS 2000 turned out to be a fortunate choice since the coliseum audio was plagued with SCR dimmer noise, EMI interference and ground loops. The frustrated audio team patched in the DAS 2000 and, much to everyone's relief, it immediately solved all the noise and EMI problems as well as the ground loops. It worked so well that the "copper" was relegated to being only an emergency backup, which

was never used.

The DAS 2000 consists of the input mainframe, with 18-bit A/D converters (with 8x oversampling) and the optical drivers; and the output mainframe, with the optical receivers, 18-bit D/A converters and a software-controlled patch and routing system with up to a 64 x 64 matrix. Connect them to a hunk of fiber and you're ready to roll.

The system can run from 16 to 64 audio lines, with eight or 16 returns on runs up to 15,000 feet—almost three miles—without line amps or any other special equipment.

It can tie directly into popular stage boxes using ELCO multipin jacks or virtually any other type of

connector. It accepts mic- and line-level inputs (-60 dB to +4 dB) and outputs a +4dB level. With a 98dB dynamic range and a sampling rate of 48 kHz, it is the digital equivalent in performance to a CD system. Gain is software-controlled, as is patching, with 192 presets available for storage in non-volatile memory.

As Michael Creamer, VP of marketing for Lester Audio Labs, likes to point out, the highest audience share of the Games was for the basketball games, where the DAS 2000 was in service. He doesn't want to imply that it was solely due to the superior audio delivered by the DAS 2000, but...

—Richard Maddox

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you're only as good as your last job," Landsberg says, "so contacts will only get you so far. It's job performance, attitude and desire that count."

As A2, Ortiz cues the music carts used as bumpers between commercials and events. All the music for the show, except the openings and closings (which are prerecorded on videotape), is on standard NAB carts.

The truck has two DuraTrac 90 cart machines installed, but they can't be used because of their location above the Neve board. Ortiz has to fly up his own decks, an ITC Delta 3-banger and a Telex Magnecord, which are sub-mixed through a Yamaha MC1202 mixer before being fed to the Neve console.

Linda Wendell selects which cuts are to be played during a broadcast from a library of 127 carts with titles like "Stinger #1 with Long Tail," "News Bumper," "Blimp Pop Music," "Techno Driving Beat" and "Heavy Rock Vamp." In her "spare time" she's a special segment producer.

As in any live event, there's a certain excitement that hits just before going on. "At five minutes to air you get up; the adrenaline gets going," Landsberg

says, "We're all perfectionists; we don't want to make a single mistake."

But perfection doesn't come without preparation. And the most important ingredient is previewing the show routine, or guidebook, which outlines what will happen when. However, with several simultaneous sporting events going on, changes are inevitable. If a late-breaking event like an upset or a record being broken occurs, the anchor will usually do a quick intro and then a new venue or VTR is called.

If the audio mixer misses any of these changes, which are announced by the director over his or her PL (private line), then he or she may also miss having the right mic up and the correct tape machine or venue patched in. "You have to be tuning into key phrases because sometimes [the directors] overlook audio," Landsberg says. The live mix is often less important for the mixer to monitor than the director's PL line.

To an outsider the result is a sort of control room chaos with the PL speaker squawking out comments and instructions from the director, the associate director, the tape op room and the studio floor director, in addition to

the main mix audio coming out of the Tannoy monitors and the normal conversations between the three audio engineers.

For Landsberg and the audio crew, one of the toughest segments of the Games involved a live interview between the anchor, Larry King, and the Voyager reporter, ex-Seattle Seahawk football star Steve Largent, while Largent was flying over Seattle with one of the Blue Angels.

Since there was no way to rehearse the interview, or even to try out the plane-to-ground video and audio link, everything was done on the fly, so to speak. The plane took off less than five minutes before the broadcast started so there was little time to work out the bugs.

All through the lead-in commercial break, the jet audio was filled with static and was barely intelligible. Fortunately, the show routine for this segment indicated that the first event after the commercial was on tape, so the crew had a few extra minutes to keep working on the audio to save the segment. The director, Tony Verna, was lining up alternative segments in case the jet audio didn't come through.

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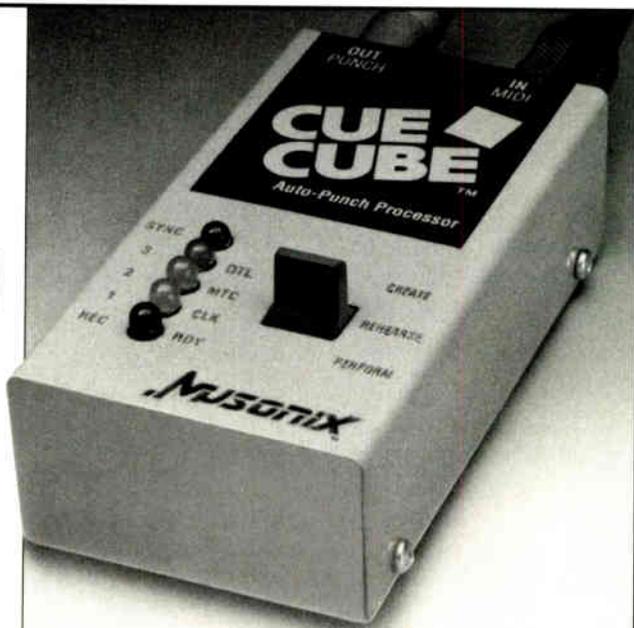
To program a punch, simply play the tape and flip the switch where you want to punch in and out. Now you can rehearse your part,

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FaderMaster to delay MIDI drum notes and re-record that data onto a new sequencer track. This clever feature is useful for adding that "human feel" to your sequenced drum tracks.

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With less than a minute to air, a good audio signal from the jet was pulled in, and there was even a monitor feed back to Largent so he could hear King. After a lead-in segment to the interview they went live.

To the viewing audience the segment worked flawlessly, with King and Largent talking back and forth as the pilot did a barrel roll and buzzed the International Broadcast Center studio. Shots from the Goodyear blimp of the plane flying over Seattle were intercut with close-ups of Largent in the plane.

In the control room a collective cheer and applause rang out as the

commercial break came in. The thrill of pulling off a stunt like that live, with almost no preparation and at the last second, buoyed everyone's spirits. To many it was the high point of the evening's broadcast.

The Goodwill Games' broadcast originated from the middle of what was once a five-acre parking lot for Seattle's Transit System buses. Turner Broadcasting dubbed it the International Broadcast Center (IBC) after turning an old maintenance warehouse into the Technical Operations Center (TOC). A two-story, temporary metal warehouse was built into a broadcast studio. Al-

most 70 modular trailers were used as production offices, and NEP sent two remote-broadcast trucks for master control centers.

A dozen technicians spent almost three months of non-stop work to wire the abandoned city block. With the help of 300 technicians during the final days before air, it was turned into a world-class television station with 16 uplink and downlink satellite dishes, a phone exchange, a bank, a post office, a 24-hour restaurant, and a private, 32-channel fiber-optic cable TV system that tied all the various venues, the press center and the staff hotels to the IBC.

At each venue the audio was pre-mixed in a remote truck before being sent to the IBC. Each venue used five to 35 microphones. Mics were placed on anything that would make sound, from the baskets at the basketball games to the gymnast's parallel bars. With 16 venues this meant there were 32 A1 engineers plus another 70 or so A2 engineers working the show.

The audio from each venue consisted of the TBS venue announcers and guests mixed on channel 1 and the effects and crowd mics on channel 2. The effects channel was also used by the international broadcasters who had their own announcers, feeds and, in some cases, control rooms.

All the venue and inject audio feeds were routed through the TOC and into the master control console (a Neve VR48) via a TT patch bay to pre-assigned faders. Since the venues were equalized before reaching the IBC, Landsberg ran them pretty flat, only adding EQ to match between venues.

The mics for the anchors in the main studio (a PZM for Larry King and Electro-Voice RE15s for Nick Charles and Hannah Storm) were all wired directly to the Neve console. The mics each got just a touch of low-end EQ, as required, to fatten them up.

After the pressure of the final broadcast, the crew let loose at the wrap party that lasted until 3:00 a.m. Landsberg summarized how he felt after 17 days of the Goodwill Games: "My highlight tonight will be pulling all the patch cords." ■

Richard Maddox is senior studio engineer at Muzak, a freelance writer and author of World Satellite TV and Scrambling Methods and Troubleshooting and Repairing Satellite TV Systems.

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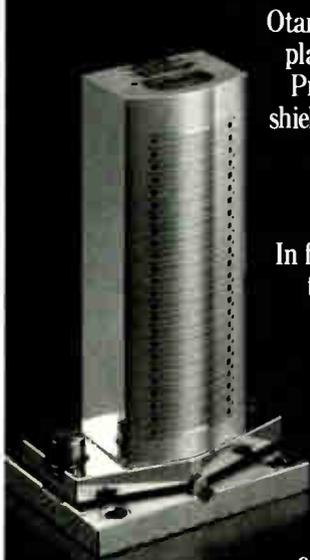
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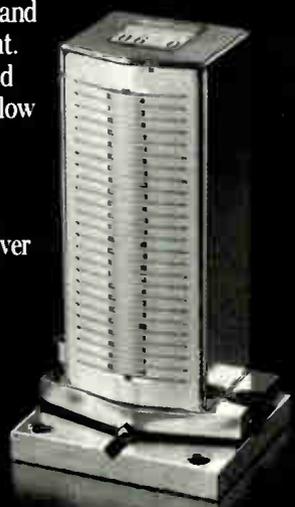


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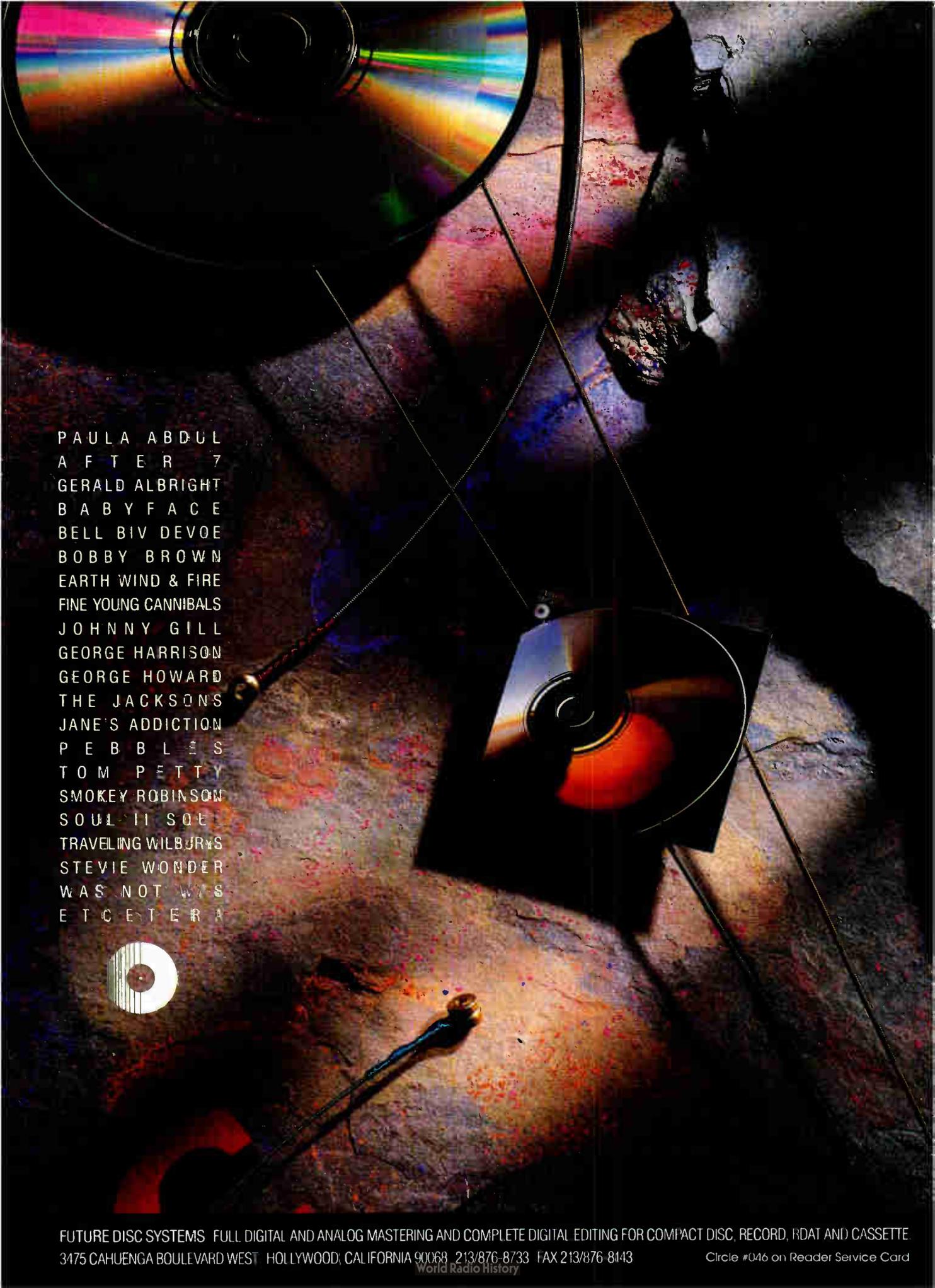


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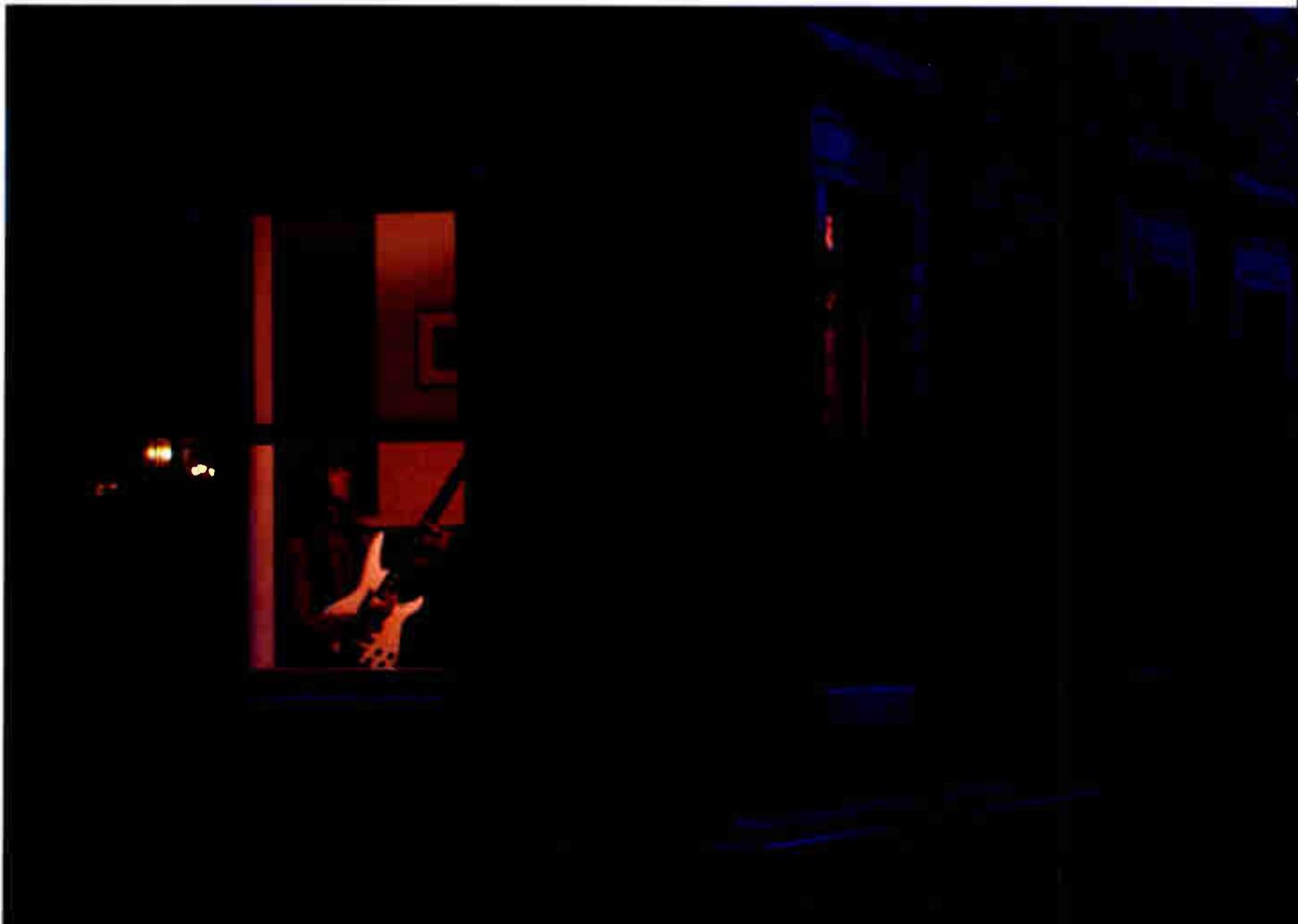
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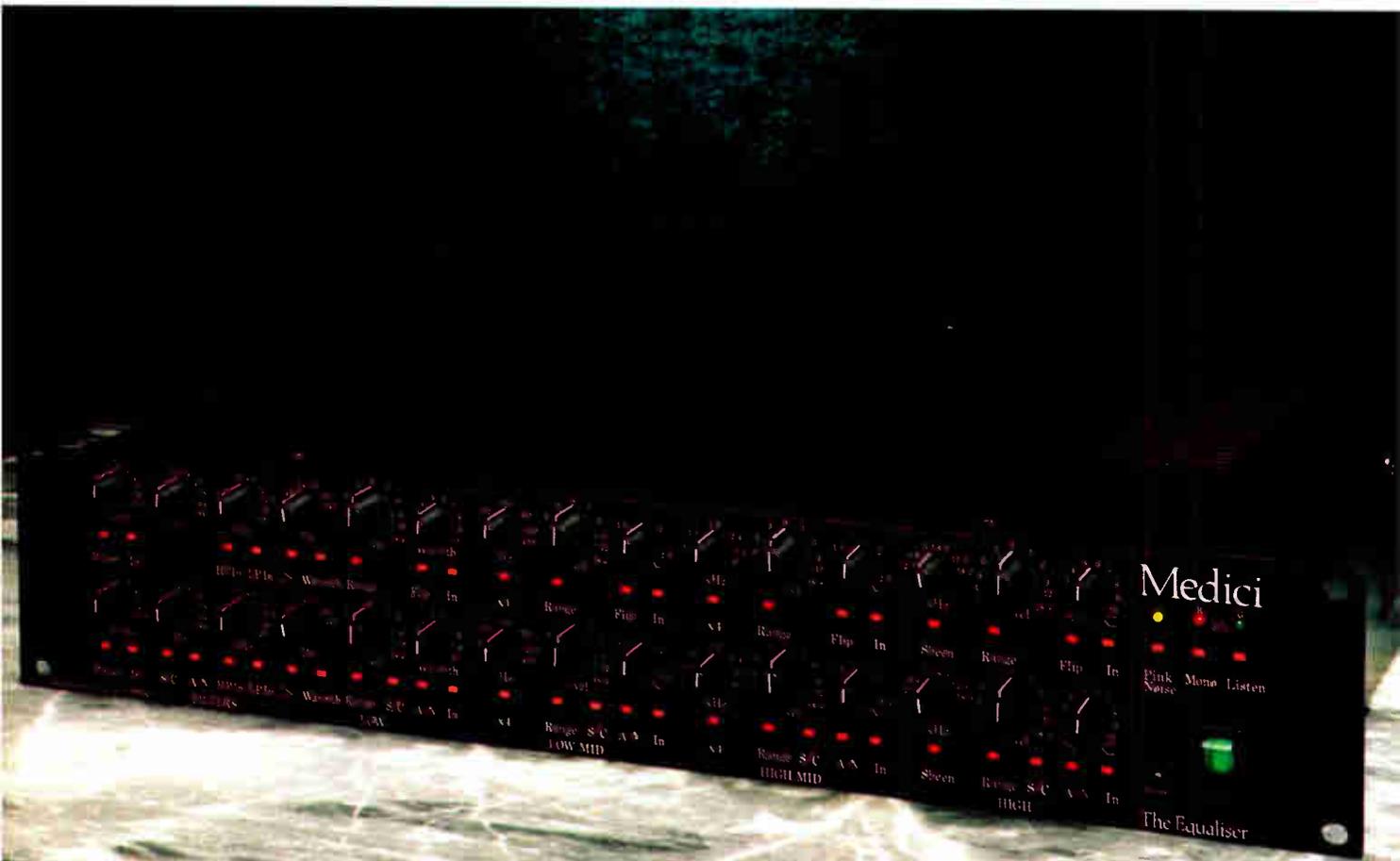
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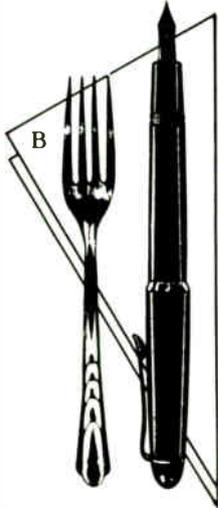
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CARMINE COPPOLA

GODFATHERLY MUSIC



How about lunch with Poppa Coppola at Art's Deli, the old joint in the Valley where billion-dollar deals are made over piles of corned beef?

But first, let's do our homework. *The Godfather*—we all remember that one. Let's take a look at the *The Black Stallion*—a superb little film, unpretentious and masterfully scored in subtle, international flavors. *Apocalypse Now*—dark power, a moody, explosive score. *The Outsiders*, *Gardens of Stone*, *Life With Zoe/N.Y. Stories*, etc.

The 1981 restoration of Abel Gance's 1927 silent classic *Napoleon* and live symphonic performances

meeting the patriarch of such a family, husband of Italia Coppola, lyricist, poet, and author of this year's big hit in Japan: *Momma Coppola's Pasta Book*. Their three kids have done pretty well—Francis has made some movies ("Ford" comes from the Ford Sunday Evening Hour radio show, for which Carmine arranged and served as associate conductor), Talia Shire has starred in a few blockbust-



Carmine Coppola holding up the Oscar for *Godfather II*, which he shared with Nino Rota.

written and conducted by Carmine were a bona fide smash here and on tours of Europe and Japan. An abridged version is available on CD. Unlike conventional scoring, *Napoleon* required continual music for every single frame—*four hours'* worth.

This man has a rich and creative history: Juilliard grad, first flute with the Detroit Symphony, decades of live broadcasts, most notably with Toscanini and the NBC Symphony. He's been around the block a few times—writing, performing, conducting operas and Broadway shows.

And how can we forget we are

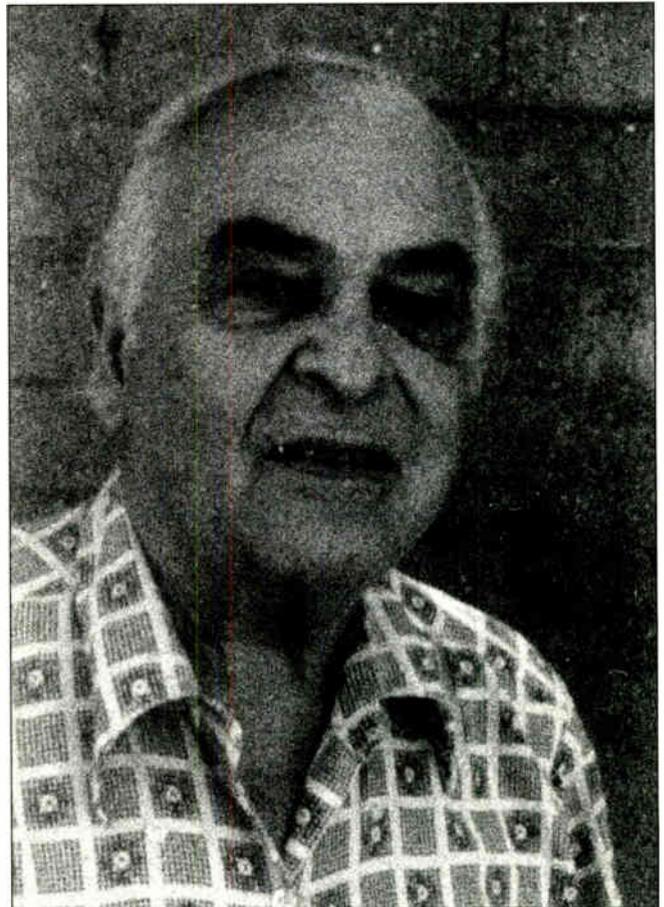


PHOTO: MR. BONZAI

ers, and August Coppola is a novelist and university professor.

This meeting in the tumultuous midst of scoring *Godfather III* was made possible by a generous hand from engineer Joel Moss. Who else

would know what the schedule would be? Sit down with us now and have a knish.

Bonzai: How are things going with *Godfather III*?

Coppola: I hope I get it done! We haven't even spotted the film, marked all the music cues yet.

Bonzai: Is it typical that things are so rushed?

Coppola: Well, I need some time to compose. It's not for five pieces. You should see the score papers, they're a mile high. It's a symphonic score and there are a lot of instruments on the page.

Bonzai: Is this continuing some of the themes that have been in the earlier films?

Coppola: Francis would like to make this Wagnerian, in the sense that Wagner used *leitmotifs*. In *III* we're using some of the [Nino] Rota themes and some of mine. There will be "Michael's Theme," for instance, which is a very dark, foreboding theme. There will be the "Love Theme," which the whole world knows.

Bonzai: Did you compose the "Love Theme"?

Coppola: No, I didn't write that. That was Nino Rota. I wish I had.

Bonzai: Did you have a good relationship with him?

Coppola: Oh, yes. He wrote his own pieces that Francis gave him to write, and I wrote what I had to write for certain scenes. I found him to be a very nice man, very talented. A good composer—very simple. He never had anything on an orchestration page that wasn't necessary. He wrote very simplistically and to the point.

Bonzai: I understand you have some Sicilian folk music in this film.

Coppola: Yes, we did a lot of it when we were in Sicily. We recorded there with a little ethnic band—accordion, a *fiscarella*—the little flute they use, which carries the melody—tambourines, rhythmic effects, guitar, mandolin and some voices. We kept it in the style it was written.

Bonzai: Do you speak Italian?

Coppola: Yes, I do. I got along quite well. We also spent a lot of time in Rome, and I did a lot of dance music there. Have you heard that yet, Joel?

Moss: Yes, we were just going through some tapes today.

Coppola: Did you hear the "Godfather's Disco"?

Moss: No, I haven't.

Coppola: I mention that because right in the midst of the "Disco," still keeping with the rhythm, I have a tarantella—in 2 and 6/8—which brings in the Italian feeling. It's an original composition for the party Michael Corleone is given in his big apartment in New York. He's just been given an award by the Pope. So he invites everyone there, and he has a 40-piece orchestra, and they play disco-style dance music.

Moss: We must have about 30 music cues for that scene.

Coppola: I don't know how much will be used, because it depends on how much time Francis has for the scene. We even do that comic song, "Hey, Gombari." [He sings.]

Bonzai: Before the first *Godfather* came out, did you think that it would become such a huge success?

Coppola: No, I had no idea. In fact, it was a hard grind because Francis was having trouble with the studio, with the actors. They didn't want the actors he wanted. They didn't want Marlon Brando. Al Pacino was too short. Jimmy Caan—they said, "He's Jewish, this is an Italian movie." He said, "I either get the people I want or I won't do it."

Bonzai: Did you have much interchange with Brando himself?

Coppola: No, he is a man who likes to be alone. He's an artist, a very sensitive artist, and my son had to treat him like walking on eggs.

Bonzai: I'm curious about your relationship with your son.

Coppola: When I work with my son, it is not as father and son. He is a director/producer and I am a composer. And that's how it goes. He wants certain things. He's very musical—he knows what he wants—and he won't hesitate to tell you, "I want something else. I like it, I know you spent time on it, but..."

Bonzai: So you have to leave the family stuff out of it?

Coppola: Yes, it's an artistic relationship and that's it. We're going to use some themes that were previously used. The only piece that I didn't write is an opera by Mascagni, which we are using as part of the story. We did the opera very professionally, onstage—beautifully done with a good orchestra. Did we get that aria in yet?

Moss: Yes, we'll do the vocal in two weeks. We're going back to New York to replace the vocal. The tenor is one of the actors, who plays Michael's son in the movie. He's an opera singer in training, so when they did it live, they made the contingency of some versions without him, just in case he wasn't in good voice in some places. He's been practicing with Pavarotti as his coach for the replacement vocals.

Bonzai: Let's talk about some other films. I studied *Black Stallion* again recently and found it interesting that you used the same instruments, yet moved through so many styles—Middle Eastern, Old English, folk music—as the picture progressed. Did you use the same group of musicians for all the styles?

Coppola: Mostly. It was just arranged for different groupings using the same musicians and the same studio.

Bonzai: What about *Gardens of Stone*?

Moss: Carmine called me up and told me that all the violin parts would be played by clarinets, so the orchestra was very unusual. It was like a military band, but with classical orchestrations.

Bonzai: Have you ever scored a film that you didn't like?

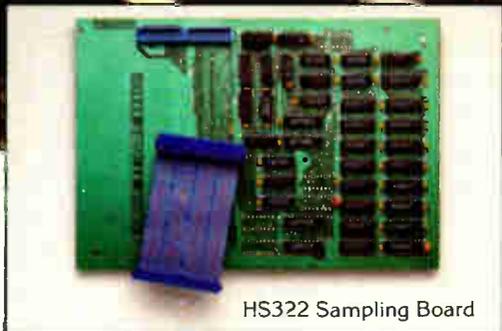
Coppola: No, but I had my doubts about *Napoleon* at first. An old film like this?

Bonzai: Yes, it struck me as a composing challenge—the scene is set nearly 200 years ago, it's a 1927 film that people associate with certain silent movie live orchestrations, and it's revived in the '80s. Great job of satisfying the three elements of the experience.

Coppola: When I did *Napoleon*, I felt that I would base it on the folk tunes of the period. Notably, the "Marseillaise," which I think is one of the greatest of all anthems. I used that a lot, and I used individual themes—a bravura march for Napoleon, a love theme for Josephine and Napoleon. I have a love theme for his family. He loved his family so much.

Bonzai: That music is so sweet. I wanted to ask you if the mood came from your own family experiences.

Coppola: Well, we are a close family—a lot of Italians are, you know. But I was more inspired by Napoleon's closeness with his mother, his brothers and sisters. I also have a theme where they are always battling. Then the lesser folk



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themes. I used the tune we know as "For He's a Jolly Good Fellow," but it's actually "Marlborough Goes to War." I used some music that came out of Italy but was very popular in France at the time. For the scenes where the carts are full of nobles going to the guillotine, I used an old popular sarcastic song about the nobles.

Bonzai: How many performances did you conduct live with the orchestra for the screenings of *Napoleon*?

Coppola: Oh, my God! It opened in '81 at the Radio City Music Hall, and was scheduled for four performances but was extended to 16 because it was such a big hit. You couldn't buy a seat, there were lines around the block. And then we presented it in other cities.

Bonzai: What did you learn from working with Toscanini?

Coppola: I learned many things. First of all, I learned that the temper he had and stamping his feet was not because he was mad at the orchestra. He was mad at himself that he was not able to achieve what he wanted. He was frustrated. A performance was never right for him; he always felt he could do it better.

I learned how to rehearse an orchestra—that you come in prepared and know what you're doing. We used to have Stokowski as co-conductor, and he used to learn with the orchestra by rehearsing. Toscanini didn't need the orchestra to hear the score. He knew it, he knew every note, and he didn't waste much time in rehearsing. He said what he wanted, he would go through it, and he was very fast. But he was meticulous.

I learned how to balance an orchestra from Toscanini. He was a perfect balancer. With a big orchestra, if there was a flute solo in the low register, which is very hard to pick up, he would get those strings down so that the flute would come out.

I learned how to treat an orchestra psychologically and not make them nervous. If a man had a difficult solo, he would look the other way and concentrate on the other musicians.

Most of all, I learned about his meticulous taste in music. He was the truth in music. He was like a high priest at a mass. He knew exactly what he was doing—he was the Pope of Music.

Bonzai: When were you playing

with Toscanini?

Coppola: From 1941 through around 1949. They are releasing CDs of these performances now, which I am getting a royalty for! The Toscanini legend goes on and on. He will be a man who is never forgotten, a man who has done a lot for the elevation of the conductor. You have to remember the respect and the positiveness of a conductor and what he stands for.

You should know that in Beethoven's time, the conductor was not the conductor that we have today. He was a guy who stood in front of the orchestra with a stick and he would beat tempo. It was Wagner and Mendelssohn who started the art of conducting facing the orchestra, rehearsing. Up to that time, everything was in the hands of the concertmaster and the first instrument of each group. But then we found one man in front of the orchestra—the conductor we know today.

Bonzai: Do you use computers?

Coppola: No, I'm the old-fashioned conductor and composer. Although *Apocalypse Now* was written for synthesizers, I wrote it just as I would write a score for orchestra. I would say I want woodwinds here, flutes there, and the synthesists would try to get the sound. But actually, I wrote it legitimately and they put in the synthesizers.

Moss: Carmine does all of his own orchestrations.

Coppola: I wouldn't give it to anybody, and I'll tell you why. It's very simple. If I hear something, I'm hearing it already orchestrated. I don't hear it as a single line; I hear it with oboe and horns, harp and so on. I will sketch it to know where I'm at, but when it comes to orchestration, it's already orchestrated in my mind because that's how I conceived it.

Bonzai: With the newer recording technology, is your work easier?

Coppola: No, I'm the old-fashioned guy. I still like to hear a body of strings instead of having A strings and then sweetening and overdubbing. I still want to hear the real thing. I don't like this stuff that they do, that emulates this and emulates that. I want to hear the real sound of an instrument.

Synthesizers can save money in scoring, and I can see its place in a movie where the producer doesn't have the money to spend for an 80-

piece orchestra. You do the best you can. Maybe get two or three guys with synthesizers, and you can score.

Bonzai: Do you have any other projects planned?

Coppola: I'd like to touch on my opera. The opera is called "Escorial," from a famous play by Michelle Digeldirot, a Flemish playwright of the Ionesco school and the Theater of the Absurd. It was a one-act play pointed out by my son, Dr. August Coppola, when he was professor of literature at Long Beach University. He's now dean of the School of Creative Arts at San Francisco State University. He was teaching this play, and said, "Dad, this would make a good opera."

At the time I was on the road conducting *Once Upon a Mattress*. I've done a lot of shows on the road: *Kismet*, *Stop the World I Want to Get Off*, *Half a Sixpence*. Anyway, I was thinking about this opera. I'm not a pianist, but I work at the piano. I developed some themes to go with this psychotic character, some heavy harmonies. It's a very contemporary, modernist score.

Bonzai: Who do you respect as composers for film?

Coppola: Well, there are many good ones, and some of them are coming up recently. I think Bruce Broughton, who did *Silverado*, is very good. I think Jerry Goldsmith is a good composer. He's very modernistic sometimes; I don't know if he could write a tune, but his orchestrations are very moving. The old guy who I have a lot of respect for is Alex North. I've respected him since he did *Spartacus*. Ennio Morricone is good, of course.

Bonzai: How important is a memorable theme to the success of a picture?

Coppola: Well, the public would like to leave the movie humming a tune. That's a test of the simplicity. Wagner didn't give a damn about the public. He wrote the way he wanted to, and to hell with all that Rossini, Bellini. Whether you liked it or not, he didn't care. Imagine sitting down in 1851 in Munich for the opening of *Tristan und Isolde*, with those cello chords. It was not the usual overture, but it was sensuous music. He wasn't sure if the public would like it, but he didn't give a damn. And it became successful, one of the greatest romantic scores ever. On the other hand, the Italian composers wanted to write tunes

that the public could hum.

Bonzai: If someone came to you and wanted to get into scoring film, what would you tell them?

Coppola: I would tell them to forget it. You can't get into it. I was just lucky because I had a son in the business. Otherwise, I would still be conducting Broadway shows, or doing operas.

Bonzai: Did you have any influence on your son becoming a filmmaker?

Coppola: I had nothing to do with it. I left my children alone. As a matter of fact, we were living in Great Neck [N.Y.], and he came down one Sunday morning with a battered suitcase. He said he was on his way to Hollywood. I said, "What!" He told me he had saved a little money working at Jones Beach selling hot dogs. He was just a kid, 18. He said, "I made an application to USC film school, and I've been accepted. You won't have to send any money. I'll get a job." I told him, "I want to send some money. I don't want you to starve to death." But he wanted to do it on his own. I took him to the airport and gave him the 50 bucks I had in my pocket. I said, "Let me hear from you. But remember one thing: It's a jungle out there. I don't know what the hell you're going to do in the film business."

He had already written some things for the movies. I told him he was wasting his time and asked him if he couldn't do something more practical, like dentistry, or be a chemical engineer or study computers. But I gave him my blessings. He wasn't there two or three weeks and wrote a script which won the Goldwyn Award. He got \$2,000 right off the bat. Then he got a job from Roger Corman, who used all these young talents. And he was on his way.

But, of course, he's got something. I worked with Toscanini—I don't say he's Toscanini—but in his field, he's just as meticulous, just as demanding, just as artistic. And more power to him. He's had his ups and downs, been criticized. *Apocalypse* didn't make it at first, but now it's seen as a great film.

Bonzai: What is your greatest ambition now?

Coppola: When we finish this project, I'd like to have my opera produced. ■

Editor-at-large Mr. Bonzai once put a horse head in his eighth grade math teacher's bed.

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by Hank Bordowitz

MIXING FOR VIDEO AT NYC'S POWER STATION

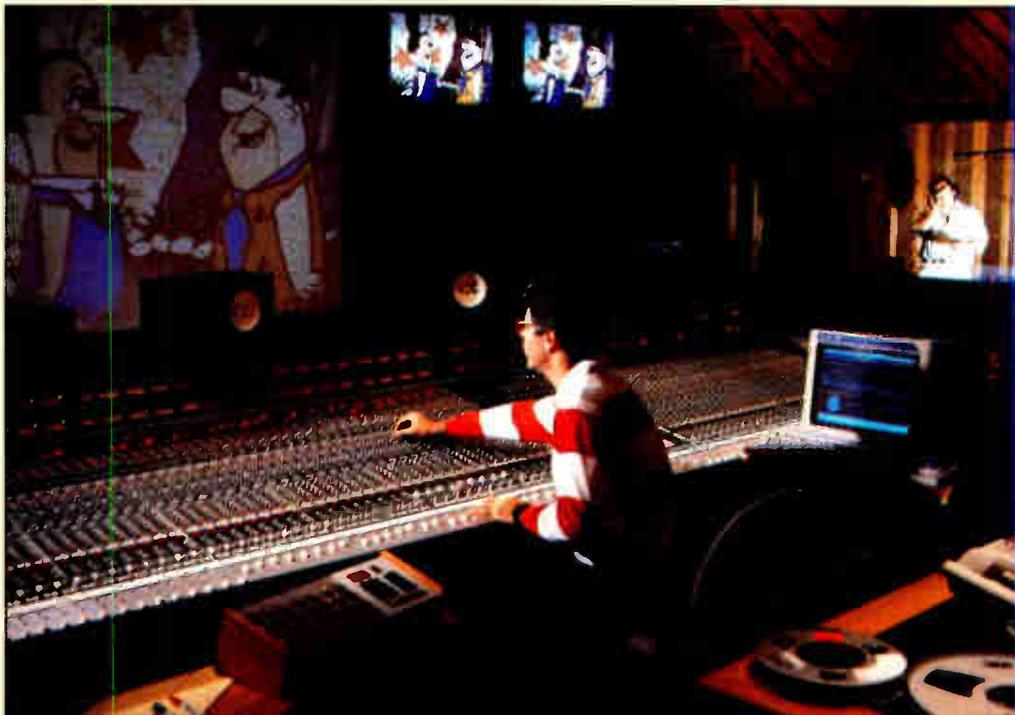
Power Station chief engineer Ed Evans surveys Studio D, the newest room in the highly regarded New York recording studio.

"We do a fair amount of scoring for commercials," Evans says. "[Up until now], once the scoring was done, the client would walk out with a 4-track mix and do the rest of the elements somewhere else. We're trying to keep that business here. First of all, we think we can do a good job of it. Secondly, it's a quality control thing. When the producer and the agencies are through, they can walk out of here with a finished product. We'll do the laybacks here, the mixing, the whole nine yards. If there are any subsequent changes to be made, you know where it can be done and how it can be done, because it's all done in one place."

"We are basically an audio mixing facility," Power Station general manager Barry Bongiovi points out. "We make records and jingles and movie soundtracks. We are not interested in competing in the video market. We do not do video editing, we do not do film editing. We want to be able to do audio post-production for video and film situations. We want to be able to lend our audio expertise to what we hope will be an ever-growing field of audio-for-video."

To this end, the Power Station opened Studio D last April. The room is equipped with an 80-channel SSL 4000G console, NED PostPro Direct-to-Disk and Synclavier 9600 systems, Dolby and Shure HTS surround sound, Adams-Smith 2600 A/V editing controllers, Sony BVH-2800 1-inch C video

Engineer Bill Ivie behind the 80-channel SSL in Studio D. That's Fred in the booth doing ADR.



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**GPI Publications, EQ Magazine MARI/APR 1990 "The Electric Near-Field Acid Test"*

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with digital audio track capability, and BVU-950 3/4-inch video for work tapes. Together with the resources and facilities of the Power Station's other equipment, the studio represents a major commitment to putting sound to picture.

"We wanted to be able to take on any facet of the work that was thrown at us," Evans remarks. "Because of the size of the board, in theory we can do full-feature mixes here. We have enough inputs to do that. And yet, we've stuck with the SSL music console. A lot of our clients, especially rock clients and jingle clients, are used to that. We're trying to accommodate as many different situations as possible."

This desire is reflected in several ways, most notably in the room itself. The Power Station's previous control rooms tended to be built for speed rather than comfort. Where many pro studio control rooms are now bigger than the actual studios, Power Station A and B are small by comparison.

But the Studio D control room is huge. Behind the console (pretty big in its own right) is a table that will seat the power brokers for an advertising agency, or all the people responsible for a music video, including the caterer. The other rooms reflect artistic and audio pursuits. Studio D smacks of the corporate side of the studio business.

"Our other rooms are very intimate in comparison to this room," Bongiovi agrees. "We gave a lot of thought as to why we needed to build a room this big. It's not what we would normally build in our other rooms. But with the type of work that we can do in this room, you'll see the need for such a sizable space. By the time you take into account the people who have to be around, the ambience created with the surround, and the other things that we can do in this room, you have to have a pretty good size."

For those who have never worked in the Power Station, it is a former substation for Con Edison (NYC's electric company). Studio A, where a transformer once lived under the 37-foot ceiling, may be one of the best drum rooms anywhere. The owners of the studio are very protective of the design of both the control rooms and the studios. They have been known to confiscate film and ask photographers to check their cameras at the door. As anomalous as the

size of studio D is to the rest of the facility, so is the way they are treating it. They encourage pictures. This room represents the last frontier for the Power Station in many ways.

"This was the last space that we renovated in the building," Bongiovi says. "The acoustical and electrical design and everything else we had done to prepare for this was right on the money. We are very happy with the results. We built an actual mock-up of this room with 2x4s to get a feel for it. We had never built a control room this big before, and we wanted to make sure that what we were building was correct. We built a whole stage, basically.

"We spent about \$125,000 just getting this space ready," he adds. "We had to do a lot of concrete work and a lot of electrical stuff."

Even elements of the design were pricy. For example, the video is projected through a GE Telaria, a costly bit of hardware, and not the one they intended to use. "Because of the ceiling heights," Bongiovi notes, "—and I got the information out of acoustic books available since the 1800s—I had to change from a \$15,000 projector to a \$70,000 projector. One reason was that the projection angle wasn't quite right, but primarily, [it would have affected] the sound of the room, so I had to make a big change."

Power Station's principals did not go into this move lightly. As the sound that accompanies the picture on film, video, television programs and even commercials becomes more sophisticated, the ability to keep up with this level of audio complexity becomes important to producers.

"One of the advantages of a room like Studio D," Bongiovi says, "is it actually gives clients the flexibility to mix their music effects and dialog all laid out at one time. Instead of having the music recorded in the studio, the effects done on a Foley stage or wherever, voice-overs done in a third situation, then everything done on premixes, which are sent to a final remixing house, they can actually record everything here. If any one specific thing needs to be adjusted in the music mix, or a specific effect needs to be adjusted so it doesn't block the theme of what the entire commercial is about, it can be done. Instead of lowering an entire music track, they can duck maybe a drum or guitar or whatever. It gives them great flexibility.

It also gives them total control of the project that comes out of here.

"Basically, clients can control their mix," he summarizes. "After putting all that time and money and effort into designing this spot, why should they have to compromise in the end when they can control their entire mix? They can end up with a first-generation master, instead of multiple generations down from all these premixes, and then the final remix."

This sounds like common sense rather than a revolutionary concept. Yet, while several film houses have these sorts of facilities, Power Station is one of the few recording studios wired to accommodate video in this manner. As more home systems incorporate surround sound, and as it becomes available in more and more programming, producers are going to be forced to seek more elaborate sound.

Studio D is also trying to attract the music video market. Most music videos use the album mix of the song for the video, but remarkable things can be accomplished by going back to the multitrack masters and mixing the video to picture in surround sound. It adds a new dimension to the medium.

"We're trying to promote that within the industry," Bongiovi says. "We've contacted several of the record companies, and there seems to be some interest. With people being able to buy surround sound for their stereo systems and through their TVs, they can enjoy this stuff easily. *Saturday Night Live* is broadcast in surround. I believe the cable television movie networks are also broadcasting in stereo surround. I think in the near future you are going to see a lot more home systems with surround."

Producers seem to appreciate Power Station's eye toward the future. All sorts of clients have been attracted to Studio D. They have done TV commercial work for Chevrolet and an American Express spot designed for play in movie theaters. They do ESPN Baseball and have a weekly date with Mel Allen for *This Week In Baseball*. They have done a surround sound music video mix for the hard rock group Helix. The room has been hopping.

"We're starting to catch on," agrees Bongiovi. "It's starting to catch on really well." ■

Hank Bordowitz is a freelance writer based in the New York City area.

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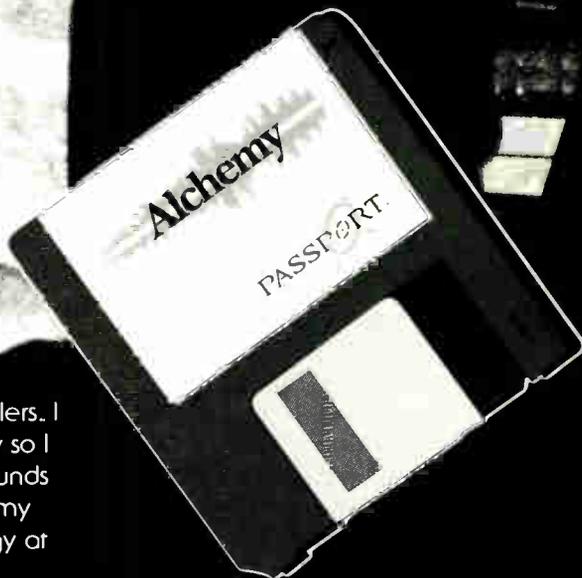
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by Paul Potyén

GETTING INTERACTIVE AT CYBERARTS

As I sit with growing frustration on a crowded commuter jet, waiting in line on the LAX tarmac to get back to San Francisco after the first CyberArts Conference, I am painfully aware that Americans (maybe humans) like to have as much control of their environment as possible. We don't like waiting

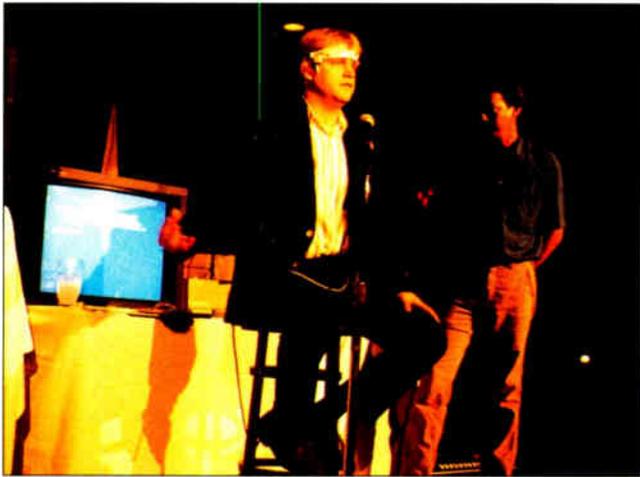


PHOTO: PAUL POTYEN

Right: CyberArts attendees spacing out with Light & Sound Research's MC2 relaxation system. Top: Hugh Lusted uses the Biomuse to control a MIDI synthesizer with brainwaves while Biomuse co-developer Benjamin Knapp monitors the equipment.

in line on the tarmac, or in the hotel lobby, or in the supermarket. We are reluctant to surrender our automobiles for public transportation, or our telephones for the U.S. mail, or our freedom to say and do what we feel.

We all value our independence, and we'll do whatever we can afford to do to achieve it. This is particularly true for artists. And the First Annual CyberArts Conference, hosted by *Keyboard* magazine at the Biltmore Hotel in Los Angeles last September, provided an excellent opportunity for inventors and artists in many disciplines to demonstrate the value of technology in their pursuit of personal, creative freedom of expression.

It also became evident there that creators and users of these new tech-



PHOTO: IRA CORD RUBNITZ

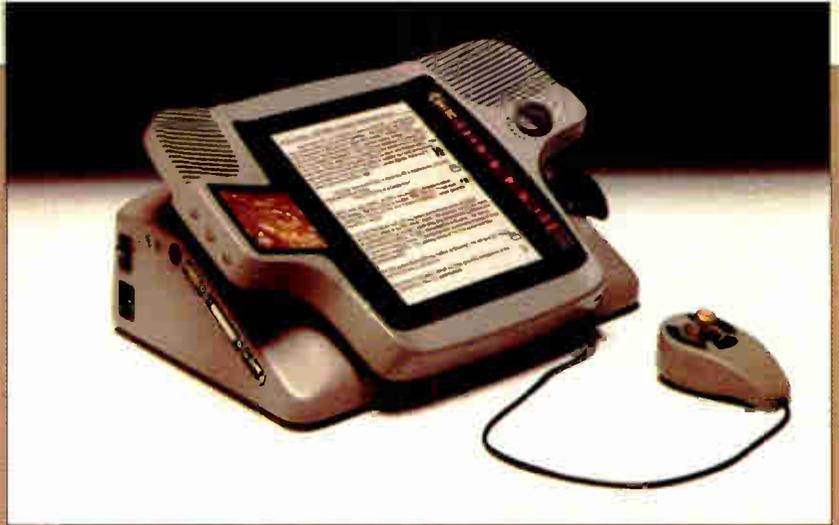
nologies still need to address some major negative side-effects of these technologies. As unique tools that provide increased freedom of artistic expression reach higher levels of sophistication, the risk of unpredictable system failure increases, and (at least for me) the risk of frustration increases. It's not so different with the developers of the Boeing 737 who, in their efforts to create a new level of sophistication in peoples' ability to move around in

Chip Shots

NeXT has announced a November release for its NeXTstation, a compact 68040-based computer that runs at 25 MHz and has 8 megabytes of RAM, a 105MB internal hard drive, and a 17-inch display. Priced at \$4,995, the unit also contains a 2.88MB 3.5-inch floppy drive that can read and write DOS-formatted disks, as well as built-in Ethernet capabilities. Also scheduled for a November shipment is the NeXTcube, offering the greatest number of options within the NeXT family in terms of expandability, storage, memory and pathways to high-end color. The standard NeXT computer fits on a single board, leaving three NeXTbus slots available for adding options. The basic NeXTcube will retail for \$7,995. NeXT Computer Inc., Redwood City, CA; (415) 780-3786.

Cornucopia™ is a new interactive multimedia appliance announced by **Empruve Inc.** The stand-alone unit uses powerful microprocessor components to access audio, video, text and graphics from CD-ROM discs, combined with technologies such as DVI. Three screens work in concert to present information retrieved from an optical disc. One screen displays primarily monochrome text and graphics; a second, smaller screen shows full-color video and still photography; and the third, a narrow vertical screen, displays 15 control icons. Instead of using a keyboard, the system employs a control device developed by Empruve called Tadpole™. The sound system is designed to create a CD-quality near-field listening environment. Cornucopia will be available for about \$3,995 to \$4,995, depending on the buyer's requirements. Empruve, Knoxville, TN; (615) 966-8888.

Opcode Systems has acquired the publishing rights for MAX, a Macintosh real-time HyperCard-like graphic development software package for music and multimedia. Described as an object-oriented tool to help simplify the development of new software, the MAX environment can be used for designing applications using MIDI, music, video, digital audio, animation and other multimedia systems. Origin-



Cornucopia, a new interactive appliance announced by Empruve Inc., is a stand-alone CD-ROM player.

nally conceived by Miller Puckette at IRCAM, MAX has been further developed by David Zicarelli for Opcode. The company is now accepting applications for MAX "developer partners." MAX will be released early in 1991 to the general public, bundled with "patches" from the most innovative developers. Opcode Systems, Menlo Park, CA; (415) 369-8131.

J.L. Cooper Electronics has upgraded its MAGI II console automation system. Version 2.0 provides many additional features including cue list offline editing, hit list, auto punch, real-time and offline MIDI event editing and Multifinder compatibility. MAGI II Version 2.0 runs on Macintosh and Atari 1040 computers, and is being sent free to all registered owners.

Also available from J.L. Cooper is an editor/librarian for the new Synapse MIDI patch bay/processor. Designed for both Macintosh and Atari platforms, the program retails for \$69.95. J.L. Cooper Electronics, Marina del Rey, CA; (213) 306-4131.

News from **Dr. T's** is that X-or 1.1 editor/librarian for the IBM PC is now shipping, and includes a runtime version of Microsoft Windows 2.11 and over 80 instrument templates. Also in production is Phantom, the SMPTE synchronizer and MIDI interface for the Amiga. Realtime 1.2, the only full-featured sequencing program for the Atari 520 ST, is now available. And finally, the company has moved. The current address is: Dr. T's Music Software Inc., Suite 1B, 100 Crescent Road, Needham, MA 02192.

(617) 244-6954.

EditLink is a PC plug-in card from **FutureVideo Products Inc.** that turns an IBM PC/XT/AT compatible into a multifeatured desktop video edit control system. The card features a two-VTR edit controller and a dual-input SMPTE reader, Edit List Manager software and a CMX file format conversion utility. Suggested list price is under \$1,800. FutureVideo Products Inc., Laguna Hills, CA; (714) 770-4416.

New from **V_Graph Inc.** is Virtual Video Producer (VVP), a multimedia authoring software package for the IBM PC. Version 3.2 of VVP provides owners of IBM Infowindow hardware with a cost-efficient option for making new interactive applications. The package retails for \$175. V_Graph Inc., Westtown, PA; (215) 399-1521.

Advent Computer Products Inc. has introduced the Neotech Color Video Encoder, an enhancement product for the Macintosh that provides all of the necessary sources for output to standard video recorders and monitors. The compact, external unit provides NTSC compatibility, with PAL as a factory option. List price is \$399. Advent Computer Products Inc., Encinitas, CA; (619) 942-8456.

Weynand Training International has announced an interactive software training program that simulates the operation of a Grass Valley Kaleidoscope control panel. It runs on Macintosh computers. Priced at \$2,995, it was expected to be available by late October. Weynand Associates, Canoga Park, CA; (818) 992-4481.

their environment, probably couldn't predict that I would be stuck on the LAX tarmac. But I digress.

Sessions by LucasArts & Entertainment's Gary Rydstrom on Sound Design, Lone Wolf's Mark Lacas on Media LANs, composer Dominic Frontieri on Composing for Visuals, MacroMind's Marc Cantor and others made for a stimulating weekend. But the most impressive and promising part of the conference was the Biomuse performance. Biomuse is a special signal processing computer that uses bio-electric signals to control musical instruments and other devices. Developed by Hugh Lusted and Benjamin Knapp, the device processes signals from muscles, brain waves and eye movements and outputs standard MIDI code. The Sunday afternoon audience watched in rapt attention as Lusted first used Biomuse to control a computer video game with his eyes, and then to play a MIDI synthesizer with movements of various muscles, his eyes and his *brain waves*. That's right, folks. Brain to MIDI is here. (Actually, Stephen St. Croix scooped me on this one. See

"The Fast Lane," May 1988.)

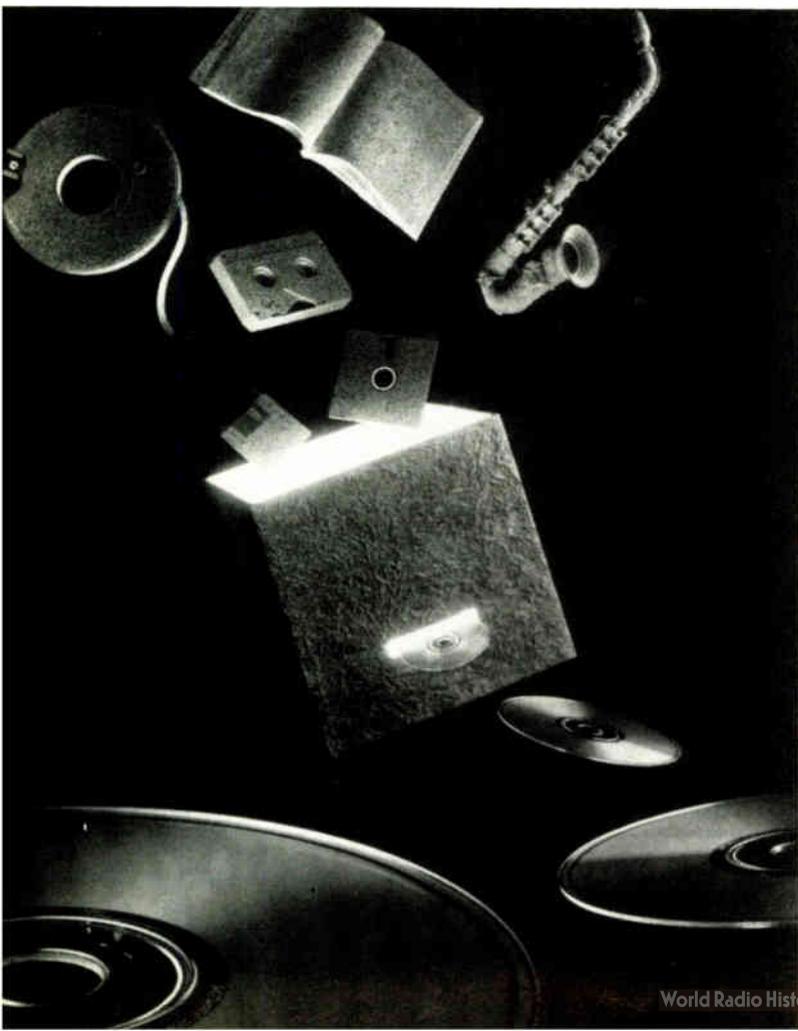
The current version of Biomuse uses eight input channels: two for muscular signals, three for brain waves, two for eye movements, and a mic input for voice processing. The possibilities for this kind of control are manifold: as a music and/or light controller for dancers, as an additional way of controlling pitch bend, pan or any other MIDI controller by a keyboardist, and as a controller for movement-impaired individuals, to name just a few. With some time and with the right people involved, this could become the ultimate controller, allowing performers to customize and refine the use of their own bodies as musical instruments.

The conference presentations were many and varied; in some cases simultaneous sessions caused me to make difficult choices about what to see. In one of the more well-attended and well-received sessions, Allen Adkins, president of Optical Media International (the company that brought you the "Universe of Sounds" on CD-ROM in 1986), examined the current and future issues of incorporating various CD formats into products and services

in different markets. He also demonstrated his company's TOPIX CD mastering workstation, available for both the Macintosh and IBM-compatible PCs. The system makes it easy to create custom write-once CD-ROM or CD-Audio from a DAT or hard drive.

James A. Moorer talked about the evolution of digital audio signal processing, from the days of his involvement with the world-famous Stanford Center for Computer Research in Music and Acoustics, and his later work as head of the SoundDroid group at Lucasfilm Ltd., to his present position as chief technical officer of Sonic Solutions in San Francisco. He demonstrated how the "audio replacement techniques" developed at Stanford are now being used to restore and remaster old recordings using the Sonic Solutions system. Among his predictions for the near future: "variable samplers," where the complex math required to manipulate waveform combinations is done "at the factory"; "mixed model synthesis," which has already engendered Roland's L/A technology; and tools to better deal with vocal sounds.

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search Council Associate at NASA-Ames Research Center, where he is heavily involved in 3-D sound. He predicted using custom electronic "ear patches," modeled after the response of some of the best mixers in the business, to achieve a successful 3-D mix. His research has found that, while there is a large standard deviation between people's auditory response, 3-D sound seems learnable, since the brain plays a large role in what people seem to hear.

Jaron Lanier, CEO of VPL Research Inc. (Redwood City, Calif.) delivered an imaginative, entertaining discourse on virtual reality. His company developed the first commercially available virtual reality system, as well as the Power Glove (licensed to Mattel). The computer scientist/entrepreneur/composer proposed that musical instruments are the ideal models for creating virtual reality, where the goal is to improvise the contents of the environment as fast as possible. He also stressed the importance of 3-D sound as part of that reality. Lanier predicted the emergence of sophisticated systems that allow two or more people to share a mutually created reality within the next five to ten years.

Digidesign president Peter Gotcher waved the yellow caution flag amid all the grandiose claims about multimedia production. His presentation, entitled "Desktop Obstacle Course: Multimedia War Stories," included a Digidesign product demo produced in-house on the Macintosh platform, preceded by his comments on its production. The message: While it is possible to produce impressive multimedia presentations on the desktop, it's not a trivial matter. There is a steep learning curve and a substantial commitment of time required to master the technology.

The four-day affair also included 24 booths and 19 artists or groups packed into 5,000 square feet of floor space devoted to high-tech exhibits and an electronic art gallery. Companies such as Apple, Korg and Roland were represented at other locations in the hotel. Live performances were a third component of the festival. They included a deliciously sinister, large-scale, interactive, electromechanical spectacle by Ritual Mechanics; "Fasnacht Revisited," a piece composed by Don Buchla and performed by him on his Thunder controller; and a performance by Vincent John Vincent and his Mandala, a system that displays the performer in

an interactive virtual reality created by a computer on a large screen. A Mandala play area was also available for public use during normal exhibit hours.

The highlight of the exhibits was at the Light & Sound Research (Scottsdale, Ariz.) booth, where you could don special stroboscopic glasses and headphones whose signals would take your brain waves to a theta state for about 15 minutes. Called the MC2 relaxation system, it retails for around \$300. People lined up throughout the weekend to experience Sense8 Corporation's (Sausalito, Calif.) "World Tool," a virtual reality system that uses real-time rendering software and 3-D input devices such as VPL's DataGlove running on a Sun workstation; and Subjective Technologies' (Encinitas, Calif.) "Existential Funhouse," an application of its new Interactive Multimedia Engine (IMME). The system uses an 80386 computer and a Reconfigurable Multi-Purpose Interface (RMPI) to respond to movements of people within the environment (in this case, a 600-square-foot space) with digitized audio and video from a laserdisc player.

In a conference marred by numerous crashes, glitches, sound and video problems, I saw an answer to such problems in a Biomuse-type system. If I suddenly encountered a stuck MIDI note in live performance, I don't have to change patches, or dip the volume, or hit a switch; I just react the way I might automatically react when I hit a wrong note on a piano (remember pianos?) and program that response to turn all MIDI notes off.

Much was said (and demonstrated) during the conference to support the position that technology gives us the freedom to create our own environment. Part of what was frustrating was I could glimpse the enormous potential of this stuff for me, both as a creator and a consumer, and I don't want to wait for the bugs to get worked out and for the price to go down. It was an exciting, stimulating conference that tickled my imagination and left me impatient for more. It also made me a little nervous about whether these new systems would enhance the expression of my creative urges without making me feel like I'm wearing a straitjacket on a crowded commuter jet in the process. ■

Paul Potyen is associate editor of Mix, and a veteran composer, producer and musician.



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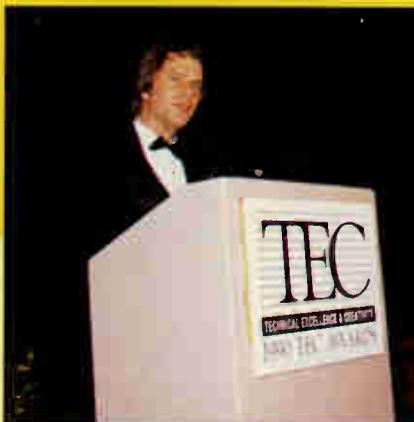
Technical Excellence & Creativity Awards yet, as over 800 audio professionals filled the Biltmore Bowl in Los Angeles to capacity. This sixth annual event, held on September 23, honored 21 winners, voted the best of the year by *Mix* subscribers. In addition, three audio greats—Deane Jensen, Quincy Jones and George Massenburg—were inducted into the TEC Hall of Fame.

“This year’s awards have come the closest to realizing the goals we set for this program when we started it back in 1985,” says Hillel Resner, executive producer of the TEC Awards. “The number and the enthusiasm of those attending, the stature of our presenters and honorees, and—most of all—the amount of money raised for hearing and audio education have made the 1990 TEC Awards the best ever.”

Among those presenting and receiving awards were Peter Asher, Walter Becker, Nina Blackwood, Hal Blaine, Bob Clearmountain, Herbie Hancock, Ray Manzarek, Roger Nichols, Michelle Phillips, Chad Smith, Bruce Swedien and Don Was.

Proceeds from the evening will be divided among the House Ear Institute’s “Hearing Is Priceless” (HIP) campaign, co-sponsored by *Mix* magazine; the Audio Engineering Society Educational Foundation; and Full Sail Center for the Recording Arts, winner of the TEC Award for Outstanding Recording School/Program. Full Sail also received a matching grant of recording tape from Agfa Corporation.

ALL PHOTOS: ALEX BERLINER



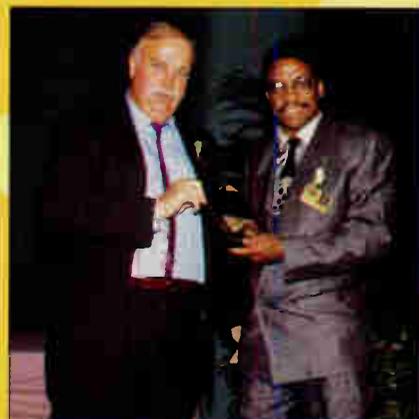
◀ **George Massenburg** not only was inducted into the TEC Hall of Fame, he also won the TEC Award for Outstanding Recording Engineer.

Presenters Walter Becker ▶ (L) and Roger Nichols had the audience howling as they unveiled plans for a new recording school—located in Hawaii and offering an 18-month semester for \$500,000.



▲ **(L-R) Don Was** accepts the TEC Award for Outstanding Record Producer from **Chad Smith** and **Ray Manzarek**.

Bruce Swedien congratulates ▶ old friend **Herbie Hancock**, who accepted the TEC Hall of Fame award for longtime acquaintance and fellow musician, **Quincy Jones**.



for the 1990 TEC Awards

(L-R) Mix publisher Hillel Resner and Mix editor-in-chief ▶ David Schwartz congratulate George Massenburg, Hall of Fame inductee and winner of the TEC Award for Outstanding Recording Engineer; Bob Clearmountain, winner of the TEC Award for Outstanding Remote/Broadcast Engineer; and Don Was, winner of the TEC Award for Outstanding Producer.



◀ (L-R) Full Sail Center for the Recording Arts vice president Gary Platt, Agfa national sales manager Andrew DaPuzzo, Full Sail president Steve Phelps, Full Sail founder/CEO Jon Phelps, Full Sail senior vice president Garry Jones, Agfa national marketing manager Teri Sosa, Mix editor-in-chief David Schwartz and Mix publisher Hillel Resner.



▲ Dr. Arthur Jensen accepts the TEC Hall of Fame plaque for his late son, Deane Jensen, from Stephen Paul.



▲ The dynamic emcee duo of Phil Proctor (L) and Mr. Bonzai debuted their act before a packed house.



▲ Hal Blaine and Michelle Phillips charmed the audience as they presented awards for Outstanding Institutional Achievement.

Grammy-winning producer Peter Asher ▶ congratulates George Massenburg upon his induction into the TEC Awards Hall of Fame.



▲ (L-R) TEC Awards executive director Karen Dunn and Hillel Resner chat with presenter Michelle Phillips before the ceremony starts.

CONTINUED ON THE NEXT PAGE 

1990 TEC AWARDS WINNERS

OUTSTANDING INSTITUTIONAL ACHIEVEMENT

Acoustics/Studio Design Company
John Storyk

Sound Reinforcement Company
Clair Bros.

Recording School/Program
Full Sail Center for the Recording Arts

Remote Recording Facility
Westwood One Mobile Recording Division

Mastering Facility
Masterdisk Corporation

Recording Studio
Power Station

OUTSTANDING CREATIVE ACHIEVEMENT

Audio Post-Production Engineer
Bruce Botnick

Remote/Broadcast Recording Engineer
Bob Clearmountain

Sound Reinforcement Engineer
Benjamin Lefevre

Mastering Engineer
Bob Ludwig

Record Producer
Don Was

Recording Engineer
George Massenburg

OUTSTANDING TECHNICAL ACHIEVEMENT

Recording Devices/Storage Technology
Akai A-DAM System

Transducer Technology
Meyer HD-1 Monitors

Computer Software/Peripherals
Mark of the Unicorn Performer 3

Signal Processing Technology
Eventide H3000 SE Studio Enhanced Ultra Harmonizer

Ancillary Equipment
Adams-Smith Zeta-3B Synchronizer

Console Technology
Neve VR Series Console

Musical Instrument Technology
E-mu Proteus

Sound Reinforcement Product of the Year
Showco Prism Digital Control System

Recording Product of the Year
Neve VR Series Console

HALL OF FAME

Deane Jensen

Quincy Jones

George Massenburg

Neve president Barry Roche celebrates as he collects Neve's second TEC Award of the evening. The Neve VR Series won for Console Technology and Recording Product of the Year. ▼



▲ Bob Ludwig (L) accepts his fifth TEC Award for Outstanding Mastering Engineer from Ray Manzarek.



(L-R) Mix magazine's David Schwartz, Mix consulting editor Stephen St. Croix, Acoustics/Studio Design Company winner John Storyk, SPARS board of directors member Howard Schwartz, SPARS president Pete Caldwell, SPARS executive director Shirley Kaye, SPARS northeast coordinator Dave Teig, Mix editor-at-large Mr. Bonzai, Mix's Hillel Resner, Neve president Barry Roche. ▼

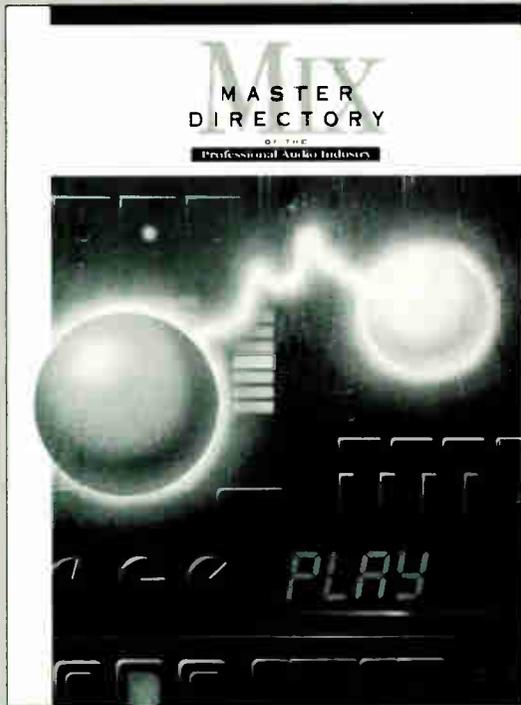


World Radio History

John Meyer (L) is congratulated by Stephen St. Croix as he accepts the award for Transducer Technology. ▼



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MASTER

Mastering
Engineers
Discuss Their
Consoles

CONSOLATION

by Linda Jacobson

Any good dry cleaner can handle a variety of materials: synthetics, sheepskin, wool, leather, silk, suede, gold lamé. No matter which source material we bring in, they have the technology to clean, freshen and press it. A mastering house may handle fewer chemicals, and may never get to the pressing stage, but the material they clean is as varied.

Today's mastering engineer works on source material that comes in on analog 2-track tape, digital 2-track tape, DAT, F1, 1630—as Nashville's Randy Kling once said, "Things come in here every way but on Band-Aids." Today's mastering facility is equipped with both



TEC Award-winning mastering engineer Bob Ludwig of Masterdisk, NYC, the TEC Award-winning mastering facility.

analog and digital consoles to provide mix-and-match equalization, dynamics processing and transfers. Some clients work in the analog domain only; some work exclusively in the

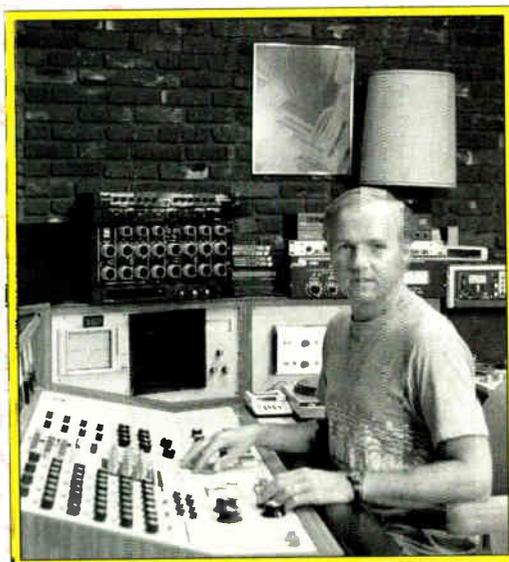
digital domain. Some want their analog tapes touched up digitally, but more request analog processing on their digital tapes. "If a tape comes in analog," says Bob Ludwig of Masterdisk, "I figure the producers decided that analog is appropriate for that project, so I stay in the analog domain—just as in days of yore—and then at the end, go into the digital domain for the CD master and other digital stuff. Generally, if it comes in digital,



The main room at QCA, Cincinnati

we work with it in digital. But we do the other permutation as well: the tape comes in digitally, we convert it back to analog and work with it on the analog console, then go back to digital again. We did the new ZZ Top album that way."

To make the finest end-product—whether PCM-1630 CD master, 1630 and DAT cassette master, or master lacquer—mastering facilities rely on different types of consoles for fine-tuning, tonal balance, level setting, channel balance and dynamic control. We asked a few mastering engineers to discuss the consoles they use to clean and freshen our source material, whether wet or dry.



Engineer John Golden at K-Disc's custom board

One-of-a-Kind Consoles

As the traditional mastering console accommodates two channels of program *and* two channels of preview (the two channels that feed the lathe computer in advance of the signal to be cut), "Every knob you twist has to twist a duplicate knob for that channel in preview," says Bill Lightner of K-Disc in Hollywood. "Level control adjustment, EQ and the faders must all track program and preview—everything is doubled up." K-Disc's analog mastering consoles are "hybrid boards designed around ten years ago by eight mastering engineers who all had say-so in what kinds

of things were necessary," Lightner adds. "The boards have lots of different equalizers, filters, level controls and crossovers, but none is active or in the signal path unless you

select it and patch it in through logic-switching.

"At the time we were designing these boards, [the late] Deane Jensen was asking audio engineers to consider his design of the 990 operational amplifier. We decided it sounded good, so the board is equipped exclusively with 990s that we built and took to Deane and he threw holy water on. Other things, such as summing networks or mix networks, were added to the basic 990 amp.

When clients bring analog tapes to Northeastern Digital near Boston, Dr. Toby Mountain fine-tunes them on a

custom, compact, tabletop mixer built into a rack case. He also uses the mixer when the client presents a DAT source

that could benefit from some analog equalization. Why custom? He couldn't

—CONTINUED ON PAGE 63

Mastering Virtually

The recording industry's embrace of personal computer technology has resulted in a new wave: the PC-based workstation that records and manipulates audio and stores it on hard disk. Just as these workstations have infiltrated recording studios, they're also used to handle more and more premastering and mastering processes. For instance, when

he's working toward an end-product, Dr. Toby Mountain of Northeastern Digital uses Sonic Solutions' Sonic System for editing and processing. He especially likes its equalization. "Often on an analog project we go through our custom analog board into the regular EQ from an analog tape into the 1630," says Mountain, "then use the digital EQ of the Sonic Solutions to touch things up a bit."

Bob Ludwig of Masterdisk also uses the EQ on the Sonic System, "but its main use is for editing and use of the NoNoise system. You *can* theoretically do everything on that system that you can do with the Neve DTC, but from an ergonomic point of view—and this is true of all virtual consoles—it's much easier to relate to a console where you can see all the equalization in front of you, and you don't have to access different screens to look at it. Also, the computers that use graphical interfaces have a flicker rate that really annoys me. I have a hard time staring at those screens for a long period of time."

The introduction of the Sonic System allowed Different Fur Recording Studios in San Francisco to diversify into digital mastering. Co-owner and chief engineer Howard Johnston and his team have used the new system to prepare master tapes for a variety of music projects, everything from acoustic piano and rap records to rock. Until construction is complete on Different Fur's new mastering suite, the Sonic System lives in the main control room, alongside an SSL 4056G console and Studer A80 and Sony 3324 recorders.

Why would a "traditional" multi-track studio venture into new technology? "We saw two trends," Johnston says. "With the build-up of home studios for live recording and the fact that musicians can work almost anywhere now, we saw a need for people to be able to bring their music someplace where they could have it enhanced or put together or simply heard in a proper environment. Now you have a workstation, a hard disk-based system, that lets you do phenomenal

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World Radio History



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T-90	2387	€14	1155
T-60	3528	1212	1719
T-30	6668	2388	3360
T-15	12222	4632	6437

TMD production per shift. Conditions: Pancake usable length = 4950 meters. Pancake change-over time = 1 minute. Blank tape between programs = 2 meters. Shift = uninterrupted 8 hour with 100% uptime.



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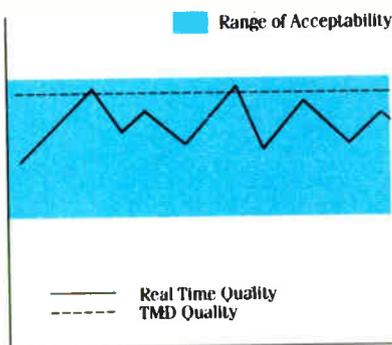
Picture quality verified

According to the results of an independent survey* presented at the International Tape/Disc Association's 19th Annual Seminar in 1989, consumers rated TMD video quality equal to or better than real-time.

*Study conducted by Consumer Sciences, Inc.



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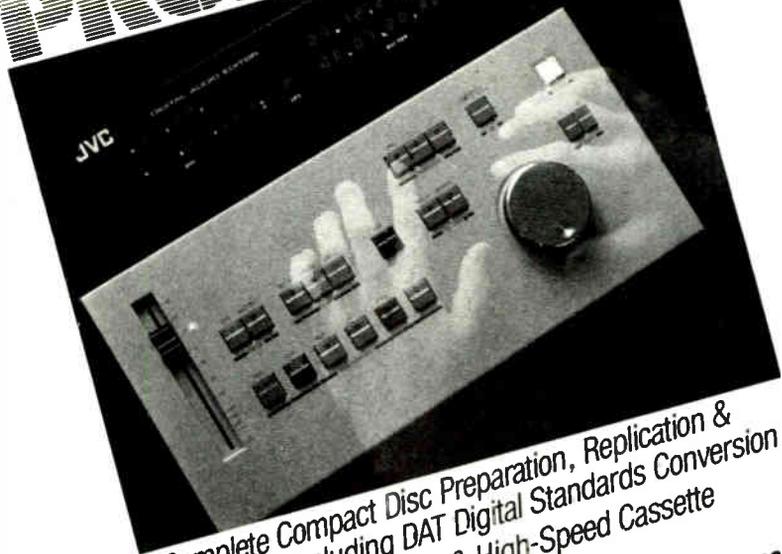


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amounts of mastering work—as long as you don't have to do vinyl and make lacquers. Suddenly mastering became attractive to us.

"Another trend [in personal studio recording]," Johnston continues, "is people recording things dry, or unequalized. They'll just get a sound on DAT that they like, and then come to a studio like Different Fur to add EQ or effects in the good monitoring environment.

"If it's an analog recording that needs EQ, I'll EQ it through the Massenburg; if it's digital and the client and I agree that it needs analog EQ, then we play back and record it back into the digital system. Otherwise I use the digital EQ within the Sonic System.

"The Sonic System sounds good. We bought it because it seemed to be the ideal tool, it's easy to use and the company is local—we've been watching what they're doing for a long time. It's a virtual system, which means you can do anything with a mouse and a keypad. And it's always developing. Sonic Solutions listens to the people who buy it, and every couple of months we get new software. We looked at other digital mastering workstations, but priced for what it could do, the Sonic seemed best."

Different Fur also uses the Sonic System to record directly to 2-track. Johnston explains: "I record directly to the Sonic System to do my edits. We'll do three or four takes, or pickup pieces, and I'll do my edits and make a digital copy. We're actually editing and mastering as we go. Also, a lot of bands now do demos by just mixing directly to DAT; then they sequence and edit right in the Sonic System."

Phil Collins recently made use of Different Fur's Sonic System; his new live album incorporates performances from different venues, and the Sonic System served as editing and mastering system. The CD master, album master and cassette master all resided on the Sonic System's hard drive. When Johnston needed to check any of them, he simply called up the file and played it. And, Johnston adds, "Every copy that comes off this is a first-generation copy. There is no 'safety'—you just make masters for days!"

—Linda Jacobson

—FROM PAGE 58, MASTER CONSOLATION

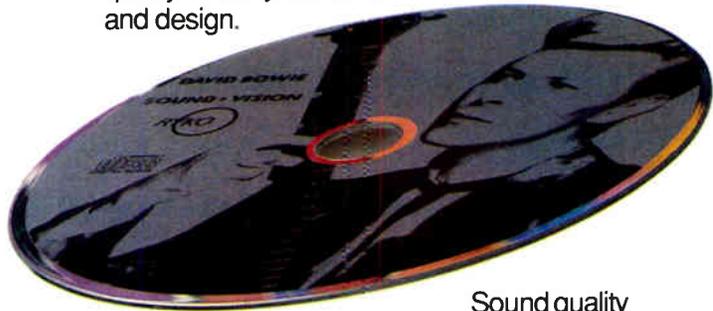
find anything off the shelf to fit his EQ and portability requirements. The board, built by Boston-based console designer Peter Troisi (well known in Northeast studios for his rack EQ), is an 8x4x2 configuration just large enough to serve as a live mixer for remote live-to-2-track recording. It has four parametric EQs with filtering, high and low shelving, and highpass and lowpass filters. "The board's best feature is that it's very, very quiet, and the EQ is excellent; compared to any other analog EQ, it has a very musical sound," Mountain says. "If the client's digital mixdown was done on a piece of digital gear that has a strident quality, this board warms it up and breathes a little life into it." Mountain occasionally uses the board in conjunction with an outboard Troisi compression unit.

Quadim, located in Westlake Village, Calif., also uses an all-custom, analog console, a rack unit. Its designer, Quadim owner Guy Costa, describes it as "very tweaky—basically a throughput, digitally balanced input, all line-level, with all outboard gear external and put in [the signal path] whenever I need it, as opposed to having it permanently in-line." Quadim went the custom route "because it was as close to a piece of wire as I could get," says Costa. "However, we primarily take the prerelease masters from the record labels and do short-run production for promotion, in-house use and so on. The only thing we typically touch up is volume, so we don't even go through the console. Only about 5 percent of the jobs involve the console for assemblies, dynamics and equalization processing, stuff like that. The components we use are [Aphex] Dominator comp/limiter, sometimes the [EMT] 140, and Massenburg EQ."

When Bernie Grundman and his partner, Carl Bischof, started designing their third cutting room last year, they knew they didn't want to deal with patching digital gear in and out of an analog console, or vice versa, so they integrated the two formats. The resulting console is "a full-blown analog board *and* a full-blown digital board complete with digital EQ, level correction, limiting and compression," Grundman says. "The analog equipment is our own design. Since it's difficult to design and construct digital equipment on your own, we use Harmonia Mundi electronics for the

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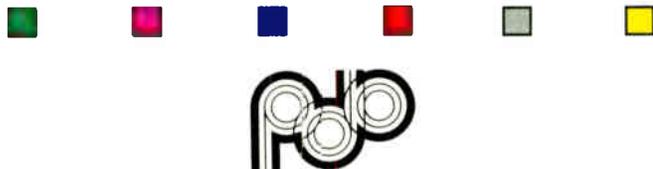
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digital section. It's easy to switch between digital and analog; you can switch to the analog board and simultaneously make a D-to-D recording onto a 1630 or DAT, and at the same time you can cut an analog disc from the digital EQ."

The analog portion has graphic EQ with 16 bands, wideband equalizers and filters to achieve "overall gloss," and selective bottom frequencies and high-end shelving frequencies. The digital EQ section sports eight bands that can be adjusted simultaneously, resembling a graphic EQ. However, Grundman notes, "If I have to do a lot

of brightening, high-end EQ, in digital, the digital EQ has a metallic, mechanical sound. Depending on the amount of correction needed, the digital EQ is a bit displeasing if you have to use a lot of it. It doesn't have the musicality of the analog EQ, which seems softer and more natural. I haven't heard a digital EQ yet that has a pleasing sound on the extreme top end."

Many agree. When Georgetown Masters in Nashville first purchased the Muse digital console, Denny Purcell thought it might threaten the financial health of his analog room, which is based on a custom Rick McCollister-

designed board in a Neumann shell. It hasn't, and today Purcell muses, "What it comes down to is this: Find me a digital Fairchild 660 mono limiter. Do you know of one? There are analog 'personalities' that aren't available in digital equipment; and if a certain analog 'personality' is desired, usually there's no other way to get it."

Speaking of Personality... The Neumann Approach

Some vinyl mastering houses like to combine the venerable with the "cutting" edge. In Studio A at Europadisk of New York City, for instance, a Direct Metal Mastering system for LPs works in conjunction with the Neumann SP79 disc mastering console. DMM represents about 30% of the work that goes through that room; Europadisk occupies 17,000 square feet of Manhattan real estate, on which it maintains its own pressing plant.

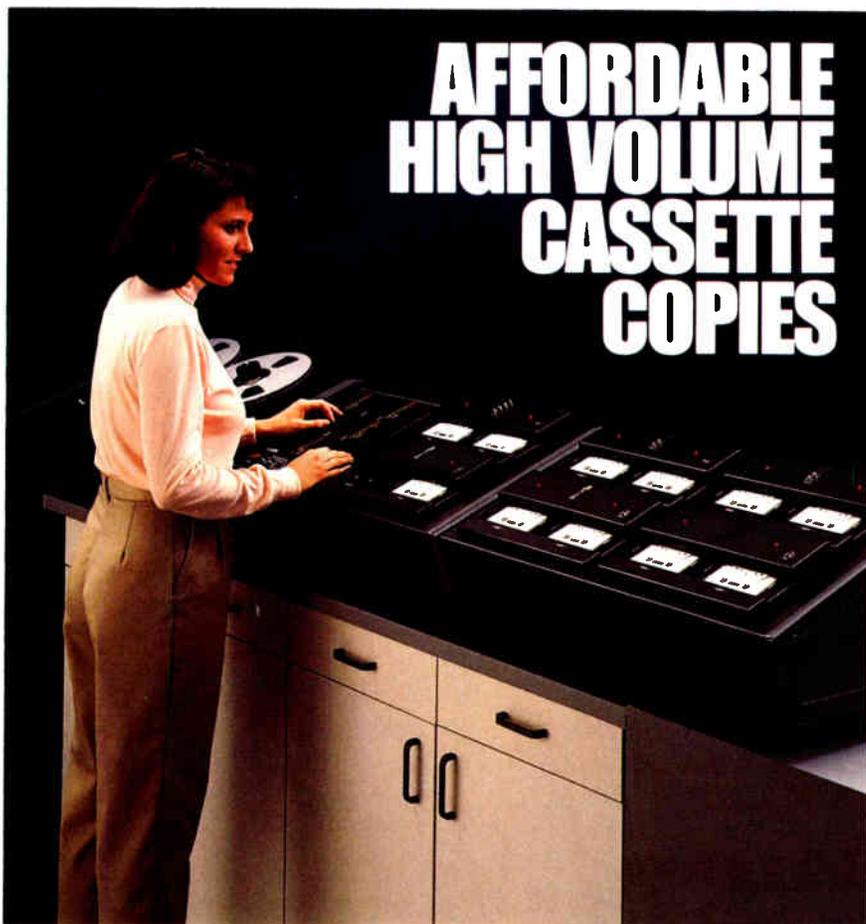
In Cincinnati, QCA masters on a Neumann SP272, purchased a decade ago. "At the time, it was a real good console for disc mastering," says Jim Bosken. "As with the rest of our cutting system, it's made by Neumann." QCA uses that system (mounted in a rack) exclusively, and will continue to do so—as long as vinyl continues breathing. "We use it for disc mastering, cassette mastering and CD mastering. We update it from time to time with things like new amps."

However, Bosken admits, "We're starting to get to a point where it doesn't make much sense to have that console. Only about one-fifth of our work involves cutting records, so we don't use a lot of things on the Neumann, like the preview channel. When we're doing cassettes and CDs, we basically only use the console for the monitoring function and setting levels. We do mostly CD and cassette business now, so it will make sense for us to go to a digital console—probably something like the Sonic Solutions workstation. We'll keep the Neumann as long as we keep cutting records."

Sony Only

FDS Labs/Quad Tech Digital of Los Angeles, which specializes in CD premastering and mastering for audiophile record labels, masters about 200 CDs per month for Hong Kong clients alone and caters to all budgets. They use the Sony K-1105 digital console, which has eight inputs and two channels out,

—CONTINUED ON PAGE 177



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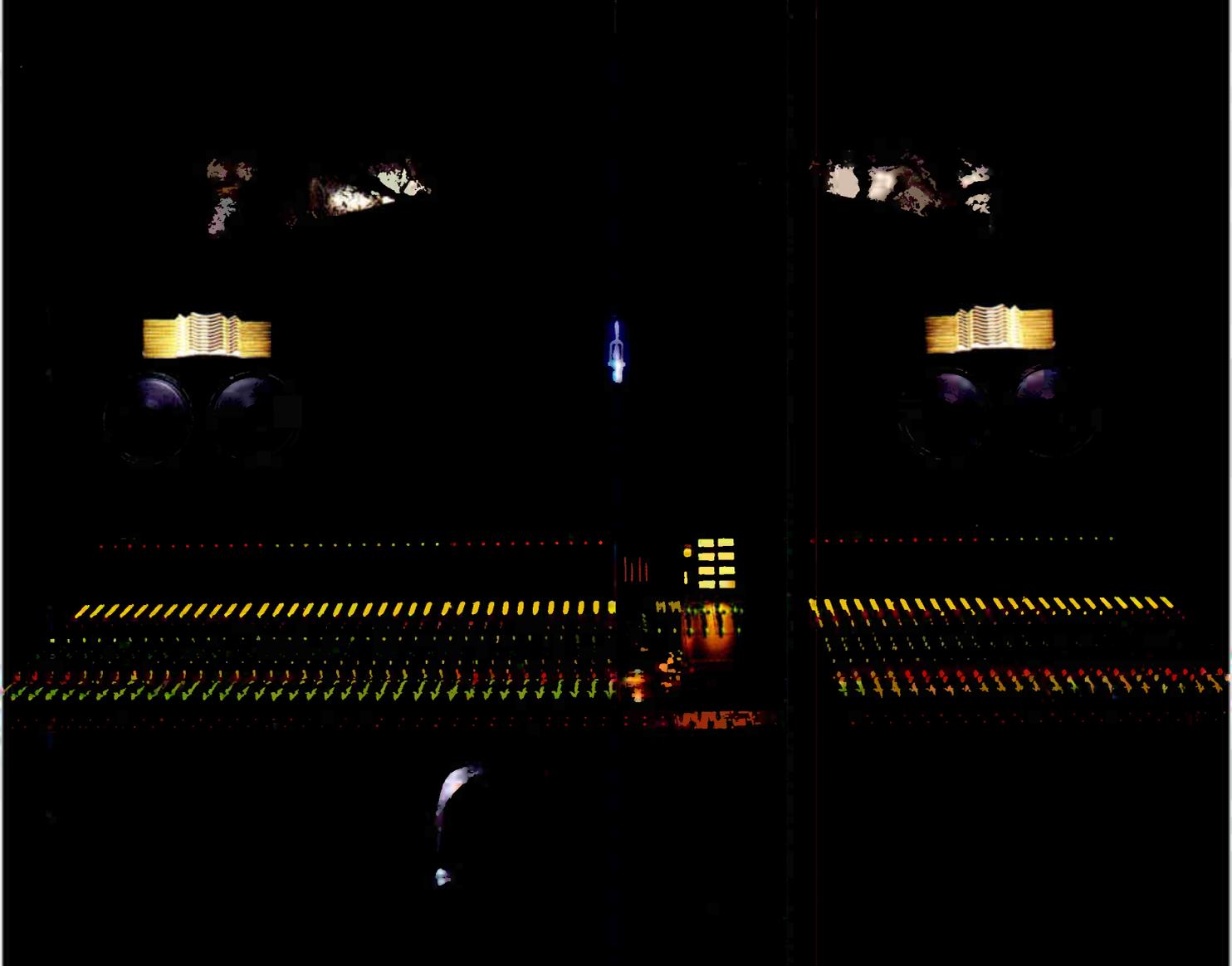
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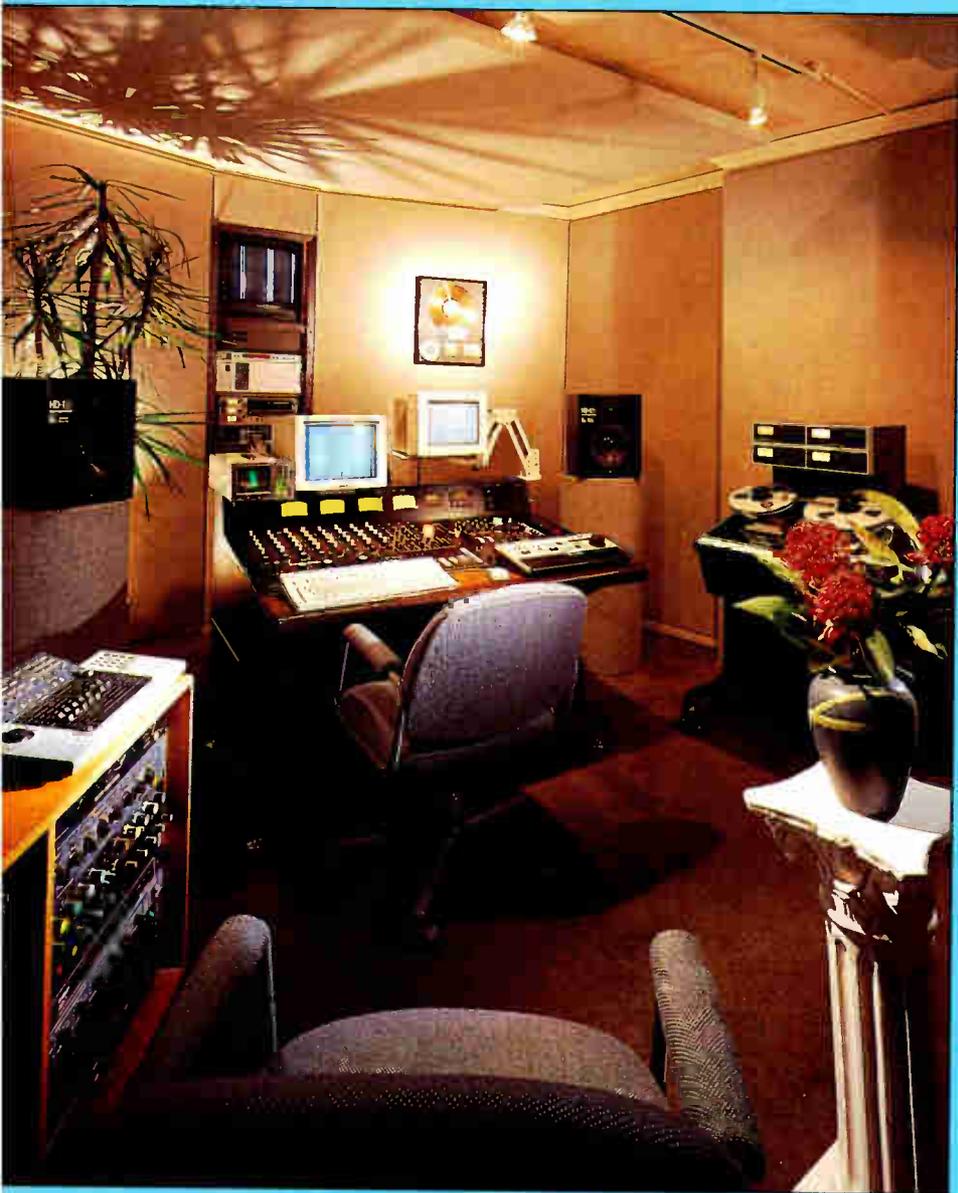
World Radio History

ROCKET LAB LAUNCHES

San Francisco has a new mastering room to be proud of: Rocket Lab, a CD mastering suite operating with a mix of state-of-the-art, vintage and audiophile equipment, opened for business July 1. It is a well-designed room with a comfortable atmosphere, directed by a veteran cutting engineer.

Rocket Lab is part of Rocket Rentals, a San Francisco-based video/audio rental company and video editing suite. The owners, Nancy Evans, David Haynes and Fred Baysinger, have all been involved in the Bay Area music scene for many years.

David Schwind of Charles M. Salter and Associates handled all isolation and acoustic design for the mastering room. Salter was chosen because it has an excellent record for room design, having completed large facilities such as the Lucasfilm recording room as well as some excellent small rooms. Salter recently designed three mastering suites for MCA and is currently designing its own listening room. Paul Stubblebine, Rocket's chief mastering engineer and the president of the San Francisco chapter of



Above: The main room at Rocket Lab.

NARAS, found that all of his design goals were in line with what Salter strove to achieve. Salter was able to make optimum use of the Rocket space while working with construction restrictions such as pillars on two of the walls. Stubblebine's familiarity with the plans allowed him to oversee construction and guarantee quality and detail.

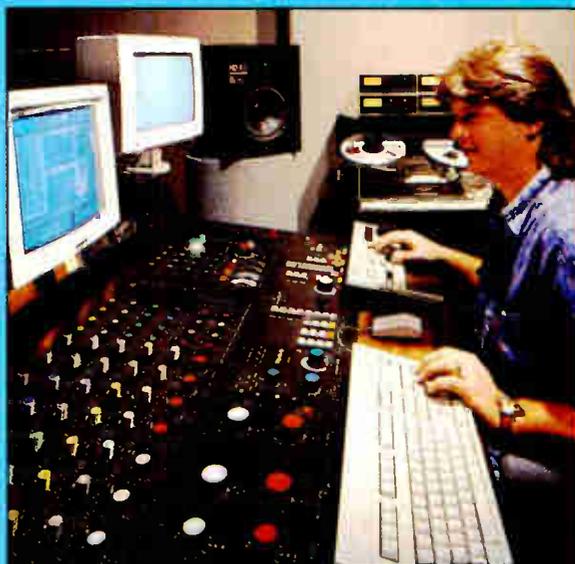
The mastering room is designed for CD mastering and digital editing and measures about 14 x 18 feet with an 8.5-foot ceiling. Plans call for a lathe for lacquer mastering in another room. Rocket owners wanted an open, pleasing, uncluttered look. The only equipment in the suite is that which the engineer needs for direct operation: the console, VDT, 1630 panel, speakers and remote controls. All other equipment, such as computers, disk drives and other noise-generating machines, are located in an adjacent equipment room, leaving the main room extremely quiet for critical listening. Although it is designed to specific acoustic goals, it has the feel and character of a home living room. Stubblebine feels that mastering rooms should get away from the highly specific acoustical design

of most control rooms and more closely represent an actual listening room.

Stubblebine chose a pair of Meyer HD-1 monitor speakers for the room because he feels that they are an extremely detailed, accurate, full-range speaker without coloration. He wants to be able to work easily in three dimensions, as do his audiophile clients. Working for hours without getting ear fatigue was also a major consideration. The speakers sit on a pair of pedestals, which place them at ear-level when seated at the console. There are no soffit-mounted speakers in the room. Stubblebine obtained an early production pair of HD-1s and has spent many hours doing critical listening in and out of Rocket Lab.

In addition to the HD-1s is a Velodyne UDL-18 subwoofer with power amp in a servo loop. The Velodyne crossover brings it in at 43 Hz. The HD-1s run at full range, so

they get a feed straight from the console without going through the crossover. This makes it easy to turn the subwoofer off and listen only to the HD-1s. Stubblebine purchased the Velodyne just to be sure he doesn't miss any subsonic problems when he's cutting.



Fred Baysinger with one hand on the Dyaxis and the other on the BIVU-500 transport controller.

The Studer Dyaxis (see May '90 "Field Test") system is used for digital editing and conversion to and from the Sony 1630. The A/D-D/A converters are highly regarded

by Bob Hodas
PHOTOS: ANDREW D. LAUTMAN

in the industry, and the multiple format and sample rate conversions Dyaxis offers are a necessity when operating a mastering facility. Who knows what format will walk through your door? The Dyaxis also has EQ and will soon have compression for those who want to stay strictly in the digital domain. All mastering and editing tasks can be handled with the Dyaxis. Rocket has installed two-and-a-half stereo hours of disk time in the Dyaxis, enough to handle just about any task. Adding to its versatility, Rocket Lab can also be rented out strictly as an editing suite. On the Dyaxis, audio editing and audio-for-video post is a simple task, and Rocket Lab has a full complement of video equipment.

Dyaxis is not the only converter option offered. The Sony 1630 is fitted with Apogee filters, and an audiophile A-D converter is also available. Clients leave with a 1630 videocassette ready for shipment directly to the CD pressing plant. PQ subcodes are available for those who need to do European pressings (U.S. plants usually don't want the codes on the tape).

A full-blown Sonic Solutions machine rounds out the state-of-the-art

**San Francisco has
a new mastering room**

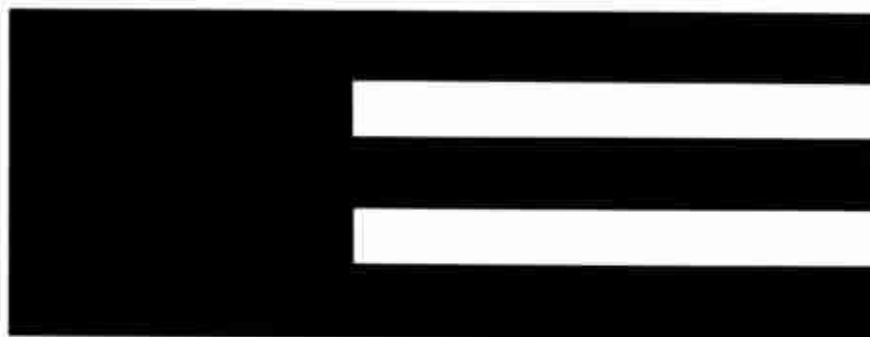
to be proud of:

**Rocket Lab, a CD
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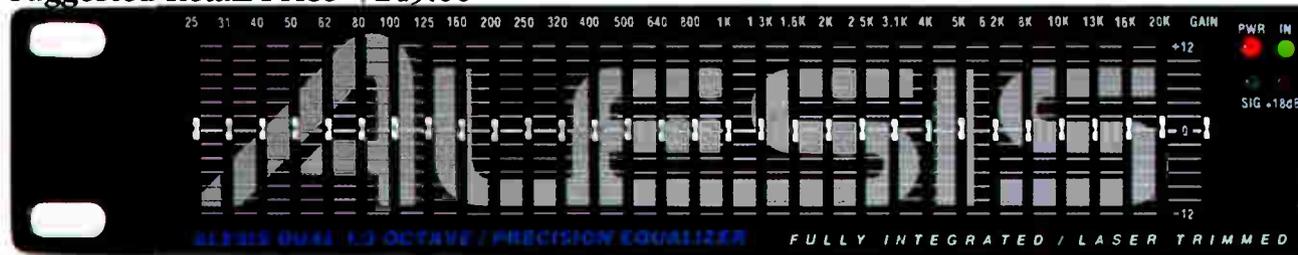
options. Rocket chose a Sonic System that includes the complete CD prep package with NoNoise offered as an option. In addition to input and output levels, it performs real-time sample frequency conversion, EQ, compression, limiting, gating and expansion. Loading can be done in the background, which saves clients a lot of time. Sonic System is a fully automated system as well. Over two hours of stereo disk time is available. The company has purchased a Sony "Write-Once" system and will cut CDs on the premises for final approval.

The console is one of eight custom-made for the renowned JVC cutting rooms, once operated by Stan Ricker. This classic mastering console is moderately sized and has a computer keyboard mounted on it for controlling the Dyaxis. Many of the respected Mobile Fidelity projects were mastered using this console. Some mods, such as custom chips and hard-wire bypasses for a cleaner signal path, are also integrated.

An Ampex ATR-104 2-track (1/4-inch and 1/2-inch heads) is available for analog masters, along with Dolby A and SR. For the audiophiles there will



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be an Ampex MR-70 2-track with custom 1/2-inch heads made by Tim de Paravicini at E.A.R. A 1/4-inch MR-70 is available as well. Rocket is catering to all commercial projects, though Stubblebine says he welcomes the audiophile market.

Both analog and digital signal processing are available for clients. The list includes Focusrite and E.A.R. limiters that can be used in addition to the console's own limiters. In the digital domain, the Dyaxis and Sonic Systems can perform limiting tasks. Outboard EQ includes Massenburg and E.A.R., along with processing in the JVC console, Dyaxis system and Sonic System. The usual assortment of reverbs are on hand, including esoterics such as Quantec and Dynacord.

Rocket Lab's parent company, Rocket Rentals, also has a complete video suite, which can be linked to the mastering suite to offer clients high-quality audio throughout a video project. All audio editing can be done with the Dyaxis in the digital domain and then locked to time code, providing first-generation audio for a finished video.

The editing suite is quite unique in

that it is modular and can be completely broken down for portability. Clients can edit in Rocket's suite or have the suite brought to them in their hotel, office, home or on location. The portable video editing suite grew out of a demand for high-quality, low-cost, low-pressure editing. It was a natural move for Rocket, which was already well-established in the nationwide video market. The suite operates as a daily rental—eliminating the hourly fee pressures—and allows clients to work where they feel most comfortable. The EDL is stored as a CMX-style list on a floppy disk as opposed to a printout. This saves the client time when working on multiple systems around the country. Management of the video rentals is handled by Fred Baysinger, while Nancy Evans manages the mastering lab. Rentals are mainly for broadcast, with some industrial work as well.

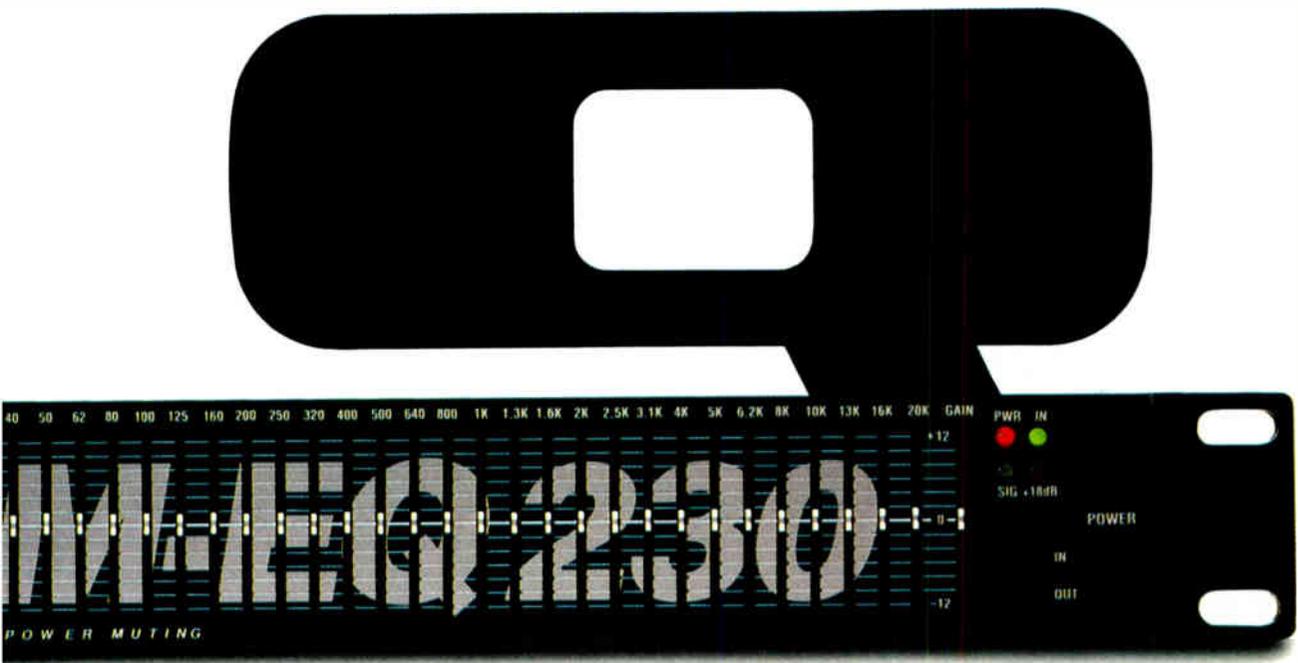
Chief engineer Stubblebine, a veteran in the mastering business, started mastering for Columbia Records in San Francisco in 1973. When the studio changed hands and became Automatt, he stayed on and ran the mastering room for David Rubinson. He mas-

tered hundreds of records and substantial hits during those years. Stubblebine was even involved in the first digitally mastered album in the U.S. (featuring Herbie Hancock and Chick Corea), which was mastered to a Sony U-Matic prototype that was never sold in production. A fine recording engineer as well, Stubblebine was part owner of a popular Marin County studio for several years.

A second mastering engineer, John Acoca, arrived from L.A. to join the Rocket Lab staff. Acoca, who is well-versed in digital workstations and the digital domain in general, worked in a variety of top mastering rooms—JVC Disc, Hot Tin Roof, MCA, A&M and Bernie Grundman's—before settling in the Bay Area.

Rocket Lab has a friendly, highly professional staff. It is a world-class facility that will make a positive contribution to the Bay Area music scene. ■

Bob Hodas is a San Francisco Bay Area-based engineer whose credits include Windham Hill Records, the Doobie Brothers, the Village People and Mickey Hart.



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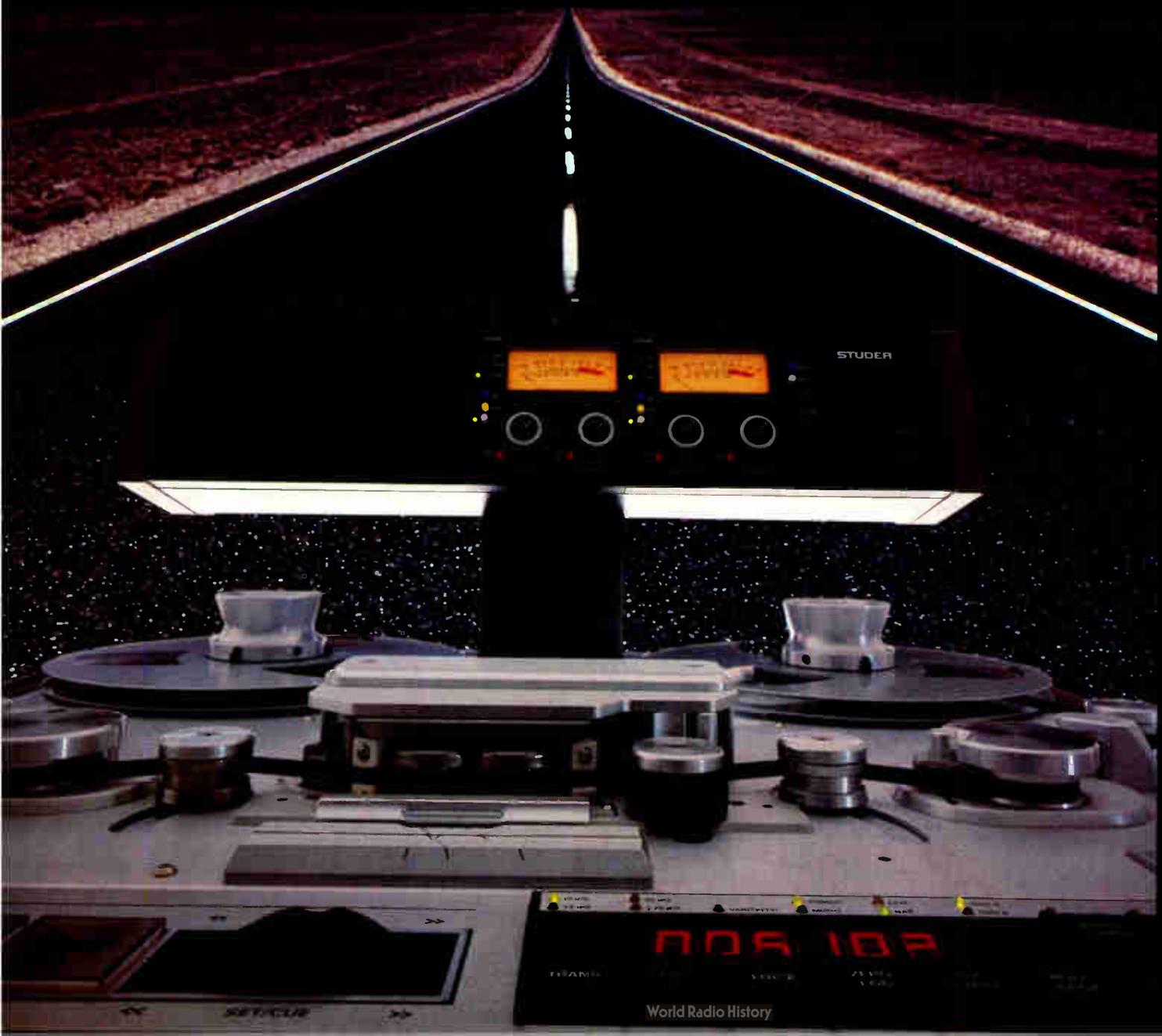
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information for various tape types.

However, the most compelling reason for analog 2-track's dominance over other stereo formats is that it is the most universally accepted professional tape

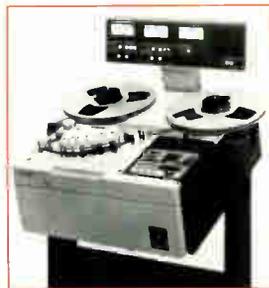
FOSTEX E-2 format, found in recording studios, mastering houses, production facilities and

with the availability of then-advanced technology such as the Soundstream and 3M digital machines. Well, one decade later, analog's still with us and it's better than ever, while the remaining user base for the aforementioned digital systems can be counted on your fingers—with a couple to spare.

Not that there's anything inherently wrong with digital, but sometimes it's nice to be able to play back a tape a couple of years after you've recorded it. It's no coincidence that professionals involved with audio

OTARI MTR-15

archiving make both analog *and* digital safety copies of important material. Analog has a predictable shelf life—who can say whether a DAT tape recorded yesterday will be playable in the year 2010?



At the same time, improvements in record electronics, noise reduction and tape formulations in recent years provide the analog medium with specs that can rival or surpass digital. And 2-track recorders with center-track time code capability have virtually eliminated the need for 4-track recorders in the post-production realm. Flexibility has also increased with the incorporation of microprocessor control in transport design, yielding faster—yet gentler—tape handling, versatile autolocate features, and even

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the ability to program and store bias and equalization



radio stations worldwide. Add to this an unparalleled ease of editing—using basic, simple tools—and it's obvious that there's a lot of life left in the analog 2-track realm.



Whether equipping a new studio or upgrading an existing facility, the prospective purchaser of a new 2-track machine is faced with a large number of choices. The accompanying chart lists dozens of recorders, but with a wide

variety of available options—ranging from mounting and console selections to speed, format and time code versions—the actual number of machines to choose from is much higher.

Finding the best machine to fit your needs begins with evaluating the most basic parameters. A 30 ips, half-inch time code machine would probably not be the best choice for a simple home studio, just as a large, console-mounted

SONY APR-5003V recorder would prove unwieldy in a cramped recording van.

These days, price is a major consideration for nearly everyone. If money is tight and your future plans involve getting into time code work or half-inch mastering, a suitable choice may be a deck that allows adding such options at a later date.

Unfortunately, a recorder's maximum reel capacity is one feature that doesn't permit future upgrading, so buyers should carefully look at their

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BY GEORGE PETERSEN

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the differing and/or incomplete reporting of measurement methods used by the manufacturers, so contact a local audio dealer or the companies directly for more information in this area. Prices refer to *basic* models (specialized versions, such as logging decks and playback-only models, are not included in the chart) and dimensions include the console or floor stand *only* if it is supplied with the standard version. Another point to note is that the heights of units include the meters in an overbridge configuration; some models allow mounting the electronics below the transport in a low profile setup. Also, all prices are suggested list in U.S. dollars. ■

2-TRACK RECORDER MANUFACTURERS

Fostex Corp. of America
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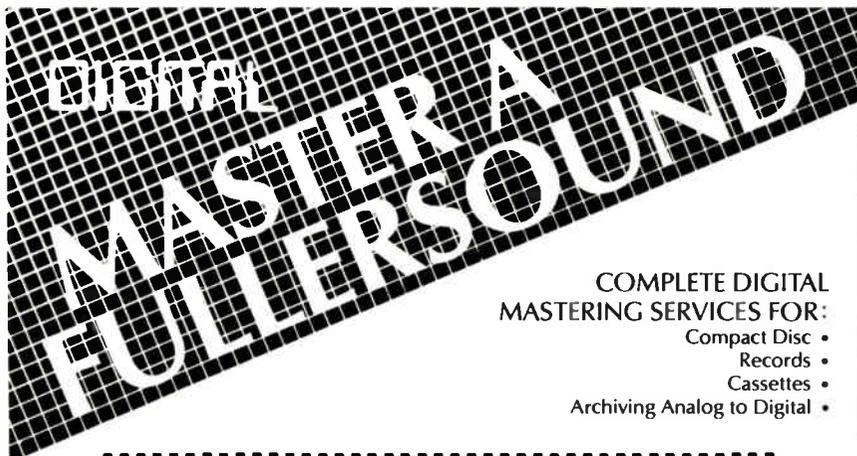
Nagra USA
19 West 44th Street
New York, NY 10036
(212) 840-0999

Otari Corporation
378 Vintage Park Drive
Foster City, CA 94404
(415) 341-5900

Sony Corporation of America
1600 Queen Anne Road
Teaneck, NJ 07666
(201) 833-5745

Studer Revox America
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Nashville, TN 37210
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Engineer: Michael Fuller

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Analog 2-Track Recorders: Facts and Features

MANUFACTURER	MODEL	FORMAT	MAX. REEL SIZE (INCHES)	SPEEDS (IPS)	PITCH CONTROL (%)	CENTER TRACK	MONITOR SPEAKER	METERS, TYPE	MIC INPUTS, TYPE	CONSOLE/FLOOR STAND	RACK MOUNTABLE	WEIGHT (KG)	DIMENSIONS W x D x H (mm)	PRICE U.S. \$	NOTES*
FOSTEX	E2	1/4	10.5	7.5/15	±15	YES	NO	3 VU	NO	OPT	OPT	30	430x444x235	3,750	B
FOSTEX	E22	1/2	10.5	15/30	±15	YES	NO	3 VU	NO	OPT	OPT	30	430x444x235	3,995	B
NAGRA	T-Audio NTA.3TC	1/4	11.8	(4) 3.75-30	±10	YES	YES	2VU	NO	OPT	YES	22	420x610x250	31,323	B,C
OTARI	MX-50	1/4	10.5	7.5/15	±7	NO	NO	2 VU	NO	OPT	OPT	25	430x450x186	2,495	J
OTARI	MX-5050B-III	1/4	10.5	3.75/7.5 or 7.5/15	±7	OPT	NO	2 VU	XLR	OPT	OPT	27	442x518x259	3,295	O
OTARI	MX-5050B MkIV-2	1/4	10.5	3.75/7.5 or 7.5/15	±7	OPT	NO	2 VU	XLR	OPT	OPT	48	439x718x476	4,295	A,O
OTARI	MX-55N	1/4	10.5	3.75/7.5 or 7.5/15	±20	NO	YES	2 VU	XLR	OPT	OPT	30	440x488x222	4,295	E,J
OTARI	MX-55N-HS	1/4	10.5	7.5/15 or 15/30	±20	NO	YES	2 VU	XLR	OPT	OPT	30	440x488x222	4,595	E,J
OTARI	MX-55NM	1/4	10.5	3.75/7.5 or 7.5/15	±20	NO	YES	2 VU	XLR	OPT	OPT	30	440x488x222	5,495	A,E,J
OTARI	MX-55TM	1/4	10.5	3.75/7.5 or 7.5/15	±20	YES	YES	2 VU	XLR	OPT	OPT	30	440x488x222	6,495	A,E,J
OTARI	MTR-12H	1/2	12.5	(3) 3.75-15 or 7.5-30	±20	NO	YES	2 VU	NO	YES	NO	100	634x588x1170	12,775	A
OTARI	MTR-15N	1/4	12.5	3.75-30	±50	NO	YES	2 VU	NO	OPT	YES	46	440x488x244	9,250	A,E,G,J,K
OTARI	MTR-15H	1/2	12.5	3.75-30	±50	NO	YES	2 VU	NO	OPT	YES	46	440x488x244	10,350	A,E,G,J,K
OTARI	MTR-15T	1/4	12.5	3.75-30	±50	YES	YES	2 VU	NO	OPT	YES	47	440x488x244	11,270	A,E,G,J,K
REVOX	B77HS	1/4	10.5	7.5/15	±10	NO	NO	2 VU	1/4"	NO	OPT	17	452x414x207	2,995	H
REVOX	PR99 MkIII	1/4	10.5	7.5/15	-34/+47	NO	OPT	2 VU	OPT	OPT	YES	19	483x349x201	3,495	G,H
REVOX	C270-2	1/4	10.5	3.75/7.5/15	-33/+50	NO	YES	2 LEO	NO	OPT	YES	23	432x444x203	4,695	E
REVOX	C270-TC	1/4	10.5	3.75/7.5/15	-33/+50	YES	YES	2 LEO	NO	OPT	YES	23	432x444x203	6,495	E
SONY	APR-5003V	1/4	12.5	7.5/15/30	±50	YES	YES	3VU	NO	OPT	YES	46	480x410x502	11,975	A,C,K
STUOER	A807-2/2	1/4	11.1	(3) 3.75-15	-35/+54	NO	YES	2VU	XLR	OPT	OPT	30	410x326x231	8,495	A,E,I
STUOER	A807-2/2 TC	1/4	11.1	(3) 3.75-15	-35/+54	YES	YES	2VU	XLR	OPT	OPT	30	410x326x231	11,495	A,E,I
STUOER	A812-2/2	1/4	12.5	(4) 3.75-30	-35/+54	NO	YES	2VU	NO	YES	NO	83	690x635x1126	14,500	A
STUOER	A812-2/2 TC	1/4	12.5	(4) 3.75-30	-35/+54	YES	YES	2VU	NO	YES	NO	83	690x635x1126	17,500	A
STUOER	A820-2/2-1/2"	1/2	14	(4) 3.75-30	-35/+54	NO	YES	2VU	NO	YES	NO	91	700x656x1298	19,900	A,K
STUOER	A820-2/2-1/2" TC	1/2	14	(4) 3.75-30	-35/+54	YES	YES	2VU	NO	YES	NO	91	700x656x1298	23,900	A,K
TASCAM	22-2	1/4	7	7.5/15	NO	NO	NO	2VU	1/4"	NO	OPT	14	410x326x231	1,099	
TASCAM	32	1/4	10.5	7.5/15	±12	NO	NO	2VU	1/4"	OPT	OPT	20	410x461x256	1,749	
TASCAM	3030	1/4	10.5	7.5/15	±6	NO	NO	2VU	1/4"	OPT	OPT	21	431x440x268	2,299	F
TASCAM	BR-20	1/4	10.5	7.5/15	±12	NO	YES	2VU	OPT	YES	YES	20	483x444x179	2,399	
TASCAM	BR-20T	1/4	10.5	7.5/15	±12	YES	YES	2VU	OPT	YES	YES	20	483x444x179	2,999	
TASCAM	ATR60-2N	1/4	10.5	7.5/15	±15	NO	OPT	2VU	NO	OPT	YES	45.6	483x566x310	4,500	A
TASCAM	ATR60-2HS	1/2	10.5	15/30	±15	NO	OPT	2VU	NO	OPT	YES	45.6	483x566x310	4,500	A
TASCAM	ATR60-2T	1/4	10.5	7.5/15	±15	YES	OPT	2VU	NO	OPT	YES	45.6	483x566x310	6,999	A

*Key to Notes: A = meter bridge version B = meter bridge optional C = includes synchronizer O = time code option available E = Dolby HX Pro™ standard F = includes dbx noise reduction
 G = transformer inputs/outputs optional H = low-speed version available I = phantom power on mic inputs J = voice editing option allows 2x playback at normal pitch
 K = auto alignment system stores data for various speed/tape type combinations

by Philip De Lancie

AES 1990

MORE PROGRESS THAN DRAMA IN DUPE AND CD GEAR

The feeling of many attendees at September's 89th annual AES convention in Los Angeles was that it was a year for refinement of existing wares rather than dramatic breakthroughs. While that means a less exciting show for those cruising for the next big thing, there's a lot to be said for consolidation of existing technology, especially in an industry suffering from IFPS (Incompatible Format Proliferation Syndrome). The trumpeting of "vapor-gear" is part of the game at these events. But for the duplication and CD manufacturing markets, the emphasis seemed to be on showing that yesterday's ideas have been

successfully transformed into today's real products—with real applications.

Among the most significant recent advances in the duplication community is the use of Dolby's new S-type noise reduction for pre-recorded product. Confirming the company's commitment to duplication, Dolby was showing its Model 422 encoder/decoder. Two channels in the single-rackspace unit are selectable encode/decode; two more are decode only. B-, C- and S-type processing are included, while optional filters are being offered for specific applications. Multipin connectors on the rear al-

low remote control and external processing.

Studer Revox was showing a new adaptation of its A820 machines to the duplication field, the A820-MR bin-loop master maker. The microprocessor-controlled 4-track, which operates at 3.75 and 7.5 ips in both 1/2-inch and 1-inch formats, comes standard with Dolby HX Pro and equalization for both ferric and chrome tape.

Over at the KABA booth, meanwhile, another Studer product, the Dyaxis 2+2, was in use as a master reproducer for real-time cassette duplication. The Dyaxis can reverse side B program and output both sides (four channels) simultaneously during duping. With the Dyaxis feeding KABA's 4-track recording slaves, real-time duplication of the complete cassette takes only the time of the longer side program. KABA's Tom Anderson says Studer Editech is working on double-speed playback capability to take full advantage of the double-speed record mode of the slaves. The two companies have announced a co-marketing agreement under which KABA will sell the Dyaxis in a package with its duplication systems.

Digital Reproducers

The infiltration of digital techniques into high-speed cassette duplication continues, with three companies showing digital master reproducers ("digital bins"). Italian manufacturer Tapematic displayed the updated version of SAM (Static Audio Master), which is in use at eight plants worldwide. SAM Due ("two" in Italian) features 16-bit linear D/A conversion and a RAM memory capacity of 124 minutes. Storage may be split into two memories of



Studer's A820-MR is designed specifically for bin-loop master recording.



KABA Development's Ken Bacon (seated) and Lee Cochran of Studer Editech using the Dyaxis 2+2 digital editor for tapeless mastering with the KABA 4-track real time duplication system.

up to 62 minutes each, allowing real-time loading and auditioning of a digital source while duplicating another program. Analog sources may be loaded at high speed.

Duplitronics was on hand with its DM 400, which loads digital program at high speed from tapes specially prepared on a master-maker version of the machine. Using slaves and loaders of neighboring exhibitor Lyrec, the company was the only digital reproducer maker to duplicate product at the show. President Jeff Binder says one major label has committed to the system, and another major deal is in negotiation. Major label-types were spotted hovering near the booth, but identities are being withheld pending delivery and installation.

Concept Designs, meanwhile, displayed a Type R (RAM) version of DAAD featuring 4-megabit memory chips. The Type D (hard drive) version of the digital bin has been online for some time at Sonopress in Weaverville, N.C., and Type R is headed for Specialty (WEA Manufacturing) in Olyphant, Pa. That installation is supposed to include the first of Concept's high-speed loading systems using Honeywell VLDS machines with VHS Type-S cassettes. While pictures of the load system were available, it was not on display at the show.

Concept showed another kind of loader, however, its new CD 9000 automatic cassette loader. The unit includes "ultra-precision" splicing, an end-of-batch predictor, the Fast Feeder, Multistacker and vacuum-free prewind extraction. The company also announced the forthcoming availability of "dSource," a 44.1kHz digital reference/calibration tone generator outputting in SDIF2, AES and SPDIF formats.

Electro Sound's 9000

No further word on digital reproducers was forthcoming from Gauss or Electro Sound, the Mark IV-owned heavyweights in the duplication field. Company president Jim Williams had confirmed previously in this space that such a system was in the works, but the Series 9000, an analog bin-loop reproducer and a dual-transport slave, was the featured new attraction at the booth. The two slaves (in one cabinet) are driven by a single brushless, DC servo-controlled capstan drive at speeds up to 150 ips. Electronics on the slave include Dolby HX Pro, and both master and slave allow recall of two preset tape alignments. The master, with a vacuum-column, servoed-tension control system, is designed for duplication ratios ranging up to 64:1 for 75 ips masters and 80:1 for 3.75 ips. The master is priced at \$32,000, while a dual-slave unit goes for \$30,000.

A new head assembly design for existing Electro Sound slaves was introduced by JRF Magnetic Sciences. Heads mounted on the "T-Bar" may be mechanically aligned from above rather than underneath. Saki Magnetics showed new heads for Studer A80 and Otari DB-1610 quality control decks. The company claims the all-ferrite replacements will wear six to ten times longer than the metal originals.

A visit to the capacious and hospitable Agfa booth uncovered no new developments on the takeover of the company's magnetic tape division by BASF. But product introductions continue, underscoring the company line of "business as usual" until the deal is approved by the German government. Even after Agfa is absorbed, no radical changes in product line are likely.

According to BASF's Terry O'Kelly, Agfa products will be maintained under the BASF brand name until such time as improvements are developed by the companies' combined R&D operations.

The biggest Agfa news for audio duplicators was the announcement of a Type II, cobalt-modified, ferric duplication tape, available in December. Priced about the same as chrome stock, PE 668 (C-60) will come in 8,200- and 12,300-foot pancakes, with PE 968 (C-90) at 11,500 and 17,300 feet. The company has also expanded its line of bulk videotape for Thermal Magnetic Duplication (TMD) with the addition of PEV 194, designed especially for EP mode programs. The new formulation is to be available in quantity late this year. MMT, a mirror mother tape for TMD, is currently in field testing.

Otari has expanded its TMD line as well. The company previewed its Q-700 Video Reference Reproducer, designed for QC checking of TMD-duplicated program both before and after loading. Tape Automation also announced a video duplication QC device, the Interchange Evaluator. The machine, set for November delivery at \$4,490, measures control-track phase and level, and video RF level and lead imbalance. It automatically calibrates itself to the user's standard tape, then measures deviation from the standard values on subsequently played tapes.

Moving back to audio duplication, Telex was on hand with its line of in-cassette duplicators, including a new microcassette-to-standard cassette model that runs at 16:1. Other new products shown for the audio cassette market included Cintas Vac's CBL (blue) and CRL

(red) leader tapes, and a mailable multicassette album box from El Mar Plastics.

CD Manufacturing

Though AES is not heavily oriented toward the CD manufacturing end of the business, ODC and OD&ME, rival makers of direct read after write (DRAW) glass master recorders, were on hand. OD&ME's new CD recoder will be available in February, as will the company's compact new electroforming units,

which need no special clean room. Available now is the new Trayloader II, a fully automated CD packaging machine that integrates with OD&ME's existing Monoliner MkII automated CD production line. The company's new Videoliner, a monoline 12-inch videodisc replication system (includes molding, metalization, coating, lamination and edge trim), was scheduled for fall installation at WEA Manufacturing.

For those using batch rather than monoline replication, Automatic Inspection Devices an-

nounced development of a CD Catalog ID Verification system. The device scans a CD's inner mirror bands for ID numbers and compares them against a stored reference. The idea is to prevent mismatching of discs to printing or packaging. AID also is testing a CD Label Verification inspection system to detect defective printing. Another new entry in the inspection field, Audio Development, has developed a PQ subcode module for its CDCATS SA2 CD testing system. The module verifies conformance of the code with standards, as well as checks correlation of cue point to changes in audio program.

Digital Dominates Program Prep Products

Among the most intriguing debuts at AES was CEDAR (Computer Enhanced Digital Audio Restoration) from Cedar Audio (at the Gotham Audio booth). CEDAR, as you may recall from last month's "Tape & Disc News," is an IBM compatible-controlled hardware/software package designed to reduce or eliminate noises, broadband and momentary (clicks, pops, etc.), from recorded material. Some of the system's features, available as optional modules, are operable in real time. That allows program to be passed through the system without being loaded onto hard disk storage; operators can hear adjustments in processing parameters as they are made. To demonstrate, Cedar engineer Dave Betts played a Paul Robeson 78 from a turntable through the system in its "1-Pass Scratch Removal" mode, comparing pre- and post-processed signal. The system was remarkably successful in minimizing crackling surface noise in the signal. Cedar claims that "2-Pass Scratch Removal," which requires loading onto hard disk for processing, yields even better results.

Regarding hiss removal, CEDAR's processing seemed to work well, though an odd choice of demonstration program made the results seem less spectacular than they might have otherwise. The original hiss had some kind of modulation, which made its presence hard to ignore even after its level had been significantly re-

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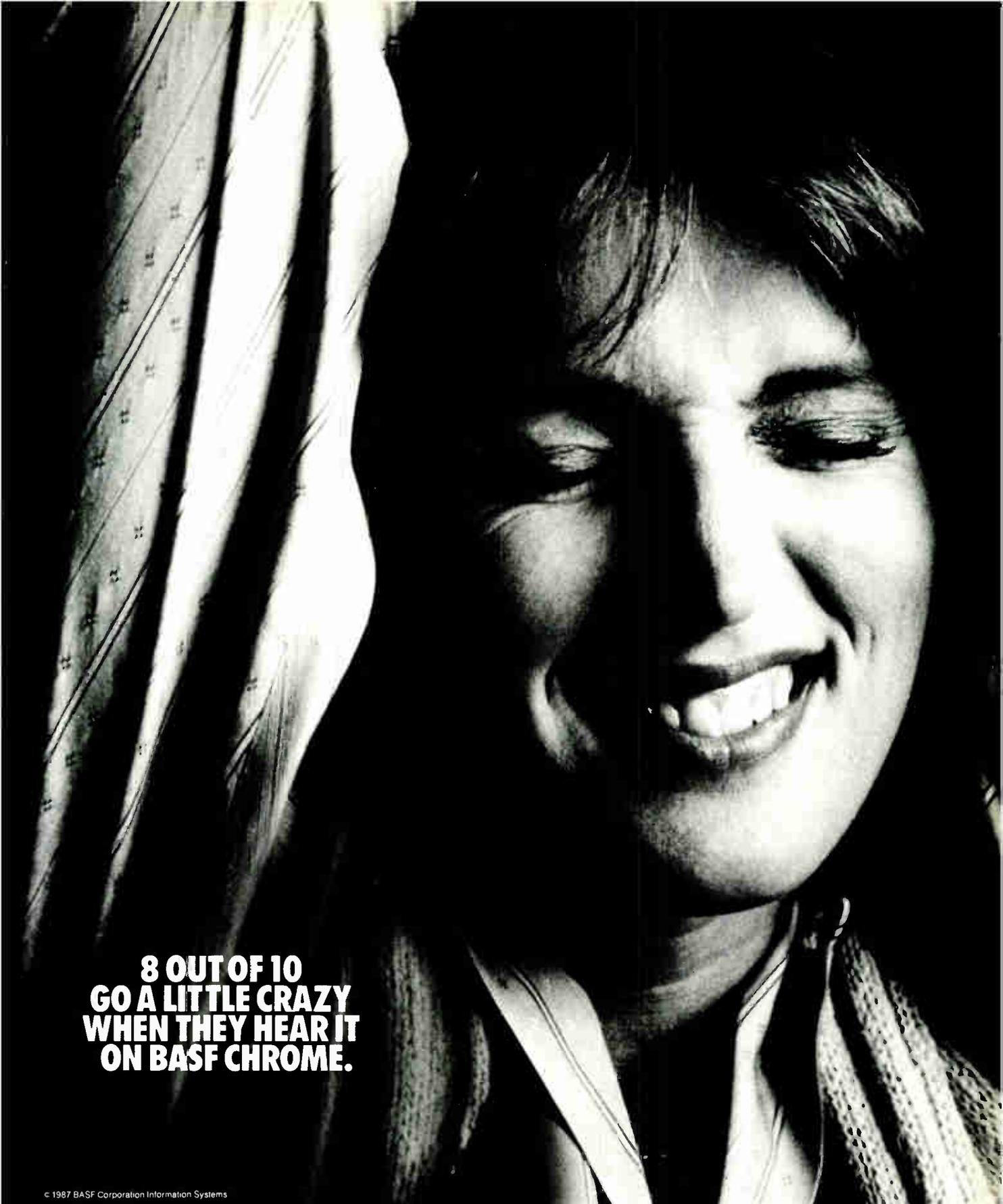


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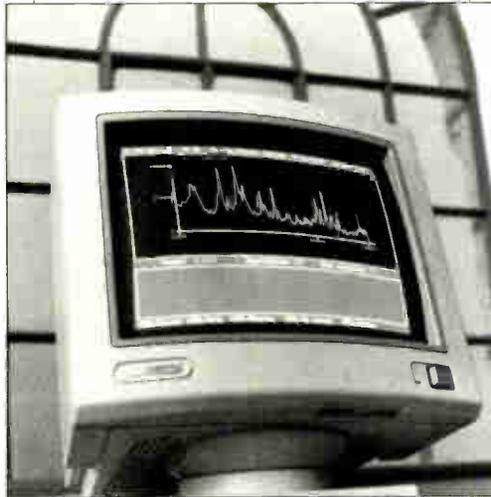
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duced by processing. Performance of the system's EQ capabilities was hard to evaluate thoroughly, but the demonstration left the impression that while a wide range of nodes and curves are available, parameter entry would likely seem cumbersome from the mastering engineer's perspective. As shown, CEDAR didn't seem ready yet to fill the role of a complete stand-alone CD preparation system, though an "advanced" editing module is in development for spring delivery. Gotham has announced the first U.S. placement of the system at BMG/RCA Studios in New York.

Sonic Solutions had several interesting developments of its own to talk about, and didn't appear to be concerned with its new competition at the show. The company was showing No-Noise II, which includes its own long-awaited module addressing the crackle problem plaguing re-issues of 78s. According to production manager John Polito, the com-

pany is not currently working on real time de-clicking or de-crackling, because, as CEDAR concedes in offering its "2-Pass" module, the best results are obtained by processing disk-stored files. But No-



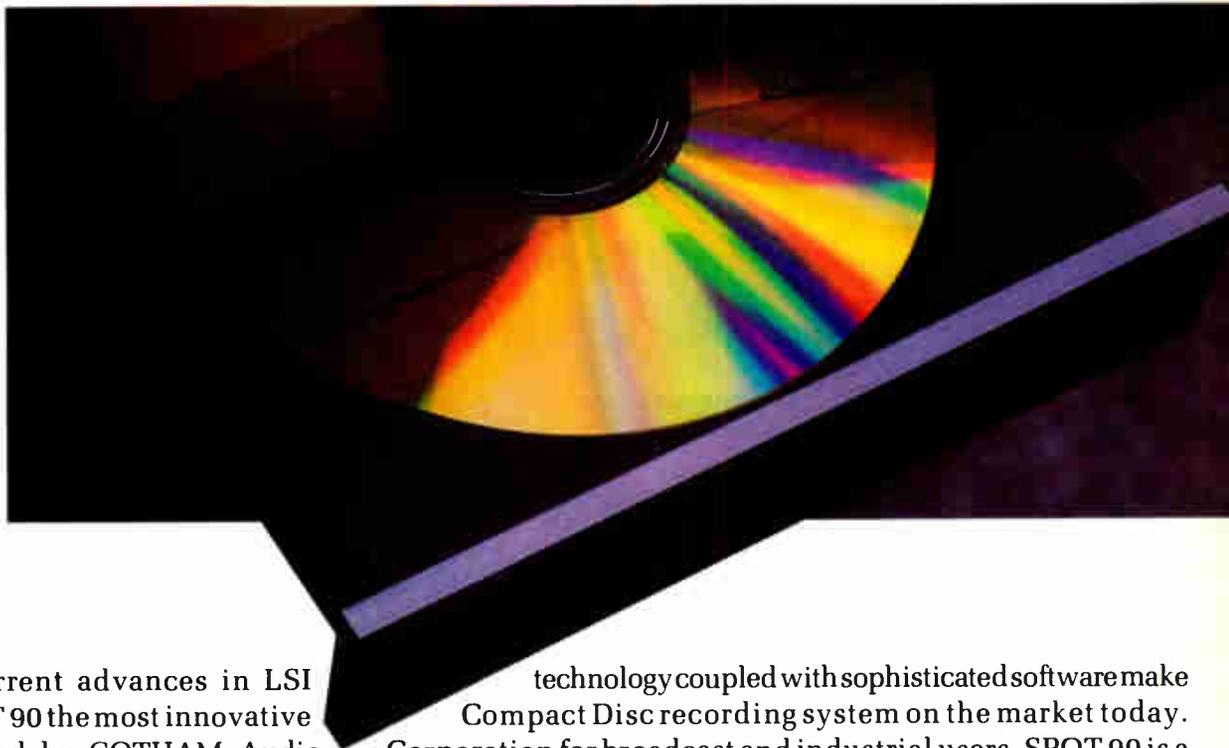
CEDAR system installed at RCA/BMG Studio in New York City.

Noise does allow pass-through hiss removal, with real-time operator adjustment of parameters.

Also announced by Sonic was the release of Version 1.0 of its CD premastering software, and a new processor for the Sonic System, the "Sonic FX," which uses Motorola DSP chips on a \$3,500 NuBus card for the Mac. Software modules, to sell for under \$2,000 each, enable the card to deliver 31-band graphic EQ, reverb, flange/phase, dynamics and time squeeze/stretch. And, perhaps in response to price pressure from systems like Digidesign's Sound Tools, Sonic will offer an "entry level" 2-track disk-based editing system dubbed the "Sonic Mini," which offers portions of the full Sonic System in a scaled-down but expandable package.

Perhaps most intriguing from Sonic was the announcement on the last day of the show of Pre-Master CD, which would allow WORM CDs to substitute for PCM-1630 format tapes in the CD mastering process. The feasibility of such a move was raised in July in this space ("DAT & CD-R: Viable Formats for CD Mastering?"), but at

SPOT 90 CD-R

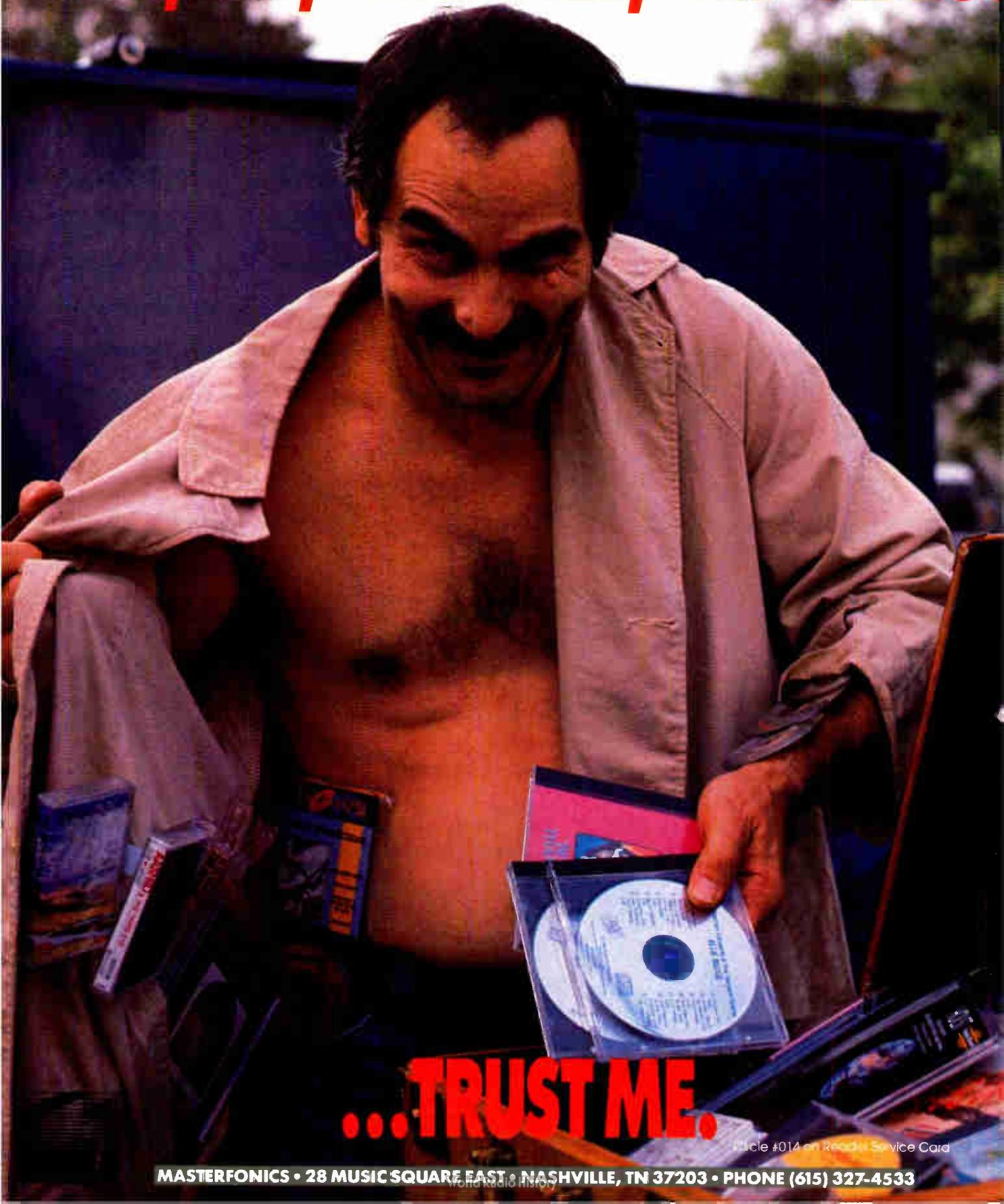


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the time there was little indication that anything much would happen soon. Now Sonic and Start Lab, the Sony/Taiyo Yuden joint venture whose CD-R writing device may be integrated into the Sonic System, are putting the necessary elements in place. Using the PreMaster CD software, Sonic System users would prepare audio and PQ information and record on CD-R using CD Maker. At the CD plant, the subcode information needed for cutting the glass master would be read from the CD-R disc by Master Maker, a "special version" of the Sonic System/CD Maker combination. The participants claim that CD plants will begin accepting PreMaster CD discs as a standard input format by January 1991. In the meantime, test programs are underway at several plants, including DADC, with the cooperation of MCA, Capitol and Warner Bros.

Another CD-R based system was being shown by Kenwood, which set up its CD-WO (Write Once) to record the voices of visitors with a microphone in their booth. The PC-controlled system is designed for both audio and ROM markets, and allows uninterrupted and incremental recording. Increased use of optical technology in production tools was also in evidence at Otari in the form of the DDR-10. The unit is, at heart, a Macintosh II (hidden inside) running Sound Tools, but packaged in a console with hardware controls that move away from strict computer-style operation. In addition to magnetic hard drive storage, it features optical storage on rewritable and removable discs. The company will market the device as a 2-track recorder with editing capabilities far exceeding those of tape-based systems.

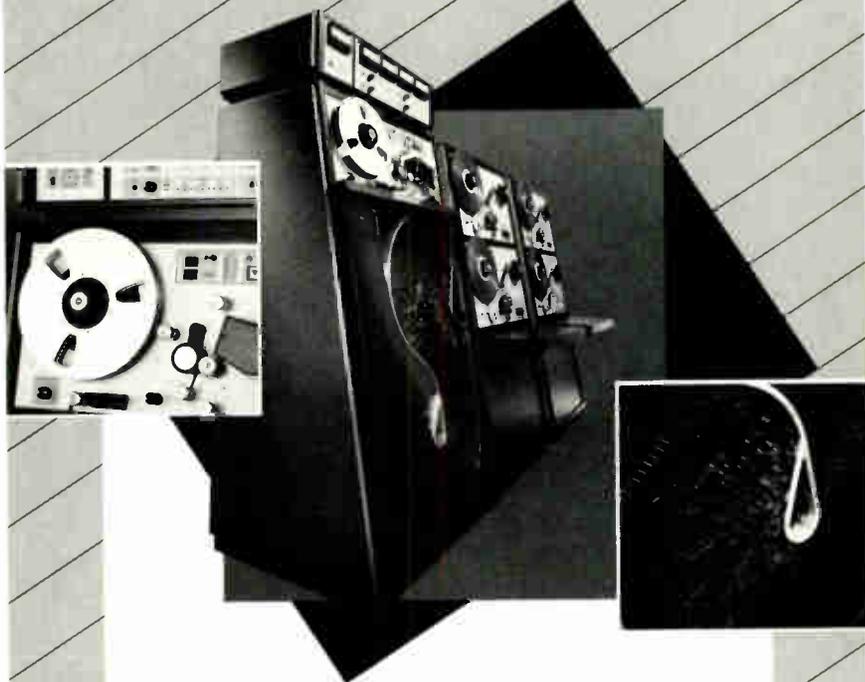
In the realm of pure mastering tools, Sony's digital mastering unit, the SDP-1000, was prominently featured, along with the time code/editing DAT machines previewed by Ken Pohlmann in the August *Mix*. The SDP-1000s on hand were the same version as those shown last year, but product manager Mike Sekiguchi expects an upgrade by the end of this year that will include no profound changes but many small operational refinements.

Audio Animation was back with the Muse; this year's version features faster graphic and control response, and an automation system completely reworked by former Sterling mastering engineer Mark Goode. The mastering console is online at Sterling and Georgetown Masters. An interesting new product from the company is Paragon, a stereo digital FIR (Finite Impulse Response) signal processor with various EQ and multiband compression features. Though currently set up for broadcast applications,

a studio and mastering version of the \$9,450 unit's user interface may be forthcoming. Another FIR product with potential application in the mastering room is Pygmy Computer Systems' AD-1 converter. The \$3,500 unit uses sigma-delta (single-bit) conversion and linear phase digital filters to convert analog to digital at either 44.1 or 48 kHz. ■

Tape & Disc editor Philip De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.

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by Philip De Lancie

TAPE & DISC NEWS

Japan's Otari Inc. is set to seize the leading position as a supplier of loaders to the audio and video duplication industries. The company's U.S. subsidiary, based in Foster City, Calif., has reached an agreement to acquire the assets and operations of King Instrument Corporation. It's unclear as yet how the two companies, which only a few years ago were contesting patent issues in court, will integrate staffs and product lines. A company statement says no immediate changes are planned, but King may end up as a manufacturing source for Otari's international loader business. Jack Soma, Otari's U.S. president, says the ac-

quisition of U.S. manufacturing capacity will free Otari from the "foreign exchange nightmare and any potential restrictions on imported goods."

♦ ♦ ♦

Undeterred by controversy, Sony is pressing ahead with its plans to bring a full line of DAT products to the U.S. market. The home electronics giant has unveiled a DAT Walkman, model TCD-D3, and an auto DAT player, the DTX-10, which includes an AM/FM tuner and controls for DiscJockey CD changers. The models, listing for \$850 and \$1,100, respectively, should be available by year's end.

The introductions reflect Sony's awareness that the success of any new format in the U.S. will be largely determined by its ability to compete not only in the living room but in the streets. The Walkman, without battery, measures only 3-3/8 x 1-5/8 x 4-3/4 inches, and weighs less than one pound. The rechargeable battery pro-

vides up to two hours of operation away from AC, and the unit may also be powered from a car battery. An optional "car connecting pack" allows playback through existing car stereos.

Sonically, both the new units use 8x oversampling, dual 18-bit DA converters, and claim 90 dB or more of dynamic range with frequency response out to 22 kHz. The Walkman is a recorder, featuring mic inputs as well as digital and line level analog ins and outs. It records at 48, 44.1 and 32kHz sampling rates, using 64x oversampling A/D conversion.

♦ ♦ ♦

Sonopress, whose annual output of 150 million makes it the largest cassette duplication firm in the world, has announced further expansion of its capacity and services. The company, owned by RCA parent BMG, is upping capacity at its Weaverville, N.C., plant to 500,000 cassettes per day, including 250,000 singles. A new die-cutter and Scandia sleeve have also been acquired to allow the production of custom-designed packaging. Sonopress will also open a CD plant in Mexico City to increase worldwide replication capacity by 2 million annually.

♦ ♦ ♦

In a sign of continued strength for the CD market, Commerce Department figures showed CD player sales for the first half of 1990 rising 8.2% over the same period last year. As reported in *Audio Week*, 2,644,723 players were imported from January to June. Nearly 80% of them came from Japan, with Singapore a distant second at 6%. The Japanese machines alone con-



Sony TCD-D3 DAT Walkman

tributed more than \$257 million to the U.S. trade deficit.

♦ ♦ ♦

Leading cassette shell supplier Shape Inc. has completed another phase of its bankruptcy reorganization with the merger of subsidiary DAP Tool and Mold into the parent company. DAP, which designed and manufactured injection molds for the audio, video and computer industries, has ceased to exist as a legal entity, but the reorganization provides for all allowed general and priority claims to be paid in full. In announcing the merger, Shape trustee William A. Brandt Jr. noted that the company had filed a motion, "which will enable us to pay even those creditors who did not file proofs of claim." Shape Inc. remains under protection of Chapter 11 of the Bankruptcy Code.

♦ ♦ ♦

A new developmental tool for mastering a variety of CD formats has been introduced by Interactive Support Group of Chatsworth, Calif. MacPDS Tools is designed to integrate hardware and software from ISG with a Macintosh II computer and Yamaha's PDS CD writing system. ISG's CD Mastering Board for the Mac is a single NuBus board that generates all data and commands for interfacing with the PDS components, the YPE-201 and YPR-201. The CD Disc Generator is the company's software for producing CD-Audio, CD-ROM (including XA) or CD-I discs. The package is intended for a range of applications, including limited runs of CD-ROM or, with the addition of an "audio grabber," CD-Audio for studio or broadcast use.

♦ ♦ ♦

Sunkyong Magnetic is launching a series of three-day seminars for audio duplication tape users on topics including QC inspection procedures, precision tape testing, and tape properties and specifications. The gatherings, slated to begin early in 1991, will

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TAPE & DISC

be conducted by Sunkyong technical director Joe Kempler at the company's new U.S. headquarters in Long Beach, Calif. Kempler is also writing Sound Talk, a free technical bulletin recently initiated by Sunkyong as part of a program to disseminate technical and practical knowledge about magnetic tape. Further information on Sound Talk or the technical seminars is available from Shelly Paulsen at (213) 830-6000.

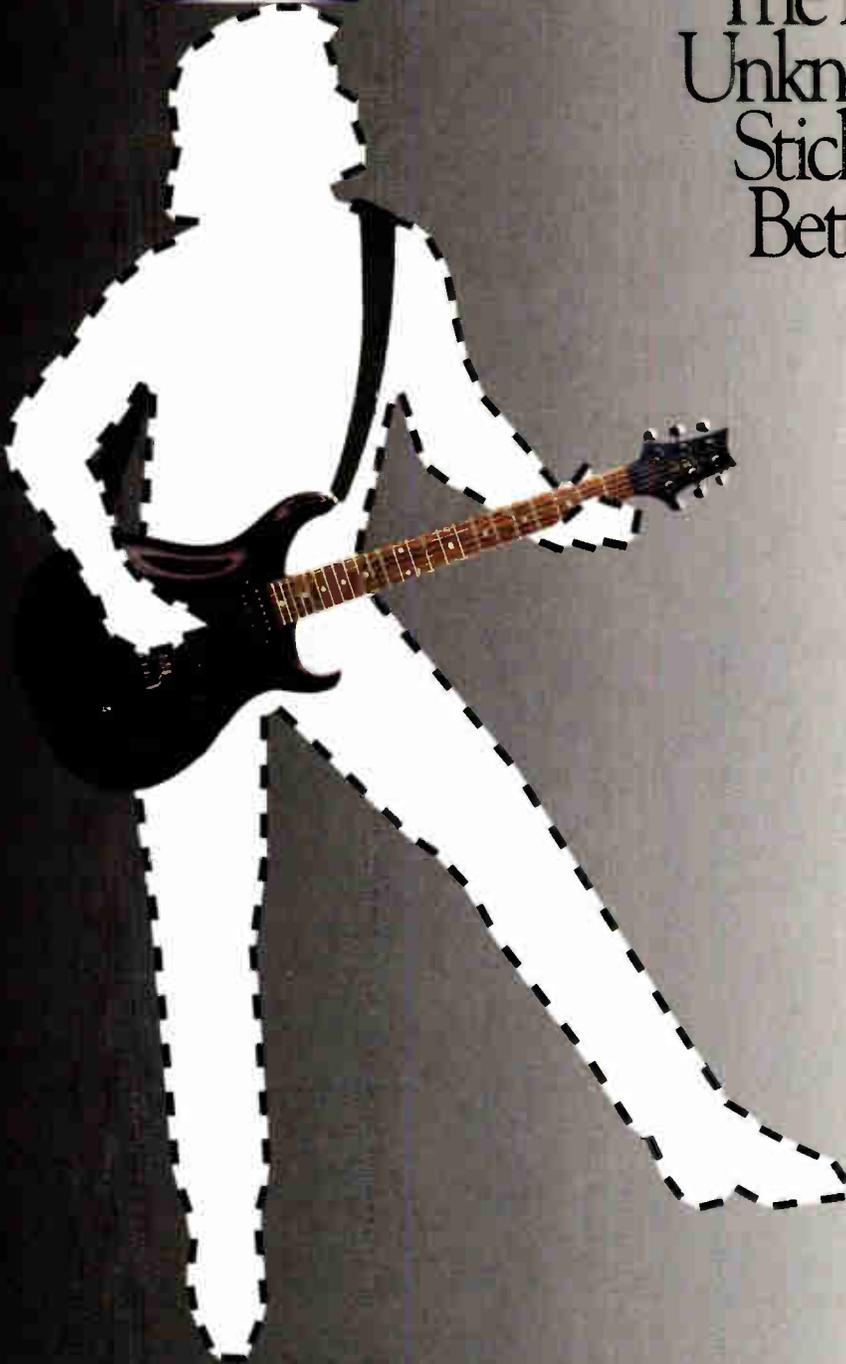
SPLICES

3M has added the 83.5-minute AUD 80+, a 3/4-inch U-Matic for digital audio recording, to its AUD line. The tape incorporates a proprietary anti-static system in which components are treated with a topical compound designed to permanently dissipate static electricity. An anti-static leader and conductive backside treatment are also featured...Harry Hirsch of **Digital House** recently served as executive producer of an all-digital Venezuela Symphony recording of "Sinfonia Oro Negro," mastered and designed by the company. The New York City operation also completed work on classical projects for WQXR and Chamber Music Plus...Also in New York, **LRP Record Production** and **LRP Cassette Production** have relocated. The two companies, under the direction of Mikhail Liberman, provide digital recording, editing and dubbing services, as well as 50-position real-time cassette duplication on newly purchased gear from KABA in Novato, CA...**KABA**, meanwhile, has added Tom Anderson and Nicholas Vitale to its staff. Anderson will work on communicating the benefits of real-time duping to audio engineers, while Vitale will work on customer service administration...**Super Duper** has added an editing suite to its Portland, OR, facilities. The room, designed for digital preparation of audio production masters, features a Sound Tools from Digidesign, as well as UREI 809s and Panasonic DAT machines. The company has also added 25 more Nakamichi MR-213 recorders, for a total of 78 real-time decks, and an Otari DP 4050E system for economy high-speed

duping. Super Duper is the exclusive Oregon broker for CD replicator American Helix...Speaking of **American Helix** (Lancaster, PA), the company's five-color silk screen printing capability has just been used to create what is claimed to be the world's first glow-in-the-dark CD. The project for BMG Classics, a special issue for Halloween, highlighting the "macabre side" of Henry Mancini, was created using custom phosphorescent inks...A videotape QC verifier for high-speed duplicators has been introduced by **Electro Sound**, which is moving its operations from Sunnyvale, CA, to the Sun Valley, CA, home of Mark IV sister company Gauss. The VQC III is an open-reel evaluator for the inspection-continuous or spot check-of prerecorded video pancakes and incoming tape up to 14 inches in diameter...**Enterprise Corporation of America** is introducing the CDCATS Service Bureau for send-in inspection of CDs. The service uses the CDCATS system from Audio Development to check manufactured discs for conformance with Red (Audio), Yellow (ROM), and Green (Interactive) Book standards. The West Des Moines, IA, company is offering introductory testing for a "nominal" fee...**Audio Animation** has announced the formation of a Scientific Advisory Board including Ken Pohlmann and Len Feldman. The group will meet at least four times annually at the company's new Knoxville, TN, headquarters. James Sullivan, formerly of Delta-Lab, has also joined in the position of VP, sales and marketing...In Washington, the **Electronics Industries Association** has appointed Thomas Lauterback staff VP, Consumer Electronics Group, whose member companies include most major manufacturers of consumer audio and video products. Cynthia Saranti Upson takes Lauterback's place as executive director of the group's communications department...Bud Jackson has been appointed vice president of marketing at **Apollo Masters Corporation**. Based in Banning, CA, Apollo manufactures master lacquer discs for the recording industry. ■



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by Sue Gold

DANNY KORTCHMAR

NO LONGER INNOCENT

His ability to adapt to almost any type of music has made Danny Kortchmar one of the hottest and most sought after record producers/songwriters/musicians in the business today. In the past year, Kortchmar has produced Jon Bon Jovi's first solo album, songs for Hall & Oates, and

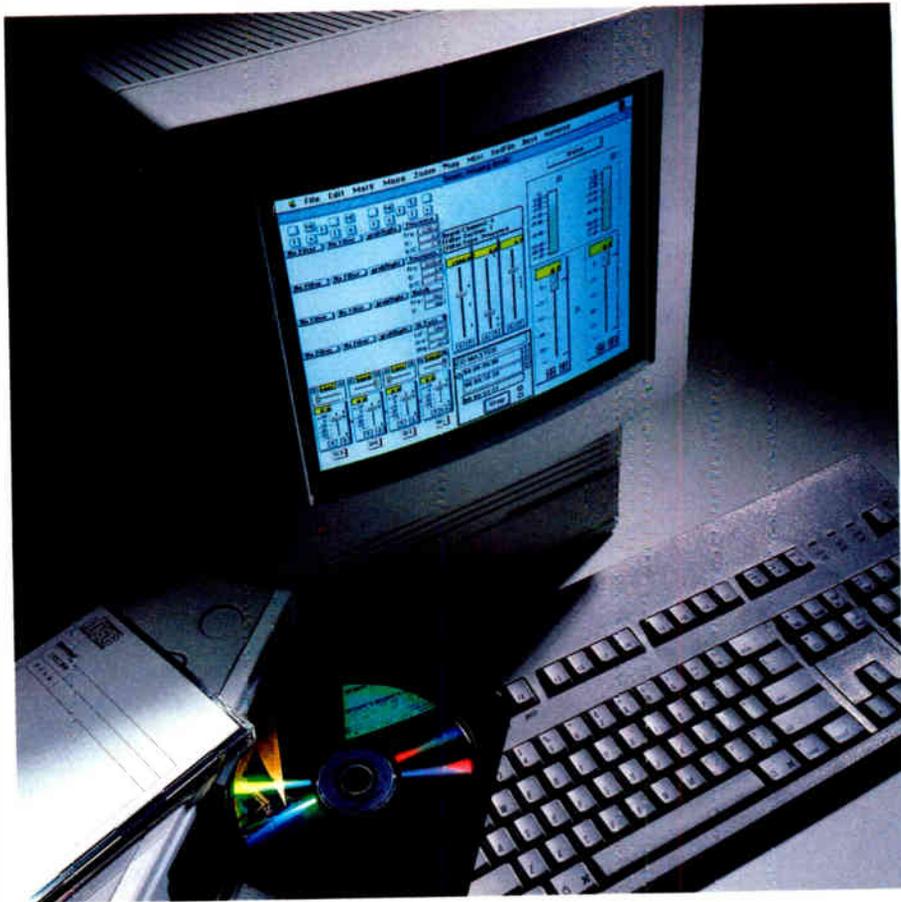
Before producing records, Kortchmar was a solo artist who recorded two albums in the 1970s. He was also one of the top guitarists of that era, playing sessions and touring with such artists as James Taylor, Graham Nash, Jackson Browne and Carole King. "Whenever I went into a session, I tried to help out and put a little bit more in than my part," Kortchmar says. "I'd make



Brent
Bourgeois.
He has also produced all three of Don Henley's solo albums, including *The End of the Innocence*, which earned him a 1990 Grammy nomination for Album of the Year.

suggestions
if I thought it would help
the overall vibe, so it was kind of a
natural progression for me to get into
record production."

Kortchmar feels it's to the artists' advantage that he is a musician. "I feel I have more to offer since I have the ability to play. With tunes I'm interested in, I sit down and play along.



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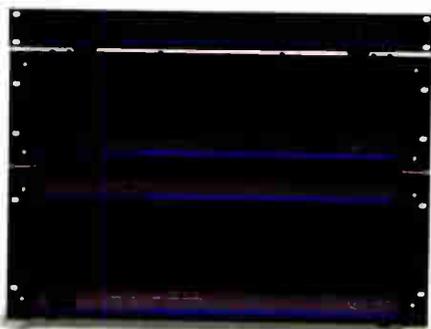
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There's no way to get to know a song better than by playing it."

Another advantage artists have in working with Kortchmar is his drum machine programming and sequencing talents. Kortchmar does most of his programming in a 12-track studio in his garage. On Henley's *The End of the Innocence*, many songs featured Kortchmar's slick programming techniques, which seemed an unlikely thing to use when you're working with one of rock's top drummers. "Don doesn't play [the drums] on his albums anymore," he explains. "I try to make my drum program as rhythm-like as possible, because when I give Don a basic track, that's what he writes to and that's what he sings to when he writes. Once he hears it that way and sets the song, melody and lyrics to it, that's what he wants to record it to."

Two tunes on Henley's album that relied heavily on Kortchmar's programming were the rockers "If Dirt Were Dollars" and "I Will Not Go Quietly." "With 'Dirt,' it was like a really

funky band," he says. "I'm really proud of that because I did a lot of playing on that track. What I was going for was a really rockin' band. And that's what it sounds like, but it was really all programmed."

"On 'I Will Not Go Quietly' I spent a long time sequencing and programming so it would have a groove. When the samples I used to make that drum kit were sequenced for that song, something happened. It ended up being terrific, so we used it. That's what I look for—things that take on a life of their own once they have been sequenced."

Kortchmar, however, plans to use live drummers in the near future. "In the beginning, we all reacted to the technology," he says. "When the LinnDrum first came out, I thought it was like a miracle. I didn't leave my studio for a year. I got an awful lot of mileage out of it, but after a while it just becomes a matter of a human thing and dealing with people."

"Sequencing is great for songwriting, but I don't know how good it is for records. I've gotten to the point where I'd rather hear real drums. When

people like Steve Jordan, Jim Keltner and Jeff Porcaro are available, then why have a drum machine?"

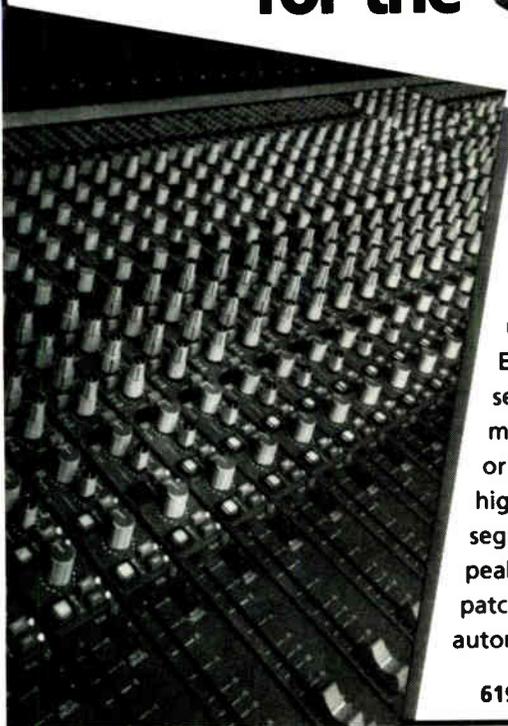
Kortchmar met Henley in the 1970s while the Eagles were still together. In 1979 he heard that Henley was preparing a solo album and met with him. "I was one of several people who went up to Don's place to play for him," Kortchmar remembers. "I worked with him a little bit, and we just hit it off and agreed on the direction that he wanted to go in."

Kortchmar says the first album was tough because "it took Don awhile to get comfortable with the role of 'recording artist.' He was a drummer who sat behind the drums. Now he had to become a lead singer, going by his own name, with just his face on the covers. In the Eagles, nobody's face was on the cover, so he had to put himself on the line. It took a lot of guts."

From the beginning, their relationship was more of a partnership, with them co-producing and co-writing the songs. "Don doesn't really write music too much, except in the sense that he edits what he hears," Kortchmar says.

—CONTINUED ON PAGE 173

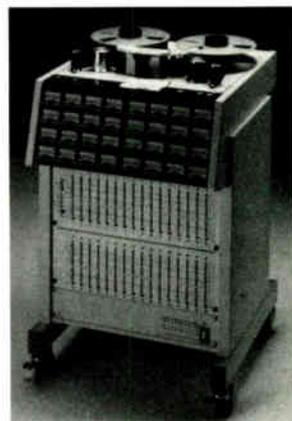
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FOCUSRITE STUDIO CONSOLE

Shown at AES and now shipping is the Studio Console from Focusrite (Bourne End, Bucks, England). Unique in many respects—including its curved design—the console uses an open architecture combining the advantages of both split and in-line designs. The Studio Console can be ordered with 24, 32 or 48 buses; standard amenities include Rupert Neve-designed ISA 110 mic pre-amp/equalizer modules, 16 aux sends and a logic routing system offering comprehensive control over all console functions. Optional are dynamics modules, PPM metering and a variety of automation packages, including GML moving faders.

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STUDER D820-48 ▶

Now being delivered worldwide is the D820-48, a 48-track digital recorder from Studer (Nashville). The D820-48 is fully compatible with all 24- and 48-track DASH format machines; a new feature on the production versions is the Sound Memory Board, which can be used for track slipping and digital "ping pong" manipulations. Also standard is an internal time code reader/generator; AES/EBU, MADI and SDIF digital inputs; onboard DSP processing for crossfading and switching; and a function for copying from track to track in the digital domain.

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NEW PRODUCTS

ESOTERIC TURNTABLE ▶

A new turntable designed for audiophiles and record restoration is the V-2 from Esoteric Sound, Downers Grove, Ill. Features on this direct-drive turntable include a standard, interchangeable cartridge head shell and fixed play speeds of 33.33, 45, 71.29, 76.59, 78.26 and 80 rpm, with $\pm 12\%$ pitch adjust. Options include various cartridges and styli optimized for 78s, a gooseneck light and a switch for playing vertically cut discs.

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LEXICON LXP-15

Offering 128 preset effects (with room for another 128 custom patches), ranging from stereo reverb and ambience to pitch shifting, stereo delays and gated sounds, is the LXP-15 from Lexicon of Waltham, MA. The single-rackspace processor also features Dynamic MIDI™ effects automation, providing remote access to the LXP-15's 27 variable parameters (up to four of which can be simultaneously manipulated by a single MIDI controller).

Circle #279 on Reader Service Card



TRIPP LITE VOLTAGE REGULATOR/FILTER

The LCR-2400 from Tripp Lite (Chicago) is a rack-mount, voltage regulator/filter designed for music and recording applications. The \$459 unit can stabilize voltages from 87-140 VAC to a constant 120 VAC; other features include a 20 amp/2,400 watt capacity; isobar level spacing; line noise and RFI/EMI filtering; and 14 power outlets, with two mounted on the front panel.

Circle #278 on Reader Service Card

BGW 350 SERIES

BGW Systems (Hawthorne, Calif.) has announced the replacement of its veteran 250 line with the 350 Series, offering twice the power (now 200 watts/channel into 8 ohms) from its three-rackspace chassis. Other features include high-speed Ultracase-II transistors (used in BGW's fourth-generation 750G/H models), balanced XLR and 1/4-inch TRS inputs, DC speaker protection circuitry, and quiet convection cooling for studio monitoring applications. A metered version (350A) is also available. ▶

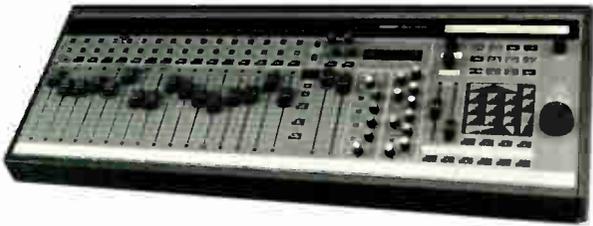
Circle #280 on Reader Service Card.

FAIRLIGHT MFX

Shown at AES and now available (with eight systems sold in the past two months) is the Fairlight MFX from Fairlight ESP (Electric Sound & Picture), Sydney, Australia. Designed for audio post-production, MFX is a time code-based multitrack disk recording and editing system with 24 tracks—16 of which can be played simultaneously. MFX features a large RAM buffer scheme, whereby audio tracks can be played faster than the disk drives can deliver. Other features include direct serial machine control of external transports, 760MB hard disk with two track-hours of audio (larger drives are available and up to seven drives can be connected to the system), 2.5 or 5GB Exabyte backup and fully object-oriented architecture, providing non-destructive editing functions such as cut, paste, loop, stretch, shrink, trim and crossfade. Sound archiving (online), sampling, sound design, cue-list and music sequencers are also available. The system includes the MFX Console (a hardware desktop controller) for easy pushbutton access to all editing/transport/storage functions, a jog wheel and an LCD screen to show time code data and status information. A color display shows all 24 tracks simultaneously. MFX system prices range from \$55,000 to \$100,000.

Circle #281 on Reader Service Card





WAVEFRAME CYBERFRAME-M AND CONTACT™

Launched by WaveFrame (Boulder, Colo.) at AES was CyberFrame-M, a powerful, yet economical—prices start at \$39,950—version of the CyberFrame-E digital audio editing system. The M (Multitrack) version is an expandable, 4- or 8-track recording/editing/playback system featuring switchable 16/24-bit recording and the ability to create hundreds of virtual tracks that can be instantly enabled or swapped for any of the four or eight active tracks.

Options include additional Winchester drives, optical storage disks, CMX-compatible list management, ADR Foley control software, and a DSP-X module with 10x6 digital mixing, digital I/O and 4-band digital EQ.

Just released is Contact, another option for AudioFrames and DSP-X-equipped CyberFrames. Contact (pictured here) is a hardware-based controller with 91 pots, faders and switches, and 22 memory presets that can handle any system mixing and manipulation functions.

Circle #282 on Reader Service Card

NEUMANN TLM50 MIC

Unveiled at AES was the Neumann TLM50 microphone (distributed by Gotham Audio of NYC), combining advanced transformerless electronics derived from the successful TLM Series with a capsule design based on the historic M50 manufactured from 1951-1971. The TLM50 features a switchable 100Hz highpass filter, -10dB pad and a unique design using a 12mm capsule mounted on a 40mm lucite sphere, which is said to provide the characteristics of a pressure-gradient mic at



higher frequencies, with a linear, pressure transducer type response at lower frequencies.

Circle #283 on Reader Service Card

HOT OFF THE SHELF

Available in 60-, 90- and 120-minute lengths is the line of **TDK DAT tapes**, which employ a fine-grain Super Finanix metal particle formulation. A new HPR mechanism with precision hubs is designed to ensure long-term protection for DAT masters. See your local dealer for details...Designed for 4-track routing of balanced-line audio feeds is the **Quad 5 audio assignment switcher**, allowing any output to be fed from any incoming track, plus a mono-sum signal from any two incoming tracks. A CRT output allows visual monitoring for stereo coherency. Call Target Technology at (916) 639-2102...Atlas/Soundolier has released a new **catalog of microphone**

stands and accessories for recording and live performance applications. For a free copy, call (314) 349-3110...A \$39.95 software update for the **Aphex Studio Clock** saves sync data for up to five 30-song sets, recallable in any order for studio or live performance applications. Call (818) 767-2929 for more info...The **Aircraft Production Music Library** has released three new CDs: #36—Hispanic music styles; #37—action/adventure themes; and #38—humor and satire. Call (800) 343-2514 or (617) 367-4962 for a demo disc and info package...PAIA Electronics has reintroduced the Craig Anderton-designed **Hyperflange &**

Chorus Kit, which includes PC board, components, hardware and manual. For info or a free catalog, call (405) 340-6300...Said to act like a "dust magnet" is **The Studio Duster** (\$7.50), where thousands of soft plastic bristles attract dust particles from keyboards, mixers, computers and other gear. Call (818) 718-7488 for more info...Available in 4 to 32 pairs is the new line of **Belden Brilliance™ snake cables**. Designed to NEC specs for permanent, in-wall installations, the cables offer similar features to the 12XXA Series, with numbering on the inner pairs for quick installs. Call (800) BELDEN-4 or (317) 983-5200 for more info...

Now available with balanced inputs/outputs as standard is the **Drawmer DL-221 compressor/limiter**, and QML, its new American distributor, has reduced the price of the 2-channel unit to \$999. Call (508) 650-9444 for details...**Bottles: The Tube Amp Video** (\$29.95) is an 85-minute VHS tape covering the history, use/abuse, maintenance and modification of tube power amps and guitar-type amplifiers. Call Antique Electronics Supply at (602) 820-5411 for details...A technical bulletin on the **Magna-Tech 9F Footage Counter**, detailing use of the unit as a counter and time code reader/generator in film and video post, is now available. Call (212) 586-7240 for a free copy. ■

by George Petersen

PRODUCT CRITIQUES AND COMMENTS

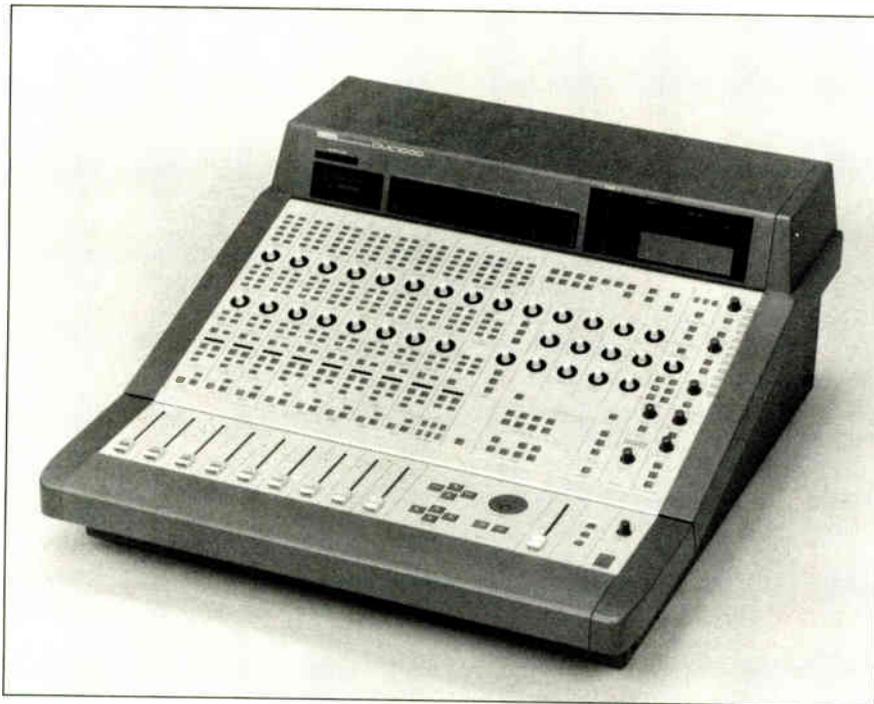
A **ES 1990: Amazed and Enthused**
The 89th meeting of the Audio Engineering Society, held September 21-25, packed thousands of pro audio thrill seekers into hundreds of exhibits at the Los Angeles Convention Center, all anxious for a preview of the shape of technology to come. Fortunately,



Products" columns.

A well-rounded selection of papers, technical sessions and workshops were presented throughout the convention. Perhaps the most popular of these was the hands-on digital workstations workshop (hosted by Fred Jones and Laurel Cash-Jones), offering a chance to hear actual *users* (rather than manufacturer reps) talk about their experiences on the various systems.

The hottest trend in workstations at the show was the proliferation of dedicated control surfaces. Who really wants to go through their audio career remembering useful trivia such as "press alternate/control/shift/R to enable recording" or some 17-keystroke command to punch-in or out?



Two of the most talked about products at the show were the Roland Sound Space 3-D audio system, and Yamaha's DMC1000 automated digital I/O console.

disappointments were few, and there was ample opportunity to check out current and future products. What follows are just a few of the show's product and technology highlights; there's a lot more to come, so we'll keep you informed in upcoming "Preview" and "Sound Reinforcement New

Obviously, the need to operate disk-based workstations and MIDI sequencers with fast, simple-to-use controls has been noted by J.L. Cooper Electronics, which demonstrated its CS-1 control station. The CS-1 is a hardware interface that provides a jog/scrub wheel, multifunction and soft

Fairlight MFX

A NEW TRACK RECORD

Fairlight's MFX is the new front runner for Audio Post



MFX is a 24-track disc recorder for post production. It can play up to 16 tracks simultaneously, for around the same price as many 8-track disc recorders. So it's cost effective enough to be used for track lay to multi-track tape, yet it has enough tracks to be used directly for the final mix.

The MFX console has dedicated keys for track selection, sound effect performance, external machine control, and most importantly - fast and powerful editing features. You can edit, cut and paste non-destructively on all 24-tracks before committing anything to tape.

Twenty-four outputs connect straight to your mixing console, with AES/EBU in/out for digital stereo

transfer. Audio is 16-bit linear at 44.1 or 48K. MFX incorporates the latest generation 2 and 3 hour capacity hard-disc drives which can provide over 20 hours of on-line storage.

It's fitting that Fairlight should set a new track record for audio post. Chances are the music soundtracks you're laying up now were produced using sampling, sequencing and waveform editing techniques that our designers introduced in earlier decades. In fact, with the addition of a MIDI keyboard, MFX can also run all of Fairlight's Series-III sampling and sequencing software.

With hundreds of Fairlights in use around the world, it's the track record that counts.

Fairlight ESP Pty Ltd
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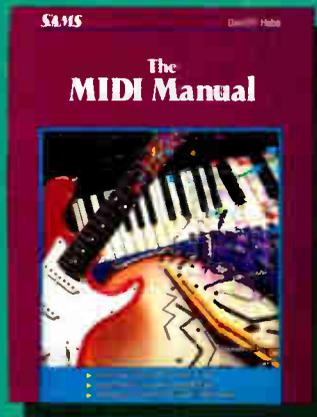
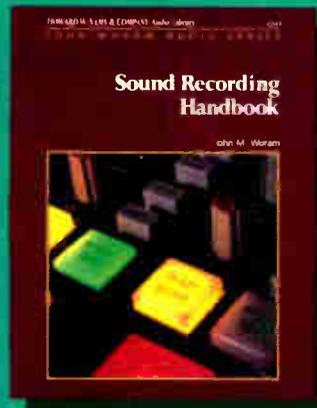
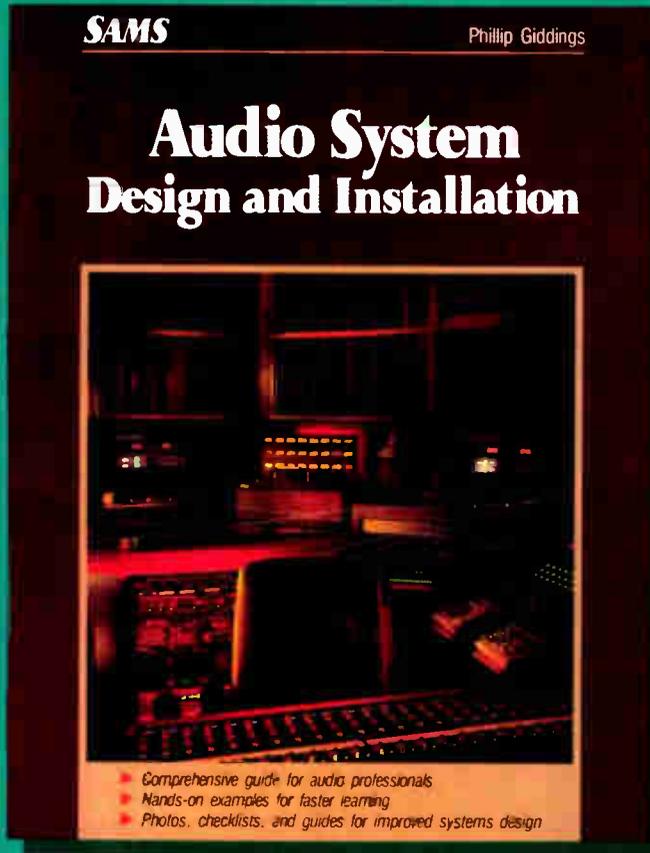


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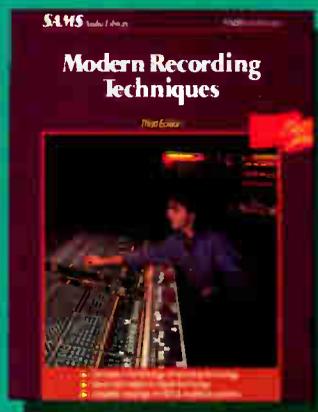
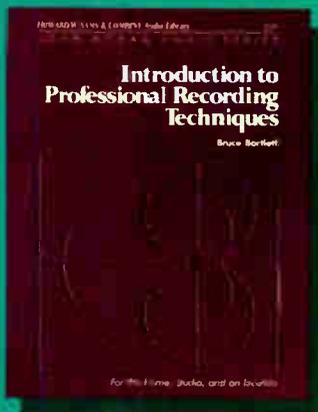
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keys, footswitch input, and rewind/stop/play/ff/record pushbuttons. The \$599 unit is available in versions with templates for use with Sound Tools, Sound Designer, Audiomedia, Vision and Performer; with an optional desk accessory, users can create and store templates to control almost any Macintosh program.

Of course, workstations remain a major area of interest among audio pros, and it was no surprise to see new entries making an AES debut. The Korg Digital Audio Production System combines an 8-channel automated digital mixer, 8-track disk-based recorder (with more than 100 track-minutes, expandable to over five times that amount), 16-track MIDI sequencer and LTC/VITC time code sync capability in a desktop package with analog and digital I/O and external word clock sync. Roland's DM-80 is a 4-track recorder/editor (expandable to eight tracks) with onboard 100MB hard disk for up to 18 minutes of record time at 44.1 kHz. Synchronizable to SMPTE or MIDI, the DM-80 includes a dedicated remote controller unit with tape recorder-type controls and a large LCD providing graphic editing and playlist control.

Otari unveiled its DDR-10 digital audio disk recorder/editor, which features a Macintosh operating environment, Digidesign control software, Apogee filters, AES/EBU and SPDIF digital ports, +4dB balanced analog I/O, internal 345MB hard disk, and a dedicated hardware controller that uses familiar tape transport-style controls.

Another new workstation, exhibited by the Australian firm Soundtracker, is aimed at the film/video post market. In addition to its powerful editing functions, this multi-user system offers a file management database for fast retrieval and preview of raw audio material. Soundtracker's control console includes a pressure-sensitive plasma display, dedicated function buttons, virtual transport controls and two rotary wheels.

Symetrix demonstrated its long-awaited production version of the DPR44 Recording and Editing Station, which provides simultaneous 4-track recording/playback (4-channel mixing is optional). The DPR44 features four layers of editing and audio manipula-

tion per track, real-time equalization/compression/limiting/expansion/gating (with dynamic automation and recall of all parameters), and control of external VTRs, ATRs, dubbers and other transports via standard serial protocols. DPR44 system operation is facilitated by clever "virtual control panel" color screens and a graphics control tablet with graphics pen.

Yamaha packed 'em in to check out its DMC1000, an all-digital console providing up to 22 inputs with ten buses and four aux sends (available at analog or digital ports), along with AES/EBU, SPDIF, ProDigi and Yamaha-format channel inputs. Its configuration includes: eight mono inputs, three stereo inputs (usable as effects returns or as six extra inputs) and eight tape returns, which can double as inputs in remix. Moving fader automation is standard, as is snapshot reset automation of every console parameter, including the four bands of true parametric equalization, with Q (bandwidth) adjustable from 0.1 to 8.16. EQ curves and console operating status are shown on a large LCD. Two onboard SPX1000-equivalent processors are provided, and the console can interlock to two Yamaha DMR8 digital 8-track recorders for 16 tracks of 20-bit digital recording. Pricing will be in the \$30,000 range when production deliveries begin next summer, and besides music recording, other applications that come to mind are CD mastering and digital audio-for-video in a D2 suite.

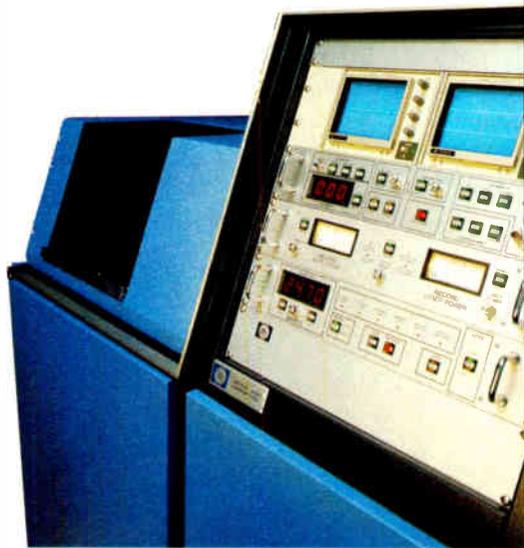
On the other end of the technological scale were tubes. Definitely non-digital, tube signal processing attracted an extraordinary amount of attention on the show floor. Drawmer (distributed by QMI of Natick, Mass.) showed the Model 1960 Vacuum Tube Compressor Amplifier; Summit Audio (Los Gatos, Calif.) demoed its line of tube gear; and NYC's Audio Techniques booth offered showgoers the chance to make A/B listening comparisons between a vintage Pultec EQP-1A and the modern Tube-Tech PE-1B program equalizer. However, the biggest tube splash was at the Vacuum Tube Logic (Chino, Calif.) booth, where dozens of VTL and Manley tube-based products were on display, including tape electronics, equalizers, preamps, line drivers, power amps ranging from 25 to 1,000 watts, and even a CD player with tube-modified analog stages!

While not generally in the spotlight, amplifiers were big news at this AES

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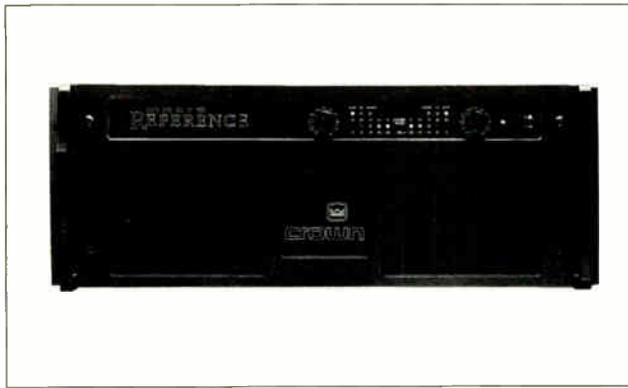
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AUDITIONS

show. Alesis announced plans for the RA-100, offering 75 W/ch into 8 ohms, 100 W/ch into a 4-ohm load; pricing is \$349, with deliveries slated to begin next month. BGW unveiled the 350 Series, the replacement of its veteran Model 250, but offering twice the power (200 W/ch at 8 ohms) from the same-sized cabinet. Another BGW surprise was the Model 200, with 100 W/ch in a single-rackspace package. Replacing the popular 6B and shipping this month is Bryston's Model 7B, the largest model in the company line, yielding 800W mono into a 4-ohm load. Carver gave a sneak preview of the PT-1800/2400, two new entries in the Pro Touring line of magnetic field power amps—the 45-pound PT-2400's specs include 1,200 W/ch at 4 ohms or



Amplifiers—such as Crown's Macro Reference and the 1,000-watt, 18-pound SA-1000 from Morenz—were big news at AES.



3,000 watts mono into 4 ohms. Crest unveiled NexSys, a system for monitoring/controlling hundreds of power amplifiers (including the new Crest M.A.S. 200 modular switching amplifier) and related gear from a single station. The company also announced the Crest LA Series, with

three cost-effective models (from 275 to 475 W/ch at 4 ohms) designed for the retail and contracting markets.

Hardly a newcomer to the amplifier business. Crown unveiled the Macro Reference, a high-end studio amplifier designed to withstand the demands of 20-bit digital audio. The Macro Reference provides 750 W/ch into an 8-ohm load, and also offers bridged and parallel mono modes, enabling the amp to drive loads as low as 1 ohm. Morenz Corp. (Carlsbad, Calif.) debuted the SA-1000, a 2-channel (1,000 watts mono into 8 ohms, 500 W/ch into 4 ohms) amp using a Pulse Width Modulation

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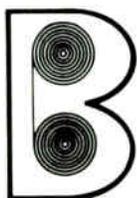
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design. The SA-1000 occupies a two-rack-space box and weighs a mere 18 pounds. Now in full production is the EX4000 from QSC Audio, a three-space amplifier capable of delivering 1,100 W/ch into 4 ohms, with a list price of \$1,998. The EX4000 features both five-way binding post and Neutrik Speakon outputs, along with an "Open Input Architecture™" approach where input modules are mounted on a removable module to interface with control systems and new signal processing devices that QSC is currently develop-

ing. Stewart Electronics unveiled its largest power amplifier yet. The PA-800 is a dual mono amp using two PWM switching power supplies, providing 400 W/ch at 4 ohms or 1,200W mono into 4 ohms. The PA-800 is housed in a two-space rack enclosure weighing 17 pounds.

One topic that rarely gets the attention it deserves in the audio press is test gear. However, this field was well-represented with some truly innovative new products.

Crown's Techron division announced beginning deliveries of its much-awaited TEF System 20, which

reduces both the size (now a single-rack-space box) and pricing (starts at \$3,950) of this world-standard analysis system. Better still, the System 20 interfaces with your IBM PC or Macintosh, thus simplifying operation while offering more flexibility.

Also available for delivery is Audio Precision's Portable One, a compact, economical (\$4,000) version of its world-class System One analyzer. The Portable One provides true 2-channel architecture for stereo measurements, as well as dual bar graph displays. Twelve different measurement functions are provided—just press a button and make the measurement. Although it's small, performance is not compromised, as the unit offers bench instrument-quality specs.

Neutrik USA (Lakewood, N.J.) showed its full line of test gear, including the new A1 Audio Test System, an affordable (\$4,000), flexible system combining a sweep generator with the ability to measure level, frequency, crosstalk, noise, distortion, wow and flutter, along with a curve tracer and audio oscilloscope. External communications and/or hard copy printing is available through an RS-232 interface or Centronics port.

Cambridge Signal Technologies—Sigtech, of Cambridge Mass.—introduced the AEC 1000, an Acoustic Environment Correction™ product that combines an intricate measurement system with a filter synthesis algorithm that automatically designs a FIR digital filter to correct for control room and monitoring system aberrations. The AEC 1000 performs its calibration procedure, in both time and frequency domains, and correction is made via a 2,200-tap digital filter. While designed primarily for the studio listening environment, other applications include sound reinforcement, fixed installations and cinema sound.

I have seen the future and it is tape. In spite of all the whoo-ha about digital, analog recording keeps getting better and better. 3M made the formal introduction of its new 996 tape, and it's unbelievable, providing an operating level that can handle +9 dB without distortion! Also, the 996 formulation is bias-compatible with 226. However, with Dolby SR becoming the standard for high-end analog recording and with the advent of new super tape formulations such as 996, we may have to re-examine the entire analog recording



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process. Current designs in record amplifiers and mechanical VU meters are fast becoming obsolete in this decade of super-analog.

Don't be too quick to write off the future of analog, as this show provided plenty of action in this domain. Otari introduced the next generation of its MTR-90 line of 16/24-track machines, the MTR-90 Series III, with an improved transport providing a substantially increased winding speed, along with new backlit VU meters and optional forward and reverse servo locking at speeds from 0.2 to 2.5-times normal speed. Foxtex unveiled the G-24S, which is essentially similar to its G-16, but offers 24 tracks on 1-inch tape, with Dolby S-type noise reduction. Tascam launched the MSR-24/S, a Dolby S version of its popular MSR-24 1-inch, 24-track, and announced a new \$12,499 price for the original dbx version.

The fiber optics revolution is picking up steam. Lester Audio Labs (Dallas) announced excellent results from the use of its DAS 2000 optic routing system at the Goodwill Games. Bec Technologies of Orlando, Fla., unveiled its Audio Plex, a series of two-way fiber optic snakes capable of handling up to 128 channels. South San Francisco-based Monster Cable demoed its OptoDigital LightSpeed 12 system by playing cuts from the new Quincy Jones album at Sunset Sound, with a Mitsubishi digital deck feeding the fiber optic snake directly. A/B'd vs. Monster Cable hard-wiring, the fiber optics took the nod. In fact, engineer Bruce Swedien, who was present at the demo, was impressed with the difference and has since decided to incorporate fiber optic trunk lines into his private facility, now under construction. Now what the fiber optic industry really needs is a single interchangeability standard, so if a sound reinforcement company, recording truck and broadcast van (each equipped with fiber systems by different manufacturers) show up for a concert gig, it would merely be a plug-in-and-go situation. When—and if—this happens, hard-wire systems would become a thing of the past.

As always, studio monitors were a hot issue at AES. AKG announced the acquisition of London-based Quested Monitoring Systems. Over the past few years, Roger Quested has developed some impressive high-performance designs, which while popular in the U.K., never made much of an impact in the States due

to poor distribution. With AKG at the helm, this situation should change. Tannoy, another British manufacturer, created quite a stir with the AES debut of its new Studio Monitor Series, which uses the concept of Differential Material Technology to advantage in the designs of both enclosures and in Tannoy's proprietary Dual Concentric™ drivers. Now distributed by Audio Intervisual Design of Los Angeles is the KRK line of monitors, marking the first AES showing of the series of speakers for both near- and far-field listening applications.

Rush Sound, of Santa Ana, Calif., demoed The Monument, a satellite system with two main boxes (including such exotic touches as sand-filled chambers and internal steel tensioning rods to eliminate resonances), each equipped with twin 7-inch Kevlar woofers and a full-size TAD 2001 HF driver on a constant-directivity horn, dual 18-inch subwoofers (in 15-cubic foot cylinders) and a three-way electronic crossover. Frequency response was stated as 16-20k Hz (±2.5 dB).

On a slightly more affordable scale, Smithline Audio (Van Nuys, Calif.) showed its line of cost-effective (\$549-

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749/pair) monitors, which after a slow start have been gaining in popularity. The Model 2X4 is a mirror-imaged pair with two 4-inch woofers and a 3/4-inch fabric dome tweeter in a compact (13x6x10-inch) ported enclosure. A companion subwoofer—which doubles as a monitor stand—is also available.

Three-dimensional sound—and the efforts to re-create the effect in a lifelike listening environment—was a frequent topic of interest throughout the convention. Elizabeth Cohen chaired two lively technical sessions dealing with various aspects of reproducing spatial sound. However, the big news in 3-D sound—the hit of the show—was in the back room of an upstairs demo suite, where Roland was showing its Roland Sound Space (RSS), a sound localization system allowing the creation of multi-dimensional effects listenable on a conventional two-speaker stereo system, without any decoding hardware. Pricing is tentative at this time (probably in the \$20,000 to \$30,000 range), and don't expect deliveries for the next four months or so.

The RSS system consists of rack-mount central processor and A/D/A converter units, and a controller unit with jog wheels for manipulating the azimuth and elevation of up to four mono (or two stereo) input sources. Spatial manipulation becomes a simple matter of turning the jog wheels (an outer ring of LEDs provides a visual indication of the spatial positioning) during a recording or mix. The controller also includes MIDI ports for externally changing settings via a sequencer or other MIDI device. I presume that the latter would also permit the automation of spatial manipulation using a MIDI-to-SMPTE converter. While initially skeptical about the process, I was impressed with the ease of operation, and the sense of localization was phenomenal. This was the first time I have truly experienced binaural-like

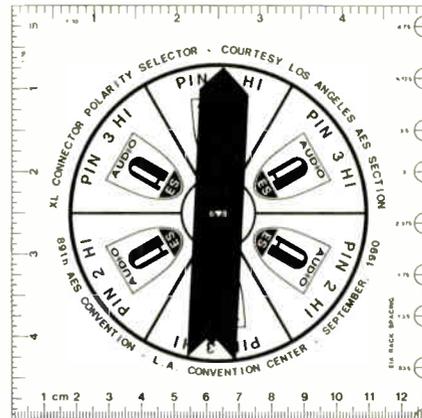
spatialization from two front speakers. Taking the demo one step more, I also listened to an RSS-processed cassette tape played back on a cheap boom box, on-axis and about two feet in front of me, and the result was the same. Yow!

AES has always been a time of new ideas, new products and a time to look forward to the new year. A number of companies were celebrating milestone anniversaries this year, and among them were Crest, 10 years; Samson, 10 years; Neutrik, 15 years; Dolby, 25 years; commemorating 25 and 30

years in the USA were TDK and Sony, respectively; and Electro-Voice topped the charts with 60 years! It's amazing that audio companies make it through even one year, so all of these companies should be congratulated for these achievements. Here's to many more!

The 89th Convention of the Audio Engineering Society was a success on every level. The Los Angeles Convention Center once again proved to be an excellent venue, with ample space for not only the exhibits, but also the papers, workshops and technical sessions. One nice touch was the Saturday educational fair, which provided prospective students with the opportunity to meet representatives from various schools and universities offering audio programs. The L.A. chapter of the AES really got into the act, sponsoring a job board service, publishing a local restaurant guide, and most importantly, coming up with the ultimate solution to the XLR polarity dilemma, in the form of a cardboard game spinner for selecting either pin 2 or pin 3 as "hot." This gets my vote for "Best Product of the Show." More seriously, this AES convention was well-run, well-organized and...well-done. It will be a tough act to follow. ■

Now in his 10th year with Mix, George Petersen still lives with his wife and two musical dogs in a 100-year-old Victorian house on an island in San Francisco Bay.



The L.A. AES Section finally put an end to the XLR polarity debate with the unveiling of this high-tech determinator.

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THE DIC//DAT Musician's Musicians Series #2



PHOTOGRAPH: KAREN ANDERSON
LOCATION: THE VILLAGE RECORDER L.A.

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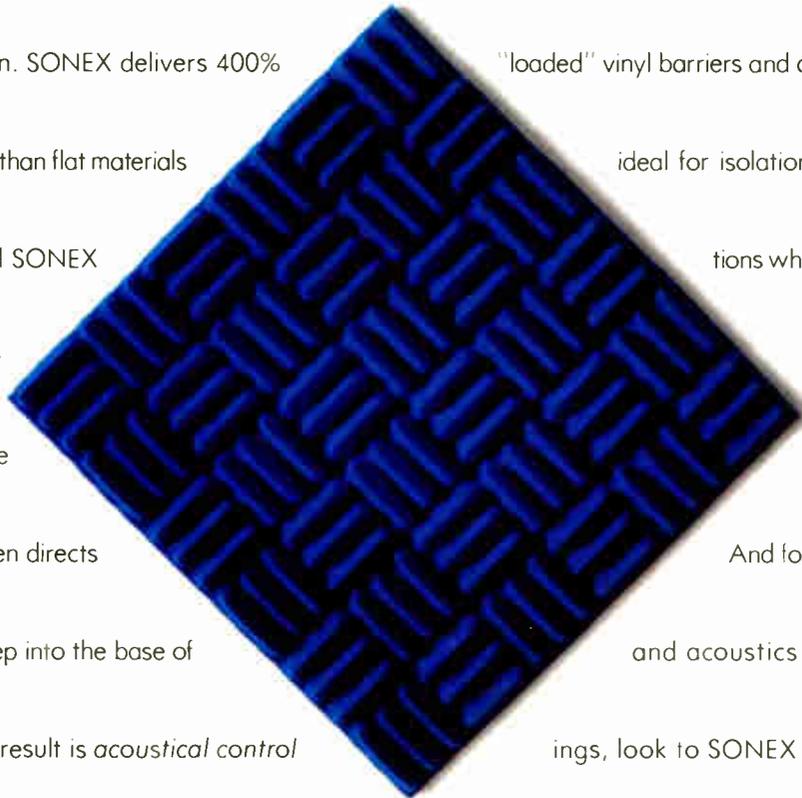
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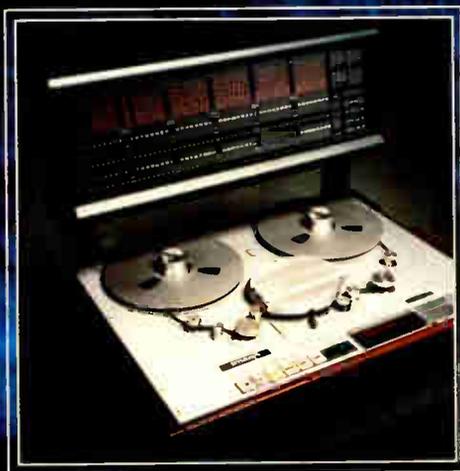
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Take the digital multitrack market. Is it oversold with the 24- and 32-track variety? Probably.

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Studer D820-48. The Digital Supermachine.

Or take the analog 24-track market (we're talking real professional studios) where 9 out of 10 major market studios are relying on Studer's great sound and unequalled reliability.

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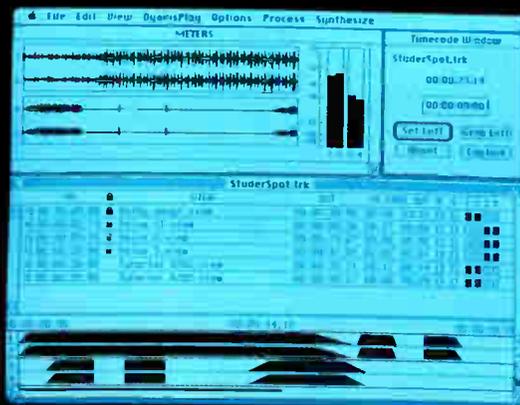
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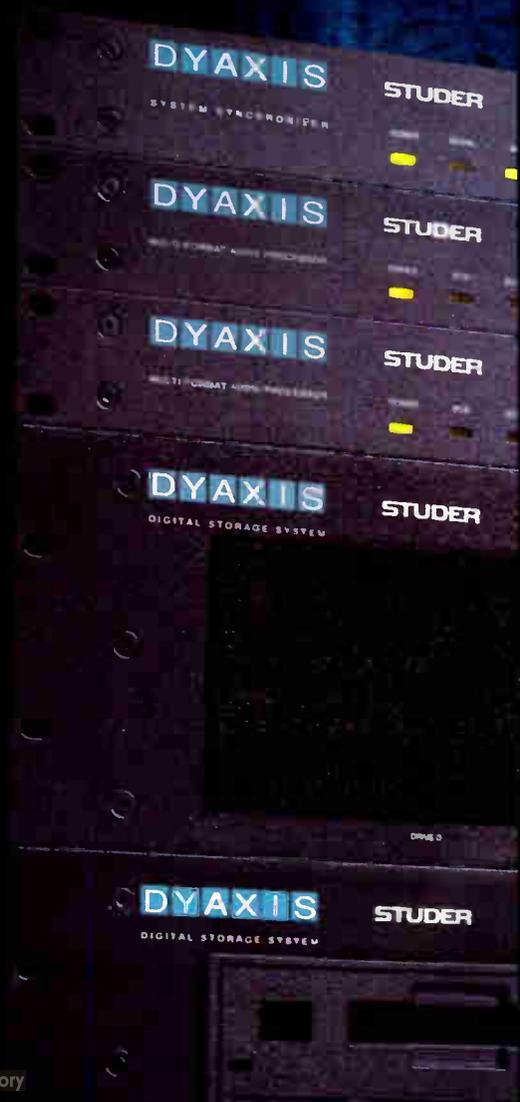
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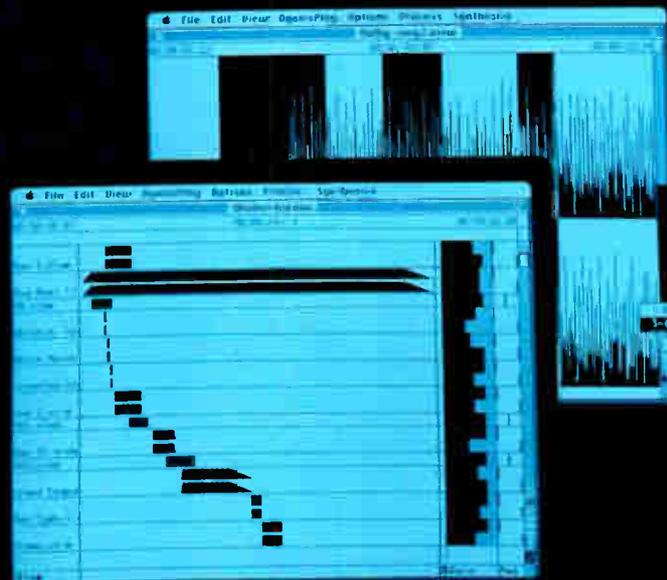
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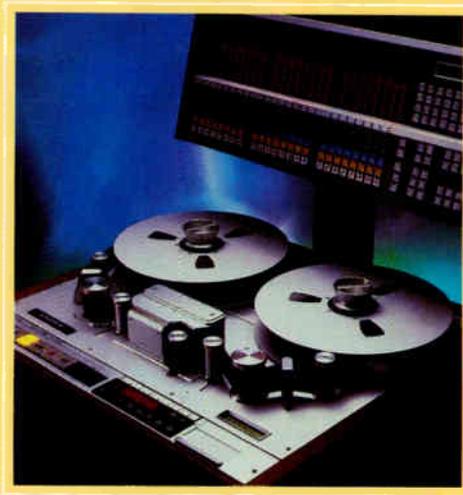
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by Dan Daley

SUTCLIFFE MUSIC

BREAKING THROUGH THE FORMAT IMPASSE

After years of comfortable familiarity regarding tape recording formats, and a neat bar fight between digital audio workstation manufacturers to keep our attention, the project studio community is seeing format compatibility become a central issue again from another angle. Currently there are at least eight different 8- and 16-track tape formats available, and selecting a studio to finish a project is often a matter of finding a facility with a compatible machine. But once you're in the 2-inch, 24-track realm—a place a lot of project studios are getting to—you'd think all that was left was a decent alignment before moving on.

However, some of the technological advances that made project studios viable and helped them proliferate—computers and music software—can themselves become a stumbling block toward interfacing. For instance, you're using computer brand A and software brand B for sequencing a jingle at home and find you need a live room for vocals. If local studios that can match your computer requirements are impractical for budgetary reasons, or can offer only brands C and D, you start thinking it might be time to build a studio around familiar technology. Fine, until you have to interact with an-

other creative type who uses a totally different system, or you find it necessary to go to a commercial facility once again to use a large room or more advanced outboard gear and deal again with the problems that caused you to build a studio in the first place. Format impasse. It happens every day, and it certainly doesn't stop the earth from spinning. But it does put canal locks into what the "slide-rule types" promised would be a smoothly running river.

"What I still don't understand is why an aggressive, commercial studio would not invest in more than one type of computer and more than



**Gary Sutcliffe
at the Sound
Workshop 34C**

one version of several types of music software," states Gary Sutcliffe, owner of 2-year-old, "upper-middle-class" Sutcliffe Music in Manhattan. Clients like AT&T, MCI, Chevy, Dodge and Nintendo have kept Sutcliffe busy as a singer, arranger, composer and studio operator. Designed by Sutcliffe and acoustic technician Horatio Malviciano, the single-room facility has a 12x14 iso booth, and a 20x25 control room in which is a Sound Workshop 34C 32-input console, a Studer A80 MkIV multitrack and some of the more reliable standbys of this sort of studio: Yamaha REV5, Eventide H3000, Yamaha SPX90II, Alesis Quadverb and a MIDverb II.

After eight years of using virtually every major commercial facility in New York for jingle and scoring work, Sutcliffe decided his own room was the way to maintain technological consistency. Since he uses an Atari 1040ST with a 30MB hard disk drive and Hybrid Arts *SmpTrack* software, Sutcliffe finds that leaving the confines of his own studio sometimes presents problems. "I'm one of the few non-Mac

guys out there," he says. "So it makes it difficult to interface in other facilities. For commercial studios to get additional computers and versions of popular software programs isn't ex-

more recent computer technology, it would be a real selling factor to people like me. We're talking about a few grand to become fully computer-compatible."



Sutcliffe Music in NYC

pensive in the context of some other purchases common for mid-sized and larger studios. I suspect this hasn't happened because [studio owners] are hoping people will bring their own computers in or rent them. Unique [Recording] was one of the first studios in this town to embrace the concept of MIDI, and if someone else could carry that concept forward to encompass

(A quick and decidedly unscientific check through the Rolodex found that some commercial studios, like Unique, maintain all three major computer types: Mac, Atari and IBM. Platinum Island's studio manager, Suzy Gaal, says that studio has Mac and Atari computers and has had few requests for IBM. At Power Station, engineer Aaron Krops says all the clients who

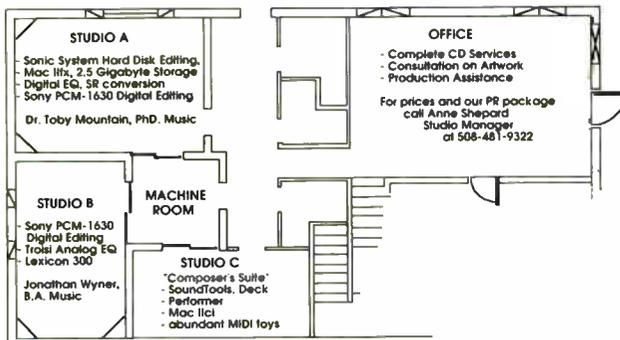
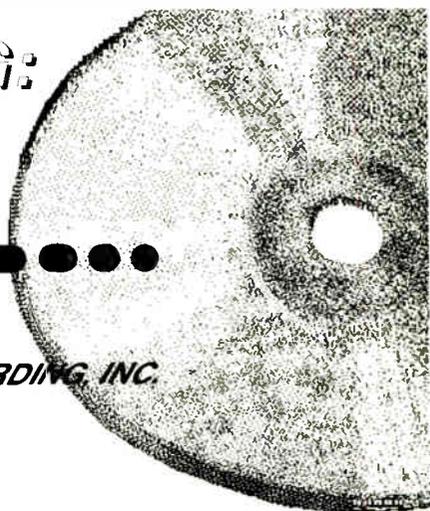
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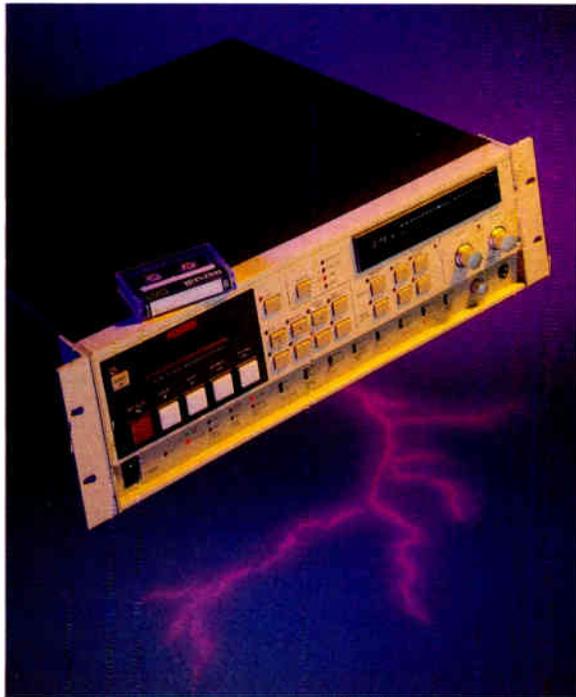
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Because of our 4-head recording system the D-20 features **off-the-tape monitoring** so that you'll always know exactly what you have on tape - a very important feature considering the DAT's ability to record for two straight hours (no more multiple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

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

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

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

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

Details of the D-20 Lease Program:

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

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Roland S-770 DIGITAL SAMPLER



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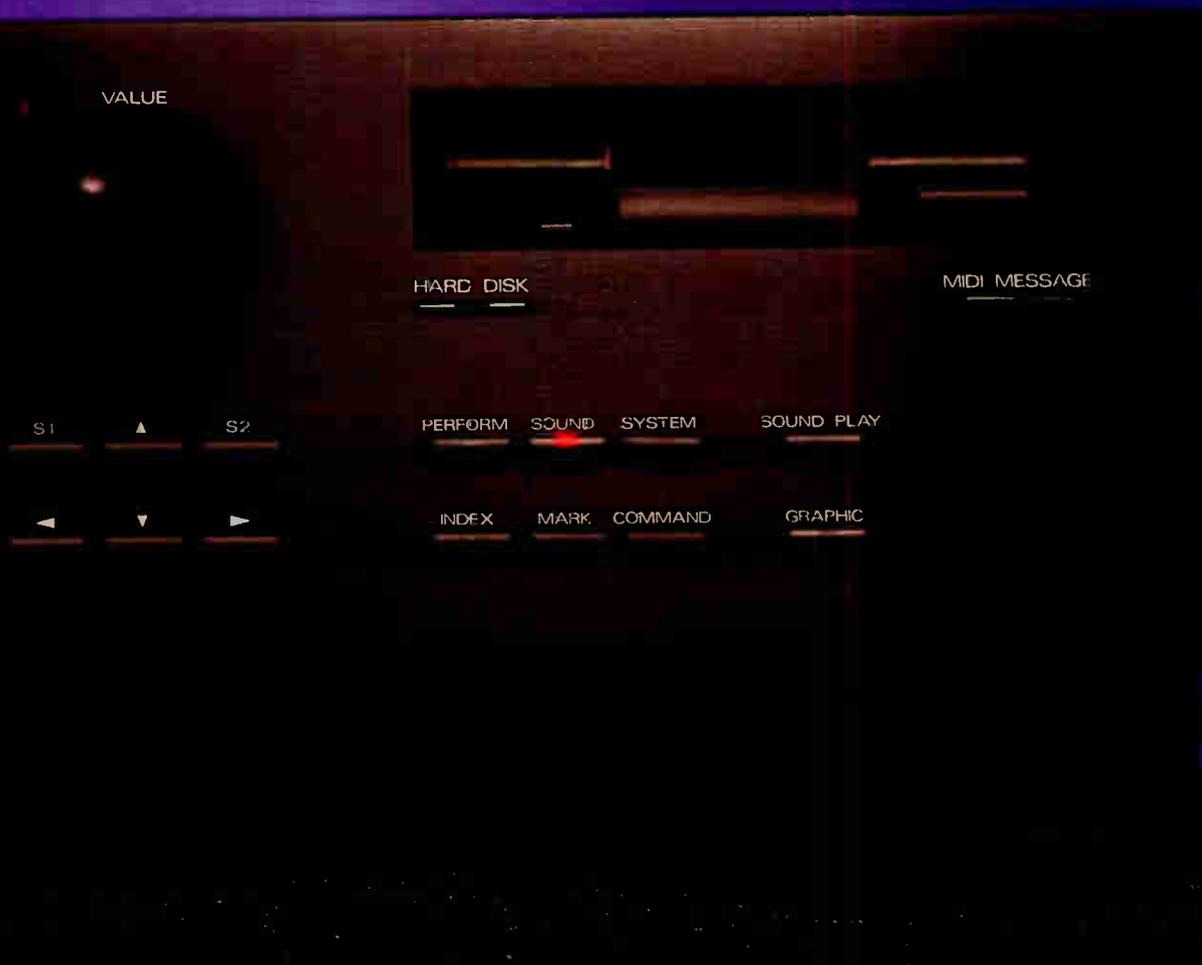
Such as the fact that the Roland S-770 is equipped

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We've also equipped our S-770 with both 20 bit D/A conversion and Differential Interpolation, thereby giving it higher resolution than any other stereo sampler.

And while we're making comparisons, allow us to offer another one. With 24-voice polyphony, the Roland S-770 has more voices than any other comparably-priced sampler. So you're not only assured of getting

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extraordinary sound but the flexibility to go along with it.

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need computers rent or bring their own, unless they're using the Synclavier's computer. At Right Track Recording, studio manager Leslie Ballard states, "We don't have a MIDI setup, and studios that cater more toward rock don't seem to have the need for computers.")

Gary Sutcliffe and other project studio owners are in an appropriate position from which to put forward such compatibility suggestions. After all, it was Sutcliffe's difficulty in finding available facilities with the right mix of computer hardware and software for his projects that forced his hand. "I work a lot in film," he explains, "and when I was crunched for finding studio time in a pinch it was always easiest to find it in places that didn't do film work every day. So between computer equipment and film and video equipment I would have to start to plan my sessions by saying to myself, 'What do I have to have on my rental list to do this session?'"

"This wave of producer-owned facilities came out of sheer necessity. You can't go into a studio you have never used with rented computer equipment and four clients and expect everything to work right the first time," Sutcliffe adds.

Like other project studio owners, Sutcliffe has had the relative luxury of having his facility's equipment list develop around his own preferences, and that especially includes computers and software. "I wouldn't want to have to go elsewhere and find I had to work with *Notator* instead of *SmpteTrack*," he says. "They're both great programs, but I'm used to and familiar with *SmpteTrack*. The old days of not worrying about setup time and having a chance to get familiar with new equipment are gone. Budgets don't allow for that anymore, and that's changed the face of the recording industry."

Nonetheless, Sutcliffe keeps a copy of *Notator* on his hard drive for use by one of his regular collaborators. This perhaps underscores another difference between the commercial studio operator and the project studio: With the latter, personal preferences have far more effect over what equipment a studio chooses and what its operators choose to become proficient on.

Sutcliffe's own equipment collection is substantial but relatively unexciting—a Korg T3, Yamaha DX7IIFD,

an Akai S1000 sampler, a Proteus/1, and Roland D-550 and MKS-70—enough to make the computer compatibility issue all the more acute.

Still, the exigencies for the computer in music are compelling Sutcliffe to acquire a Mac II in the near future to work with another planned purchase, the Digidesign Sound Tools digital editing software system. "In the long run," he says, "it'll make life easier for my collaborators when they come in to work, and it'll also make the studio more flexible in case we start to do more outside work. Once it's in the studio and online, we'll become accus-

tomed to the Mac fairly easily."

The computer and its MIDI-related brethren were instrumental in the rise of home recording and the project studio. But as projects grow larger and more complex, and the need to interface with commercial facilities with their more spacious recording rooms and better microphones increases, this particular interface situation could move closer to the front burner. ■

Dan Daley is a Mix contributing editor. His latest non-technical publication, "Roadkill Recipes," will be available for Christmas.

microphone

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NEWS

FROM AROUND THE WORLD

Hong Kong Hosts Pro Audio Asia' 90
The second International Trade Exhibition for Professionals in the Recording, Public Address, Sound Reinforcement, Installation/Contracting, Sound-for-Vision, Broadcast and Duplication Industries in Asia—also known as Pro Audio Asia '90—opened on July 11 at the Hong Kong Convention and Exhibition Centre. On hand for the event with some opening remarks was

quickly expanding Asia/Pacific market. Pro Audio Asia '91 will take place at the World Trade Centre in Singapore on July 10-12, 1991. The Business and Industrial Trade Fairs Ltd., Asia's largest independent trade show organizer, sponsors the event.

TGI Acquires Martin Audio Ltd.

TGI plc, the largest manufacturer of loudspeakers in the UK, acquired Martin Audio Ltd. in June. The parent company currently incorporates three of the leading companies in the UK audio industry: Tannoy, Goodmans and Mordaunt-Short.

David Martin, managing director of Martin Audio, comments, "We now have an excellent opportunity to use the manufacturing and design strengths within the TGI group,

and share resources to develop a new breed of competitive, high-performance loudspeaker systems."

Martin America, the U.S. distributor for all Martin Audio products, will remain at its current location in Chatsworth, Calif., under the direction of TGI North America.

Soviet Audio Company Purchases E-V MT-4 Systems

The largest private audio company in the Soviet Union, ALT Show Service and Management, recently purchased 42 Electro-Voice MT-4 concert speaker systems.

ALT provides complete audio and lighting systems, as well as transport,



Alan Parsons checks out the Allen & Heath Saber P.A. console at the Pro Audio Asia '90 exhibition.

world-famous musician and producer Alan Parsons.

"The whole world has adapted to new expected levels of quality," Parsons stated. "Manufacturers that have watched the dramatic public acceptance of the CD medium have realized that the public now demands quality." He added that consumers in Asia and internationally are receiving substantially improved sound products from the audio industry, and that sound professionals are benefitting from new technology designed to work with personal computers.

The three-day event attracted about 200 leading international exhibitors and associated manufacturers to the



Studio Spotlight

Phase 1 Recording Studios Ltd., in Scarborough, Ontario, Canada, has racked up a notable track record over the years, having produced more than 40 gold and platinum records. Artists who have recorded at the three-studio complex include Alice Cooper, Air Supply, Bob

Dylan, Kiss, Whitesnake and Harry Chapin. Shown here is Studio B, with its 48-frame SSL 4000 Series console. This room, primarily used for mixing, measures 30 feet x 30 feet, and uses one of the three Studer 24-track machines. Also available is a Mitsubishi X-850 32-

track recorder. Head engineer Lenny DeRose recently finished projects here for Denise Lopez for A&M, Haywire for Attic and Fatal Flowers for PolyGram Records. The complex continues to do album work for Canadian and international clients.

rigging systems and full-service audio crews to the country's growing concert market. The company has provided audio for a number of notable events in cities such as Moscow and Leningrad, including a concert held last year at the Moscow Olympic Stadium featuring the most popular Soviet bands.

Prosound Designs and Installs System for Namibian Independence Ceremony

Earlier this year, the nation of Namibia celebrated its independence from South Africa, and pro audio distributor Prosound was on hand to put together the sound system for the official independence ceremony at the Windhoek Football

Stadium in Windhoek, Namibia.

The celebration featured official speeches and performances by Ziggy Marley and popular African artists, requiring separate systems to be constructed for two stages. For the official speeches a distributed sound system was created that consisted of Electro-Voice S-1202 and Altec Lansing Model 60A cabinets, and E-V condenser and dynamic microphones.

The main P.A. for the performers' stage was made up of 16 E-V MT-4 systems, set to each side of the stage and powered by a series of Crown 1200 amplifiers. E-V FM-1502 and FS-212 monitor systems were used, with sidefill provided by E-V SH-1810ER cabinets. The audio feed was also sent, on a time-aligned basis, to a distributed

system with Altec horn and driver clusters placed around the venue's entire outside perimeter.

International Bits & Pieces

Ocean Sound Radio is the first UK commercial radio station to purchase a DAR SoundStation II digital audio, recording, editing and production system. The 8-channel system was delivered to the Fareham, Hampshire, facility in August...Elsewhere in England, West London's **Metropolis** has opened three new rooms. The complex now offers two automated Neve VR 72-channel consoles, two SSL consoles and a 72-channel Focusrite desk with Flying Faders automation. Mitsubishi digital multitracks will be available in all five studios...**Gold-**

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crest has installed 48-channel and 64-channel SSL 5000 M Series consoles at its Elstree and Roger Cherrill locations. The SSL boards are being used there for film post-production. Another British facility making use of its new SSL desk is **Pinewood Studios** in Buckinghamshire, which has installed a 60-channel SL 5000 M Series for film dubbing work...

Audio Outpost, a division of London's Chipperfield entertainment and video casting complex, has ordered an AudioFrame digital audio system from WaveFrame Corporation...London's **Westside** has installed a Neve VR72 with Flying Faders automation as the centerpiece of a complete studio refit. The console will be used with Quested monitoring and Studer analog or Sony digital machines...**Angel Recording Studios** in London has installed a customized 60-channel Neve VR Series console with Flying Faders automation in Studio 1...

Castle Sound Studios, near Edinburgh, is the first studio in Scotland to offer digital multitrack facilities, following the recent purchase of a Mitsubishi X-850 32-track machine. The purchase was part of a major refit that included redesigning the control room and installing a 56-channel Amek Mozart console with Supertrue automation and new RN modules...The **Finnish Broadcasting Corp.** (YLE) purchased two 16-channel DAR SoundStation II systems for its TV transmission center in Helsinki. Also ordered were ten Audio Kinetics ES.Lock 1.11 synchronizers, bringing the total to 62 units...A trio of top studios in Denmark—**Puk**, **Sweet Silence** and **Medley**—has invested in Neve VR Series consoles with Flying Faders automation...Sales of **Nexo** speaker systems have been made to government-sponsored La Compania Nacional de Teatro Clasico in Madrid, as well as the Compania de Teatro Josep Maria Flotats, based in the Poliorama Theater in Barcelona. Irish folk band The Wolfe Tones and Cork and one of Ireland's newest nightclubs, Sir Henry's, also purchased Nexo systems...

Three Japanese studios have taken delivery of T.O.C. (Time Offset Correction) Monitor 1 studio speaker systems by Professional Audio Systems. **Pony Canyon** in Tokyo, a ma-

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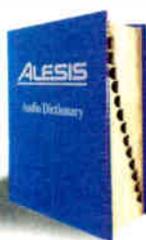
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for Japanese recording and music video software company, has purchased three pairs of T.O.C. Monitor 1s for CD premastering. Other installations were made at **Hitokuch-Zaka Studios** and **Japan Vistec**, a new video post-production facility...Tokyo's **Asahi Sound Studio** purchased a Soundmaster integrated audio editing system for audio post-production on television programs for satellite broadcast. The installation was part of a conversion of its Studio 601 from a film dubbing suite to a video sweetening room...Yamaha Sound Technology Inc. completed the installation of a massive sound system at the **Tokyo Metropolitan Gymnasium** earlier this year. Among the Altec Lansing components of the system are 72 Mantaray horns, 79 compression drivers, 55 16-inch loudspeakers and 15 programmable EQs...Gauss loudspeakers were installed in the prestigious **Olympic Park** in Seoul, Korea. The installation is located in the eight-acre art garden of the park and is used primarily for synchronized shows...**Soundcraft Japan Ltd.** changed its name to **SCJ & AKG Ltd.** The new address is 2F Yoyogi-Living 5-21-12 Sendagaya, Shibuya-ku, Tokyo 151, Japan...

Sony Broadcast Export Corp. reports sales to Latin and South American studios. **Pypsa Recording** in Monterrey, Mexico, has installed an MXP-3036, an APR-24 analog multitrack and a PCM-2500 DAT recorder in its renovated studio. In Mexico City, **CBS** purchased a Sony MXP-3056VF mixing console, and **Sonopress** has installed Sony's new CD mastering equipment, which includes a DAE-3000 digital audio editor, a PCM-1630 processor and a DMR-4000 recorder. **Inter-sonido** in Caracas, Venezuela, received an MXP-3036 and an APR-24, the first installed in that country. **Niche Studio** in Cali, Colombia, is another facility to install a Sony APR-24...Elsewhere in South America, **Raimy Recording Studios** in Curacao installed an Otari MX-80 24-track recorder...

In European industry news, Soundtracs appointed **Audiatur AB** as its exclusive distributor for Soundtracs audio mixing consoles in Sweden... Digital Audio Research appointed **John Wase** to sales executive covering the UK, Ireland, Switzerland, Italy and the Benelux. ■

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by Craig Anderton

BEYOND HARD DISK RECORDING

The recent AES convention in Los Angeles was in the grip of hard disk recording mania. According to some estimates there were 52 devices (give or take a dozen!) with the "look and feel" of digital audio workstations, and most of these had hard disks—or a close cousin, the magneto-optical drive—as the primary recording/storage medium. Yet I can't help but feel that these systems, as wonderful as they are, represent a stopgap measure. Here's why.

Tape has served us well and will continue to do so, but we're all a little tired of razor blades and splicing blocks, waiting for rewind and fast forward times, sonic coloration, the need for noise reduction, and the lack of precision with which material can be edited. MIDI sequencing spoiled a lot of people by offering tapeless recording, precision editing and high sound quality at a very reasonable price. However, most musicians concede that as wonderful as MIDI sequencing is, a musical world without vocals, electric guitars and acoustic instruments is overly limited.

Combining hard disk recording with

MIDI sequencing, as is currently done by Opcode's Studio Vision (and promised by a bevy of other manufacturers for the near future), is a great compromise. For not that much money, one can use MIDI for most instruments and add the occasional acoustic sound with hard disk recording. Digidesign's recent announcement concerning multitrack operation for Sound Tools Vision means that programs such as Studio Vision will be able to access more than two tracks before long.

Hard disk recording in general has become as popular as it has for compelling reasons. Prices continue to fall, with large hard disks (300 to 600 meg) offering the most cost-effectiveness. This is fortunate, since hard disk recording systems require lots of available storage. Access times are also speeding up, and, as a rule of thumb, larger hard disks offer faster access times. Of course, there is also the underlying appeal and precision of digital audio.

Yet there's a dark side to hard disk recording. First is mechanical noise, which is not exactly welcome in re-

—CONTINUED ON PAGE 175

Your hard disk is here



by Blair Jackson

JAZZIN' AROUND

A LOOK AT HOT JAZZ RELEASES



Down in Bluesiana with Art, Fathead and the Good Doctor

[Editors note: The following article was written and edited before Art Blakey passed away. He was truly a master drummer and will not soon be forgotten.]

Like the infamous Bermuda Triangle, the Bluesiana Triangle is a place where strange, unexplainable things happen. It's a vortex that can suck you in and take you out of this world—if only for a little while. But in Bluesiana, the vibes are all *good* vibes, and chances are it'll end up being a place you'll want to visit over and over again.

It would've been hard to predict what would come of sessions with as unlikely a trio as jazz drummer Art Blakey, N'awlins R&B pianist/guitarist/singer Mac Rebennack (Dr. John) and honkin' sax great David "Fathead" Newman. And

Like the infamous Bermuda Triangle, the Bluesiana Triangle is a place where strange, unexplainable things happen. It's a vortex that can suck you in and take you out of this world—if only for a little while.



PHOTO: EBE ROBERTS

Left to right: Dr. John, David "Fathead" Newman, and Art Blakey

now that I've heard their Windham Hill Jazz disc a few times, I still can't really begin to tell you what it's all about, except that it's infused with each of the principal's personality. Which is to say that it has Blakey's unmistakable swing, Dr. John's loose 'n funky Crescent City jive, and Fathead's vibrant, richly textured explorations. Helping out, too, are bassist Essiet Okon Essiet and percussionist Joe

Bonadio.

"It was a good time all the way," Rebennack says of the two days of sessions in March 1990 at Acme Studios in suburban Mamaroneck, N.Y. "Goin' in, we'd never worked together before, but I've always liked Art and I've wanted to work with Fathead for years. I knew that these were a couple of cats who could play, man! And you know Art—

he's up for anythin'!" He chuckles gruffly. "It was a real loose thang. Played some blues. Somethin' with a little more swing, R&B. A gospel thang. We tried a whole bunch of stuff, and the way it came together in the end was pretty cool."

The Triangle was actually put together for the Windham Hill Jazz label by producer Joe Ferry, who frequently works at Acme (situated just a few paces from Mamaroneck Harbor). Peter Denenberg, who engineered the sessions, is co-owner of the facility, which boasts a 48-track and 24-track room, and a unique console "based on parts that have been salvaged from various old, discrete English consoles," Denenberg says. "We've built a whole sophisticated metering and display system, rewired a lot of it, redesigned a lot of it, and then we've got this great automation system by this Long Island company called Musically Intelligent Devices. The basic thinking behind the board is that it's a high-voltage, discrete signal path all the way through, and at the mix stage there's the insertion of one high-quality VCA that does levels, mutes and gating," Denenberg describes Acme as primarily a tool for producers like Ferry, who bring in album and some soundtrack work.

If the Bluesiana Triangle disc sometimes sounds like a jam session, that's because it *is* in a sense—very little was worked out in advance; spontaneity was the order of the day. "The CD functions like a documentary of the two days the guys spent together," Denenberg says. "Some tunes just happened and they kept the first take; others they worked on a bit, changed them around. There are a couple of overdubs, but it's effectively a live record. A big part of a record like this is you're going for *feel*. You're not trying to fix everything. You're trying to record the vibe of the date and not worry about whether every note is perfect."

"I like it loose," Rebennack says, "but this was even looser than most of the records I've done. Usually, I like to rehearse a lot before I go in the studio, but this was more a situation where we were learning it and cutting it at the same time. Me and Fathead come from different schools on that one. But it was a real nice change of experience for me."

Dr. John notes that he always tries to cut his records live—even the highly arranged *In a Sentimental Mood*, which

topped the jazz charts last year, was cut live. "I don't record no other way," he says.

From a recording standpoint, "The idea was to throw them in a pretty big room together—it was 22 x 25—with some baffling between them, but excellent sightlines so they could really interact," Denenberg says. The project used just 28 of the available channels, most of those on Blakey's drums: Denenberg's choices included a Neumann U47 on the kick; a Shure SM57 on the snare; AKG 451 on the hi-hat; and AKG 414s and Sennheiser 421s on the toms.

As far as miking sax, Denenberg raves about the ease of working with Fathead: "Sometimes you put a mic on a saxophonist and you can't figure out what to do—you try making it warmer, you try adding top to it. But anything worked with him because his tone is so fabulous."

The material on the disc is a delectable blend of familiar tunes and more obscure choices. In the former cat-

egory, there's Junior Parker's old R&B smash "Next Time You See Me," and a surprisingly fresh work-up of "When the Saints Go Marchin' In." Then there's "Shoo-Fly Don't Bother Me," a song most of us probably learned in elementary school. But in the hands of the Triangle, it's a long, meandering river of rhythm that bears a slight resemblance to Dr. John's spooky voodoo anthem "Walk on Gilded Splinters." And in grade school we didn't get to sing the verses about prison!

The real discovery for me, though, was "Cousin" Joe Pleasant's bluesy, funny "Life's a One Way Ticket." "Yeah, not many people know about him," Rebennack says with a laugh. "He wrote some classic tunes; real funny stuff, like 'How Come My Dog Don't Bark When You Come Around?' In the bebop days he was the only singer the coolest blues cats in New Orleans would bring in on a date. I'd see him in clubs on Bourbon Street singin' these hip and swingin' tunes he wrote; and real gut-bucket blues, too. It was fun bein' able to do one of his songs."

"Fun" seems to be the operative word here. More than anything else, this disc is an unpretentious blast. It's too early to tell whether the *Bluesiana Triangle* will be just a one-shot or the



Jack DeJohnette

PHOTO: JEFF KATZ

beginning of something bigger for the trio. All these guys have so many irons in the fire at any given time it may be tough to get them together in one place again anytime soon. Rebennack, for instance, is working on three differ-



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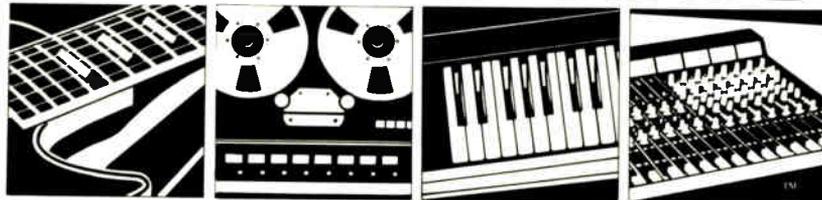
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ent musical approaches to his next Warner Bros. solo album. And the septuagenarian Blakey is always on the road, it seems.

"If we're all cool, we can do it again sometime," Rebennack says. "I know everybody enjoyed it. When you look at it, it seems like it'd be three guys goin' in different directions. But we came together and it was cool. *Real cool.*"

Jack DeJohnette in Dreamland

Anytime I see Jack DeJohnette's name on a record, I know I've come across something that's going to be musically interesting and challenging. You can tell a lot about player by the company he keeps, and over the past quarter-century, the extraordinary drummer (and keyboardist) has worked with the likes of Coltrane, Sun Ra, Miles (on *Bitches Brew*), Monk, Sonny Rollins, the avant-garde AACM, and Keith Jarrett. In the '70s he was an integral part of the first exciting wave of artists on Manfred Eicher's groundbreaking ECM label, and in the late '80s he was still working with the most adventurous players around: his collaboration with trumpeter Lester Bowie on *Zebra* (a "visual tone poem" on zebra life produced by a Japanese video maker) was brilliant.

His most recent release, *Parallel Realities* (on MCA Records), finds him working in a super trio with two old friends: keyboardist Herbie Hancock and guitarist/Synclavierist Pat Metheny (another ECM alumnus). The threesome recorded at Dreamland Studios in West Hurley, N.Y., near DeJohnette's home in Woodstock.

According to Tom Mark, who engineered the sessions, Metheny moved into DeJohnette's house for the duration of the album, and the two worked up demos of most of the tunes there, relying heavily on Metheny's Synclavier. Then, when it came time to do the actual in-studio recording with Hancock, "There was a good map in the computer already," Mark says, "and instead of playing to a click track, they played to a synthesized bass that was sequenced."

Dreamland, Mark says, "is a beautiful, old converted church—a real nice room. It has a very warm sound. The main room had nothing in it except for Jack's drums; it's a great room for that. Herbie was in this large isolation room off the main room, but it's not like some little iso booth. It's probably 25 x

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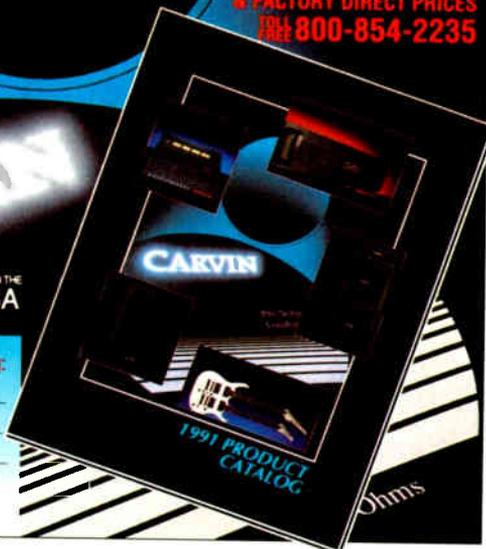
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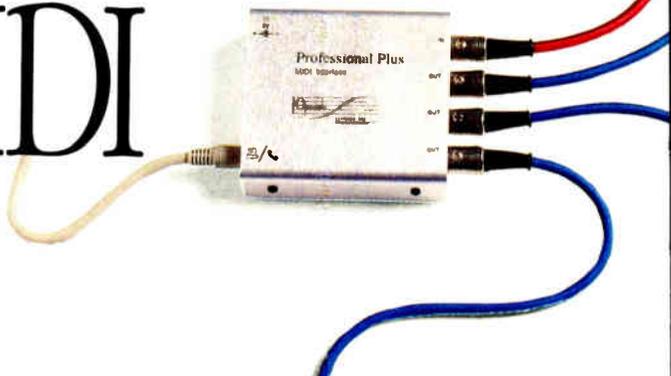
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20 with a high ceiling and one granite wall. Then Pat was in the control room with me so he could deal directly with his Synclavier technician. But they could all see each other, and listening to the record you'd never know they weren't all in the same room together."

Mark utilized a number of different mics on DeJohnette's large set, including an AKG D-12 on the bass, a Shure SM57 on the snare, Sennheiser 421s on the toms, a Neumann KM84 on the hi-hat and an AKG 451E on the overheads. Hancock played a Yamaha MIDI grand that Mark recorded acoustically (using Telefunken CM-61s) as well as recording the MIDI data into the Synclavier at all times. "Doing it that way gave us a lot of flexibility," Mark says. "It allowed us to double a part, or even just a few notes if we wanted." In addition, Hancock had a DX7 MIDI'd to the grand piano. Metheny's axes went direct into Dreamland's API 3232 console.

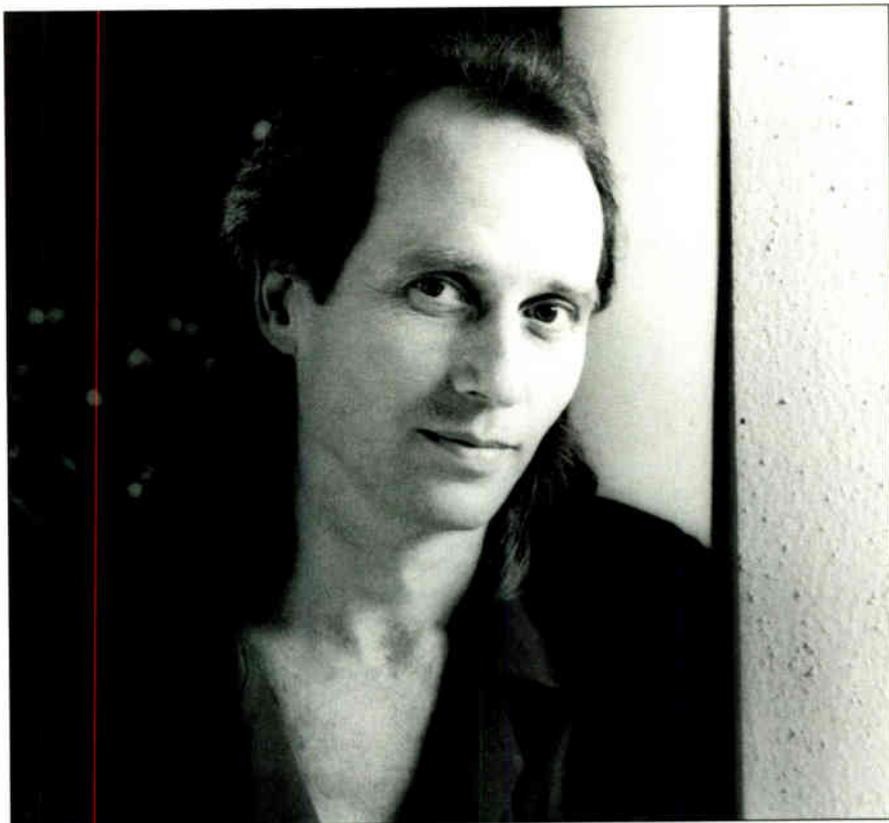
Mark says that the three musicians

how to listen to each other. They're very sensitive in that way."

"We have a rapport... great chemistry," is how DeJohnette puts it. "Even though these guys may be bigger names than me as far as the business goes, we're on the same level musically. There's something intimate about the way we sound. It's well-produced but organic."

DeJohnette and Metheny split the songwriting tasks down the middle (and co-wrote one), but all seven tracks bear the indelible stamp of each of the three players. It's more "up" and obviously accessible than many of DeJohnette's records—and that may explain why it has been the drummer's best-selling album in some time. "The whole record makes you smile," DeJohnette says, "and I'm anxious to let people see that side of my composing."

This isn't simplistic "happy jazz" *à la* Kenny G., however. There's real textural depth in the arrangements of the

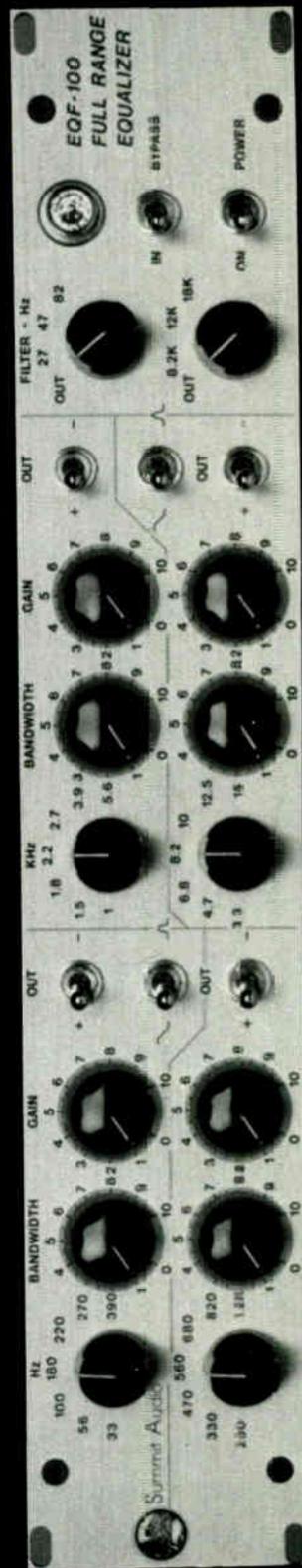


Chet McCracken

"obviously have a tremendous amount of respect for each other. I'd be in the control room with Pat, and Herbie would play something that would drive Pat wild; same with Jack. Obviously, they're amazing musicians, but a lot of it I think is that they all really know

seven compositions that make up the disc, as well as some fascinating rhythmic turns that alert the listener that yes, this is Jack DeJohnette territory. Hancock is typically inventive throughout (Is there any player more adept at so many styles?), while Metheny

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continues to expand his vocabulary as a guitarist with each project.

The trio, augmented by bassist Dave Holland (another monster player with formidable credentials), toured extensively last summer, suggesting that *Parallel Realities* might just be a teaser for what these guys can *really* do together.

Chet McCracken's Solo "Flight"

Drummer Chet McCracken has played with everyone from Hank Williams Jr. to Tina Turner to Delbert McClinton, but he is probably best known as the skinsman for the Doobie Brothers during their commercial peak in the late '70s and early '80s. It's a time McCracken recalls fondly:

"I really have nothing but good things to say about my time in the Doobie Brothers. I wasn't in the group long enough to become independently wealthy, but they were very generous with me and I loved working with them. They're really nice guys, and it was a real eye-opening experience for me. It really showed me how good things can be in the music business."

Things are a little leaner for McCracken these days, but artistically

he's at a career high. His solo album, *Flight to Moscow*, released a few months ago on the independent Voss Records label, showcases his skills as a composer and player like nothing he's ever done before. Over the course of 12 solid instrumentals, he shows a deft touch for a broad range of fusion styles, from highly accessible (and in some cases slightly generic) pop-oriented material, to denser, more challenging pieces that bring to mind everyone from the Mahavishnu Orchestra to latter-day Miles Davis.

"Definitions are always a problem, especially with instrumental music," he says. "I'm trying to avoid the tag of being fusion, which is terminology from the '70s. The music does have a rock groove, and it's rather aggressive because I'm a drummer."

McCracken's drumming isn't even highlighted particularly; rather, the spotlight falls mainly on guitarist Chris Pinnick and Chapman Stick player Rich Grossman. Brad Dutz is credited with "electric MIDI mallets," and Grossman shines on a number of basses. Saxophonists Danny Pelfrey and Marty Grebb guest on reeds.

Most of the project was recorded

over the past couple of years in the home studio McCracken built for himself nearly a decade ago. "I needed a place to write and create anytime I had the urge," he says. "I had one of the original Portastudios years ago but did very little recording on it. Then I did the old convert-the-garage routine. I didn't really know what I was doing, but I got a lot of expert help and it worked out well. It's modest, but I've enjoyed working there." Included in his setup is a Tascam 1-inch, 16-track recorder, a Sound Workshop mixing console, BGW power amps, REV7s, DigiTech 128s and more.

McCracken does most of his work alone, utilizing a "trustworthy remote unit" that allows him to be musician and engineer at the same time. "When I write a song, I have a rack of keys, or vibes, to work things out on, depending on the initial inspiration," he says. "Then I'll record the drum track to go along with the melody, and bring in a bassist and guitarist. What I'm trying to go for is a live feeling as much as possible. You definitely lose some of the spontaneity of more than one musician working together at a time. But it allows me to, say, point out a

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drum riff that I want the bassist to play off of, and so on. It lets me think more about the interaction. In the end, I think the advantages outweigh the disadvantages. You can really tailor a track working that way. And also I think when you have the whole rhythm section playing together on a track, you're more likely to settle for something that could've been different or better."

The disc has garnered generally favorable reviews so far, but cracking radio is a difficult proposition for this sort of material. "I tried to make it as melodic and commercial as possible while still being the kind of music I like to play drums to," McCracken says. "It hasn't taken on radio as quickly as I'd hoped." Still, with a backlog of about 40 tunes at his disposal (and more being written all the time), McCracken knows that if this isn't the album that breaks him as a solo act, maybe the next one will.

"It took awhile to get this one together and get a deal and all," he says, "but at least now I feel like I've got a foot in the door."

Four CD Reissues Worth Checking Out

Wayne Shorter: *Native Dancer* (Columbia, 1975); **Milton Nascimento:** *Milton* (CBS; originally Horizon/A&M, 1976).

The brilliant Brazilian singer Nascimento possesses a falsetto that soars above his accompaniment like a great jungle bird. Shorter's tenor and soprano sax lines sing in an amazingly *human* voice. On both of these discs there are extensive passages where the two play together, and the result is rapturous, heavenly music. The chemistry is palpable: You can hear them sparking each other, and each is given ample room to shine.

Native Dancer remains my favorite of all of Shorter's solo albums. Recorded just four years into his stint in Weather Report, it is a supremely melodic and sonorous fusion of jazz and Brazilian folk styles; indeed, half of the album's nine tunes are by Nascimento, four are by Shorter (including "Ana Maria," one of his prettiest ballads) and one is by Herbie Hancock, who plays piano throughout. Brazilian percussionist Airtio Moreira, one of Shorter's Weather Report *compadres*, also shines on the sessions. Nascimento's album was recorded shortly after the *Native Dancer* sessions with some of the

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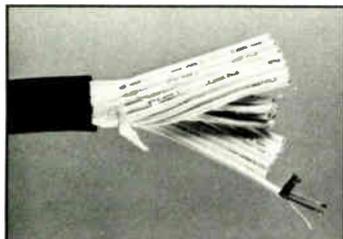
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Milton Nascimento

same players—Hancock, Moreira, drummer Roberto Silva—as well as the great guitarist Toninho Horta and bassist Novelli. All of the compositions were written or co-written by Nascimento, and there isn't a weak track in the bunch. I particularly like the opening tune, "Raca," with its irresistible strummed guitars, and the interplay of Hancock, Shorter and Nascimento on "Francisco." Both albums are absolutely exquisite (with Shorter's probably the more appealing to straight jazz fans), and though the two have worked together on other occasions through the years, for my money, neither has topped these outings.

Native Dancer was recorded at the Village Recorder in Los Angeles. It was produced by Jim Price and engineered by Rob Fraboni. *Milton* was recorded at the Village in L.A. and Shangri-La in Malibu. Fraboni produced the album; Jeremy Zatkun engineered.

Miles Davis: *Filles De Kilimanjaro* (Columbia, 1968)—I sit proudly with the minority when it comes to Miles—my favorite Miles albums are from the late '60s and early '70s, roughly from *Nefertiti* through *On the Corner*. I loved how Miles was able to inject elements of hard blues and electric rock 'n' roll (Hendrix, James Brown and Sly were big influences) into such flowing, seemingly open-ended musical landscapes. As he got deeper into electric music, the stew got thicker. *Filles De Kilimanjaro* represents the other side of the spectrum. The playing is spare, the arrangements airy, but you can still hear some of the blues and even rock sensibilities that would become more prominent on *In a Silent Way* and *Bitches Brew*. This is essentially two similar quintets: Miles, Wayne Shorter (on tenor only), drummer extraordinaire Tony Williams, and then either Chick Corea on piano and electric piano and Dave Holland on bass, or Herbie Hancock on keys and Ron Carter on bass. There is a clarity to these arrangements that is breathtak-

ing—at the same time you can hear all the players searching within themselves, and there is an unmistakable unity of purpose and approach. Listening to the title tune or the sinuous "Mademoiselle Mabry," (one of two tracks digitally remixed by Tim Geelan) it's easy to get lost in the dreamy, elegant motion of this music. The original recording was produced at CBS Studios in New York by Teo Macero, engineered by Frank Laico and Arthur Kendy. The CD sounds wonderful.

John Coltrane: *Coltrane Live at Birdland* (Impulse, 1964)—Here's another classic grouping at a peak: Coltrane on tenor and soprano, blowing free and easy, still just this side of the sometimes freaky Ornette-inspired "noise" that was to come; McCoy Tyner laying down (mainly) mid-range piano blocks that Trane sculpts around; Elvin Jones driving the rhythm with quick rolls and abrupt cymbal splashes; and bassist Jimmy Garrison providing a steady, propulsive anchor to it all. Actually, only three of the five Bob Thiele-produced tracks come from the October '63 Birdland show; the other two were cut live with Rudy Van Gelder at an unspecified studio a month later. The main difference is the bass is more prominent on the studio cuts. Though this is definitely Coltrane's show, it is Jones who seems to set the tone in much of the music, pushing and prodding, constantly signaling potential new avenues for exploration. But then, there is also a beautiful passage of *solo* blowing in "I Want to Talk About You" that showcases Coltrane's extraordinary sense of both melody and rhythm, not to mention the raw emotion that marked so much of his work. In those few moments we learn that as great as his band was, Coltrane had the goods to do it *alone*, too. ■

Blair Jackson is managing editor of Mix.

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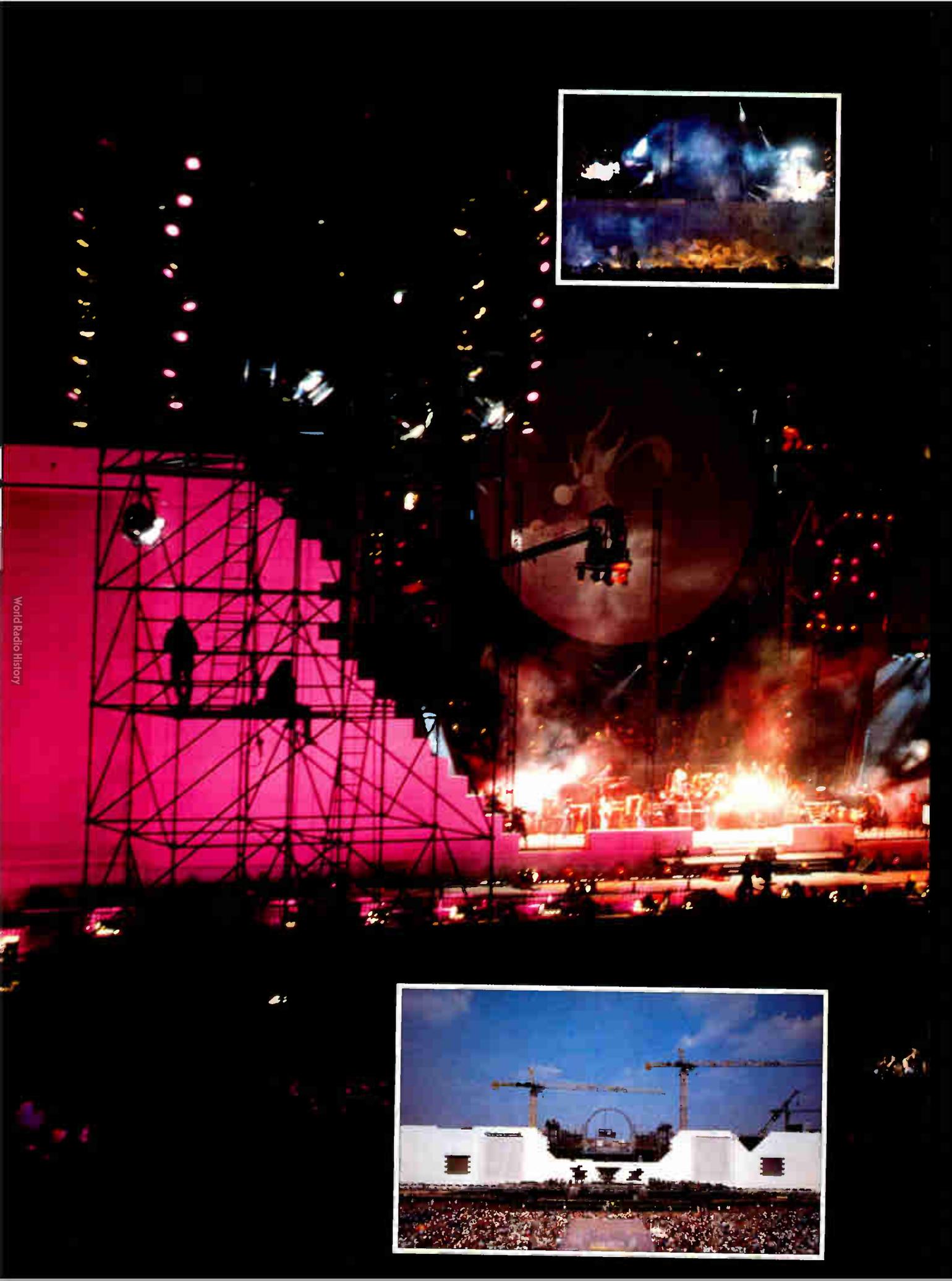
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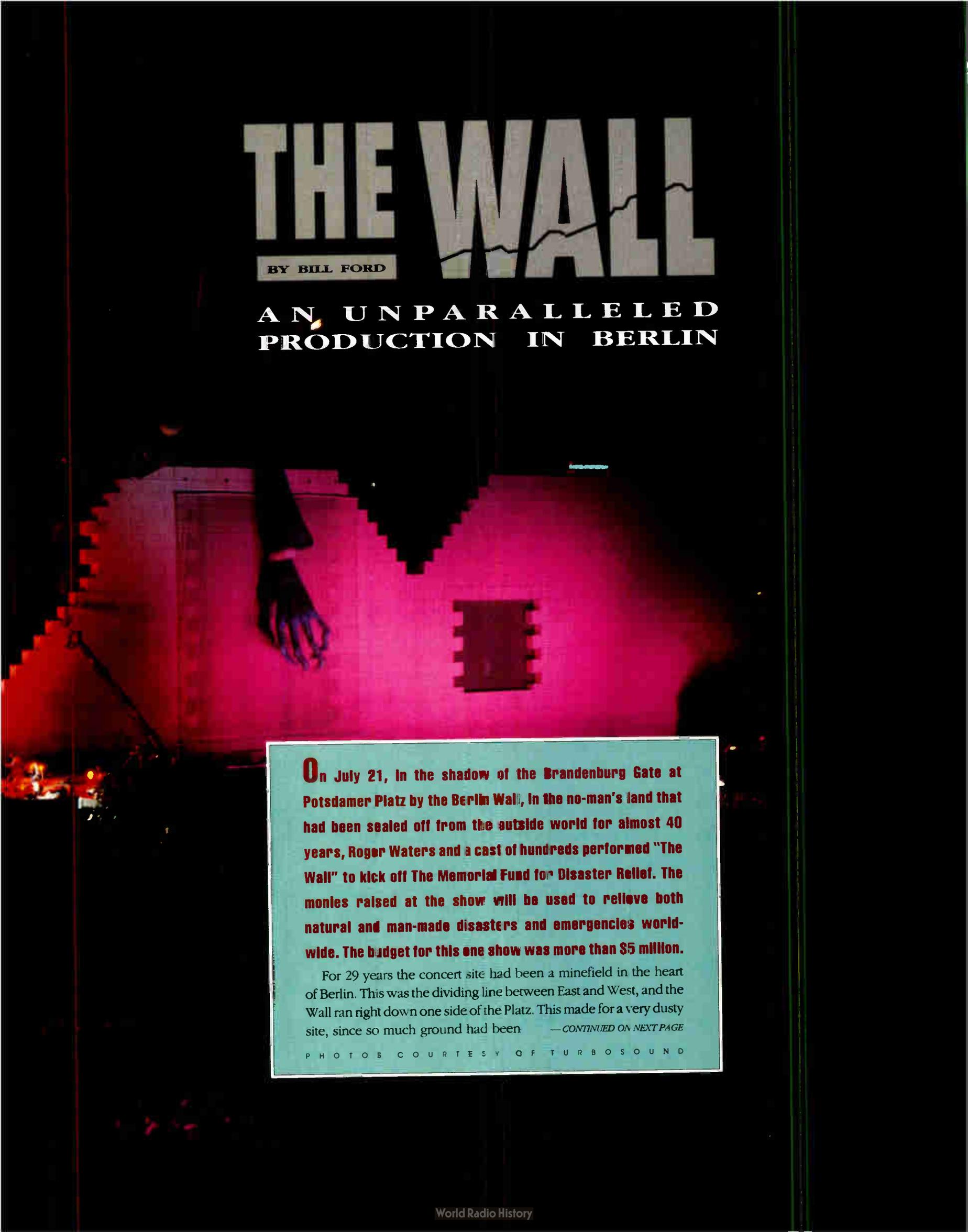


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For 29 years the concert site had been a minefield in the heart of Berlin. This was the dividing line between East and West, and the Wall ran right down one side of the Platz. This made for a very dusty site, since so much ground had been.

—CONTINUED ON NEXT PAGE

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turned over by East German soldiers in the process of mine removal. I heard more than one crew member mention that they hoped all the mines had been retrieved before the Platz filled with people!

Artists

The cast assembled by Roger Waters reads like a Who's Who of the music business: Thomas Dolby, Sinéad O'Connor, Van Morrison, The Scorpions, The Hooters, Bryan Adams, The Band, Jerry Hall, Joni Mitchell, The Chieftains, James Galway, Albert Finney (narrating), Cyndi Lauper, Tim Curry, Marianne Faithfull, Ute Lemperer, and Roger Waters and the Bleeding Heart Band, with Andy Fairweather-Low. Additional guests and cast members included the 100-piece Marching Band of the Combined Soviet Forces in Germany, a 40-voice chorus from Berlin, the 50-piece East Berlin Symphony Orchestra, 15 Harley Davidson motorcyclists, 50 Storm Troopers, about 20 bricklayers, and a host of onstage vehicles.

An estimated audience of 330,000 from all over the world flew, drove, ferried and bused into Berlin for this gig. Many arrived without tickets, hoping they'd be able to gain entrance somehow once they got to the site. The show was broadcast worldwide, and the listening and viewing audience was estimated by show producer Mick Worwood to be nearly 500 million.

Backstage

Upon arriving, I was immediately impressed with the extremely efficient manner in which the German locals had been employed. Many had been at the site for more than a month, and had transformed it into a combination command post and home away from home, complete with mess halls (don't forget your meal ticket!), a communications center, tech trailer, press office, artist lounges, remote trucks, showers, wardrobe area, helipad, and, of course, a Hard Rock Cafe...*artistes* only. There was even a patch of unturned grass that was used as a tenting area for crew members who could not get a hotel room or piece of floor in someone else's room.

Set off to one side of the Brandenburg Gate, an area approximately 450 x 600 feet was used as the backstage "staging" area; and in front of the stage was an audience area approximately 1,300 x 750 feet. The stage itself was more than 550 feet long and 75

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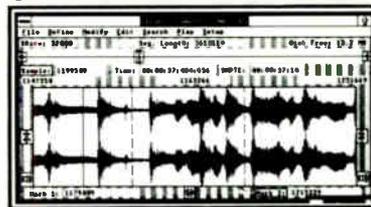
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feet deep, with ramps at each end to accommodate the 45-foot flatbed trailer, limo, ambulance, and a dozen or so Harley riders and various other vehicles that were to drive onstage during the production. Waters' styrofoam Wall was almost 50 feet tall, which translates into about 60 feet of required scaffolding.

The artist's working area of the stage was set on three levels: the 40-voice choir (highest up in the back), the 50-piece orchestra (mid-level), and the main players' and guests' working spaces at and around the line where, later in the show, the wall would bisect

the stage. The lip of the stage had to be wide enough for two military transport vehicles to pass each other in opposite directions.

The all-Turbosound P.A. was provided by Britannia Row, with Turbosound founders Tony Andrews and John Newsham working in close conjunction with Britannia's Mike Lowe. In fact, Newsham had been at the site for almost two weeks.

The "Flashlight" Mains System

Turbosound's Flashlight is a small, efficient, two-box, high-level four-way system. Andrews and Newsham have

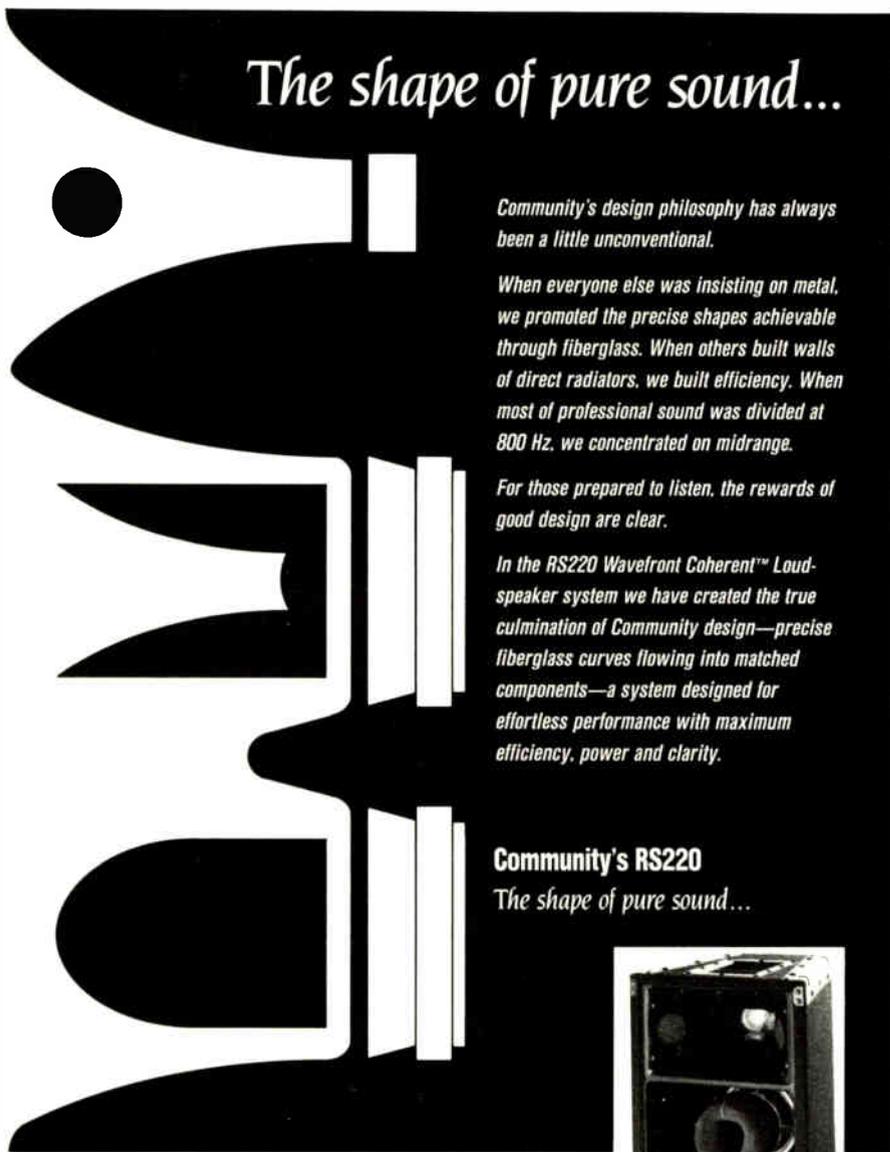
been defining and refining it for the past four years, and it is now on the worldwide market. Each box measures only 22.5 inches wide x 32 inches tall. "In certain circumstances, one Flashlight box will take the place of three TMS-3s," says Dave Talbot, sales and marketing manager for Turbosound in the U.S.

The heart of the Flashlight system is the Mid-Hi Pack, which Andrews describes as "a 12-inch low-mid with a newly developed version of the patented Turbo-Mid device, which brings the turbo-loading technique to a new, lower octave of the frequency band." This 12-inch driver "extends up to about 1.3 k, and is followed by a new 6.5-inch mid-high speaker on a similar device with a flare of exactly the same shape as the 12-incher." The 1-inch high-frequency compression driver comes in at about 8 k, mounted on another new horn flare of Turbosound's own design. The Mid-Hi Pack design criteria has a dispersion of about 30 degrees and is designed specifically for large arenas.

The subs (designed by Andrews specifically for this sub-box) are driven by 21-inch drivers with 6-inch voice-coils, and were manufactured for Turbosound by Precision Devices (a sister company). The drivers are mounted in a TurboBass enclosure with rigging hardware attached.

Two clusters of the new Flashlight Mid-Hi packs were flown within the staging behind large white scrims on either side of the stage. Forty-eight boxes were used, flown 24 to a side, six across and four high, suspended by a new Turbo-developed flying rig about 50 feet up in the staging. Beneath the flying rigs were the 21-inch subwoofers, stacked six across and three high, making a total of 18 per side (36 subs) at stage level.

The main system was quite small compared to the huge quantity of speakers usually required to cover an audience and venue this large. Gary Bradshaw, an independent engineer from the U.K. who was hired by Waters to do the house mix, was shocked upon seeing the system. He described it as "minute—microscopic when you see it. I had a heart attack when I saw it! This is the biggest gig I've ever done, with probably one of the physically smallest P.A. systems I've ever used at a large venue show. And it delivers a feral punch, 110 to 112 dB on average, crystal clear, with a great frequency response."



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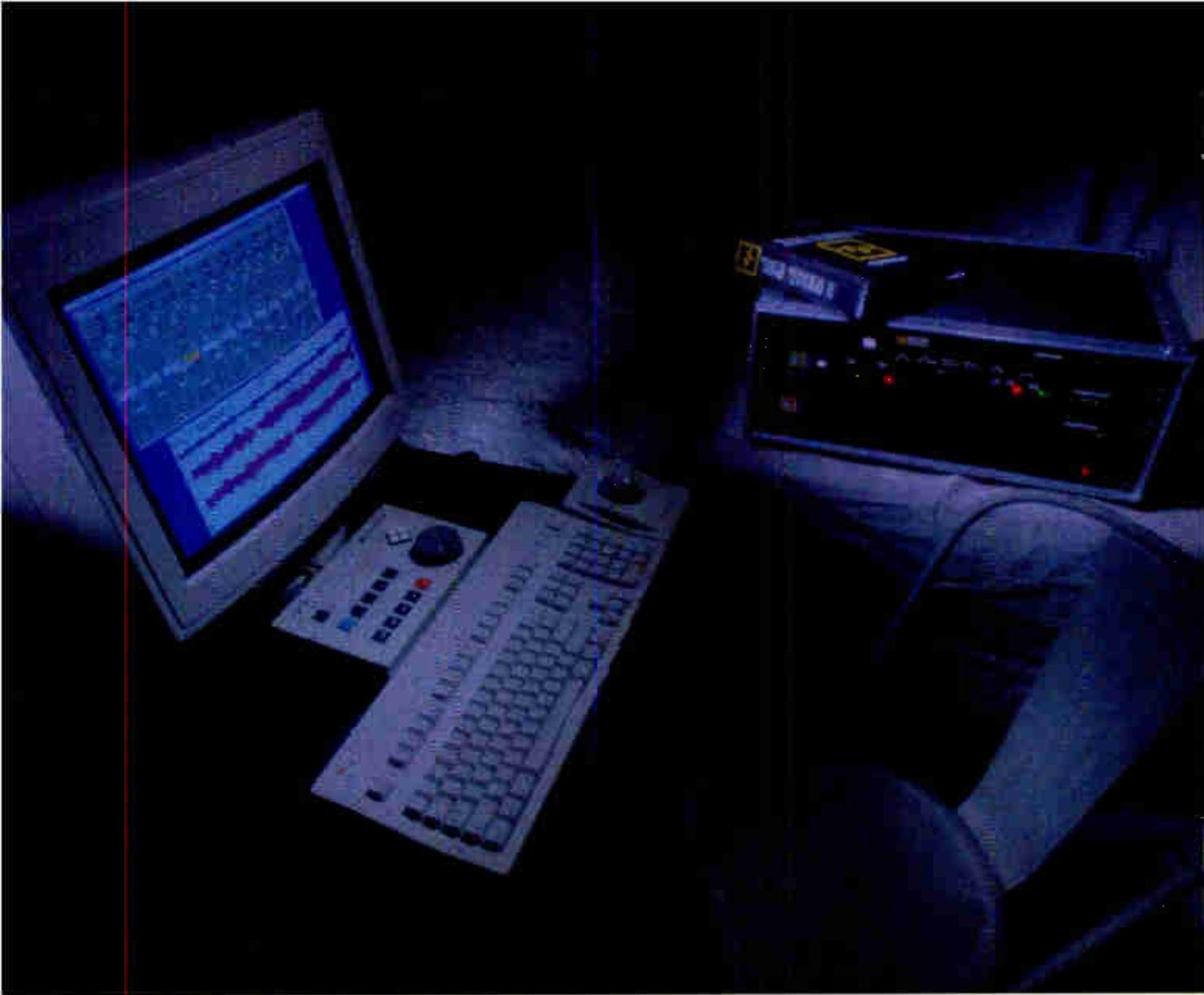
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Power Users

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Mike Corbett, CBS Records, Credits: Mariah Carey, George Michael

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Roger Nichols, Producer/Engineer, Credits: Rickie Lee Jones, Rosanne Cash

"I use Sound Tools to assemble albums, edit tunes, and even create songs that never could have existed otherwise."

Shep Pettibone, Remixer/Producer, Credits: Madonna, Janet Jackson

"Sound Tools gives me creative options I just can't get with tape—and that shows up in my mixes on songs like *Vogue* and *Escapade*."

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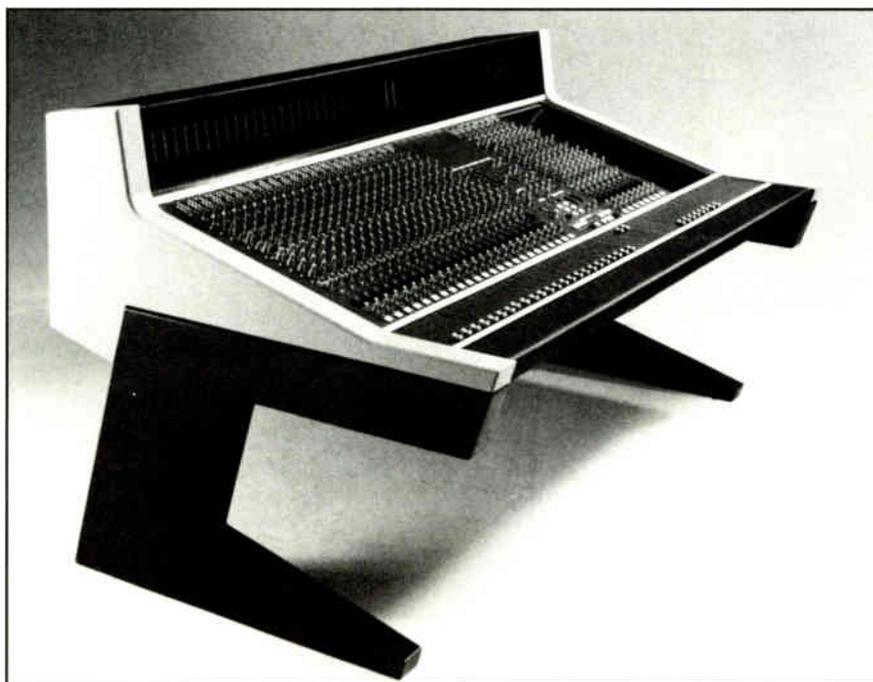
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Newsham, when asked if this system would take advantage of any sort of processing, replied, "It doesn't need it." Turbosound will be marketing something called the Loudspeaker Management System, which consists of a new high-power Brooke-Siren Systems amplifier coupled to a Brooke-Siren Systems FDS-360 (which has built-in limiters). It utilizes a dedicated crossover card incorporating timing and phase alignment circuitry for the Flashlight.

The flying hardware is a derivative of the TMS-3 flying rig, which has developed a wide following among touring pros over the years. Designer Newsham explains: "Each motor hoists eight boxes—two across and four deep on the flying rigs. What's new is a 'spreader' with a mini-bar that has a series of holes to adjust the horizontal splay angle in five-degree increments. The vertical is adjusted by a hook on the chains to make the length shorter on the top chains than on the chains nearer the bottom of the cluster."

Front Fill and Delay Systems

At the front lip of the stage was a full-range, delayed center-fill, consisting of 32 TMS-3 cabinets—stacked two high—sitting atop a single row of 14 TSW-124 subwoofers, loaded with 24-inch Precision Devices drivers. (Their job was to cover the large central area since the main Flashlight P.A. stacks had to be so far apart.) In addition, two stacks of TSW-124 enclosures, 21 a side, formed an extra sub-bass system running from an aux send at the mix position.

Visualize 11 delay towers using a total of 116 TMS-3s. The first row of three towers was situated 100 meters from the stage, with 12 TMS-3s on each tower. The second row of delays was 180 meters back and consisted of four towers with ten TMS-3s stacked on each tower; the third row used the same configuration as the second, but at 270 meters, with the delay time set for 798 milliseconds.

The first row of delay towers was powered by British-made C-Audio Model 707 and 202 amps, with each rack powering six TMS-3s; the second and third tiers of delay towers were juiced by 22 racks of QSC 3800 amps, driving four TMS-3s per rack of three amps. Crossover points on all TMS-3s were 250 Hz and 3.7 kHz.

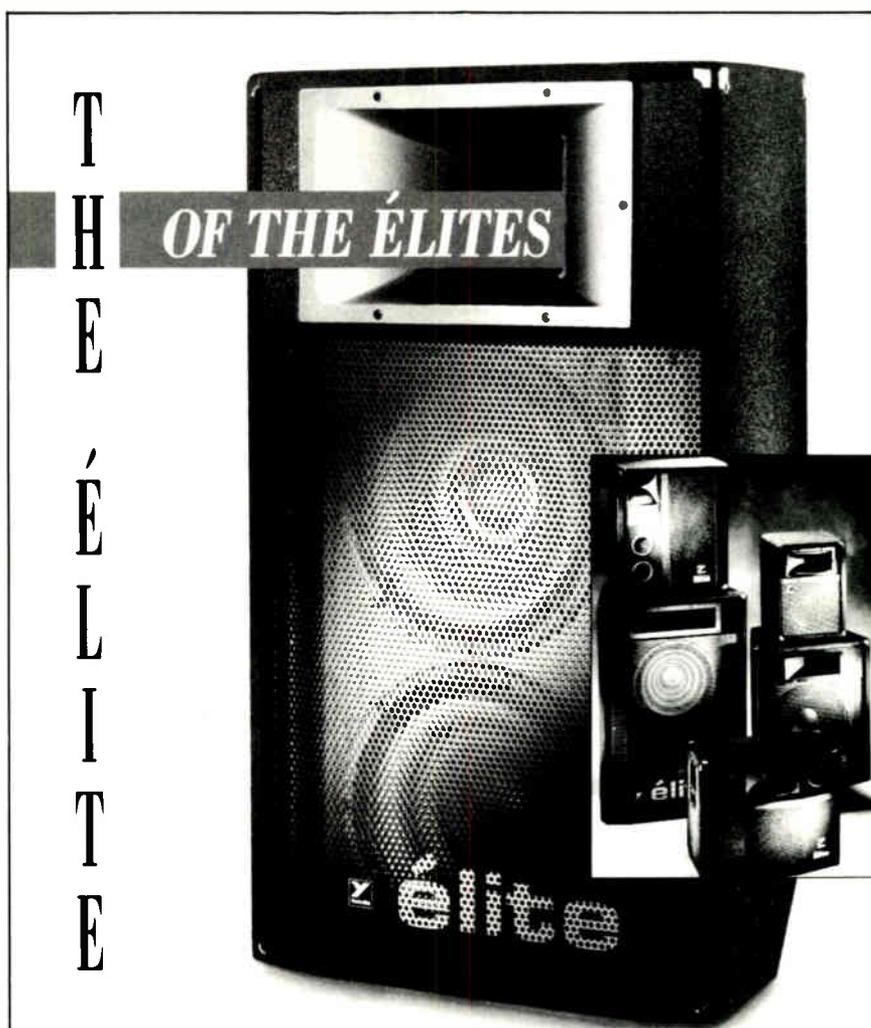
Front of House Mix

House mixer Gary Bradshaw usually works with Showco, Clair S-4s, MSI

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for this gig.**

and "Roadstar out of Sheffield" systems. His previous gig was the Knebworth festival in the U.K., where he mixed Tears for Fears. The day before the show was scheduled as a full dress rehearsal; it was also Bradshaw's first chance to hear the new Turbosound system at full volume.

In the mix tent, things were slightly cramped, with four consoles, two Otari MTR-90s, rackloads of processing and a rare relic synthesizer all vying for floor space. A pair of 40-input Yamaha PM3000 consoles were chosen as the main house and drum submix consoles.



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The main console received the signals from the band and guest vocalists. The drum submix console fed the main 40-input Yamaha stereo submix right into the VCA masters. Keys, guitars, basses, acoustic guitar and vocals were also assigned here. From a third console, 2-channel submixes of the choir, the 100-piece Russian marching band and lots of tape effects were sent to the main console.

Tucked off at one end of the drum submix console by the tape machines was Paddi Addison, house mix position technician and synth operator. Addison created the sounds of the Wall crashing down. His rig consisted of an old analog VCS-3 synthesizer with three oscillators, one ring modulator and one reverb section. Manufactured around 1971 by Electronic Music Studios of London, this particular synth is on various older Floyd albums, like *Dark Side of the Moon*. Judging from the reactions of people who saw it in the mix tent, this seemed to be "the cool technology."

A 48-channel Midas console helped bring the total of mics, DIs and tape returns to 112. The Eurosound Mobile stationed backstage also fed left and right submixes of the orchestra to one of these submixers. These two submix consoles and the MTR-90s were ably operated by Heidi Cannavo.

The Otari multitracks continuously fed a number of destinations, largely keeping things timed to the frame. Eight effects tracks with a large assortment of stereo sound effects were sent to the submix console. Familiar Roger Waters sound effects were used, such as bees, pig noises, hammers and WWII Stuka planes buzzing the audience. The drummer received a click track, performers got count cues, and the orchestra conductor was kept steady by guide track. Bradshaw also mentioned "various aids for other people," and, "tape is running all the time as there are so many cue tracks doing things." A pair of SMPTE tracks helped control projectors for frame accuracy, while time-coded video triggered other effects.

This sounds like a lot of gear, but it took only four trucks to get it all on site. One-and-a-half trucks were loaded with consoles, processing, amps and monitors. The main house Flashlight gear was transported in a half-truck, and delay towers filled the last two trucks.

The concert is to be released as a live CD, video and possibly laserdisc.

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The Manor Mobile was trucked in from the U.K. to record the dates digitally with a Sony PCM-3348, getting its feed from the active four-way split. The Mobile then sent 48 subgroups to an SSL console in an on-site, custom-built booth, which then sent the live broadcast worldwide.

German television ZED-TV got this feed, and during the show a German TV production person told me they were encountering problems with a 2-channel subfeed from the Mobile—he said it was “breaking up.” I listened, and it sounded like he had a bad headset. He felt redeemed during the show when stage power went out twice within a minute; and the time code locked “Zed Guys” were able to slip, with nary a glitch, to the tape of a flawless take from the previous evening’s full dress rehearsal. The viewing world was none the wiser.

Stage Monitors

Robin Fox mixed monitors for the show, and also seemed to be surrounded with consoles, using two 40-channel Ramsa WR-S840 monitor consoles and an older Midas 3116. The main Ramsa board had main vocals, guitars and band assigned from there. The other WR-S840 was used for drums, guest guitars, vocals, keys and the synth from the house console. The Midas console was used for monitoring sound effects from the multitracks.

In servicing all needs and satisfying all tastes, Fox manipulated 16 monitor mixes, using a total of 40 stage monitors. Monitors included an assortment of Turbosound TMW-215s, TMW-212s, MSI 2x15s and 2x12s, with an additional four TMS-3s used as sidefills. More than 100 feet away and 50 feet in the air, Turbosound TMW-215 monitors powered by Carver PM-1.5 amps were placed near the top of the Wall for the guest guitarists.

Post-concert feedback from Gary Bradshaw regarding the sound reinforcement system was that “the system had a good, warm vocal sound. I’m very impressed with it.” John Newsham mentioned, “The system has been through three outdoor thrashings and not lost a single speaker.” Chris Hey of Brit Row summed up the thoughts of many on the production crew: “The most over-the-top show I’ve ever been involved with.”

Bill Ford lives in El Granada, Calif., though obviously he’s been to Europe.

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World Radio History

ALL ACCESS

PHIL COLLINS IN CONCERT

**PERSONNEL**

House Mixer: Rob "Cubby" Colby

Monitor Mixer: Phil Christensen

Head System Engineer: Howard Page

Technicians: Paul Kalenak (asst. monitor), Peter Greenlund, Mike Waters

CONSOLES

House: TAC SR9000 40x16x2 with 24-channel extender

Monitor: Harrison SM-5 32x16 with 20-channel extender

AMPLIFIERS

Main FOH: Crown MA1200, Crown PSA-2

Monitors: Crown MA1200, Crown MT1200

MAIN LOUDSPEAKER CABINET

Manufacturer: Showco
Model: Prism

SOUND COMPANY:

Showco

ARTIST:

Phil Collins

VENUE:

Shoreline Amphitheatre,
Mountain View, CA

VENUE SIZE:

20,000 people

DATE:

September 19, 1990—
evening/outdoors



PHOTOS: STEVE JENNINGS

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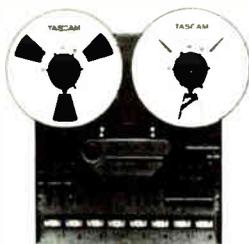
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Configuration: flying 4-deep
x 5-across per side
Flying System: Showco Prism
grids
Truck Pack: stacked five
across with subs on top

LOW END CABINET

(or Subwoofer)

Manufacturer: Showco

Model: Prism Sub

Total FOH Quantity: 24,
stacked on floor

ONSTAGE

MONITOR WEDGES

Manufacturer: Showco

Model: (19) BFM600, (4)

BFM400

HOUSE RACK

Equalizers: Industrial
Research Products TEQ DG-
4023, Klark-Teknik DN3030,
GML 8200 parametric

Crossover: Showco Prism
Digital 1040

Effects: Yamaha SPX900,
Yamaha SPX90 II, Eventide
H3000, Lexicon Super Prime
Time, AMS RMX 16, Lexicon
224X, Roland SDE-3000

Gates: Aphex 612

Compressor/Limiters:
dbx 160x, dbx 900 rack with
903 modules, BSS DPR 402

Misc: Klark-Teknik DN60
spectrum analyzer, Tascam 501
CD player, Furman PL8 power
conditioner & light

ONSTAGE SIGNAL

PROCESSING

Equalizers: Klark-Teknik
DN360, Klark-Teknik DN410
dual parametric, Industrial
Research Products TEQ
DG-4023

Crossovers: Showco 1016
(3-way)

Effects: Yamaha SPX900,
Yamaha SPX1000, Yamaha
SPX90 II, Yamaha REV5

Gates: Drawmer 201

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DN504, dbx 160

Intercom: Clear-Com

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Kick: Beyer M88

Toms: Beyer M201, M420

Overheads: Beyer M740

Snare top: Shure SM57

Snare bottom: AKG 414

High Hat: AKG 460

Guitar: Shure SM57

Sax & Trombone: Sennheiser 441

Trumpet #1: Shure Beta SM58

Trumpet #2: Sennheiser 421

Direct Boxes: Countryman

REVIEW:

The audio production quality was excellent; every aspect of the show was done extremely well. Showco's Prism P.A. exhibited clarity, seamless coverage and pristine audio purity. Rob Colby's front-of-house mix couldn't have been any better, either. His superb handling of the band was the perfect complement to the Prism system. He achieved a remarkable balance of level, definition and punch. There was good instrumental separation and vocal intelligibility throughout the entire show. Even while the band was providing driving accompaniment, one could understand every word.

Showco's efforts and determination to design and field a first class sound system really bears fruit with the current Prism system on tour with Collins. This great-sounding gig was no fluke; other audio professionals I know, after hearing this tour in other venues, echo these same sentiments. My hat's off to Showco, Colby and the entire Showco crew.

— Mark Herman

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by Mark Herman

SOUND REINFORCEMENT NEWS

All of a sudden it seems that the sound reinforcement industry is bursting with new products. Many manufacturers waited until this fall to finally show off their latest designs and models. The annual AES convention is always a time to showcase new equipment, and this September was no exception. Some areas of the marketplace were beginning to stagnate, but the year is ending with a flourish of interesting equipment. (Check October's *Mix* for the new sound reinforcement models.)

MSI update... **Maryland Sound Industries'** client list continues to grow and grow. Spokesman **Ronnie Smith** reports heavy touring activity for MSI throughout the second half of 1990. Smith says, "MSI has had a blockbuster year. Our touring division is going full steam ahead, and the installation division is staying busy as well." With enough equipment and personnel to field over 16 major tours at a time through their U.S. offices, together with its European affiliate **Britannia Row Productions**, MSI has become one of the most dominant players in the sound reinforcement industry today.

Take a deep breath as we go

over the MSI client roster... **David Bowie's** world tour ended in early October... **Earth, Wind & Fire** toured Europe this fall using an MSI/Britannia Row arena system. They traveled to Japan soon after... **Anita Baker**—out since May with a 40-box MS-10/MS-10B system—has extensively toured the U.S. and been to Europe and Japan twice. Baker is scheduled to continue into '91. **Gerard Schmerick** is mixing FOH on a Gamble EX-56... **Daryl Hall & John Oates** traveled through Europe... **Depeche**

Mode hit Europe for several months after doing the U.S., Japan and Australia... MSI/Britannia Row provided sound for the star-studded Knebworth Festival held in the U.K. and **Roger Waters'** incredible Berlin production of "The Wall"... **Crosby, Stills & Nash** completed their tour of the U.S.... **Luther Vandross** finished touring in October... **Kenny G.** and **Michael Bolton** did sellout business together across the U.S. using the MSI single-box MS-3W system... **Joe Jackson** finished a six-week tour in November...



Providing the punch for Prince's European tour: a 50-box Electro-Voice MT-4/MTL-4 mains system from SSE Hire of Birmingham, England (subcontracted by dB Sound). Photos: Herbert K. Adam



View of the stage setup on the Prince tour at the 5,000-seat Maimarkthalle in Mannheim, Germany. House mixer was dB's Davie Moire.

Hard-working **Patti Labelle** is scheduled to hit the road again in time for the Christmas holiday season... **Anne Murray** continues to tour steadily... **Chicago** kept a 40-box MS-10/MS-10B system busy... Lead singer **Belinda Carlisle** completed her solo tour shortly before the **Go-Go's** began a six-week stint in early November... **George Benson's** ongoing

world tour carried an MSI electronic front-end package everywhere... **Roberta Flack** continues to work, as does MSI's oldest account, **Frankie Valli**... The explosive **Pointer Sisters** were out... MSI provided engineers for **Stephanie Mills**... **Miami Sound Machine** will be going out on the first of the year... **Whitney Houston** is ready to resume touring soon... **Debbie Gibson** will begin rehearsals early this month in preparation for an upcoming theater tour... **Bobby McFerrin** was scheduled to go out sometime this winter... **Tracy Chapman** was out earlier this year... **Johnny Clegg and Savuka** will finish their U.S. tour sometime in December... **Dolly Parton** was on and off throughout the year... Other MSI clients included **Soul II Soul**, **Tears for Fears**, **Peter Allen**, **Sheena Easton** and **Phylicia Rashad**... MSI also handles audio for the Universal Amphitheatre, Greek Theatre (L.A.) and Fiddler's Green (Denver) facilities.

MSI also just purchased one of the impressive high-end Paragon house/monitor consoles manufactured by Audio Teknology Inc. The new Paragon was scheduled to be pressed into touring service immediately. Don't be surprised if MSI gets another Paragon soon.

AKG assimilates Edge-Tech... AKG Acoustics Ltd. recently purchased a controlling interest in Edge Technology Ltd. U.K. With this purchase, AKG—which also owns Orban and dbx Professional—has added speaker manufacturer Turbosound, signal processing manufacturer BSS Audio and Precision Devices. The new AKG divisions will be headed by marketing and sales manager **Dave Talbot**. AKG, which just moved into a large, new facility in San Leandro, CA, plans to warehouse and service its new products at the new Northern California

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— *Webster's New World Dictionary*

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location.

New BSS products... BSS Audio now offers two models of time correctors for sound reinforcement and broadcast delay applications. The TCS-803 is a mono, 1-in/3-out, multitap digital delay line designed for multiple speaker installations in arenas and auditoriums. The other unit, model TCS-804, is a stereo dual-tap delay line for speaker systems and delay tower time correction for large arenas. The TCS-804 offers a special relative time-shift feature for temperature changes at the venue... Another new BSS product now available is the innovative DPR-901 Dynamic Equalizer that integrates expansion and compression functions along with parametric equalization. The DPR-901 offers level-dependent equalization, noise reduction, broadcast limiting, de-essing, de-ffing, dynamic loudness contouring and more. It has four fully parametric bands of frequency-selective expansion (+16 dB) and compression (-30 dB). According to BSS, the DPR-901 could be particularly useful for monitor mix enhancement and dynamic control of vocals and acoustic guitar.

Delicate Productions

(Camarillo, CA) had a busy fall and early winter touring season, which included the second leg of the **Basia** tour. The Basia setup features 24 Martin F2 cabinets and Yamaha PM3000 house and Soundcraft Series 4 40x16 monitor consoles... **Jane's Addiction** is using 24 F2 cabinets and Yamaha PM3000 and TAC 30x12 monitor consoles... **The Cocteau Twins** are out with 24 F2 cabinets and Yamaha PM3000 house and Soundcraft Series 4 40x16 monitor consoles... **Los Lobos** are traveling with a monitor system, house console and effects... **Delicate's Spy Matthews** says, "I wish I had another two systems available. I am having to turn

AMS AUDIOFILE.. THE PLUS POINT

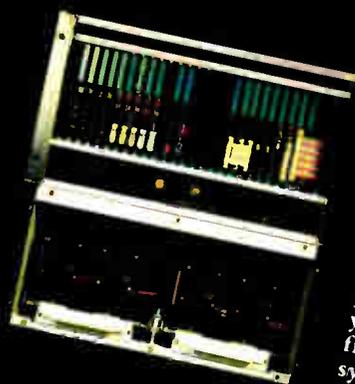
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LIVE SOUND

away tours as the word about the Martin F2 system spreads!"

In addition to sound reinforcement touring, Delicate has been active with corporate clients. **Smoother Smyth** reports that they recently handled full production for five stages at the MCA convention in Dana Point, CA. Among the live acts were **Indecent Obsession** (Australian), **The Blessing** (English), **Chagall Gueverra**, **Tiffany**, **Will T. Massey**, **David Benoit**, **Raffi**, **Spread Eagle** and **Vince Gill**. For the larger stages, three Apogee systems and two Martin F2 systems were used along with Yamaha PM3000 house consoles and Soundcraft Series 4 stage consoles. Soundcraft Delta mixers handled the smaller, more intimate performances...For the fourth year in a row, Delicate provided production services for the Emmys' Crafts (technical) Awards. A total of 16 Apogee AE-5 cabinets were distributed throughout a 30,000-square-foot room being used for the televised event...Other notable corporate functions included the opening of Christian Dior in Beverly Hills and a lavish party at 20th Century Fox.

New Midas console...

Klark-Teknik, U.S. distributor for console manufacturer Midas, announced that the company has come out with a new mixing console designed for both front-of-house and stage sound reinforcement. The flexible new XL3 has 16 main outputs, eight VCA groups, 16 discrete sends and eight auto mute groups.

Where's the battery?...

The new Turbosound concert loudspeaker Flashlight System made a splashy debut at Roger Waters' late-summer extravagant production of "The Wall" in Berlin. [See "The Wall: An Unparalleled Production in Berlin" in this issue.] The Flashlight System has been designed for powerful long-throw applications and

—CONTINUED ON PAGE 157

ENGINEER SPOTLIGHT

ROBERT SCOVILL

Engineer: Robert Allen Scovill

Age: 29

Years of experience: 10

Home: Los Angeles, Calif.

Now employed by: Independent

Favorite mixing console:

Live—Gamble EX-56

Studio—Neve-API (tracking),

SSL (mixing)

Favorite vocal microphones:

Live—Beyer M88, Electro-Voice

757, AKG 414

Studio—AKG C-12, AKG 414EB,

Neuman U47

Favorite signal processing

devices: Lexicon PCM70, AMS

RMX16 and 1580S, T.C. Electronic

2290, Publison, Eventide

H3000SE, Tube-Tech limiters and

preamps. "Anything that has a

vibe to it."

Favorite venues:

Indoors—The Palace (Detroit),

L.A. Forum, Saddledome

(Calgary)

Outdoors—Irvine Meadows

Amphitheatre

Memorable tours: Def Leppard

('87-'89), Rush ('90)

High point of career: "There are

many, but finding out how I got

the Def Leppard position sticks

out. It turns out that Joe Elliot

(Def vocalist), whom I had never

met, got hold of one of my Alice

Cooper board tapes and was so

knocked out by it that he called

Leppard's manager and requested

my services for the upcoming

tour. That felt great, because I got

the gig strictly on the merits of my

work, not through who I knew."

Low point of career: "Being

used as a sacrificial lamb on a

tour early in my career. I got fired

just to satisfy an artist's ego. The

reasons were entirely political and

in no way reflected on my job

performance, but it was hard to

swallow at the time. In retrospect,



PHOTO: STEVE JENNINGS

it made me less naive and taught me a valuable lesson about the politics surrounding the job."

Hobbies: Working in home 24-track studio, skydiving, water sports, computer hacking.

Advice for aspiring engineers:

"Learn to pay attention to every detail in every process. Be meticulous and lay everything out well, because anything you miss will come back to haunt you."

Background: Robert Scovill is a highly touted and respected live and studio engineer with plenty of experience in both areas. His first technical audio experience came at a small 16-track recording studio in Kansas City. Around the same time, Scovill was going to school at the Missouri Institute of Technology and spotted an ad from a local sound company needing help for a series of weekend outdoor concerts. He showed up at the first show and worked for free. He continued to work for the entire series of concerts (over several months) even though, unknown to the company, he made no money. His dedication landed him a paying job doing live sound, and he continued to do both recording and live audio in the region.

Scovill's touring career began when the band Shooting Star passed through the studio and asked him to become their monitor engineer. At the time,

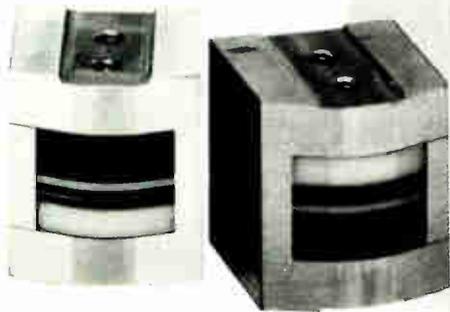
Shooting Star was opening for major headliners. This exposure resulted in contacts and much needed experience on top-line equipment used in arenas, sheds and clubs. In 1982 Scovill had a chance meeting with Ricky Farr and Pierre D'Astugues of Electrotec, who eventually assigned him engineering duties with some of their biggest clients. Tours followed with artists such as The Go-Gos, John Cougar Mellencamp, Rick Springfield, Laurie Anderson, Psychedelic Furs, Alice Cooper, Tesla and others. Mixing the latest Def Leppard and Rush tours has highlighted Scovill's abilities and propelled him into the upper rank of in-demand engineers.

Recently, Scovill finished a tour with the Rolling Stones' European support act, the Dan Reed Network; he's currently producing and engineering several recording projects in the L.A. area.

Says Scovill, "One of the most important things about live sound is learning how to keep a cool head—no matter what's going on. There can be a lot of pressure when there are 16,000 screaming people (including screaming managers and artists), rain, technical problems and so on. I love sitting at the console and mixing the show with absolute pandemonium around me. I love the spontaneity of it all."

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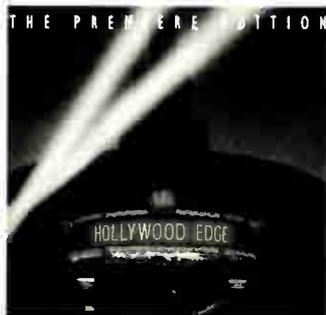
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Observations from the Peanut Gallery...

Here are ten items I find notable after going to zillions of shows:

- 1 A good-sized sound system requires a tremendous commitment of money and time to build up. There is no place in this business for someone just fooling around because it's "cool." The faint-hearted need not apply.
- 2 Many of the shows are way too loud. No, I'm not getting that old. I like it fairly loud, but often many of the paying public are in obvious discomfort due to the high dB levels. Just look around at some shows and see how many people have fingers in their ears. Our industry should somehow regulate itself in a moderate fashion before the government steps in and shuts us down. This has all the makings of becoming a big issue in the next few years.
- 3 Smoothness of coverage varies tremendously between different sound companies' systems.
- 4 Engineers' perceptions vary considerably on what the proper bass, kick and snare levels should be.
- 5 The drum sounds are often fantastic. There is no comparison to the "old days."
- 6 Lawn-fill speakers seldom sound as good as the main system.
- 7 Engineers on the road still never get enough sleep.
- 8 Sometimes I can even understand the words throughout the show. Vocal intelligibility seems to be gradually improving overall. Let's be charitable and say the chances of intelligibility are around 50/50, with the wildcard being the acoustics of the venue.
- 9 Devastating equipment failure is becoming rare. This is a compliment to the equipment manufacturers and the personnel who operate the equipment.
- 10 Lighting companies make more than sound companies. Don't people really come to *hear* the artist?

—CONTINUED FROM PAGE 154. SR NEWS includes a control system with time-aligned crossovers with preset limiters and balanced line drivers, lightweight 1,800 W/ch power amplifiers, and a 2-box, 4-way loudspeaker design. Covering the Flashlight's mid-highs is the time-aligned TFS-780H enclosure loaded with a 12-inch speaker, a smaller 6.5-inch cone speaker and a custom 1-inch compression driver coupled with a high-Q waveguide horn. The TFS-780H components all feature very narrow dispersal pattern characteristics, giving the "flashlight" performance in the system's name. The complementary TFS-780L cabinet delivers low-end frequencies in the 30Hz to 150Hz range via a 21-inch speaker with a 6-inch voice-coil... Along with the the Flashlight System, Turbosound announced a new flying and lifting system that allows full control of the angular inclinations between adjacent enclosures.

Crossroads Audio (Dallas, TX) is a regional Texas sound reinforcement and equipment rental company that primarily services the Dallas and San Antonio areas. Owner **Chuck Conrad** says, "A lot of our business is convention-oriented. We stay busy most of the year, but unlike other sound companies, our slow period is during the summer months. We mostly do one-nighters, special events, conventions and trade show services. We are also very active in over-the-counter rentals and sales of pro equipment. We rent a good deal of wireless microphones. In the past, Crossroads did a lot of touring, but we have gotten away from that, instead concentrating our efforts closer to home."

Crossroads' main P.A. speaker system comprises proprietary full-range 3-way JBL and E-V horn-loaded enclosures used in conjunction with proprietary subwoofer boxes. QSC MX1500 amplifiers provide the power. For monitors, proprietary, bi-amped, JBL-loaded floor wedges use dual 12-inch speakers and a 2-inch compression driver. Cross-

roads also has smaller wedges loaded with a single E-V 15-inch speaker and a JBL driver... Recent equipment purchases include Yamaha PM3000 and PM2800 consoles.

Electro-Voice Installations & News... American Sound & Electronics installed E-V HP horns and DH1A drivers at the Merle Shoemaker Multi-Purpose Center, the new basketball arena for the University of Cincinnati... A proprietary system, using E-V speakers and amps, was installed at Pleasure Island Theaters (Orlando, FL)... The *Austin City Limits* PBS television show had DeltaMax DML-1122A and DML-2181 speaker systems installed in their studios by **Xeno Sound** (Austin, TX)... The **Mixingboard** (Burlington, VT) installed DeltaMax DML-1122A and DML-2181 speaker systems and E-V 100S speakers in the Hopkins Center Theatre at Dartmouth College.

E-V has come out with a recent addition to its electronically controlled DeltaMax loud-speaker line. The new DML-1152MC slant stage monitor has the same acoustical performance as its cousin—the compact main P.A. 1152A—and features a 15-inch DL15X woofer and DH1A compression driver on a square horn that can be rotated for either a 60°x40° or a 40°x60° coverage pattern. The carpet-covered, 14-ply, Finnish birch 1152MC cabinet comes standard with a Neutrik NL4MP-R Speakon connector.

John "Klondike" Koehler started **Klondike Sound Co.** (Wendell, MA) in 1968. His company now works around 250 shows a year, servicing much of the Northeast region. A branch office in Portland, ME, primarily services festivals and corporate clients in the continental U.S.'s most northern state. Klondike specializes in acoustic-oriented jazz, some R&B, and the folk sound reinforcement market, and stays busy through most of the year except for a slow period around January and February. Koehler says, "We do a lot of multistage festivals and quite a

—CONTINUED ON PAGE 159



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DECEMBER 1990, MIX 157

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**PAS STAGE WEDGE 2**

Professional Audio Systems of Harbor City, Calif., introduces the TOC Stage Wedge 2, a compact monitor design featuring a 15- ▶ inch coaxial driver with a 2-inch compression driver on a 30x60-degree, constant-coverage horn. A unique cabinet design allows the SW-2 to be angled at 20, 40 or 90 degrees for low-profile monitoring. Each SW-2 includes an electronic crossover module that fits into the PAS S-2 cardframe/power supply, which accepts up to six modules, providing up to six monitor mixes from a three-rack-space chassis.

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**APOGEE SSM**

A compact (13x5.5x5.8-inch), high-output, wide bandwidth speaker for front fill, monitor and under-balcony applications is the SSM from Apogee Sound of Petaluma, Calif. Designed for use with the SSM processor (providing fixed equalization points, peak and RMS limiting and driver time domain alignment), each enclosure features dual 4.5-inch, high-excursion woofers and a 1-inch titanium dome tweeter. Specs include an 80-25k Hz bandwidth (± 3 dB), and the system can deliver SPLs of 112 dB continuous (118dB peak) with power handling of 200 W continuous (800W peak).

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SABINE FEEDBACK EXTERMINATOR™

The FBX Feedback Exterminator from Sabine Musical Manufacturing (Gainesville, Fla.) detects and eliminates feedback via six microprocessor-controlled parametric notch filters. The single-rack-space unit has balanced and unbalanced line/mic inputs, and can be used wherever a graphic equalizer might be used. Typical operating time from onset of feedback to correction is approximately a half second, and applications include fixed installations (particularly those with unattended sound systems, such as churches and meeting rooms) as well as ▶ concert sound systems, where an FBX can be assigned to each monitor mix.

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**SAMSON UHF A WIRELESS**

Available in belt pack (lavalier) or handheld versions is the new line of UHF wireless microphone systems from Samson Technologies of Hicksville, N.Y. Operating from 938 to 952 MHz, the systems use the model UR-4 true diversity receiver, which features precise cavity tuning, di-electric filtering, balanced or unbalanced output, and a compact single rack-space design.

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—CONTINUED FROM PAGE 157. SR NEWS
 few national one-offs throughout the New England region. We have an average of at least one major multistage festival every weekend of the summer." Some of Klondike's annual festivals include the seven-stage Maine Festival, Pete Seeger's annual Hudson River Revival, Jackie Robinson Jazz Festival, Falcon Ridge Folk Festival, Rhode Island Cajun/Bluegrass Festival and the Traditional Irish Music Festival. Klondike also operates a live audio retail sales facility that handles over 30 product lines.

Koehler has been the audio director for the huge New Orleans Jazz & Heritage Festival for many years [see *Mix*, October '90]. His job is to specify, select and oversee all of the audio for the entire festival, which involves 14 different stages as well as a nighttime venue and numerous club venues. Koehler's credits also include work as house mixing engineer on a number of Garrison Keillor's live NPR remote broadcasts.

Klondike's largest main P.A. system includes 20 Turbo-sound TMS-4 boxes powered by Crest 8001 amplifiers. They also have a flyable E-V Delta-Max system with DML 1152 and DML 2181 subwoofers driven with Crest 4801, 7001 and 8001 amplifiers for smaller shows. House consoles are a 32-channel Yamaha PM1800 and a Soundcraft Delta 200 24x4x2. The stage monitor rig uses a Soundcraft 400B 24x8 console and Electro-Voice SM1502 passive floor wedges powered by QSC MX1500 amps. Klondike also has a number of small systems featuring powered mixers for lightweight applications often found in festival work...Recent equipment purchases include Lexicon LXP-1 and LXP-5 digital EFX processors.

Odds and Ends...Microphone manufacturer Samson Technologies has a new UHF Series of wireless systems

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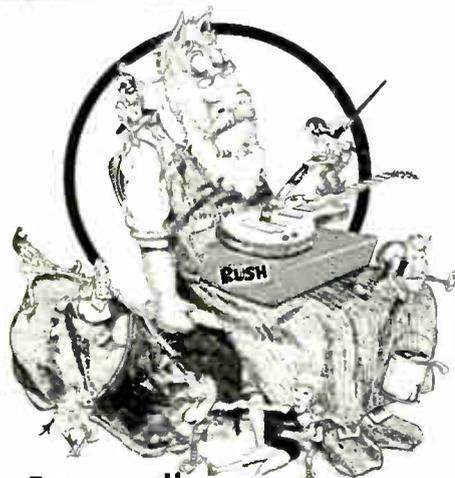


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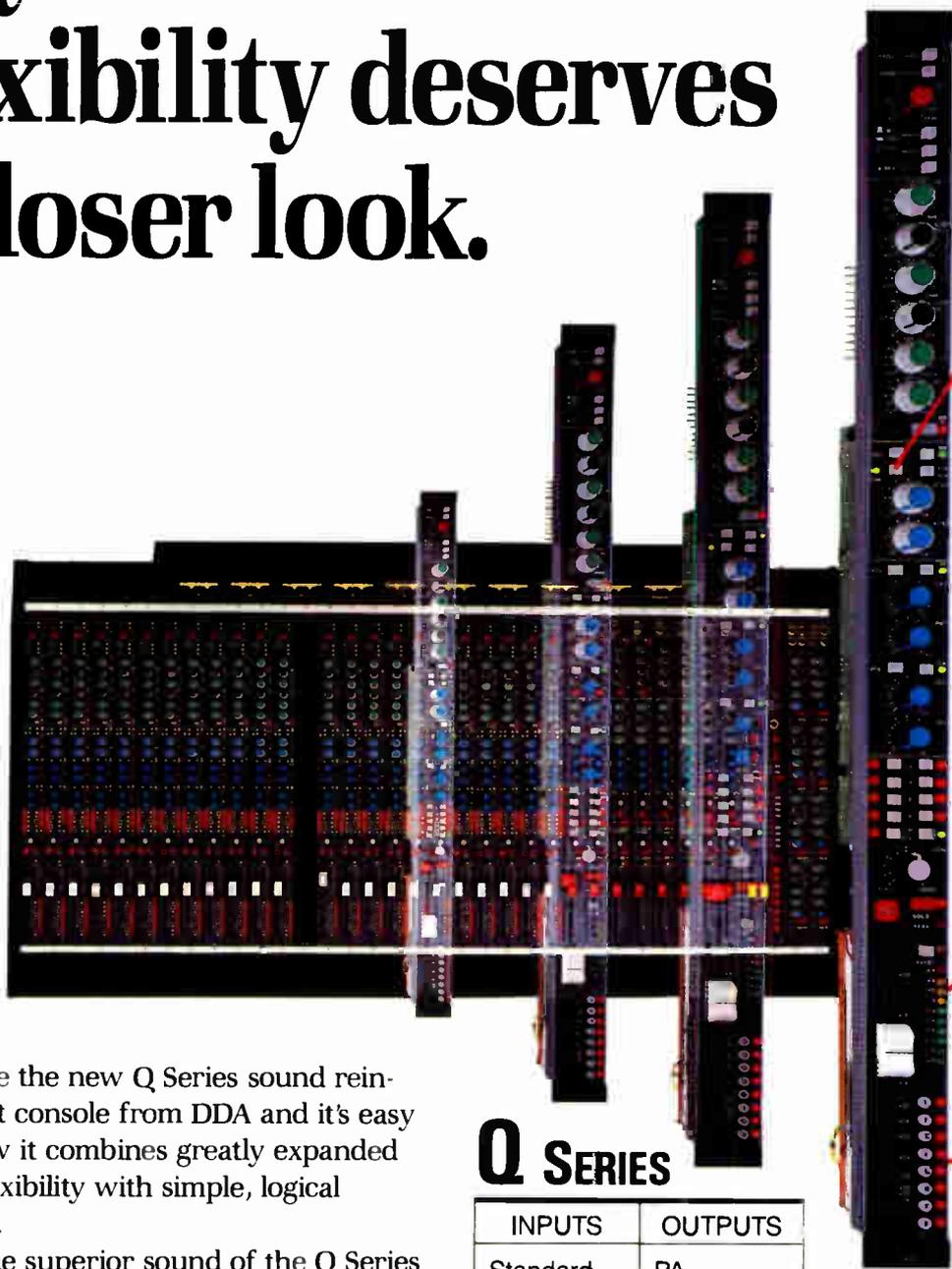
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available in belt-pack (lavalier) or hand-held versions. The UR-4 features either balanced or unbalanced output with a signal level of +10 dBm without clipping...Gauss Loudspeakers has expanded its speaker manufacturing capability by moving into a specialized manufacturing plant in Newport, TN. Also, the establishment of an additional warehouse and distribution center in Tennessee will allow lower freight costs and quicker delivery of Gauss speakers for the eastern United States. Sales, service, and administration will remain in Sun Valley, CA...Tannoy P-100 loudspeakers were installed into the Minneapolis Children's Theater...A 40-channel Soundcraft 500 console was installed at the Drury Lane Theater (Oakbrook, IL) by Gand Pro Audio...Wireless microphone manufacturer Vega is providing an informational paper that deals with wireless microphone application techniques and offers solutions to many common wireless problems. A free copy may be obtained by calling (800) 827-6701...Renkus-Heinz will handle the worldwide distribution of the EASE acoustic design software program developed by Dr. Ahnert, one of Europe's leading acousticians. EASE is designed for use on IBM or compatible PC/AT computers. Renkus-Heinz also introduced the new CM121 cabinet at the AES show. It is loaded with a 12-inch woofer and a 1-inch high-frequency driver mounted on a constant-beamwidth horn.

(Note: Some of the data in this column is based on information provided by companies. Address all correspondence and photos to Mix Publications, Sound Reinforcement Editor, 6400 Hollis Street, Suite 12, Emeryville, CA 94608.) ■

When not writing for Mix, Mark Herman operates a rental company specializing in sound reinforcement consoles.

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C O A S T

L.A. GRAPEVINE

by Amy Ziffer

In late September, L.A. was host to the Audio Engineering Society convention, which won't visit downtown again until 1994. The schedule for the next three years is New York, Anaheim and New York in '91, '92 and '93, respectively. One of the bigger items of business news to come out of the show was the introduction of the new Focusrite console. At a champagne reception given at the very start of the convention, it was announced that the display model on the floor would

—CONTINUED ON PAGE 165

Top guns in the engineering/producing/mixing fields assembled for a NARAS educational workshop, a masterclass in modern recording techniques, held at the AES convention in L.A. Pictured (left to right) are NARAS national education director Ron Bergan, Bob Clearmountain, Al Schmitt, Bruce Swedien, AES' Don McCroskey and George Masenburg.

SESSIONS & STUDIO NEWS

SOUTHWEST

Successful rap duo **2 Lajit** completed their album *Flavin' Fun* at **Chaton Recordings** (Scottsdale, AZ) in Octo-

ber. Also in Austin, **Jerry Jeff Walker** was in at **Austin Recording Studios**... **Evan Johns** and the **H-Bombs** dropped into **Planet Dallas** to work on their forthcoming album for Rykodisc, which is expected out in early 1991. **Rick Rooney** engineered.



ber. **Stephen Escallier** engineered and **Dave Bowers** produced...Down in Austin, TX. **The Tailgators** were in recording at **Sixth Street Studios**...

In a Music Row reunion (left to right), session guitar player Harold Bradley, mastering engineer Randy Kling, guitar great Chet Atkins and Music Row founder Owen Bradley reach a mutual agreement where disc mastering will move back into the original RCA Studios of Nashville.



Raucous rockers **Bone Circus** barged into Planet Dallas to lay down seven hard-hitting tracks. Also at Planet Dallas, the **Rodeo Love Gods** were burning the midnight oil as they recorded two new songs...**Fire Station Studios** of San Marcos, TX, hosted **Doug Sahm** and **Jimmy LaFave**...

NORTH CENTRAL

At **Tone Zone Recording** of Chicago, R&B vocalist **Willie Clayton** has been

C O A S T

in completing guitar and vocal overdubs as well as mixdown on a number of tracks for his upcoming album. **Roger Heiss** and **Dan Pinault** twisted the knobs at the sessions. ...Famed jazz guitarist **Earl Klugh** has been cutting and mixing a live album at **Studio A** (Dearborn Heights, MI) with his trio. Production duties were handled by Klugh. **Dave Palmer** engineered with the assistance of **Randy Poole**. ...Producer/composer/artist **JAS** was at **Disc Recording Studios** in East Detroit, MI, to track vocals for the upcoming single to *Intimate*, an original motion picture filmed in Detroit by Creative Life Entertainment. The track features **Norma Jean Bell** on saxophone and pop-funk-rock band **For Bad Girls Only**. Engineering duties were handled by **Greg Reilly**. ...Heavy metaloids **Talon** were bending the walls at **Ajax Recording Team** (Fort Wayne, IN), and alternative music group **Michael** were finishing their new album *In a Strange Land*...

NORTHWEST

Brian Eno recently spent a day working on a project at **Alpha & Omega Studios** of San Francisco. Eno flew in the rhythm section from the Neville Brothers' band—"Mean" **Willie Green** on drums and **Tony Hall** on bass—and used San Francisco's own electronic percussion ensemble **D'Cuckoo** to set the rhythmic ambience of the piece. Engineering the session was **David Plank**, with **Peter Steinbach** assisting. ...**Spectrum Studios** of Portland, OR, had local blues great **Curtis Salgado** in Studio A mixing and putting the finishing touches on his new album. Engineer **Phil Kaffel** was at the board. **Marlon McClain** produced the project. ...At **Hyde Street Studios** of San Francisco, which recently celebrated its tenth anniversary: **Jello Biafra** was doing overdubs and mixing for Alternative Tentacles group **Steel Pole Bath tub**; and famed reggae

artist **Augustus Pablo** was in producing **The Elevations'** third album. **Matt Kelley** engineered with the assistance of **Tom Doty** on both projects. ...Also in San Francisco: **Rinde Eckert** was working on his debut album at **Mobius Music**. The album was produced by **Lee Townsend** and engineered by **Oliver DiCicco** and **Jane Scolieri**. Featured performances came from jazz greats **Bill Frisell** on guitar and **Clark Suprynowicz** on bass. ...Recent activity at **Crow Recording** in Seattle includes **Rudy & the Tube Shakers** working on an LP and **Interurban** mixing jazz demos...

N.Y. METRO REPORT

by **Randy Savicky**

BMG/RCA Recording Studios has become the first facility in the U.S. to take delivery of the CEDAR Sound Restoration System. Developed by Cedar Audio in England and distributed by Gotham Audio, CEDAR (computer enhanced digital audio restoration) removes unwanted noise from both old or new and damaged recordings. Designed to address all classes of degrada-

—CONTINUED ON PAGE 171



SOUTHEAST

Rockin' Dopsie, hailed by many as the living king of zydeco, completed work on his new album for Atlantic Records at **Ultrasonic Studios** in New Orleans. Legendary producer and Atlantic founder **Ahmet Ertegun** produced the sessions with **David Farrell** engineering. Also at Ultrasonic, an-

Rock legend Ronnie Spector at **Blank Productions** (Stamford, CT) working on her cassette/book, *Be My Baby*, with (left to right) **Bob Blank**, **Joel Kaye**, **Jon Greenfield** and producer **Jessica Kaye** of the *Publishing Mill*.

other zydeco great, **Boozoo Chavis**, finished his album for Nonesuch Records. **Terri Adams** and **Jack Reich** produced, with **Tom Marks** engineering... At **Reflection Sound Studios** of Charlotte, NC: **The Kinetics** of Myrtle Beach, SC, known for their strong harmonies and songwriting, were in to work with engineer **Mark Williams**; and Australian pop stars **The Hummingbirds** were recording their new album with Williams at the board...

NORTHEAST

At **Calliope Studios** (NYC), **Queen Latifah** was working on her second

album with Danish producers **Soul Shock** and **Cutfather**. **Shane Faber** handled the engineering and mixing duties... At **Power Play Studios** (Long Island City, NY), **Boogie Down Productions** produced a remix of the Neville Brothers' "Sons and Daughters," with various studio musicians adding to the funk. Also at Power Play were **Jack Douglas**, **Bizmarkie** and **Salt-N-Pepa**... **Crystal Sound** (NYC) reports **Biond Fury** was working on his 24-track project. Such notables as **Steve Gadd**, **Hiram Bullock** and **Will Lee** laid down the rhythm tracks as **Steve Vavagiakis** engineered... **Swans** were back in **Baby Monster Studios** (NYC)

to record another album. **Michael Gira** produced and **Bryce Goggin** and **Steve McAllister** both engineered... At **Truly Excellent Recording** in Manhattan **Dan Daley** produced and engineered tracks for **Julie Newdow**. **Carbide Johnson** assisted on the session...

SOUTHERN CALIFORNIA

At **Mad Hatter** (L.A.), Polygram Brazil brought in **Joao Gilberto** and arranger **Clare Fischer** to work on Gilberto's upcoming album. **Arne Frager** engineered and **Larry Mah** assisted... **Whitney Houston** was recently in at **Encore Studios**, Burbank, doing overdubs for her upcoming release. **Barney Perkins** engineered with the assistance of **Milton Chan**... At **Foz Sound** (L.A.): **Billy ZP** was recently in working on three new songs with former record producer of the year **Barry Fasman**, and French recording artist **Michelle Forrester** was in to mix four sides with engineer **Toby Wright**... Finnish pop singer **Mervi** just completed her first solo album at **Trax Recording** of Hollywood. Mervi came to America to work with internationally known engineer **Michael J. McDonald**... At **King-sound Studios** (North Hollywood), **Bruce Hornsby & The Range** were tracking and doing overdubs on their next album, *Night on the Town*. **Don Gehman** and Hornsby produced, while **Eddie King**, Gehman and **Steve Cormier** engineered the sessions... **Richard Chamberlain** went to **Audio Resource Honolulu** to record the narration for an upcoming PBS television series, *The Astronomers*. Producing the sessions for California's community TV station, KCET, was **Peter Baker**. Audio Resource's **Milan Bertosa** engineered...

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PROFESSIONAL AUDIO

STUDIO NEWS

Sound Arts Recording Studio in Houston has installed a new Trident Series 80B 54-channel console into its newly remodeled studio... **Ian Stewart**, owner and operator of **Orchid Studio** (Santa Barbara, CA), announced the formation of an in-house production and recording label: Reality Records. Well-known surf titles like *Tales of The Seven Seas*, *Blazing Boards* and *The Last Surf Movie* have come from this studio... **FilmSPACE Inc.**, State College, PA, has installed an Otari MX-80 24-track machine and Adams-Smith Zeta-3 synchronizer... **Baker Sound Studios**, Philadelphia,

has given its music department a separate identity: **Chuck Butler** and the gang in Studio A are now known as **Monster Tracks**...Three of the Bay Area's best recording artists have formed a production company: **Geoff Muldaur, Scott Matthews** and **Roy Rogers** have formed **MMR-MultiMedia Recording** in San Francisco. For more information contact **Gaynell Rogers** at (415) 898-6840...**GRC Studios** of Baltimore recently acquired an ADAP II digital workstation. "It gives our recording projects more options," said chief engineer **Leo McLaughlin**...**Chapman Recording Studios** (Kansas City, MO) added a Studer Dyaxis digital audio workstation with synchronizer to its two-room facility...**Starlight Sound** in Richmond, CA, recently installed a brand new 48-input Harrison MR-4 console with Diskmix II automation. To complement the new gear, Starlight has also undergone a complete re-wire of the control room along with new 1200-watt Microtech amps for the main and aux speakers...**Music Grinder Studios** of Hollywood, CA, has moved to a new facility. The new Studio A, which is located at 5540 Hollywood Blvd., was designed by Vincent Van

Haaff and features a large control room, three isolation booths and a 50x70-foot tracking room. Construction of Studio B has commenced and should be ready by the spring of 1991. Reportedly, there's even room for a third studio at the new facility. ■

—FROM PAGE 162, L.A. GRAPEVINE

be going to Conway Studios at the conclusion of the show.

According to owner Buddy Brundo, the new room at Conway, Studio C, is the first ground-up studio construction in L.A. for many years. (Most facilities are situated in commercial or sometimes residential spaces that were not originally intended as studios.) After the show, Brundo said he decided to try the Focusrite because over the years he's made a point of getting "firsts," having had the first Neve V Series console, among other things, in Los Angeles. (Brundo credits his mentor and Bread engineer Bruce Morgan, who once told him never to buy the first anything, as his inspiration.) Brundo expected to have the Focusrite up and running by the start of November, and would be putting it through its paces personally before deciding on a first booking from the "list" of people

interested.

Studio C will be quite large, with 25-foot ceilings, three isolation booths, an Augspurger/TAD monitor system and the new Studer 48-track digital recorder. (This will apparently be the first installation of that machine in the United States, too.) In the coming year, Studio A also will be remodeled by adding an iso booth and some treatments to make the room brighter.

Another U.S. first is being installed at Skip Saylor Recording, which will be the home of an 80-input SSL 4000 G Series console with Total Recall/Real World Cue Matrix System automation and SSL's new stereo programmable equalization. The new board replaces a 64-channel 4000 E. The automation is the brainchild of Peter Gabriel, whose own facility was the first to feature it. The Cue Matrix System adds four echo sends per channel with automated on/off, controlled through a roll-around rack. The first client on the new board was mixer John Potoker working with MCA-UK artist The Blessing; Martika is up next.

Getting back to the convention: In a fitting goodbye blast, Agfa, which was recently acquired by BASF and

—CONTINUED ON PAGE 169

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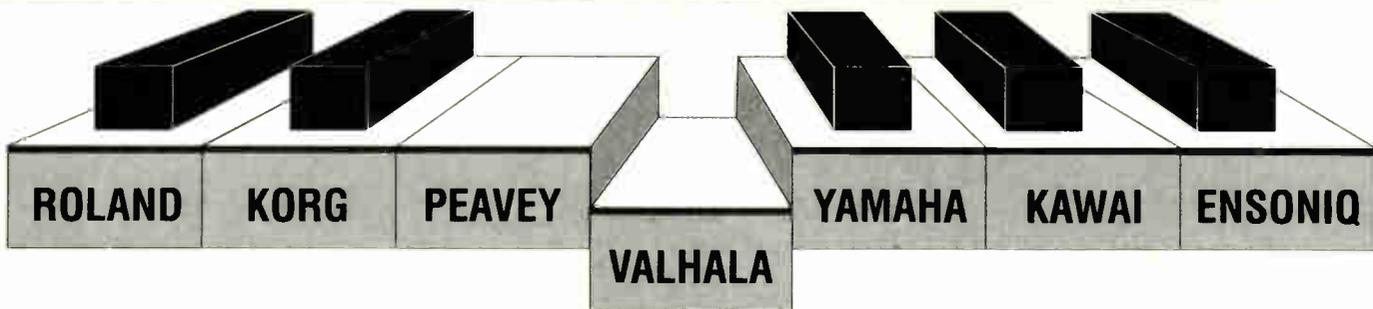
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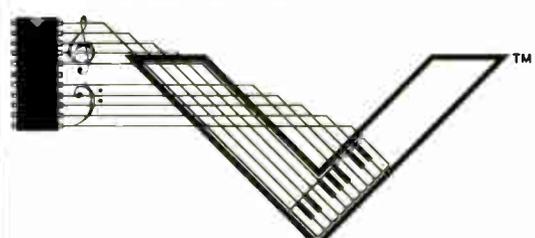
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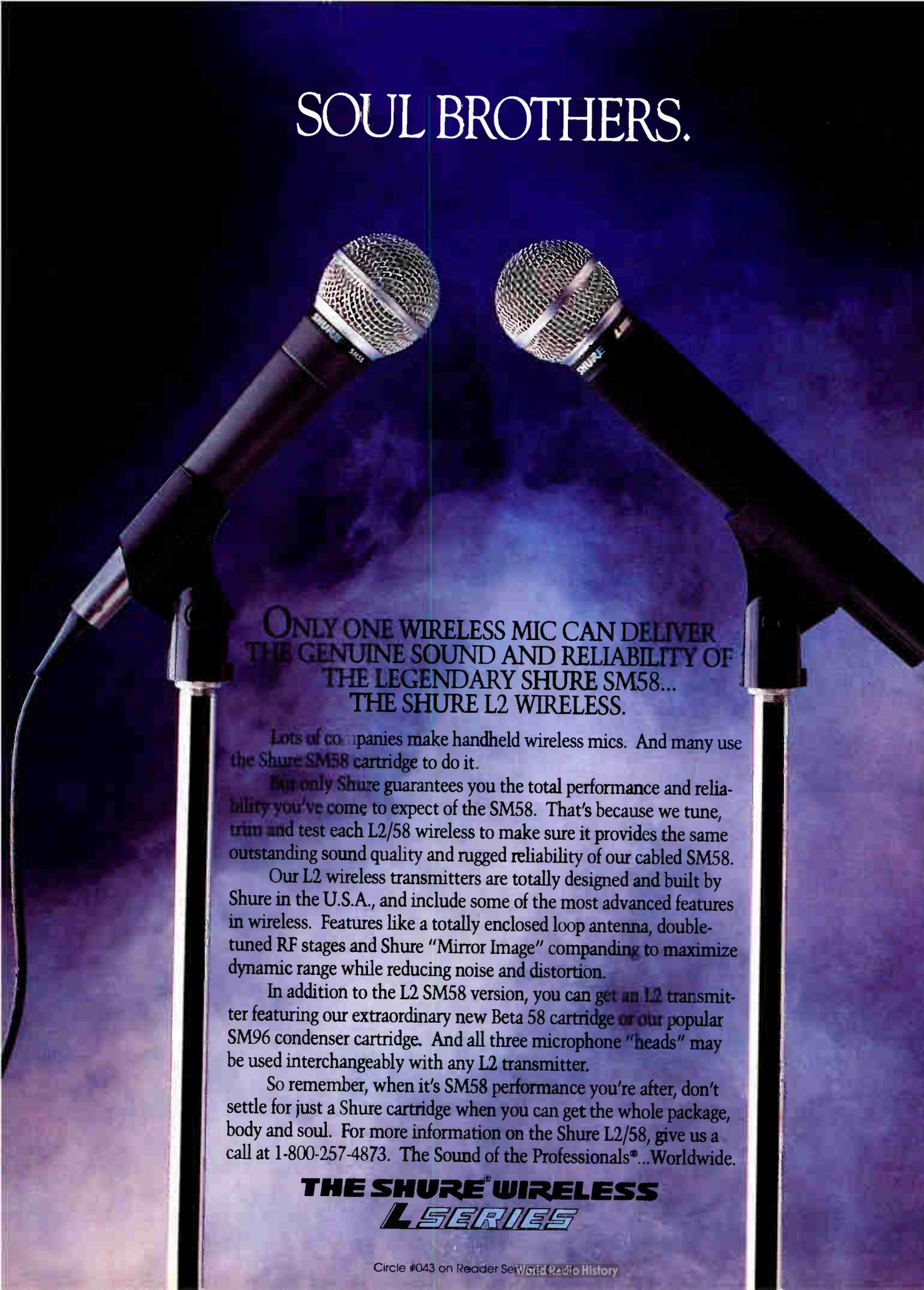
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L SERIES

—FROM PAGE 169, L.A. GRAPEVINE

always throws the best party of the show, outdid itself once again. The Hollywood Palace was the venue for a bogus "Agfa Award" ceremony, and guests, upon entering, were accosted

by fake photographers and reporters inquiring as to how it felt to be "honored" at the event. After having been elbowed in the groin by rabid photographers while reporting the Emmys only a week before, I found it rather

SPARS



B E A T



The 1990-91 SPARS officers (left to right): Lee Murphy, Brigg's Bakery, NYC; chairman of the board: David Porter, Music Annex, San Francisco; first vice president: Dick Trump, Triad Productions, Des Moines, IA; president: Pete Caldwell, Doppler Studios, Atlanta; Howard Schwartz, Howard Schwartz Recording, NYC; executive director: Shirley Kaye; Tom Kobayashi, Skywalker Sound, San Rafael, CA; Jon Dressel, Paisley Park, Chanhassen, MN; Northeast coordinator: David Teig; John Fry, Ardent Recording, Memphis; treasurer: Steve Lawson, Lawson Productions, Seattle. (Not pictured: secretary: Dwight Cook, Cook Sound and Picture Works, Houston; Johnny Rosen, Fanta Professional Services, Nashville; Ralph Cousino, EMI-Music Worldwide, Los Angeles.)

New Faces on The SPARS Board of Directors

by Pete Caldwell

The Society of Professional Audio Recording Services elected its 1990-91 board of directors at a general membership meeting held recently in Los Angeles. New leadership for the 1990s is emerging. Three members were elected to fill open seats on the 11-person board:

Jon Dressel, studio operations

manager of Paisley Park Studios, Minneapolis, Minn., brings broad industry experience to the SPARS board. He began his career in 1980 with United Western Studios in L.A. as a maintenance engineer. In 1984 he became chief engineer at Sunset Sound Factory. While continuing his own education at UCLA, Dressel

—CONTINUED ON PAGE 172

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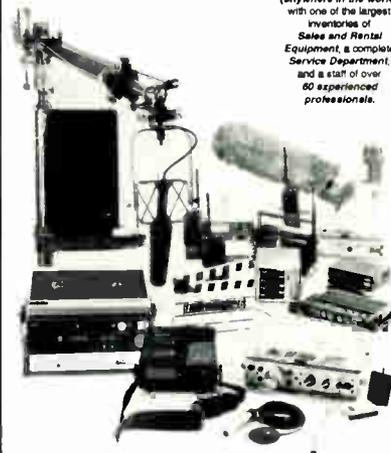
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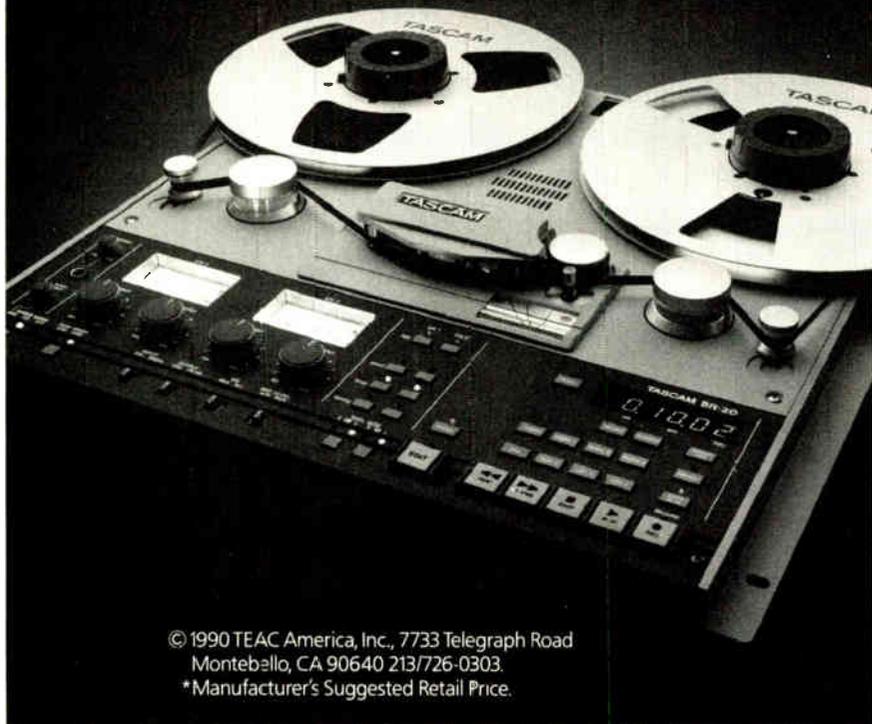
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educational to be on the other side of the velvet ropes.

Other recreational highlights included a George Massenburg Labs party on Santa Monica Pier (I wasn't there myself, but I was told, yes, the carousel was rented for the evening), a Ramsa-sponsored concert by Lee Ritenour, and, of course, the Technical Excellence & Creativity (TEC) Awards at the Biltmore Bowl, attended by an SRO crowd (see a full report on page 52 in this issue).

Speaking of parties, Salty Dog Recording in Van Nuys used to regularly throw a Halloween party at which all sorts of strange creatures came out of the woodwork. Well, Salty Dog is no more, but out of the ashes has arisen Santa Fe Recording Studio. Owner and longtime L.A. producer Enrique Elizondo took possession of the Trident 80/3M-79 facility on July 1 of this year and has turned it into a studio catering primarily to Latin artists. Paloma San Basilio, Marisela and Pandora are three of the acts selling well in Spain, Mexico and South America to be booked at Santa Fe recently. Elizondo has done some cosmetic work but is so pleased with the studio's acoustics he may forego anything more extensive. Santa Fe Recording can be reached at (818) 994-9973.

Over at SoundWorks West, chief technical engineer Ron Lagerlof has left for Lucasfilm up north. Also, Peter Frampton has set up a production company in one of the downstairs offices converted from live chambers during the building's Hitsville days, as have the team of Arsenio Hall musical director Michael Wolf and composer/arranger John West. And I'm finally free to tell you that the "mystery artist" at SoundWorks, who I mentioned some months ago in this column, was none other than Bruce Springsteen, who just completed five-and-a-half months of work there. On the SoundWorks West soundstage, DIC has moved in, shooting the popular Spanish-language soap/sitcom *Pepe Platta*.

Lastly, '60s heavyweight Iron Butterfly is currently working on a comeback album at Burbank's Take One Studio with producer Tim Landers (bass player with the Tom Scott Band on the recently deceased *Pat Sajak Show*, among other things). Will Iron Butterfly join that elite class of bands to successfully redo their own music? We'll find out when the album comes out with a '90s version of "In A Gadda Da Vida."

This month I'll leave you with the best joke of the AES convention. The introduction by 3M of a new recording tape with the number 996 of course elicited jokes along the lines of, "Did you hear 3M has come out with a new recording tape? It's called 666—made especially for backward masking." Okay, I didn't say it was going to be a good joke. ■

—FROM PAGE 163, N.Y. METRO

tion, including broadband noise, scratches and pops, thumps, and buzzes and hums, CEDAR will be used on both BMG's new release and reissue programs. (See this month's "Tape & Disc News" for further information on the CEDAR system at BMG/RCA.)

The first rock concerts ever held at Yankee Stadium, Billy Joel's two-night stand in "the house that Ruth built," was recorded by Dave Hewitt's Remote Recording Services for a future film or home video release. Jon Small of Picture Vision was the film's producer and director, and Hewitt served as engineer with Phil Gitomer assisting. TimeLine's Lynx keyboard control unit and Lynx time code modules were used to control two Studer A820 24-track analog recorders with SR cards for the live recording.

McCann-Erickson christened the new Apollo Theater recording studio with a Cherry Coke commercial produced by the Aleem Brothers with executive producer Barbara Tager, a vice president and music-associated creative director for the ad agency. Part of the completely renovated 50-year-old Apollo theater—home to artists like Duke Ellington, Ella Fitzgerald, Billie Holiday, Charlie Parker and James Brown—the studio features a Neve VR console with up to 96 mic lines.

Bob Clearmountain remixed Paul McCartney's upcoming live album at Bearsville Studios in Woodstock, N.Y. The double compact disc release was originally produced and remixed by Clearmountain at Air Studios in London on a Mitsubishi 32-track digital machine. However, because Clearmountain wanted to use Sony's newest digital machine, The Toy Specialists supplied a 48-track Sony PCM-3348 digital tape recorder for the Bearsville dates.

The Venezuela Symphony Orchestra, WQXR and Chamber Music Plus are among some of the recent classical projects that have been completed at Digital House Ltd. Harry Hirsch, Digi-

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tal House's vice president of technical services, was executive producer of the all-digital Venezuela Symphony project, which was recorded on location in Caracas, Venezuela. The 19-track CD for WQXR, the radio station for *The New York Times*, was a special project specifically designed to be played in selected Cineplex Odeon movie theaters.

Chung King House of Metal acquired two Neve VR consoles: a VR60 with flying faders in November and a VR60 fitted 48 with manual automation in December. John King, owner of Chung King, purchased the consoles

in August. Recent projects at Chung King include a national radio spot for the season premier of *Twin Peaks* and rap music from the likes of Run DMC and Young MC.

Recent Giant Sound projects include hosting Big Bird, Ernie, Grover, Cookie Monster and the rest of the Sesame Street gang for the "Sesame Street Live!" touring company; David Nichtern scoring and mixing the new Lucas Reiner film *The Spirit of '76*; and Branford Marsalis laying down overdubs for the new Cleveland Marcus LP (Polydor).

People & Places...John Alberts of

Howard Schwartz Recording created sound design for the CD of *Spike & Co.: Do It A Cappella*, originally broadcast on PBS's *Great Performances*...**Eddy Trabanco** has been named vice president of **Penny Lane Studios**...**Blank Productions** (Stamford, CT) hosted rock legend **Ronnie Spector** as she recorded a new cassette/book, *Be My Baby*, her story of life as a Ronette...**Korg** product specialist (M1 and T1 keyboards) **Jordan Rudes** composed musical accompaniment for Jeff McBride's magic show, "The Mask, Myth & Magic of McBride"...**LavskyMusic** has added composer/programmer **Fred Szymanski**.

Please send press releases with the latest news of your recording facility directly to *Mix* magazine, attn: N.Y. Metro editor, 6400 Hollis Street, Suite #12, Emeryville, CA 94608. Or fax it to (415) 653-5142. ■

—FROM PAGE 169, SPARS BEAT

taught at the Institute of Audio/Video Engineering, designed and built numerous commercial and home studios, and became a well-known freelance engineer. He returned to his native Minnesota in 1987 to become chief engineer and, later, operations manager of Prince's acclaimed Paisley Park Studios.

Ralph Cousino is VP of Technology Development, EMI-Music Worldwide. Cousino began his distinguished career with Capitol Records in 1970 as manager of electronic development. In 1972 he became director of recording operations, and in 1974 he was named director of engineering. He was made a vice president of Capitol Industries in 1976 when he was promoted to assist and coordinate a joint venture with corporate parent Thorn EMI, manufacturing the HDV disc. He has recently been involved in the reorganization of Capitol and EMI manufacturing facilities.

Lee Murphy is the president of Brigg's Bakery, New York City. A longtime New York SPARS activist, Murphy operates a small, state-of-the-art, audio-for-video post-production facility on Manhattan's West 88th Street. Murphy began his career as a newscaster, but soon gave in to his fascination for audio production. He opened Brigg's Bakery in 1984. He is best-known for his Emmy-winning creative audio design for the PBS series *Reading Rainbow*. ■

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—FROM PAGE 91

"He's not really a hands-on music writer. He needed someone to give him musical ideas and different directions, and that guy happened to be me. At the time I was thrilled. It was really exciting for me to be writing every day.

"Very few contemporary artists are capable of writing ten great songs," he continues. "Some people can do it in a year, but not that many. It's difficult, but that's actually where the time should be spent. The hardest thing to achieve on an album is the writing."

Kortchmar says their songs usually start with him giving Henley a completed basic track. From there, one of them or both will think of a melody or a hook. Once in a while, Henley will come in with an idea and explain to Kortchmar what he wants. "He suggested a song, 'New York Minute,' which he wanted to be a little Gershwin-like, but soulful and R&B at the same time. We threw a lot of ideas around, decided what kind of mood it should be, and then I went and did it.

"Don leaves a lot of it to me, but the bottom line is with him and what he feels comfortable with," he says. "Henley is an old pro, he's infallible. I respect him more than anybody."

Kortchmar used Henley's album as a chance to experiment with different production techniques. "We tried a lot of different things," he says. "We recorded parts slow and fast, tried leaving stuff out, and brought in a lot of different guys to play different parts, and threw them out at the end of the day.

"But this is stuff that you can do only when you don't have a heavy budget limitation. A new group has to turn things around while the clock is ticking in the studio. With a guy like Don, you can take more time and do things like that."

Besides Kortchmar himself, there was an array of guests on Henley's last album. "We took everything tune by tune," Kortchmar says. "For each song, we tried to imagine who would be the greatest to have. We were lucky enough to get some of the people we dreamed up."

Some of the artists they dreamed up and got were Ivan Neville, Take 6 and

Guns N' Roses lead singer, Axl Rose. "When we wrote 'I Will Not Go Quietly,' I heard the chorus that Don had put with it and realized that it could be a really good two part chorus. I suggested to Don that we get Axl. I thought he would be great. We were fans of Axl and by lucky chance it turned out that he was an Eagles fan. We were really excited about that."

Working with hard rock singers isn't foreign to Kortchmar, who also produced Jon Bon Jovi's solo album—music for and inspired by the film *Young Guns II*. "He called me and I was really surprised," Kortchmar admits. "I didn't know he even had a clue as to who I was or what I was about, but we hit it off right away. Jon had all of the songs written when he called me, and we only had six weeks to get everything finished."

Once again, Kortchmar had a striking guest list that featured Elton John, Jeff Beck and Little Richard, though he admits that he tries not to think about the legends behind the people he's working with. "If you start thinking about it you go nuts," he says. "You forget that you have to help them and get them through the song. Anyone

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that comes in wants direction, not 'I love you, you're great.'"

At the other end of the musical spectrum on Kortchmar's impressive resume is Brent Bourgeois, whom he produced five tunes for, including the lush hit ballad, "Dare to Fall in Love."

"I got a copy of the demo tape and thought it was brilliant. My first question to the record company was, 'What do you need a producer for?' It was a terrific arrangement. He's very bright and very talented. I'm surprised he even wanted a producer, but once I met him I realized I could really help him make a terrific album. He wanted some help from, not an engineer, but someone he could bounce musical ideas off of, and I found I was able to help him a lot without interfering with his vision. He is so brilliant. I was glad to be a part of it. It's a terrific record."

Kortchmar also produced one track for the new Hall & Oates album. "I produced that at the same time we were doing Jon Bon Jovi's album," he says. "I booked time at another studio, cut the tracks with the same group of

musicians and just kept going back and forth.

"I produced the song with John [Oates]," he continues. "Daryl wrote the song, but we kind of rewrote and rearranged the entire song. Daryl originally didn't have the drums coming in until three quarters of the way into the song. Now they come in right away. Daryl didn't hear it as a gangbusters single at first, but John and I did. It ended up being a great song."

Kortchmar says that the most important thing in producing is the relationship between him and the artist, and so far he's been successful in picking the right artists to work with. "Fortunately, I haven't gotten any projects that [have turned out to be] a bad match—where people aren't communicating. That's everybody's worst nightmare in record producing, because you know you're stuck in there. You either pull the plug or you slide all the way through it. If I got into a combination that wasn't right, I would pull the plug, but I've never done it. I've been lucky enough or wise enough to work with people I knew I'd get along with. I hope it continues."

He also stresses the importance of having good chemistry with his engineers. For the past year, Kortchmar has worked almost exclusively with Rob Jacobs. "I give Robbie a lot of control in the studio," he says. "He hears things the same as I do, so we don't have to have a lot of discussions. On day one of a session, I usually get there a couple of hours after Robbie has worked on the drums. At that point, it basically sounds great already, and if we're going to agree on that, we're pretty much going to agree on everything else. He's definitely an up and coming engineer."

While he continues to ride high on his success, Kortchmar says he has no intention of doing another solo album or returning to touring, though he has thought about touring with Henley and performing his own tunes. "Part of me would love to do that, but I really feel if I'm going to be a record producer, I should concentrate on that. It's hard to do touring halfway, and it's impossible to do record production halfway. You either are or are not a record producer." ■

Sue Gold is a Los Angeles-based freelance writer.

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—FROM PAGE 119

cording studios. Sure, you can banish your drives to a vocal booth somewhere (if your SCSI bus can handle the cable length) or otherwise try to cover up the noise, but the fact remains that the noise has to be dealt with somehow. Access time is also an issue since pulling data from a hard disk takes time, and not all hard disks are suitable for recording applications. Access time also leads to a more serious problem: track limitations. More tracks usually mean more hard disks, since it's hard to read lots of tracks from a single disk.

Digital audio also works a hard disk pretty hard, which leads to the question of reliability. Hard disks do crash, and backup is necessary, if only because it's so easy to fill up a disk with data. The cost of a hard disk system must also take into account the cost of backup, which can range from removable hard drive cartridges (expensive and with limited storage, but easy to use) to DAT with digital I/O (slow, but inexpensive).

Optical storage is not necessarily the answer. At the moment, magneto-optical drives are slower than hard disks, and cartridges are expensive. "Recordable CDs" should be great for archiving when they appear, but are pretty much out of the running for multitrack operation. An ideal tapeless system would be partitionable into as many tracks as you want, have no moving parts, generate no noise and allow for fast editing operations. Taking these criteria into account, the place to look for the future of tapeless recording is not bigger hard disks, but lower RAM prices.

The main reason RAM has not been considered a viable storage medium for digital audio is price. A 600-meg hard disk costs \$3,000 or less; 600 megs of RAM at current prices (about \$40 a meg) comes to a whopping \$24,000. However, you don't always need 600 megabytes. One hundred megabytes would allow approximately 20 tracks of digital audio for a 30-second commercial, and at \$4,000, the price isn't that outrageous.

What does the premium price buy you? No mechanical noise, but most importantly, *partitioning into multiple tracks* since access time is not an issue. RAM is easy to test for data integrity (if a chip fails, replace it), and the lack of moving parts means

greatly improved reliability.

And RAM prices will continue to drop. When RAM hits the magic price point of \$10/MB, the advantages of using RAM may be enough to justify the extra expense.

This doesn't mean that existing technology will go away. RAM-based recording will be excellent for multitrack applications, but for 2-track mastering, a large hard disk will probably remain a more cost-effective option. Fortunately, these two can be integrated. A tapeless recording system of the future might consist of:

- * A large RAM bank, 100 MB to 600 MB, backed up with a "mini" uninterruptible power supply.

- * A large hard disk used for "automatic," fast RAM backup. RAM's non-volatile nature means you'd want the hard disk acting as a watchdog for the RAM data. When not backing up the RAM in multitrack recording applications, the large hard disk could be used for the less critical task of stereo mastering in systems lacking enough RAM to master a whole album, with individual songs shuttled into RAM from DAT as needed during the mastering process (see next).

- * DAT with digital I/O for long-term, archival backup. The hard disk would essentially be a "buffer" that, when stored to DAT at the end of a session, could be erased for use with the next tune.

How far will RAM prices decline? Time is on our side. RAM represents such a huge potential market that companies are scrambling to cram more data into less silicon for less money. Assuming no radical technological breakthroughs but a steady evolution, it's not unrealistic to expect RAM to hit the \$10/MB price before the end of this decade. Yet even at \$20/MB, I'm sure many would consider it worth spending \$2,000 for 20 track-minutes of recording with the attendant advantages of working in RAM. I sure would.

For now, hard disk recording is great. But keep your eye on the future. Some day, the idea of hard disks spinning around as heads scramble to collect data from them will seem as primitive as wax cylinders do today. ■

Craig Anderton currently divides his time between writing books, recording, consulting to musical equipment manufacturers, and giving seminars in the U.S. and Europe.

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—FROM PAGE 64, MASTER CONSOLATION

with parametric EQs and digital filters. Hank Waring really likes it. "When we bought it three or four years ago," he says, "it was the only one that would handle digital directly. We use it for digital transfers, EQ, things like that. We also picked it because it had 4-band EQ, and because we have five rooms of Sony equipment. When we do crossfades or special effects, we need a board that can handle the SDIF2. We have to go down to 1630, and this console is either 48 or 44.1 [kHz]. We have the [Mitsubishi] X-80 and X-86 2-track digital machines. We go to our board [via] AES/EBU and convert the signal over to SDIF2."

Every audiophile record project handled by FDS Labs goes through a custom Delta Modulation-based digital rack that Waring and his cohorts started developing way back in the early '70s. "It's basically German technology with Yankee ingenuity," Waring laughs, noting that it's not the same Delta Mod used by dbx. "The configuration is basically 2-in, 2-out, and it has digital equalization. We have to go through a format converter to go down to 48 and 44.1.

It's at 648,000 times a second now." About 70% of Quad Tech's business comes in on DAT, and about 80% of that is at the 48kHz sampling rate. Waring explains that DAT material is level-adjusted digitally and flavored with digital EQ, then sent to a Sony sample-rate converter, then to a Sony digital limiter to catch peaks, then into the Delta Mod rack, then back to a sample-rate converter, and finally to 1630. "We set levels, adjust EQ, and go tune-by-tune to R-DAT, moving from R-DAT to R-DAT, all digitally," Waring says. "To raise the level on a low-level tape, we can digitally bring up about 10 or 12 dB of extra gain. And the rack is set up so you don't have to move anything in: the 701, the F1, all [Sony] products go into the system through the sample rate converter."

That Ol' Neve Magic (With & Without Harmonia Mundi)

Masterdisk in New York City has one of the first three Neve DTC desks that came off the line; in fact, they helped Neve develop the console. Of great importance to Bob Ludwig was that the new desk have "an amazingly wide range of frequencies—and a lot of

precise control—because in mastering it's critical to be able to do exactly what you did before. That's why the automation on the DTC is extremely accurate. The level-setting can be to within a tenth of a dB! The other things we wanted on the DTC were the ability to work with the 1630 using the Sony digital interface, and an AES/EBU input and output."

Masterdisk owns three digital consoles: Neve DTC, Harmonia Mundi BW102 system (rack unit with separate control panel), and Sonic Solutions' Sonic System workstation. Ludwig likes using the Harmonia Mundi in conjunction with the DTC: "Generally, I use the Neve for its automation and a certain part for its sound, and I use the Harmonia Mundi because it has 0.5dB equalization steps [the DTC's EQ travels in 1dB steps] and sharper Qs in the bass and the extreme top end. We rarely use the Neve alone because there's no dither on the output. The new DTC-2 does have dither, but ours doesn't, so I always use the Harmonia Mundi after the Neve to properly dither the signal. And this Harmonia Mundi system has all the goodies: EQ that we can look at separately left and right,

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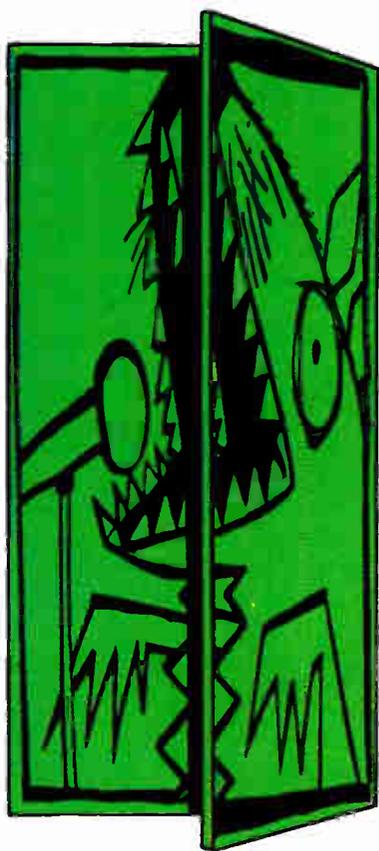
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**Mastering & the
Digital Generation Gap**

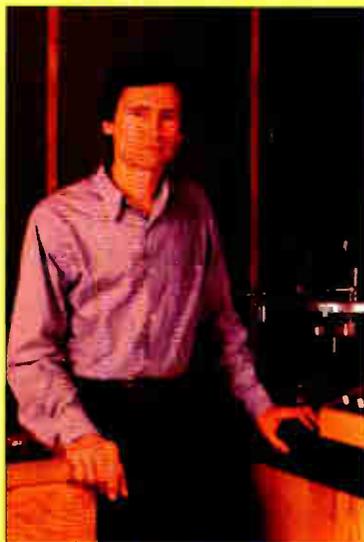
Bernie Grundman recently installed a Studer Editech Dyaxis digital audio production system in his new cutting room. Why? "It's great for editing because it does complex edits easily," Grundman says. But he's not using that system—or any other digital audio system—to do transfers.

"This is a controversial issue," Grundman says, "but any time you dump program information on to a hard disk, then pull it back off, you've gone down a couple of generations. Contrary to what everyone says, when creating the D-to-D copy, no matter what type—whether it's to hard disk, whether it's one X-86 to another, or a 1630 to another 1630—you lose. You lose ambience, depth and the naturalness in the high end. The more generations, the more spiky and grainy it gets. The top engineers are converts now, because they're starting to hear it."

"I first heard about [digital's degradative effect] from Allen Sides, one of the top ears in L.A. Then I started noticing it as I was doing more work with digital, at first just on 1630. If you're not sure you hear it, just take a copy and make a copy of the copy, then make a copy of that, and compare the copies. So now, most mixers don't want to go down digital generations if they don't have to. That's why the X-86 machine is getting popular—you can do your sequencing and minor editing without going down a generation. On 1630 you must go down

a generation to edit and assemble your album. And of course we also have to go down a generation when we make the CD submaster with equalization on it. You make compromises.

"The hard disk system is no exception. We tested several by dumping a 1630 master onto hard disk, digitally, and didn't do anything to it but put it right back on another 1630. Then we compared the two tapes; the material was definitely degraded. All the hard disk systems degraded it in different ways; some worse than others. We chose the Dyaxis because it has the least amount of degradation.



Bernie Grundman

Digital has problems with complex signals, especially distortion. Distortion is hard to duplicate because it's a really radical signal. It's hard for the digital system to follow and duplicate. There's distortion in everything, and digital tends to accentuate that. On

CD the resolution is 4:1, which is sampling a 15,000-cycle waveform three times a second—that's not enough. You get only an approximation of what's there, and you can hear the difference. Faithfully reproducing complex waveforms such as resonance on a vocal, or a saxophone, is very difficult. Digital doesn't have an easy time with it.

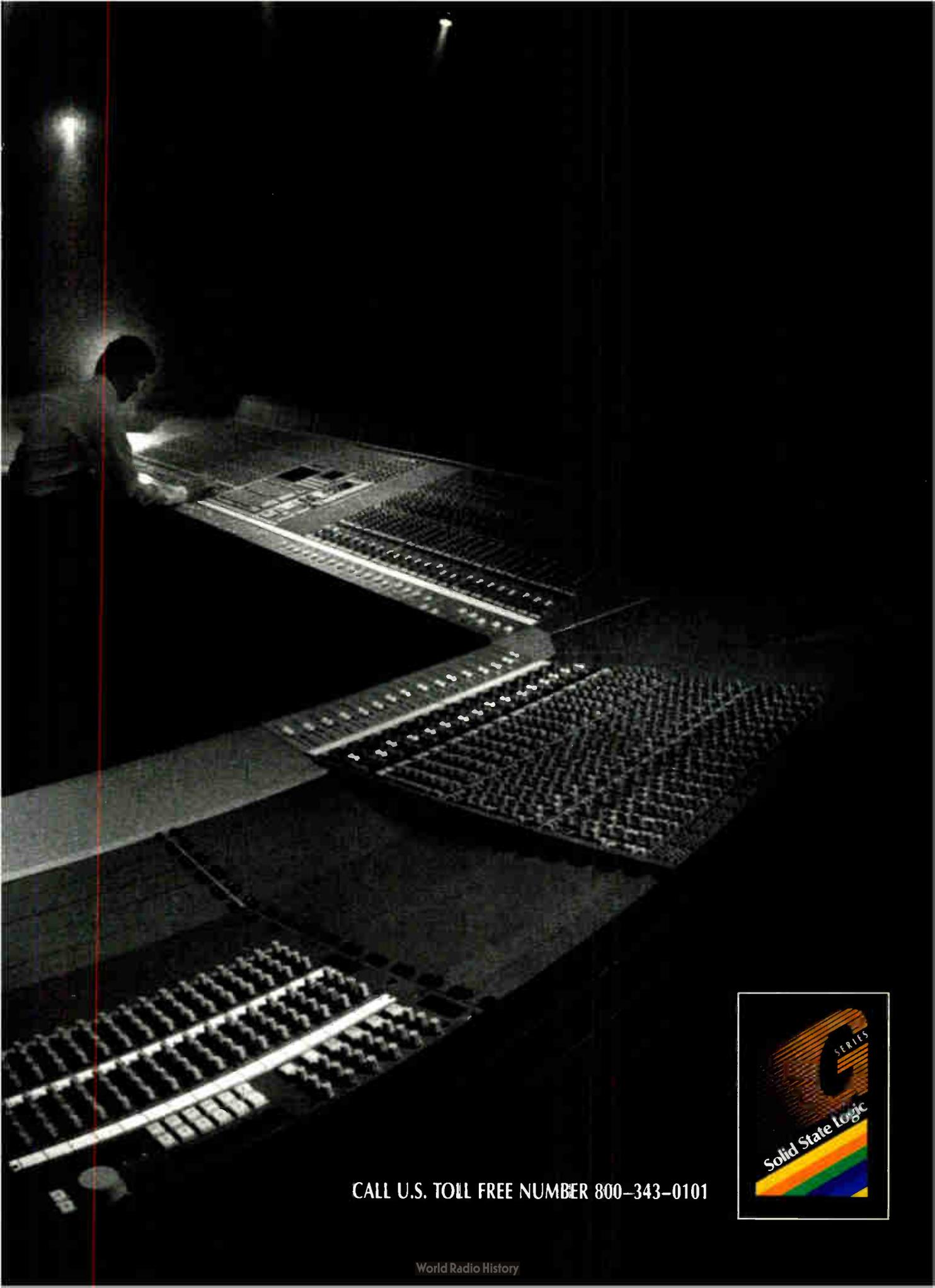
"I'm not trying to hurt digital; I would like to see it improved. You have to be careful about some things when you're doing digital, and I think it still has a way to go. It's very interesting that a lot of my clients are going back to analog, and Dolby SR is getting very popular!"

—Linda Jacobson

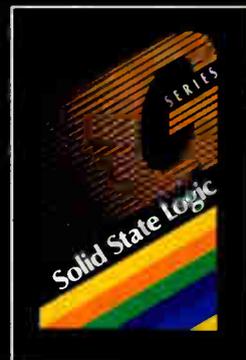
dynamic processor with compressor, limiter, expander and noise gate, and the newest thing—the digital domain de-esser, which is just fantastic. We're also considering Harmonia Mundi's new Penguin computer interface for

even more precise automation."

The Neve DTC at New York's Europadisk lives in the same room as the DMM system and Neumann console. Mastering engineer Jim Shelton admires the DTC for its "full dynamic



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control with compression, expansion, limiting, gating, equalizing with four independent frequency ranges, and shelving and parametric curves. You can have three 2-channel inputs, but very rarely is there any call for us to mix more than one source together. However, we might assemble a CD master from two or three different source tapes, which could be DAT, analog, EIAJ/F1 format, Mitsubishi, and any of those can come into the console digitally."

The Neve DTC at K-Disc moved in almost four years ago. Bill Lightner enjoys using it because "it lets you

program the console so it will make function changes lock to SMPTE time code; once you figure out what needs to be done to a take, you can 'sample' the settings of the board and assign that setting to a point in time that you want it to become active or inactive. You can do program fades, level adjust, channel balance, filters, limit, compression, expansion, noise gate. You name it, you can do it—either 'live,' or by letting the automation do it by allowing the SMPTE reader to activate based on the SMPTE on the tape. Also, the DTC has storage to 3.5-inch disk. Should you want to retain a

bunch of settings for a specific tape, rather than print them on the tape as is the case with the Harmonia Mundi, you run it all out onto a floppy disk. While we still write down the settings in case we lose the dumb disk, it's much speedier to have it on the floppy. You just run that information back into the console, put up the tape, press 'play,' and do it again."

Pursuing The Muse

For about a year, Georgetown Masters has worked with the Audio Animation Muse system, developed for mastering with the help of Georgetown's master, Denny Purcell. He says, "Every time I work on the Muse, it's like making love!"

Several years ago, Purcell says, "One of the principals in the company asked me about my interest in this type of console. I got our resident Nashville digital wizard, Rich McCollister, to spend time with them. A few months later they came to me and said, 'Here's a piece of paper. Draw out what you want.' The company and I developed it to the way it is now."

The Muse, Purcell says, is the best-sounding mastering console he's ever heard. Bias aside, he also likes it because Audio Animation "built the most powerful digital processor that's ever been built, and with FIR filtering. Then they came to me to focus it for use in mastering. I didn't want something that you had to be a computer operator to operate. The rule with most equipment that I let come through our door is that my 8-year-old son has to be able to operate it. The Muse is so friendly, even I can operate it."

Along with a great personality, the Muse gives great control. "It has a Q from .01 to a Q of 50," says Purcell. "It has eight banks of parametric EQ; each one has five bands, and each band has at least 1,000 variables. When I was working on Emmylou Harris' album, I said, 'I'd like to do something to open this up just a little bit, but not so much that it makes it harsh.' So I tried listening to the difference between .05 and .03 dB at 17 k—.03 worked, but .05 was too much. You can instantly A/B on the Muse, and that's what mastering's all about." ■

Linda Jacobson runs Wordswork, providing high-tech writing, editing and publishing services to businesses in the San Francisco Bay Area. She was managing editor of the original EQ magazine.

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TAPE TO DISC

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

Information in the following directory section is based on questionnaires mailed earlier this year and was supplied by those facilities listed. *Mix* claims no responsibility for the accuracy of this information. Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.



The centerpiece of the mastering room at Fantasy Studios in Berkeley, Calif., is the new Sony SDP-1000 digital console, installed in June 1990. With the addition of this new system, Fantasy now offers maximum flexibility in processing digital and analog programs using any format. Photo: Phil Bray. Enhancement: Mark Schroeder.

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Mix listings procedure: Every month, *Mix* mails questionnaires to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a charge to list a Boldface Listing (name, address, contact) and an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory write or call the *Mix* Directories Department, 6400 Hollis Street #12, Emeryville, CA 94608; toll free 800-344-LIST!

Upcoming Directory Deadlines:

Remote Recording & Sound Reinforcement Facilities: **December 14, 1990**

Video Production/Post-Production Facilities: **January 15, 1991**

Northeast Recording Studios: **February 15, 1991**

EASTERN

Tape & Disc

Mastering, Pressing, Tape Duplication
and Compact Disc Facilities

AIR CRAFT RECORDING AND REAL TIME DUPLICATION'S SERVICE; *TD*, Dormont Square; Pittsburgh, PA 15216; (412) 343-5222. Contact: Barney Lee.

AIRSHOW INC.; *CDM, TM*; 7021 Woodland Dr.; Springfield, VA 22151; (703) 642-9035. Contact: David Glasser. **MASTERING.** Mastering Console: AMS/Calrec M series. Tape Machines: Sony PCM-1610 with Apogee filters, BVU-800 and DTA-2000 digital tape analyzer, Sony PCM-2500 DAT, Sony PCM-601ESD and PCM-701ES processors with Beta or VHS VCRs. **Noise Reduction:** All noise reduction formats available. **Monitor Speakers:** Meyer HD-1, KEF 103.2, Yamaha NS-10 with Bryston amp. **Digital Editing Systems:** Digidesign Sound Tools with Mac Ix, 1+ hour of stereo hard disk storage. **Signal Processing:** Lexicon 480L available. Sound Tools digital EQ, sample rate conversion, and dynamic control. API equalizers (all models), AEA M/S matrix, API 525 compressors, various analog and digital signal processing available. **Engineers:** David Glasser and friends. **Rates:** Less than you would expect for digital editing and CD mastering services. Please call to discuss your project's requirements. **OTHER.** AIRSHOW provides hard disk digital editing and CD premastering. Our clients and projects in 1990 include: Rounder, Sugar Hill, Smithsonian/Folkways, Rebel Records, Doc Watson, Tony Rice, Seldom Scene, Mary Chapin Carpenter, Santa Fe Chamber Music Festival, National Geographic Society and NPR's Fresh Air. We have recently constructed a new mastering room, co-located with Bias Recording in Springfield, VA.

ALPHA RECORDS INC.; *TM, TD, DM, RM*; 1400 NW 65 Ave.; Plantation, FL 33313; (305) 587-6011; FAX: (305) 587-7039. Contact: Dick Smith.

AMERICAN HELIX TECHNOLOGY CORPORATION; *CDM, CDR, TM, TD*; 1857 Colonial Village Ln.; Lancaster, PA 17601; (800) 525-6575; FAX: (717) 392-7897. Contact: Jim Boyer. VP or Marc Feingold, dir. of sales & marketing. **COMPACT DISC.** Services, prices: Full-service CD manufacturing facility located in Lancaster, PA, specializing in production runs of 500 to 50,000 units. Helix is a self-contained fully automated CD replication plant. Complete premastering, packaging and print services offered. Five-color, silk-screened picture discs and gold-tone metallization available.

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AMERICAN MULTIMEDIA INC.
Burlington, NC

AMERICAN MULTIMEDIA INC.; *TD*; 2609 Tucker Street Extension; Burlington, NC 27215; (919) 229-5554; FAX: (919) 228-1409. Contact: Tim Mallard. **MASTERING.** Mastering Console: Neve 8108. Tape Machines: Otari, Studer. **Noise Reduction:** Dolby A, B, C and SR, S Dolby. **Monitor Speakers:** UREI, JBL. **Digital Editing Systems:** Sony 1610 & 1630, JVC BP-90, Nakamichi, DMP-100, Sony 1630. **Signal Processing:** dbx, Dolby A, B, C and SR capabilities, Aphex, Lexicon. **Engineers:** Richard Clark, Howard Hoyt. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. Duplication:

tor: Otari. Electro Sound, Gauss. **Duplicating Speed:** 64:1, 80:1. **Capacity:** 50 million annually. **Tape Used:** By customer request. **Shell Used:** By customer request. **Loading Equipment:** 36 Concept Design modifications. **Packaging Equipment/Fulfillment Services:** Apex printing, Ilesman labelers, Scandia wrappers, Sentinel blistering, F-20, HS-3 and A-22 Shanklin, CST Pad printer, and Kbar thermo forming blister packaging. **COMPACT DISC.** Services, prices: 4-color process and 5-color booklet and inlay card printing. **OTHER.** Subsidiary: Amerigraphics specializes in audio cassette J-card and label printing. Full-service 4 and 5 color services for audio, video and CD.

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ANALOGUE INDUSTRIES; *TD*; 217 S. Union St.; Burlington, VT 05401; (800) 777-1927; FAX: (802) 863-1234. Contact: Rick Dexter. **TAPE DUPLICATION.** Method of Duplication: In-cassette. **Duplicator:** KABA 20 positions, Wollensak 16x. **Duplicating Speed:** Real time, 2 times and 16 times. **Capacity:** 12,500 per week. **Tape Used:** BASF. **Shell Used:** Shape. **Loading Equipment:** King. **Packaging Equipment/Fulfillment Services:** Shrinkwrap. **OTHER.** On-cassette printing, insert design and printing, custom-length blank cassettes. Personalized service and fast turnaround for short or long runs. Very competitive for larger orders.

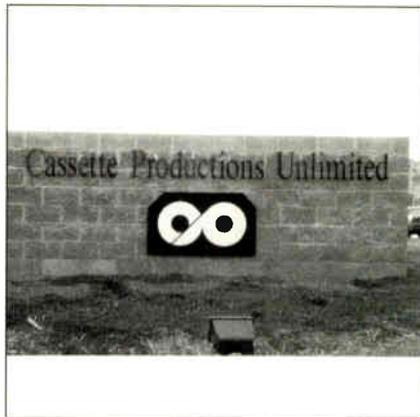
APEX MACHINE CO.; *TD*; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 566-1572. Contact: Bob Coningsby. **OTHER.** Apex Machine Company designs and manufactures a wide variety of hand-operated, semiautomatic and fully automated machines for the audio, video and R-DAT industry, including the CA-30 and CA-80 dry offset printers which can now also be fitted with our new Gravure offset heads for an especially high quality, opaque impression. Apex also manufactures their patented Potoscreen™ (Machine for high speed screening of cassettes) and the Z-90 packaging machine for inserting J-cards and cassettes into Norelco boxes.

LEGEND

CDM: CD Mastering/Premastering
CDR: CD Replication
TM: Tape Mastering
TD: Tape Duplication
DM: Disc Mastering
RM: Record Manufacturing

AUDIO CRAFT; *TM, TD*; 2701 E. Sunrise Blvd.; Ft. Lauderdale, FL 33304; (305) 563-0553. Contact: Lonny Kelem or Christine Kelem. **TAPE DUPLICATION.** Method of Duplication: In-cassette. **Duplicator:** Studer Revox (real-time duplicator), Telex CD high speed. **Duplicating Speed:** Real time and 16:1. **Capacity:** 10,000 tapes per week. **Tape Used:** BASF, Ampex, Agfa. **Shell Used:** ICM, Magnetic Media. **Loading Equipment:** Concept Design. **King.** **Packaging Equipment/Fulfillment Services:** Complete packaging. **Rates:** Upon request.

BRUNSWICK TAPE MEDIA; *TD*; 580 Eighth Ave.; New York, NY 10018; (212) 840-1559. Contact: Woody Batzer.



CASSETTE PRODUCTIONS
UNLIMITED INC.
Arden, NC

CASSETTE PRODUCTIONS UNLIMITED INC.; *RM, TD*; 6 Commerce Way; Arden, NC 28704; (800) 868-2737. Contact: Jeff Baker. **MASTERING.** Mastering Console: Soundcraft. **Tape Machines:** Otari MTR-12, Studer A80. **Noise Reduction:** Dolby A, SR, B, dbx. **Monitor Speakers:** JBL. **Digital Editing Systems:** Sony PCM-2500. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. **Duplicator:** Electro Sound 8000. **Duplicating Speed:** 64:1. **Capacity:** 100,000 day (C-40). **Tape Used:** BASF LHD. **Shell Used:** 5-screw, Sonic, others. **Loading Equipment:** King 790. **Packaging Equipment/Fulfillment Services:** Heino Ilesmann, Shanklin S/W, custom-audio book package. **Rates:** Competitive. **OTHER.** 24-track music/voice studio, audio producer(s), design, typesetting, printing, packaging, video duplication, product assembly, warehousing, fulfillment, a complete audio/video service. Established in 1978 with a reputation for on-time delivery of over 40 million cassettes.



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Nashville, TN

CASSETTE EXPRESS (DIV. OF AL JOLSON ENTERPRISES INC.); 114 17th Ave. S.; Nashville, TN 37203; (615) 244-5656. **MASTERING.** **Noise Reduction:** Dolby A/SR, dbx type 1. **TAPE DUPLICATION.** Method of Duplication: In-cassette. **Duplicator:** (104) KABA slave deck, (52) dual unit. **Duplicating Speed:** 1 7/8 +3 3/4 and 15 or 1:1, 2:1, 8:1. **Capacity:** 1100 C-45 per shift. **Tape Used:** Agfa 649, BASF chrome II. **Shell Used:** Lenco, Michelex. **Loading Equipment:** AEF, Kronos 4. **Rates:** Competitive rates, please inquire. Other services, printed labels and inserts.

CBS RECORDS INC. NEW YORK STUDIO; *CDM, TM, TD, DM*; 49 East 52nd St.; New York, NY 10022; (212) 445-2956. Contact: Rob Grabowski.

CROWN MAGNETICS INC.; *CDM, CDR, TM, TD*; 1223 Bittner Blvd.; Lebanon, PA 17042; (717) 274-2812; (800)

736-9001. Contact: Judy Musser. **MASTERING.** Mastering Console: Soundcraft Series 400B. Tape Machines: Studer, Ampex, Otari, Technics, Tascam. Noise Reduction: Dolby A, B, dbx. **Monitor Speakers:** JBL 4411, 4312. **Signal Processing:** Orban. **Engineers:** Jim Kimball, Brian Oxenreider, Chuck Musser. **Rates:** Cal. **TAPE DUPLICATION, Method of Duplication:** In-cassette and bin-loop. **Duplicator:** Telex, Magnefax, modified 1" Ampex bin. **Duplicating Speed:** 16, 120, 240. **Capacity:** 10 slaves. **Tape Used:** Agfa. **Shell Used:** Swire. **Loading Equipment:** AUA, King. **Packaging Equipment/Fulfillment Services:** Scandia, Apex. **Rates:** Call. **COMPACT DISC, Services, prices:** Sub-contract. **OTHER.** Printing available, fulfillment, direct-imprint labeling, shrinkwrap.

CRYSTAL CITY TAPE DUPLICATORS INC.; 48 Stewart Ave.; Huntington, NY 11743; (516) 421-0222. Contact: Frank Russo. **TAPE DUPLICATION, Method of Duplication:** In-cassette and bin-loop. **Duplicator:** Otari bin-loop. **Duplicating Speed:** 64:1. **Capacity:** 16,000 per day. **Tape Used:** BASF, Maganetic Media, Agfa. **Shell Used:** Allison Industries, Mag-netic Media. **Loading Equipment:** Electro Sound, AEG, Kronos 4. **Packaging Equipment/Fulfillment Services:** Apex on-cassette print, Scandia wrapper. **Rates:** On request. **OTHER.** Video duplication 3/4", 1/2" Panasonic 6810 hi-fi stereo.

THE CUTTING EDGE; CDM, CDR, TM, TD, DM, RM; PO Box 217—Old Rte. 17; Ferndale, NY 12734; (914) 292-5965. Contact: Paul Gery.

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

db PLUS DIGITAL SERVICES INC.; CDM; PO Box 694; Lynbrook, NY 11563; (516) 872-2325. Contact: Kathy Kerr.

BARRY DIAMENT AUDIO; CDM; 2728 Henry Hudson Pkwy.; Riverdale, NY 10463; (212) 543-2079. Contact: Barry Diament, Mary Antonelli. **MASTERING.** Tape Machines: Sony 1630 w/Apogee Filters, DMR-4000, DTA-2000. **Monitor Speakers:** Dahlquist DQ-20, M.I.T. with Monster Cables. **Digital Editing Systems:** Sony 1100A. **Engineers:** Barry Diament. **Rates:** Call. **OTHER.** Credits: AC/DC, Anita Baker, Edie Brickell and New Bohemians, Cars, Phil Collins, Jim Croce, Crosby, Stills and Nash, Cult, Divinyls, Eagles, Enya, Kevin Eubanks, Genesis, Guns n' Roses, Hanoi Rocks, Kitano, Eartha Kitt, Led Zeppelin, Julian Lennon, Bob Marley, Stevie Nicks, Robert Palmer, Robert Plant, Questionaires, Otis Redding, Rolling Stones, Linda Ronstadt, Simply Red, Steps Ahead, Tesla, Pete Townshend, U2, Joseph Villa, Yes, Warren Zevon.

DIC DIGITAL; 222 Bridge Plaza S.; Fort Lee, NJ 07024; (201) 224-9344. Contact: Kevin Kennedy, nat'l mktg. mgr. **OTHER.** Manufacturer of digital audio tape (DAT) used for mastering. We carry a complete line of all DAT products including standard-length cassettes and custom-loaded-length cassettes in bulk for custom labeling/printing. Pancakes and R/Os are available.



DISC MASTERING INC.
Nashville, TN

DISC MASTERING INC.; CDM, TM, TD, DM; 30 Music Square West; Nashville, TN 37203; (615) 254-8825. Contact: Elizabeth Bannister. **MASTERING.** Mastering Console: Neve DTC digital console, Neumann SP 75. **Tape Machines:** Studer A820 1/4 and 1/2, A80, A810, PCM-2500, PCM-1630, DMR 4000. **Noise Reduction:** Dolby A, SR, dbx. **Monitor Speakers:** New Tannoy monitor series DMT. **Digital Editing Systems:** Sony DAE 3000, Cedar. **Cutting Lathes:** VMS 70, SL 74B, SX 74. **Signal Processing:** Neve Custom 2087, Neumann 473 limiter compressor. **Engineers:** Randy Kling, Chad Kling, Hoyt Dooley and Joe Dainwood. **TAPE DUPLICATION, Method of Duplication:** In-cassette. **Duplicator:** (16) Studer A710 cassette modified. **Duplicating Speed:** Real time. **Capacity:** 16x. **Tape Used:** Ampex. **Shell Used:** Lenco. **Rates:** Available upon request. **COMPACT DISC, Services, prices:** Upon request. **RECORD MANUFACTURING.** Presses: Available upon request. **OTHER.** Credits: Narada Productions, David Arkenstone, Paul Lanz, Blacktop Records, W.C. Handy, Blackfoot, Christy Lane, Gary Stewart, Jim Brock, Alabama, Dolly Parton, The Judds, Hank Snow, Eddie Arnold, Anson Thunderbird.

EASTERN STANDARD PRODUCTIONS INC.; CDM, CDR, TM, TD, DM, RM; 26 Baxter St.; Buffalo, NY 14207; (716) 876-1454; (800) 527-9225. Contact: Deborah L. Mekker.

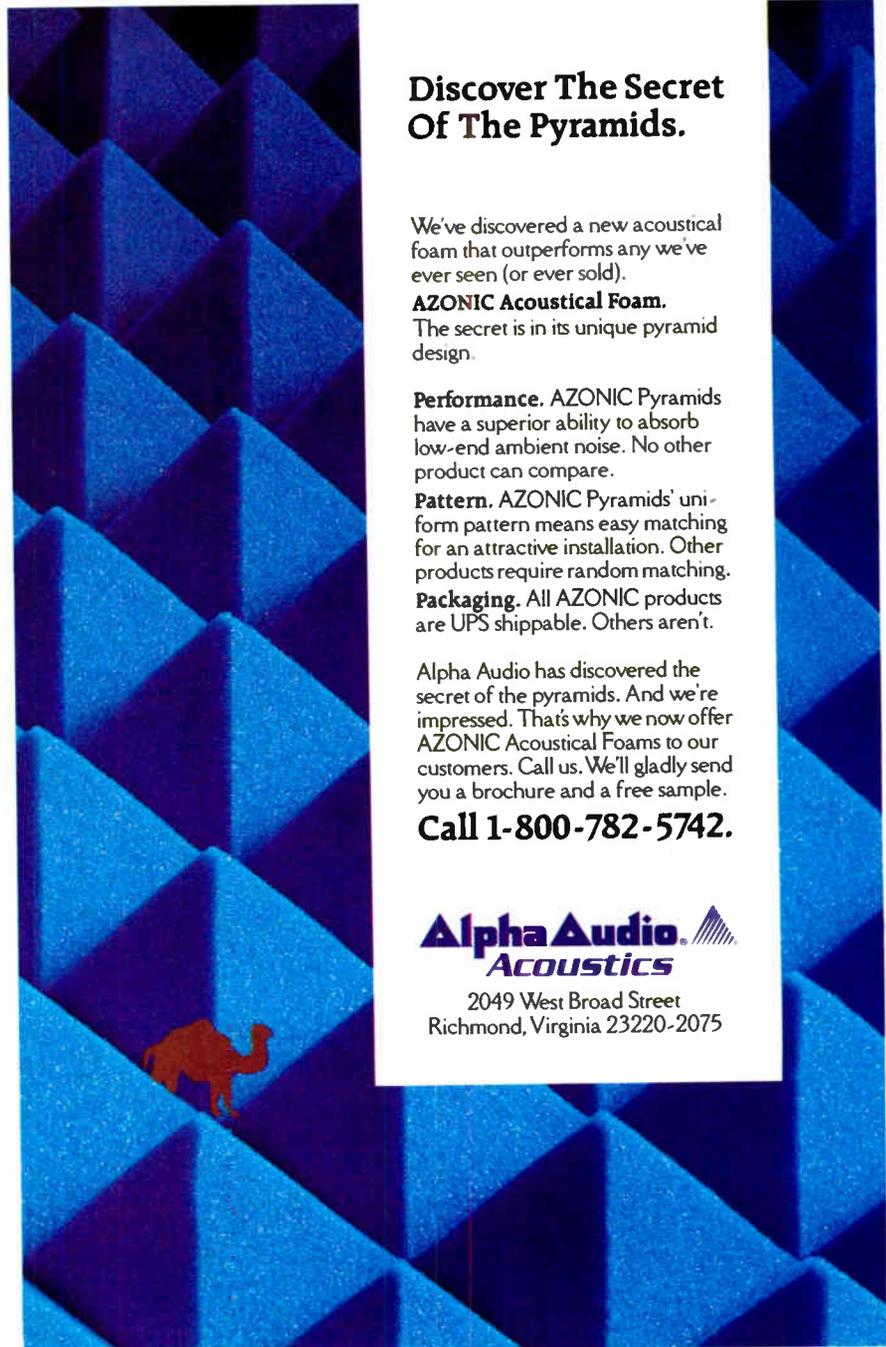
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DIGITAL HOUSE LTD.; CDM, CDR, TM, TD; 101 West 57th St.; New York, NY 10019; (212) 333-5950; FAX: (212) 262-5631. Contact: Jerome Bunke, Harry Hirsch. **OTHER.** Creative design studio, graphics, printing, sonic enhancement.

DIGITAL 1; 658 Douglas Ave.; Altamonte Springs, FL 32714; (407) 682-7790. Contact: Batt Donovan, Rob Monaco. **TAPE DUPLICATION, Method of Duplication:** In-cassette and bin-loop. **Duplicator:** KABA. **Duplicating Speed:** High speed, real time, 2 x 1. **Capacity:** 30,000 per month. **Tape Used:** RDK chrome, Agfa 649. **Shell Used:** Lenco, Shape. **Loading Equipment:** Electro Sound. **Packaging Equipment/Fulfillment Services:** Shrinkwrap, on-cassette printing. **Rates:** Call for brochure.

DISC MAKERS; CDM, CDR, TM, TD, DM, RM; 1328 N. 4th St.; Philadelphia, PA 19122; (215) 232-4140 (in PA); (800) 468-9353. Contact: Tony Van Veen.



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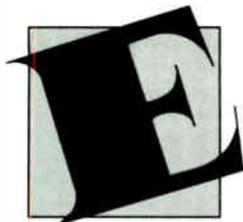
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ELITE DUPLICATION INC.
Charlotte, NC

ELITE DUPLICATION INC.; *TM, TD*; 4475 Morris Park Dr., Ste. K; Charlotte, NC 28227; (704) 545-9973; FAX: (704) 545-6296. Contact: Tim Dixon, Connie Connor. **MASTERING.** Tape Machines: Otari MX-55N-HS, (2) Panasonic SV-3500 R-DAT, Sony F-1/Beta/VHS. **Monitor Speakers:** JBL. **Signal Processing:** Aphex Compellor, Neve V Series available upon request, Carver, Gentner, Monster Cable. **TAPE DUPLICATION.** Method of Duplication: In-cassette. Duplicator: (50) Nakamichi MR-2. Duplicating Speed: Real time. Tape Used: BASF Super chrome. Shell Used: Shape Mk 10 II. Loading **Equipment:** Concept Design, King. **OTHER.** Elite Duplication—where our main goal is customer satisfaction without compromise. We maintain a personal touch with our clients who appreciate and understand the need for premium materials to achieve a superior end-product. Rates and other services available upon request.

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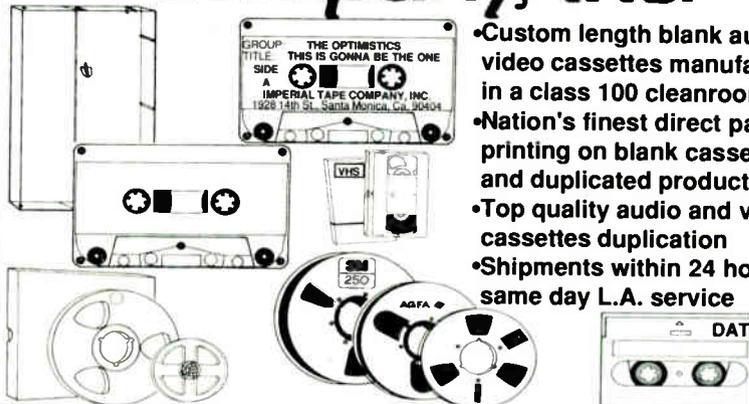


EUROPADISK LTD.
New York, NY

EUROPADISK LTD.; *CDM, CDR, TM, TD, DM, RM*; 75 Varick St.; New York, NY 10013; (212) 226-4401; FAX: (212) 966-0456. Contact: Jeremy Guttenberg, Pat Rosiello, or Jim Shelton. **MASTERING.** Mastering Console: Neve Digital Transfer console, Neumann SP-79 analog. **Tape Machines:** (2) Sony DMR-4000/PCM-1630, Sony DMR-2000/PCM-1610, Sony PCM-2500 Pro-Dat, Sony PCM-1200 Dat, Sony JH-110M, 1/4"-1/2" inch analog mastering machine, Mitsubishi X-80 digital, Sony PCM-501 with Beta & VHS transports, Studer A80-MR 1/2" for cassette bin-masters. **Noise Reduction:** Dolby A, Dolby SR, dbx I and II. **Monitor Speakers:** JBL 250ti, Yamaha NS-10. **Digital Editing Systems:** Sony DAE1100A Digital Audio Editor, DAQ1000 PQ Cue Code Editor. **Cutting Lathes:** Neumann VMS-82 DMM (Direct Media Mastering). **Signal Processing:** Neve DTC Digital Transfer Console, Neumann SP-79 Transfer Console, Sony DFX2400 Sampling Rate Converter, Studer DAD (Digital Audio Delay). **Engineers:**

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Jim Shelton, Thom Spallone. Rates: Complete brochure on request. **TAPE DUPLICATION.** Duplicator: Lyrec (Danish). Duplicating Speed: 80 to 1. Capacity: 5,000,000 per year. Tape Used: BASF, Agfa, Shell Used: ICM, Michelex, Lenco, Shape, Beres. Loading Equipment: AEG Tachos-90. Packaging Equipment/Fulfillment Services: Roldex, Apex. Rates: Complete brochure on request. **COMPACT DISC.** Services, prices: CD premastering, replication, packaging, graphics printing. Analog-to-digital transfers, digital conversions, sampling-rate conversions. Call for complete brochure. **RECORD MANUFACTURING.** Presses: Toolex-Alpha and Hamilton fully automatic. Capacity: 3,000,000 per year. Vinyl Used: Audiophile quality, dye-colored PVC compound. Rates: Call for complete brochure. **OTHER.** Complete audio software packages—CD, cassette, LP, including printed graphics (CD booklets, cassette J-Cards, LP jackets).

EVA-TONE

EVA-TONE INC.
Clearwater, FL

EVA-TONE INC.; TM, TD, DM, RM; 4801 Ulmerton Rd.; Clearwater, FL 34622; (800) EVA-TONE; (813) 572-7000. Contact: Norm Welch. **MASTERING.** Mastering Console: Sony and Eva-Tone customized. Tape Machines: Studer Revox, Otari, MCI, Nakamichi. Noise Reduction: Dolby A, B, SR, dbx type I. Monitor Speakers: Tannoy SGM-1000. Cutting Lathes: Scully automated and manual. Signal Processing: Urei, AMS, Sontec, Aphex, Orban. Engineers: Michal Newsome, Jacques Woodin, Kristina Lucas, Michael Watkins, Peter Revron, Kim Garland. Rates: On request. **RECORD DUPLICATION.** Method of Duplication: Bin-loop. Duplicator: Gauss 2480 and 2420 bin, Type 2410 slave. Duplicating Speed: 64:1 and 128:1. Capacity: 20 million C-40 per year. Tape Used: Various high-quality sources. Shell Used: Various high-quality sources. Loading Equipment: King 790. Packaging Equipment/Fulfillment Services: Apex, Stoddard, Iseman, Scandia, Custom E-T. Rates: On request. **RECORD MANUFACTURING.** Presses: Eva-Tone custom (flexible Soundsheets). Capacity: 200 million annually. Vinyl Used: Special order. Rates: On request. **OTHER.** Commercial printing, typesetting, packaging, mailing services.

FORGE RECORDING STUDIOS INC.; CDM, CDR, TM, TD; PO Box 861, Valley Forge, PA 19481; Byrne Bldg., Lincoln & Morgan St.; Phoenixville, PA 19460; (800) 331-0405; (215) 935-1422. Contact: Warren Wilson.

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New York, NY

FRANKFORD/WAYNE MASTERING LABS INC.; CDM, CDR, TM, DM; 1697 Broadway, #1404; New York, NY 10019; (212) 582-5473. Contact: Jimmy Lee (studio manager), Carol Steele (business affairs). **MASTERING.** Mastering Console: Ranstele Audio custom/proprietary DC-coupled console with full equalization and processing facilities, analog and digital capable, transformerless. Ranstele/Harmonia Mundi digital transfer console with digital level, equalization, compressor/limit sampler rate conversion, to/from any format. ADT digital transfer console-to/from any digital format, sample rate conversion. Gotham/Yamaha programmable Disc System-CDR-90. Tape Machines: Sony PCM-2500 Pro R-DAT, Sony PCM-1630 digital processors with Apogee filters, Sony PCM-601 processor, Sony-MCI JH-110MB 1/4" and 1/2", Sony-MCI JH-110C 1/4" and 1/2", Technics RS1520 pro 2-track, Scully LJ-12 stereo recorder, Technics cassette recorder, Sony PCM-3402 DASH reel-to-reel, Sony PCM-10/100 digital F-1 compatible processor, Sony DMR-2000 Digital U-matic, Sony DMR-4000 Digital U-matic, Sony VO-5800, Sony BVU-800DB U-matic, Sony SL-2700 Beta, Sony DTA-200 digital tape analyzers, Panasonic Super-VHS. Noise Reduction: Doby A, Dolby SR, dbx. Monitor Speakers: JBL 4350B bi-amped, JBL 4343B bi-amped, JBL 4330, JBL 4311, B&W 701, ADS 300, Auratone 5C, Technics 6060, JBL custom subwoofer systems, Yamaha NS-10M, E-V Sentry 100, JBL 4430. Cutting Lathes: (2) Neumann lathes with Technics quartz drive and Neumann SX-74/SAL-74B driver rack and Sontec Compudisk control computers, (4) Scully/Ranstele automated quartz-locked drive lathes with Sontec Compudisk computer and Neumann SX-74/Ranstele cutter drive system. Signal Processing: Sontec, Urei, ITI, Pultec, Ranstele Audio, Orban, Technics equalizers, Sontec, Sony, Aphex limiters and compressors. Sony and Valley International Digital Compressor/Expander, Sony Limiter, AMS/Lexicon Digital Delay Lines. Engineers: Tom Steele (owner and chief engineer), Carlton Batts, Michael Sarsfield, Rick Essig, Alexis Windsor. Rates: \$200 analog mastering time, \$250 digital editing/EQ, CD refs: \$200-\$275, CD masters: \$225 to \$425. Lacquers 12": \$125 to \$175, 7": \$55 to \$65, 12" refs: \$90/side, D/F: \$140. **COMPACT DISC.** Services, prices: CD references from \$225 to \$275. **OTHER.** Credits include: Technotronic, Vanilla Ice, Dee Dee Lite, Suzanne Vega, Ziggy Marley, Harry Chapin Tribute, Annihilator, Queensryche, Michael Fath, Joe Satriani, Michael Brecker, Eric B. & Rakim, Stevie B., Kid N Play, Blaze, The Boys, Sarah Dash, Today, Guy etc.



FULLERSOUND INC.
Miami, FL

FULLERSOUND INC.; CDM, TM, DM; 1755 NE 149th St.; Miami, FL 33181; (305) 945-6697. Contact: Michael Fuller/Margie Curry. **MASTERING.** Mastering Console: Neve DTC-1 Digital/Cyberonics custom automated MC2003E analog. Tape Machines: Sony 1630, 2500 DAT, PCM-601, 3402 DASH, Mitsubishi X-80. Noise Reduction: dbx, Doby A, Dolby

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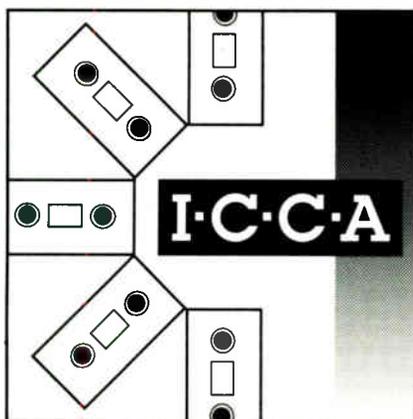
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SR. Monitor Speakers: UREI 813A, Yamaha NS-100, Auratone Cubes. Digital Editing Systems: AMS AudioFile available on request. Cutting Lathes: Scully LS-76 with Ortofon DSS-821 cutter heads. Signal Processing: Neve DTC Digital, Sontec MES-430B EQ, Sontec DRC-400, Ortofon STL-852. Engineers: Michael Fuller and Rod Fuller. Rates: Available on request.

GRENADIER; TM, TD: 10 Parkwood Ave., Rochester, NY 14620; (716) 442-6209; (716) 275-2942. Contact: Tom Greene. TAPE DUPLICATION. Method of Duplication: In-cassette. **Duplicator:** Nakamichi real time and Telex high speed. **Duplicating Speed:** Nakamichi real time 1:1, high speed 8:1. **Capacity:** 800 per day. **Tape Used:** Agfa. **Shell Used:** Lenco, Michelex. **Loading Equipment:** Loading to custom length. **Packaging Equipment/Fulfillment Services:** Printed labels or direct-on-cassette printing available even for quantities as low as 100 tapes. Full-color inserts, assembly, shrinkwrap, collating and complete packaging available. Rates: Small orders welcome. Superb quality at affordable pricing. We specialize in complete packages for small-to-medium quantities. Smaller quantities of even 100 real-time cassettes with full-color inserts, printing and shrinkwrap available. **OTHER:** Audio-for-video and full 24- and 16-track recording studio and mastering facilities. Recording and duplication to 2-track analog or digital. Formats with Dolby A, B, C, SR or dbx type I noise reduction. 1/4" and 1/2" analog 15/30 IPS, PCM 501/601, R-DAT, VHS Hi-fi, Beta Hi-fi and Nakamichi Dragon cassette mastering machines available.

THE HIT FACTORY - DMS INC.; CDM, TM, DM: 130 West 42nd Street; New York, NY 10036; (212) 768-4141; FAX: (212) 768-9818. Contact: Patti Firincili.



ICCA INC.
Charlotte, NC

ICCA INC.; TD: 429 Briabend Dr., Charlotte, NC 28209; (704) 523-7219; (800) 624-5940 (outside NC.) Contact: John Firestone, Harrell Canning. TAPE DUPLICATION. Method of Duplication: Bin-loop. **Duplicator:** Electro Sound ES 8000 (4) master, (25) slave, Lyrec (2) master (10) slave. **Duplicating Speed:** 32:1, 64:1, 80:1. **Capacity:** 75,000/day. **Tape Used:** By customer request. **Shell Used:** By customer request. **Loading Equipment:** King 790. **Packaging Equipment/Fulfillment Services:** Apex printing, Ilsemann boxer, Ilsemann wrapper, Ilsemann labeler. Rates: Call for prices. **OTHER:** Graphic arts design, typesetting, desktop publishing, label and insert layout, blister packaging, custom package design, O-card packaging.

KEWALL REAL TIME TAPE DUPLICATORS; TM, TD: 77 Bayshore Rd., Bayshore, NY 11706; (516) 586-2486; (800) 67KEWALL(675-3925); FAX: (516) 586-2486. Contact: Keith or Dorothy.

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KLARITY CASSETTE INC.; TD: One Post Office Square Bldg.—Main; St. Waterville, ME 04901; (800) 458-6405; (207) 873-3911-Tech; FAX: (207) 873-3924. Contact: Michael Pepin, CEO. MASTERING. Mastering Console: Custom-designed, semi-automated with exclusive computer loopback. **Tape Machines:** Custom-modified computer-assisted Studer Revox B-215, Panasonic DAT, Sony PCM F-1. **Noise Reduction:** Dolby A, dbx Type I, Dolby B HX-Pro. **Monitor Speakers:** Custom-designed digital loopback. **Signal Processing:** dbx computer analyzer, various Tektronix, all necessary processing available, including: dbx compressor/limiters, dbx noise gates, dbx eq-essers. **Engineers:** William Wheeler, Michael Rodrigue, Matthew York. Rates: Studio production/editing \$45 per hour, color brochure available for duplication rates. **TAPE DUPLICATION. Method of Duplication:** In-cassette **Duplicator:** Custom-designed, Studer Revox B-215 (60) with computer circuitry-controlled bias, EQ, level and azimuth. **Duplicating Speed:** Only real time. **Capacity:** 40,000 per month. **Tape Used:** Ampex, Agfa pure-chrome. **Shell Used:** Sharp, ICM, Michelex. **Loading Equipment:** King. **Packaging Equipment/Fulfillment Services:** Autolabe, Simpulse. Rates: Ask for our detailed color brochure. **OTHER:** Pope John Paul, Arlo Guthrie (exclusive), Yale Glee Club, Houston Symphony Orchestra and hundreds more. Full range of services including: typesetting, label-printing, insert (J-card) printing, direct stamp printing, custom packaging, custom-loaded blank cassettes and full 6-color printing. Quality control is Klarity Cassette's hallmark with continuous testing on a daily basis.

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Warren, PA

LORAN CASSETTES AND AUDIO PRODUCTS; TD: 10-48 Clark St., Warren, PA 16365; (800) 633-0455; FAX: (814) 723-9490. Contact: Earl J. Keeney Jr., Randy Britton. MASTERING. Noise Reduction: Dolby HxPro. **Monitor Speakers:** JBL. **Engineers:** Darny Imel, Brian Karda, Darryl Bergstrom. Rates: Call for free quote. **TAPE DUPLICATION. Method of Duplication:** In-cassette, Bin-loop, and DAT. **Duplicator:** Electro Souno high speed and real time, Harman Kardon. **Duplicating Speed:** 64:1 and real time. **Capacity:** 7 million per year. **Tape Used:** Agfa, BASF, Loran or equivalent. **Shell Used:** Loran and other azimuth-correct shells. **Loading Equipment:** King, Otari. **Packaging Equipment/Fulfillment Services:** Insert cards, direct print on shell, labeling, shrink-wrap, assembly, packaging and fulfillment. Rates: Call for free quotes. **COMPACT DISC. Services, prices:** Professional DAT

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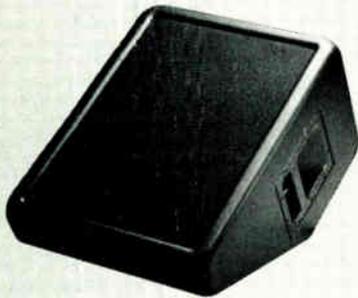
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duplication using Sony DRD-100 units with complete table of contents encoding, custom loading and on-cassette multicolor printing. OTHER, Full-service analog and digital duplicator including licensing services to handle concept through fulfillment. Credits: Ford Motor Co., Sisapa Records, Narada, GRP, Sheffield Lab, JCI, Earwig, Sampler Records, Scarlet Records, Mobile Record Service, Alpine, Rykodisc.



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LRP CASSETTE PRODUCTION; 32 W. 22 St., 2nd floor; New York, NY 10010; (212) 477-3785; (212) 807-9363. Contact: Mikhail Liberman. **MASTERING.** Mastering Console: Allen & Heath. Tape Machines: Any digital formats, Sony R-DAT 2500, 2000, DASH-3402. **Noise Reduction:** Dolby A, Dolby B330 with cat 66 card. **Monitor Speakers:** JBL. **Digital Editing Systems:** Sony 3402, 1630. **Engineers:** Mikhail Liberman, Tatyana Liberman. **Rates:** \$85/hour editing, \$250 mastering. **TAPE DUPLICATION.** Method of Duplication: In-cassette, and direct digital. **Duplicator:** KABA 25 slaves, Telex 6120 XLP. **Duplicating Speed:** 1:1, 8:1, 2:1. **Capacity:** 7000/day. **Tape Used:** BASF chrome. **Shell Used:** Shape. **Loading Equipment:** Tapemate 2002. **Packaging Equipment/Fulfillment Services:** Shrinkwrap. **OTHER.** In-house J-card printing, plating, packaging, print on-shell. Full-service, all digital recording studio, digital editing, live digital recording and CD pressing.

MARK CUSTOM RECORDING SERVICE; CDM, CDR, TM, TD, DM, RM; 10815 Bodine Rd.; Clarence, NY 14031-0406; (716) 759-2600. Contact: Mark J. Morette. **MASTERING.** Mastering Console: Neumann SP-272 or Artek M3000. **Tape Machines:** Studer A80-V0II analog, DCM-1630, DCM-2500, (3) Panasonic SV-3500, (5) Panasonic SV-255. **Noise Reduction:** dbx, Dolby A. **Monitor Speakers:** UREI 813A. **Digital Editing Systems:** Studer Dyaxis with digital EQ and DD1200. **Cutting Lathes:** Neumann VMS-70. **Signal Processing:** Lexicon 224X w/LARC, DCM-42, 60, 70. **Engineers:** Mark J. Morette, Fredrick A. Betschen, Bruce Leek, Glenn Bernardis, George Gravus. **Rates:** \$125.00 per hour. **TAPE DUPLICATION.** Method of Duplication: In-cassette. **Duplicator:** 50-Nakamichi LX-5, 52-Nakamichi MR-1 (Modified). **Duplicating Speed:** 1:1. **Capacity:** 100 C-60s per hour. **Tape Used:** TDK-SA or SAX or MA or MAX, BASF CrO2 or normal. **Shell Used:** Shape Mark X Generation II, IPS-colored shells. **Loading Equipment:** (2) King 770. **Packaging Equipment/Fulfillment Services:** X-rite shrinkwrap machine. **Rates:** Quantity, length and quality dependant. **COMPACT DISC.** Services, prices: CD—premastering—DCM-1630—DMR-2000 Studer-Dyaxis digital editing available—manufacturers representative. **RECORD MANUFACTURING.** **Presses:** Manufacturers representative. **Vinyl Used:** Teldec, Kaiser. **Rates:** Quantity and quality dependent. **OTHER.** Full art department, 4-color printing and negative services. Bulk-mailing facilities, 24-track recording studio. Past clients: Columbia Pictures Publication, Houghton Mifflin Publishing, Jeff Tyzik, Spyro Gyra, New York Voices, Kryst the Conqueror, Air Force, Army and Marine Bands.

MASTER CUTTING ROOM INC.; CDM, DM; 321 W. 44th St.; New York, NY 10036; (212) 765-8496. Contact: Joseph Brescio.

MASTER RECORDS INC.; TM, DM; 3000 Biscayne Blvd., Ste. 105; Miami, FL 33137; (305) 573-8587. Contact: Aldo Vazquez, Aldo Vazquez Jr. **MASTERING.** Mastering Console: Made in house. **Tape Machines:** MCI, (2) Otari, (2) Scully, (2) Studer. **Noise Reduction:** Dolby A, dbx. **Monitor Speakers:** (2) JBL 4411, (4) UREI 809, (2) JBL 4312. **Cutting Lathes:** (2) Scully auto., Westrex cutting head and driving. **Engineers:** Aldo Vazquez Jr., Juan G. Bustamente, Aldo Vazquez Sr. **Rates:** LP \$100 sides 12" \$90 per sides 7" \$55 per sides. **OTHER.** Cutting Lacquer Master—Julio Iglesias, Miami Sound Machine, Roberto Carlos, Wilfredo Vargas, Mike Sterling and others, K.C. and the Sunshine Band, Gladys Night and The Pips.

MASTERSDISK CORP.; CDM, TM, DM; 545 W. 45th St.; New York, NY 10036; (212) 541-5022. Contact: Doug Levine. **MASTERING.** Mastering Console: Neumann. Neve DTC. **Tape Machines:** Sony DMR-4000, Studer A80, Mitsubishi X86/X80, Sony 2500 DAT, Panasonic SV-3500 DAT. **Noise Reduction:** Dolby, Sonic System. **Monitor Speakers:** Duntec Sovereign, Altec, UREI, Hartley, Fourier. **Digital Editing Systems:** Sony DAE-3000, Sonic System. **Cutting Lathes:** Neumann VMS 70, Neumann DMM. **Signal Processing:** Harmonia Mundi (all modules), Sonic System. **Engineers:** Bob Ludwig—chief engineer, Howie Weinberg, Tony Dawsey, Scott Hull, Andrew Van Dette, Don Grossinger. **Rates:** Rate card available.



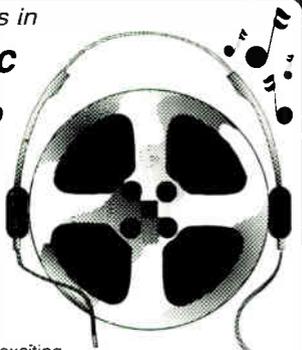
MASTERFONICS INC.
Nashville, TN

MASTERFONICS INC.; CDM, TD; 28 Music Square E.; Nashville, TN 37203; (615) 327-4533; FAX: (615) 242-0101. Contact: Frank L. Wells. **MASTERING.** Mastering Console: Neumann SP75 Custom, JVC DS-DM900 automated digital. **Tape Machines:** JVC VP-900, Sony 3402, Mitsubishi X-86C, Sony 1630, Sony 2500 DAT, Panasonic SV-3500 DAT, Fostex D-20 with Time Code, Otari MX-55MN with center-track time code, Studer A80 & B67, Sony F1, JVC FC901, Sony PCM-601, **Monitor Speakers:** Kinoshita/Hidley, Yamaha NS-10M, Genelec Tri-amp S30, Fostex RM780, Auratone 5C, B&W. All power amps by FM Acoustics. **Digital Editing Systems:** JVC AE-90 and AE-900 digital editors. **Cutting Lathes:** Neumann VMS70, SAL 74B, Zumaudio, JVC CD-90, Ampex ADD-1. **Signal Processing:** JVC DS-DM900 digital mixing/EQ, JVC DS-LC900 automated parametric EQ and dynamics controller, Sony DFX-2400 sample frequency/format converter, Wadia Digital 2000 digital decoding computer, Sony DAL-1000 digital limiter, Sontec EQ and DRC, Quantec QR, Barth Dynaset, Outer Ear image recovery, Dolby A and SR, BASE and custom spatial enhancement, Yamaha reference CD system. **Engineers:** Glenn Meadows, Benny Quinn, Jim Loyd, Milan Bogdan. **Rates:** On request. **TAPE DUPLICATION.** Method of Duplication: In-cassette. **Duplicator:** Tascam 122 MkII cassette deck. **Duplicating Speed:** 1:1. **Capacity:** 15. **Tape Used:** Ampex 472. **Shell Used:** Ampex. **Rates:** On request, per size of run. **COMPACT DISC.** Services, prices: Preparation/Manufacturing: Complete CD master tape preparation from any 2-track source. Eight years experience with product from all major labels. Fully digital processing including compression, EQ, sample frequency conversion, format conversion, pre-emphasis removal, crossfades. JVC AE-90 digital editor. Sample accurate in-song editing. Custom CD duplication available, small or large quantity, any or all duplication services from mastering and artwork to packaging. Reference CDs available with Yamaha optical CD recorder. **OTHER.** Tom Hidley-designed, 20Hz monitoring environment mix room that must be experienced to be fully appreciated. Includes SSL 4000E (G computer, TR) 56x32 console, Otari DTR-900 digital 32-track, JVC VP-900 digital 2-track, and a generous complement of outboard equipment. Hidley-designed tracking and overdub studio with SSL 4000E (G computer, TR) 48x32 console, Otari DTR-900B digital 32-track, more. Also: Full coordination of custom cassette production from mastering to artwork and display packaging. Submaster preparation for high-speed duplication. Editing compilation services for sampler cassettes.

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MASTERMIX
Nashville, TN

MASTERMIX; CDM, TM, DM: 1808 Division St.; Nashville, TN 37203; (615) 321-5970. Contact: Chris Sullivant. **MASTERING.** Mastering Console: Neumann SP77, Harmonia Mundi. Tape Machines: Digital machines are: 3402 or 3/4" based 1630 system/analog; Otari or Studer. **Noise Reduction:** Dolby A and SR, dbx. **Monitor Speakers:** Meyer 833, Meyer HD-1, and Rogers 3/5A. **Digital Editing Systems:** The Sonic System, AMS AudioFile and Sony DEA-1100. **Cutting Lathes:** Neumann VMS70 with Technics quartz direct-drive and Zuma Audio Preview computer, Neumann SAL-74B cutter rack, Neumann SX74 cutter head. **Signal Processing:** Digital signal processing, including level adjustment, compression, limiting, equalization and de-essing, is done with Harmonia Mundi System. Analog processing is done using a Neumann SP77 with EQ by Sontec, API, Summit and Neumann. Analog compressor available are by Sontec and NTP. **Engineers:** Hank Williams and Ken Love. **Rates:** Available upon request.



MASTERWORK RECORDING INC.
Philadelphia, PA

MASTERWORK RECORDING INC.; CDM, CDR, TM, TD, DM, RM; 1020 N. Delaware Ave.; Philadelphia, PA 19125; (215) 423-1022; FAX: (215) 423-6020. Contact: Albert Oon, Peter Humphreys. **MASTERING.** Mastering Console: Custom/Proprietary by Masterwork. Tape Machines: MCI/Sony digital (PCM-1630 and PCM-2500 R-DAT). **Noise Reduction:** dbx, Dolby A, Dolby SR. **Monitor Speakers:** JBL, Tannoy, Yamaha, JVC, Sony. **Cutting Lathes:** Scully with Sontec "CompuDisk" system, Westrex-Ranstele Driver Systems. **Signal Processing:** Sontec, UREI, Soundcraft, Ampex digital delay, Orban, Sontec/Valley People limiters/compressors. **Engineers:** Nimitr 'Nim' Sankananda, Peter Humphreys, David Humphreys. **Rates:** Available upon request. **OTHER.** Credits: Grover Washington Jr., Chuck Mangione, LeVert, The O'Jays, E.U., Lou Rawls, Phyllis Hyman, Miles Jaye, Third World, Wolvz, Michael Faith, Robbie Mychals, Exotic Birds, Sunni, Ferenzik and many others. Other Services: Compact disc premastering and preparation, submastering for cassette duplication, custom CD and record pressing, real-time and high-speed cassette duplication.

MIAMI TAPE INC.; CDM, CDR, TM, TD, DM, RM; 8180 NW 103 St.; Hialeah Gardens, FL 33016; (305) 558-9211; FAX: (305) 825-9873. Contact: Carlos Garcia.

MIRROR IMAGE SOUND & RECORDING INC.; CDM, TM, TD; 619 S. Main St.; Gainesville, FL 32601; (904) 376-8742. Contact: Ray Valla.

MULTITAPE; TM, TD; 1630 Euclid St. NW, Ste. 131; Washington, DC 20009; (202) 332-1522. Contact: Bruce Moyer.

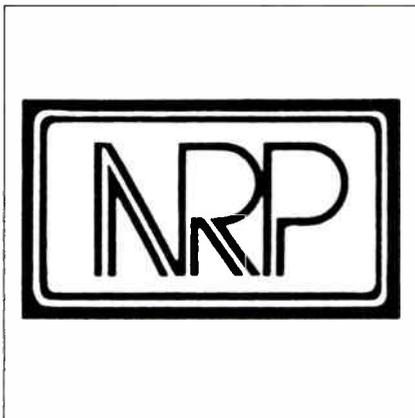
THE MUSIC CONNECTION INC.; CDM, CDR, TD, RM; 175 Fifth Ave.; New York, NY 10010; (212) 529-0557, Fax: (212) 529-1281. Contact: Ira Cohen. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. **COMPACT DISC.** Services, prices: CD preparation/manufacturing, replication, fulfillment, packaging. **RECORD MANUFACTURING.** Presses: 12", 7". **OTHER.** Graphic design, printing/packaging all recorded configurations, CDs, vinyl, cassette, UHS slipcases. Complete analog and digital mastering services. Film separations and board jacket printing.

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Englewood Cliffs, NJ

MUSIKA RECORDS INC.; TM, TD; 35 W. Bayview Ave.; Englewood Cliffs, NJ 07632; (201) 944-5628. Contact: Alexander (C) Lim. **MASTERING.** Tape Machines: Sony ProDAT PCM-2500, Otari MX-55, 56K. **Noise Reduction:** Dolby SR/A and B. **Digital Editing Systems:** Turtle Beach 56K digital editing system. **Signal Processing:** Lexicon, dbx, Eventide, Aphex, UREI, etc. **Engineers:** Edmund B. Lee. **Rates:** Call for rates. **TAPE DUPLICATION.** Method of Duplication: In-cassette. Duplicator: KABA real-time system. **Duplicating Speed:** Real time. **Tape Used:** BASF, Agfa and Maxell (chrome). **Shell Used:** All types. **OTHER.** For all our professional music needs, multitrack recording, digital recording and editing, music laser typography, complete cassettes and CD manufacturing services.



NASHVILLE RECORD PRODUCTIONS INC.
Nashville, TN

NASHVILLE RECORD PRODUCTIONS INC.; CDM, TM; 469 Chestnut St.; Nashville, TN 37203; (615) 259-4200. Contact: George Ingram, president, or John Eberle, studio manager. **OTHER.** Three mastering suites, MCI and Studer 1/4" and 1/2" analog tape machines, Sphere and Neve consoles. Neumann and Westrex cutting systems. Sony 1610, F-1 and R-DAT digital systems. Neve, Sphere and Sontec EQ, Aphex Aural Exciter, Yamaha NS-10 and E-V monitors. Special services: CD prep, digital editing and premium real-time cassette duplication. Also custom productions for CDs, cassettes, LPs and 45s in large or small quantity. Credits: Recent projects include artists Charlie McCoy, Zachary Richard, The O'Jays, Curtis Mayfield, Clarence Carter, The Hee-Haw Gospel Quartet, Jerry Landsdowne, Ray Price, Buddy Emmons, Rev. Thomas Whitfield and Choir, Rev. Al Green. Labels: A & M, Step One, Link Records, Playback, Ichiban, Waylo, Sound of Gospel, Sonlite and Morningstar/Harvest.

NEW YORK AUDIO PRODUCTIONS; TM, TD; 140 West 22nd Street; New York, NY 10011; (212) 243-6826. Contact: Marianne Goldberg.

L. NIX & CO. INC.; TM, TD, DM; 2000 Madison Ave.; Memphis, TN 38104; (901) 725-0855. Contact: Larry Nix.

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NORTHEASTERN DIGITAL RECORDING INC.; CDM, CDR; 2 Hidden Meadow Ln.; Southborough, MA 01772; (508) 481-9322. Contact: Anne Shepard. **MASTERING.** Mastering Console: Troisi 20 series (analog), Sonic System (digital). **Tape Machines:** Sony PCM-1630/DMR 4000, Sony APR-5003 (analog 1/2" or 1/4"), numerous DAT. **Noise Reduction:** Dolby SR, Dolby A, dbx I, dbx II. **Monitor Speakers:** Studio A; Snell type C, Studio B; Tannoy. **Digital Editing Systems:** Sonic System, Mac IIx, 2.4 Gbyte, (2) Sony DAE-1100. **Engineers:** Dr. Toby Mountian, Jonathan Wyner. **COMPACT DISC.** Services, prices: Compact disc replication, production assistance. **OTHER.** David Bowie, Frank Zappa, Arlo Guthrie, Ritchie Havens, Paul Winters, NRBQ, Rounder, Rykodisc, Northeastern, Titanic, Biograph, Omega, Newport Classic.

PHILIPS AND DU PONT OPTICAL COMPANY; CDM, CDR; 1251 Avenue of the Americas, 22nd floor; New York, NY 10020; (212) 512-9350; FAX: (212) 512-9358. Contact: Bob Wray, senior VP marketing.

PORTER MUSIC BOX CO. INC.; TD; RR2 Box 27A; Randolph, VT 05060; (802) 728-9694. Contact: Ben Sault.

PRODIGITAL INC.; CDM, CDR, TM, TD; 3400 Pendleton Dr.; Wheaton, MD 20902-2446; (202) 319-5588; FAX: (202) 319-4490. Contact: Bill Burns, Alan Wonneberger.

PROJECT 70 AUDIO SERVICES INC.; TD; 777 Lambert Dr. NE; Atlanta, GA 30324; (404) 875-7000. Contact: Jerry L. Connell. **MASTERING.** Mastering Console: Hill Audio. **Tape Machines:** Otari MTR-10 1/4" and 1/2", Ampex 440B 1", R-DAT. **Noise Reduction:** dbx, Dolby A, Dolby B. **TAPE DU-**



PROJECT 70 AUDIO SERVICES INC.
 Atlanta, GA

PLICATION. Method of Duplication: Bin-loop. **Duplicator:** Ampex BLM 200 (new electronics 1987), Electro Sound 6000. **Duplicating Speed:** :32:1. **Capacity:** Ampex 10 slaves, Electro Sound 6 slaves. **Tape Used:** Sunkyong, Agfa, BASF. **Shell Used:** Mag Media. **Loading Equipment:** King 790s with Concept Design modifications. **Packaging Equipment/Fulfillment Services:** Slape labeler, Roldex imprinting, Scandia wrapper. **OTHER.** Complete fulfillment services from script recording to mailing of finished product.

RANDOM ACCESS (DIGITAL AUDIO RECORDERS); CDM, TM; 169 Massachusetts Ave., Ste. 23; Boston, MA 02215; (617) 547-7973; (617) 524-2061. Contact: Jonathan A. Wyner, Robin Coxo-Yeldham.

RPL INC.; CDM, TM, TD; 1100 State St.; Camden, NJ 08105; (800) 966-3001. Contact: Lisa Oliano. **MASTERING.** Mastering Console: Custom Electrodyne, Ampex, Altec. **Tape Machines:** Otari MTR 12LX, Sony PCM-2500, Panasonic SV-255, Ampex. **Noise Reduction:** Dolby SR, A, B, dbx. **Monitor Speakers:** JBL, Altec. **Cutting Lathes:** Digidesign Sound Tools, DAT I/O. **Signal Processing:** Sonic Maximizer, Pultec, UREI, EMT, Alesis. **Engineers:** John L. Miller, Mike Daily. **Rates:**

Quotes upon request. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. **Duplicator:** (2) Electro Sound Bin 24-slave, Liberty custom (3) Ampex slaves. **Duplicating Speed:** 8:1, 16:1, 32:1, 64:1. **Capacity:** 25,000/shift. **Tape Used:** Agfa, CBS, Shell Used: Shape, Lenco, Beres. **Loading Equipment:** King/Concept Design. **Packaging Equipment/Fulfillment Services:** Apex, Scandia, ITI. **Rates:** Quotes upon request. **OTHER.** On-location recording, packaging, fulfillment, collation, full printing services in-house, direct imprinting, custom binders, drop shipment.

SOUND-ARTS CO. INC.; TD; 5 Cindy Lane; Oakhurst (Ocean), NJ 07712; (201) 493-8666. Contact: Ethel Davidson.

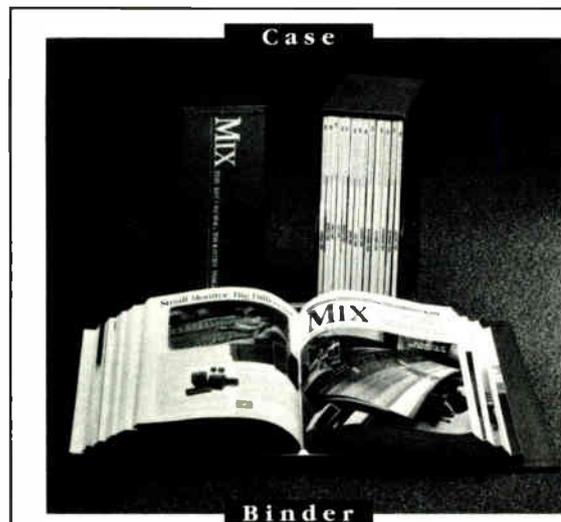
STERLING SOUND INC.; CDM, TM, DM; 1790 Broadway; New York, NY 10019; (212) 757-8519.

STUDIO MAGNETICS CO. INC.; TD; 12 Long Island Ave.; Holtsville, NY 11742; (516) 289-3400; (800) 874-2202; FAX: (516) 289-9150. Contact: Craig M. Balaban.



TAPE COMPLEX
 Boston, MA

TAPE COMPLEX; TD; 4 Haviland St.; Boston, MA 02115; (617) 437-9449; (800) 447-0322. Contact: Greg Greenway



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(Sales Manager). **MASTERING. Tape Machines:** PCM-2500 DAT with digital capacity, Otari 5050B 1/4" mastering analog deck. **Digital Editing Systems:** Sony PCM-553 assembly edit system 1/2" or 3/4" with electric valve crossfading. **Signal Processing:** Full complement of studio outboard gear. **Engineers:** James Grant (chief), Marisa Dery, Steve LeValley. **TAPE DUPLICATION. Method of Duplication:** In-cassette. **Duplicator:** 250 customized Aiwa decks controlled by "Tape Duplicating Operating System" TDOS™. **Duplicating Speed:** Real time. **Capacity:** 5000 album-length cassettes per day. **Tape Used:** Ampex, Agfa. **Shell Used:** Michelex (German)/Lenco. **Loading Equipment:** King & TTL loaders. **Rates:** Call or write for retail/wholesale catalogs. **OTHER.** All real-time duplication is done using the TDOS™ computerized quality control system, which enables us to ensure that each deck is running at maximum efficiency. On-cassette or label printing, B&W or full-color inserts. Shrinkwrap.

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TAPESOUTH INC.; TD, 1801 1st Ave. S., Ste. 333; Birmingham, AL 35233; (800) 248-2730. **Contact:** Jeino or Kerri or Steve. **TAPE DUPLICATION. Method of Duplication:** In-cassette. **Duplicator:** KABA 10 slaves, Telex stereo 7 slaves. **Duplicating Speed:** Real time and 16x. **Capacity:** As many as you need. **Tape Used:** Agfa and BASF. **Shell Used:** Shape Mark 10 and Mark 1. **Loading Equipment:** King 790. **Packaging Equipment/Fulfillment Services:** Apex imprinter, Clamco shrinkwrapper. **Rates:** Better than you'd think. Call us! **OTHER.** Direct-from-DAT duplication, remote recording packages, full packaging available. Recording studio supplies and accessories. Authorized Agfa dealer.

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Hackensack, NJ

TRUTONE RECORDS; CDM, TM, TD, DM; 310 Hudson St.; Hackensack, NJ 07601; (201) 489-9180; FAX: (201) 489-1771. **MASTERING.** Mastering Console: Neumann, Studer, custom. **Tape Machines:** Studer A80 MkII, Studer A810, Studer B67, Ampex ATR-102, MCI JH-110B, Sony PCM-1630, PCM-2500, PCM-701. **Monitor Speakers:** UREI 813, B&W 801, B&W DM-220, JBL, Yamaha, Auratone. **Digital Editing Systems:** DAE 1100, DAE 3000, 1630 and 1610 PCM processors. **Cutting Lathes:** Neumann VMS70 with Zuma computer, Scully lathe with Capps Varipitch II computer. **Signal Processing:** Neumann, Pultec UREI, Sontec, Harmonia Mundi. **Engineers:** Carl Rowatti, Phil Austin, Ray Janos, Steve Robb. **Rates:** Upon Request. **TAPE DUPLICATION. Method of Duplication:** In-cassette and bin-loop. **Duplicator:** KABA real and double time LYREC with HxPro high speed. **Duplicating Speed:** Real time and double time, high speed, 80:1 or 64:1. **Tape Used:** Agfa 649, 949, 647, 947. **Shell Used:** Michelex, Swire, Shape, KHL. **Loading Equipment:** Tapematic 2002. **Packaging Equipment/Fulfillment Services:** Scandia and Weldotron shrinkwrapping. **Rates:** Upon request. **COMPACT**

DISC. Services, prices: Preparation/assembly of Sony PCM-1630 masters for compact disc. Complete package from mastering to finished product available. Prices upon request. **RECORD MANUFACTURING. Presses:** Mastering and cutting of reference acetates and master lacquers. Complete package from mastering to finished product available (7" and 12"). **Rates:** Upon request. **OTHER.** Sony digital editing, digital EQ, R-DAT and F1 masters. High-quality, short-run cassette duplication. Cassette duplication available directly from digital or analog source without running master (real and double time). Custom-loaded blank cassettes.

U.S. OPTICAL DISC INC.; CDM, CDR; Rte. 109 and Eagle Dr.; Sanford, ME 04073; (207) 324-1124. **Contact:** Debra J. L'Heureux (customer service mgr) or Robert Pelitt (marketing sales dir.). **COMPACT DISC. Services, prices:** U.S. Optical Disc Inc. is a complete compact disc manufacturer committed to delivering quality on time. We pride ourselves in our product as well as being known for providing top-quality customer service in all areas of CD replication from the major label to the independent producer.

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WAREHOUSE RECORDING STUDIO; TM, TD; 2071-20 Emerson St.; Jacksonville, FL 32207; (904) 346-0373; FAX: (904) 398-9683. **Contact:** Bart Stone. **MASTERING.** Mastering Console: 32-input Audioarts. **Tape Machines:** 24-track MCI, Ampex. **Noise Reduction:** dbx. **Monitor Speakers:** Yamaha NS-10M. **Signal Processing:** Noise gates, Barometric EQ, UREI and dbx limiters. **Engineers:** Tom Markham, Skip Osmundson, Rick Painter. **Rates:** \$60/hour. **TAPE DUPLICATION. Method of Duplication:** In-cassette. **Duplicator:** KABA. **Duplicating Speed:** Real time through 8x. **Capacity:** 1000 per day. **Tape Used:** BASF. **Shell Used:** Magnetic Media and Lenco. **Loading Equipment:** King/Concept Design 775. **Packaging Equipment/Fulfillment Services:** Sargent Shrinkwrap. **OTHER.** In-house art department, printing, cassette inserts black/white to four color, printed labels, direct printed cassettes, shrinkwrapping, complete fulfillment, custom-length blank cassettes C-10 to C-90s, 48-hour 4-color inserts.

WHITE CROW AUDIO; TM, TD; 19 Marble Ave.; Burlington, VT 05401; (802) 658-6475. **Contact:** Douglas Jaffe. **MASTERING.** Mastering Console: Neve 8068 MkII/GML Automation. **Tape Machines:** Studer A820, Studer A80, Studer A810, Sony PCM-2500. **Noise Reduction:** Dolby SR, Dolby A. **TAPE DUPLICATION. Method of Duplication:** In-cassette. **Duplicator:** (50) Nakamichi CR-1A. **Duplicating Speed:** Real time 1:1. **Capacity:** 500 C-60/Day. **Tape Used:** BASF Pro II Chrome, TDK SA Chrome, TDK AD Normal. **Shell Used:** Shape MkII, Michelex, Magnetic Media, TDK (standard preloaded). **OTHER.** On-shell printing, cassette inserts and labels, shrinkwrap.

WINTHROP PRODUCTIONS; TD; 156 W. 94th St.; New York, NY 10025; (212) 662-8685; FAX: (212) 749-8387. **Contact:** Susan Winthrop.

WK STUDIO; TM, TD; 611 Broadway, Ste. 721; New York, NY 10012; (212) 473-1203. **Contact:** Konstantine Sareyani.

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A & R RECORD & TAPE MFG. CO.; CDM, CDR, TM, TD, DM, RM; 920 N. Industrial Blvd.; Dallas, TX 75207; (214) 741-2027; (800) 527-3472 (outside TX). Contact: Richard Sobel, Stanley Getz II.

A TO Z AUDIO SERVICES INC.; TD; PO Box 26087, 21929 Lorain Rd.; Fairview Park, OH 44126; (216) 333-0040. Contact: Jean Rust, sales manager.

ACME RECORDING; CDM, CDR, TM, TD, RM; 1708 W. Belmont; Chicago, IL 60657; (312) 477-7333. Contact: Jim, Mike or Sharon.

ANVID RECORDING CO.; CDR, TM, TD; PO Box 8130; Bartlett, IL 60103; (708) 837-9840. Contact: David Schuler.

AUDIO DUPLICATION & SERVICES INC.; CDM, CDR, TM, TD, DM, RM; PO Box 31546; St. Louis, MO 63131; (314) 965-8895. Contact: Rick Schaumberger.

AUDIOPHILE REAL TIME CASSETTE DUPLICATORS; TM, TD; 13801 E. 35th St.; Independence, MO 64055; (816) 245-2582; (800) 322-2832. Contact: Jeff Propst.

BROOKWOOD STUDIO INC.; CDM, TM, TD; 1155 Rosewood, Ste. A; Ann Arbor, MI 48104; (313) 994-4992. Contact: David Lau. **MASTERING. Mastering Console: Seck 1882. Tape Machines: Otari, Fostex, Crown, Sony. **Noise Reduction:** dbx I, dbx II, Dolby B, Dolby C. **Monitor Speakers:** CSI MDM-TA3, Yamaha NS-10M, Auratone 5C, Rodgers LS-35A. **Digital Editing Systems:** Studer/Editech Dyaxis. **Signal Processing:** Aphex, Valley People, Rane, Yamaha, Tapco, dbx, Roland. **Engineers:** David Lau, Matt Hanson. **Rates:** Digital editing/premastering \$100/hour, analog production \$80/hour. **TAPE DUPLICATION.** Method of Duplication: In-cassette. Duplicator: KABA 2 masters, 20 slave positions. **Duplicating Speed:** Real-time and double speed. **Capacity:** C-45 at 2x: 90/hour. **Tape Used:** BASF CrO₂ and Sunkyoung CrO₂. **Shell Used:** Michelex, Lenco. **Rates:** Real-time C-45 CrO₂ at 100: \$1.88, 2x C-45 type-1 at 100: \$1.32. **OTHER.** Brookwood studio can duplicate directly to cassette from DAT or EIAJ (F1) digital masters, making each cassette an actual first-generation analog recording.**

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CENTURY 21 PROGRAMMING
Dallas, TX

CENTURY 21 PROGRAMMING; CDM; 14444 Beltwood Pkwy.; Dallas, TX 75244; (800) 937-2100; (214) 934-2121. Contact: Gary Hollis, digital studios mgr. **MASTERING. Mastering Console: Sony MXP-200, Yamaha DMP7D. **Tape Machines:** Sony PCM-3203 DASH, (2) 1630 DMR 4000, (3) Sony 2500 Pro DAT, Sony 501, MCI 2-track analog. **Noise Reduction:** Dolby A, Dolby SR, dbx. **Digital Editing Systems:** (3) Sonic Solutions with "No Noise". **Cutting Lathes:** CDI-off (WORM) system, Sony, Sonic Solutions. **Signal Processing:** Yamaha DMP7D. **Engineers:** Gary Hollis, Chris Green, Ed Johnson, John Parthun, Del Anderson, Bob Stevens, Chris Friedley. **Rates:** \$150 per hour, No CD processing \$100 per finished minute. **OTHER.** Complete CD packages available, also CD I-off service, digital sound effects library, in-house MIDI, production studio.**

LEGEND

- CDM: CD Mastering/Premastering
- CDR: CD Replication
- TM: Tape Mastering
- TD: Tape Duplication
- DM: Disc Mastering
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KABA REALTIME **AUDIOPHILE QUALITY CASSETTES DUPLICATED ON THE KABA SYSTEM**

AUDIO-VIDEOGRAPHICS
Independence, MO

AUDIO-VIDEOGRAPHICS; TM, TD; 13801 E. 35th St.; Independence, MO 64055; (816) 254-0400; (800) 322-2832. Contact: Jerry Riegle. **MASTERING. Mastering Console: TAC Scorpion 16 x 8. **Tape Machines:** (3) Sony APR-5000 2-track mastering, Sony 2500A DAT, Sony PCM-F1 and PCM-501 with JVC 1/2" and 3/4" videocassette recorders. **Noise Reduction:** Dolby A, Dolby SR, Dolby B, dbx. **Monitor Speakers:** Norberg BCS-16 2-way near-field, Auratone, Andante 3A. **Signal Processing:** Barcus-Berry model 802, Dorrough loudness meters, Aphex Compellor, UREI 546 parametric EQ, UREI 1176LN, UREI 1178. **Engineers:** Eric Etwell, Tom Stack, Vaughn Weddle. **TAPE DUPLICATION.** **Method of Duplication:** In-cassette and bin-loop. **Duplicator:** KABA real-time, (3) bin-loop system (modified Libertys), Magnefax 24x-speed bin-loop system (model 1990), (3) Sony APR-5000 2-track, Technics 1506 1/4-track, Sony 2500A R-DAT. **Duplicating Speed:** Real-time, 2x, 16x, 24x and 32x. **Tape Used:** BASF chrome, Agfa 649/949, BASF LHD, ferric cassette tapes, Agfa 526, Ampex 456, 1/4" mastering tape. **Shell Used:** Shape Mark 10, Lenco, Michelex. **Loading Equipment:** King 790 loader. **Packaging Equipment/Fulfillment Services:** In-house typesetting/layout, in-house on-cassette printing, shrinkwrapping. **Rates:** Quote per job. **OTHER.** Video duplication and packaging. 1", 3/4", 1/2", stereo, stereo hi-fi duplication.**



**CREATIVE SOUND
PRODUCTIONS INC.**
Houston, TX

CREATIVE SOUND PRODUCTIONS INC.; CDM, TM, TD; 8383 Commerce Park Dr. #604; Houston, TX 77036; (713) 777-9975; (800) 451-7034; FAX: (713) 774-3419. Contact: Edward B. Smith, president; Michele Crosby, dir. of duplication. **MASTERING.** Tape Machines: Otari MTR-10-4 with HX Pro, Otari ES50 Mark III-4, MCI JH-110, Ampex ATR 700, Panasonic SV-350C R-DAT, Sony PCM-501, Tascam M32, M34, M38. **Noise Reduction:** dbx, Dolby A. **Monitor Speakers:** . BL. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. Duplicator: Otari DP-80 with HX Pro 64:1, bin-loop master, 5 slaves. Otari DP-1010 master/bin-loop, 5 slaves. Infonics open-reel master, 8 slaves. Duplicating Speed: 64:1 and 16:1. Capacity: 10,000 per 8-hour shift. Tape Used: Agfa 647 chrome, Agfa 649 and 619, Ampex 615. Shell Used: Swire Premium, ICM Pro II, Shape Mk10, Lenco. **Loading Equipment:** Tapematic 2000, Tapematic 900HS, King automatics. **Packaging Equipment/Fulfillment Services:** Label printing, Apex imprint, Macintosh II GTP graphic design system, shrinkwrap, custom vinyl albums. **Rates:** Quotes and catalog upon request. **COMPACT DISC.** Services, prices: CD services include CD replication, graphic design and printing of tray cards/booklets, complete packaging shrink, blister, long box. **OTHER.** In-house graphic design, label printing via Sohn FlexoPress, 1-4 color caseliner printing, Apex direct imprint on shell, video duplication and packaging, custom-loaded blank cassettes.



**CRYSTAL
CLEAR SOUND**
Dallas, TX

CRYSTAL CLEAR SOUND; TD; 4902 Don Dr.; Dallas, TX 75247; (214) 630-2957. Contact: Keith Rust. **MASTERING.** **Mastering Console:** MCI JH-636. **Tape Machines:** Sony 5002, Panasonic SV-3500 R-DAT. **Noise Reduction:** Dolby A, dbx. **Monitor Speakers:** UREI, Yamaha, JBL. **Engineers:** Keith Rust. **TAPE DUPLICATION.** Method of Duplication: In-cassette. Duplicator: KABA, 40 position. **Duplicating Speed:** Real-time and double speed. Tape Used: BASF CrO₂. Shell Used: Shape Mark 10. **Rates:** Very competitive, please call! **OTHER.** We duplicate using the KABA system on BASF chrome tape housed in a clear shell made by the Shape company. This combination of a superior tape and the best duplicator... available insures you the highest quality cassette copy you can get. ANYWHERE!

DIGITAL AUDIO DISC CORPORATION; CDM, CDR; PO Box 3710; Terre Haute, IN 47803; (812) 462-8100. Contact: Scott Barlett.

EMC PRODUCTIONS; TM, TD; 300 York Ave.; Saint Paul, MN 55101; (612) 771-1555; (800) 328-1452. Contact: Dick Stevens, Pamela Schreier, Paula Jeske.

INTERNATIONAL AUDIO INC.; TD; 2934 Malmo Rd.; Arlington Heights, IL 60005; (708) 956-6030. Contact: Paul Mally.

JEWEL RECORDS; CDM, CDR, TM, TD, DM, RM; 1594 Kinney Ave.; Cincinnati, OH 45231; (513) 522-9336. Contact: Rusty York.

THE LITTLE WAREHOUSE INC.; TD; 5505 Valley Belt Rd., Ste. F; Independence, OH 44131; (216) 398-0022; (800) 445-8273. Contact: Joe Kaufman. **TAPE DUPLICATION.** Method of Duplication: In-cassette and bin-loop. Duplicator: Telex 6120XLP, Telex CD series, Magnefax LBC 82-OT, Magnefax LBC-88TT, Magnefax TM 81-FT. **Duplicating Speed:** 8:1, 16:1, 24:1. **Tape Used:** Audio: Agfa 619, 649, BASF chrome, Video: Ampex, Agfa HGX, Maxell. **Shell Used:** Magnetic Media 5-screw C-O, Strand V-O. **Loading Equipment:** King 790, King 2500. **Packaging Equipment/Fulfillment Services:** Conflex sealer and Weldotron shrink-tunnel. **Rates:** Quote on request. **OTHER.** In-house typesetting and printing of labels and inserts. Custom-loaded broadcast quality VHS and a full range of AudioTrack cassettes. Video duplication of 1", 3/4" and 1/2" masters to 3/4" and 1/2" VHS. Blank audio and videocassette labels are available in standard pressure-sensitive and laser formats.

MUSICOL INC.; TM, TD, DM, RM; 780 Oakland Park Ave.; Columbus, OH 43224; (614) 267-3133. Contact: John Hull.

NATIONAL SOUND CORPORATION; DM; 17610 W. Warren; Detroit, MI 48228; (313) 336-3800. Contact: Ron Murphy. **OTHER.** **Mastering:** Cutting lathes (2) Scully lathes with Haeco & Westrex cutter heads. Master reference lacquers and dub cutting of all sizes and speeds, stereo and mono, specialists in club/rap. 12" singles rate card available on request.

PREMIERE VIDEO INC.; TD; 35687 Industrial Rd.; Livonia, MI 48150; (313) 461-4650. Contact: Michael Hartman.



QCA
Cincinnati, OH

QCA; CDM, TM, TD, DM, RM; 2832 Spring Grove Ave.; Cincinnati, OH 45225; (513) 681-8400. Contact: Amber Hines. **MASTERING.** **Mastering Console:** Neumann. **Tape Machines:** MCI, Otari, Sony 1610, Panasonic SV-3500. **Noise Reduction:** Dolby A, Dolby SR, dbx. **Monitor Speakers:** UREI 811, Eastern Acoustic Works, Yamaha NS-10M. **Digital Editing Systems:** Sony DAE 1100 A. **Cutting Lathes:** Neumann VMS66 with Zuma disc computer. **Signal Processing:** Sontec parametric EQ, Aphex Compellor, Aphex Dominator, Ortofon Limiter. **Engineers:** Donnie Kraft. **Rates:** Call sales department. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. Duplicator: Cetec Gauss 2400 with Dolby HX Pro. **Duplicating Speed:** 32:1, 64:1, 128:1. **Capacity:** 9,000 per day. **Tape Used:** Agfa chrome. **Shell Used:** ICM, Shape Mark 10. **Loading Equipment:** King 790, 770. **Packaging Equipment/Fulfillment Services:** Apex printing, 4-color insert printing, packaging and wrap. **Rates:** Call sales department. **COMPACT DISC.** Services, prices: Q.C.A. handles complete manufacturing of CD from premastering to final packaging. **RECORD MANUFACTURING.** **Presses:** (5) S.M.T. automatic 12" presses, (2) S.M.T. automatic dual 7" presses. **Capacity:** 15,000 LPs per day, 15,000 7" per day. **Vinyl Used:** Keyser E 588. **Rates:** Call sales department. **OTHER.** Plating, typesetting, color separation, jacket and sleeve printing, packaging, shrinkwrap.

RICHARDSON TAPE; TD; HC71, Box 231; Mountain View, AR 72560; (501) 269-3908. Contact: Aubrey Richardson. **MASTERING.** **Tape Machines:** Otari, Crown, Technics Digital, Panasonic R-DAT. **Noise Reduction:** dbx, Dolby. **Monitor Speakers:** E-V. **Signal Processing:** Aphex Type C, BBE, DOD Electronics EQ, UREI LA-3A. **TAPE DUPLICATION.** Method of Duplication: In-cassette. Duplicator: Nakamichi MR-2 (77 decks). **Duplicating Speed:** Real-time 1 7/8. **Capacity:** 1000 C-30's per shift. **Tape Used:** BASF, Magnetic Media. **Shell Used:** Magnetic Media, Shape. **Loading Equipment:** —LISTING CONTINUED ON NEXT PAGE

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—LISTING CONTINUED FROM PREVIOUS PAGE
ment: King, Superscope. Packaging Equipment/Fulfillment Services: Clamco, APS. Rates: On request we do small orders (under 500). OTHER: Services from Blane Audio cassettes to full-color packages—with direct-to-cassette printing, we also do small quantity demos.

RSRT REAL TIME CASSETTE DUPLICATION by Royal Scanlon



AUDIOPHILE QUALITY CASSETTES
DUPLICATED ON THE KABA SYSTEM

R.S.R.T.
(ROYAL SCANLON'S REAL TIME)
Kansas City, KS

R.S.R.T. (ROYAL SCANLON'S REAL TIME); TD: 4020 Stateline; Kansas City, KS 66103; (913) 262-5335. Contact: Royal Scanlon, Dan Shanks "production manager". MASTERING. Mastering Console: Soundcraft. Tape Machines: Otari MTR-12, Sony 2500 R-DAT, Panasonic SV-3500 R-DAT, Tascam DA-30. Noise Reduction: Dolby SR, Dolby A, dbx type I. Monitor Speakers: Yamaha NS-10M, EAW MS-50, Minimus 7. Signal Processing: All standard outboard gear. Engineers: Royal Scanlon, Larry (El Jay) Johnson. Rates: Editing, sweetening and remastering \$60 per hour + materials, straight transfer time \$45 per hour + materials. TAPE DUPLICATION. Method of Duplication: Real time. Duplicator: Modified KABA system, (54) Nakamichi MR-1. Duplicating Speed: Real time or double time. Capacity: 4800 (2x) C-40 per day, 2400 real time C-40 per day. Tape Used: BASF chrome, BASF LHD normal (other run upon request). Shell Used: Clear (other run upon request). All types available. Loading Equipment: Yes. Packaging Equipment/Fulfillment Services: Yes. Rates: Supplied upon request. OTHER: "El Jay" has been Johnny Cash's F.O.H. mix engineer for the past ten years. Royal Scanlon has worked as a recording artist and engineer for the past 25 years. RSRT's stringent quality control and attention to detail is well-known throughout the Midwest.



SONIC SCULPTURES
Cincinnati, OH

SONIC SCULPTURES; CDM, CDR, TM, TD, DM, RM; 636 Northland Blvd.; Cincinnati, OH 45240; (513) 851-0055. Contact: Lan A. Ackley.

SOUND RECORDERS INC.; CDM, TM, TD; 206 S. 44th St.; Omaha, NE 68131; (402) 553-1164. Contact: Cleto Baker.

VAUGHN DUPLICATION SERVICES (VAUGHN BROADCAST RENTALS); TD: 7951 Computer Avenue S.; Minneapolis, MN 55435; (612) 832-3150. Contact: Cindy Verant.

WMG, Inc.

WMG INC.
Indianapolis, IN

WMG INC.; CDM, CDR, TM, TD, DM, RM; 8472 Brookville Rd.; Indianapolis, IN 46239; (317) 353-1113. Contact: Andrew J. Symons. MASTERING. Tape Machines: Studer A-80 1/2" with HX Pro MCI JH-110B 1/4", Tascam 122 MkII, Nakamichi MR-1B, Panasonic SVR-3500 DAT, Sony 601 processor. Noise Reduction: Dolby A, Dolby SR, Dolby B, dbx type 1. Monitor Speakers: UREI 809 with Carver PM 175. Signal Processing: Klark Teknik DN410 parametric EQ, Drawmer M500 dynamics processor, Barcus-Berry BBE 442. Engineers: Andrew Symons. TAPE DUPLICATION. Method of Duplication: Bin-loop. Duplicator: Gauss 1200 1/2" master, (5) Gauss 1200 slaves, Studer 1/2" with HX Pro mastering machine, Gauss 1200B QC machine. Duplicating Speed: 64:1. Capacity: 250,000 per month with 2 shifts running. Tape Used: Agfa 649, 949, 647, 947, 619i, 919i, Sunkyong SKX C-60, C-90. Loading Equipment: (3) Concept Designs modified King 775. Packaging Equipment/Fulfillment Services: Scandia. COMPACT DISC. Services, prices: Complete CD packages from premastering, pressing, graphic filmwork and printing. CD Reference Discs. RECORD MANUFACTURING. Rates: Available. OTHER: Graphic creation, filmwork, printing, warehouse order fulfillment, mail fulfillment, special assemblies, posters and mailers.

WORLD CLASS TAPES; TD: 670 Airport Blvd.; PO Box 7611; Ann Arbor, MI 48107; (313) 662-0669; (800) 365-0669. Contact: Rob Martens.



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A&M RECORDING STUDIOS; CDM, TD: 1416 N. LaBrea Ave; Hollywood, CA 90028; (213) 469-5181 Contact: Gail Miller. **MASTERING.** Mastering Console: A & M discrete transformerless.



A&M MASTERING STUDIOS
Hollywood, CA

A&M MASTERING STUDIOS; CDM, TM, DM: 1416 N. LaBrea Ave; Hollywood, CA 90028; (213) 469-2411. Contact: Marv Bomstein. **MASTERING.** Mastering Console: A & M custom discrete transformerless. **Tape Machines:** Mastering deck, modified MCI deck, custom elec., ATR-102, Yamaha K2000. **Noise Reduction:** A & M custom transformerless discrete rack, Dclby A, SR, dbx. **Monitor Speakers:** Tannoy 15" drivers with A & M custom cabinets and crossovers. **Digital Editing Systems:** Sony digital editor, DMR 400C, 1630. **Cutting Lathes:** Modified Scully with custom discrete electronics, modified Westrex head. **Signal Processing:** Digital Harmonia Mundi Acustik a, analog Sontec, API, UA, Aphex dbx.

Used: BASF CRO2, Agfa 649 normal. **Shell Used:** Quality 5-screw clear black or white shell shape Mark X (upon request). **Packaging Equipment/Fulfillment Services:** X-Rite shrink-wrap machine, Auto-labe automatic labeler. **Rates:** Upon request, please call. **OTHER.** Sonic enhancement, analog-to-digital mastering, full graphic design and printing services offered. Full mixing mastering and recording at our 24-track recording studio. Banquet Sound Studio.

ABACAB AUDIO; TM, TD: PO Box 3376; Costa Mesa, CA 92628; (714) 432-1745. Contact: Marc Smaniotto.



AUDIOPHILE QUALITY CASSETTES
DUPLICATED ON THE KABA SYSTEM

ABBEY TAPE DUPLICATORS INC.
Chatsworth, CA

ABBEY TAPE DUPLICATORS INC.; TM, TD: 9525 Vassar Ave.; Chatsworth, CA 91311; (818) 882-5210. Contact: Bill Snow, Norman Cooke. **MASTERING.** Mastering Console: Tascam. **Tape Machines:** MCI, Ampex, Nakamichi F-1, Panasonic R-DAT, Technics, Sony. **Noise Reduction:** dbx, Dolby. **Monitor Speakers:** JBL. **Signal Processing:** UREI, Kepex, Aphex. **Engineers:** Rudy Menart (Chief), Boris Menart, Dave Steele. **Rates:** \$48/hour. **TAPE DUPLICATION.** **Method of Duplication:** In-cassette and bin-loop. **Duplicator:** Dabbings 24-slave (bin-loop), KABA 50 slave (real time). **Duplicating Speed:** 36 ips and real time. **Capacity:** 5000/day. **Tape Used:** BASF-LHD, BASF-chrome. **Shell Used:** 5-screw white, black or clear. **Loading Equipment:** King 790s. **Packaging Equipment/Fulfillment Services:** ITI labeling, Roll-Cax imprinting, shrinkwrapping, albums, individual mailing. **OTHER.** Complete narration studio and audio production facilities, editing, sequencing, equalizing, mixing. *NEW: Tape backing to eliminate sticky shed syndrome, and transfer to R-DAT or reel. Video duplication. Reliable personal service for over 22 years.

AMERICAN PRODUCTION SERVICES; TM, TD: 2247 15th Ave. W; Seattle, WA 98119; (206) 282-1776; FAX: (206) 282-3535. Contact: Nicholas Denke.

LEGEND

CDM: CD Mastering/Premastering

CDR: CD Replication

TM: Tape Mastering

TD: Tape Duplication

DM: Disc Mastering

RM: Record Manufacturing



AAPEX TAPE DUPLICATION
San Rafael, CA

AAPEX TAPE DUPLICATION; TD: 28 Paul Dr., Ste. E; San Rafael, CA 94903; (415) 492-1300. Contact: Devon Huelt. **MASTERING.** **Tape Machines:** Sony Beta VCR and Quazar VCR, Panasonic SV-3500 DAT, Otari MTR-12 2-track (7 1/2, 15 or 30 ips). **Noise Reduction:** Dolby A or SR or dbx I (master), Dolby B or C (cassette). **Monitor Speakers:** JBL. **Signal Processing:** Sony PCM-301ES digital processor, Aphex Compellor, Aphex Aural Exciter type B, Yamaha 3rd-octave equalizer. **Engineers:** Keith Bender, Denis Huelt. **TAPE DUPLICATION.** **Method of Duplication:** In-cassette. **Duplicating Speed:** 1:1 real time only. **Capacity:** 1500/day. **Tape**

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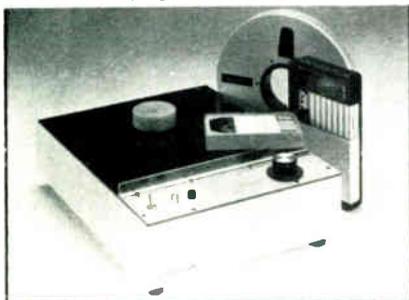
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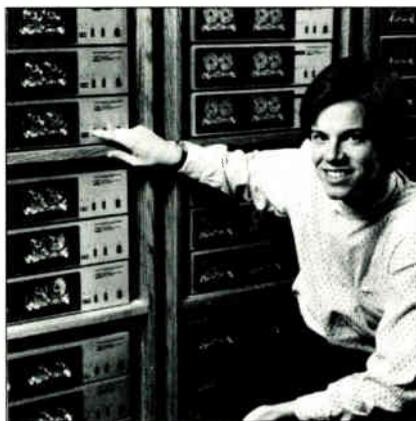
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ARTISAN SOUND RECORDERS; CDM, TM, DM; 1600 N. Wilcox Ave.; Hollywood, CA 90028; (213) 461-2751. Contact: John Austin.

ASR RECORDING SERVICES; TD; 8960 Eton Ave.; Canoga Park, CA 91304; (818) 341-1124; (213) 294-3853. Contact: Lester P. Edwards.



AT&T RECORDING/DUPLICATION
 Los Angeles, CA

AT&T RECORDING/DUPLICATION; TM, TD; 501 N. Larchmont Blvd.; Los Angeles, CA 90004-1305; (213) 466-9000; FAX: (213) 467-6615. Contact: Kathy Van Booven. **MASTERING.** Mastering Console: Ramsa. **Tape Machines:** Studer 1/4", Otari 1/2" 8-track, Scully 1/2" 4-track, Sony DAT 2500, Panasonic DAT 3500. **Noise Reduction:** dbx, Dolby. **Rates:** \$80/hour + materials. **TAPE DUPLICATION.** Method of Duplication: In-cassette and bin-loop. **Duplicator:** (94) KABA real-time decks, (10) Nakamichi real-time, high speed out-of-cassette duplication: 16x speed. **Duplicating Speed:** Real time, 2:1, 16:1. **Tape Used:** Agfa 649, 647, 949, 947 for cassette, Agfa 468 for masters. **Shell Used:** Shape Mark 10. **Magnetic Media.** **Loading Equipment:** King. **Rates:** Competitive rates. Call for quotation. **OTHER:** Label printing, packaging, shrinkwrapping.

AUDIO CASSETTE DUPLICATOR CO.; TD; 12426 1/2 Ventura Blvd.; Studio City, CA 91604; (818) 762-ACDC (2232). Contact: Steve Mitchell.



AUDIOPHILE QUALITY CASSETTES
 DUPLICATED ON THE KABA SYSTEM

BAUER
 COMMUNICATIONS INC.
 Sepulveda, CA

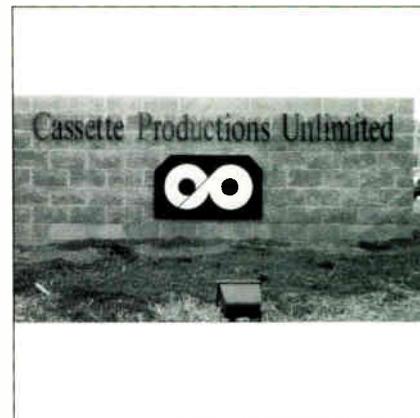
BAUER COMMUNICATIONS INC.; TM, TD; 8840 Valjean Ave.; Sepulveda, CA 91343; (800) 627-7277. Contact: Jim Bauer. **MASTERING.** Mastering Console: Soundcraft. **Tape Machines:** Nagra T Audio, Ampex, Technics. **Noise Reduction:** Dolby, dbx, Burwen, SAE. **Monitor Speakers:** Yamaha, Nestorovic. **Signal Processing:** UREI, Dolby, dbx, Burwen, Aphex, Modulation Sciences, Lexicon, Sony, Boulder. **TAPE**

DUPLICATION. Method of Duplication: In-cassette. **Duplicator:** Modified KABA w/84 positions. **Duplicating Speed:** Real time. **Tape Used:** BASF chrome. **Shell Used:** EMC/Group. **Loading Equipment:** TTL. **Packaging Equipment/Fulfillment Services:** Wrap Master. **Rates:** In quantities of 100 C-30-\$1.58, C-60-\$2.31, C-90-\$3.14 (other quantities and lengths available). **OTHER.** Short runs (12 to 5000) requiring fast turnaround and audiophile quality are our specialty, utilizing state-of-the-art mastering equipment and real-time duplication. Insert labels and shrinkwrap done in-house for immediate turnaround. We emphasize personalized service. 24-hour turnaround available.



CAPITOL RECORDS STUDIOS
 Hollywood, CA

CAPITOL RECORDS STUDIOS; CDM, CDR, TM, TD, DM, RM; 1750 N. Vine St.; Hollywood, CA 91355; (213) 871-5001. Contact: Tina Hopkinson (production manager), Docken Polk (senior prod. coordinator). **MASTERING.** Mastering Console: Neve, Sony, Studer. **Tape Machines:** Studer, Sony 1630, Mitsubishi X-86 IIS. **Noise Reduction:** Dolby A/SR. **Monitor Speakers:** JBL custom. **Digital Editing Systems:** Sonic Solutions, Sony DAE 3000. **Cutting Lathes:** Neumann SAL 74B with Zuma computer. **Signal Processing:** Harmonia Mundi, Sontec EQ, NTP EQ, Sonic Solutions. **Engineers:** Wally Traugott, Ron McMaster, Larry Walsh, Odea Murphy, Kevin Reeves, Bob Norberg. **Rates:** Call for pricing and information. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. **Duplicator:** Capitol, Gauss. **Duplicating Speed:** 80:1, 40:1. **Capacity:** Millions per year. **Tape Used:** Various manufacturers. **Shell Used:** Capitol. **Loading Equipment:** Tapematic, Tacos. **Packaging Equipment/Fulfillment Services:** Apex. **Rates:** Custom, please call **COMPACT DISC.** **Services, prices:** CD pressing, artwork, printing, packaging, graphics. **Prices:** custom—please call. **OTHER.** At the Capitol mastering facilities in Hollywood we will provide CD premastering, EQ and PQ encoding, CD reference discs, cassette mastering for duplication, reference/master lacquers, cassette copies, DAT copies. Credits: Richard Marx, Julio Iglesias, Kenny Rogers, Lee Ritenour, Dwight Yoakam, Stryder, Shalamar, The Whispers, The Bangles, Crowded House, and many more.



CASSETTE PRODUCTIONS
 UNLIMITED INC.
 Irwindale, CA

CASSETTE PRODUCTIONS UNLIMITED INC.; TM, TD; 5796 Martin Rd.; Irwindale, CA 91706; (800) 345-0145. Contact: W. Weston Jolly. **MASTERING.** Mastering Console: Soundcraft. **Tape Machines:** Otari MTR-12, Studer A80. **Noise Reduction:** Dolby A, SR, B, dbx. **Monitor Speakers:** JBL. **Digital Editing Systems:** Sony 2500 PCM. **TAPE DUPLICATION.** Method of Duplication: Bin-loop. **Duplicator:** Electro Sound 8000. **Duplicating Speed:** 64:1 **Capacity:** 100,000 day (C-40). **Tape Used:** BASF LHD. **Shell Used:** 5-screw, sonic, other. **Loading Equipment:** King 790. **Pack-**

aging Equipment/Fulfillment Services: Heino Ilsemann, Shanken S/W, custom audio book pkg. Rates: Competitive. **OTHER:** 24-track music/voice studio, audio producer(s), design, typesetting, printing, packaging, video duplication, product assembly, warehousing, fulfillment, a complete audio/video service. Established in 1978 with a reputation for on-time delivery of over 40 million cassettes.

CASSETTE PRODUCTIONS; TD, 545 West 500 South #140; Bountiful, UT 84010; (801) 298-8273. Contact: Marv Curtis.

C.M.S. DIGITAL; CDM, CDR, TM; 182 S. Raymond Ave.; Pasadena, CA 91105; (818) 405-8002. Contact: Diana Mundy.

COMMAND PRODUCTIONS; TM, TD; 480 Harbour Drive; Industrial Center Bldg. #107; Sausalito, CA 94965-1412; (415) 332-3161. Contact: Warren Weagant.

CUSTOM DUPLICATION INC.; CDR, TD; 3404 Century Blvd.; Inglewood, CA 90303; (213) 670-5575. Contact: Rick Hvely, VP sales.

DAVKORE CO.; TD; 1300 Space Park Way; Mountain View, CA 94043; (415) 969-3030. Contact: Tom Sherry, Yvonne Kendall.



DIFFERENT FUR DIGITAL
San Francisco, CA

DIFFERENT FUR DIGITAL; CDM; 3470 19th St.; San Francisco, CA 94110; (415) 864-1967. Contact: Susan Skaggs. MASTERING. Mastering Console: Sonic Solutions Desktop Audio System with NoNoise. Tape Machines: Sony 1630, DMR-4000, Sony 1000ES DAT, Panasonic SV-3500 DAT. Noise Reduction: Dolby SR, Dolby A. Monitor Speakers: Westlake TM-1, Yamaha NS-10, Tannoy NFMDMT 8". Digital Editing Systems: Sonic Solutions with NoNoise. Engineers: Howard Johnston. Rates: Please telephone. COMPACT DISC. Services, prices: Brokerage service for CD manufacturing. OTHER: Phil Collins live video, Limbomaniacs, George Winston, Windham Hill, The Residents. Brokerage services for compact disc and cassette manufacturing. Solid State Logic 4056 console, Studer A80, Sony 3324. GML and digital equalization.

DIGIPREP; CDM, TM; 1425 N. Cole Pl.; Hollywood, CA 90028; (213) 461-1709. Contact: Warren Salyer.

DIGITAL BROTHERS; CDM; 1731 Bonaire Way; Newport Beach, CA 92660; (714) 645-9702; FAX: (714) 642-7249. Contact: Ben or Bryan.

DISC MANUFACTURING INC.; CDM, CDR; 3500 W. Olive Ave., Ste. 1020; Burbank, CA 91505; (818) 953-7790. Contact: Suzan Simone.

FANTASY STUDIOS MASTERING; CDM, CDR, TM, TD, DM, RM; 10th & Parker Streets; Berkeley, CA 94710; (415) 549-2500. Contact: George Horn. MASTERING. Mastering Console: Sony SDP-1000 digital console. Tape Machines: Sony 1630, Mitsubishi X-86C, Studer A80. Noise Reduction: All types. Monitor Speakers: Hidley. Digital Editing Systems: Mitsubishi. Cutting Lathes: Neumann. Signal Processing: Sony digital. Engineers: George Horn, Phil De Lancia. Rates: Call for rates.

FDS LABS INC.; CDM; 4007 W. 6th St.; Los Angeles, CA 90020; (213) 383-2155; (213) 383-2156; FAX: (213) 383-2158. Contact: Hank Waring, Joe Steiner.

FUTURE DISC SYSTEMS INC.; CDM, TM, DM; 3475 Cahuenga Blvd. W.; Hollywood, CA 90068; (213) 876-8733. Contact: Susan West.

GOOD VIBRATIONS RECORDING AND PRODUCTION CO.; CDM, CDR, TM, TD, RM; PO Box 764; Bonita (San Diego County), CA 92002; (619) 267-0307. Contact: Don

Marshall, Karl Fitch. MASTERING. Tape Machines: Sony R-DATs. Monitor Speakers: Akai MS200. Digital Editing Systems: Digidesign Sound Tools/Macintosh IIfx/600 MB hard drive. Signal Processing: B.A.S.E. (Bedini Audio Spatial Environment), digital EQ, digital mixing/merging/crossfades. Engineers: Don Marshall, John Hendrickson. Rates: \$35/hr. (editing); \$350 (premastering). TAPE DUPLICATION. Method of Duplication: In-cassette. Duplicator: KABA, Otari. Duplicating Speed: Real-time, double-time, high-speed (8:1). Capacity: 24 slaves. Tape Used: BASF chrome, BASF LDH, Agfa, Ampex. Shell Used: Magnetic Media, Michelex. Rates: Various rates based on quantity and mode of duplication. COMPACT DISC. Services, prices: Analog-to-digital mastering; digital editing of R-DAT; pricing based on quantity (1000 CDs including premastering, mastering, printing and typesetting 4-page booklet, tray card, CD labeling, jewel box, fabrication & shrinkwrapping: \$2.80 each). Quantities as low as one. OTHER. Typesetting for CD booklets & tray cards; 4-color printing for cassette J cards as low as \$185/1000; Printing on shell and complete packaging; call for vinyl prices. We can improve your master with the Bedini Audio Spatial Environment processor (B.A.S.E.).

BERNIE GRUNDMAN MASTERING; CDM, TM, DM; 6054 Sunset Blvd.; Hollywood, CA 90028; (213) 465-6264; FAX: (213) 465-8367. Contact: Nickie Walters.

JACKSON SOUND PRODUCTIONS LTD.; TD; 3897 S. Jason St.; Englewood, CO 80110; (303) 761-7940. Contact: Linda M. Loughman. MASTERING. Mastering Console: Custom Spectra-Sonic. Tape Machines: Studer A80 1/2", 3M 1/2" & 1/4" (3M79). Noise Reduction: Dolby B, dbx. Monitor Speakers: JBL 4311. Signal Processing: Orban, RCA, UREI, Barcus-Berry. Engineers: Ben Tanler, Doug Brand. Rates: \$50 per hour. TAPE DUPLICATION. Method of Duplication: Bin-loop. Duplicator: Gauss 2400 Series duplication system with Dolby HXPro. Duplicating Speed: 96 to 1 music, chrome and normal; 128 to 1 voice. Capacity: 10,000 per shift. Tape Used: BASF, Mag Media. Shell Used: Mag Media. Loading Equipment: King 790s. Packaging Equipment/Fulfillment Services: Full service, imprinting, inserts, packages, shrinkwrap. Rates: Competitive quotes upon request. OTHER. Jackson Sound Productions Ltd., in business for 26 years, has just completed a major expansion, including a new Gauss 2400 Duplicator, widely considered the most advanced equipment in the industry. With the ability of complete packaging, we offer the most competitive prices and the best service in the Midwest. Call us for your next project at (800) 621-6773.

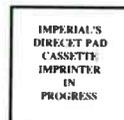


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**KABA AUDIO
PRODUCTIONS
Novato, CA**

KABA AUDIO PRODUCTIONS; CDM, CDR, TM, TD; 24 Commercial Blvd.; Novato, CA 94949; (415) 883-5041; (800) 231-TAPE; FAX: (415) 883-KABA. Contact: Toni Lynn, sales manager. MASTERING. Mastering Console: Specially designed. Tape Machines: KABA, Nakamichi, Sony DAT. Noise Reduction: Dolby A, B, SR, Dynaflex. Other: Studer Dyaxis 2+2 digital audio workstation. Monitor Speakers: JBL, Tannoy, Yamaha NS-10. Digital Editing Systems: Dyaxis 4+4 by Studer Revox. Signal Processing: Aphex Dominator, Orban Cooperator, Aphex Compellor, Klark-Teknik Graphic Equalizer. Engineers: Gordon Elliott, Margaret Olney, Ted Stratton, Tom Anderson. Rates: Call for estimate. TAPE DUPLICATION. Method of Duplication: In-cassette, bin-loop. Duplicator: KABA audiophile cassette duplication system—100 positions. Duplicating Speed: Real time 1:1 - Double time 2:1, 16:1 and 32:1. Capacity: 80,000 to 100,000 per month. Tape Used: BASF Chrome, Agfa 649, Sunkyoung Normal Bias. Shell Used: Michelex, EMC, Shape, Elmar, Lenco. Loading Equipment: AEG. Packaging Equipment/Fulfillment Services: Kent Pack printer, Roldex printer, ITT cassette labeler and Pack-All
—LISTING CONTINUED ON NEXT PAGE

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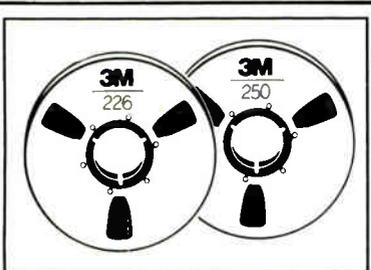
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Compact Disc Facilities

—LISTING CONTINUED FROM PREVIOUS PAGE
shrinkwrap. Rates: Call for estimate. **COMPACT DISC. Services, prices:** Exclusive dealer for American Helix in Washington state. Also serving Alaska, Montana, Idaho and Oregon. Premastering, pressing, one to full-color disc label printing, packaging, OTHER. Cassette shell pad imprinting, J-card/O-card printing, CD book/tray card printing, shrinkwrap, project coordination. Project mastering with EQ changes and other effects.

KDISC MASTERING; CDM, TM, DM, RM: 6550 Sunset Blvd.; Hollywood, CA 90028; (213) 466-1323; FAX: (213) 466-7237. Contact: Julie Gach, office manager.

TERRY LESSIG SOUND; TD: 1626 N. 7th St.; Phoenix, AZ 85006; (602) 255-0155. Contact: Terry W. Lessig, president. **MASTERING. Tape Machines:** Otari MTR-10, Panasonic SV-3500 DAT. **Noise Reduction:** Dolby B, C, S. **Monitor Speakers:** JBL 4311. **Signal Processing:** Aphex Dominator. **TAPE DUPLICATION. Method of Duplication:** Bin-loop. **Duplicator:** Magnefax, (2) LB-72 mono, 7801 stereo. **Duplicating Speed:** 24:1 mono and stereo. **Capacity:** 7,500 per day. **Tape Used:** BASF chrome, LHD, LNS-Agfa 649, 3M DAT. **Shell Used:** Lenco, ICM. **Loading Equipment:** (2) Concept Design 775. **Packaging Equipment/Fulfillment Services:** On-shell imprinting, Cellophane overwrap. **Rates:** Call for quote. **OTHER. Open-reel 1/4-inch duplication** for broadcast syndication, R-DAT duplication. J-cards and O-cards printed from fully composed negatives. Specialist in informational and educational cassettes. In-house studio turns your scripts and ideas into finished cassette tapes.

LOCATION RECORDING SERVICE INC.; CDM, DM: 2201 W. Burbank Blvd.; Burbank, CA 91506; (213) 849-1321. Contact: Shari Fraiberg, general manager. **MASTERING. Mastering Console:** (2) Neumann SP79, Neumann MT66. **Tape Machines:** (4) Studer A80 Mk II 1/4" and 1/2", (3) Studer B67, (4) Nakamichi MR-1, Sony PCM-1630, (2) DMR 4000. **Noise Reduction:** Dolby SR, A, dbx type I. **Monitor Speakers:** UREI 811-A, Studer A68 amps. **Cutting Lathes:** (3) VMS-70 with SAL-74 amps, SX74 heads. **Signal Processing:** Sontec Mes 430, EMT 240 plates, Yamaha REV 5, UREI 1178 limiters. **Engineers:** Bruce Kennedy, David Ellsworth, Stew Hillner, Kevin Gray. **Rates:** \$95/hour analog, \$150/hour digital. 12-inch LP \$105/side, 1630 CD submaster \$400. CD clones \$180. **OTHER. Complete printing services** record labels, jackets, CD inserts and tray cards, cassette J-cards, commercial printing, complete record production.

Martin AudioGroup

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MARTIN PRODUCTIONS INC.
DBA MARTIN AUDIO GROUP
Seattle, WA

MARTIN PRODUCTIONS INC., DBA MARTIN AUDIO GROUP; CDM, CDR, TM, TD, DM; 1200 Westlake Ave. N., Ste. 414; Seattle, WA 98109; (206) 784-0139; FAX: (206) 783-3284. Contact: Roxanne Robertson, Scott Olsen. **MASTERING. Tape Machines:** Otari 1/4", R-DAT, F1 VHS. **Noise Reduction:** Dolby SR/A, Dolby B. **Monitor Speakers:** Custom Johnson Acoustics. **Engineers:** Bob Boeck II. **TAPE DUPLICATION. Method of Duplication:** in-cassette. **Duplicator:** KABA real time, 50 positions. **Duplicating Speed:** Real time and 2:1. **Capacity:** 20,000-30,000/month. **Tape Used:** BASF chrome, Agfa 941 normal bias. **Shell Used:** Shape Mark

X. Packaging Equipment/Fulfillment Services: Manual. Rates: Quotes on quantity and length. **COMPACT DISC. Services, prices:** Exclusive dealer for American Helix in Washington state. Also serving Alaska, Montana, Idaho and Oregon. Premastering, pressing, one to full-color disc label printing, packaging, OTHER. Cassette shell pad imprinting, J-card/O-card printing, CD book/tray card printing, shrinkwrap, project coordination. Project mastering with EQ changes and other effects.

MASTER TRACK PRODUCTIONS; CDM, CDR, TM, TD: 1524 W. Winton Ave.; Hayward, CA 94545; (415) 782-0877; FAX: (415) 782-6280. Contact: Customer services manager. **TAPE DUPLICATION. Method of Duplication:** Bin-loop. **Duplicator:** Studer A80 MR. **Duplicating Speed:** 16:1, 32:1. **Tape Used:** Sunkyoung. **Shell Used:** ICM, Michelex, Magnetic Media. **Packaging Equipment/Fulfillment Services:** On-shell printing, overwrap, paper labels, full-color inserts. **Rates:** Call for detailed price list. **COMPACT DISC. Services, prices:** Complete compact disc manufacturing including mastering, replication, insert printing and packaging. Call for price information. **OTHER. Our duplication business** began after our 24-track studio was established. Because of our studio experience we have set very high standards for our cassette duplication plant. Being trained critical listeners we strive to reproduce on cassette the same excellent quality we hear in the studio.

THE MASTERING LAB; CDM, TM, DM: 6033 Hollywood Blvd.; Hollywood, CA 90028; (213) 466-8589. Contact: Shannon Ahern, studio manager; Doug Sax, owner.

MELODY PRODUCTIONS; TM, TD: 7712 23rd Ave. NW; Seattle, WA 98117; (206) 783-8694; FAX: (206) 781-1765. Contact: James A. Bostad Sr., pres. **TAPE DUPLICATION. Method of Duplication:** in-cassette. **Duplicator:** Nakamichi MR-2B, Otari 4050 Cassette to Cassette and 1/4" 7-1/2 on 15 ips to cassette. **Duplicating Speed:** 1:1 and 8:1. **Capacity:** 480/day real time and 1750/day high speed. **Tape Used:** Full line BASF Products (LNS, LHD, CRO and "New" Super chrome). **Shell Used:** Shape MK-10, Michelex, Lenco, Kyrac, Magnetic Media and SYS. **Loading Equipment:** Exclusively King 790. **Rates:** Call for rates. **OTHER. Full audio services,** from mixing to mastering in our 8-track studio, to custom loading of cassettes, to duplication and pad printing, J-cards and shrinkwrapping, included in our production studio is a video editing suite, with effects and duplication from 1/2" or 3/4". Credits: soundtracks and endless cassettes for international exhibits and museums.



MUSIC ANNEX DUPLICATION
Fremont, CA

MUSIC ANNEX DUPLICATION; CDM, CDR, TM, TD: 42650 Christy St.; Fremont, CA 94538; (415) 226-0800. Contact: Cathy Furness. **MASTERING. Mastering Console:** Custom (Neve components). **Tape Machines:** Otari MTR-10, HX Pro, MCI JH-110-B 1/4", 1/2", Sony 2500 DAT. **Noise Reduction:** Dolby A, SR, dbx. **Monitor Speakers:** JBL 4311, Yamaha NS-10. **Signal Processing:** Orban 424A, Orban 642B, Valley People 415. **Engineers:** Pall Grondal. **Rates:** Call for rates. **TAPE DUPLICATION. Method of Duplication:** Bin-loop. **Duplicator:** Otari DP-80 (6 slaves), Electro Sound 8000 and (6) 4800 slaves). **Duplicating Speed:** 40:1, 64:1, 80:1. **Capacity:** 250,000 to 300,000 units per month. **Tape Used:** Sunkyoung, BASF, Agfa. **Shell Used:** Michelex, Almag, ICM, Lenco. **Loading Equipment:** Tapematic, King-Concept Design 790. **Packaging Equipment/Fulfillment Services:** Apex, ITI, Scandia. **Rates:** Call for quote. **COMPACT DISC. Services, prices:** Complete compact disc manufacturing and packaging services. Graphics and printing available, as well. **OTHER. Full service graphics design department—LPs, CDs, cassette J-cards and O-cards. Fulfillment warehouse—ship direct to distributors and retailers.**

MUSICON; TM, TD: 27501 SW 95th Ave.; Wilsonville, OR 97070; (503) 682-8668; FAX: (503) 682-3043. Contact: Steve Ziegler. **MASTERING. Mastering Console:** Soundcraft. **Tape Machines:** Otari, Ampex, Sony DAT, Nakamichi. **Noise Reduction:** Dolby A, B, C, SR, dbx. **Monitor Speakers:** JBL.



CASSETTE PRODUCTION

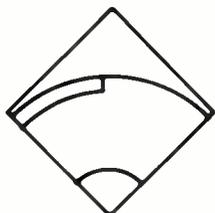
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MUSICON
Wilsonville, OR

Yamaha, E-V. Digital Editing Systems: Studer Dyaxis 2+2. Signal Processing: Aphex, dbx, UREI, Lexicon. TAPE DUPLICATION. Method of Duplication: Bin-loop. Duplicator: Versadyne 1500 8-slave, Magnefax 7-slave. Duplicating Speed: 64:1, 32:1. Capacity: 50,000 C-45/day. Tape Used: Sunkyong, BASF. Shell Used: L.E.S. Loading Equipment: (6) King 790. Packaging Equipment/Fulfillment Services: On-cassette printing, automated labeling, automated boxing. Rates: Please call. OTHER. We are the largest cassette production facility north of Los Angeles. We are quality fanatics who carefully handle every detail. We are in business to serve our customers. We hope that you become one soon.

NORTHWESTERN INC.; TM, TD: 15938 SW 72nd Ave.; Portland, OR 97224; (800) 547-2252; (503) 624-7800. Contact: Jeanne Allredge, Ken Thompson. **MASTERING. Mastering Console:** Soundcraft Delta 200. **Tape Machines:** Ampex ATR 800, Sony PCM-2500 DAT. **Noise Reduction:** Dolby SR, Dolby A, Dolby B, dbx. **Monitor Speakers:** Tannoy NFM-8. **Signal Processing:** Aphex Compellor-Dominator, BBE 822, UREI 1/3-octave EQ, etc. Rates: Please call with any questions. **TAPE DUPLICATION. Method of Duplication:** In-cassette and bin-loop. **Duplicator:** KABA real time, Otari in-cassette, AudioTek bin-loop. **Duplicating Speed:** Real time, 8:1, 32:1. **Capacity:** 1-100,000 piece orders our specialty. **Tape Used:** BASF, Agfa, Ampex, TDK. **Shell Used:** Shape, Michelex. **Loading Equipment:** King loaders with Concept Design upgrade. Rates: Call us for competitive rates. OTHER. Complete packaging, labeling and fulfillment services. DAT duplication, custom load blank cassettes, complete voice recording studio, CD project management, VHS duplication with Sony Sprinter. We specialize in custom services designed to meet your exact needs. Give us a call to discuss your next project.

OCEAN VIEW DIGITAL MASTERING; CDM, TM; 2323 Corinth Ave.; West Los Angeles, CA 90064; (213) 444-9904. Contact: Joe Gastwirt, Cal Roberts. **MASTERING. Mastering Console:** Custom analog/Sonic Solutions digital. **Tape Machines:** Sony 1630, Sony DAT 2500, Panasonic DAT 3500, Custom A & R 104. **Noise Reduction:** Dolby, dbx, No Noise System. **Monitor Speakers:** Custom design, Tannoy SGM-10B with Mastering Lab crossover. **Digital Editing Systems:** Sonic Solutions hard disc editing system. **Cutting Lathes:** Sony/Start Labs CD writer. **Signal Processing:** Sontec, Neumann, NTP, etc. **Engineers:** Joe Gastwirt. Rates: Call for quote.



OPTICAL MEDIA
INTERNATIONAL

OPTICAL MEDIA
INTERNATIONAL
Los Gatos, CA

OPTICAL MEDIA INTERNATIONAL; CDM, CDR; 485
Alberto Way; Los Gatos, CA 95032; (408) 395-4332. Con-

tact: Sylvester Pesek. **MASTERING. Mastering Console:** Topix CD Audio, CD-ROM premastering workstation. **Tape Machines:** Sony DMR 4000, Fostex D-201 DAT. **Noise Reduction:** Sonic Solutions, Sound Tools. **Digital Editing Systems:** Topix workstation, Sonic Solutions, Sound Tools. **Signal Processing:** Sony DFX-2400. Rates: Call for Quote. **COMPACT DISC. Services, prices:** CD Audio, CD-ROM, and mixed mode CD preparation, tape premaster and encoding. Yamaha, Sony reference disc systems. CD pressing in any quantity—24-karat gold compact discs. OTHER. Complete services for all CD formats: CD Audio, CD-ROM, CD-ROM XA, CD-I, including program design, graphics, packaging and fulfillment. Call for price quote.

PENGUIN DIGITAL RECORDING COMPANY; TM, TD: 10650 East Bethany Dr., #5B; Aurora, CO 80014; (303) 755-9978; (800) 783-PDR(7372). Contact: Robert Berglund. **TAPE DUPLICATION. Method of Duplication:** In-cassette. **Duplicator:** (70) Nakamichi MR-2. **Duplicating Speed:** 1:1 real time only. **Capacity:** 700 C-60s per shift. **Tape Used:** BASF LHD, BASF chrome. **Shell Used:** Michelex. **Loading Equipment:** Concept Design 775. **Packaging Equipment/Fulfillment Services:** d-e-b A-301 shrinkwrap machine. Rates: Please call for quote.



(Established 1974)

PHYLCO AUDIO
Gold Hill, OR

PHYLCO AUDIO; TD; 11693 Old Stage Rd.; Gold Hill, OR
97525; (800) 525-0100. Contact: Robert E. Deates, Gail Husa.

QUAD TECK DIGITAL; 4007 W. 6th St.; Los Angeles, CA
90020; (213) 383-2155; (213) 383-2156; FAX: (213) 383-
2158. Contact: Hank Waring, Joe Steiner.

QUADIM CORPORATION; CDM, TM, TD; 31542 Rustic Oak
Dr.; Westlake Village, CA 91361; (818) 706-8843; FAX: (818)
706-8426. Contact: Guy Costa.



RAINBO RECORDS
AND CASSETTES
Santa Monica, CA

RAINBO RECORDS AND CASSETTES; CDR, TM, TD, DM, RM: 1738 Berkeley St.; Santa Monica, CA 90404; (213) 829-3476; FAX: (213) 828-8765. Contact: Jack G. Brown, Steven E. Sheldon. **TAPE DUPLICATION. Method of Duplication:** Bin-loop. **Duplicating Speed:** 64:1. **Capacity:** 50,000 per 24-hour day. **Tape Used:** BASF chrome and normal, Sunkyong chrome and normal. **Shell Used:** Michelex, Lenco. **Loading Equipment:** King 790. **Packaging Equipment/Fulfillment Services:** Scandia. **COMPACT DISC. Services, prices:** CD replication, packaging, blister-pak multiples. **RECORD MANUFACTURING. Presses:** 26 Lened Automatic, Labels, Jackets, Sleeves—Prg Drop Shipping. **Capacity:** 50,000-12".
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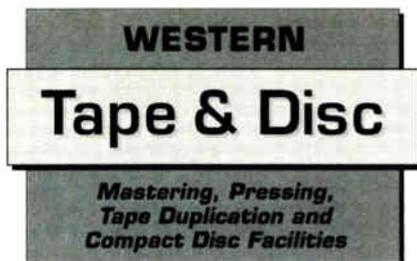
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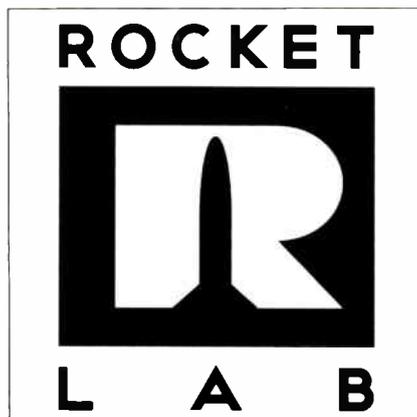


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REELTIME TAPE DUPLICATION; TD; 125 Alena St.; San Rafael, CA 94901; (415) 459-7180; (800) 798-9354. Contact: Tony Johnson. MASTERING. Tape Machines: Scully 280 1/2-track, Technics 1500 1/2-track, Sony DTC-1000 ES, Nakamichi MR-, Panasonic 3700 DAT, Tascam 112 cassette. Monitor Speakers: JBL 4411. Signal Processing: Orban 622B parametric. Rates: \$30/hour. TAPE DUPLICATION. Method of Duplication: In-cassette. Duplicator: (20) Nakamichi MR-2. Duplicating Speed: Real time. Capacity: 320 C-30/day. Tape Used: BASF chrome, TDK SA. Shell Used: Precision S-Screw, Shape available. OTHER. Since 1981, Reeltime has been producing state-of-the-art cassette copies for songwriters, trends, media personalities, filmmakers and businesses of the Bay Area. Low prices, full-service printing and packaging, and fast turnaround characterize our approach. Small orders welcome!



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THE ROCKET LAB; 51 Federal #100; San Francisco, CA 94107; (415) 495-2297. Contact: Nancy Evans. MASTERING. Mastering Console: JVC, Sonic Solutions. Tape Machines: Ampex ATR-104, Studer A820, Sony PCM-2500, Panasonic SV-3500. Noise Reduction: SR Dolby, Dolby A, dbx. Monitor Speakers: Meyer HD-1, Velodyne ULD 18 II. Digital Editing Systems: Studer Dyaxis, Sonic Solutions. Cutting Lathes: Scully/Westrex. Signal Processing: Massenburg, EAR, Sonic Solutions, Studer Dyaxis, Roland. Engineers: Paul Stubblebine, John Accoca. Rates: \$140. TAPE DUPLICATION Rates: Call for quotes. COMPACT DISC. Services, prices: Call for quotes. RECORD MANUFACTURING Rates: Call for quotes. OTHER. CD reference discs available. Complete digital editing including audio for video.

RTI-RECORD TECHNOLOGY INC.; CDR, TM, TD, RM; 486 Dawson Dr.; Camarillo, CA 93012-8090; (805) 484-2747; FAX: (805) 987-0508. Contact: Don MacInnis/Bill Bauer.

SONIC ARTS CORP.; CDM, TM, DM; 665 Harrison St.; San Francisco, CA 94107; (415) 957-9470; (415) 957-9471. Contact: Kenneth Lee, Leo Kulka. MASTERING. Mastering Console: Custom mastering console. Tape Machines: Scully, Inovonics, 1/2" & 1/4" mastering, PCM Digital. Noise Reduction: Dolby A & SR, dbx. Monitor Speakers: Altec 604e with E.M. Long Association time-aligned crossovers, Yamaha NS-10s. Cutting Lathes: Neumann mastering system. Signal Processing: Sontec mastering EQ, AKG reverb, Pultec, UREI

comp., SAE EQ. Engineers: Kenneth Lee and Leo Kulka. Rates: Available upon request.

SOUND PRODUCTIONS; CDM, CDR, TM, TD; 713 Fairview N.; Seattle, WA 98109; (206) 525-9999; FAX: (206) 292-9999. Contact: Brian Bouchard, Mike Allred.



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SOUNDWORKS WEST LTD.; CDM, TM, DM; 7317 Ro-maine St.; W. Hollywood, CA 90046; (213) 850-1510; FAX: (213) 874-1420. Contact: Kellie Takemoto.

SUPER DUPER-AUDIO DUPLICATION SERVICE; CDM, CDR, TM, TD; 3235 SE 39th; Portland, OR 97202; (503) 239-6070; FAX: (503) 239-0296. Contact: Rick McMillen, Todd Chatalas. MASTERING. Mastering Console: Soundcraft Delta 200. Tape Machines: Otari MTR-12C, Panasonic SV-3500 DAT, SV-3700 DAT, SV-255 DAT, Otari 5050, Nakamichi MR-1. Noise Reduction: Dolby SR, Dolby A, Dolby B, Dolby C, dbx. Monitor Speakers: UREI 809, JBL 4410, JBL 4408, Yamaha NS-10 with subwoofer. Digital Editing Systems: Digidesign Sound Tools, Mac Ilci with 660meg HD. Signal Processing: Aphex Dominator, Aphex D/As, Aphex 10-4, JBL/UREI 1/3-octave EQ, BBE Sonic Maximixer, Scamp Rack. Engineers: Rick McMillen, Todd Chatalas, Tony Lash. TAPE DUPLICATION. Method of Duplication: In-cassette. Duplicator: (77) Nakamichi MR-2B with Realworld EQ, Otari 4050 E Series hi Speed, Sony hi Speed. Duplicating Speed: Real time & 16:1 (Otari and Sony). Capacity: 100 C-45/day, real time; 5000 C-45, high speed. Tape Used: BASF Super Chrome, Pure Chrome, LHD, LNS. Shell Used: Shape Mk 10, Michelex. Loading Equipment: Custom lengths via King 790. Packaging Equipment/Fulfillment Services: Shrink packaging, J-cards, labels, laser typesetting. One-stop service. Rates: Less than L.A. COMPACT DISC. Services, prices: Exclusive regional broker for American Helix. Quantities 500 to 500,000. Lowest regional prices. OTHER. DAT clones, DAT CD + duplication digital premastering, broadcasts dubs. Recent clients include: Nushooz, Heart (R. Erwin), Blue Hearts, Dazz Band, Dharma Burns, Tom Grant.

TAPE ONE HAWAII INC.; CDM, CDR, TM, TD; 1520 Liona St.; Honolulu, HI 96814; (808) 947-8802. Contact: Dwain H. Hansen. MASTERING. Mastering Console: Otari MTR. Tape Machines: MCI, Sony 2500. Noise Reduction: Dolby B/C/A. Monitor Speakers: Tannoy. Signal Processing: Orban, Symmetric, Aphex. Engineers: Two. TAPE DUPLICATION. Method of Duplication: In-cassette and bin-loop. Duplicator: Versadyne (4 slaves), KABA real time (22 slaves). Duplicating Speed: 32:1, 64:1, 128:1. Capacity: 10,000 per day. Tape Used: Agfa, Cintas, GC. Shell Used: Anwell, Lenco, EMC. Loading Equipment: Two Concept Design. Packaging Equipment/Fulfillment Services: Shrinkwrap insert printing, on-shell imprint (Apex). Rates: Competitive. COMPACT DISC. Services, prices: CD mastering/premastering, CD replication, printing and packaging. OTHER. Full service from gleam in the eye to finished product! Custom vinyl cassette cases/albums, creative services.

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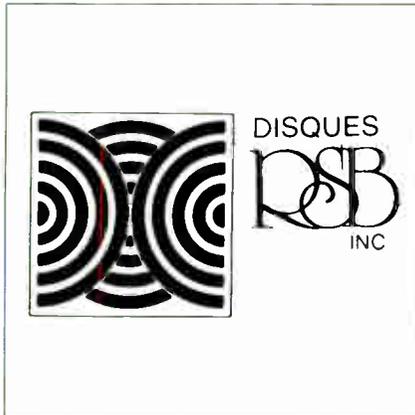
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DISQUES RSB INC.; CDM, TD: 8420 Cote De Liesse; St. Laurent, Quebec, H4T 1G7 Canada; (514) 342-8511. Contact: Richard Belanger.

THE LACQUER CHANNEL INC.; CDM, TM, DM: 297 Les Mill Rd., Toronto, Ontario, M3B 2V1 Canada; (416) 444-6778; FAX: (416) 444-0251. Contact: Ted Carson, mgr.; George Graves chief engineer. **MASTERING.** Mastering Console: Sony SDP-1000 digital transfer console, modified Neve analog console. **Tape Machines:** Studer A80 1/2" and 1/4", Otari 1/2", Studer Revox cassette deck. **Noise Reduction:** Dolby A, SR, B, dbx type I. **Monitor Speakers:** SOTA CF-750 in two acoustically matched. **Digital Editing Systems:** (2) Sony PCM-1630, (4) BVU-820, (2) PCM-2500, DAL-1000 limiter. **Cutting Lathes:** Neumann VMS 70 with Zuma audio. **Signal Processing:** Pultec EQ, UREI LA-4 limiter, BBE-202R. **Engineers:** George Graves, Chris Flint, Allan Moy, Ted Carson.

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LES INDUSTRIES MAGRA LTEE; TD: 5722 St-Andre; Montreal, Quebec, H2S 2K1 Canada; (514) 272-8224; FAX: (514) 272-9785. Contact: Mario Piquet, president; Francois Gouard, engineer. **MASTERING.** Mastering Console: Chilton GM5. **Tape Machines:** Studer A807-2/2, Studer A807 4/4, (2) Revox. **Noise Reduction:** Dolby B. **Monitor Speakers:** JBL 4312. **Signal Processing:** Klark Teknik EQ, Symetrix noise reduction. **Engineers:** Francois Gouard. **Rates:** On request. **TAPE DUPLICATION.** Method of Duplication: In-cassette and bin-loop. Duplicator: (102) KABA slaves, bin-loop. Duplicating Speed: KABA 1-1 and 1-2, AEG Lyre 1-40 and 1-80. Capacity: 1,200,000. **Tape Used:** Ampex, Sunkyong, Agfa. **Shell Used:** Magnetic Media, Snape Mark IV, Microflex. **Loading Equipment:** (3) AEG Koros 4, (2) Electro Sound. **Packaging Equipment/Fulfillment Services:** Shrink and print on cassette with Rolodex. **Rates:** On request. **OTHER:** KABA, demo, new age on CrO2, cassette burn kits, 48-hour service. Bin-loop, low minimum and choice of colors for printing. DAT-to-DAT copy, reel-to-reel copy. Free demo sample on cassette and studio accessories available. Distributor of Ampex and 3 products.

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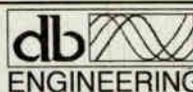
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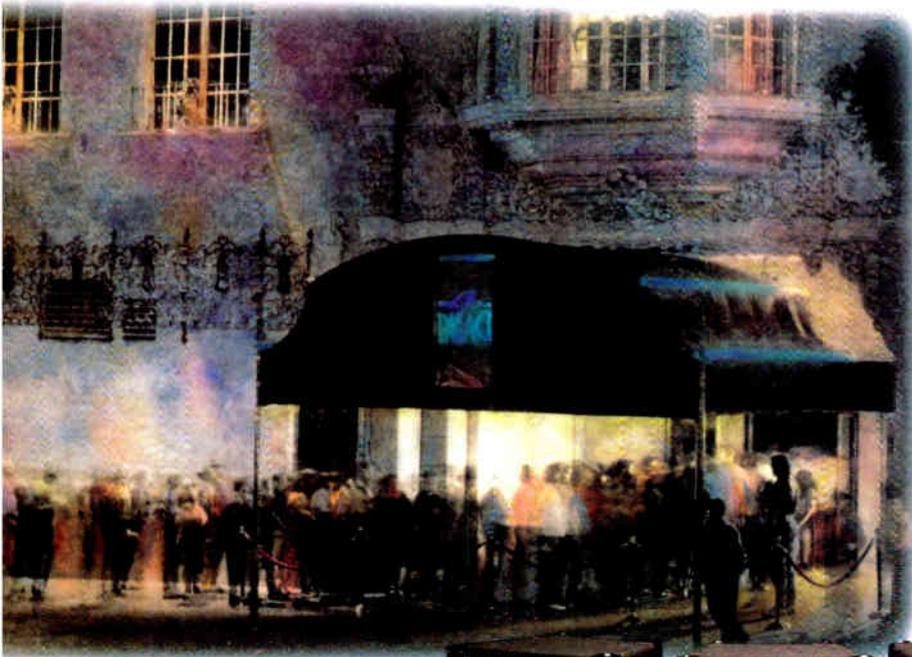
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