

Producer/Engineer John Potoker • Apple vs. Apple • Steve Lukather

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# MIX

**Special Digital Focus:  
Testing the Limits  
of DAT**

**The New Generation of  
Digital Recorders**

THE RECORDING INDUSTRY MAGAZINE



SOUND FOR "THE ABYSS"

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**Directory: Southwest Recording Studios**

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

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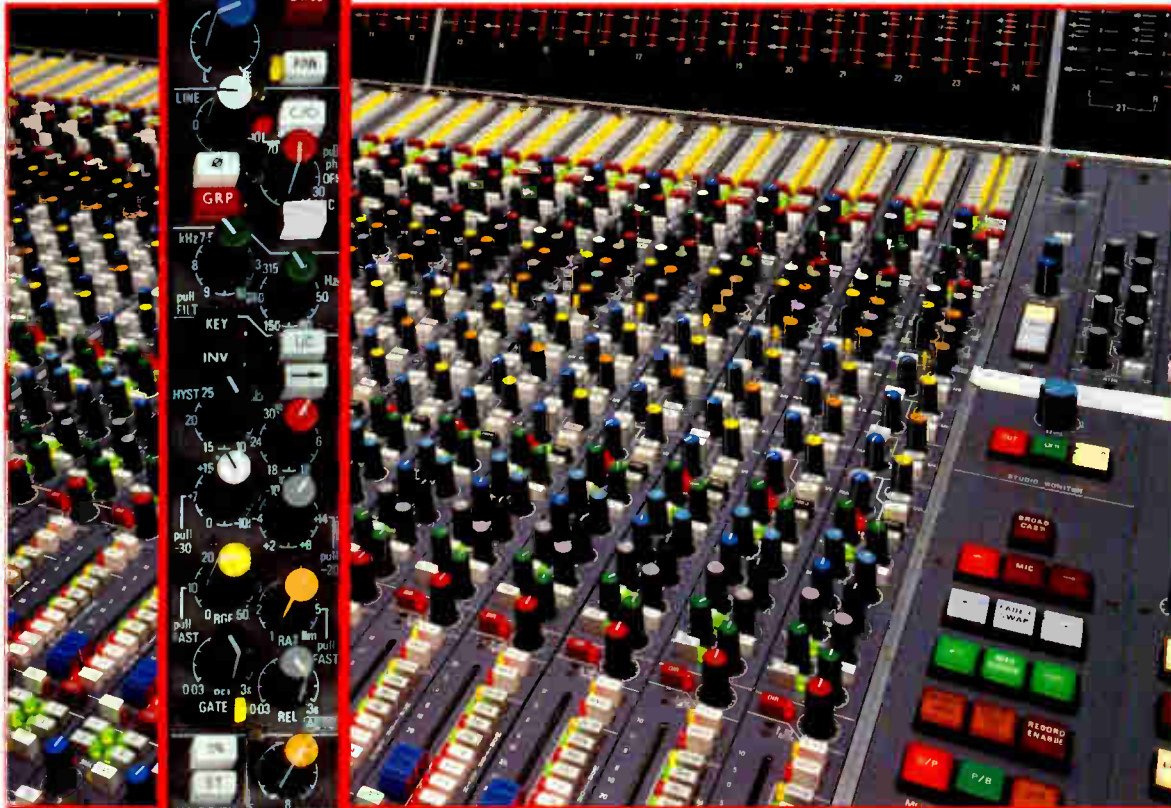
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# MIX

JULY 1989

THE RECORDING INDUSTRY MAGAZINE

VOL. 13, NO. 7



JUXTAPOSITIONS

PAGE 14



DIGITAL TRENDS

PAGE 28



P.D.Q. BACH

PAGE 102



STEVE LUKATHER

PAGE 140

## FOCUS ON DIGITAL

- 16 Insider Audio:** Examining the State-of-the-Art in Digital Recording  
*by Ken C. Pohlmann*
- 28 The New Generation of Digital Recorders**  
*by George Petersen*
- 38 Testing the Limits of DAT**  
*by Robert Harley*
- 128 After-Mix:** DAT for Pros—Swift Start, Uncertain Future  
*by Philip De Lancie*
- 136 Interactivity:** A Look at the CD-ROM Conference  
*by Lou CasaBianca*
- 152 Southwest Studios Talk About DAT in the Control Room**  
*by Paul Potyen*

## EDUCATION

- 14 Juxtapositions:** The School of Hard Knocks  
*by Mel Lambert*
- 25 The Fast Lane:** School Daze  
*by Stephen St. Croix*
- 64 Digital Diplomas:** Preparing Tomorrow's Engineers for the Digital World  
*by Tom Kenny*
- 174 15 Points to Consider in Choosing a Recording School**  
*by Linda Jacobson*

## RECORDING

- 50 "The Abyss":** The Challenge of Underwater Recording  
*by Iain Blair*
- 58 Producer's Desk:** John Potoker—Slave to the Song  
*by Nick Vallelonga*

## LIVE SOUND

- 115 Sound Reinforcement News & Tour Update**  
*by Mark Herman*
- 124 Sound on Stage:** Frank, Sammy and Liza Live!  
*by Mike Stande*
- 126 Sound Reinforcement New Products**

## PRODUCTS

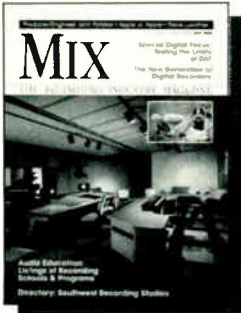
- 86 Field Test:** Panasonic DAT Recorders  
*by Bob Hodas*
- 92 Preview/Hot Off The Shelf**
- 94 Auditions:** Beyer DT 770 Pro Headphones; Milab DC-96B Microphone; John Woram's "Sound Recording Handbook"

## MUSIC

- 102 Lunching with Bonzai:** P.D.Q. Bach to the Future  
*by Mr. Bonzai*
- 140 Music & Recording Notes:** Bob Mould's Life After Husker Du; Steve Lukather Solo; Apple vs. Apple; Journal of Country Music; Mickey Hart's Labor of Love

# FROM THE EDITOR

Founded 1977 by  
David M. Schwartz and Penny Riker Jacob



**Cover:** The latest addition to Studio 1 at Future Audio in Dallas is a 44-input Mitsubishi Westar automated console. The 1,100-sq.ft. control room also features UREI 8138 monitors, RPG Diffusers along the back wall and custom-built diffusers along the right wall. **Photo:** Dennis Larson.

## DEPARTMENTS

- 6 Current
- 9 Industry Notes
- 10 Sessions/Studio News
- 169 Classifieds
- 176 Ad Index

## DIRECTORY

- 76 Recording Schools & Programs
- 157 Southwest Recording Studios



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**T**he complexity of our technology has all but required entry-level technical people to have specific and relevant education. Recording schools and programs have increasingly become the legitimate ports of entry to the exciting world of recording. The walking-in-off-the-street-type jobs are now just a fond memory of the way things used to be. With this in mind, we again look at formal education for the sound production industry.

Usually in our July "Education Issue" we like to talk to people at some of these fine recording schools and hear their views on matters of interest to the industry. This year, an interesting response arose to our queries on how schools today prepare students for digital audio.

Just as studios have to gauge their desires, needs and abilities to acquire digital recording equipment, schools face a similar, if not *more* critical, issue relative to purchasing digital. Some schools have chosen to keep the belt tight and hang with analog for the foreseeable future, while others have found ways to acquire the latest available technology. This has caused concern among some school administrators over the creation of perceived "haves" and "have-nots."

Some of the more astute of these learning institutions have dealt with the equipment rat race dilemma by developing intelligent relationships with neighboring studios and manufacturers. Through clever arrangements, the schools' limited access to equipment can be offset with real-world demonstrations and hands-on experience at these remote locations.

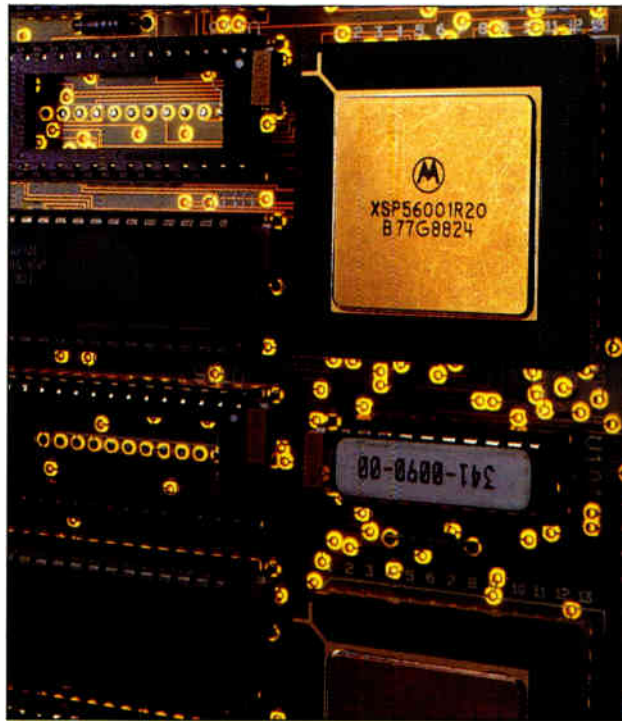
Whether schools have equipment in-house or at a nearby location is less of an issue than how well they can prepare students for today's and tomorrow's recording-studio-as-workplace. It would be a shame to have a school turn away from any valid direction taken by technology that has a bearing on the future of the recording business. It would be certainly less than fair to students.

The challenge for the schools is how to prepare a balanced and worthwhile curriculum for the student and to create a foundation for higher learning in the real world.

Keep reading,

A handwritten signature in black ink, appearing to read 'David Schwartz'.

David Schwartz  
Editor-in-Chief



## WHEN ASKED WHY THEY LIKED THE AUDIOFRAME, EXPERTS LISTED ITS 24 BIT AUDIO BUS, CONSTANT RATE SAMPLING, DIGITAL MIXING AND SIGNAL PROCESSING.

We can give you all kinds of technical reasons to buy our new AudioFrame Production System. But if it doesn't deliver excellent sonic quality, will you care? Not likely.

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The core of the AudioFrame is our Digital Audio Bus.™ This 24 bit, 64 channel bus works in conjunc-

tion with our Constant Rate Sampling technology to provide a true digital environment for your work. Dramatic non-aliased transposition, virtual editing, digital mixing and processing can all be accomplished without sacrificing timbral integrity. Phase coherency is maintained throughout the production process. So listening fatigue is reduced and artistic values are preserved.

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# CURRENT

## **CARILLON SELLS dbx PRO & OEM**

In a move designed to allow more freedom for focusing on consumer electronics, Carillon Technology, Sunnyvale, Calif., has released a formal letter of intent for the sale of dbx Professional Products Division and dbx OEM Products. Carillon still owns dbx Consumer Products, Audio Dynamics, ADC, Final Technology and CTI Japan.

The bid for dbx Professional Products offered by AKG Acoustics, Inc., Stamford, Conn., has been accepted, and the agreement is expected to be final by mid-July. AKG, a leading manufacturer of microphones, also recently purchased Orban Associates of San Francisco.

Meanwhile, Carillon has reached an agreement in principle for the sale of dbx OEM Products to THAT Corporation, Natick, Mass., according to Carillon president, Jacques Robinson. THAT Corporation is a newly formed company founded by former dbx employees Leslie Tyler (vice president, engineering) and Gary Hebert and Paul Travaline (longtime engineering managers).

THAT Corporation will continue dbx OEM operations, including supplying VCAs, RMS detectors, circuit boards and modules to manufacturers.

## **HOME STUDIO CONTROVERSY IN L.A.**

There is a storm brewing in the Los Angeles recording community, and its effects might soon be felt throughout the music production business. At its most basic, the controversy pits musicians and producers who own home recording studios against an industry trade group known as the Hollywood Association of Recording Professionals (HARP).

By order of the L.A. zoning commission and Department of Building and Safety, independent producer and songwriter Chas Sanford has been ordered to shut down his home studio, Secret Sound L.A., because the studio violates city zoning ordinances restricting the commercial use of residential property.

According to the *Los Angeles Times*, Sanford was ordered to have his home studio dismantled by May 24. At presstime, Sanford was wrapping up production commitments, planned to file for a 90-day extension and was calling for an amendment to the current zoning regulations.

The controversy came to a head as HARP prepared for their first meeting in early May. Buddy Brundo, owner of Conway Recorders in Hollywood and a member of HARP, says the organization was convening to discuss common business concerns such as the rising costs of health and studio insurance. Then members got a hold of a six-page, full-color brochure promoting Secret Sound L.A., and the name Chas Sanford dominated the closed-door session.

Sanford maintains that he sent the brochure to one record company executive and "a few friends" to save himself the time of explaining his operation again and again. He says that he pays the proper taxes to the proper state agencies—denying a major charge made against him by HARP representatives. He also denies that he runs a studio for hire.

L.A. zoning administrator Frank Eberhard has hinted that he would like to see the current zoning regulations changed to allow more people to work out of their homes. However, he says, any resolution to the commercial/residential stand-

off will take into account the impact of home business on neighborhood residents.

## **TEC NOMINATIONS ANNOUNCED**

*Mix* magazine has announced the nominees for the fifth annual Technical Excellence & Creativity (TEC) Awards, to be held October 19, 1989, at Manhattan Center Studios in New York City.

A total of 104 nominees in 20 categories received nominations from the panel of nearly 200 leading audio professionals. A highlight of this year's ceremony will be the induction of Wally Heider, George Martin and Rupert Neve into the TEC Hall of Fame. Turn to page 63 in this issue for a complete list of TEC nominees.

Subscribers to *Mix* magazine will receive a TEC voting ballot with the August issue. For ticket information and other inquiries, contact Karen Dunn at (415) 653-3307.

## **RICHARD HEYSER SCHOLARSHIP LOAN FUND**

The Richard C. Heyser Scholarship Loan Fund has been established to honor one of the audio community's most gifted and respected engineers with a lasting memorial. The scholarship program will provide assistance to promising graduate engineering students who are in need.

Heyser, who died in March 1987 a few months before he would have assumed the office of AES President, contributed to pro audio most notably through his discoveries in time delay spectrometry.

Tax-exempt contributions may be made payable to the "Richard Heyser Scholarship Loan Fund" in care of Mrs. Amy Heyser, 10415 Fairgrove Ave., Tujunga, CA 91402. ■



# In an age of disk and digital, why buy analog?

We know there are some applications where our 32-channel digital machine, the DTR-900, is the only answer. But if your business is such that you can do anything you want to do in the analog domain, and at the same time do less damage to your budget, then our brand new analog 24-channel MTR-100A may be the perfect machine for you.

When you consider that the MTR-100 will literally *change forever* the way engineers interface with audio machines, and

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What's more, with its optional EC-103 chase synchronizer, the MTR-100 maintains frame-lock in forward and reverse from 0.2X to 2.5X play speed, and will typically park with zero frame error.

Then, there's the sound. New cylindrical-contour heads built by Otari especially for the MTR-100 result in remarkably low crosstalk and outstanding low-frequency performance. Pre-amps are located directly beneath the heads to further improve frequency response, and HX-Pro\* is built-in for enhanced high frequency headroom. (An optional internal noise reduction package houses Dolby\* SR/A.) Add all these features to gapless, seamless, punch-in, punch-out, which is also built-in, and your

MTR-100's sonic performance will rival, or beat any digital machine in the world.

So there you have it. With these powerful benefits available in analog, does it make sense to go digital? Sure, for some applications. But analyze your needs carefully before you buy. For many applications, a hot

analog tape machine like the MTR-100 is the right choice.

And because we can see both sides of the question, put us to work. We have information that can help you make the right decision. Call Otari at (415) 341-5900 for the "Technology You Can Trust".



Reel motors that approach one horsepower are driven by pulse width modulation amplifiers to tape speeds up to 474 ips.



The MTR-100's auto-alignment saves you hours of time by eliminating constant tweaking and re-tweaking between sessions.

that this new way will save you hours spent in non-productive time, the analog choice begins to make even more sense. You see, the MTR-100 features full Auto-Alignment that allows total recalibration of the record and reproduce electronics. This means you can compensate for different tapes in a *fraction* of the time that it previously took, and your studio is not bogged down with constant tweaking and re-tweaking between sessions.

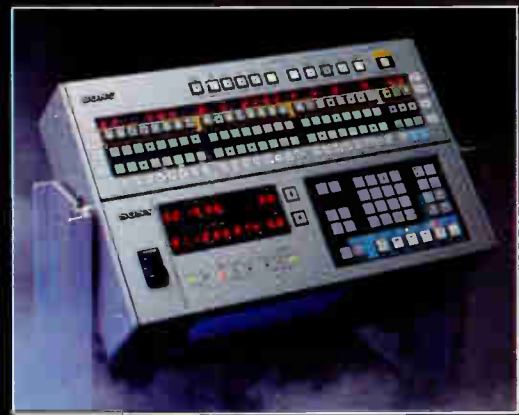
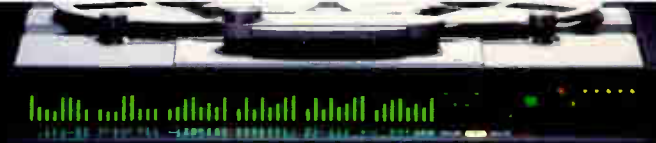
And if you think digital machines have a corner on high performance transports, think again! The MTR-100's new transport incorporates reel motors that approach one horsepower—you'll get fast wind speeds of up to 474 inches per second! Of course, the

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PCM-3348 adds up to 24 more channels of digital audio to the original recording.

Clearly, the creative possibilities are limitless. To explore them, call your regional Sony Professional Audio office: East: (201) 368-5185. West: (818) 841-8711. South: (615) 883-8140. Central: (312) 773-6001.

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World Radio History

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# INDUSTRY NOTES

Mike Abercrombie has joined Trident Audio USA (Torrance, CA) as national sales manager and Kim Templeman Holmes was hired by Trident Audio Developments (London) as UK/European sales manager. . . Mitsubishi Pro Audio Group moved its headquarters to Travellers Lane, Hatfield, Herts AL10 8XB, UK. Neve North America will be the U.S. distributor for Mitsubishi's PCM line. . . Solid State Logic Inc. (NYC) will be the North American distributor for Sondor. . . Chris Fichera is the new DDA product sales rep in L.A. for Klark-Teknik (Farmingdale, NY). . . A new recordable compact disc system, CD Professional, is now on the market from Meridian Data (Capitola, CA). . . In Waltham, MA, Lexicon's service network for the Opus Digital System now includes Russell Bibens as field service engineer manager and Chip Gould as a field service engineer out of L.A. Opus demo rooms are now open to the public in Waltham, New York, Los Angeles and Montreal. . . Meyer Sound Laboratories (Berkeley, CA) promoted Mark Johnson to director, technical marketing, and Cindy Ramos to national sales manager. . . Robert Corti has joined Capitol-EMI Music, Inc. as manager, national quality control, in Hollywood, CA. . . Boston Acoustics (Lynnfield, MA) has hired Robert Harris as national sales manager, designer series. . . Analog engineer Dan Lavry will head the design team of A/D and D/A conversion systems for Apogee Electronics Corp. (Santa Monica, CA). . . Larry Lamoray has joined broadcast tape company Fidelipac Corporation as director of marketing (Moorestown, NJ). . . In Chicago, the Electronics Representatives Association announced new officers: Russell Diethert, chairman of the board; Joel H. Schwartz, president; and four senior vice presidents. . . Atlas/Soundolier has a new Western regional assistant sales manager, Jim Edwards. . . CMX (Santa Clara, CA) promoted John W. Shike to senior product manager for video editing systems. . . In Lynnwood, WA, Len Tweten of Magnolia Hi-Fi & Video was elected

to the Carver Corporation's board of directors. . . Speaker manufacturer Teeng Shurn Co., Ltd., of Taiwan appointed Ron Colantonio as marketing manager. . . Artel Communications Corp. (Hudson, MA) has signed an agreement to provide products and services to BICC Data Networks Ltd. (UK). . . Sheer & Chaskelson Research (NYC) is conducting the second annual Professional Audio Marketplace survey from May to October 1989. . . Several Michael Jackson "Bad" tour designers recently created Hydra Tech (Hollywood, CA) to offer tour and studio preproduction and support. . . In Plantation, FL, Audio Market Place was formed as a broker for used pro audio equipment. . . VRI Scharff Rentals came out of the merger of Video Rental Inc. and A/T Scharff Rentals in NYC. . . Edge Distribution Corp., distributor for Turbosound and BSS Audio, has moved from the Big Apple to RR2 Box 144C, Milewood Rd., Millbrook, NY 12545. . . Soundstream Technologies has relocated to 120 Blue Ravine Rd., Folsom, CA 95630. . . NYC sound equipment manufacturer Magna-Tech Electronic Co. has opened a facility in Middlesex, UK. . . James E. Thornton was elected to the board of directors of Wadia Digital Corporation (Hudson, WI). . . Michael Mazur joined Editel/LA as telecine colorist. . . Groupe Andre Perry (Washington, DC) has appointed Frank Nemis as paintbox artist/graphic designer, Tom Pelke as senior editor and Nick LaGrasta as associate editor. . . EC International is the new artist development division of Eric/Chandler, Ltd. in Los Angeles, headed by Steve Rennie. . . Also in L.A., VTE Mobile Television Productions named Jack Sheehan as vice president, director of operations. . . Full Sail Center for the Recording Arts (Winter Park, FL) has a new full-time instructor, Dan Mockensturm. . . Jah Works Studios brought aboard Mark Brown as engineer in O'Brien, OR. . . Recording studios involved in Grammy-winning recordings can contact NARAS to order a plaque: 303 N. Glenoaks Blvd., Suite M-140, Burbank, CA 91502. ■

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Circle #118 on Reader Service Card

Deganahl doing double duty as engineer . . . Sound Emporium in Nashville reports that producer Greg Nelson and engineer Bob Clark were in for Word Records, working on a collection of a cappella vocals. . . Miami Sound Machine was at Criteria Recording Studios in Miami working on an upcoming album. Production was handled by Clay Oswald, Jorge Casas and Emilio Estefan. Eric Schilling engineered with assistance from Andrew Rosenberg. . . Susan Hudson was at Music Mill in Nashville cutting tracks for her latest release on PolyGram. Norro Wilson produced the project with Jim Cotton and Paul Goldberg at the controls. . . Mark Blumberg and Stephanie Smith wrote and produced a jingle for Worthington Furniture Warehouse at New Memphis Music in Memphis. Niko Lyras engineered the sessions. . . Engineer Dave Barton and assistant Jim Thomas recorded radio spots for Dole at New River Studios in Ft. Lauderdale. Under the theme "Pon Mas Frescura En Tu Vida Con Dole," two versions were recorded: a Nortena version for the San Antonio market and a salsa version for the Miami market . . .

## NORTHEAST

Bill Scheniman was at Blue Jay in Carlisle, MA, engineering for Buster Poindexter's new album on RCA, with Mark Tanzer assisting. Also at Blue Jay, Bob Mould was in doing overdubs and mixing his album for Virgin Records, with Steve Haigler engineering and Tanzer assisting. . . Marcel Monroe were at Crystal Sound Recording in Manhattan working on their upcoming release for Certain Records. Larry Buksbaum engineered the trio's efforts, with assistance from Nicole Kelly and Jean-Marie Horvat. . . The Gibson Brothers recently finished their first live studio album at Slap City Sound Studio in Chateaugay, NY. Dan Wills engineered and produced with support from Steve Vanier. . . Northeastern Digital Recording (Shrewsbury, MA) was put in charge of digitally remastering the entire David Bowie RCA catalog, which will be released on CD by Rykodisc. The 18 masters span a 12-year period and include such titles as *Space Oddity*, *Ziggy Stardust* and *Changesone-bowie*. . . Horizon Recording Company in Wilton, CT, commenced operation in January with several album projects. Rory Block recorded for Munich Records, with Ron Bach and Alan Gorrie producing. . . Melba Moore was cutting vocals at 39th Street Music Productions in New York. Howard King produced the album for

—CONTINUED ON PAGE 22

# WORLD SERIES

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**John Hudson**

**Mayfair Recording Studios, London**

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**Dominique Blanc-Francard**

"It's great to have been involved in the development of the new computer system and its new software features. The huge increase in speed and flexibility of operation makes it by far the most advanced mixing system available. As for the sound, I'm delighted with the end result. The transparent musicality of the new electronics is a pleasure to experience, whether mixing or recording. I'd be at a disadvantage to have to work with anything else."

**Bob Clearmountain**

今や私には空気のような存在である。——時には音の発想の手足となりあるときは、複雑な要求にも応えてくれ、いや、もしかしたら求めた以上のものを与えてくれるかもしれない可能性を秘めている。今や私の仕事空間には必要不可欠なコンソールである。

内沼 映二 **Eiji Uchinuma**



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by Mel Lambert

# EDUCATION IN THE SCHOOL OF HARD KNOCKS

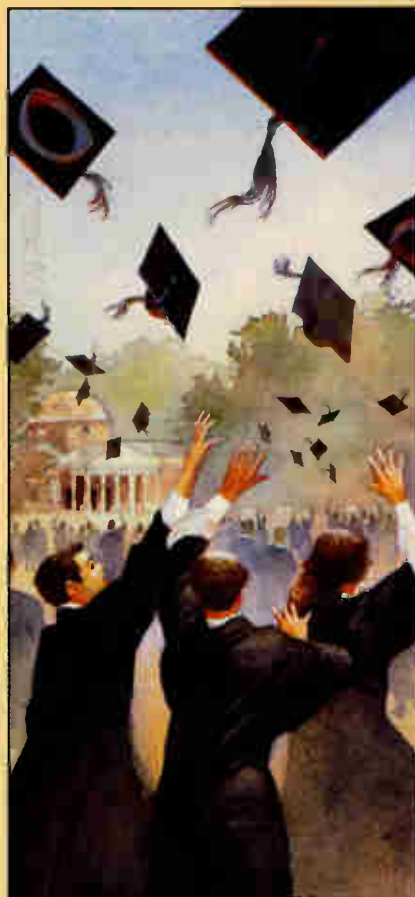
**T**he subject of education is a thorny one. We, as audio professionals working on both sides of the glass, often pride ourselves on our intuitive talents and artistic skills. And a great deal of the creativity we exhibit in the control room, the studio or onstage is indeed something that springs from within our very souls. Talented artists exist in every field, not just performance; all of us have experienced that adrenaline rush of being in the presence of somebody whose creative genius is undeniable.

But how can we mere mortals take advantage of situations that come our way in the wild 'n wacky world of professional audio? Even if we are born with that creative spark, we must learn the necessary skills to take advantage of opportunities presented to us. All too often our industry feigns ignorance of this necessary educational process. On a very prosaic level, nobody enters this world knowing how to line up an analog 24-track; that's a skill we either learn by watching somebody very good at the task, or by reading up on the subject. There are literally dozens of technical tasks that can be "taught" in the normal sense of the word. And there are dozens of excellent training courses around the world that do a wonderful job of turning out talented technicians and recording engineers.

But technical competence is only part of the equation. Of greater importance are the people skills that set apart the seasoned engineer, producer or musician from the individual new to the business. All of us have worked with such people. They immediately command your attention, even if they are simply helping out on

a pretty mundane task. When it comes to decision time, all eyes and attention naturally gravitate to that center of calm for creative decisions.

Having been around a number of new graduates from a wide range of university and trade colleges offering



audio courses, I find the spread of talents extremely wide. They run the spectrum from the technically brilliant but gauche "boffins," through the routinely competent, agreeable per-

—CONTINUED ON PAGE 23

# MASTERING THE NEW AGE



## 01 DIGITAL PRODUCTION CENTRE

Mastering and editing are as important to the quality of a record as the final mix. With the emergence of CD as the dominant consumer software medium, a new approach is needed to bring the quality of service traditionally provided by the vinyl disc mastering room to the digital domain.

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U.S. TOLL FREE NUMBER 800 343 0101

by Ken C. Pohlmann

# DIGITAL RECORDING

## EXAMINING THE STATE OF THE ART

Since its commercial advent in the 1970s, digital recording has transformed the audio industry in both the professional and consumer areas. Although analog recording is still dominant, and indeed preferred by many engineers, it increasingly carries a stigma about it, as if anything recorded in analog is lesser because of it. Digital recorders occupy a privileged place in the industry, and a studio that has invested in that technology immediately enjoys a premier position. Likewise, a digital recording often carries a special advantage, at least

with a CD-buying public that prefers the perceived all-important DDD designation. Clearly, digital recording has established itself as a mainstream technology and will inevitably increase its own market share and spread its influence by encouraging purchase of other digital technology. Soon it will be analog recording that will be viewed as a unique case, a special (and inferior) circumstance in a digital environment.

Not so clear is exactly what form digital recording technology will take in its missionary crusade. Already there are numerous digital formats, often with incompatibility within physical types. The future promises to yield still more digital formats and more incompatibility. Just as the personal computer underwent several years of consolidation, in which early and promising technology (remember the S-100 bus?) fell by the wayside, many current digital audio systems will be lost. And just as principal companies forged dominant (yet incompatible) computer environments, dominant digital audio systems will appear. Of course, woe to the studio that chooses the wrong format.

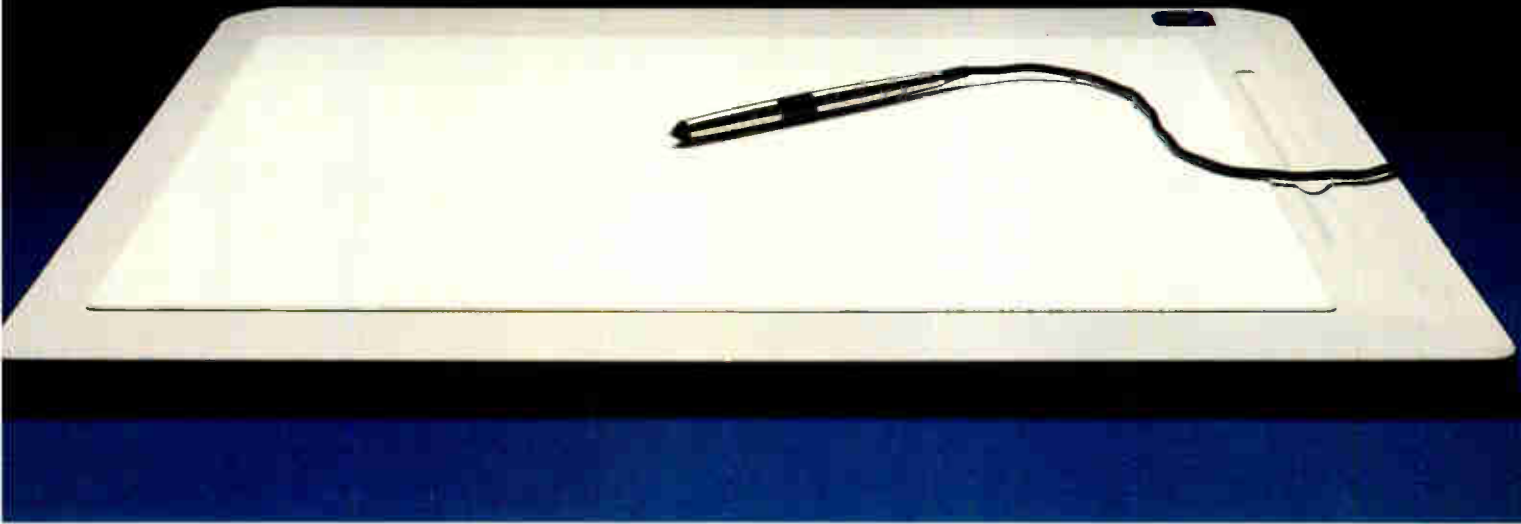
One early victim of evolution is the EIAJ format, better known through its incarnations as the F1, 501, 601 and 701. This nearly ideal format (low-cost hardware and medium) is essentially out of production. Too successful for its own good, its corporate parents never supported it, and they have abandoned it in the face of DAT.

DAT, originally designed to supplant the analog cassette in the consumer world, has been both excluded by threat of litigation and, where available, shunned by customers. Curiously, the professional world has embraced DAT, and it is the fastest-growing segment of the digital recording market. Read-after-write systems have been marketed (Nakamichi 1000)





# THE AUDIO POST ROOM



## DIGITAL AUDIO FOR VIDEO AND FILM

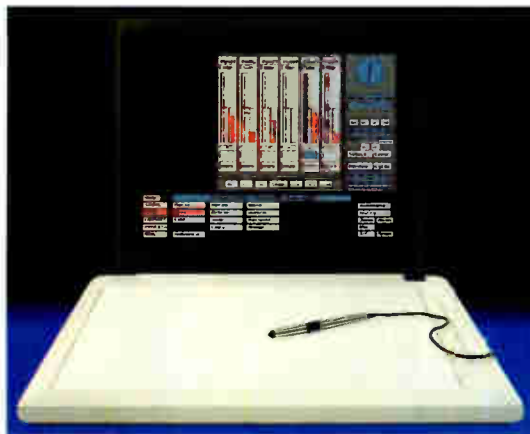
A state of the art audio-for-vision editing suite usually requires considerable investment in equipment, but above all, the patience and dexterity of skilled engineers to manipulate several tape sources to VT and film. Miracles can be performed, but the editor is often constrained from creative experimentation by the limitations of both time and his facilities.

Solid State Logic conceived ScreenSound to put more creative power and time into the hands of the editor by

eliminating logistical problems. Instead, we provide an entire editing suite in one integrated unit, with a simple pen and tablet control surface, enabling rapid editing, laying

up and track-slipping, all with the digital sound integrity necessary to meet today's broadcast standards.

ScreenSound provides the first working environment built around the editor, not the equipment, leaving him free to use his creative skills on the final soundtrack.



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as have machines with time code (Fostex D-20). The AES Convention in Hamburg saw the agreement for a universal time code standard for professional DAT recorders; the final document should be ratified at the AES Convention in New York this fall, icing DAT's lock as the standard machine for location and post-production work, and probably boosting its chances for replacing the PCM-1630 as the de facto standard for CD mastering. Of course, the next step is a DAT editing system; this, too, will take time.

The PCM-1630 and similar processors face severe competition from DAT. They are uncompetitive in terms of cost and size of both hardware and media, and their technology is showing the ravages of time. DAT machines have incorporated newer digital audio recording and reproduction circuitry, primarily borrowed from work in the consumer area. For example, full implementation of existing CIRC decoding has greatly improved error-correction ability (as in Philips-made CD players), higher oversampling rates have minimized effects of output ana-

log lowpass filters, and 18-bit D/A conversion has greatly improved low-level linearity. Similarly, several companies have developed 1-bit decoding systems, which promise cost-effective integration and high audio performance. Keep your eyes open for the

**The biggest crowds at trade shows are no longer at multi-tracks or consoles—they line up to see workstations.**

Philips SAA 7320 digital filter and dual D/A chip, which uses bit stream technology: one bit is derived from the 16-bit medium via 256-times oversampling and noise shaping, and output at a rate of 11.2 MHz, creating the analog waveform directly without need of a multi-bit D/A converter.

Incidentally, chip enthusiasts should also look for Sony's CXD-1160 and CXD-1355 DSP chips—highly efficient at effects processing and other tasks.

New technology also promises to greatly improve performance at the encoding side. For example, the CTI/dbx F410/D20C10/A1520 chip set is an 18/19/20-bit A/D converter using 128-times oversampling and noise shaping at 6 MHz; 4-bit flash conversion is employed rather than the conventional, successive approximation method. This converter yields S/N of 105 dB, THD of less than 0.005% at maximum output, 0.01% untrimmed THD at -20 and -40dB input, and a low 0.00000076% differential linearity. Sampling rates of 32, 44.1 and 48 kHz, as well as variable sampling rates, are easily accommodated. For more information, see Robert Adams' paper in the March 1986 *AES Journal*, or give a listen to Johnny Frigo with Bucky & John Pizzarelli (Chesky JD1).

Also challenged by rapidly moving technology are conventional, open-reel digital recorders. Although widespread use of professional magnetic tape will probably not outlast your home mortgage, tape still has many

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The 7110, with our exclusive program dependent Smart-Slope™, gives you adjustable compression curves from 1.5:1 through infinity:1. You set

threshold, attack, release time and output level – the 7110 automatically rides the gain with split second response.

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Just another limiter/compressor? We don't believe so. After you've heard it for yourself, we think you'll agree. Stop by your local JBL UREI dealer and give it a listen. And, get ready to rack up another hit.



*The 7110 combines the smooth predictable RMS style performance of the LA-4 with the precise automatic peak control of the 1176LN.*



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The M-600 is modular. Which means you can custom configure the console to *your* audio or video production needs. The M-600 lets you choose up to 32 input channels, or you can start with 16 or 24 input channels and expand the board as your needs change. Optional stereo modules can also be added to provide even more line inputs for MIDI instruments and video production convenience.

Installation and wiring is exceptionally easy. The M-600 is the only modular mixer that's available with all the necessary finished cables and installation hardware. And that can eliminate a lot of installation hassles and expense. At the same time, no other mixer at its price gives you multi-pin, computer-type connectors for quieter, more secure connections.

But the real pleasures of the M-600 will only be evident after it's in your studio. Up to 64 stereo or 128 mono inputs can be accessed directly from the top panel. A patch bay can be added for fast, flexible routing. That's convenience.

The M-600 has all the features you'd expect in a professional mixing console. Like balanced insert patch points on all inputs, PGM busses as well as the stereo master buss for increased signal processing capability. Plus sweep-type parametric EQ, balanced inputs and outputs, phantom power, talkback/slate channel and all the audio performance you'll ever need. Without the exorbitant price you don't need.

So check out the M-600 modular mixing console. It's ready for fame when you are.



# TASCAM

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useful years ahead. Audio is, after all, a linearly sequenced event, and a long strip of tape is not the most illogical place to store it. With its inherent advantage of random access, digital tape will be the dominant medium until something else is both cheaper and removable. Sony has introduced its full-blown implementation 48-track recorder, and surely the rest of the product line will now be implemented with 8- and 16-track recorders. In the spirit of competition, Mitsubishi has shown the X-880, an updated version of the X-850 32-track recorder. Like the X-86, it weighs in many pounds lighter due to consolidation of circuitry. It also sports an improved autolocator.

For many, random access has become a storage medium in its own right (never mind that it is backed up on tape). For production, hard disk systems have proven to be a cost-effective and reliable medium. However, studio owners' feet are put to the fire when choosing a digital audio workstation. The high cost of purchase, maintenance and incompatibility make it a decision without margin for error. In addition, it should be obvious that most of these systems will eventually go under as consolidation inevitably takes place. On the other hand, if a workstation can repay its loan in a few years, future obsolescence is not a factor. Despite their disadvantages, workstations have gained tremendous popularity due to their potential profitability. Increasingly, it is workstations that have become synonymous with the perceived development of digital audio technology. The biggest crowds at trade shows are no longer at multitracks or consoles—they line up to see workstations. Coupled with hard disk storage, workstations are the *enfants terribles* of today's audio scene.

On the other hand, hard disk storage itself remains problematic. Its large size, possibility of head crashes, complex operating system and non-removability all present difficulties. Still, hard disk technology is evolving rapidly, with higher density, smaller size and lower costs. It is certainly possible to envision several gigabytes in a small package, with DAT backup, as a viable medium. Still, non-removability dooms this medium to a finite life-span. Hard disk is, in fact, a transi-

tional, interim technology.

It is on the optical disc that much of the recording industry has pinned its hopes. Of course, playback-only CD formats have whet the appetites of professionals and consumers alike, and CD has become an effective medium for sound design and sampling libraries. Taiyo Yuden is now building its CD-R disc facility for manufacture of write-once CDs. These discs are compatible with the Red Book and thus will be playable on any CD player. WORM drives have already appeared in workstations with success. However, it is recordable/erasable optical discs that hold the most promise for the audio industry.

Fortunately, the computer industry has the same need and has sponsored aggressive development of optical storage. Companies such as Sony, Ricoh, Hitachi and Maxtor have already marketed 5¼-inch drives and media at low cost. The \$6,500 NeXT computer employs a Canon-made optical drive holding 256 megabytes as its primary storage medium. However, data transfer rates and disc access times must be improved before this particular system is wholly satisfactory for discriminating hackers.

Surely it will not take too long (or too much genius) for a company to take an existing, off-the-shelf, optical drive (holding 1 GB and costing \$7,000) and incorporate it in a digital audio record and reproduce system, and market a 2-track optical recorder for under \$20,000. Surely this should be available by 1990 or 1991 at the latest. For a company like Sony, this project should be a snap. Of course, multi-track optical recorders, using either optical disc or tape, would be the next logical step, but that would require a much longer development time.

One thing is certain: digital recording technology is developing at a remarkable pace and proliferating throughout the audio (and video) industries. The future will see consolidation in existing formats and the advent of optical recording. Until then, we'll have to ride the rough (and exciting) seas of transition, from analog to digital recording. ■

*Ken C. Pohlmann is author of Principles of Digital Audio and The Compact Disc: A Handbook of Theory and Use. He also holds three successive international championships in tractor-pulling competition.*

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Capitol Records with engineer Steve Goldman and assistant Ed Douglas. . . In the SSL room at Power Play Studios in Long Island City, NY, KRS One was busy producing Sly & Robbie for Island Records, with Dwayne Sumal and Rebekah Foster engineering. . . Selcer Sound (Brighton, MA) reports that drummer Bob Moses was almost finished with his album project, engineered by Brian Ales. . . Urban Blight continued work on their next Atlantic Records release at Sound on Sound Recording in New York. Producer/engineer Stephen Benben was assisted by Peter Beckerman and Kevin Forrester on the project. . . At Calliope Productions in New York, Capitol artist/producer Glenn "Sweety G." Toby produced tracks for an upcoming Evelyn King album for EMI, with help from programmer Gregge Tupper. . . Scott Gordon Enterprises in Paramus, NJ, was selected to produce *The Italian American Serenade*, a syndicated radio show. Scott Gordon engineered the project, a nostalgia program featuring historical Italian language recordings. . . At Blank Productions in Stamford, CT, Bob and Lola Blank produced a series of French and German rock songs for APM and created their own record label, LOLA Records. . . Audio mixer John Alberts completed the post-production audio mix for KRT Productions' *Sting Live in Japan*. Recordist and music mixer Jay Vicari worked closely with Alberts at Howard M. Schwartz Recording in Manhattan using its Sony PCM-3348 48-channel digital recorder. . . Steve Lunt and Eric Beall were at Hip Pocket Recording Studios in NYC producing tracks for Brenda K. Starr. Butch Jones was at the console, with assistance from Aaron Clapp and Pat Sweeting. . . Also in New York, Martee LeBow was at Pyramid Recording Studios producing four new songs with her band. LeBow's engineer, Mike Golub, was assisted by Angela Dryden and Joe Warda. . . Producer Gail King was at D&D Recording in NYC working on a remix for PolyGram artists Shakatak, with Mac Quayle programming and Kieran Walsh engineering. . . At Acme Recording Studios in Mamaroneck, NY, producers Joe Ferry and Jeff Andrews began work on an album of previously unrecorded compositions by the late Jaco Pastorius. Rory Young engineered. . .

## NORTH CENTRAL

Epic Records recording artist Chris Bender was at Studio A in Dearborn Heights, MI, laying down vocals for his first single release, with Eric Morgeson producing and

John Jaszcz behind the board. . . At ARS Recording Studio in Alsip, IL, Keith Keyman Edwards finished a new single, "It's You," for Island Records. Rick Seipak produced. . . Daryl Thompson completed the DAT mastering of his latest new age album, *Life Flow*. Fred Breitberg handled the AMS AudioFile editing and assembly at Chicago's Streeterville Studios. Thompson and Joe Tortorici produced the project. . . Mike Muntzel was at Alpha Music Productions in Lenexa, KS, working on a nine-song album release for Alpha's new label. Glenn Major produced and engineered with help from Bill Colburn. . . Portions of Kiara's "Every Little Time" were mixed at the Disc Ltd. in East Detroit. Greg Reilly mixed on an SSL G Series console to a Mitsubishi digital 2-track. . .

## NORTHWEST

Russian Hill Recording in San Francisco reports a flurry of commercial activity, including a series of humorous TV spots for Skippy Dog Food. Producer/editor Miodrag Certic and producer Cindy Fluitt worked on effects, Foley and dialog with Russian Hill's sound editor, Sam Lehmer. . . News from Fresno, CA: Bob Siebenberg (Supertramp) recorded and mixed with Heads Up! at Maximus Recording Studios. John Punter engineered the 48-track project with assistance from Jeff Hall. Also at Maximus, Buck Owens recorded several songs for *Hot Dog*, with Hall and Terry Geiser engineering. . . Narada Michael Walden was at The Plant in Sausalito, CA, with co-producer Walter Afanasieff producing the group License to Kill's title track to the new James Bond movie. Dana Chappelle engineered with Stuart Hirotsu assisting. . . Reggae engineer Scientist teamed up with Jah Levi of Jah Works Studios in O'Brien, OR, to mix several new releases for Theocratic Records. . . Poolside Studios in San Francisco recently completed audio post-production for a stress management video, *Desert Life*, to be distributed in Japan. The soundtrack was composed by Timothy North of the electro-industrial cyberpunk group Rhythm and Noise. Post-production was completed by David Nelson with technical support by Naut Humon. . . At Ironwood Studio in Seattle, engineer Paul Scoles and producers Mike Lynch and Jan Kurtis were busy working with country songwriter Darren T. Maddy. . . Force M.D. stopped by Starlight Sound in Richmond, CA, to work on some tunes with producers Thomas McElroy and Denzil Foster. Ken Kessie and Steve Counter engineered the sessions and Ray Floyd assisted. . . Shari UI-

rich and Bill Henderson co-wrote and produced a public service announcement for the Foundation for Immune Disease in Vancouver, BC. The spot, produced at Mushroom Studios, promotes condom use by teenagers and will be shown in movie theaters around the province. . . George Benson was at Lahaina Sound Recording Studio in Maui working on jazz tracks with Dave Russell at the console. . . John Francombe handled pre-production and programming of Suzanne Ciani's new album at his San Rafael, CA, home studio. Basics were recorded at The Site in nearby Nicasio. . .

## STUDIO NEWS

Eastern Sound in Toronto completely redesigned and equipped its three 24-track rooms. Additions include a 60-input Neve V Series III console with Necam 96 automation and a Sony PCM-3348 48-track digital recorder. . . Nashville-based audio console manufacturer Harrison Systems, Inc. announced shipment of the largest Series Ten system built to date to EFX Systems in Burbank, CA. The system is fitted with 64 input modules for a total of 128 automated inputs. . . A Solid State Logic G Series computer was installed at Different Fur Recording in San Francisco. The upgrade included twin Bernoulli 20MB disk drives, 2MB RAM, new software and a G Series keyboard. . . New Age Sight and Sound in Atlanta recently acquired a Neve V 60 Series MkIII 60-input console with Flying Faders automation. . . Premier Recording in Washington, DC, recently completed a \$100,000 studio expansion. New equipment includes a Dyaxis digital workstation, Sony PCM-2500 R-DAT and an Otari MTR-10II. . . Jeffers and Meralie Adams Dodge have opened a 24-track studio in Glendale, CA, called Dodge City Sound, featuring a Trident console with Otari 2-inch and 1/2-inch machines and a full array of outboard equipment. Lakeside & Associates were contracted to design the control room. . . Terminal Studios in Jackson, MS, recently installed a new Trident 80 B/C Series console with 46 channels of disk-based automation (also added, a Casio FZ-1 and Emax sampler). . . Under construction: at Middle Tennessee State University an extensive mass communications teaching facility, designed by The Joiner-Rose Group. The 85,000-sq. ft. facility in Murfreesboro, TN, will feature two control rooms and studios, MIDI labs, a full television stage with audio and on-air control rooms, two video post rooms, ten video edit suites, and other classrooms and labs. ■

## JUXTAPOSITIONS

—FROM PAGE 14

sonality of the middle ground, to the creative types who absorb technical facts at a pace that is frightening to behold, but who at the same time can interact with musicians on their own level, and who instantly earn the respect of session producers.

Just where do these enviable interpersonal and interdisciplinary skills come from, I wonder? Some of them can be taught by example, and there are indeed such courses that are being created and taught by world-class educators and articulators of the recording arts. But it's often said that a fine artist or sculptor is born; creative skills of that caliber cannot be taught. I wonder if the same is true of the top-flight engineer or producer?

Is there some tangible essence that comes from within, which sets apart the gifted audio professional from the rest of the herd? I recall many conversations and in-depth interviews I've had during the past dozen or so years with some of the most talented people to have graced a production console. Their work has been admired by both their peers and the public—although not always in that order, nor in equal proportions—and their recorded or live work shows care, attention to detail and a determination to excel at whatever the production requires.

In just about every instance, these people have been interesting and fascinating human beings; that they choose to earn their living in the studio, on the road in support of a cabaret act or in the bowels of a network post-production facility seems to be entirely incidental. What drew them to these diverse but related professions, I'm forced to conclude, is usually a sense of wanting to be part of the creative process, but with a major emphasis on its technical dimensions. So, instead of choosing to perform in front of the microphone—and again it is hardly surprising that so many recording and production engineers are also accomplished amateur/semi-professional musicians in their spare time—they are content to refine their sound-mixing chops to ensure that the performance is captured as faithfully as possible.

I wonder if many of the fledgling engineers who are literally flocking to the audio schools and universities understand the dynamics of getting

ahead in this business. What do they expect life within a recording or production studio to be like? Usually very different from the way it turns out, I've learned from talking to applicants before, during and after they graduate. I find that many attempt to get into this industry for all the wrong reasons: fame, fortune and the chance to hang out with the stars of stage, screen and television. A big maybe on that one! In the beginning it means long hours for little pay, as the first engineer and the producer—along with the musicians and production talent—scope out the new guy or gal to see whether they behave professionally under less than ideal circumstances. So those training sessions in the school or university—usually involving too few actual hands-on hours at the board, and seldom if ever with “uncooperative” or “anxious” clients—offer little comparison with real life.

And what of the interpersonal skills that we all need to hone on the job? I seldom hear of students being involved in classes that feature “Psychology of the Talented Artist” or “How to Salvage a Perilously Rebellious Overdub Session.” All too often it's a case of sink or swim. One side of

me says that's a good thing, because nobody can prepare you for the first day on the job; another side contends, however, that it's also a waste of human talent.

I believe this industry is populated by some of the nicest human beings it has been my pleasure to encounter. The sad fact, however, is that few of these students get the opportunity to fully experience it ahead of time to determine if it's the sort of lifestyle they want to adopt (or whether they have the personality to adjust to some of the psychological bullies who pass for creative talent).

All in all, it's a dilemma faced every day by our technical schools and universities. By and large, I feel the vast majority do an excellent job of preparing their students for the technical side of the operation. But we mustn't overlook the fact that ours is a “people” industry; getting on with people means getting ahead. A plain truth. ■

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

# M-1

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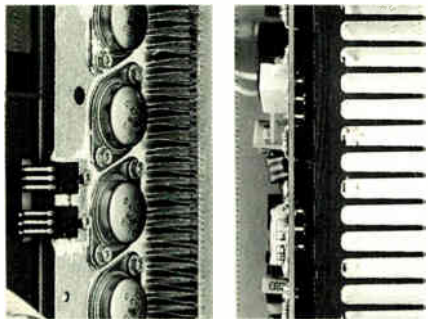
Circle #127 on Reader Service Card

# Warning: To Avoid Risk Of Shock,

## Ignore This Amp-To-Amp Confrontation.

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

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



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

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

### TAKING THE HEAT

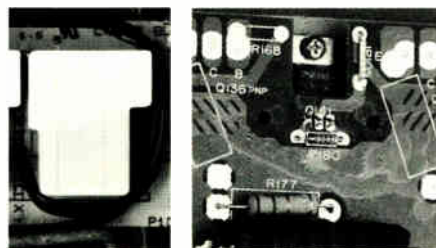
If the MacroTech heat exchanger reminds you of an air conditioner, you've grasped its design. This approach works, at least until dust and dirt clog the fins. But as soon as the air flow slows or stops, temperature rises. Soon after that, the Crown shuts off — it could even fail.

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

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

### REAL SPEAKER PROTECTION

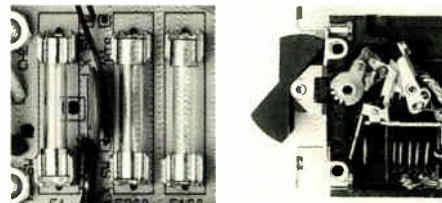
Most amps today are direct coupled, so a blown output transistor (the most common failure) connects the power supply directly to the speakers. Earlier MacroTechs had no protection against DC. Now Crown has learned their lesson — or have they? The sensing circuit and relay they now use shuts off the power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



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

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

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



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

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

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



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by Stephen St. Croix

# SCHOOL DAZE

**T**hose of you who actually read my stuff may have noticed that I was gone last month. I am back. I went out into the real world for a little more education. For those of you who never noticed, never mind.

what it all does to the *sound*? Or maybe one who knows all that *and* has studied music, too, so that you can actually communicate in real terms?

Or let's say you are looking for a piece of audio hardware. Would you



We have this sort of game here at *Mix* where the editor in chief asks me to write about a certain subject, and I don't.

Well, this time is different. I have been asked to touch on a subject so important, so critical to us all, that I could not decline: education. Actually, it is not even possible to fit what I would like to say on this subject in *ten* columns, but I will try to squeeze the basics into this one.

If you are a player, who would you rather work with: an engineer who has figured out what all the knobs do, and maybe even what the meters mean, or one who has actually learned

rather pay more for a product that tries to get it done the wrong way, or less for one that does it the right way? With the exception of ultra-high-end technology, that is often the deal, because only educated designers already know what to do in the design areas where the answer is known, so all the money spent on *their* research goes to areas where R&D is actually needed. This sure beats reinventing the wheel just because the engineer didn't know that the wheel was already in use across the street.

Say, boys and girls—had enough of those silly audio salespeople who are trying to sell you something you al-

## THE FAST LANE

ready know more about than *they* do? Or worse yet, the ones who try to sell you something that you feel you might need, but you don't know enough to ask the right questions to find out if he or she knows the answers? So neither of you knows, and there you sit? I *bate* it when that happens.

On the other hand, most of us will happily stick with a salesperson who shows signs of being educated enough that we can believe their answers. If we find one.

Each of us feels the impact of both of these conditions—well-educated and uneducated co-workers—every single day. The few educated ones are clearly in demand, while the others are, well, not. Have you ever felt that the ranks of the “others” are growing? The decline of the United States as a technological leader is really based on (you guessed it) education, or, in fact, lack of it. It's not just that we don't know what to do, we don't even know how to *learn* what to do!

Now I am surely not advocating that we all run out and sign up for the

Recording Institute of Scarbolia, which promises to turn out professional engineer-type graduates in three months, ready to pop right into those thousands of job opportunities that are just waiting outside the door on graduation day.

I am talking about *real* preliminary education. The school system is no longer providing musically educated people to work in our industry. I don't mean that the top music-oriented universities are not competent; on the contrary, the top ones are excellent and needed desperately. But how many people actually come out each year? Wait—how many *enter*?

The American education system does very little to attract those interested in music today. It does even less to attract those who might be interested tomorrow. By this I mean the entire system, starting with young children.

You know the rap—there won't be any trees to harvest tomorrow if we don't plant them today.

How can we fix this? Taxes? Grants? Persuasion? Violence? Come on! This is America. Private sector money is what gets it done here. Money comes

from business. The future of our industry is dependent on educated newcomers. They will exist only if new kids get involved early enough. This will happen only if they are exposed to interesting, attractive glimpses of the music-making processes when they are very young.

Tree companies are finally being forced to learn that it is *they* who must plant the trees to replace the ones they cut down. No one else is going to do it, and no one else could be as well-qualified.

It's the same for us. Short of college-level (and in too many cases, *including* college-level), the quality (not to mention the budget and the size) of music school programs has fallen alarmingly in recent years.

Okay, so it looks like we have to face up to the facts. Music education simply cannot be left alone to coast. It is *not* self-propagating. We, as an industry, must look ahead and provide the foundation for our own survival.

There is nothing bad about private industry stepping in to reverse the downward trend in adolescent music education in light of the fact that it is becoming painfully obvious that the sys-

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tem no longer spontaneously survives.

What? You say that private industry involvement is there only to propagate a future market for their own products. So? If it gets the job done, who cares? Nothing else is currently working.

If a company wants to take the long-range view—if it wants to step in with grants, special educational programs or maybe specially priced hardware, with the underlying concept that having kids stare at the company logo for eight years, only to eventually graduate to pursue the business of the art that they have learned—fine. Of course, these kids will need to go directly to the closest music store to purchase a keyboard (made by... well, let's see now...). If a company helps to provide high-quality education where there was none, and they want the reward of improved name-brand loyalty, it seems an equitable arrangement to me. Actually, *many* of the really big boys do some form of this; it is just a part of business.

If I ever manage to get too old to make music, I damned well want the kids who take over to know everything that I did, *and more*. Right now, they don't! Where are those Young Turks nipping at my heels? I don't actually want to feel a bite, of course, but I do miss seeing them there when I turn around to check.

On my flight back from last month's journey of enlightenment, I happened to be seated next to Stan Stitgen of Yamaha. As the dinner conversation evolved, I revealed that I was working on a column addressing education in our industry.

Surprise. Yamaha has an ongoing program for just that. The company is quite concerned because there are so few teachers, and the existing school programs are so atrophied. Mr. Stitgen gave me a booklet that said, among other things, that the elementary music instructor population is shrinking to an all-time low. In San Diego, roughly 65,000 elementary students are taught by a total of five music specialists. That's one for every 13,000 kids! I guess L.A. had better not look south for the next generation's players or composers!

A huge Japanese-based company cares about what goes on in the school system in America, because it wants as many little school kids as possible to become little Yamaha customerettes. Early, and often. This is

fine with me. If it takes the money of private business to drive the machine of education, so be it. Industry-driven education is great when the alternative is none at all.

In the case of Yamaha, it seems that this obvious business formula has evolved beyond just that. Stan Stitgen is an American. He is corporate vice president of Yamaha Corporation of America and is chairman of the board of trustees of the Foundation for the Advancement of Education in Music. At the end of the flight I felt that his interest in all this reflected a genuine concern for the problem of music education today. As a result of that discussion, I went on to research more about the topic, and found what I tell you here. It completely changes my original column concept from educating our friends and workers, to educating our *kids*. It seems that my original ideas were way too shortsighted.

It is no secret to anyone that the American education system is damaged and suffering. It is also no secret that the highly competitive, industry-driven Japanese education system is healthy and productive. It may, in fact, be a little *too* healthy, when you consider that the competition for acceptance to the preferred *kindergartens* is so severe that there are stories of parental suicide stemming from a child's rejection. There are even schools to teach very little children how to gain a competitive edge *in applying to schools!*

What can *we* do? Well, in addition to keeping an eye on the plans of the big companies' education programs, we can make a real effort to educate our own employees, whether salespeople in music stores and pro audio dealerships, or techs and engineers in studios and production houses. This must come both from the manufacturers themselves and the facility owners if it is to realistically make a difference. Remember? Like the old days when we were all interested?

Wake up America! We can't compete if we don't even understand what we are doing.

I should refrain from closing with the old cliché that knowledge is power. But it is. ■

*Consulting editor Stephen St. Croix apologizes to the guy who wrote in and said he likes it better when he keeps it funny.*

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# THE NEW GENERATION OF DIGITAL RECORDERS

## PRESENT AND FUTURE DEVELOPMENTS

by George Petersen

As we look at the offerings in the second and third generations of professional digital recorders, one point becomes clear: digital is better than ever. And it's not just hype—advancements in thin film heads, upgraded filtering circuitry and refinements in LSI technology have all made a significant impact on the current state of the art. Clever use of large-scale integration, for example, has yielded smaller recorders with fewer components, resulting in greater reliability, reduced pow-

er consumption and lower manufacturing costs. In fact, the latter has been enough to keep retail prices stable, despite the dollar's poor showing against most foreign currencies.

We checked in with the manufacturers of professional audio recorders in the DASH (Digital Audio Stationary Head) and PD (ProDigi) camps, and offer this update on the latest models and developments. Also included is an up-to-the-minute report on a newcomer offering a unique and affordable multitrack alternative. Unfortunately, space and time limitations preclude



Now that Neve is distributing Mitsubishi digital products in North America, the user base of PD-format, X-880 32-track recorders should be on the rise.

Last fall, Sony created quite a stir with the debut of the PCM-3348, offering 48-track recording on ½-inch tape.



covering the burgeoning DAT scene in this article, but we'll delve into that topic in the months to come. Stay tuned.

#### AKAI

Having made its public debut at last year's AES Convention in Paris, Akai's A-DAM (Akai-Digital Audio Multitrack) system is finally being delivered. A-DAM is a 12-track digital recording package offering up to 17 minutes of recording time on readily available, standard 8mm videocassettes. An analog auxiliary track is provided for cueing or time code functions.

The \$35,000 system is comprised of

the DR1200 recorder, DL1200 programmable autolocator and DM1200 meter bridge (all rack-mountable). Since the DL1200 can simultaneously control up to three DR1200 transports, users can upgrade the system to 24- or 36-track operation with the purchase of additional DR1200/DM1200 units.

A DAM's specifications state a 20 to 20k Hz frequency response (+1 dB, -1.2 dB), a dynamic range of over 90 dB, switchable 44.1/48kHz sampling rates, 16-bit linear quantization and double RSC (Reed Solomon Code) error correction. Features include balanced (+4dBm) XLR inputs and outputs, ±6% pitch change, selectable

digital crossfade times (12, 23, 46 or 93 ms) for smooth punch-ins/outs, auto punch-ins/outs (accurate to within a frame), spot erase capability and storage of up to 100 cue points and stack numbers.

Among its rear panel connections are ports for an external error-rate counter, internal sync in/out, aux track in/out and a proprietary digital in/out terminal. The latter allows clone copying from one A-DAM unit to another in the digital domain and provides access for the optional Akai DIF1200 AES/EBU digital interface unit. Other options include a roll-around stand for the autolocator and a 7.5-meter

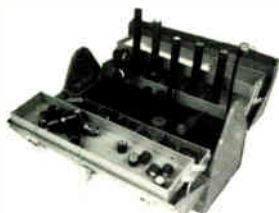
**Akai is now delivering its 12-track A-DAM system, which is expandable for 24- or 36-track recording.**



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## Large-scale integration has yielded smaller recorders with fewer components, resulting in greater reliability, reduced power consumption and lower manufacturing costs.

cable for doubling the separation between the locator and the recorder.

Akai Professional, 1316 East Lancaster, Fort Worth, TX 76102, (817) 336-5114.

### MITSUBISHI

At this year's NAB Show in Las Vegas, Neve announced that it is now the

exclusive North American distributor for Mitsubishi professional digital audio products (see last month's "Current").

Unveiled at last fall's AES Convention in Los Angeles, the X-880 is the flagship of Mitsubishi's ProDigi line. Priced at a suggested retail of \$156,000, this 32-track recorder represents the

---

### Studer 48-track DASH prototype



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# The Essentials of Recording.

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of available headroom, increased signal-to-noise ratio, and distortion-free recording at a cost far below the digital alternative, with the convenience and speed of editing that only analog tape allows.

The Model 363 contains: two channels in a 1-U high frame, record/play switchable either from the tape recorder or locally, transformerless balanced and floating input and output circuits, Auto Compare test facility with built-in noise generator and LED metering, and a hard bypass facility.

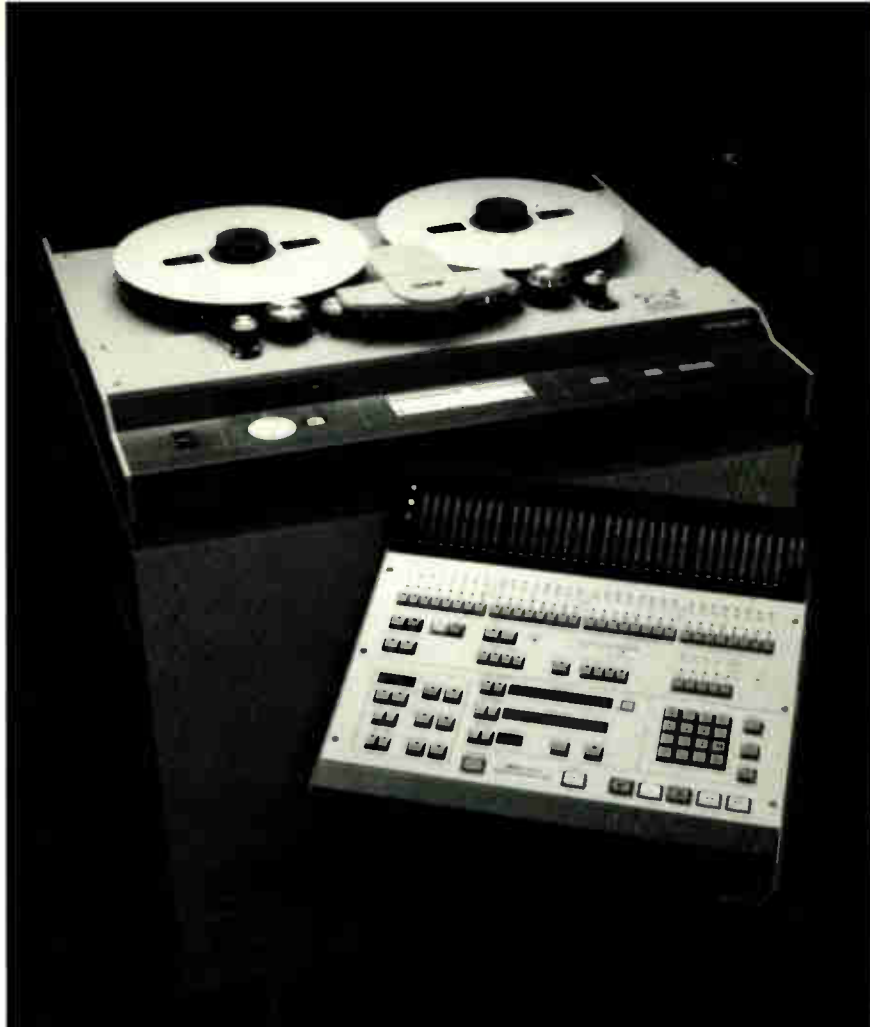
All audio facilities—music recording, video post-production, broadcast and film—will find the Model 363 is simply the most compact, essential unit available for outstanding audio.



company's third generation of digital multitracks and maintains complete tape compatibility with the earlier X-850 series. The first domestic X-880 sale came last fall, to Conway Recording Studios in Hollywood; recent deliveries include a machine going to Digital Associates, where they expect to keep the machine busy in Nashville's healthy digital rental market.

The extensive use of large-scale integrated circuits throughout the X-880 has dramatically decreased the unit's size and weight—now 50 pounds lighter than its predecessor. Other improvements include linear-phase active analog filters, a "remoteable" meter bridge and a pull-down front panel that conceals power on/off, emphasis select, ping pong (digital track bouncing) switching and system status controls.

Options for the X-880 include the CS-1 plug-in chase synchronizer (offers sync resolution of  $\pm 20$  microseconds for phase-coherent, 64-channel recording or intermachine editing), an analog remote interface (IF-SSL 1) for controlling the X-880 from SSL



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Model 363

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**Sony PCM-3402 two-speed DASH recorder**

consoles, and a DIF-32 AES/EBU digital interface unit.

Currently the only 16-track digital recorder in production, Mitsubishi's X-400 (\$36,000 retail) is a 1/2-inch, PD-format machine that has found favor with companies involved in audio-for-video/film work. New York City-based Phantasmagoria Productions recently upgraded its facility with an X-400 to keep pace with its steady stream of film clients.

The X-86HS (\$31,000 retail) version of Mitsubishi's X-86 2-track samples and records at 96 kHz, the highest sample rate available on any digital 2-track recorder. The X-86HS has selectable sample rates of 44.1, 48, 88.2 and 96 kHz, and tapes recorded at the two lower sampling rates are fully compatible with other members of the X-86 line.

Besides the standard X-86 2-track (\$16,800 retail), Mitsubishi offers the X-86C (\$30,000), a version that also offers full playback compatibility with tapes recorded on X-80 machines.

Neve/Mitsubishi Digital Pro Audio, Berkshire Industrial Park, Bethel, CT 06801, (203) 744-6230.

#### **OTARI**

Another ally in the ProDigi camp, Otari's current offering is the DTR-900B, its second-generation digital 32-track. The company announced the first U.S. deliveries of the \$150,000 (pro user price) machines last fall. The DTR-900B features entirely redesigned autolocator/remote hardware

and software, in-house manufactured heads and PC boards, expanded use of VLSIs for greater reliability and less power consumption, and improved  $\pm 15$ -volt power supplies to accommodate optional Apogee Electronics lowpass filters in the A/D and D/A sections.

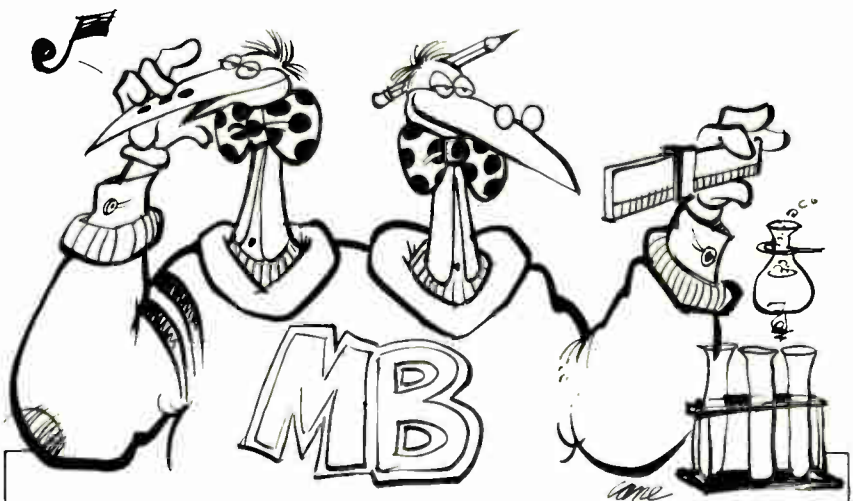
Other options include a plug-in chase synchronizer module (EC-104), which simplifies locking the DTR-900 as a slave to a master time code source, and a CB-503 PD-to-DASH-to-PD format converter enabling bidirectional transfers between the DTR-900B and any DASH multitrack recorder—entirely in the digital domain. Most of the

new features of the B series can be retrofitted to the earlier DTR-900 models.

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

#### **SONY**

The earliest advocate of the Digital Audio Stationary Head (DASH) format, Sony continues to be a leader in digital technology, especially with the introduction of the PCM-3348 48-track recorder at last fall's AES Convention in Los Angeles. Since that time, Sony has delivered approximately 50 of the \$240,000 machines worldwide, with



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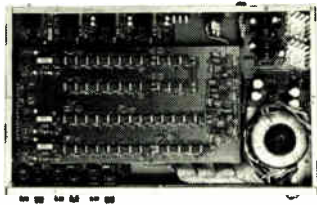
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10 recorders in the United States. As stated in *Mix's* report on the PCM-3348 (November 1988), the recorder uses the double-density DASH format. Thus, basic tracks can be recorded on any standard 24-track DASH deck, and production can continue by using the (upwardly and downwardly) compatible PCM-3348, providing 24 extra tracks available for overdubbing and mixing. Other features include a total recording time of up to 69 minutes, two-times oversampling, digital FIR-type filters, a power consumption of only 1,200 watts, and improvements in the DACs and associated analog circuitry.

Sony has been delivering the 24-track PCM-3324A recorders to the U.S. for about a year now, and the \$139,000 machine shares many of the performance upgrades of the PCM-3348, such as two-times oversampled digital input/output converters, linear-phase digital filters and low power consumption.

On the 2-track front, Sony currently offers two choices: the PCM-3202 and the PCM-3402. The latter is a \$28,000, two-speed machine with many features provided for manual or electronic editing and synchronization applications. A new serial interface software package—which allows the deck to be controlled remotely by a Sony BVE-9000 video editor—is now available as a free upgrade to PCM-3402 owners. With an eye toward accommodating the growing need for DAT editing systems, Sony has reintroduced the single-speed PCM-3202 2-track. This \$15,000, 15-ips recorder incorporates some of the improved playback circuitry designs from the PCM-3402, and like all DASH 2-tracks, offers simple razor blade editing.

Sony Professional Audio Division, 1600 Queen Anne Road, Teaneck, NJ 07666, (201) 833-5306.

### STUDER

The big news from Studer is that a 48-track digital recorder is on the way, with initial deliveries slated to begin in 1990. A prototype of the new model, designated the D820-48, was shown in Montreux, Switzerland, at last month's Montreux TV Seminar. Details about the new machine were sketchy at press time, but suffice it to say, the double-density DASH format recorder is based on the proven 820-series transport, and Studer is no newcomer to the digital multitrack

—CONTINUED ON PAGE 47

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## TASCAM

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# DAT

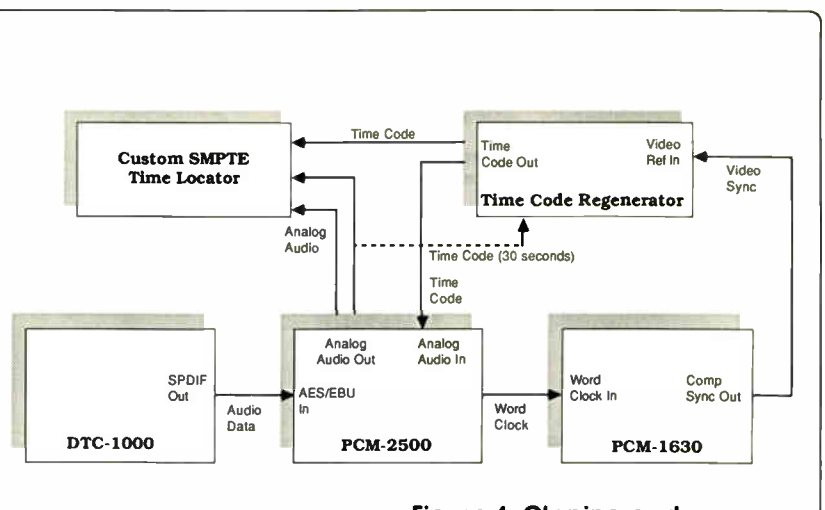


Figure 1: Cloning and PQ Point Locating

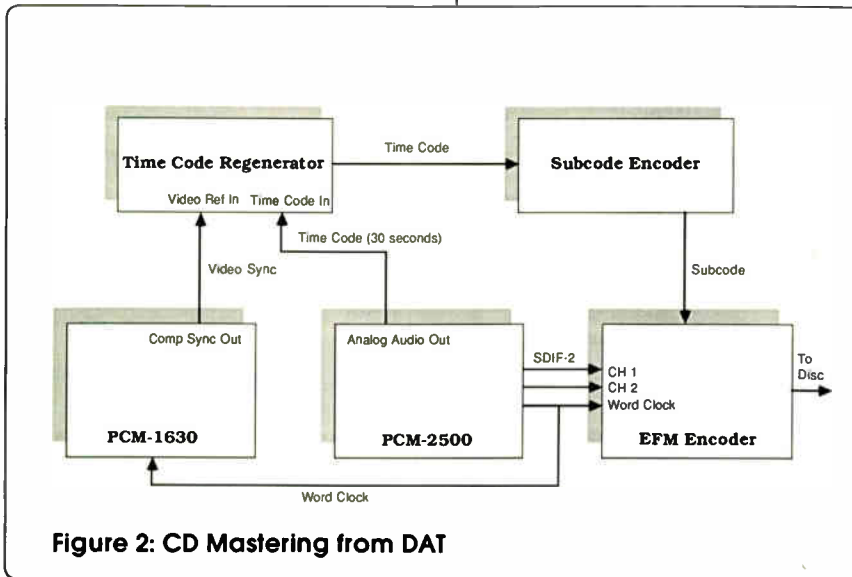


Figure 2: CD Mastering from DAT

approached me about engineering the label's next project, I saw my opportunity. Anello was enthusiastic and saw how his jazz label could benefit from the combination of DAT recording and computer-based editing.

## THE RECORDING

Our recording artist was a straight-ahead jazz group consisting of leader Chiz Harris on drums, Joe Letteri on piano, Jay Migliori on tenor sax, Conte Candoli on trumpet and flugelhorn, and Isle Eckinger on bass. White Field Studio in Santa Ana was chosen as the recording site, mainly for its exquisite 1915 Steinway concert grand piano

When we think of the country's major recording centers, Los Angeles, New York and Nashville usually come to mind, not Orange County, California. Similarly, when the conversation turns to professional digital recording, we usually mention DASH, ProDigi and PCM-1630 formats, not digital audio tape.

Nevertheless, I'd like to tell you about a project recorded directly to DAT, edited on a hard disk system and transferred back to DAT, with the edited DAT then used to cut a master disc for CD replication. To my knowledge, this is the first CD made entirely in the DAT format, bypassing PCM-1630 and 3/4-inch, U-matic hardware. The entire project—even the CD manufacturing—took place in Orange County.

I work daily with 3/4-inch, U-matic, CD master tapes at Discronics' Anaheim facility. I advise people on how to get projects into a form acceptable to a CD manufacturer. As you can imagine, questions arise about DAT's suitability as a pro digital recording

format. Many clients are sensitive to the high cost of 3/4-inch, U-matic editing and CD premastering.

So I decided to do a project entirely in the DAT format to explore its capabilities and limitations in a demanding professional environment. I also set the requirement that the signal remain in the digital domain during the entire process, with no intermediate D/A-A/D conversions.

Besides investigating DAT's professional capabilities, another objective was to explore computer-based, hard disk editing systems. After seeing a demonstration of Sonic Solutions' Macintosh-based editing system at the AES Convention, I realized its potential to revolutionize digital audio editing, signal processing and CD master tape preparation.

When jazz guitarist John Anello, the producer and owner of Cexton Records (based in Costa Mesa, Calif.),

## Testing the Limits in Recording, Editing and CD Mastering

and its collection of vintage tube microphones.

We recorded onto a Sony PCM-2500 professional DAT machine and its consumer counterpart, the DTC-1000. The PCM-2500 recorded at a sampling frequency of 44.1 kHz, the backup DTC-1000 at 48 kHz. (Consumer DAT machines don't record at 44.1 kHz, to prevent digital-to-digital recordings from CDs. This also limits a DAT machine's usefulness to the professional. CD master tapes, whatever the format, must be recorded at 44.1 kHz. Sampling frequency conversion would be

BY ROBERT HARLEY

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required if our "consumer" tape were to be used.)

The session was recorded live, with the stereo outputs of White Field's 36-input, DDA AMR-24 console driving the two DAT machines. Dischronics CD premastering engineer Joon Kim handled the two DAT recorders, and I engineered the session, with Scott Macklin seconding. John Anello produced.

The session went well, with some great performances by these veteran jazz players. We recorded nearly two hours of music, which ultimately would be pared down to 71 minutes for the CD release. With the original, unedited master DATs in hand, we faced the problem that confronts many DAT owners: master tape editing.

#### EDITING AND CD MASTER TAPE PREPARATION

The conventional method of getting a project on CD involves transferring the 2-track master tape (whatever the format) to 3/4-inch, U-matic tape in the PCM-1630 format. Editing is then performed by transferring digital audio data from one 3/4-inch machine to another, using a digital audio editor. Equalization or other signal processing is accomplished by routing the signal through additional digital hardware. Fades are performed manually, as in analog disc mastering.

Sonic Solutions (San Francisco) takes a completely different approach. Their "Sonic System" is a complete, desktop digital editing and signal processing system based on the Mac II. It represents a milestone in digital audio technology and a harbinger of the future of editing and signal processing. It consists of the computer, hard drive and Sonic Solutions' custom circuit board and software. The Sonic System interfaces to the user's digital recorder through AES/EBU or SDIF (Sony Digital Interface) digital input/output ports.

The system provides three main screens: a graphic waveform display, a mixing desk and a crossfade screen. A full description of the Sonic System and its capabilities is beyond the scope of this article, so let's focus on how we used the Sonic System to convert the unedited DAT master to a final CD master tape.

One of the first Sonic Systems was purchased by Digital Brothers, a recording company in Costa Mesa. Co-owner Ben Shaw performed the edit-

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ing on our project.

First, the DAT master was played back on the PCM-2500, loading digital audio data (via the SDIF port) to the Sonic System's hard drive in real time. Each tune was given a "Soundfile" name, usually the name of the track and the take number. When all the music that eventually would end up on the CD was loaded on the hard disk, the editing began.

The track we wanted first on the CD was called up by its Soundfile name and displayed on the waveform screen. The system displayed the dynamics of the entire tune. Then we used the mouse to "grab" a small section of the beginning of the tune and display it in much greater resolution below the first display. This made it possible to find the attack of the first note. The cursor was placed at the attack, and this point became the edit-in point. To make sure the edit was in the right spot, the system played up to the edit point, then played starting from that point.

To achieve precise location of edit points, the system offers a rock-and-roll feature. Analogous to rocking the reels on a tape machine, this allows shuttle or jog slow-motion play near the edit point. Direction and speed of jog and shuttle are controlled by direction and speed of the mouse. In addition to hearing the music as in analog editing, you can see the edit point move in relation to the waveform. The audio and visual cues, and the display's high resolution, combine synergistically to provide astonishing accuracy in selecting edit points. Slight movements of edit points are performed and auditioned quickly and easily.

During the original recording session, no fades were done with the console master faders, allowing for greater flexibility during editing. It was necessary to fade each track on the Sonic System: a section was grabbed by the mouse and displayed in an expanded scale. The mouse was used to select begin and end points of the fade, and the fade "curve" was selected from the mixing desk screen. We chose from several preset fade curves, or tailored the fade as required. Once a fade was chosen it was auditioned and, if acceptable, stored.

This process was repeated for each track that would go on the CD. When the entire program was assembled and displayed, it was a simple job to

review all track start and end points: just click the mouse near the point to be reviewed, and the system begins playing. The ability to jump instantly to any portion of the 71-minute program is extraordinary! It takes an adjustment in thinking to fully comprehend this ability, especially if you have spent years rewinding tape to find selected areas. Thanks to this random-access function, the concept of what is recorded "first" on the hard disk loses its meaning.

Next, we transferred the edited program in real time from the hard disk to a fresh DAT, via the SDIF port. The screen then displayed a listing of each track and its duration. We now had an edited, ready-to-master DAT cassette.

### CD LASER MASTERING

Before a tape can be used to cut a CD glass master disc, it is necessary to program its PQ subcode (the non-audio data on a CD that provides timing, control and display information to the CD player). The CD mastering system must be told when each track begins and ends, referenced to SMPTE time code recorded on analog audio channel 2 of the 3/4-inch, U-matic master. During mastering, time code is input to a "subcode encoder," triggering subcode output that will be multiplexed into the bit stream written on the disc.

Because the entire laser mastering sequence is based on time code, we needed an alternative method to master directly from DAT. Finding precise PQ subcode points and synchronizing mastering sequence events without time code seemed a formidable challenge, but we devised a technique that worked flawlessly.

First, the edited DAT master was cloned onto a second DAT machine via the AES/EBU port. During this transfer, SMPTE code was fed to the second machine's analog audio input. After recording 30 seconds of code at the head of the tape, the second DAT's input selector was switched from analog input (SMPTE) to digital (audio data from the DAT master). The new, cloned master was identical to the first tape, except for the 30 seconds of code during lead-in.

Next, the DAT machine, a time code reader/generator, a PCM-1630 and a custom SMPTE time locator were all connected (see Fig. 1). During playback, the 30 seconds of code on the cloned tape was fed to the reader/

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Following the burn-in period, the amplifiers are monitored for DC bias stability for approximately another full day. At this point, they are returned to the test bench for another complete checkout of all operating parameters and functions, at which time a test sheet is made, and included in the packing with the unit.

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

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generator, which continued outputting code even after the input was removed. To maintain lock between audio and time code, word clock from the DAT machine was input to a PCM-1630. The video sync derived by the 1630 from the 44.1kHz word clock routed to the video sync reference input on the reader/generator. The regenerated time code was thus locked to the audio data, assuring synchronization between audio and time code.

Now that we had continuous time code, we could find the start and end points of tracks for PQ subcode programming. With 3/4-inch tapes, a digital audio editor finds frame-accurate times. But we needed an alternative method.

So we designed a custom SMPTE locator, a device that finds the SMPTE start times of tracks on CD master tapes without an editor. The locator receives analog audio from a 1630 and time code. During the pause between tracks you press a momentary switch, and the device freezes its time code display at the precise frame at which audio begins.

With the subcode programmed and our synchronization method in place, we were ready to cut a CD master disc directly from the DAT master. We used the same setup shown in the illustration, except this time the reader/generator's time code output was input to the encoder that generates subcode to be written on the disc. In addition, the 1630's SDIF output was input to the EFM (8-to-14) encoder. This encoder receives SDIF from the 1630, subcode from the subcode encoder, multiplexes them, and performs CIRC error-correction encoding and 8-to-14 modulation. All is accomplished on the fly as the CD master is cut! Fig. 2 shows the DAT-to-CD-master signal flow.

We cued up the DAT master exactly two minutes before the start of Track 1 and put the mastering machine in the record mode, writing "Table of Contents" in lead-in. At the correct disc radius (previously calculated), the DAT master was played back. The reader/generator's time code output triggered the subcode encoder's output to the disc.

Three events must occur in CD mastering in the following order: the correct recording radius must be reached; the subcode must be triggered (switching from lead-in to timing information); then, two-and-a-half seconds



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later, audio begins. Our improvised synchronization system worked well, triggering subcode at the precise moment. Once subcode is triggered, time code is no longer needed: the subcode encoder runs on an internal, real-time clock. During the mastering run, we verified synchronization between subcode and audio by decoding an auxiliary EFM signal.

#### LIMITATIONS

Although interesting from an academic standpoint, this method is not practical for full-scale CD mastering. Locating index points within music, for example, is difficult. Another problem is that once started, the tape cannot be stopped and still maintain SMPTE reference.

#### A NEW METHOD

In a brainstorming session with Bob Doris, Sonic Solutions' president, and Ben Shaw, we devised a much simpler method of mastering from DAT. This technique overcomes the above limitations and promises to make DAT mastering a practical alternative to the 3/4-inch, U-matic format.

Sonic Solutions is working on a

method of writing SMPTE code at the head of a DAT master tape and referencing all points (begin and end of tracks, indices, etc.) to this time code. When the DAT master is created on the Sonic System, a SMPTE log is printed that lists the PQ access points. Time code is recorded on the DAT master (as though it were an analog audio signal) until one second before the beginning of Track 1.

During mastering, subcode output is triggered by SMPTE at Track 1, Index 0, two seconds before music begins (Track 1, Index 1). This method eliminates the reader/generator, PCM-1630 and custom SMPTE locator, greatly simplifying the mastering process and overcoming the limitations of the first method. In addition, a proprietary error-analysis system has been devised for the PCM-2500, allowing verification of audio data integrity on the DAT master tape as the disc is cut.

#### MOVING FORWARD

The recent surge of interest in DAT mastering is fueled by economics: the \$3,200 price tag of a professional DAT machine is pocket change in the world of 3/4-inch U-matics. Also, the

large initial expense of a digital processor and 3/4-inch tape machine (\$40,600) is just the beginning. Routine maintenance of a 3/4-inch system costs about \$7,000 every 12 to 18 months or so. And that doesn't include unexpected breakdowns.

In addition, DAT has the potential of maintaining a performance edge over pro digital audio recording equipment due to the shorter product cycles inherent in the consumer marketplace. For example, DAT machines could be the first to incorporate the latest advancements in A/D and D/A converter technology.

The extent of DAT's inroads into CD mastering will be determined by technology *and* the marketplace. If new technology performs a job as well as the old technology did—and at lower cost—its success is inevitable. One day DAT may become the format of choice for CD premastering and laser mastering. ■

*Robert Harley works at the Discronics facility in Anaheim, Calif., where his responsibilities include digital audio engineering, CD master tape preparation and technical writing.*

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—FROM PAGE 36, DIGITAL RECORDING

arena, having unveiled its first digital 8-track design at the 71st AES Convention in March of 1982.

Studer's current digital offering is the D820X 2-track, a single-speed (15-ips), Twin DASH recorder priced at \$19,000. The D820X now includes adaptive-run processing circuitry, which compares the signal coming off the tape to a model stored in memory and adjusts the playback parameters for optimum performance. The process is said to greatly reduce the number of CRCC (cyclic redundancy check code) errors and enhances the playback quality when interchanging tapes between different machines. A new option offered is digital in/out insert points specifically designed for pre-listening in analog disc mastering applications.

Studer Revox America, Inc., 1425 Elm Hill Pike, Nashville, TN 37210, (615) 254-5651.

### TASCAM

Unveiled at last year's AES Convention in Los Angeles and priced under \$100,000, the first Tascam DA 800/24 24-track DASH recorders should be delivered by the end of this year. The



Tascam's DA 800/24 24-track will ship later this year.

DA 800/24 includes proprietary ZD circuits in the opto-isolated D/A converters, two-times oversampling in record and playback, analog and digital cue tracks, 30-point autolocator, 40-character alphanumeric display, and both AES/EBU and SDIF digital I/O ports. Onboard synchronization is standard, and the DA 800/24 can operate either as a slave or master code source. Some of the recorder's convenience features are de-emphasis and control logic switching at the remote control (under a hidden panel),

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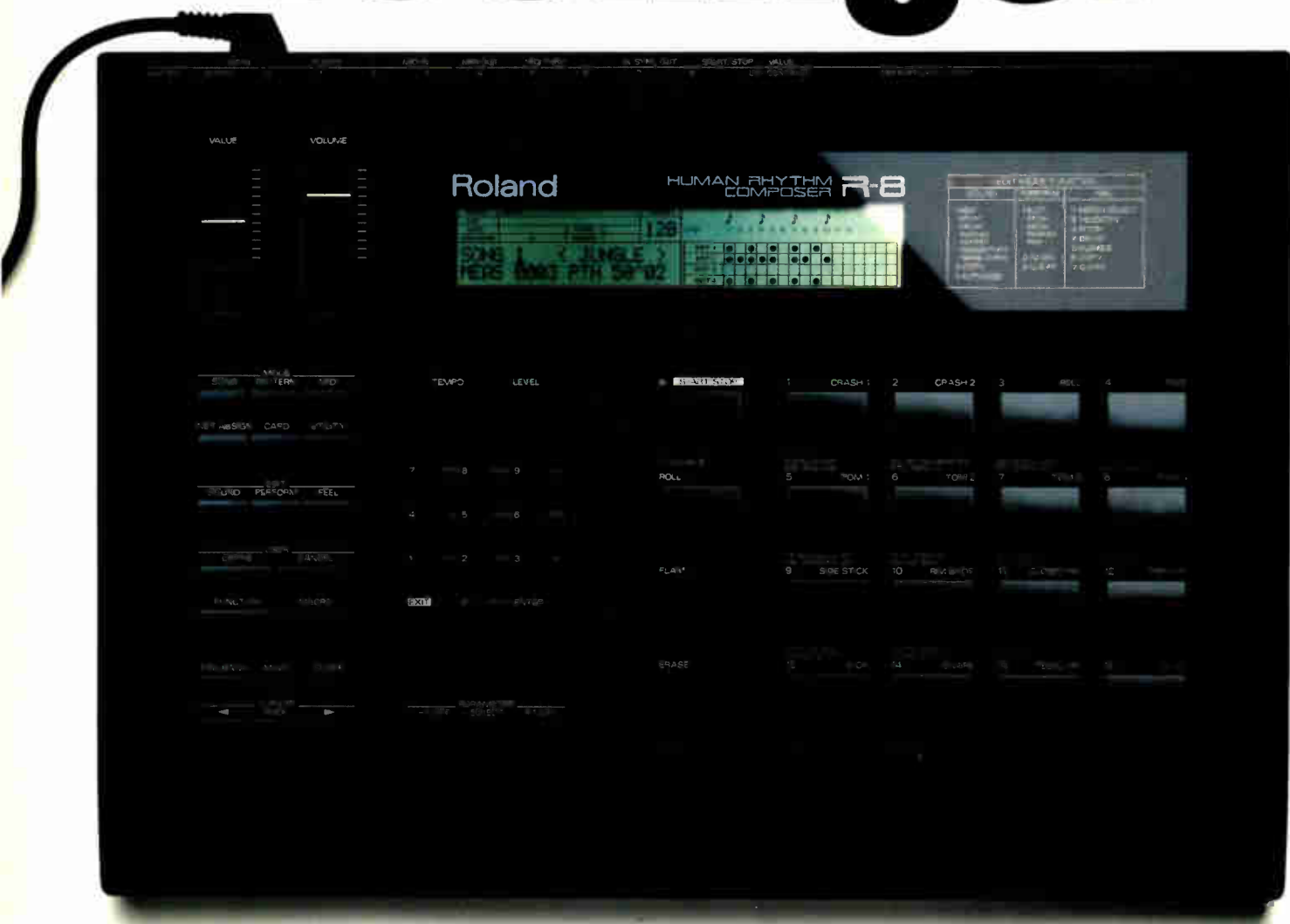
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drum and percussion sounds sampled at a CD-quality 44.1 kHz. And even better, both the eight individual outputs as well as the stereo outputs are available for routing those CD-quality sounds to a mixer for individual processing.

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Even the drumsticks are more human.

And up to 100 patterns with up to 99 measures each, can be programmed in the unit. The R-8 has 68 internal sounds. And when you combine these

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TO  
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SET  
OF

# THE ABYSS THE

by Iain Blair



20TH CENTURY FOX

**T**he Cherokee Nuclear Power Station outside Gaffney, South Carolina, is a long way from Hollywood. Abandoned after a local power company had sunk \$700 million into construction, it sits deserted in the bleak, wintry landscape, its giant cooling pipes snaking away from the giant concrete containment tank like some alien life-force.

"Yeah, the perfect place to shoot a movie like this," says director James

Cameron of his latest project, *The Abyss*, an epic underwater adventure starring Ed Harris, Mary Elizabeth Mastrantonio and Michael Biehn. Cameron, whose last two films, *Aliens* and *The Terminator*, were box-office smashes, has been holed up here along with producer Gale Anne Hurd, his cast and a crew of hundreds for the past six months working on what production designer Leslie Dilley calls, "the most technologically advanced

piece of filmmaking ever."

It's no exaggeration. With 40% of the film's live-action principal photography taking place underwater, Cameron and Hurd's production company had to design and build experimental equipment and a communications system that would allow actors and the director to talk underwater and dialog to be recorded directly onto tape—for the first time ever—all before shooting a frame of film.

Filming the complex underwater sequences took place in two specially constructed tanks. The first, A Tank, holds 7.5 million gallons, is 55 feet deep and 209 feet across, and is the world's largest fresh-water filtered tank. Additional scenes were shot in B Tank, which holds 2.5 million gallons.

(Above) Dual mono pair of Schoeps MK-4s recording above-water regulator sounds.

(Left) The crew of "Deepcore," a prototype underwater oil-drilling habitat, are called together to learn that their rig has been authorized to assist the U.S. Navy in a seemingly routine search-and-rescue mission in *The Abyss*.



World Radio History

PHOTO: RICHARD FOREMAN



PHOTO: RICHARD FOREMAN

“What we’re doing here is pretty ambitious,” allows Cameron with typical understatement, “but it’s the only way. We’d originally planned to film on location in the Bahamas where the story is set, but we soon realized we had to have a totally controlled environment because of the large number of stunts and special effects involved.

“Underwater visibility was a major concern for me before we even got started on this project properly,” explains the director, who is an experienced diver himself. “In real life, deep sea divers are used to working

in total darkness, and therefore there’s no need for them to be able to see very much out of their helmets. But for this film, I had to be able to see the actors’ faces and hear their dialog.”

To solve these problems, the company enlisted the expertise of Western Space & Marine, who designed and built ten experimental diving units for the film. In addition to engineering helmets that remain optically clear underwater, the company also installed state-of-the-art, aircraft-quality mics into each helmet. Then sound mixer and underwater communica-

**Civilian diver Ed Harris leaps from the edge of the Cayman Trough, a four-mile deep trench in the ocean floor, in a desperate attempt to prevent a crazed Navy SEAL from taking disastrous action in *The Abyss*.**

**(Below) Two Technics DAT recorders prepared to simultaneously record different combinations from six different underwater microphones.**

**A typical configuration of the underwater microphone rig (top to bottom): the Aquaphone; a waterproof PZM; a waterproofed dynamic mic. A second Aquaphone (hidden behind the PZM) allows underwater recording in stereo.**



20TH CENTURY FOX



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There's even a pitch control complete with digital read-out. It's on our front panel (not shown), along with other professional touches.

The D-20 has been shipping since last year and it's being used daily in audio and video post-production suites. It works.

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tions designer Lee Orloff created a system for Cameron to talk to all the actors and technicians, whether they were underwater or above the surface (see sidebar).

Orloff, whose film and television credits include *Blood Simple*, *Starlight* and *Second Effort*, started by redesigning the aviation-style mics. "We split each mic onto a separate track so we could record each actor's dialog," he reports. "In all previous underwater films, this wasn't possible because of the conventional scuba breathing regulators. Our idea was to come up with a system that would allow us to shoot as if we were on an ordinary soundstage.

"It was also essential because Jim [Cameron] was directing underwater—another first in filmmaking," adds Orloff. "He was down in the tanks with all the actors for five hours at a time, filling up with air while still down there, so we had to wire the system to handle a number of layers of communication all at the same time."

Using a mixture of military equipment and commercial diving communications systems, then adapting and experimenting through trial and error, Orloff devised a system that permitted Cameron to communicate not only with the actors in the suits and submersibles, but topside with his first assistant director and 20 additional crew members who were equipped with Clear-Com remote station headsets. In addition, all crew members using Clear-Com intercoms could talk to each other.

Technical innovations on *The Abyss* were not confined solely to underwater filming and communications. The production also promises to reach new heights—or depths—in terms of its sound design. While director Cameron and his cast and crew splashed around in the tanks, supervising sound editor Dody Dorn and sound designer Blake Leyh have been busy trying to complement the spectacular visuals with equally spectacular sound effects.

Both Dorn and Leyh are highly experienced (Dorn's credits include *The Big Chill*, *Silverado* and *Choose Me*, while Leyh's include *Under the Cherry Moon* and the special, edited version of *Aliens*), and together they are responsible for the way *The Abyss* will sound.

"I concentrate on the actual sound design and effects, while Dody takes

care of all the dialog and ADR or looping," explains Leyh. "The latter poses a special problem in post as it was all recorded underwater, so when we replace any lines on the ADR soundstage, we have to use all the original equipment, including the helmets and underwater mics."

Finding the right underwater mics was also a special challenge for Leyh and sound effects recordist Dane Davis. "The first thing we all realized was that none of this has ever been done before," explains Leyh. "In the past it's always been simple and sparse in terms of sound—a few bubbles and perhaps some underwater ambience; that's it.

"But when I first sat down with the director, he made it very clear he wanted something totally different, and so the first few weeks of production were just spent figuring out how to do the job," he continues. "We all agreed that conventional hydrophone mics sound horrible, and after some preliminary testing, we decided to discard them altogether."



Leyh then began experimenting with different ways of waterproofing conventional mics, and eventually hit on several workable solutions. "First


we tried a Schoeps NK4 in a condom, and then a pair of PZM mics in a larger rubber enclosure, and finally some dynamic Sennheisers," he says. "It's an old trick, except that most people would probably use a cheap mic rather than a \$1,200 Schoeps, which we actually tested 60-feet out in Santa Monica Bay one day. It died, but fortunately we managed to dry it out.

"What we found was that while this method worked quite well for some types of sounds, it also lacked high-end and detail because of the waterproofing process," continues Leyh. "So at that point we also started designing and developing our own mic, called the Aquaphone."

Leyh and Davis started from scratch, using an electret-condenser mic element waterproofed in such a way that its front plate is actually in contact with the water. "The big problem with hydrophones is there's an intermediate conductor, so the sound has to go through a layer of epoxy before it reaches the diaphragm of the mic," explains Leyh. "But with the Aquaphone, there's no intermediate conductor, so the resulting sound is far superior.

"When we first started building it,



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we had no idea it would really perform, but it did, and we took it through various stages until we ended up with the Aquaphone MkIII," adds Leyh. "Everything was then recorded using that or conventional mics in rubbers. A lot of the time we'd also use multiple mics and combine the sounds."

Leyh and Davis then recorded everything onto DAT using two Technics SVMD1 machines, often recording on them simultaneously. "Recording the real sounds in the film, such as the submersibles, the divers and some of the high-tech equipment like ROVs [remote-operated vehicles] and robot arms was fairly straightforward," reports Leyh, "except we found the DAT machines and the Schoeps mics were both highly susceptible to humidity—a bit of a problem on an underwater shoot."

Far more challenging was Leyh's job of recording the numerous special effects—"all the sounds that simply don't exist, or that would be impossible to record, such as an underwater avalanche, or a large sub crashing into the ocean floor," Leyh says.

Leyh came up with inventive solutions by experimenting with a wide array of raw materials as well as equipment. "One sound that worked really well involved dragging huge blocks of dry ice across steel girders and recording the results above water with a stereo pair of Schoeps and the PZMs," he says.

"Another interesting find was recording fireworks both above and below water, as well as road flares. I also chanced across a table saw in the construction department that produced an unusual vibration; I recorded it with the Aquaphone, then slowed it down three octaves and used it as part of the nuclear sub's engine sound, in conjunction with other sampled sounds."

Having assembled most of the needed sound effects, Leyh and Dorn then moved back to their Los Angeles studio to start on the huge amount of post-production involved, helped out by a team of 12 other sound editors and assistants working under their direction.

"We're sent the videotapes of various sequences as they're being rough-cut, then we start building up the soundtrack from that," explains Leyh. "All the different sounds we recorded are stored on DAT, and a lot of them are sampled on my Emulator III.



**In their makeshift trailer, Lee Orloff (foreground), sound mixer and underwater communications designer, works with George Leong, sound operator, running the layers of communications designed and built for the underwater filming of "The Abyss."**

## **Abyss Crew Members on Communicating Underwater**

On any motion-picture set, communications are an essential part of the production. The director of photography must communicate

with camera operators and assistants, grips and electricians must know what they are rigging and lighting, actors must be able to get direction and cues, and the director should be in contact with all departments.

The set of *The Abyss* wasn't much different except for the small inconvenience of being underwa-

"So for the rest of the post-production period, I'll be going through every single sequence with a fine-tooth comb, figuring out exactly what's needed sound-wise to complement what's happening on screen," he adds.

To do this, Leyh is employing *Professional Librarian and Sound Supervisor* by Leonardo Software. "This has all the individual effects from my library neatly cataloged, so I can enter scenes from the film into the program, then list every sound I might need," he says. "These end up being several thousand, and the software program is a great help in matching the effects in my library with the film effects in a very broad sense.

"It's a huge project, and it's also

been very frustrating at times—there were many occasions where we'd spend hours and even days tinkering around with mics and experimenting with wiring, so now it's heartening to be on post-production. We can finally begin to hear some results from all the hard work."

Director Cameron is equally enthusiastic. "It'll be the best thing we've done so far," he predicts. 20th Century-Fox has scheduled it for a July 4 release as its biggest film of the summer. ■

*Iain Blair is a contributing editor to Mix and a widely published freelance writer.*

ter. Normal lines of communication were not possible. Radio frequency is not terribly reliable underwater, and with the submersible craft involved in the production, interference from the thrusters would be problematic. Decompression is just one problem associated with having to come to the surface each time new information needs to be distributed. Something new had to be put into place.

Long before production began, recordings were made from a simple system used for camera tests and dive training. All the conversation was punctuated by a pulsing sound from the servo regulators in the divers' helmets. Much time was required to work out the details of the recording system, but communications were needed at the B Tank, so a simple rig was set up poolside.

Western Space & Marine (Santa Barbara, Calif.) and Jim Cameron had devised experimental helmets for the actors and director. Each diver wore a scuba-style pack attached to a helmet that featured a wideview faceplate, a servo regula-



While Western Space & Marine engineer Greg Bryant operates the manipulator arm from inside the sound proof booth, sound designer Blake Leyh records its sounds for "The Abyss."

tor, and built-in earphones and microphone incorporated from aviation technology.

WSM also provided an underwater intercom that allowed any four people in helmets to hold a



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All the conversation was punctuated by  
a pulsing sound from the servo  
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conference. An extension brought to the surface let a topside participant in on the conference and fed an audio signal to an amplifier and underwater loudspeaker. Thus, any-

one in a helmet could speak over the underwater P.A. system. Unfortunately, because of the deafening regulator sound, only one person could be attached to the system at

a time, or the breathing would obscure all other voices. This worked for testing and some pre-production, but not for total communication and control over dialog recording for the film.

By putting each helmet on a separate line, we could minimize crosstalk from the regulator and allow one person at a time to be on the underwater P.A. without interference.

We first adapted Jim Cameron's helmet, which worked well except for the inability of the connectors to pass the small mic current after underwater mating. For aesthetic and safety considerations, the helmets had to be detachable underwater from the comlines. The divers all underwent extensive training in bailout techniques, so they could pop off their custom-fit helmets instantly in case of complications. So underwater-matable connectors were a high priority. Countless underwater splices were made, and pressure fittings in the helmets were adapted to take the new connectors, which were fitted with special caps to prevent DC voltage from electrolyzing the gold plating when the cables were underwater and not in use.

Now we had a tested, working unit, but a system had to be built around it for people to receive and send to their intended parties.

With the actors it was fairly simple. Each comline would be brought topside to our trailer where it ran into its own channel of the Sonosax recording mixer. Each channel-out went to a separate communications mixer. This way, dialog could be recorded onto separate tracks and also mixed together, and sent back down to the actors so they could hear other actors and themselves.

The rest was trickier. Cameron would be diving with the actors and crew during all the underwater shooting. He required the ability to give information instantaneously to everyone on the set, topside and underwater; talk to the actors; and converse privately with the assistant director, who would be coordinating topside.

With the major elements of the system now worked out, we concentrated on finalizing the record-

—CONTINUED ON PAGE 101

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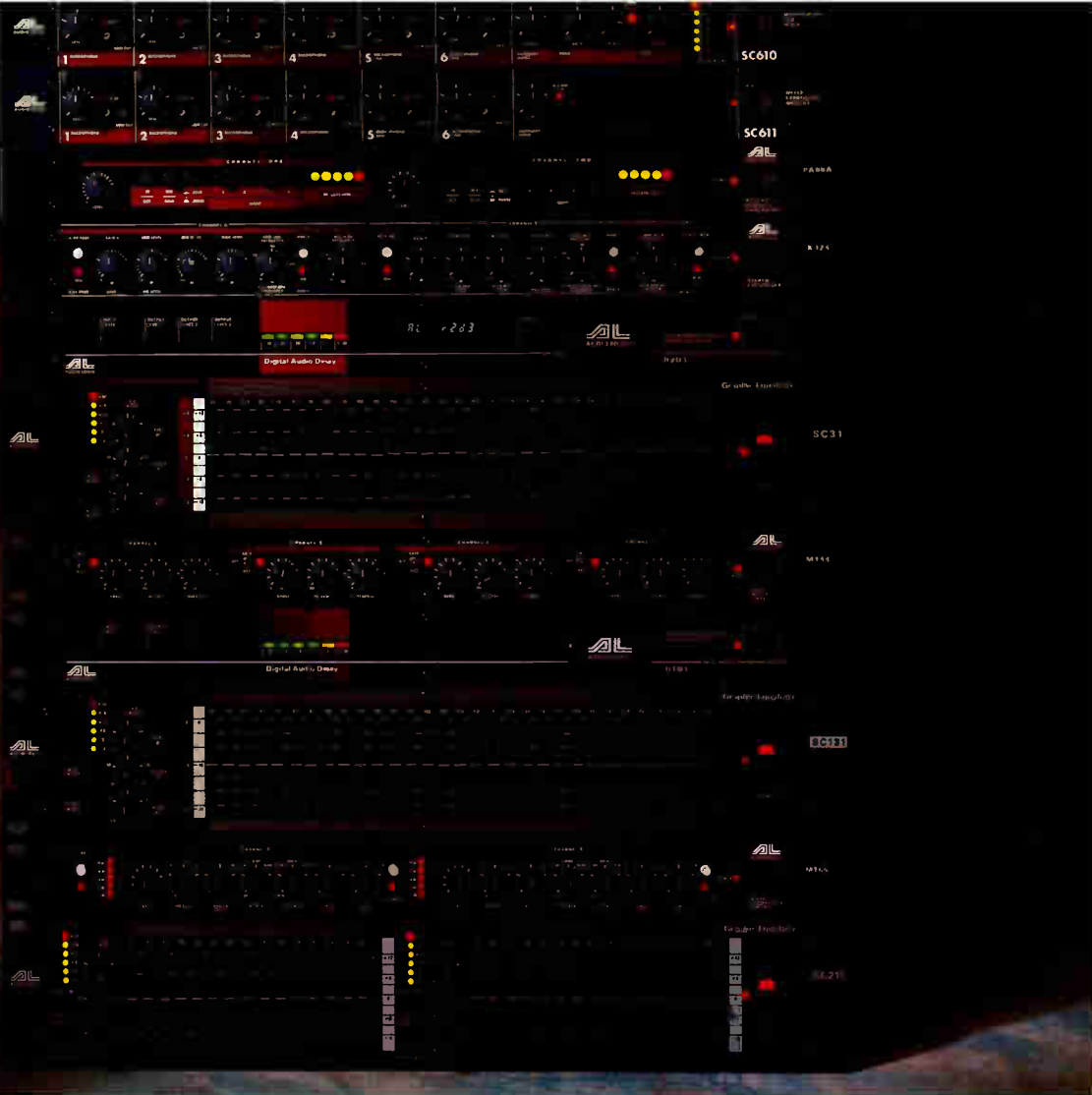
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SC31	1/3rd octave bandwidth 31-bands, ISO-centered Dual range ±12 or ±6dB	Frequency center tolerance: ±2% S/N Ratio: Less than -90dB (all sliders flat) Dynamic range: +119 dBm, E.Q. in, balanced, +113 dBm, E.Q. in, unbalanced

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by Nick Vallelonga

# JOHN POTOKER

## SLAVE TO THE SONG

**T**he headline in the April 16, 1988, *Billboard* read: "Potoker and Jones Give New Order Tune New Life." "Potoker" refers to producer/engineer John "Tokes" Potoker, and "Jones" is Quincy Jones. Any time your name gets mentioned in front of Quincy Jones in an article about music, you must be doing something right. In the past year alone, Potoker's production and remix credits include Herb Alpert, the

Band and then with Benny Goodman. After the big band era ended, Potoker Sr. became an accomplished studio musician, working with various artists and on jingles. It was here that the seeds for John Jr.'s musical influences were planted—he learned music theory from old jazz masters, and he also became interested in recording.

As a teen he played with local bands, but he tired of that grind and



Four Tops, Phil Collins, Genesis, Go 101, Toni Childs, New Order, the Pointer Sisters and Quincy Jones. It's an impressive list, and the diversity reflects Potoker's background in varied types of music.

His father is John Potoker Sr., who in the 1940s was considered one of the top pianists in the country, playing primarily with the Tommy Dorsey

started working as a DJ in clubs and on radio. Eventually, though, he decided his calling was in the recording studio, and he managed to land a succession of dues-paying jobs at small studios and jingle houses. His big break came when he got a job as an engineer at Sigma Sound in NYC. His engineering credits from this period are extensive, including Ma-

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donna and Ashford & Simpson.

**Mix** caught up with Potoker at his home recording studio in New Jersey, in a townhouse overlooking the Manhattan skyline.

**Mix:** When did you first feel that you had really contributed to the sound of a track or an album?

**Potoker:** There was one project that I felt real comfortable on, in that I was allowed to contribute a lot to what was going down. In fact, at times it felt like if I wanted to I could move aside from the engineering aspect and go pick up an instrument and start

playing it, and that was with the Talking Heads and Brian Eno on a record called *Remain In Light*. Eno was real generous in allowing me to start things on my own. He liked to feed off situations, and he was really into sound treatments, so the things that we developed on those records were all started from him, but he let other people input their creativity.

**Mix:** That must have been a great experimental period for you.

**Potoker:** Yeah, we did some wild things. I remember a track on another record with Eno and David Byrne called *My Life In the Bush of Ghosts*, where we lifted a vocal track off an-

other record. The interesting thing was that before sampling and all this controversy about lifting things from records, we were doing that—I guess it was '79 or '80. We were lifting things off cassettes, off the radio, wherever we could get them. We would put them on ¼-inch tape and then fly them into different sections of the multitrack and actually make a tune out of them. But anyway, we ended up patching out of this one vocal into, I think it's called, a typograph key—what they use to send SOS messages. And that would trigger the sound. So the vocal could be played with rhythmically; you could tap out a beat on this thing and the vocal would open on and off, which was real effective.

**Mix:** You've continued your relationship with the Talking Heads.

**Potoker:** Yeah, I've done work with Jerry Harrison on his solo record, and I think I'll be doing some work on his new one. Jerry and I also worked on a Fine Young Cannibals song that was used in the movie *Something Wild*.

**Mix:** To what do you attribute your growth as an artist?

**Potoker:** I think initially you just pick things up along the way. As far as engineering techniques, those are things you've just got to experiment with and let your ears be the judge. As far as production techniques, I've been fortunate to work alongside some really great producers, and I was able to see the differences in the way they work, and pick out the good things about each person.

**Mix:** You have worked with some great producers and artists. Let me throw out some names to you. Phil Ramone.

**Potoker:** Yeah, Phil's great. I've actually never recorded for Phil; I've just done some mixing for him. It's a situation where he basically lets me go and do my thing. We may be working in the same studio, and he may be in a session upstairs while I'm working downstairs, so he'll come in with fresh ears and listen. Actually Phil is a lot like my high school football coach in that he presents you with a situation and tries to psych you up for the job that's ahead of you, and tries to get you to do your best.

**Mix:** Stevie Wonder.

**Potoker:** I did a session with Stevie Wonder that was just a pleasure. We didn't sleep the whole weekend; we just hung out in the studio.

**Mix:** Ashford & Simpson.

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**Potoker:** Great songwriters, very feel-oriented production techniques.

**Mix:** Quincy Jones.

**Potoker:** Quincy was supervising a remix and post-production that I was doing for a New Order tune ["Blue Monday"] on his label, Qwest. Quincy's like "The Master." He sort of reminds me of Yoda from the *Star Wars* movies. Quincy will go through the tracks with me and pick out things he likes and bounce them off me to see if I can get into where his head is at. I find it incredibly stimulating to work with people of that caliber.

**Mix:** Phil Collins released a CD called *Phil Collins 12-inchers*, where five of the six tracks were remixes that you produced. That's quite a compliment. How did you start working with Phil?

**Potoker:** I was at The Townhouse in London working on some other things. Phil had just come in to start a record and he'd brought in an incredible amount of equipment—the halls were just lined with drum kits. I was working with Steve Chase, who used to assist on all of Phil's projects. Phil had just finished up some work with Philip Baily, and here he was working on his own record, and on the weekends he was working on the Band Aid

Christmas record ["Do They Know It's Christmas?"]. He had to do the 12-inch on the Philip Baily project, so he asked Steve, and Steve recommended me. So I have Steve to thank for connecting me with Phil.

It turned out that one day I was walking down the hallway and someone called out "John," and I turned around and way down at the other end of the hall was Phil. He told me he had this song called "Easy Lover," and he asked if I was interested in doing [the 12-inch]. The thing was that he needed it right away, so I had to get it done by the end of the weekend. So while Phil was doing his thing for the Christmas record, I was in the other studio mixing.

It was one of those things where I really got off on what I was doing, and I ended up staying in the studio for two days. About ten o'clock Monday morning, Phil came in fresh, had a little breakfast, and I had the song ready for playback. It was Phil, Hugh Padgham and Phil's guitar player, Daryl Strummer. I just *knew* during the playback that I had nailed the tune, and Phil waited till Daryl and Hugh had left the room and he said, "You know, if I had thought of that

intro, I would have used it on my version." Since then I've done most of his remixes and some Genesis things, and I also did a remix on a song he produced with Lamont Dozier for the Four Tops on the soundtrack of *Buster*, the film he starred in.

**Mix:** We've talked some about producers you've worked with. Now let's talk about you as producer. You were recently working in Australia.

**Potoker:** I went to Australia to produce a band called Go 101. They're from Melbourne, and it's a new band so there were a lot of problems you encounter working with a new band—getting them used to recording in the studio, etc.

**Mix:** Were you comfortable working in Australian studios?

**Potoker:** I didn't really enjoy recording in Melbourne, but by the time we were finishing the record we had moved to Sydney, where I found EMI 301, a really great studio. I had excellent assistance from the engineers, the disc cutting people—right down the line. It was a well-run situation.

**Mix:** Besides Australia, you've had the opportunity to work in New York, L.A., Nashville, Paris, London. Do you find major differences in the studios?

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**Potoker:** You might find equipment differences, and, of course, acoustics are going to change depending on who designed the room. But the odd thing is that sometimes you'll find a studio in England, for instance, which was built by somebody from L.A., so it's not as different as you might expect.

**Mix:** Are there certain types of equipment you specifically request to have in a studio?

**Potoker:** Not really. I feel that at this point I should be able to figure out the room that I'm working in and be able to deal with whatever equipment is there. But the studio has to be maintained. When I walk into a studio, I expect whatever I see in front of

Macintosh for sequencing software. I use a Yamaha drum machine, and I've got a Roland module and another Yamaha module. Sequencing is real helpful to me, and right now I apply it when I do additional production on things that are almost done or need reworking for the dance floor.

**Mix:** How much production should be put into a home demo?

**Potoker:** I'm not really one for big 24-track demos. I've heard things done at home that go straight to DAT and sound incredible.

**Mix:** You are primarily known for your mixing and your 12-inch production. Where would you like to go next?

**Potoker:** I'm just into working on quality projects, no matter what capacity. I mixed an album for A&M by Toni

member of a very techno-oriented band, Doppelganger. But even in the context of that band, you had excellent musicianship. There's so much to be said for live feel, and I guess the best thing is to try to create a marriage between the technology and people. I don't think manufactured music is going to fool anybody. There's got to be a feeling to the music. As long as the feeling gets through, that's what it's about as far as I'm concerned. I think the disadvantage of technology is that there are so many different keyboards, samplers and libraries of sounds to choose from, that perhaps people are not that anxious or curious about going out and miking up their own things. Whenever I use a sample on a record, it's a sample that I created, that I went out and miked, that I compressed or did whatever I needed to do to get that sound. I feel like that's my personal stamp, and I want to continue that. I don't want to have to rely on the factory preset.

**Mix:** You have a reputation for going into a studio and not coming out for days. How did you get into that habit?

**Potoker:** That gets back to all the technology that's available. I like to explore all the options. So although something might be sounding great, I still want to know what it's going to sound like if I try another approach. So I end up exhausting all the possibilities I can, or exhausting myself, whichever comes first.

**Mix:** How do you approach a song?

**Potoker:** It depends. Mixing is different from producing a song. When I'm producing a song from scratch, I'm afforded the luxury of reworking the parts. With album mixing, I'm a bit more confined by what's there on tape. In remixing, I'll pick parts out that I would really like to accent, develop or delete, maybe creating a 16th note on the hi-hat when it had an eighth-note feel, or doubling things up with harmonizing. I'll go in there and get a different perspective on the song. Usually people come to me because they've heard something I've done, they know what I'm capable of doing and they want something different. So I'm more or less given free rein. I'll just do what feels right. I slave to the song. ■

*Nick Vallelonga is a writer/actor living in the New York area. He is currently working on a motion picture screenplay.*

“Before sampling and all this controversy about lifting things from records, we were doing that. We were lifting things off cassettes, off the radio, wherever we could get them.”

me to work.

**Mix:** Do you prefer digital recording or analog?

**Potoker:** I guess a combination of both is the way to go, if you're fortunate enough to have the budget to do that sort of thing. The one good thing about digital for me is that it's quiet: you don't get tape hiss, and the signal is not going to change from repetitive playback. I find that with analog tape, throughout the course of a project, running the same material over the heads changes it. There are ways to work around it, but why go through the hassle if you don't have to?

**Mix:** What kind of a setup do you use in your home?

**Potoker:** I've just got a small home studio. I've got a 4-track, which I'm thinking of upgrading to an 8-track. It's basically a little keyboard setup. I use the DX7II as my master keyboard, and I usually run *Performer* off my

Childs, which was a great record to get involved with. The thing that turned me on to it was when I heard the rough on a cassette, the songs and music were really different from what people know me to do. And then I found out that David Ricketts from the band David & David had co-written some of the stuff, and co-produced, and he was someone that I had wanted to work with. It was a new opportunity, a new artist and a real nice album to work on.

**Mix:** What attracts you to producing a new artist?

**Potoker:** It's got to be someone who's really confident. First, they've got to have the songs. I respond to the songs. If the songs are there, then I'll pursue it and find out more about the artist or the band.

**Mix:** How do you feel about the technology affecting today's music?

**Potoker:** For a while there I was a



## THE 1989 TEC AWARDS NOMINEES

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- Randy Ezratty
- Ed Greene
- David Hewitt

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- Gregory Fulginiti
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- Randy Kling
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- Buford Jones
- Dave Kob
- Benji Lefevre
- Mike Ponczek

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#### Recording School/Program

- Berklee College of Music, Boston, MA
- Full Sail Center for the Recording Arts, Altamonte Springs, FL
- Middle Tennessee State University, Murfreesboro, TN
- Trebas Institute, Montreal, Quebec, Canada
- University of Miami, School of Music, Coral Gables, FL



The 1989 TEC Awards will be held October 19th at Manhattan Center Studios in New York City. For more information, contact Karen Dunn at (415) 653-3307.

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WATCH FOR YOUR VOTING BALLOT IN THE AUGUST ISSUE OF MIX.

# DIGITAL

HOW  
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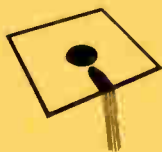


PHOTO: TED CRAGER

The University  
of Miami in  
Miami, Florida

by Tom Kenny

"The secret to college is for teachers to teach what will be useful three or four years from now," says Ken Pohlmann, director of music engineering at the University of Miami. "If the schools teach what is current today, by the time you get a chance to go out there and use it, you'll be obsolete, especially in a field moving as fast as audio. Schools at least should teach digital audio theoretically and

be as aggressive and future looking as possible. That's the least they owe their students."

Trebas Institute in Los Angeles is in the process of redesigning the curriculum for five to ten years down the road, adding a total of 38 new courses. The Recording Institute of Detroit has established a "study class" to teach students methods for staying current after they leave the program. Further east, New York City's Institute of Audio Research offers digital training designed to get people *into* the industry and give them enough to *stay*.

Today, staying in the industry requires an understanding of digital concepts. There is no way around it. Miriam Friedman of the Institute of Audio Research elaborates:

"At the entry level things have not changed all that dramatically. But beyond the entry level, oh ho! Things change enormously, and, therefore, a good, underlying background in digital is critical to understanding the whole new generation of equipment. Entry-level job responsibilities are very different from what's required if you want to grow in the industry."

Berklee College of Music in  
Boston

*Mix* called the directors of 20 recording school programs around the country and asked, "How do you introduce a new student to the world of digital recording?" We got a variety of answers, like starting with a textbook, or building digital circuits, or turning knobs on the first day of class.

However, we found that all schools combine some form of theoretical training with hands-on applications. Emphasis and priorities vary from program to program, but it is clear you can't have one without the other.

## THE BLACKBOARD JUNGLE

Steve Szajna, an advanced-class instructor at the Recording Institute of Detroit, says, "Even with all the equipment you could possibly get, it would be very difficult to train somebody in a practical way for every situation that might come up in a recording studio. The key is to have students so well-grounded in theory, so able to know what they're talking about, that when they walk into a new situation it's a simple matter of adapting to the specific [equipment] at that place. Apply the theory to that particular room."

Toward that end, their students must complete an oral final exam following the three 12-week courses,



PHOTO: COURTESY OF BERKLEE COLLEGE OF MUSIC



# DIGITALS

because engineers must be able to communicate ideas, too. Digital in the form of dynamics processing, tape machine alignment, MIDI control and delayed signal processing is introduced in the third course.

At the L.A. branch of the School of Audio Engineering, vice president of marketing and sales Iain P. Everington says that students are introduced to "the realm of digital" halfway through the 15-month program, covering systems such as DASH, ProDigi, DAT and hard disk-based setups. But that's only the beginning.

"You really have to get into the depths and explain where digital came from and how it started. We go into CD mastering systems, like Sony 1630,



PHOTO: ED MALLIS

## Full Sail Center for the Recording Arts in Winter Park, Florida

ment, people are not going to learn. You can explain until you're blue in the face what an EQ sounds like, but you can't do it properly until you have the knob in front of you, turn it, and hear the tonal changes. You cannot do that sort of thing by lecture."

The 80 students who entered SAE in September 1988 attend two three-hour lectures per week; the rest is studio time. They have access to an

IMS Dyaxis hard disk recording system, Panasonic DAT machine, Neve 8232 (analog) console and a host of outboard effects. As a final project, each student must complete a session on his or her own, from setup through compilation of the final 2-track master. They have to do it in both the analog and digital domains.

Achieving the proper balance between theory and hands-on application is no less difficult at a four-year



PHOTO: C.B. NIEBERDING

## Peabody Conservatory of Music in Baltimore, Maryland

as a recording medium. We go into the ProDigi multitrack and DASH machines. So we have an overview of the history of digital recording, then get into the practicality and applications."

Though SAE begins with digital theory, the instructors recognize the need to provide balance. "It doesn't matter how well-qualified teachers are in using the classroom," Everington says, "unless you've got the equip-

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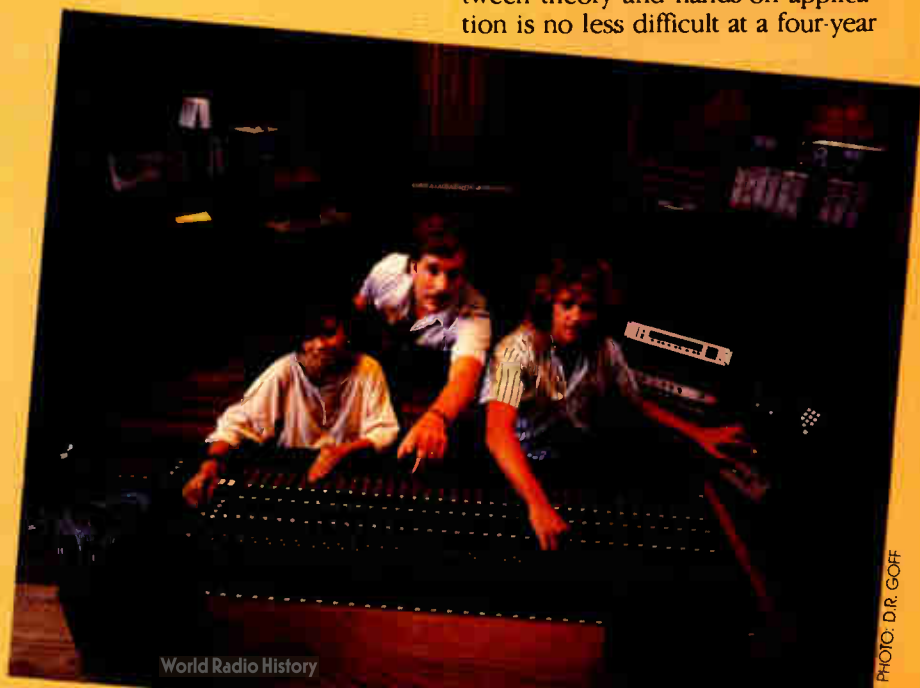


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PHOTO: STANLEY SELIGSON

**Albert Grundy and students at NYC's Institute of Audio Research.**

academic institution. At the Berklee College of Music in Boston, a three-time Technical Excellence & Creativity Award winner, students must be enrolled for two semesters before applying for a major in music production and engineering. Then they take an introductory course in principles of analog and digital recording, followed by advanced courses dealing with digital signal processing, digital control of automation systems, and recording and editing on PCM and DASH systems. Senior-level students can take an elective course in digital audio applications, with an emphasis on audio-for-video synchronization and editing.

"We try to develop a solid foundation so students can go into a career that involves advanced digital theory or advanced digital training," says Don Puluse, chairman of Berklee's music technology division.

"By the same token," he continues, "there is no end to the hands-on facilities at Berklee. We have an audio-for-video post suite, which enables students to practice digital editing, for instance, on the Sony DAE 1100 editor and 1630 processor. It also enables them to go in and understand how the DASH works—they can do razor-blade edits using the Sony DASH 2-track. They also have the F1 to study the differences."

At Full Sail Center for the Recording Arts in Altamonte Springs, Florida,

the influx of New England Digital equipment (part of an arrangement in which that school serves as the official NED training center) might lead one to believe that students jump right in on the Synclavier. They do, but not before acquiring some basic digital concepts.

Garry Jones, senior vice president, says that in the basic recording engineering course, "students receive an introduction to digital conceptually. During the advanced recording course we fly in Ken Pohlmann from Miami, and he spends a day teaching the theory of digital audio more in depth. But we don't just teach the theory of the digital storage medium. We teach them digitizing SMPTE code, digital as it applies to console automation systems, outboard gear and consoles in general."

At Full Sail, "lab and theory go hand-in-hand," Jones continues. "During the recording engineering courses, students have four hours of lecture each day, and for four hours that same day they have a lab that coincides with what they're learning. They'll do recording, audio post-production or maybe restructuring sound effects for a piece of a movie or a 60-second commercial."

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—CONTINUED ON PAGE 70

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## A Digital Connection

The advent of MIDI has opened up all kinds of new recording possibilities for the budding musician/engineer. So it is not surprising that many recording schools use MIDI to introduce students to the principles of digital audio.

Students at Ball State University in Muncie, Indiana, obtain a bachelor's of music in music engineering technology, with a required minor in applied physics. "It's not a recording engineering program," emphasizes Dr. Cleve L. Scott, director of the music engineering studios. "Though students do make digital recordings of concerts with the Nakamichi DMP 100, the major emphasis in our program is sound synthesis and the telecommunication of information.

"At the end of their first year, students are introduced to MIDI and FM synthesis via the [Yamaha] CX5M," Scott continues. "We start in on tape manipulation, analog synthesis, and then from analog to hybrid control of the analog system by way of the CX5M."

In their second year, students begin with voice synthesis in the digital domain and then get heavily into sampling. In the physics department, they learn D/A and A/D conversions and how to build digital circuits on an Intel development system.

Ball State University in Muncie, Indiana. Pictured foreground: Kim Planet, graduate assistant, and Dr. Cleve Scott.

"Our next big move," Scott says, "is to reconfigure the main hybrid studio with parallel computers. We're going to have a PC environment talking to the [Yamaha] YCAM system directly, or the Macintosh talking to it directly, or talking from our AT&T mini-mainframe 3B2400 system. For everything we've got on one system, we've tried to maintain a parallel on the others, for instance, visual editors for sampling."

The recording engineering program at Grove School of Music in Van Nuys, California, was nominated for a 1988 TEC Award. The school also offers a year-long program in electronic composing and arranging, where students are introduced to bits and bytes in the first week of class.

"We begin by explaining MIDI concepts in-depth," says program director Terry Griffey. "We get into bits, bytes and data streams; then we start looking at MSBs [most significant bits] and LSBs [least significant bits], analyzing the digital data stream and how that is stored in the computer—basically what sequences are. Once the students get an idea of what things like a hexadecimal are, we can start into

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explaining what sampling is.”

Students get their first taste of sampling in the eighth week of class, after receiving some technical background. A Korg DSM and Akai S1000 are controlled via *Sound Designer* for the Macintosh and Atari, introducing students to looping, sample length and basic calculations. “We give an overview of sampling, then a technical explanation, then an actual application,” Griffey says. “But students can’t really understand sampling until they understand hex and data structures and how memory is laid out.”

Another approach is taken in Vancouver, where Niels Nielson of the Institute of Communication Arts (ICA) says that 85% of the Canadian market for sound engineers is freelance. The two-year program at ICA focuses on production principles through personal, modified workstations. David Miles Huber will be a guest lecturer this fall, concentrating on digital workstations.

“Most of our education is through practical experience, so we’re exposing them to taking samples and editing waveforms as quickly as possible,” Nielson says. “That way they get an idea of what sound looks like in technical terms so they can manipulate it.”

Students can play with sound on the school’s Atari in the synth lab, or on their own equipment, thanks to a student loan program that allows them to purchase a computer, keyboard, mics, phones, etc. “You can learn all the principles of a workstation on a Mac II or Atari system—sampling, waveform editing, MIDI—and it will keep you busy for a couple of years,” adds Nielson.

Across the country in Kingston, Ontario, the four-year bachelor of music program at Queen’s University allows for a specialty in electronic music. One year of MIDI and analog fundamentals is followed by a year of electronic music composition and sampling. The third and fourth years are filled by independent composition courses with individualized instruction. Recording is covered in summer school.

Students at Queen’s move into the centralized MIDI studio by their junior year, using an IBM PC and a

—CONTINUED ON PAGE 70

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MIX 7/89

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digital signal is going on correctly. They don't test every IC into every gate, but they learn that. They learn about NAND and NORD gates so they have a conceptual idea of how digital signal processing takes place."

The Institute of Audio Research has been teaching digital audio for ten years and typically graduates 250 students per year from the nine-month multitrack recording technology program. The first three-month session covers analog, the second digital and the third is a recording workshop, normally meeting in groups of seven.

"Our students are very strong in maintenance because their orientation is in technology," adds program director Miriam Friedman, "but we're not specifically training maintenance engineers. The operator who understands technology is, in fact, a much more sophisticated operator. That's the underlying philosophy."

Many schools incorporate digital electronics as part of digital theory training. The audio technology program at the Technical Institute of Hutchinson (Hutchinson, Minnesota), has taught digital circuitry for five years. Curriculum manager David Igl says, "We deal with digital electronics from the standpoint of, 'What is a gate?' and 'How do you troubleshoot and repair equipment from an understanding of basic digital circuits?' At the same time students are taking courses in electronics, dealing with test equipment, signal generators and that sort of thing, they apply the use of the meters and signal generators by tracing signal flow through a mixing console."

Hutchinson offers a two-year program for about 30 students. Igl says program graduates have been in high demand in and around the Minneapolis marketplace, and the reports he's received from employers indicate the blend of technical know-how and applications ability is working.

The 1988 TEC winner for Recording School/Program, the University of Miami, requires a minor in electrical engineering to complete a BS in audio engineering. Recording courses give a heavy dose of digital, incorporating a Synclavier system with a Macintosh front end.

Two courses at Miami deal specifically with digital audio. The advanced course (usually taken in junior year) uses Pohlmann's *Principles of Digital Audio* as a primary text (the book came about after Pohlmann began



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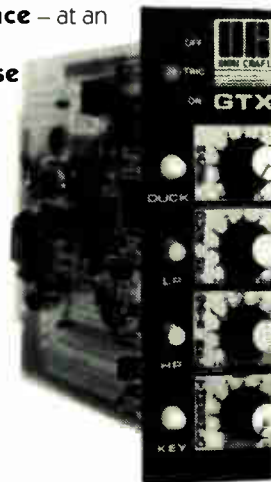
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teaching the course and discovered there was no comprehensive text available), and the teaching approach is strictly by lecture. But that doesn't mean students spend all their time in the classroom. Pohlmann says, "Our students start to learn hands-on before they actually learn the theory behind digital. You really can't learn the in-depth theory until you've gotten through other classes in circuit theory and so on. It takes about two to three years to get up to it in a theoretical level to be able to deal with it effectively."

"Meanwhile the students have been using [the Synclavier] and mastering

the application. It's kind of bass-ackwards, but there's really no way around it. You can't make them wait until they've learned it theoretically to let them use the equipment. The application itself takes a few years to figure out. Hopefully it will all come together in their senior year."

#### COMING TOGETHER: HANDS-ON APPLICATIONS

At Peabody Conservatory of Music in Baltimore, recording performances on the Sony 3324 digital multitrack takes place before students learn the complementary theory. When students begin digital theory in their second

year, classes are held in the studio so they can walk right into the control room for applications—immediate reinforcement.

After they learn some electrical engineering, students maintain the studios at Peabody in their junior year (as they do at Miami, Middle Tennessee State and other schools). Available equipment includes an IMS Dyaxis workstation, digital 2-tracks and multitracks, PCM-2500 DATs and a fully automated console.

Peabody's five-year program accepts ten students each year and culminates in a bachelor of music in recording arts and sciences; half music, half engineering/recording. "The best engineers I've come across are musicians," says Alan Kefauver, program director. "Our premise is that it's easier to teach musicians engineering than to teach engineers music."

Middle Tennessee State University in Murfreesboro offers an advanced technology course that requires students to complete a recording project on the Sony 3324. Separate mixdown projects end up in PCM, DAT and Mitsubishi X-80 formats. Workstation applications incorporate the IMS Dyaxis.

The final project at MTSU, however, forces students to keep their hands off the console. The Studio Production course allows a student "to put on the producer's hat and deal with a student engineer," says Geoffrey Hull, chairman of the recording industry management department. "After three years of working on the equipment, it's sometimes hard for them to pull back and let someone else do the work."

The culmination of the seven-week program at the Recording Workshop in Chillicothe, Ohio, involves taking a band from setup to mixdown, ending up on DAT. Automated mixing is handled on an MCI 600 console. Other projects include tape machine alignment (with an optional maintenance/troubleshooting extension) and audio layback to video. Theory is stressed so students can judge the quality of a piece of equipment, but according to chief engineer Jeff Ling, the primary emphasis is on practicality.

"One of the things [students] find interesting is that you can take a 501 processor and a couple of VCRs and bounce back and forth through the processor to do pseudo-digital multitracking," Ling says. "They do a stereo basic and then another pass, bouncing to another machine and adding new tracks."



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Students at Northeast Community College in Norfolk, Nebraska, save their recordings on DAT masters, thanks to the addition of the Sony DT1000ES DAT deck. They master to DAT, then copy to quarter- or half-inch 1/2-track. A second DAT deck and an automated mixing console should arrive this fall. Meanwhile, NCC teaches digital audio through electronics courses in digital circuit building and in terms of storage formats.

"Employers want people with employable skills," says David Leonard, founder of the decade-old Trebas Institute. "Where necessary, we teach theory, but we temper that with a lot of practical applications." On the Hollywood campus, Trebas computer courses and labs begin right away, basic electronics and MIDI principles come next, digital principles enter in the third term, and digital audio (especially as it relates to audio-for-video post-production and workstation concepts) comes at the end of the two-year program. A variety of nontraditional classes such as Ethics & Professionalism are also available for students who want to leave the program feeling well-rounded.

The L.A. Recording Workshop rents studio time at various nearby L.A. studios such as Track Record. Students train "on the clock" with 32-track and 24-track digital recorders, getting in 15 hours on digital gear. Class size is limited to six students.

The 300-hour program moves into digital audio about two-thirds of the way through. Digital theory is handled in lectures. "Digital is part of our training because it's part of the industry," says administrator Christopher Knight, "but we don't see it as a digital-only world. What's become very popular, for example, is recording drums on analog, then putting them on digital, in order to pick up the IM distortion, which has become a popular sound over the last 30 years."

### IT'S NOT ALL DIGITAL

We do still live in an analog world, and many recording schools find that it helps to teach digital principles in terms of analog concepts.

Students at the Institute of Audio-Video Engineering in Hollywood, California, build their own digital circuits and work with digital effects devices from day one, but "they have to learn the analog domain," says T.C. Coley, director. "We teach analog as it relates

—CONTINUED ON PAGE 174

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# RECORDING SCHOOLS, SEMINARS & PROGRAMS

## MIX 1989 DIRECTORY

### WESTERN

**ASPEN MUSIC FESTIVAL AND SCHOOL;** Course/Program Title: Aspen Audio Recording Institute; Box AA, Aspen, CO 81612; (303) 925-3254. Chief Administrator: Daniel Craik, director ARI

**AUDIO SERVICES CORPORATION;** Course/Program Title: Various seminars on production sound for film/video; 10639 Riverside Dr., North Hollywood, CA 91602; (818) 980-9891. Chief Administrator: Fred Ginsburg, C.A.S.

**BRIGHAM YOUNG UNIVERSITY;** Course/Program Title: Sound Recording Technology; C-550 Harris Fine Arts Center; Provo, UT 84602; (801) 378-3083. Chief Administrator: Ron Simpson

**CALIFORNIA POLYTECHNIC STATE UNIVERSITY;** Course/Program Title: Music—Recording Arts and Electronic Music Program; Music Dept.; Cal Poly State University; San Luis Obispo, CA 93407; (805) 756-2406. Chief Administrator: Dr Antonio G. Barata

**CALIFORNIA STATE UNIVERSITY, CHICO;** Course/Program Title: Recording Arts (BA and minor); Department of Music; Chico, CA 95929; (916) 895-5152. Chief Administrator: Raymond Barker, Daniel Craik. Program: The Department of Music at California State University, Chico, offers two programs in recording arts: the Bachelor of Arts in Music with an option in Recording Arts, and the Minor in Recording Arts. These programs are being offered in newly constructed, state-of-the-art recording facilities in the west wing of the Performing Arts Center. The new facilities, available fall 1989, include a 24-track control room, a performance studio and electronic music studio. A music major in the Recording Arts option will take courses in music history, music theory, composition with electronic media, and audio recording, along with courses from other departments in electronics and physics of sound. The option in Recording Arts for music majors includes a capstone "internship" course that will provide the opportunity to record the major productions on this campus and to acquire experience in selected recording studios off campus.



CALIFORNIA STATE UNIVERSITY, DOMINGUEZ HILLS  
Carson, CA

**CALIFORNIA STATE UNIVERSITY, DOMINGUEZ HILLS;** Course/Program Title: Audio Recording and Music Synthesis (ARMS); 1000 Victoria St.; Carson, CA 90747; (213) 516-3543. Chief Administrator: David Champion, John Hill, David

Following is a briefly annotated list of schools and programs offered in the areas of audio and music education, compiled from questionnaires received from those institutions earlier this year. The courses vary greatly in scope, intent and cost and we urge those interested in attending any program to investigate very carefully before making their decisions. *Mix* claims no responsibility for the accuracy of the information provided by the institutions.

Bradfield. Program: CSU, Dominguez Hills offers four-year BA music degrees in Audio Recording and Music Synthesis and a certificate program in Audio Technology. The curriculum includes lecture and hands-on lab courses in audio engineering, music synthesis, music production, studio electronics and equipment maintenance. Elective studies in video production are available. Recording labs are conducted in an automated 24-track facility that includes a Soundcraft 2400 console, Sony/MCI JH-24 with Dolby SR, digital and analog 2-track machines for mixdown and an assortment of state-of-the-art microphones and signal processors. The adjoining MIDI studio (with SMPTE lock) is configured around an 8MB Emulator III system. Students use an extensive software library for music sequencing, patch editing/storage, music printing, algorithmic composition and visual sample editing on the Macintosh and Atari ST computers. Expander synthesizer modules include products by Yamaha, Roland, Oberheim, Casio, Alesis and Korg.



College for  
Recording Arts

COLLEGE FOR RECORDING ARTS  
San Francisco, CA

**COLLEGE FOR RECORDING ARTS;** Bi-Cultural Foundation Inc.; 665 Harrison St.; San Francisco, CA 94107; (415) 781-6306. Chief Administrator: Leo De Gar Kulka. Program:

One-year course for recording engineers and others intent on a career in the music/recording industry. C.R.A. is accredited by the National Association of Trade and Technical Schools (NATTS), approved by the California Superintendent of Public Instruction, approved for veteran training and authorized under federal law to enroll non-immigrant, alien students. Semesters start the first full week of June, October or February. Over 15 years of providing quality graduates to the music/recording industry.



CONSERVATORY OF RECORDING ARTS & SCIENCES  
Phoenix, AZ

**CONSERVATORY OF RECORDING ARTS & SCIENCES;** Course/Program Title: Master Recording Program; 1110 E. Missouri, Ste. 400; Phoenix, AZ 85014; (602) 493-9898. Chief Administrator: Jacqueline F. Vican. Program: Professional career training in audio recording and production. The conservatory offers the Master Recording Program, a 300-hour, intensive, 15-week course including: audio recording and production, MIDI/computer/electronic recording, music business, sound reinforcement and troubleshooting. Emphasis is hands-on, working in a variety of studios including 24/16/8/4-track. Individual projects required. Each applicant judged on aptitude and attitude. Classes limited in size, interviews suggested. Internships available in commercial studios. Director of Education is gold-album-winning engineer who is a current professional in the recording industry. Master program enrolls four times per year: spring, summer, fall, winter. (Formerly The Academy of Recording Sciences.)

**FULLERTON COLLEGE;** Course/Program Title: Music Recording/Production; 321 E. Chapman Ave., Music Dept.; Fullerton, CA 92634; (714) 992-7296. Chief Administrator: Alex Cima. Program: 1985 *Mix* TEC Award nominee. The college offers a one-year certificate in Music Recording/Production encompassing two semesters of audio recording, two semesters of electronic music, one semester of music business and other relevant music courses. The Music Dept. has a fully equipped 24-track studio w/automated board, digital reverb, digital mixdown and the usual complement of signal processors (harmonizer, compressors, etc.) and microphones. Fullerton College is a public California community college with minimal tuition for California residents. A great way to receive a college education and learn professional audio recording.

**GOLDEN WEST COMMUNITY COLLEGE;** Course/Program Title: Commercial Music, Recording Arts; 15744 Golden West St.; Huntington Beach, CA 92647; (714) 895-8780. Chief Administrator: Scott Steidinger, Evan Williams. Program: A fully comprehensive, 12-year-old program of national reputation. The program features extensive hands-on experience in our



**GOLDEN WEST COMMUNITY COLLEGE**  
Huntington Beach, CA

three well-equipped studios. Studio A features MCI 24-track recorder, 40-channel Neotek Elite automated console, Q-Link synchronizer, Lexicon 22-4XL reverb plus extensive outboard signal processing. Studio B features Neve 16-channel mixer, MCI 16-track recorder, analog and digital signal processing. Studio C features Rarisa WR-T820 mixer, Tascam Model 58 8-track recorder, extensive signal processing and an array of 20 MIDI-sequenced synthesizers (Yamaha DXs, TF modules, Kurzweil 250, Roland Juno, etc.) controlled by Macintosh computer and various software programs. Highlighting each year is a student composed/arranged/engineered and produced CD. Each two-year certificate program cycle begins with the first semester in mid-August. Interested students are encouraged to apply as early as possible!

**INSTITUTE OF AUDIO-VIDEO ENGINEERING;** Course/Program Title: Recording Engineering (Audio & Video); 1831 Hyperion Ave., Hollywood, CA 90027; (213) 666-2380; (800) 551-8877. Chief Administrator: Chaba Mehes. Program: The Institute of Audio-Video Engineering offers concise, expert instruction in audio and video engineering and is housed in a state-of-the-art recording studio, actively engaged in servicing the local community. The school is an accredited member of the National Association of Trade and Technical Schools. The eight-month, state-approved diploma program includes audio recording, video production, editing and studio maintenance. Elective classes offer students an opportunity to further their understanding and skills in specialized areas such as sound reinforcement, advanced mixing, advanced video editing and use of the Fairlight CMI music computer. New terms start approximately every ten weeks. The cost of the entire program ranges from \$4,880 to \$5,500, depending on electives selected. Approximately \$175 will be needed for books and supplies for the whole program. Classes are scheduled primarily during evening or weekend hours since instructors are working professionally currently active in the entertainment fields. Students are required to complete 72 hours of internship prior to graduation, as well as completing 492 clock hours of classes with 314 of those hours being hands-on experience. The Institute of Audio-Video Engineering has been established since 1980. Financial aid is available to qualified students.

**LONG BEACH CITY COLLEGE;** 4901 E. Carson St.; Long Beach, CA 90808; (213) 420-4309; (213) 420-4517. Chief Administrator: Patricia Remeta, Dr. George Shaw. Program: Facilities include 24-track, 16-track (TEAC and Fostex), 8-track and 4-track studios. A state-of-the-art MIDI classroom is comprised of 21 individual computer-controlled songwriting stations. Each station is equipped with Macintosh, synthesizer, drum machines, effects and recording equipment. Commercial music instructors are all professionals in the music recording and performance fields. Students are given hands-on training and receive certificates in record producer, recording engineer, songwriter/arranger, copyist, vocal, instrumental including MIDI applications.

**LOS ANGELES RECORDING WORKSHOP;** Course/Program Title: 200-hour Recording Engineering Program, 300-hour 1st Engineer Program; 12268-X Ventura Blvd.; Studio City, CA 91604; (818) 763-7400. \*See Our Ad in the Business Pages! Chief Administrator: Christopher Knight. Program: The Los Angeles Recording Workshop offers 200-hour and 300-hour programs in Recording Engineering. These are intensive, hands-on training programs designed specifically to train students for jobs in the recording industry. Job placement assistance is included. Our students train in six different studios: four different 24-track studios, one 16-track SMPTE-MIDI lockup studio and one rehearsal studio that is used for the live engineering portion. Studies include analog and digital recording, mixing techniques, live engineering, MIDI sequencing and sampling, production techniques, outboard gear, tape machine alignment and music business. Both full-time (5-week or 10-week) and part-time (10-week or 15-



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Studio City, CA

week) schedules are available. We are fully accredited by ACCET, and financial aid is available to qualified students. Dorm-style housing is available. Call or write for our brochure and soundsheet.



**LOS MEDANOS COLLEGE**  
Pittsburg, CA

**LOS MEDANOS COLLEGE;** Course/Program Title: Recording Arts; 2700 E. Leland Rd.; Pittsburg, CA 94565; (415) 439-0200. Chief Administrator: Frank Dorrite. Program: Los Medanos College in Pittsburg, California, offers a degree program in Recording Arts, including courses in multitrack recording, sound reinforcement, acoustics, MIDI sound synthesis, producing and troubleshooting. Theory, hands-on experience, a state-of-the-art recording studio and a facility honored with ten Grammy nominations make the Los Medanos Recording Arts program the finest in Northern California. Fees: California residents \$5 per unit (\$50 max per semester), out-of-state \$92 per unit.

**MAY SCHOOLS;** Course/Program Title: Recording Engineer and Radio/Television Broadcasting; 1320 Grand Ave.; Billings, MT 59102; (406) 259-7000. Chief Administrator: Michael May. Program: Recording students complete training in eight months with emphasis on hands-on training in a full 24-track studio plus individual MIDI-equipped studios and advertising production studios. The radio/TV students complete training in 12 months and work in the school television studio and post-production edit suites after completing the audio training. Accredited member of NATTS. Provides job-placement assistance, student financing, professional staff. Classes start every eight weeks. Call or write for free catalog and financial aid information.

**MENDOCINO COUNTY SCHOOLS R.O.P.;** Course/Program Title: Radio, TV; PO Box 226; Mendocino, CA 95460; (707) 937-1200. Chief Administrator: Bob Evans, Oleg Harenar.

**PORTLAND COMMUNITY COLLEGE;** Course/Program Title: Recording Technologies; Music Dept./Cascade Campus; PO Box 19000; Portland, OR 97219-0990; (503) 283-2541 ext. 5226. Chief Administrator: Hal Lee. Program: The PCC Vocational Music Department offers excellent program in recording, performance and composition. Designed by musicians for musicians, the two-year program leads to an Associate of Applied Science degree. The recording course seeks to integrate music and technology by emphasizing an overall understanding of production skills. Topics covered include engineering fundamentals, microphone techniques, multitracking, mixing, editing and MIDI recording applications. Additional classes cover electronic media, histories of jazz, rock

and folk, business for the musician, and classes in basic instrumental improvisation. Whether you are just getting under way or are a practicing professional needing to polish skills, this program has something to offer you. Portland Community College's Cascade campus is located 15 minutes from downtown Portland, the live music capital of the Pacific Northwest. Tuition costs are reasonable, averaging approximately \$250 for in-district residents.



**RECORDING INSTITUTE**  
Van Nuys, CA

**RECORDING INSTITUTE;** Course/Program Title: Music Engineering & Video; 14511 Delano St.; Van Nuys, CA 91411; (818) 994-9976. Chief Administrator: Fred Munch, Larry Cook. Program: Comprehensive, hands-on training for first and second recording engineers. 24-track in-house studio with over 20 gold/platinum records! Small classes taught by professionals. Diploma program, six months, includes extensive 24-track recording and mixing, video production and post-production, sound reinforcement, digital technology, MIDI, music software, studio maintenance and internship. 500 hours. \$5,650. Financing. Placement assistance. High school diploma and a personal interview (possible by phone) required for admission. Administrators were all formerly at Institute of Audio-Video Engineering. For a catalog and further information contact Recording Institute.

**R.O.P. (REGIONAL OCCUPATIONAL PROGRAM) MENDOCINO COUNTY OFFICE OF EDUCATION;** Course/Program Title: Audio Recording & Radio Technician; PO Box 226; Mendocino, CA 95460; (707) 937-1200. Chief Administrator: Paul Tichinin, Bob Evans. Program: Mendocino County Schools' regional occupational program (ROP) audio recording studio for adult and high school students offers individualized instruction in recording techniques, sound reinforcement, introduction to MIDI, radio production, safety and studio etiquette. Equipment includes Tascam 16-track recording facility, 2/4-track mixdown, Tascam multichannel mixing board, Yamaha SPX90, Korg DVP-1 digital voice processor, Macintosh Plus computer w/Opcode 2 Pro MIDI interface, Opcode 2.54 sequencer, DX TX librarian, Deluxe Music Construction Set, Roland SDE-3000 digital delay, Yamaha DX7, Sequential Circuits MAX, Korg DS8, Casio CZ-100, Yamaha DX100, SDS9 digital drums. Mics: Sennheiser 421, AKG condensers, Shure SM57s, Audio Technica Dynamics Facility drum isolation booth, large main tracking room, control room. No charge for training, although program requires a small materials fee for tapes, disks, books and equipment repair. Open entry/open exit. Sept.-June only. Certificate awarded to completers. 1,200 hours maximum. Contact Bob Evans, studio manager/instructor.

**SAN FRANCISCO STATE UNIVERSITY;** Course/Program Title: Music Recording Industry Certificate Program; SFSU Extended Education Downtown Center; 814 Mission St., Ste. 201; San Francisco, CA 94103; (415) 338-1372. Chief Administrator: Mary Pierall. Program: An accredited music industry program for students and professionals, with courses that range from record engineering, mixing, artist management, publicity, tour management, industry history and legal aspects to seminars like songwriting and music video. Expand skills with one or two workshops or earn a professionally recognized certificate with completion of a structured academic program taught by Bay Area pros. Formal University application is not required.

**SKE PUBLISHING;** Course/Program Title: Recording School Curriculum Service; PO Box 2519-M; Sedona, AZ 86336; (602) 282-1258. Program: We publish a complete curriculum for schools and recording studios wishing to teach sound engineering. Based on the book *Practical Techniques for the Recording Engineer*, these course materials are already in use at over 75 universities, colleges and studios throughout the world. The program includes the text (\$28.95). Teacher's

—CONTINUED ON NEXT PAGE

# RECORDING SCHOOLS, SEMINARS & PROGRAMS

WESTERN

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**SKE PUBLISHING**  
Sedona, AZ

Manual (\$45), Answer Key (n/c), Student's Workbook/Supplement (\$16.50) and three final exams (n/c). Suggested session content for hands-on studio work. Course features practical, useful content. Text covers techniques and skills while Workbook/Supplement covers conventional subjects. Write for more information. Sound Engineering Home Study Course. A fast, affordable way for the sound enthusiast to study high-powered sound engineering based on the college text *Practical Techniques for the Recording Engineer*. Work on your own or with a friend to master the musical and technical concepts of sound engineering. The home study cassette packages for Basic, Intermediate and Advanced contain 12 50-minute audio cassettes at \$99.99 each. Some of the course features are mics, recorders, session and stage setup and breakdown, alignments, noise reduction, sound and audio theory, acoustics, editing, mixing techniques, tricks-of-the-trade, grounding, special effects, and much more all covered in great detail! The eight lecture cassettes expand on the information in the books while the four answer cassettes complete the learning experience.



**SONOMA STATE UNIVERSITY**  
Rohnert Park, CA

**SONOMA STATE UNIVERSITY;** Course/Program Title: Recording & Electronic Music; 1801 E. Cotati Ave.; Rohnert Park, CA 94928; (707) 664-2324. Chief Administrator: Arthur Hills, Warren Dennis, Ron Pellegrino. Program: Three semesters of recording studio plus tutorial. Career minor in recording technology also includes internship. One semester of Studio Musicianship and Production and Commercial Song-

writing. All programs incorporate hands-on use of a new, fully outfitted, 1" 8-track studio with two full isolation booths. Electronic Music Studio: courses in sound synthesis with computers and digital, hybrid and analog synthesizers, emphasis on fundamental principles and studio techniques, composition and performance. All courses have hands-on work with FM, sampling, phase distortion, linear/arithmetic, percussion and analog synthesis. Completely integrated MIDI/SMPTÉ studio includes latest Macintosh-based software for sequencing, notation and voice editing, librarian functions for all studio synthesizers. Studio includes an 8-track and two 4-track tape machines, and multiple outboard processors for audio and MIDI signals.



**SONY INSTITUTE OF APPLIED VIDEO TECHNOLOGY**  
Los Angeles, CA

**SONY INSTITUTE OF APPLIED VIDEO TECHNOLOGY;** Course/Program Title: Audio I thru IV (and other video-related workshops); 2021 N. Western Ave., PO Box 29906; Los Angeles, CA 90029; (213) 462-1987. Chief Administrator: Jeffrey Glasser, Stephen Gach. Program: Get your career on the fast-track! Learn from the leaders. The Sony Institute of Applied Video Technology offers the most comprehensive curriculum in professional video education today. Workshops are university accredited, fully certified and carry a dynamic money-back guarantee if you are not fully satisfied. More than 30 exciting workshops have been developed to meet your professional needs. Courses like: Audio 1—Audio for Video Production; Audio 2—Postproduction Audio for Video; Audio 3 and 4 (for the more advanced professionals); ENG: Capturing the Live Event; as well as numerous courses in electronic field production, editing, lighting and more! The Sony Institute also offers a variety of top-notch products and production tools, such as: Shaping Your Sound, the Video Music Composer Library, and the Complete Guide to Videotape Editing. Call now for further information and details: (800) 662-SONY, (213) 462-1987 in California. Course Spotlight: Audio 1 through 4—in-depth workshops in production audio-for-video, from pre-production through post-production and completion.

**SOUTHWEST INSTITUTE OF RECORDING ARTS AND SCIENCES;** Course/Program Title: Audio Recording Engineering; 4831 N. 11th St., Ste. C; Phoenix, AZ 85014; (602) 241-1019. Chief Administrator: Merel Bregante. Program: A 16-week, 384 class-hour learning system designed to teach audio recording and engineering. Students will progress from a firm understanding of the most basic recording concepts through student-engineered sessions using the most sophisticated of modern recording equipment, thus gathering an academic and practical knowledge of all the most common aspects of audio recording. By starting with the basic (2-track date), then working through the fully automated mixdown (SSL 4040 E/G automated mixing desk) of a state-of-the-art, multitrack digital recording (Sony 3324 digital multitrack and Mitsubishi X-80 digital 2-track), this system will enable students to successfully compete in any audio recording environment as fully qualified, entry level, audio engineers. Seats in this class will be limited to ensure comprehensive work loads with a major emphasis on hands-on training

**TREBAS INSTITUTE;** Course/Program Title: Recording Arts & Sciences: Integrated Music Tech., Music Industry Management; 6602 Sunset Blvd.; Hollywood, CA 90028; (213) 467-6800. Chief Administrator: David P. Leonard. Program: Two-year programs in the Recording Arts and Sciences w/specialization options in Integrated Music Technology and Music Industry Management. More than 100 courses to choose from in 11 tracks of study including: Music, Production, Synthesis and MIDI, Video, Computers, Digital, Audio Engineering Theory and Studio Recording, Electronics, Music Business, Management and General Education. Three majors available: Production/Engineering, Engineering/Electronics and Management. Diploma in Recording Arts & Sciences (w/specialization in one of the two programs above). One entrance scholarship offered at each of five campus locations across North America, valued at \$6,000 each. Memorial scholarship for second-



**TREBAS INSTITUTE**  
Hollywood, CA

year studies at each location. Other awards of merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studio, electronic music/synthesis/MIDI studios, electronics lab, computer labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center, including library of several thousand volumes (books, magazines, articles) on the music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET



**UCLA EXTENSION**  
Los Angeles, CA

**UCLA EXTENSION;** Course/Program Title: Certificate Program in Recording Engineering; 10995 Le Conte Ave., PO Box 24901; Los Angeles, CA 90024; (213) 825-9064. Chief Administrator: Ms. Ronnie Rubin, Van Webster, program coordinator. Program: The UCLA Extension Certificate Program in Recording Engineering is a rigorous training program that prepares the student in both the art and science of sound recording. Drawing on the talent and studio facilities of Los Angeles, one of the music industry capitals of the world, we have created a sequential curriculum of required and elective courses that covers both theory and practice in audio technology, equipment, musicianship and business practice. All classes are taught by working professionals in the recording industry, who bring a wealth of practical knowledge to the classroom and studio workshops. The objective of the program is to enable future engineers to acquire vision and problem-solving techniques that meet the challenge of rapidly evolving technology and a dynamic sound recording market. Prerequisite courses include basic physics, math and electronics plus ear-training and sight singing or a music performance background. All prerequisite classes are available through UCLA Extension, the continuing education arm of UCLA. The Certificate Program in Recording Engineering is a State of California-approved recognition of significant educational accomplishment in a professional field. Additional certificate programs are available in electronic music, film scoring and recording arts. All classes are held at night or on weekends, enabling working adults as well as full-time students to attend. Class fees range from \$250 to \$895 per quarter. Scholarships are available

**UNIVERSITY OF ARIZONA;** Tucson, AZ 85721; (602) 621-1655. Chief Administrator: Jeff Haskell. Program: A recording

studio production class is offered to music and RTV students. The class includes a basic overview of studio equipment use and terminology, in addition to music production and music law. Courses in computer and MIDI applications are offered. The recording studio features an audiophile-quality 24-track facility with numerous signal processing equipment, including Lexicon PCM70, Drawmer gates, dbx 165A compressors, Pultec EQP-1A EQ, Prime Time delay etc. The recording studio is very accessible to students for gaining experience writing, producing and performing in professional-quality recordings.



UNIVERSITY OF COLORADO DENVER,  
COLLEGE OF MUSIC  
Denver, CO

**UNIVERSITY OF COLORADO DENVER, COLLEGE OF MUSIC;** Course/Program Title: Recording Technology & Sound Synthesis; 1200 Larimer St., Box 162; Denver, CO 80204. (303) 556-2727. Chief Administrator: Roy Pritts. Program: UCD College of Music offers a Bachelor of Science in Music degree with a strong emphasis on contemporary technology of studio recording, sound reinforcement and electronic music. The Recording Technology and Sound Synthesis area of study develops the skills necessary for each student to be competitive as a professional in his/her "home studio," as well as a professional in a chosen career as a recording engineer/producer. Students receive intensive, hands-on training in recording studio technology and procedures, with individual instructor-assisted time in the college's four professionally equipped studios. Electronic music studies include synthesizers, samplers, MIDI and computer workstations using Apple and IBM. The four-year program includes studies of music theory, performance, music business, music history including the "History of Rock & Roll" and general studies of the liberal arts. Contact Program Director Bill Porter at (303) 556-2727, or write UCD College of Music, Box 162, 1200 Larimer St., Denver, CO 80204. Accreditation is through the National Association of Schools of Music, (NASM). 1988 in-state tuition, fees and books are approximately \$1,200 per semester.



UNIVERSITY of DENVER

Lamont School of Music

UNIVERSITY OF DENVER, LAMONT SCHOOL OF MUSIC  
Denver, CO

**UNIVERSITY OF DENVER, LAMONT SCHOOL OF MUSIC;** Course/Program Title: Bachelor of Music in Commercial Music; 7111 Montview Blvd., Denver, CO 80220, (303) 871-6400. Chief Administrator: David J. Genova. Program: This degree is for the student who wants to develop into a first-rate freelance or sessions player, and/or commercial arranger/composer, ready to enter the world of high-tech music. Within the structure of a Bachelor of Music degree, commercial music majors will participate in a well-rounded general edu-

cation program, enhanced by special offerings appropriate to developing commercial musicians. Commercial music majors will take courses in commercial composition and arranging, applied commercially oriented harmony at the keyboard, business, law and contracts for commercial musicians, basic electronics, history of synthesis, synthesis programming, sampling and courses in sound recording in the home and professional studio. Sound reinforcement is included, and advanced students will intern as recording engineers and session players.

**UNIVERSITY OF NEVADA, LAS VEGAS;** Course/Program Title: Recording Studio/MIDI Programs; 4505 S. Maryland Pkwy.; Dept. of Music; Las Vegas, NV 89154; (702) 739-0819. Chief Administrator: Curt Miller.

**UNIVERSITY OF SOUTHERN CALIFORNIA;** Course/Program Title: Bachelor of Science in Music Recording; School of Music; MUS 212; Los Angeles, CA 90089-0851; (213) 743-2627. Chief Administrator: Richard McIlvery. Program: The Recording Arts Program at USC offers a four-year Bachelor of Science in Music Recording degree. Skills in both music and mathematics are required for entrance. Courses are taught by both university professors and outside industry professionals in Los Angeles and include one-semester classes in Mixing Consoles, Acoustics and Speaker Design, Tape and Tape Recording (analog), Reverb and Outboard Equipment, Basic Recording Techniques, Advanced Recording Techniques and Remote Recording plus two-semester courses: Recording Theory, Recording Studio Maintenance, Digital Recording and Equipment. Enrollment is limited to 15 students per year. Call or write for information.

**USA AUDIO VIDEO;** Course/Program Title: Audio Video Engineering/Recording Engineering; 1645 N. Vine St., Ste. 350; Hollywood, CA 90028; (213) 467-5256. Chief Administrator: Raghu Gadoke. Program: USA offers certificate programs in Audio/Video Engineering, Recording Engineering, Music Business Management, Maintenance Engineering and Commercial Music including MIDI and synthesizers as well as video sweetening. We have been in business for 12 years and are a nationally accredited school. We offer day and night classes. We have a state-of-the-art video production studio, video editing studio, MIDI room and a 24-track recording studio available to the student on premises. Financial aid and student I-20 VISAs are available to qualified individuals. Our instructors are well-respected professionals in the industry. Students work on record and music video as part of their portfolio.

## CENTRAL

**ALVIN COMMUNITY COLLEGE;** Course/Program Title: Communications Dept. (Recording and Sound Reinforcement); 3110 Mustang Rd., Alvin, TX 77511; (713) 331-6111 ext. 379. Chief Administrator: Cathy Forsythe. Program: The Communications Department at Alvin Community College offers two separate programs in recording. For the student who is pursuing an associate of applied arts degree in recording and sound reinforcement, a four-semester degree program is available. Also available is a one-year certificate program. The Communications Department also offers an associate degree and certificate program in both radio broadcasting and television. Classes begin three times each year. At Alvin Community College, small classes emphasize a practical, hands-on approach to learning. Through these classes, the student will acquire a knowledge of the equipment and processes used in recording studios. Some of the topics covered will include tape recorder and console operations, microphone theory, microphone placement and signal processing. In cooperation with Houston-area recording studios, the student can gain practical, working knowledge and related work experience through internships. The student will earn college credit for working part-time for recording studios in the fourth-largest city in the nation. The cost of instruction is extremely competitive, as Alvin Community College is a state-supported institution. The cost of the program consists only of normal tuition and fees. For those students who qualify, financial aid and work scholarships are available.

**THE ART INSTITUTE OF DALLAS;** Course/Program Title: Music and Video Business; 8080 Park Ln.; Dallas, TX 75231; (800) 441-1577. Chief Administrator: Terry Pope, program director. Program: The Music and Video Business program at The Art Institute of Dallas is an intensive, 18-month program in music and entertainment management. The program focuses on the specialized knowledge needed to begin a career in the business or technical side of the music, recording, video or entertainment industry. Musicians, songwriters and performers can redirect their careers with practical music-business knowledge. Other students who start with only a love for music soon develop marketable skills and explore new career directions. The MVB program is taught by an experienced, energetic group of industry professionals. Students become famil-

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# RECORDING SCHOOLS, SEMINARS & PROGRAMS

CENTRAL

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**The Art Institute of Dallas**

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Dallas, Texas 75231-9959

THE ART INSTITUTE OF DALLAS  
Dallas, TX

lar with how professionals develop a hit record and produce a live concert or music video. Students also learn the marketing, sales, promotion, legal, financial and business management sides of the music industry. The Institute also assists graduates in their job search by helping them determine career goals and by offering assistance in preparing resumes, conducting interviews and establishing job leads. Financial aid (if eligible) and housing assistance are available. Call the Institute at 1-800-441-1577 or locally at 692-8080 for more information.

**BOWLING GREEN STATE UNIVERSITY;** Course/Program Title: Recording Technology Minor; College of Musical Arts; Bowling Green, OH 43403; (419) 372-8405. Chief Administrator: Robert W. Thayer. Program: The Recording Technology Minor is a supplementary program that provides students with appropriate terminology and allows them to become familiar with the equipment and techniques of a recording studio. By means of elective courses, students can emphasize either the business or technological aspects of the programs, or create any combination of those aspects.

**CAPITAL UNIVERSITY CONSERVATORY OF MUSIC;** Course/Program Title: Music Industry; 2199 E. Main St.; Columbus, OH 43209; (614) 236-6411. Chief Administrator: Paul K. Formo, dean. Program: A bachelor's degree (four-year program) with elective options in music merchandising and music media. A program designed to provide undergraduates with a solid base of traditional and contemporary musical training. Music study is supplemented with studio recording techniques taught in conjunction with The Recording Workshop in Chillicothe, Ohio. This degree can be combined with a second major (business, communication, etc.) or a minor in business or one of the liberal arts departments.

**CEDAR VALLEY COMMUNITY COLLEGE;** Course/Program Title: Commercial Music Recording Technology; 3030 N. Dallas Ave.; Lancaster, TX 75134; (214) 372-8127. Chief Administrator: Helen Spencer. Program: Commercial Music Recording Technology (two-year associate degree). This two-year program is designed to provide the technical and musical skills necessary in the field of recording technology. Musical skills include vocal, instrumental and MIDI-based, computer-driven synthesis. Technical skills include electronic and acoustical theory, multitrack recording, automated mixing, session planning, session procedure, digital recording and troubleshooting.

**THE CLEVELAND INSTITUTE OF MUSIC;** Course/Program Title: Recording Engineering Program; 11021 East Blvd.; Cleveland, OH 44106; (216) 791-5165. Chief Administrator: Tom Knab, department head. Program: The Cleveland Institute of Music offers an outstanding environment for learning audio/music production while pursuing a BM in recording engineering in a conservatory setting. Our courses cover audio system design and operation, digital audio, advanced

microphone techniques, audio-for-video production and post, electronic music and multitrack recording. An internship, independent projects and four years of professional experience round out the program. Classical music recording studies are done under the guidance of Jack Renner, of TELARC International. Guest lecturers include John Eargle and Shawn Murphy. Conservatory setting offers excellent orchestra, chamber music and top-quality musicians for collaboration. Our program emphasizes musical and aural acuity development and technical excellence. Two well-equipped student studios allow for plenty of hands-on time. Equipment includes Otari 16-track recorder, Soundcraft and Trident consoles, Adams-Smith synchronization, 3/4" and 1/2" video, Macintosh II MIDI setup, DX7, TX816, Synclavier II and Emox synthesis/sampling, digital 2-track, Lexicon, Yamaha, Orban, Symetrix, etc., signal processing equipment, and a high-quality microphone selection. Sixteen majors accepted—to ensure personalized instruction, studio time and support in internships and job search. Strong musical and academic entrance requirements. Minor in electrical engineering available through joint program with Case Western Reserve University.

**COLUMBIA COLLEGE-CHICAGO;** Course/Program Title: Sound Engineering; 600 S. Michigan Ave.; Chicago, IL 60605; (312) 663-1600, ext. 354. Chief Administrator: Douglas R. Jones. Program: Columbia College offers two ways to get an education in audio. There is a four-year bachelor of arts program with an emphasis in sound engineering, and a two-year sound engineering certificate program. The core curriculum consists of Introduction to Audio, Basic Sound Practices, Electronics for Audio, Sound Engineering, Audio Processing, Radio Production, Acoustics for Microphones and Advanced Acoustic Design. In addition, there are approximately 20 other sound classes in various departments that may be taken as part of the degree or certificate program.

**ELMHURST COLLEGE;** Course/Program Title: Music Business; 190 Prospect; Elmhurst, IL 60126; (312) 617-3515. Chief Administrator: Tim Hays. Program: Located in the Chicago metropolitan area, Elmhurst College is a nationally accredited institution that offers both a BS and a BM in music business. In addition to classwork in music, business and the business of music, students get hands-on industry experience through internships, industry speakers and course tours to locations as diverse as Los Angeles, New York City and West Germany. Resources include a 16-track studio that has just come online in the college's new (1989) Computer and Technology Center, recently expanded practice and recital facilities and an artist faculty of over 30. Industry support is provided in the form of scholarships from organizations such as NAMM and NARAS, corporate sponsorship, a student chapter of MEIEA and an intern/job bank. Offering students individualized instruction in music business for over 17 years, Elmhurst provides a specialized career track integrated within a four-year degree.

**HOUSTON COMMUNITY COLLEGE SYSTEM;** Course/Program Title: Commercial Music, Audio Engineering Technology; 901 Yorkchester; Houston, TX 77079; (713) 468-6891. Chief Administrator: Aubrey Tucker. Program: Fully accredited college offering two-year associate degree and certificate programs in audio engineering. Cost of instruction is extremely competitive in this field, consisting of normal tuition and fees. Great emphasis is placed on practical, hands-on experience. Two fully equipped studios. Studio A features MCI JH-536 automated console, MCI 24-track recorder with 24 channels of Dolby A noise reduction, two MCI 2-track recorders, Lexicon 200 and 224 digital reverb units, full Scamp rack and a wide variety of professional microphones. Studio B contains Tascam 520 20-channel mixing console, Foxtel 16-track recorder and similar onboard equipment and microphones. New inventory of keyboards, synthesizers, drum machines and sequencers.

**INDIANA UNIVERSITY;** Course/Program Title: Associate of Science in Audio Technology; School of Music MU 4C; Bloomington, IN 47405; (812) 335-1613; (812) 335-1900. Chief Administrator: Ted W. Jones, David A. Pickett. Program: The Associate of Science in Audio Technology, lasting approximately five semesters, offers training in audio recording, reinforcement and media production, with emphasis on classical music recording techniques. Students record all official concerts ranging from solo and chamber music through symphony orchestras, jazz ensembles and opera. In total, about 1,000 performances are produced annually in a 500-seat recital hall and the 1,460-seat Musical Arts Center. Classes in recording techniques, electronics, acoustics, maintenance and musical styles. Professional equipment includes 2-track digital and up to 16-track analog. University financial aid and some work scholarships available. Departmental assistance offered in job placement.

**LANSING COMMUNITY COLLEGE;** Course/Program Title: Media Technology/Audio; PO Box 40010; Lansing, MI 48901; (517) 483-1673. Chief Administrator: Dr. James Greene. Program: A three-track program with courses in audio production, audio recording and sound reinforcement. The courses are progressive and provide a balance between theory and practice. Lab facilities include modern analog and digital processing equipment. A two-year degree is available for students wishing to pursue an academic degree. Lansing Community College offers an open enrollment policy.

**MCLENNAN COMMUNITY COLLEGE;** Course/Program Title: Commercial Music/Audio Technology; 1400 College Dr.; Waco, TX 76708; (817) 750-3578. Chief Administrator: David Hibbard.

**MICHIGAN STATE UNIVERSITY, DEPARTMENT OF TELECOMMUNICATIONS;** Course/Program Title: Telecommunication; 409 Comm. Arts & Sciences Bldg.; East Lansing, MI 48824; (517) 355-8372 (dept. office); (517) 353-9753. Chief Administrator: Gary A. Reid, Bradley Greenberg. Program: An emphasis in audio production is available to students majoring in the department of telecommunication. Students must first complete a required sequence of core telecommunication courses. Upon completion of this core, students may opt into various areas of specialization. The production specialization area consists of advanced courses in both audio and video production. The audio sequence is based around three courses with content ranging from basic, radio-oriented production through full 24-track studio sessions. Emphasis is also placed on MIDI-based computer sequencing and SMPTE-based video sweetening. Independent study courses and internships are available to advanced students. A similar area is available for students specializing in video production. Students graduate with a BA in telecommunication. A master's-level production program is also available. The facilities include 2/4/8/24-track audio studios interfaced with two video production studios.

**MIDLAND COLLEGE;** Course/Program Title: Audio Recording Technology (16-track); 3600 N. Garfield; Midland, TX 79705; (915) 685-4648. Chief Administrator: Gerald D. Tubb.

**MILLIKIN UNIVERSITY;** Course/Program Title: Commercial Music; 1184 W. Main; Decatur, IL 62522; (217) 424-6300. Chief Administrator: Dean A. Wesley Tower. Program: Millikin University School of Music is the first accredited university in the Midwest to offer a Bachelor of Music degree program in commercial music with a vocal and instrumental emphasis. In addition to the traditional aspects of professional music training, course concentration includes commercial music performance, commercial music arranging, commercial music ensembles, traditional and commercial studio ensembles, recording studio engineering, record producing, jingle writing and producing, commercial vocal styles, commercial music theory, improvisation techniques and commercial/jazz history and forms. Scholarships, talent awards and financial aid are available.

**NATIONAL EDUCATION CENTER-BROWN INSTITUTE CAMPUS;** 2225 E. Lake St.; Minneapolis, MN 55407; (612) 721-2481. Chief Administrator: Donald W. Swanson, electronics dept. chmn. Program: NEC-Brown Institute is a technical school that offers an associate degree program in electronics technology. We are accredited by the National Association of Trade and Technical Schools. Audio recording technology is one of several areas of specialization that students may choose to pursue after having completed five quarters (1,200 hours) of electronics fundamentals. Students in the audio program are trained in systems analysis as well as component-level troubleshooting. Topics covered in the program include the following: 1) sound, hearing and acoustics, 2) audio amplifier design and troubleshooting, 3) studio tape recorder maintenance and repair, 4) editing and master tape preparation, 5) mixing console operation, maintenance and troubleshooting, 6) signal processing equipment operation, maintenance and troubleshooting, 7) synchronization techniques, MIDI and SMPTE, 8) microphone types, applications and placement techniques, 9) digital audio media. NEC-Brown Institute's audio recording technology program combines operations training with equipment maintenance in order to meet the needs of the industry.



NORTHEAST COMMUNITY COLLEGE  
Norfolk, NE

NORTHEAST COMMUNITY COLLEGE; Course/Program

—CONTINUED ON NEXT PAGE

6

# Reasons To Subscribe To Mix



## **Craig Anderton/MI Update**

Guitarist, synthesist, electronic music expert Craig Anderton reports on music technology and its effect on the audio, video and film environments.

Craig is also editor of our sister publication, *Electronic Musician*.

## **Mel Lambert/Juxtapositions**

Industry veteran Mel Lambert examines current trends in audio/video production techniques and applications, with a view to inform, enlighten and *connect*.



## **Philip De Lancie/After-Mix**

With an eye toward new technology and market trends, Phil talks to the engineers, inventors and executives who shape the flow of tapes and discs from mastering room to the consumer.



## **George Petersen/Auditions**

*Mix* product editor George Petersen evaluates new equipment, software, books and instructional videos in a working production environment—his own digital recording studio.



## **Ken Pohlmann/Insider Audio**

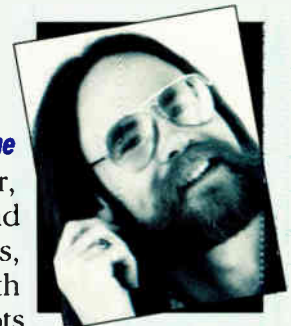
Our monthly liaison between the old and the new, and an international authority on digital audio, Ken provides a technical and theoretical overview of the latest

audio developments for the studio.



## **Stephen St. Croix/Fast Lane**

A musician, producer, designer, engineer and resident jack-of-all-trades, Stephen writes each month on futuristic audio concepts and technologies as they apply to the present.



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**MIX** THE RECORDING INDUSTRY MAGAZINE

# RECORDING SCHOOLS, SEMINARS & PROGRAMS

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—CONTINUED FROM PREVIOUS PAGE

**Title:** Audio and Recording Technology; 801 E. Benjamin Ave., PO Box 469; Norfolk, NE 68701; (402) 644-0506. **Chief Administrator:** Timothy Miller **Program:** Program offering a two-year Associate of Arts and/or Associate of Applied Science in audio and recording technology. The Audio and Recording Technology program offers a balanced mix of audio theory, sound reinforcement, music, MIDI, TEF™, studio techniques and hands-on experience with professional equipment and facilities. Northeast Community College is accredited by the North Central Association of Colleges and Schools and the Nebraska State Department of Education.

**BERLIN CONSERVATORY; Course/Program Title:** Technology in Music and Related Arts (TIMARA); Oberlin College; Oberlin, OH 44074; (216) 775-8276. **Chief Administrator:** Conrad Cummings, Gary Nelson **Program:** Completed in spring 1989, TIMARA's new electronic and computer music studios are among the best equipped in the world, with technical resources that are often unavailable at the undergraduate level. This seven-studio complex holds equipment ranging from the earliest analog synthesizers to the most recent digital synthesis technology. Some of the equipment includes recording decks by Otari, Ampex, Scully, Sony, and Revox, Macintosh microcomputers, synthesizers by Moog, Buchla, Arp, Putney, Korg, Yamaha and Ensoniq. The TIMARA program has two academic faculty members and a full-time music engineer. Through the TIMARA program, the Oberlin Conservatory of Music offers a Bachelor of Music degree with a major in electronic and computer music. Our courses stress musical and technical fundamentals and individual creative projects. Student works range from popular idioms through jazz to avant-garde music, with multimedia production and live performance encouraged.

**OHIO UNIVERSITY; Course/Program Title:** School of Telecommunications; 253 RTVC Building; Athens, OH 45701-2979; (614) 593-4870. **Chief Administrator:** Drew McDaniel, director **Program:** The four-year program in audio production leads to the Bachelor of Science degree in communication. This is a broadly based curriculum with an emphasis on media studies. Audio courses stress technical theories, practical skills and artistic considerations, and are complemented with training in music and electronics. Teaching facilities include stereo and 8-track studios. Other campus facilities available to advanced students include Synclavier and 16-track studios. Practical experience is offered through one of Ohio University's public, full-time radio stations and through internships. Admission is highly competitive, but financial aid is available to qualified students.



RECORDING INSTITUTE OF DETROIT, INC.  
East Detroit, MI

**RECORDING INSTITUTE OF DETROIT, INC.; Course/Program Title:** Recording Techniques; 14611 E. 9 Mile Rd.; East Detroit, MI 48021; (313) 779-1380. **Chief Administrator:** Robert Dennis **Program:** Established in 1976, the Recording Institute of Detroit offers a licensed educational program in 24-track professional and related music theory. The program includes

270 hours of classes and interning that is taught in two 24-track, automated studios. State-of-the-art equipment is used including a Solid State Logic 4000G recording console and Mitsubishi digital recorder. Students complete courses in basic recording, applied music theory, advanced recording and a 100-hour internship in a specialty of their choosing. The program includes six recording projects to expose the students to different musical styles and recording techniques. Actual experience as a 24-track second engineer is part of the curriculum. Twenty-one start dates per year, evening and weekend schedules. Job placement assistance and remedial study courses are offered. \$1,899 base tuition. Scholastic testing required for acceptance.



THE RECORDING WORKSHOP  
Chillicothe, OH

**THE RECORDING WORKSHOP; Course/Program Title:** Recording Engineering and Music Production Program; 455-X Massieville Rd.; Chillicothe, OH 45601; (614) 663-2510; (800) 848-9900. **★See Our Ad in the BusinessPages★** **Chief Administrator:** Jim Rosebrook, director **Program:** A seven-week, 300-hour program designed to prepare assistant recording engineers—the original "hands-on" training program for students seeking a concentrated, short-term course of study. 205 hours are spent in-studio. Our students get experience in recording, mixing, song production, commercial and TV audio production, editing, and equipment maintenance. In lecture, students receive a broader study of audio engineering and music business practices. Our 6-studio recording complex features two automated 24-track studios, two 16-track studios, a commercial production studio, an ear-training studio and an editing lab. Our equipment emphasizes the hardware that is most popular in the job market, including the latest in MIDI and digital technology. In-studio class size is three to six students, and lecture class size is 48. We provide internship and job placement services. We offer low-cost, on-campus housing. Financial aid is available. The Workshop is a TEC Award nominee and is licensed by the Ohio State Board of School and College Registration. Please call for a free brochure.

**RED WING TECHNICAL INSTITUTE; Course/Program Title:** Band and String Instrument Repair, Electronic Music Technology; Hwy 58 & Pioneer Rd.; Red Wing, MN 55066; (612) 388-8271; (800) 642-3344 (MN).

**SMITH/LEE PRODUCTIONS MEDIA SCHOOL; Course/Program Title:** Basic Recording, Advanced Recording, The Music Business; 7420 Manchester Rd.; St. Louis, MO 63143; (314) 647-3900. **Chief Administrator:** David Smith **Program:** Smith/Lee Productions is a professional 24-track studio offering basic recording, advanced recording and music business courses. The basic recording course is designed to prepare students with the proper theoretical foundation in audio and magnetic recording while providing key instruction in the operation of professional audio recording equipment. The advanced recording course provides continuing technical instruction and training, preparing the student to successfully tackle more complex production situations in sound recording, mixing, A/V production and audio-for-video. The music business course is designed to examine the unique structure and complexity of the international music business system. It is a must for those planning a career in music or a related field. Smith/Lee's Media School offers courses quarterly, for five-eight weeks, meeting once a week. These courses are excellent training for students, professionals, musicians, record producers and recording artists.

**SOUTH PLAINS COLLEGE; Course/Program Title:** Performing Arts Production Technology, Sound Technology; 1401 S. College Ave.; Levelland, TX 79336; (806) 894-9611. **Chief Administrator:** Pat McCutchin **Program:** Performing Arts Production Technology program trains you to work as production manager or technician of video production houses, entertainment and convention facilities, civic centers and theaters. Program provides training in video and audio production, lighting, stage crafts and business management. Training

facilities include new Tom T. Hall Production Studio with Sony SP format ¼" recording and editing equipment, Grass Valley switcher and Dubner character generator, 36-channel automated console with 24-track recorder. Studio features Strand-Century lighting system with mini Light Palette computer control and Sony CCD cameras. Two-year program awards Associate of Applied Science degree. Contact Pat McCutchin. Sound Technology Program trains you for a career in the recording industry as a recording engineer, sound reinforcement specialist, studio technician. Excellent training facilities include the 5,000 sq ft Tom T. Hall Recording and Production studio with 24-track audio capabilities synchronized to high-grade ¼" video. Professional gear includes full Sony 36-channel automated console. Plus, the Waylon Jennings Recording Studio with MCI 24-track recording capabilities, an 8-track demo studio and a synthesis/MIDI room and electronics lab, complement training opportunities. Two-year program awards Associate of Applied Science degree. Contact Randy Ellis.

**TECHNICAL INSTITUTE OF HUTCHINSON; Course/Program Title:** Audio Technology; 200 Century Ave.; Hutchinson, MN 55350; (800) 222-4424 (in MN); (612) 587-3636. **Chief Administrator:** Dick Lennes, David Igl **Program:** Audio Technology. Two-year intensive technical audio program. Extensive hands-on training in audio electronics (analog and digital), studio and remote recording, systems design and installation, acoustics, signal processing and sound reinforcement for pro sound market. Music television training option available. Heavy on lab and practical applications. Personalized instruction allows students to enter throughout year, receive credit for previous experience and work at accelerated pace. Graduates available throughout year. Extensive cooperation with employers for internships and supervised work experience. Students active in AES. State school, low tuition. Our graduates have the mix of technical and production skills for today's pro sound market.

**TEXARKANA COLLEGE RECORDING AND MIDI STUDIOS; 2500 N. Robison Rd.; Texarkana, TX 75501; (214) 838-4541 x257/x360. Chief Administrator:** Murry L. Alewine **Program:** Two-year associate degree in commercial music, classes in MIDI, arranging and the recording studio. A state-sponsored college with two 16-track studios. Each 16-track studio has complete facilities with modern, up-to-date equipment. Professional-quality equipment with professional faculty. Classes begin each September, January and June. Fees/tuition schedule available on request. Hands-on instruction and lab time for all students beginning first semester. Fourth-semester students have access to professional 24-track studio in city. Many clubs, lounges, restaurants available in vicinity for employment. MIDI studio available. Three courses (Elementary/Intermediate/Advanced) in MIDI instruction. New program. Music Printing—two semesters. Macintosh SE with 20MB hard disk, laser printer NTXII, *Finale* by Coda and *Music Publisher* graphic notes.

**UNIVERSITY OF WISCONSIN-OSHKOSH; Course/Program Title:** Music Merchandising—Recording Technology. Emphasis; Music Department; 800 Algoma Blvd.; Oshkosh, WI 54901; (414) 424-4224. **Chief Administrator:** Charles Isaacson **Program:** The recording technology emphasis is an option of the music merchandising program, one of the music majors offered by the University of Wisconsin-Oshkosh. This is a four-year program covering all aspects of the recording process, mixing to mixdown, production and contractual agreements. The final semester is spent in the field as an intern at a professional recording studio. The music department is accredited by NASM. Early application for admission to the university is advised. Classes begin after Labor Day.

## EASTERN

**ART INSTITUTE OF FT. LAUDERDALE; Course/Program Title:** Music and Video Business; 1799 SE 17th St.; Fort Lauderdale, FL 33316; (800) 327-7603. **Chief Administrator:** John Morn **Program:** The Art Institute of Ft. Lauderdale offers an associate degree program in Music and Video Business management. The program prepares students to enter both the business and technical ends of the entertainment industry, including artist management, booking, concert promotion and production, retail, video production and audio engineering. The Art Institute of Ft. Lauderdale offers job placement assistance during the program and employment assistance upon graduation. NATTS accredited, financial aid available to those who qualify. Co-ed. School-managed housing available and apartment referral service. Personal counseling and student services.

**THE AUDIO WORKSHOP SCHOOL (DIV. COMMUNICATIONS RESEARCH GROUP); Course/Program Title:** Studio and Stage Sound Production—SSP 300 + 400 Series; 119 Fresh Pond Pkwy.; Cambridge, MA 02138; (617) 547-3957. **Chief Administrator:** Steve Langstaff **Program:** New England's oldest audio school. The Audio Workshop, has been guiding aspiring engineers, producers and musicians since 1972. It offers comprehensive training in theory and techniques of sound engineering, in collaboration with several 24/32/48-track Boston studios. Four-month intensive approach meets weekday evenings and weekends. Classes are small and



personal. Program covers acoustics, hearing and perception, microphones, analog and digital recording and processing, monitoring, mixing consoles, automation, MIDI, SMPTE, production in music, commercials, location, stage, film and video sound, equipment interfacing and maintenance, vinyl, CDs, business and financing, production organization and psychology. It includes 24-track analog and 32-track digital production access. Students choose their own artists for projects. Harvard-educated principal instructor Steve Langstaff is a respected engineer, studio designer and consultant, and a member and former chairman of the New England section of AES. Noted guest speakers contribute in specialized areas. No prerequisites for SSP-301. Licensed by the Massachusetts Department of Education.

**BERKLEE COLLEGE OF MUSIC; Course/Program Title:** Music Production and Engineering; 1140 Boylston St.; Boston, MA 02215; (617) 266-1400. Chief Administrator: Lee Eliot Berk, president. Program: The Music Production and Engineering program at Berklee is a four-year degree (or diploma) program that focuses on both professional production and recording engineering skills. The Berklee facilities include seven fully equipped studios (three 24-track), a digital/video post-production editing room (Sony DAE-1100 digital editor and Boss/BTX/TimeLine audio post-production system), Macintosh-controlled synthesis, SMPTE-based interlock, excellent support and maintenance facilities, and a superb faculty/staff of working professionals. Courses in maintenance, sound reinforcement and video post-production are available as is an internship program. Alumni are working for Capitol, PolyGram, GRP, CBS Records, New England Digital, Record Plant, Unique Recording, Power Station, Paramount Sound Stage, A&M, Hit Factory, Astoria, Conway, Masterdisk, Criteria and Mission Control Recording Studios, as well as in many countries throughout the world. Berklee is proud to have received three consecutive TEC Awards. Our goal is to graduate highly qualified producers and engineers.

**CAYUGA COUNTY COMMUNITY COLLEGE; Course/Program Title:** Telecommunications; Franklin St.; Auburn, NY 13021; (315) 255-1743. Chief Administrator: Steven Keeler.

**CENTER FOR ELECTRONIC MUSIC; 432 Park Ave. S.; New York, NY 10016; (212) 686-1755. Chief Administrator:** Howard Massey. Program: The Center for Electronic Music is a unique nonprofit organization dedicated to providing low-cost educational and production services in the field of MIDI and music technology. Under the direction of well-known educator and author Howard Massey, CEM is open to the public and offers a comprehensive series of inexpensive seminars and workshops each month. The Center also boasts an extraordinary collection of state-of-the-art synth and MIDI equipment—including over 200 MIDI software programs—available for on-premises use at nominal cost. Staff members are also available for private instruction and consultation. Course titles include Introduction to Studio Production (\$100 for two weeks of instruction, one night a week), Advanced Production Techniques (\$150 for two weeks of instruction, one night a week), Computer-Assisted Film and Video Scoring (\$200 for four nights of instruction) and MIDI-Controlled Signal Processors (\$100 for two nights of instruction). Also offered are a number of beginning courses, including Synthesizer Basics (\$50 for two nights of instruction) and Introduction to MIDI (\$75 for two nights of instruction). For more information and a free brochure, call or write to CEM at the number/address above.

**CENTER FOR THE MEDIA ARTS; Course/Program Title:** Recording Arts/Music Technology; 226 W. 26th St.; New York, NY 10001; (212) 929-6999. Chief Administrator: Lee Stafford, dean. Program: Today's audio professionals must master the knowledge and skills of new technologies in the recording industry. In the Audio Arts Division, you'll learn the art and technology of clean, sharp sound production through equipment-intensive training. Supervised by an experienced team of professional recording engineers, you'll explore all aspects of the sound and music industries, including music recording, mixing and editing. The Music Technology program combines recording arts technology with creative computer synthesis skills necessary for today's music industry. You'll master all aspects of music production—editing, mixing, synthesizer programming and MIDI protocol. You'll gain experience as a session synthesist in CMA's own 24-track recording studio. And, you'll be ready to produce innovative sounds in today's most advanced recording studios. The Center for the Media Arts is accredited by the Accrediting Commission of the National Association of Trade and Technical Schools (NATTS) and is licensed by the New York State Education Department.

**COLLEGE OF ST. ROSE; Course/Program Title:** BS in Music, concentration in Studio Music; 432 Western Ave.; Albany, NY 12203; (518) 454-5178. Chief Administrator: Mary Ann Nelson. Program: The College of Saint Rose's Studio Music program leads to a BS degree in music with a concentration in studio music. The studio music component focuses on strong musical performance, writing, arranging and improvisation, as well as studio production, recording technology and television production. Admission by audition. Catalog and application information: CSR Admissions Office (518) 454-5150.

**FIVE TOWNS COLLEGE; Course/Program Title:** Audio Recording Technology; 2165 Seaford Ave.; Seaford, NY 11783;

(516) 783-8800. Chief Administrator: Dr. Stanley Cohen. Program: The AAS degree program in business management with a concentration in audio recording technology is intended for those students who wish to enter the recording field directly after completion of their studies at the college. Students will acquire a knowledge of the technical equipment and processes used in recording studios; the ability to produce both an artistically and commercially acceptable master recording for a record company, publishing company, broadcasting company, etc.; and an understanding of the various financial aspects involved in establishing and operating a recording studio business. All courses are taught in the new state-of-the-art 24-track recording studio. The college also offers two-year degree programs in Jazz/Commercial Music, Music Business, Music Instrument Technology and Video Arts. It is fully accredited by the Middle States Association (MSA).



FULL SAIL CENTER FOR THE RECORDING ARTS  
Winter Park, FL

**FULL SAIL CENTER FOR THE RECORDING ARTS; Course/Program Title:** The Recording Arts Comprehensive Program. The Video and Film Comprehensive Program; 3300 University Blvd., Ste. 160; Winter Park, FL 32792; (407) 679-6333 (in FL); (800) 221-2747 (outside FL). Chief Administrator: Jon Phelps. Garry Jones. Program: The Recording Arts Comprehensive Program and The Video and Film Comprehensive Program cover all aspects of the industry, including recording engineering, record production, digital recording, live sound reinforcement, the Tapeless Studio, music business, MIDI, studio maintenance, and video and film production/post-production, lighting, set design, special effects, make-up, creative writing and working with talent. 24/13 total contact hours are offered with hands-on training emphasized in over 1,350 lab-hours utilizing Neve, New England Digital, SSL, Studer, Otari, CMX, Chyron, Grass Valley and Ampex equipment. A six-week internship in studios around the world provides on-the-job training. Short courses (two to six weeks) are available. Full Sail is the official training center for New England Digital and Neve. The school is accredited by NATTS with a diploma awarded. Full Sail is a 1987 and 1988 TEC Award Nominee. Financial aid is available to those who qualify. Call and tell us about your career goals. We take your dreams seriously.

**GEORGIA STATE UNIVERSITY; Course/Program Title:** Bachelor of Science degree with a major in Commercial Music/Recording; University Plaza; Atlanta, GA 30303; (404) 651-3513. Chief Administrator: Dr. Frederick J. Taylor. Program: The department of commercial music/recording offers the Bachelor of Science degree with a major in Commercial Music/Recording. The purpose of the program is to prepare properly qualified personnel for positions in all areas of the music industry, including that of top-level management. Students may pursue either a two- or four-year program of study with a concentration in business or recording/production. The program offers practical experience, with hands-on experience in the university-owned 24-track recording studio and an internship program with major recording companies. The program offers a sound liberal arts education coupled with courses in business, music, law, communication and commercial music. The program is unique in that all the teachers possess the minimum degree requirement of a master's and are actively engaged in some aspect of the music industry. If interested, please call or write.

**INSTITUTE OF AUDIO RESEARCH; Course/Program Title:** Multitrack Recording Technology Program; 64 University Pl.; New York, NY 10003; (212) 777-8550 (NY, NJ, CT); (800) 544-2501 (all others). Chief Administrator: Albert B. Grundy, Miriam Friedman. Program: The program features the technology and techniques of the multitrack recording studio. Students perform hands-on recording sessions with professional bands in the Institute's own control rooms/studio complex featuring a 32-in/24-out MCI Series 63i console, MCI and Studer tape machines, Dolby full complement of outboard equipment, as well as complete MIDI studio with



INSTITUTE OF AUDIO RESEARCH  
New York, NY

64-track digital sequencer. Emphasis is placed on the technology of the equipment, including audio electronics, digital engineering and systems design. Each student can intern in one of the top studios in the New York area. The Multitrack Recording Technology program is nine months for the full-time student. The evening/weekend session takes 15 months to complete. There is a special accelerated summer program designed for college students. IAR also offers a full curriculum in video technology and special short courses in areas such as audio for film and video, studio maintenance, advanced MIDI, producing for engineers and more. IAR now provides advanced training in conjunction with SSL. The Institute is fully accredited by NATTS and offers federal financial aid programs to eligible students. Veterans benefits are also available for qualified students. The Multitrack Recording Technology program starts four times a year: September, January, March and June. Interested parties should contact the admissions department directly.

**LEBANON VALLEY COLLEGE; College Ave.; Annville, PA 17003; (800) 223-6181 (PA); (800) 445-6181 (outside PA). Chief Administrator:** John J. Uhl. Program: The Sound Recording Technology program at Lebanon Valley College is a comprehensive course of study combining the art, science and philosophy of recording. The students follow a variety of disciplines involved in the field of audio engineering including recording technology, music, physics, electronics, mathematics, computer science, business administration and selected courses in the liberal arts. Emphasis is placed on student usage of equipment in laboratory and level 500 courses. All applicants to the program must pass a musical audition for acceptance. The degree conferred is a Bachelor of Music Sound Recording Technology and meets NASM standards.

**LOYOLA UNIVERSITY—COLLEGE OF MUSIC; Course/Program Title:** Seminar in Recording Technique I and II; 6363 St. Charles Ave.; New Orleans, LA 70118; (504) 865-2773. Chief Administrator: Sanford Hinderle.



MEMPHIS STATE UNIVERSITY  
Memphis, TN

**MEMPHIS STATE UNIVERSITY; Course/Program Title:** Commercial Music; CFA 232 - Memphis State University; Memphis, TN 38152; (901) 678-2559. Chief Administrator: Larry Lipman. Program: Bachelor of Music in Commercial Music with concentrations in recording technology and music business. Fully accredited by NASM. A thorough understanding of fundamental concepts and techniques is stressed within each concentration. Equal emphasis is placed upon develop-

—CONTINUED ON NEXT PAGE

# RECORDING SCHOOLS, SEMINARS & PROGRAMS

EASTERN

—CONTINUED FROM PREVIOUS PAGE

ing the student's ability to adapt quickly to new practices, technologies and creative directions. Our faculty members have been carefully selected to ensure that students work with instructors who possess a broad knowledge of music industry practices and who are actively involved in today's commercial music industry. Modern production facilities include a comprehensive 24-track studio, video production suite, electronic music lab and Synclavier digital audio workstation. (See Southeast Studios or Annual Directory for complete equipment list.) The Memphis arts community offers diverse cultural opportunities and a rich assortment of internship possibilities. A commitment to personal attention and quality instruction requires that enrollment be limited and based on selective procedures.

**MIAMI SUNSET SENIOR HIGH SCHOOL;** Course/Program Title: TV Production, Electronic Music; 13125 SW 72nd St.; Miami, FL 33183; (305) 385-4255. Chief Administrator: Daniel B. Sell. Program: Sunset offers a three-year curriculum in television production and electronic music (recording engineering). Students in TV work in a four-camera color studio with computer-assisted editing, telecine and interformat dubbing. Students produce commercials, live closed-circuit broadcasts, daily news and record schoolwide events including four-camera remotes. Students involved in audio use the 8-channel Tascam/Tapco studio complete with dbx and many outboard accessories. Students also study sound reinforcement using our Yamaha PA system. Most projects include combining the TV, recording and sound reinforcement equipment. These programs are open to all full-time students in the school.



MIDDLE TENNESSEE STATE UNIVERSITY  
Murfreesboro, TN

**MIDDLE TENNESSEE STATE UNIVERSITY;** Course/Program Title: Recording Industry Management; PO Box 21, MTSU; Murfreesboro, TN 37132; (615) 898-2578. \*See Our Ad in the Business Pages! Chief Administrator: Geoffrey Hull. Program: Recording Industry Management (RIM) is a four-year Bachelor of Science degree program in music business and audio engineering. RIM offers 64 semester hours of courses in audio and the recording industry, ranging from acoustics and maintenance and survey of the record industry to concert promotion. Audio students work in two studios on campus, a 24-track digital room and a 16-track analog room. Internships are available for senior-level students in audio and music business. Approved minors include mass communications, business, music and electronics. Video instruction is available. Three MIDI/electronic music courses are offered. The School of Mass Communication is accredited by ACEJMC. A new building with video soundstage and two recording studios is planned for fall 1990. The program has seven full-time faculty and over 400 majors from 35 different states. Current tuition, full-time, \$571/semester in-state, \$1,939 out-of-state.

**MUSIC BUSINESS INSTITUTE;** Course/Program Title: Music Entertainment Management; 3376 Peachtree Rd. NE; At-

lanta, GA 30326; (404) 266-2662. Chief Administrator: John Knepper, president

**MUSICATION;** Course/Program Title: Music Technology; 1600 Broadway, Ste. 1000A; New York, NY 10019; (212) 957-9100. Chief Administrator: Jaime Blackman. Program: Musication offers courses with a comprehensive overview geared to the needs of the performer, composer, arranger, producer and engineer. Special emphasis is placed on understanding the language and implications of MIDI, SMPTE and Music Technology. Participants will work with a state-of-the-art audio/video digital music workstation and microcomputers such as Mac, Atari and IBM. These courses include a review of current software for composition, voice editing, notation and film scoring. Individual and group instruction are available on all aspects of the new technology. For a free catalog please call or write

**NEW YORK UNIVERSITY;** Course/Program Title: Music Business and Technology; Dept. of Music and Music Education; 35 W. 4th St., Rm. 777; New York, NY 10003; (212) 998-5432. Chief Administrator: Dr. Ken Peacock (tech.), Steve Engle (business manager). Program: New York University offers specialized courses in analog synthesis, computer music, FM synthesis, MIDI, electronic music composition, film scoring, studio production and audio engineering. Four-year programs lead to Bachelor of Music degrees in music business and technology, composition, performance, jazz studies and music education. Non-degree, special-student status is available to those wishing to enroll only in specific classes. Graduate studies leading to MA, DA, Ed D. and PhD degrees are also offered. NYU recording and electronic music studios are continually being upgraded. Current facilities include a 16-track recording studio, three 8-track studios and two 4-track studios. All are MIDI-equipped with computers (IBM, Atari, Macintosh, Amiga, Yamaha) and a varied selection of synthesizers (Yamaha, Korg, Fairlight, Voyetra, McClaver, Arp, Buchla, Serge), mixers, monitoring systems and a wide assortment of outboard gear. Research laboratories provide opportunities for the application of computers and MIDI in music education and music therapy. Advanced techniques in digital synthesis and computer-aided composition are explored using the school's DEC PDP11-44 computer system.

**OMEGA STUDIOS' SCHOOL OF APPLIED RECORDING ARTS AND SCIENCES;** Course/Program Title: Recording, Advertising Production, Electronic Music and MIDI Programs; 5609 Fishers Ln.; Rockville, MD 20852; (301) 230-9100. Chief Administrator: Bob Yesbek. Program: The Omega Studios' School, presently in its 12th year, offers a basic program (32 hours, \$595), intermediate program (32 hours, \$795), advanced program (40 hours, \$995), an advertising production program (24 hours, \$695), plus a basic synthesizer/MIDI program (40 hours, \$795) and an advanced synthesizer/MIDI program (40 hours, \$995). The courses include comprehensive coverage of acoustics, microphones, signal processors, operation of various consoles, magnetic tape machine theory and operation, MIDI, SMPTE, audio-for-video, radio and TV commercial and jingle production, synthesizers, samplers, sequencing hardware and software, programming techniques for MIDI-based devices and extensive hands-on session and mix experience. Students learn in Omega's four professional control room/studio complexes using all professional equipment. Approved by the Maryland State Board for Higher Education and approved for veterans training.

**PEABODY INSTITUTE OF THE JOHNS HOPKINS UNIVERSITY;** Course/Program Title: Bachelor of Recording Arts and Sciences; 1 East Mt. Vernon Pl.; Baltimore, MD 21202; (800) 368-2521. Chief Administrator: Alan P. Kefauver. Program: The Recording Arts and Sciences department of the Peabody Institute of The Johns Hopkins University offers a five-year program of training culminating in a Bachelor's of Music degree. The program combines the musical strengths of the world-famous Peabody Conservatory of Music with the technical expertise of the electrical engineering program at Johns Hopkins. Approximately 100 students per year meet the qualifications for acceptance into this prestigious program that requires a musical audition and high math SATs. Students are trained in the conservatory's automated analog/digital 24-track recording studio with a variety of music. From classical string quartets through high-intensity techno-popular styles, hands-on training and in-studio lectures are combined with the coursework in music and engineering to produce highly qualified recording engineer/producers whose technical abilities match their musical expertise. Scholarship aid is available, and all students are employed by the studio during their course of study.

**SONY PROFESSIONAL AUDIO TRAINING GROUP;** 1400 W. Commercial Blvd.; Fort Lauderdale, FL 33309; (305) 491-0825. Program: All courses are offered as either factory training in Fort Lauderdale or on-site at the customer's location. The curriculum is two-fold: 1. Technical service training classes designed to provide technical service engineers with knowledge and confidence to service and maintain Sony Professional Audio products in the field. A two-year electronics degree is required for this training. 2. Applications engineering classes designed to provide the sales/recording/service engineers with the knowledge necessary to effectively recommend, demonstrate and specify Sony Professional Audio equipment. All courses stress hands-on time,

enabling students to become confident with operating and/or servicing the specific equipment. Call our offices for course listings, prerequisites, tuition fees and latest schedule information.

**UNIVERSITY OF MIAMI;** Course/Program Title: Music Engineering; School of Music; Coral Gables, FL 33124; (305) 284-2439. Chief Administrator: Ken Pohlmann. Program: The Music Engineering program at the University of Miami offers a four-year Bachelor of Music Engineering degree, with a minor in electrical engineering, as well as a two-year Master of Science, Audio Engineering degree. Courses in the undergraduate curriculum include recording engineering, digital audio, acoustics and studio design, studio maintenance, video production, computer programming, circuit theory, music business, music theory, arranging and performance. The graduate curriculum includes study in advanced digital audio, video, psychoacoustics, electrical engineering and a research thesis. The principle recording studio houses an automated Sony MXP-3036 console, MCI 24-track and Sony 2-track recorders, 3M digital recorder, dbx digital audio processor, Audio Kinetics synchronization system, Sony 3 1/4" video recorders, a Synclavier system and other equipment. Our recent graduates enjoy the highest placement rate in the professional audio industry, and have engineered gold, platinum and Grammy-winning albums.

**UNIVERSITY OF NORTH ALABAMA;** Course/Program Title: Bachelor of Arts/Science in Commercial Music; Box 5040, Univ. of North Alabama; Florence, AL 35632-0001; (205) 760-4361. Chief Administrator: Dr. James K. Simpson. Program: General Studies: 44 to 55 semester hours. Music Core: Music Theory, 12 to 15 sem. hrs., Music Literature & Music History, 9 sem. hrs., Conducting, 2 sem. hrs., Orchestration, 2 sem. hrs., Musical Activities, 5 sem. hrs., Class and/or Applied Music, 7 sem. hrs., Music Electives, 4 sem. hrs. Prescribed Business Administration minor and supporting courses (24 semester hours): Accounting 291, 292 (6) Elementary Accounting, Business Law 280 (3) Business Law I, Management 330 (3) Principles of Management, Marketing 360 (3) Marketing 373 (3) Principles of Advertising, Math & Computer Science (6) Commercial Music (18 semester hours) Music Publishing (3), Record Company I & II (6), Studio Techniques (3), Production (3), Commercial Music Production (3). Music Dept is a member of the National Assoc. of Schools of Music.



UNIVERSITY OF NORTH CAROLINA-ASHEVILLE  
Asheville, NC

**UNIVERSITY OF NORTH CAROLINA-ASHEVILLE;** Course/Program Title: Bachelor of Science in Music with Recording Arts; UNCA Department of Music; Asheville, NC 28804-3299; (704) 251-6432. Chief Administrator: Dr. Wayne J. Kirby. Program: Bachelor of Science in Music and Recording Arts or Bachelor of Arts in Music. Distinguished music faculty includes Dr. Robert Moog, the inventor of the Moog synthesizer. The BS degree program is designed for aspiring musicians interested in both the creative and technological aspects of music recording and production. This program includes practical experience in on-campus facilities, which house a multitrack recording studio, computer-based electronic music/digital synthesis laboratory, digital editing lab and maintenance/repair lab. Studies include MIDI, SMPTE, digital recording, sound reinforcement, synthesis, sound sampling, multitrack recording, acoustics, studio performance. Electives include composition, jazz improvisation, arranging, music business and other profession-oriented courses. Minors are available in computer science, management, communications and theater. Internships are available to qualified students. In-state tuition and fees for one semester, approximately \$514, out-of-state, approximately \$2,349. Limited enrollment by audition.

**WIDENER UNIVERSITY;** Course/Program Title: Musical Aspects of Recording; Widener Univ.; Chester, PA 19013; (215) 499-4338. Chief Administrator: John Vanore

## OUTSIDE U.S.



### The Banff Centre

THE BANFF CENTRE FOR THE ARTS  
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**THE BANFF CENTRE FOR THE ARTS;** Course/Program Title: Media Arts Audio Recording & Production Internships; Office of the Registrar, PO Box 1020, Station 600, Banff, Alberta, T0L 0C0 Canada; (403) 762-6180; FAX: (403) 762-6444. \*See Our Ad in the BusinessPages!\* Chief Administrator: David Kellin, head of audio recording. Program: Professional development internships are available to individuals with rigorous training or significant experience. Those accepted receive full scholarship, room and board, and stipend. Functioning as staff engineers, interns work in the digital multitrack and MIDI studios, digital audio workstations, etc., pursuing their own development/research arms and production projects. Duties include multitrack production, stereo recording (classical/jazz), audio-for-video, support for artists working in electroacoustics, multimedia and hypermedia, studio management, etc. Applicants are required to have strong credentials in at least one of these areas. The program strives to foster production projects of a fine arts and experimental nature generated from within and outside The Banff Centre. It aims to provide professional development experience in audio recording and production, and foster research within an artist-driven production environment. Residencies available from three months and up, please inquire. Direct telephone number to program head (403) 762-6407, FAX (403) 762-6444.

**I.C.A. INSTITUTE OF COMMUNICATION ARTS;** Course/Program Title: Audio Engineering/Production Music Technology, Commercial Music, 34 W. 8th Ave., Vancouver, BC, V5Y 1M7 Canada; (604) 876-0451. Chief Administrator: Niels Hartvig-Nielsen Shannon Barker Program: One-year, two-year and part-time programs in: audio recording, music production, commercial music performance, entertainment business, audio production technique for video, electronic music and synthesizers, video production, music theory and arranging, audio electronics, music technology instrument tutorials. Student financing available. Commencement October, February and June. I.C.A. Institute is recognized by the U.S. Dept. of Education and therefore eligible to participate in the U.S. Guaranteed Student Loan Program. G.S.L. #025403. Call or write for more information.

**MCGILL UNIVERSITY, FACULTY OF MUSIC;** Course/Program Title: Master's of Music in Sound Recording; 555 Sherbrooke St. W.; Montreal, Quebec, H3A 1E3 Canada; (514) 398-4538. Chief Administrator: John Rea. Program: Master's of Music in Sound Recording degree. Duration: one preparatory undergraduate year plus two years graduate. Course titles: Sound Recording (Theory and Practice), Analysis of Recordings, Technical Ear-Training, Analog and Digital Audio Editing, Studio Equipment Maintenance, Digital Studio Technology, Computer Music/Sampling/MIDI, Classical Music Production. Facilities: Two concert halls, one recital hall, two control rooms, one two-room studio, 24-track and 2-track recording, computer-assisted mixing, digital and analog recording and editing, computer/MIDI/electronic music studios, audio research laboratory, remote recording equipment, repair shop. Costs/tuition: Canadian citizens \$900 CDN/year, foreign students \$9,000 CDN/year tuition and student services. General information program established in 1979. Admits four or five students per year, competitive. Bachelor of Music degree is required for admission. Non-McGill applicants are admitted to a prerequisite undergraduate year to do preparatory work in sound recording, electronic music, physics and psychophysics of music, musical acoustics, electroacoustics, mathematics, orchestration and computers.

**ONTARIO INSTITUTE OF AUDIO RECORDING TECHNOLOGY;** Course/Program Title: Audio Engineering; 500 Newbold St., London, Ontario, N6E 1K6 Canada; (519) 686-5010. Chief Administrator: Paul Steenhuis, Geoff Keymer. Program: An intensely focused, full-time program of study, one academic year in length (Sept-April), designed to prepare the

student for a career in the audio and music recording industry. Course headings: Recording Technology, Recording Practical Labs, Studio Electronics, Equipment Alignment, Digital Technology, Acoustics, Music, Music Business, Music Production, Audio-for-Video and more. Courses begin at introductory levels and accelerate rapidly, combining to provide the student with knowledge and practical skills in ALL aspects of audio recording. The program is a 'step-through' process with smaller concepts and skills building on each other until, within five months, our students are responsibly operating a \$300,000 recording facility. Theoretical material is intensely supported with practical labs, each lab having a maximum of three students per instructor. Lab time: 200+ hours. Classes held in studio: 400+ hours. All studio equipment is professional and representative of technology found in every major recording facility worldwide—Mitsubishi, Studer, Lexicon, JVC, Roland, MCI, AKG, Neumann, etc. Seven full-time instructors and a maximum enrollment of 50 students ensure individual attention. Registered and approved by the Ontario Ministry of Colleges and Universities under the Private Vocational Schools Act. Financial assistance is available to those who qualify. Contact the above address for a detailed program description.

**RECORDING ARTS PROGRAM OF CANADA;** Course/Program Title: Recording Engineering/Music Production; PO Box 348, Piedmont, Quebec, J0R 1K0 Canada; 28 Valrose Dr. (main office), Stoney Creek, Ontario, L8E 3T4 Canada; (416) 662-2666. Chief Administrator: Nick Kece. Program: The Recording Arts Program of Canada houses two 24-track recording studios, also a comprehensive studio equipped with computers, focusers, drum machines and synthesizers. At R.A.P., the focus is on hands-on, practical instruction. Students work with professional recording engineers and producers on a wide variety of commercial projects. Active participation, detailed theoretical instruction, computer music studios and music business seminars at R.A.P. help students evolve into well-rounded professionals. First term—Acoustics, Analog Recording, Mixing Consoles, Microphone Applications I, Processing Equipment I, Studio Set-Up Procedures, Recording and Mixing I, Ear Training I and Music Business I. Second term—Digital Recording, Processing Equipment II, Live Recording Procedures, Recording and Mixing II, Mixing Consoles II, Microphone Applications II, Commercial Music Production I, Computer Music Studies I, Music Business I, Sampling and Editing. Third term—Full Session Engineering, Commercial Music Production II, Music for TV, Film and Radio, Post-Production Audio/Computer Music II, Advanced Control Room Procedures, Ear Training II, Music Business II, Recording Manufacturing and Studio Maintenance. Total length 452 hrs., 26 wks., ten students/class, course fees \$3,650 Can., texts and materials \$300, admission requirements: Grade 12 or mature-student status. Recognized by Ministry of College & Universities. Financial assistance available.



TREBAS INSTITUTE  
Montreal, Quebec, Canada

**TREBAS INSTITUTE;** Course/Program Title: Recording Arts & Sciences Integrated Music Tech., Music Ind Mgmt; 1435 Bleury, Ste. 301, Montreal, Quebec, H3A 2H7 Canada; (514) 845-4141. Chief Administrator: David P. Leonard. Program: Two-year program in the Recording Arts & Sciences w/specialization options in Integrated Music Technology and Music Industry Management. More than 100 courses to choose from in 11 tracks of study including: music, production, synthesis and MIDI, video, computers, digital, audio engineering theory and studio recording, electronics, music business, management and general education. Three majors available: production/engineering, engineering/electronics and management. Diploma in Recording Arts & Sciences (w/specialization in one of the two programs above). One entrance scholarship offered at each of five campus locations across North America, valued at \$5,000 each. Memorial scholarship for second-year studies at each location. Other Awards of Merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studio, electronic music/synthesis/MIDI studios, electronics lab, computer labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center including library of several thousand volumes (books, magazines, articles) on music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET.

puter labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center including library of several thousand volumes (books, magazines, articles) on the music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET.

**TREBAS INSTITUTE;** Course/Program Title: Recording Arts & Sciences Integrated Music Tech., Music Industry Mgmt; 290 Nepean St., Ottawa, Ontario, K1R 5G3 Canada; (613) 232-7104. Chief Administrator: David P. Leonard. Program: Two-year program in the Recording Arts & Sciences w/specialization options in Integrated Music Technology and Music Industry Management. More than 100 courses to choose from in 11 tracks of study including: music, production, synthesis and MIDI, video, computers, digital, audio engineering theory and studio recording, electronics, music business, management and general education. Three majors available: production/engineering, engineering/electronics and management. Diploma in Recording Arts & Sciences (w/specialization in one of the two programs above). One entrance scholarship offered at each of five campus locations across North America, valued at \$5,000 each. Memorial scholarship for second-year studies at each location. Other Awards of Merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studio, electronic music/synthesis/MIDI studios, electronics lab, computer labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center including library of several thousand volumes (books, magazines, articles) on the music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET.

**TREBAS INSTITUTE;** Course/Program Title: Recording Arts & Sciences Integrated Music Tech., Music Industry Mgmt; 410 Dundas St. E., Toronto, Ontario, M5A 2A8 Canada; (416) 966-3066. Chief Administrator: David P. Leonard. Program: Two-year program in the Recording Arts & Sciences w/specialization options in Integrated Music Technology and Music Industry Management. More than 100 courses to choose from in 11 tracks of study including: music, production, synthesis and MIDI, video, computers, digital, audio engineering theory and studio recording, electronics, music business, management and general education. Three majors available: production/engineering, engineering/electronics and management. Diploma in Recording Arts & Sciences (w/specialization in one of the two programs above). One entrance scholarship offered at each of five campus locations across North America, valued at \$5,000 each. Memorial scholarship for second-year studies at each location. Other Awards of Merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studio, electronic music/synthesis/MIDI studios, electronics labs, computer labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center including library of several thousand volumes (books, magazines, articles) on music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET.

**TREBAS INSTITUTE;** Course/Program Title: Recording Arts & Sciences Integrated Music Tech., Music Industry Mgmt; 112 E. 3rd Ave., Vancouver, BC, V5T 1C8 Canada; (604) 872-2666. Chief Administrator: David P. Leonard. Program: Two-year program in the Recording Arts & Sciences w/specialization options in Integrated Music Technology and Music Industry Management. More than 100 courses to choose from in 11 tracks of study including: music, production, synthesis and MIDI, video, computers, digital, audio engineering theory and studio recording, electronics, music business, management and general education. Three majors available: production/engineering, engineering/electronics and management. Diploma in Recording Arts & Sciences (w/specialization in one of the two programs above). One entrance scholarship offered at each of five campus locations across North America, valued at \$5,000 each. Memorial scholarship for second-year studies at each location. Other Awards of Merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studio, electronic music/synthesis/MIDI studios, electronics lab, computer labs, audio/video post-production mixing lab and analog/digital disc mastering rooms (at selected campuses). Resource Center including library of several thousand volumes (books, magazines, articles) on the music business, audio, video, recording and music production. Full- or part-time, day or evening studies. Limited number of internships available. Job placement assistance. Eighty percent of graduates placed. Financial aid available to qualified students. Government approved. Founded 1979. Internationally accredited by the ACCET.

by Bob Hodas

# PANASONIC PRO DAT RECORDERS

## THE SV-3500 STUDIO TAPE RECORDER

The SV-3500 is a rack-mountable, professional DAT recorder using the same MASH technology as the SV-250. Panasonic is also using four DACs on the output and 18-bit digital filters for four-times oversampling outputs. The company claims this eliminates the zero-cross distortion found with low-level input signals. It has balanced ins/outs and can record and play back at 32, 44.1 and 48 kHz. Output levels may be selected between +4 and -10 dBm for convenient interfacing with studio or stereo systems. All in all, Panasonic has put together a package that sounds very good and is quite smooth operationally.

able partner, which makes it a good working machine for the studio environment.

I like having control of the output level. This is convenient for interfacing either to a console or your home stereo without having to buy a level matching box. However, I did have to use my Aphex 124 level matcher to get proper level into the SV-3500 when recording from a CD, album or cassette at home. This indicates a problem interfacing with semipro consoles, so plan on purchasing a level matching box if your studio is not +4 dBm.

The record balance control is a great change from concentric level controls, which I find to be a pain.



The photo should give you an idea of some of the SV-3500's abilities (programmed play, timed record, search and scan modes, large peak-level meters, real-time counter and digital/analog input switching). I would like to point out a few things I found particularly enjoyable with this unit, and a couple of dislikes. I won't bother to mention features duplicated on the SV-250. Of course, the SV-3500 has many more capabilities than its port-

The timer selector seems like a good idea for home recordists who want to catch a radio show, but it seems useless in a professional situation.

The counter operates in real time, program time or as a simple counter, which helps with tapes recorded on the SV-250. Unfortunately, the counter would not read real time on a tape I recorded on another machine. It also would not read program time if I used any cueing of fast-wind modes. Ideal-

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ly, a studio machine should read real time for any tape and not make the user convert non-Panasonic tapes to counter numbers. If I wanted to record on the first 50 minutes of a 120-minute tape and then put the next selection at 60 minutes, the machine would not show real time, nor would it auto-assign program numbers. It works in absolute time, but only if you record straight through on a tape. This is not practical in my book, and I think Panasonic needs to readdress its approach to this counter design.

The level meters show overload on playback as well as record, and the overload light is nice and bright so there is no guessing involved. A curious thing happened when I played a tape recorded on some other DAT, though. The meter indicated overload even though none was heard, and overload was not indicated during the recording process. More incompatibility?

Plenty of options are available for programming in different types of orders and repeats. This is quite handy for cueing samples or looping a sam-

ple to work out details such as EQ before loading. "Start ID" and "skip ID" writing and erasure comes in handy as well. These options make it simple to sequence tapes after recording. Arrangements may be made by hopscotching around a tape and skipping unwanted pieces. Operation of all options was clear via the use of indicator lights on the front panel.

A "cleaning" indicator is definitely genius, and the "dew" indicator is a must for any digital recorder. The industry should pay attention to this. However, the manual confused me by suggesting that the heads be cleaned daily with a cleaning tape that was supposed to be supplied. I did not receive one. The manual then goes on to say that if the cleaning indicator lights up, you need a different cleaning cassette (which you must buy).

Remote control is attained through cables using either serial or parallel ports. There is no indication in the manual regarding the maximum allowable cable length. A longer cable for the supplied remote (parallel) would be nice, as it seems too short to be practical. I did not hook up a computer to access the serial port.

The manual was clear and fully explained all operations with no problem. There were only minor amounts of Japanese-English, and the graphics were presented in a clear, logical manner.

I like the sound quality of the SV-3500. As with the SV-250, it has a warm, smooth sound uncharacteristic of digital. This is accomplished by Panasonic's new MASH development—something that other manufacturers will want to address. The SV-3500 met or exceeded its published specifications, and at a price of \$2,950, it looks to be a good entry into the professional DAT market.

### THE SV-250 PORTABLE DAT RECORDER

Panasonic has released what I believe to be the smallest, lightest portable DAT recorder on the market today. The \$2,700 SV-250 accepts line-level inputs at either professional (+4 dBm) or consumer (-10 dBm) levels, and microphones may be plugged in directly.

Panasonic is claiming sonic superiority for this unit based on its new MASH A/D converter, an LSI chip fea-

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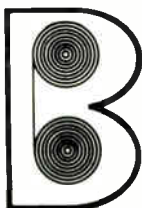
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## FIELD TEST

turing 64-times oversampling at the input stage, allowing the use of a fairly simple analog filter. The result is improved phase response and the elimination of a generation of zero-cross distortion, resulting in improved signal clarity.

The simplicity of the SV-250 is evident from the photo (see page 175), which should give you an idea of how the unit operates without any long-winded prose from me. I made extensive use of this deck during these tests; after all, this is an operational assessment. I should say here that the manual is good. There are no schematics, but all operations are described fully and clearly in a logical order.

The SV-250 is small, lightweight and a real pleasure to carry around. For remote recording situations where you don't need in-field editing capabilities or time code sync, portable DAT can be a winner.

The battery pack provides 2.2 hours of operation with a full eight-hour charge. Since you cannot use standard cells in this unit, I recommend carrying an extra charged battery on all remotes. A battery is good for about 300 recharges. The AC adapter has a nonstandard DC jack, so don't forget to bring it. You won't be able to get a quick replacement at a local electronics or stereo store.

When the unit is on you can hear a distinct noise, which I assume is from the motor for the rotating head. Whatever it is, it is loud enough that it would bother me when doing very quiet remote recordings with a hand-held mic. I found that the machine needed to be isolated in order to record quiet samples such as crickets in a field.

The SV 250 does not pass any audio when using the "cue/review" buttons ("FF/REW" in play mode). One must use the tape counter to locate passages or songs. I really missed the audio cue, a feature I find very convenient on other DAT machines.

This machine will assign program numbers automatically as you record if you remember to press the "auto PNO" button before starting—a habit I recommend you learn. The advantage of having program numbers becomes apparent when you are searching for a specific track or sequencing

—CONTINUED ON PAGE 175

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## Southern California

IN THE

## September Mix

Southern Cal Recording

Pacific Rim Production

Radio Production Update

**O**ur annual look at Southern California recording includes a glance across the water—to Australia, Japan and the Pacific Rim.

Bonus distribution at NAB Radio Show in New Orleans, Sept. 13-16.

**Ad Closing: July 7  
Materials Due: July 14**

## AES/New Products

IN THE

## October Mix

Audio in the '90s

HDTV Update

NY Recording History

**O**ur biggest issue of the year—with new products for 1990. Also, a grounding primer and trends in retail sales.

Bonus distribution at AES in New York City, Oct. 18-22; SMPTE Technical Conference in L.A., Oct. 21-25.

**Ad Closing: August 8  
Materials Due: August 15**

## Opcode Studio 3 MIDI/SMPTE Interface ▶

The Studio 3 from Opcode Systems (Menlo Park, CA) is a rack-mount accessory for the Macintosh computer that combines a MIDI interface and a SMPTE-to-MIDI converter. With two MIDI ins, six outs and a thru port, the Studio 3 reads and writes SMPTE time code (all formats) and outputs MIDI Time Code directly to the Mac. It also jam syncs and sends "direct time lock" as an alternate sync code. Features include internal power supply, audio input for converting signal into MIDI notes, connectors for two footswitches and a controller, and special functions for use with Opcode's music software programs. Retail price is \$459 including cables and software; optional foot-pedals are available.

Circle #001 on Reader Service Card

## Sony TCD-D10 Portable DAT

Shown at last month's NAMM Exposition in Chicago and now available, the TCD-D10 is a compact, AC- or DC-powered DAT recorder designed for location recording. Balanced XLR inputs can be



# NEW PRODUCTS



switched for either mic or +4dB inputs, and both AES/EBU and Sony/Philips digital inputs/outputs are accommodated. Other features include oversampling digital filters, two rechargeable battery packs, built-in limiter and mic attenuator, internal speaker, 100× search mode, 32/44.1/48kHz playback and 48kHz recording from analog sources (32/44.1/48 kHz via AES/EBU digital inputs). Options include the ECM-MS5 M-S stereo electret mic (shown), digital connection cable and a 12VDC adapter for auto use.

Circle #002 on Reader Service Card

## Gold Line HPA-Jr. Portable Headphone Amp

Now you can use your favorite, full-sized 'phones to monitor audio from nearly any source, via the HPA-Jr. Headphone Amp from Gold Line (W. Redding, CT). This compact device, which runs off 9V batteries or external DC power, drives headphones of many impedances to ideal listening levels with a sound quality not obtainable at low output levels or with lightweight "personal" headphones. The HPA-Jr. provides a stereo/mono selector, input sensitivity switch (-110 dBm or -30 dBm), standard stereo ¼-inch TRS connections and belt clip.

Circle #003 on Reader Service Card

## Ultimate Support Systems Studio Organizer ▶

Clutter weary engineers and musicians will appreciate the HS26BP Studio

Organizer from Ultimate Support Systems (Ft. Collins, CO). All its tiers and surfaces are tilt-adjustable, and the sturdy tabletop (adjustable from 27" to 32" high) supports a computer or recording machine. Constructed of tubular anodized aluminum that's lightweight and rugged, the Studio Organizer retails for \$199.99. Custom additions include mic boom adapters, rack-mount rails, keyboard extensions and monitor speaker adapters.

Circle #004 on Reader Service Card

## Studio Technologies Broadcast Simulator

The Generation II stereo simulator has been developed specifically for broadcasters by Studio Technologies (Skokie, IL). It converts mono program material into high-quality, simulated stereo. Setup is easy; operation is straightforward (simply set the amount of simulation desired); settings are tamper-resistant, and reliability is promised.

Circle #005 on Reader Service Card





**Ensoniq VFX ▲**

The VFX synthesizer (\$1,995) from Ensoniq of Malvern, PA, features 21 voices dynamically assigned to as many as six different waves (each with dual multimode digital filters, three 11-stage envelopes, an LFO and 15 modulation sources), and each is routable to a dynamic dual effects processor. An internal 24-bit VLSI provides a full range of stereo effects, including reverb, chorus, flanging and delay. The VFX allows real-time performance control over effects parameters, such as assigning reverb depth or flanging sweep to poly-key pressure or a mod wheel.

Circle #006 on Reader Service Card

**Furman AR-117 AC Line Voltage Regulator**

Take control over damaging power outage and overvoltage problems by installing the new AR-117 AC line voltage regulator from Furman Sound (Greenbrae, CA). It accepts input voltages from 99-129 VAC and converts them to the 117V standard. Rated at 15 amps, the unit was designed specifically for audio applications and is housed in a 1U rack-mount box with eight regulated outputs on the rear panel and one on the front. A bar graph LED meter shows input voltage; an LED indicates proper operation. The unit senses dangerously high overvoltages

and shuts down the output prior to damage. Suggested list price is \$399.

Circle #007 on Reader Service Card

**Sound Technology 3100B Audio Signal Generator**

With the 16-bit digital era upon us, Sound Technology (Campbell, CA) offers the 3100B programmable audio signal generator. Designed to exceed test equipment requirements, the 3100B provides three operation modes: manual, front panel control for troubleshooting; automatic for quick tests; and computerized test and measurement using optional, external, menu-driven software. Features include



easy setup, portability, PC-compatibility and memory of up to 91 test setups; with digitally controlled analog oscillators, sine waves from 1 to 102.39k Hz and square waves from 1 to 50k Hz can be generated. Basic list price is \$4,250; other test signals (intermod, tone-burst, etc.) are optional.

Circle #008 on Reader Service Card

**Valentino CD Libraries**

Correction: The products section in our May issue listed information about the Valentino (New York City) CD music and sound effects libraries, but omitted the price from the latter. Since that time, the company has also expanded its offerings: 28 effects disks (\$50 each on a buy-out basis) and 34 CDs of production music (\$20 each, plus annual blanket or per-use fees). For more information, call (800) 223-6278 or (212) 869-5210.

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profiles of 80 schools, lists addresses of 300 programs worldwide, and offers other resources for students. Available for \$11.95 postpaid (NY residents add 70 cents sales tax) from New Ear Productions, 1033 Euclid Ave., Syracuse, NY 13210. . . **Music Quest's MQX-16** (\$199) and **MQX-16S** (\$249) are board-level MIDI interfaces (for IBM PC/XT/AT and compatibles) that offer pro quality tape sync and more; (214) 881-7408. . . **CAST's Computerized Audition Serv-**

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by George Petersen

# PRODUCT CRITIQUES AND COMMENTS

## **B** EYER DT 770 PRO HEADPHONES

An essential tool in any professional audio environment, headphones provide a vital link between the audio engineer and the source material, whether in studio, broadcast, location recording, mastering/replication or sound reinforcement applications, or quality control. While headphones are regarded generally by consumers as a convenient accessory for private listening, audio pros depend on their favorite headphones as a reference point for critical monitoring.

A recent addition to Beyer's "Studio Group" product series, the DT 770 headphones employ a large—yet extremely low-mass—Hostaphan® diaphragm in each earcup, with a dynamic (moving-coil) design using a neodymium magnet structure. The DT 770s also employ a tuned, bass reflex earcup, which extends low-frequency response to a point well below what is usually encountered or expected in headphones.

The DT 770s are lightweight—only 250 grams. The padded headband and leather-look, circumaural,

vinyl earcups help form an effective seal against outside sounds, yet can be comfortably worn for extended periods without duress. A 10-foot coiled cord with molded plug is standard, and the four conductors to the two earpieces are of the flat cable type, each wire set side-by-side. Beyer also markets the DT 990 headphones, a model using the same Hostaphan/neodymium combo drivers as the DT 770, but in an open-back (non-sealed) earcup configuration.

I was impressed with the DT 770's performance

in both general studio operations and critical listening tests over a period of several weeks. The DT 770s were well-received by engineers, session players, vocalists and voice talent alike. While most headphones perform adequately in mid-range reproduction, it is in the extreme high and low ends of the audio spectrum where other designs usually fail to deliver. Beyer claims that the DT 770s have a frequency response of 5-35,000 Hz. While these manufacturer's specs don't include  $\pm$ dB variations



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**Bill Marino, Sync Sound, New York.**

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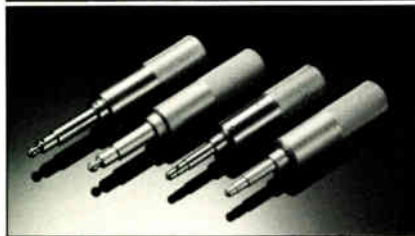
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## AUDITIONS

from a flat response curve, the headphones' audio reproduction was extremely faithful, with an excellent overall balance of highs and mids. Transients were clear and punchy, while the bass was solid—robust and well-defined.

For those of you who like it loud, the DT 770's power handling capacity provides an SPL of 116 dB at an input of only 100 milliwatts; the neodymium drivers are fairly efficient and would work well with many of the popular multiple-headphone amplifier systems. The DT 770's medium impedance rating of 600 ohms should pose few compatibility problems. Beyer also offers a low-impedance version of the headphones on special order.

Offering a great sound with highly effective isolation and a comfortable design, Beyer's DT 770s are a winner. Their only drawback is a list price of \$239, which means they perhaps are better suited to control room applications, or as a personal set for the independent recording/broadcast/location engineer who works in a variety of environments. In any case, the 770s are well worth checking out and represent an excellent choice for anyone seeking an accurate, reliable reference.

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

## MILAB DC-96B CONDENSER MICROPHONE

Over the years, Milab (pronounced "my-lab") has earned a solid reputation for delivering top-quality microphones to European studios. Unfortunately, this Billsholm, Sweden-based manufacturer has gone through several different U.S. distributors in the past, and Milab microphones have not received the attention they deserve in this market. However, with the recent appointment of Klark-Teknik Electronics, Inc., as the U.S. importer, you may see a lot more from Milab in the future.

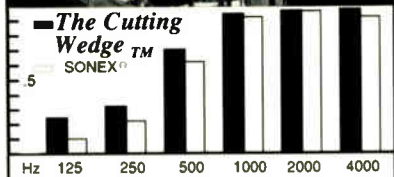
Just a shade under six inches long, the DC-96B is a 48-volt, phantom-powered condenser mic designed for serious recording. Like its cousin, the top-of-the-line VIP-50, the DC-96B employs a dual-membrane, large-diaphragm rectangular capsule. Unlike the switchable-pattern VIP-50, the DC-96B has a fixed, cardioid response. The capsule uses an internal, silicon rubber mounting that reduces the

transmission of external vibrations, mic stand noise, etc. The DC-96B includes a mic clip (with an adapter to fit European or American stand threads); a shock mount (SM-27) is available as a \$45 option.

The mic has a tough, anodized, matte-black finish, except the front windscreens, which is chrome. The screen's mesh is fairly coarse, thus requiring use of the supplied foam windscreens in close vocal and outdoor applications such as location recording or sample gathering. The open-cell acoustic foam windscreens is fairly large and very effective in reducing breath pops and wind noise without affecting the overall sound of the mic.

Every DC-96B comes with an individual frequency-response chart that indicates each mic's performance before it leaves the factory in Sweden. The mic is basically flat from 50 Hz to 5 kHz, with a gently rising presence increase (peaking about +5 dB) at 8 kHz.

My first test for the DC-96B was on live sax in an R&B ensemble, with the mic placed about a foot from the bell. The resulting tracks were airy, open and warm, without any of the harshness that sometimes occurs when miking this instrument.



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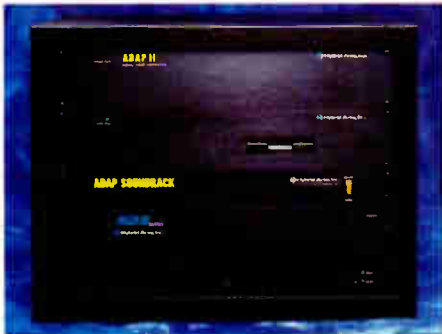
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## MAJOR BREAKTHROUGH IN MUSIC TECHNOLOGY

Los Angeles, CA - Hybrid Arts, a leader in music computer technology, has again made history with the introduction of ADAP II...the direct to hard disk digital audio recorder/editor. ADAP is the acronym



for Analog to Digital Audio Processor. In short, ADAP is a digital mastering device and audio work station, a 16 bit stereo sampler, a visual non-destructive sound editor with sample precise accuracy, a MIDI module, a SMPTE trigger, full EDL (Edit Decision List), a cue system and much more.

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**787A Programmable Mic Processor:** Combines 3-band, "constant-Q" parametric EQ with a compressor, de-esser, and compressor/noise gate in a fully programmable package. Designed for both mic and line-level inputs, the unit can be used to store 99 commonly-used instrumental and vocal settings for instantaneous recall. MIDI, RS-232, and remote control interface options.

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## CONSULTANTS

Orban Specification Language  
is available free as text or on disk.



## AUDITIONS

One of my favorite applications for condenser microphones is on fretted acoustic instruments, and the DC-96B performed admirably on six- and 12-string guitars, dulcimer, balalaika... even bouzouki. As with any mic, the DC-96B was not always a sure thing on lead vocals. Most of the time, the results were quite good, but vocal miking is really a matter of matching the right mic to a particular voice, and no microphone has that perfect "one size fits all" characteristic.

With a crisp top end and a maximum SPL rating of 128 dB, the DC-96B is ideally suited as a cymbal mic. While I didn't have a stereo pair of DC-96Bs to use for overheads, I used the mic for recording samples of some beautifully preserved, antique K. Zildjian ride, crash and hi-hat cymbals with great success. Transients were clean, with all the zing and ping exactly the way I wanted to hear it.

Over several weeks of testing, the Milab DC-96B proved itself to be an able performer, a solid general-purpose condenser suitable for a variety of recording applications. At a professional user net price of \$695, the DC-96B is a worthy contender in the market of mid-priced studio condenser microphones.

Milab Klark-Teknik Electronics, 30B Banfi Plaza North, Farmingdale, NY 11735, (516) 249-3660. ■

### John Woram's "Sound Recording Handbook"

John Woram's name is well-known in the audio industry largely through his book *Recording Studio Handbook*. This classic text introduced many to the technology and techniques of professional audio recording. Woram's new, 400-page book, *Sound Recording Handbook*, attempts to surpass his earlier work with a treatment of similar topics, but with more emphasis on the analytical and conceptual nature of the workings of audio technology, rather than an applications-oriented view.

To avoid confusion, let's differentiate the two books. *Recording Studio Handbook* (published by Elar Publications) has been rewrit-

ten by Alan P. Kefauver, the director of recording at Peabody Conservatory of Music, and retitled *The New Recording Studio Handbook*. It is my understanding that Woram did not participate in this revision. Because copies are not yet available, I do not know what portion is taken from the earlier work, although Woram is still listed as a co-author. Woram's new book, *Sound Recording Handbook* (published by Howard W. Sams) is wholly written by Woram and is completely new. Finally, none of these volumes should be confused with John Eargle's masterfully written *Handbook of Recording Engineering*, available from Van Nostrand.

*Sound Recording Handbook* covers the entire spectrum of audio technology, providing a fundamental treatment of topics. The emphasis is on basics, with special attention to concepts and mathematics underlying everything in audio. Although topics are treated individually, an intellectual thread runs

throughout the book, showing the commonality in all topics and enhancing the reader's ability to comprehend the field as a whole.

The book contains 12 chapters: basic audio theory; music and psychoacoustics; microphones; stereo microphone theory; monitor systems; delay and reverberation systems; equalization; dynamic range; magnetic tape and tape heads; tape transport systems; noise reduction; and recording consoles. Four appendices provide the SMPTE time code standard (reprinted verbatim), a glossary, list of abbreviations and a bibliography. Advanced applications topics are not covered; the book is concerned with providing a thorough description of audio fundamentals. The illustrations are generally excellent, including a number of airbrushed illustrations, imparting a good three-dimensional image—a convenient item when explaining topics such as Sound Field microphone configurations.

The book is rampant with mathe-

—CONTINUED ON NEXT PAGE

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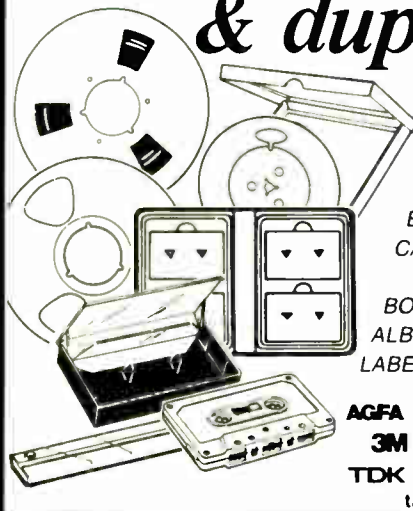
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matics, but even the most equation-fearing reader should not be fearful. Woram is careful to use math to help underscore the concept at hand, and math is never used to merely impress or obscure. With a small amount of effort by the reader, the equations and the resulting examples really nail down the essence of a topic.

Clearly, Woram has kept his personal computer busy for many long nights, computing numerical examples from his formulas and often plotting the results. So much of the discussion springs from the mathematics that many readers surely will be tempted to do some number-crunching to verify his results (and gain an even deeper understanding). Given the time and energy expended by Woram in writing this software, it would be a real boon if the publisher would make it available to schools and other interested parties. [Mr. Woram tells us that the software will be available in the fall. Check the book for information—Ed.] It is almost as impressive an accomplishment as the book itself. For the faint-hearted, Woram is careful to balance his math with prose, so a full understanding (albeit at a less rigorous level) is possible even if the equations are skipped.

The prose is taut indeed, without an extraneous paragraph or sentence. The result is a model of brevity and of excellence in technical writing. Virtually every page makes it apparent that Woram has not been satisfied merely to restate conventional axioms or examples, but has instead considered the problem and invented entirely new avenues of thinking. Indeed, Woram has uncovered numerous cases of conventional wisdom that just aren't necessarily so, and proceeded (probably for the first time in audio history) to set the facts straight. Finally, aficionados of the famous Woram humor will be glad to hear that it is as dry as ever.

John Woram's new book may strike some as being too analytical and too much work to master. They may prefer more familiar, easier introductory treatments. But the fact is that the audio profession itself is no longer as easy to learn

as it once was. It is an increasingly sophisticated field, sorely in need of rigorous texts by experienced authors. John Woram's *Sound Recording Handbook* offers the kind of sophistication and rigor that will benefit audio education for years to come.

Published by Howard W. Sams & Company, a division of Macmillan, Inc. Available at technical bookstores or through Mix Bookshelf, (415) 653-3307 or (800) 233-9604.

—reviewed by Ken C. Pohlmann

—FROM PAGE 56, ABYSS

ing configuration while putting together all the elements. We used Crown amplifiers and JBL monitors for the topside P.A., multiple communications mixers, equalizers, limiters and pads to optimize underwater P.A. performance, which relied on multiple amp and speaker combinations to convey Cameron's directions to the divers working in the giant tank.

To allow Cameron to speak with anyone on the surface, we used hardwire and wireless communication equipment from Clear-Com, whose reliability and flexibility of configuration was well-known. To facilitate direct communication from the surface to the underwater crew, the remote surface stations were interfaced to the underwater P.A. Anyone needing to use the P.A. could easily do so with a request to the communications operator. The operator also kept private conversations isolated, and, at Cameron's request, would bring him on and off the system so the water was filled with information, not the sound of his regulator. The actors were mixed to a separate feed so they were spared all the technical conversations; however, the dialog mix was audible to the crew for cueing purposes.

The most labor-intensive work after the system was in place was cable-related. To keep costs down, hardwire links were used to all the fixed, topside locations, such as electrical control areas, cranes and video stations. Every actor was on hundreds of feet of communication cable; the subs required enormous quantities of cable; special bundles of air, electrical and communication umbilicals were made for the

divers and underwater transducer lines. Several dialog scenes combined both topside and underwater elements, which stretched the supplies quite thin. Crew member Knox White ran the miles of cable needed every day, maintained the underwater connectors and continually repaired cables damaged by heavy use.

Underwater filming was still difficult, but sophisticated communications made complex setups possible. We were gratified by shots such as a submarine driver (played by Kimberly Scott) singing to silent

playback while cruising through the underwater set in a free-floating sub, and others featuring divers exploring the wreckage of a flooded submarine while conversing, complete with precisely timed special effects. Most importantly, though, instantaneous communication in an inherently dangerous environment provided an extra measure of safety.

—Lee Orloff (sound mixer, underwater communications designer) and Peter Kurland (underwater communications designer/operator).

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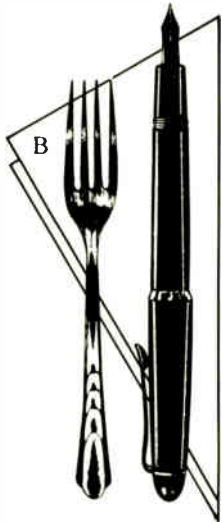
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# P.D.Q. BACH TO THE FUTURE

## AN INTERVIEW WITH PROF. PETER SCHICKELE



Great balls of humor, in the tradition of Spike Jones, Victor Borge and the best of Looney Tunes—that's the spirit of the classic prankster P.D.Q. Bach (last and least of Johann Sebastian Bach's children), as interpreted by the swinging Professor Peter Schickele, alter ego of the respected composer Peter Schickele. On the one hand we have the extravagant legend and scam-

bled oeuvre of the notorious P.D.Q. (1807-1742?), explored in 25 years of nationwide concerts and ten albums by the Professor. On the other hand we have Peter Schickele, author of more than 100 works for symphony orchestras, voice, choral groups, jazz bands, movies (*Silent Running*) and television (*Sesame Street*). He gives new meaning to the term "Renaiss-

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Since we moved to larger quarters here in Burbank we've opened *two* new fully equipped showrooms. In the Pro Room are three complete, operating production systems—consoles, monitors, tape machines (including 32 track digital), and signal processing/effects gear. Our second room has three more complete production systems set up to hear and compare. This room caters to the

audio/video needs of musicians and production studios.

**Just the Facts, Ma'am**

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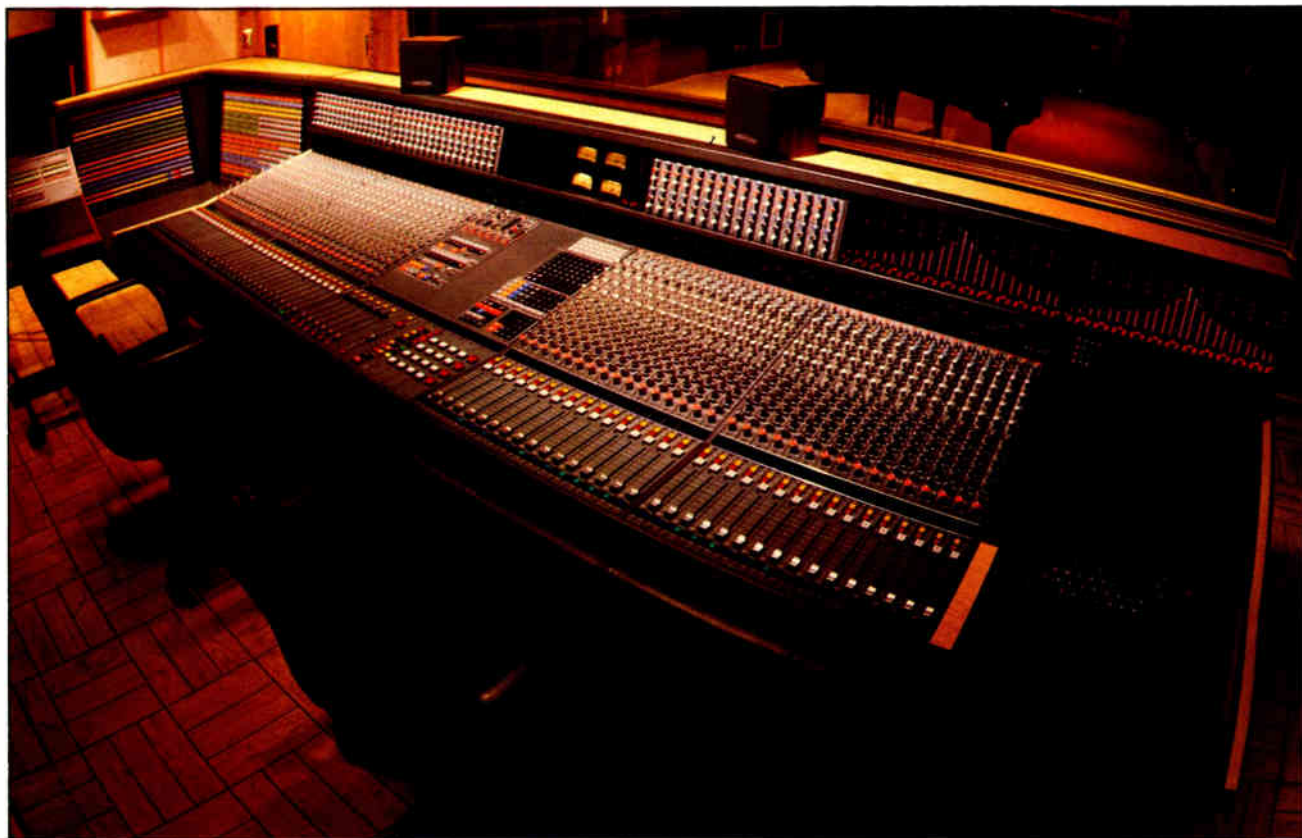
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I had the pleasure of witnessing a P.D.Q. spectacle this spring at Claremont College, near Los Angeles. The Professor arrived late, running through the auditorium with black tie and tails flying. His bassoonist never made it, so he simultaneously played both piano and bassoon for the opening "Sonata 'Abasoonata' in F Major." In his following selections, the Professor exhibited his musical versatility by playing manicotti, cardboard mailing tubes and an odd instrument filled with wine. After intermission he appeared in goatskin leggings as the god Pan in "The Magic Bassoon," simultaneously playing the instrument and chasing the mezzo-soprano around the stage. A performance of P.D.Q. Bach music covers the complete comedic scale, from the highbrow to the low-down.

After the show, the Professor autographed my copy of *The Definitive Biography of P.D.Q. Bach* and we set out to unravel his crazy quilt. . .

**Bonzai:** You've shocked, disturbed, delighted and disgusted audiences for so many years. What surprises can we expect in the future from P.D.Q. Bach?  
**Schickele:** There's a new one coming out this summer on Telarc, with all new stuff on it. It's called *The 1712 Overture and Other Musical Assaults*. The Boston Pops had the great foresight, or hindsight, to commission the discovery of a P.D.Q. Bach work for its 100th Anniversary a couple of years ago. The "1712 Overture" was what I was able to find. It's by far the most ambitious and bombastic of all the P.D.Q. Bach pieces, so it's pretty spectacular.

**Bonzai:** I was at your show at Claremont College, the first time I had seen you in concert. Have you scaled down the size of your road show?

**Schickele:** No, I have two different kinds of personal appearances. You saw the *intimate* P.D.Q. Bach program, which is a five-person show. But a lot

of my touring is as a guest soloist with symphony orchestras, because I don't travel with my own orchestra. In Los Angeles, I've appeared many times with the L.A. Philharmonic, the L.A. Chamber Orchestra and the USC Orchestra. I appear with a wide range of symphony orchestras, from the Chicago, Cleveland and Boston symphonies, to community and college orchestras—the whole gamut. For these concerts I supply myself and Bill Walters, the fellow who started the show you saw in Claremont when I was late. He is a combination stage manager and straight man. He actually runs the show as stage manager and is involved in a lot of the bits.

**Bonzai:** When you play with orchestras, do you distribute some of your strange instruments to the members?

**Schickele:** Sometimes, although a lot of the pieces simply require that the musicians play their instruments in unusual ways. For instance, the brass players may play with only the mouthpieces, or the double reed players use only the reeds without the rest of the oboe or bassoon.

I now have seven different programs I can do with an orchestra. Some of those programs do involve the weird instruments, but I try to avoid that as much as possible because some of them take a fair amount of practice to learn, and there usually isn't that much practice time.

**Bonzai:** In this last show, you played an instrument—it wasn't the Clarinet Sauvignon—that uses a long tube filled with wine.

**Schickele:** That is the Tuba Mirum.

**Bonzai:** What type of wine do you use?

**Schickele:** Just a good Rhine red—it has "RR" on the label, and I guess that's what it stands for. P.D.Q. Bach's haunts were in the Rhine Valley of southern Germany, an area known for its white wine, so the red wine is only fit for use in musical instruments.

**Bonzai:** Do you actually drink the wine after playing the piece?

**Schickele:** Yes, you have to drink it at the end. It's part of the ritual of playing the instrument.

**Bonzai:** I understand that you've done some composition for Maurice Sendak's *Where the Wild Things Are*.

**Schickele:** Yes, it's an eight-minute animated film of the book. I wrote the music and narrate as well. It's a favorite book of mine, one that my kids had when they were young, and

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## LUNCHING WITH BONZAI

it was a great kick to do. It was also great to meet Maurice Sendak, a tremendous guy.

**Bonzai:** How is that available?

**Schickele:** It's available to libraries from an outfit called Weston Woods. They deal with animations and filmstrips of children's books. I believe they are selling it only to libraries now, but I think they are putting together a longer video with Sendak's *In the Night Kitchen*, which I narrated as well, and some more material for home video sales.

**Bonzai:** Speaking of children, were you a performer as a child?

**Schickele:** Yes, I got started pretty early. I was one of those kids who likes to get up and entertain. When I was about ten years old, I started a theater with my brother in our basement. A lot of kids do that, or used to, but usually it only lasts a couple of weeks. Our theater lasted five years. We called it "The Nitso Theater," a name that came from a slang term in our age group in Washington, DC; in those days—the mid-'40s—"nitso" meant "neat." I would write plays and direct, and my brother and other kids would perform. The plays were mostly imitations of the movies we went to, usually Westerns and Tarzan movies. My parents didn't like the idea of us getting very involved in financial ventures at that age, but they also knew that if it was free it wouldn't feel like a real theater. So, we got to charge a penny for admission. Once we wrote an adult play—by our definition, this meant it didn't have any fistfights in it. We were allowed to have reserved seating at two cents.

**Bonzai:** Was there music involved?

**Schickele:** Not much, but part of the way I got into music was through the theater. Around that time I got turned on to Spike Jones.

**Bonzai:** Ah-ha, I was going to ask you if you felt that Spike Jones had been influenced by P.D.Q. Bach.

**Schickele:** Well, he was definitely the granddaddy for me. I started spending all my allowance money on Spike Jones records. My brother and our friends would sit around for hours on summer afternoons, acting out and lip-synching to his records. Later, when my brother and I got older, we would sometimes provide entertainment at Rotary luncheons and events like that by lip-synching and acting

out Spike Jones records.

Spike Jones had a traveling stage show that was very much in the old vaudeville tradition. I saw his show a couple of times when I was a kid. I put together a little band when I was 12 or 13, very much in imitation of Spike Jones, and I was as interested in the theatrical part of it as I was in the music. My band consisted of two clarinets, violin and tom-tom. We did parodies of songs like "The Volga Boatman," which were pure imitation Spike Jones.

"Only red wine is  
fit for use in musical  
instruments."

From the very beginning, in addition to making those arrangements for the band, I found myself arranging folk songs and seriously writing little pieces. One of the first things I did in terms of writing was an arrangement for "Down in the Valley." I started composing little pseudo-dixieland pieces and some classically oriented pieces. I found myself doing serious stuff too, and what interests me in looking back is that's the way my life has remained. I continue doing the serious as well as the funny. As things turned out, one got more well-known than the other. During my teenage years, I got more and more involved in music and less and less in theater. By the time I went to Swarthmore College, I spent all my available time writing music. My only involvement in theater was as a composer.

**Bonzai:** Tell me about your formal training.

**Schickele:** While my family lived in Fargo, North Dakota, I studied composition privately as a teenager with the conductor of the orchestra there. When I went to Swarthmore College, I was a music major—the only music major they had, as a matter of fact. They had a minuscule music department, consisting of one-and-a-half instructors, who also taught at Haverford. Then I went to Juilliard for my master's in composition.

**Bonzai:** So you do have some credentials...

**Schickele:** Yes, I'm a composer. [Laughs] That's what I am.

**Bonzai:** It's a well-known fact, but

why does classical music have such a stigma of being snobbish, boring, snooty, high-brow, decorated bullshit? **Schickele:** Partially due to an attitude of "art as religion" that arose during the 19th century. Those who wrote most of the classical music, at least in the 18th century, did not tend to be stuffy people. The movie *Amadeus* may have exaggerated Mozart somewhat, but basically he was a party animal. At one point, he owned two billiards tables and loved playing, and he wrote a lot of music for parties. He wrote outrageous "rounds," some of which could not be printed in a family publication. And Beethoven got mad at a waiter once and dumped a bowl of spaghetti on his head. These were not the kind of people who fit the image you are talking about.

But in the latter 19th century, there developed this feeling of art as something that you took extremely seriously, in an almost religious way. I think that has spilled over. At least in the 19th century you still had that thing about the passionate artist against society, and there was a lot of antihourgeois behavior. What seems to have happened in this century is that the stuffiness has remained and a lot of the wild behavior hasn't. It has a museum atmosphere, which is really unfortunate. A good example of this situation is that it is regarded as very *gauche* to applaud during movements of a symphony. You're supposed to wait until the very end.

In the 19th century and before, people often clapped after every movement. They clapped if they particularly liked the movement—usually, the scherzo, the fast movement, was a real crowd pleaser—and sometimes they would applaud until the orchestra repeated it before going on with the rest of the symphony. Mozart wrote to his father about a symphony he premiered in Paris where the audience liked something so much that they applauded in the middle of the last movement. It was like jazz where you applaud after each solo, while the music is still going on. I can't say that I wish people always applauded in the middle of the music, because I like to get lost in the music, but I think at the end of a movement, if it has a real zippy ending, that people ought to applaud.

**Bonzai:** Twentieth-century classical music seems to me to be very disjointed and only for experts who can

appreciate all the nuances. What do you think of modern classical music? **Schickele:** Well, there is a lot of good stuff around. It's largely a matter of conditioning. Many classical people can't stand listening to rock music, not only because it's loud, but because they are not used to it and it all sounds the same. I've had non-classical people tell me that all of Bach's music sounds the same. I would recommend one piece, Stravinsky's *Rite of Spring*. Part of it is used in the movie *Fantasia*. It wasn't written as movie music, but it has been used in movies. That's a tremendously exciting piece. Another very good piece is by Prokofiev, called *Lieutenant Kijé*, which he wrote for a Russian movie. You'll find it's very tuneful and easy to get next to.

I'd also like to throw something out, because I'm a composer. I have a string quartet out on CD—this is a Peter Schickele piece, not P.D.Q. Bach—called *American Dreams, String Quartet No. 1*, recorded by The Audubon Quartet. It's very American, and uses square dance tunes and a Navajo song, and has a lot of jazz-like sections. It's on RCA.


**Bonzai:** What do you think of Frank Zappa?

**Schickele:** I like some of his music very much. I'm not as angry as he is, and some of his music seems very angry—he seems to try as hard as possible to shock the bourgeoisie. I think he is a fascinating guy, someone who has really done what he has wanted to do, and arranged his life so that he could keep doing that, even if some of the albums don't sell as much as others. I admire him a lot for that.

**Bonzai:** Have you had good experiences with the music industry?

**Schickele:** I've had good ones and bad ones. Most of my experiences have been pretty good. There are ten different P.D.Q. Bach albums on Vanguard. The CD, *The Worst of P.D.Q. Bach*, has highlights from the first four albums. Vanguard has been sold, and I had some complaints about distribution, but they always gave me tremendous free rein in making the albums. I couldn't hire a 120-piece orchestra, but within the basic limits I could do what I wanted to do. Some of the theatrical experiences have involved a hard time getting money out of people, but that's very common in theater.

**Bonzai:** In the early days of perform-



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## LUNCHING WITH BONZAI

ing P.D.Q. Bach's music, did you ever find audiences small, or totally unprepared for what you were presenting?

**Schickele:** We *still* get people in the audience who have no idea what to expect and don't know that it's going to be a humorous concert. I still have people come expecting a regular Bach concert. It amazes me after all these years.

**Bonzai:** Do they walk out?

**Schickele:** Sometimes they give us what we call a "walking ovation." And sometimes they stay and enjoy it anyway. But in the beginning, we would get whole audiences that had no idea what to expect. Then we would really have to win them over. That almost never happens anymore.

P.D.Q. Bach concerts are an annual tradition in New York during the last week in December. It's been going on since 1965, and there are people who come every year because the program is always different. The posters have wild, funny pictures, and yet there will be people who are surprised and go to the box office to get their money back.

**Bonzai:** Of all your performances, can you remember one that was especially gratifying, or moved you, or is memorable in some special way?

**Schickele:** In general, I would say that the best concerts are the ones that are the best played. Because of the whole schtick associated with P.D.Q. Bach, people think that playing with some podunky orchestra is perfect for that type of music. It *can* work, but one of the things I learned from Spike Jones is that the better played it is, the funnier it is. Spike Jones had a tremendous band with top-flight musicians. A city that has a top-notch symphony orchestra will also have a good audience, in the sense that they are into classical music. When I play with the Cleveland Orchestra, which is one of the best in the world, or the Chicago Symphony, or the L.A. Philharmonic, or the Boston Symphony, these tend to be the best concerts because they are played well and the audiences are really in on everything.

**Bonzai:** I've heard that you used to swing onto the stage from a rope. Have you given up such athletic entrances?

**Schickele:** I often have come in swinging, or have thrown a rope off the balcony and shimmied down to

the first floor. I have occasionally swung in like Tarzan from the first balcony onto the stage, but there are few theaters that accommodate that entrance. I still do it, but in my old age I am getting pickier and pickier about how high the balcony is. I promised my wife that when I turned 50 I would review the policy.

**Bonzai:** Do groupies cause any problems for you on the road and touring around the world?

**Schickele:** Well, P.D.Q. Bach doesn't seem to attract the groupies that rock artists do. I've always imagined that Paul Newman and Sylvester Stallone must get letters all the time from women, including pictures and a note: "Here I am—you can have me anytime." Well, one of the most touching bits of mail I ever received came with Polaroid photos of the harpsichord the fan had made. Those are your P.D.Q. Bach groupies. Of course, I'm making fun of it in a way, but I also appreciate it. I know what it's like to be in the minority in your musical tastes. I'm glad to be a refuge for these folks.

**Bonzai:** As a professor, do you still teach?

**Schickele:** I taught at Juilliard from 1961 to 1965, but then I quit to be free to perform P.D.Q. Bach. Also, that period was the heyday of the super mathematical approach to classical music—a very dry, academic period, and I didn't feel comfortable in the surroundings.

**Bonzai:** At one point in our talk you mentioned Stevie Wonder. Who are some of the other contemporary, popular artists you enjoy?

**Schickele:** It's funny, I go through periods. I was a big fan of pop music in the '60s: the Beatles, the Stones and a lot of the black groups. Before that, I was a fan of Ray Charles, the Everly Brothers, Elvis. Now I tend to listen to classical and folk music more than pop. I am a big David Byrne fan, and I like a lot of Talking Heads' music. I especially enjoyed his collaboration with Brian Eno, *My Life in the Bush of Ghosts*, and some of Brian Eno's solo work.

**Bonzai:** In your field, you've pretty much monopolized the marketplace. Do you think there is room for more of this type of humorous music?

**Schickele:** Yes, sure, why not? But it's interesting that at any given time there have never been many musical satirists around. There may be club

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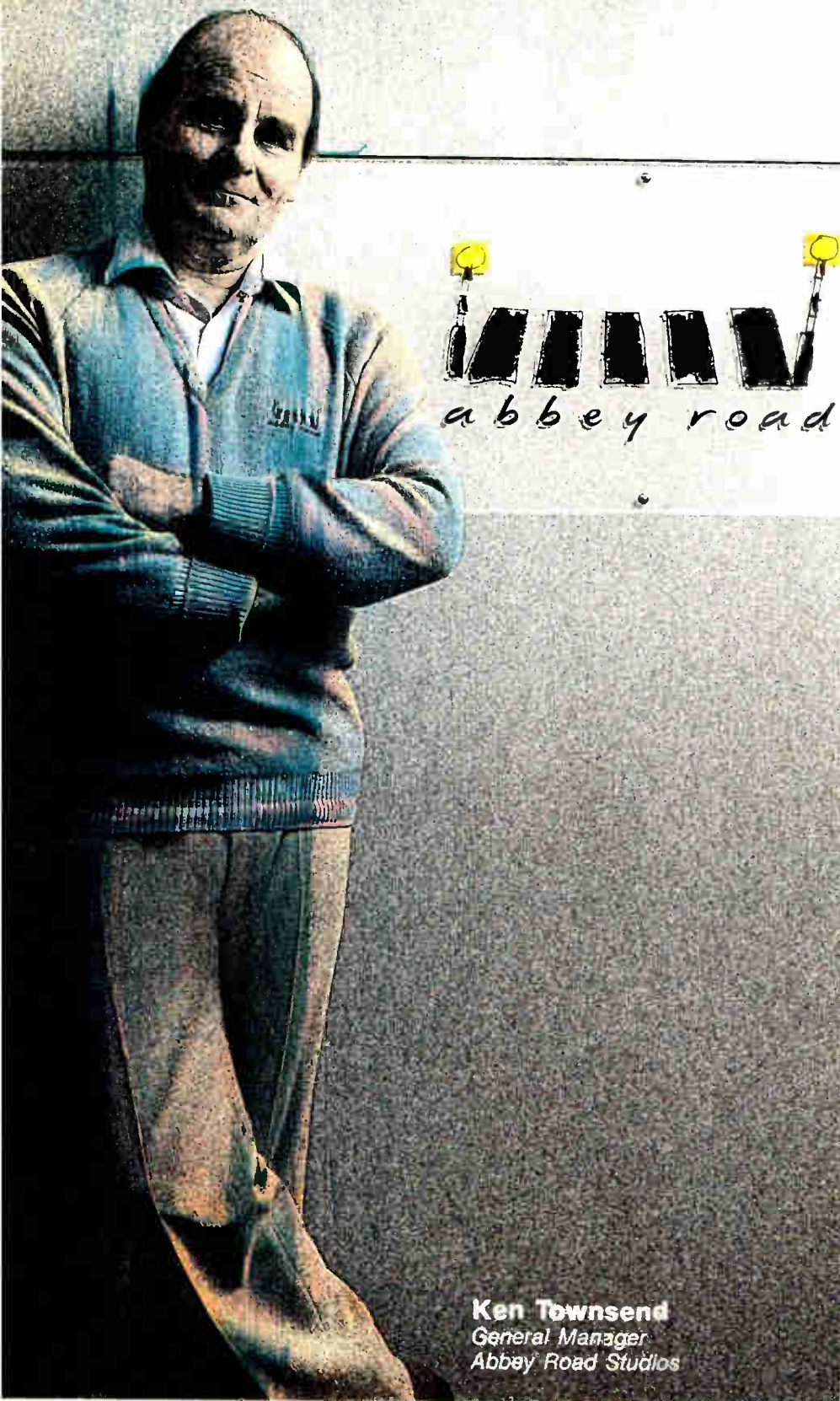
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## LUNCHING · WITH · BONZAI

acts, but when Spike Jones was popular there weren't 20 comic bands around. In classical music, we have Victor Borge, and there's Anna Russell, although I think she has retired now. Even in pop music, aside from Weird Al Yankovic, how many artists specialize in comedy? Partly, it's a very hard thing to do, because music is basically abstract, and unless you are doing funny lyrics, there just don't seem to be that many people who come up with funny things to do. I haven't gone out of my way to monopolize anything, but at any given time there just aren't that many people around in this field.

**Bonzai:** Looking back on all the glory, what is the biggest mistake of your life?

**Schickele:** Using my real name, Peter Schickele, for the Professor. If I could do it over again, I would have used a funny name, like Groucho Marx did in his movies. I would use something like "Professor Hossenfesser" for the P.D.Q. Bach concerts and save my real name for the serious composition.

**Bonzai:** This has caused a problem?

**Schickele:** Yes, a lot of people don't even know that I do serious music. They see an advertisement with my name and come expecting P.D.Q. Bach. My serious music is not thorny music; it's very easy-to-get-next-to music. If I could do it over again, I would keep that separation. Not as a secret, but as a signpost.

**Bonzai:** The name P.D.Q. Bach is more familiar than Professor Peter Schickele, so you have a number of name problems going on here.

**Schickele:** There are tremendous identity problems. In addition to the classical music, I've also written for jazz bands, and I write modern pop-folk songs in the Paul Simon/Randy Newman/John Sebastian tradition. People just have trouble when they see my name; they're not sure what to expect.

**Bonzai:** It's tough being a Renaissance guy these days.

**Schickele:** The cross I have to bear.

**Bonzai:** What kind of a note should we end on?

**Schickele:** Well, there's always C sharp—that's a good one. ■

*Mr. Bonzai is a Southern California-based recording industry veteran, writer and bon vivant.*

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by Mark Herman

# SOUND REINFORCEMENT NEWS

Despite many similarities between U.S. and Canadian sound reinforcement companies, conditions unique to Canada pose special problems for our friends up north. Canada's population of 25 million is concentrated very close to the U.S. border, and consists of about ten geographically separate markets. Travel distances are extremely long for touring companies, winters are hard, venues are small (which means less money) and often have in-house systems, the cost of professional audio equipment runs about 30% higher than in the U.S. and there isn't a strong Canadian client base.

There is heavy competition—especially in the Toronto area—for the few tours and national acts that do come through. Companies have adapted by going to tight truck packs and less P.A. "It's competitive," admits Steve Byron of Band Aid Services. "Sound companies try to use one-truck tours as much as possible due to the long distances and smaller venues."

All the talk and action about the new free-trade laws between the U.S. and Canada seems to have had little impact on the industry. It is still very difficult and expensive for sound companies to cross the border.

**National Show Systems Inc.** (416-444-8880) is a 5-year-old Ontario sound reinforcement company heavily involved in staging and custom set design for touring industrials. National typically works on trade shows, conventions, fashion shows and occasional concerts. In addition, the firm provides subcontracted equipment support for other sound companies. Events like the **Professional Golfers' Association** golf tournaments in Canada



Setup for cultural festival at Northlands Coliseum in Edmonton, Alberta, featuring 24 Adamson cabinets.

and the **Festival of Fashion** (considered to be the largest fashion show in the world) pop up throughout the year. About 10% of its work is in the U.S.

National's P.A. is comprised of Adamson Acoustic Design cabinets with QSC amplification, proprietary monitors, a Yamaha PM1800 console in the house and Soundtracs for the monitors. According to owner **Rob Sandolowich**, "We are strong supporters of Adamson P.A. cabinets. They sound very good and are quite cost-effective. And the truck pack is incredible. We can fit 36 cabinets in nine feet of truck space by going four across and three high in the pack. They require very little equalization and produce minimal distortion. The

vocal clarity is excellent, and the 60-degree coverage pattern is very well defined. The Adamson is a true, even-responding cabinet." Sandolowich also praises the QSC MX1500 amplifiers that power his monitors. "They've been really good for us. It is a lot of amp in a small space.

"There is real growth in the Canadian sound reinforcement market with many new companies springing up," comments Sandolowich. "National Show stays busy all the time—unlike many of the rock and roll companies that slow down in the winter—because we have the type of shows that happen all year 'round."

On April 14 in Toronto, National Show Systems provided sound reinforcement for the **MTV World**

**LIVE • SOUND**

**Music Video Awards.** A 36-box Adamson main P.A system was set up in Nathan Phillips Square for performers **k.d. lang & the reclines** and the **Stray Cats**. I happened to be in Toronto at the time and checked out the Adamson setup for myself; I liked the results.

**Band Aid Services** (416-690-3343) is located in Scarborough, Ontario, near Toronto. **Bob MacFee** and **Steve Byron** are the owners of this 16-year-old business. Both are accomplished engineers; Byron is well-known as the monitor engineer for **Rush** the past five years. Band Aid uses a Crest-powered Meyer P.A. system

with eight MSL-3s, four 650 subs and additional UPA-1s. HH Mosfet V800 amplifiers power the monitor system, which uses both Martin LE200 enclosures and the UPA-1s. The system also uses more than 50 additional Martin P.A. cabinets. House consoles are a Yamaha PM3000, a PM2000 and a Midas Pro4; Midas Pro4s are used

# ON THE ROAD

## SOUND COMPANIES, EQUIPMENT, ARTISTS & PERSONNEL ON TOUR

Artist Sound Company Tour Dates Region	House Console#1 House Console#2 Monitor Console#1 Monitor Console#2 House Crossover	Main Speakers Main Speakers Subwoofers Monitor Speakers Monitor Speakers	Main Amplifiers Main Amplifiers Sub Amplifiers Monitor Amplifiers Monitor Amplifiers	Engineers: (B) = band eng. (H) = house eng. (M) = monitor eng. (T) = technician (a) = assistant
Bruce Cockburn Band Aid Services February - May North America	Yamaha PM-2000 32x8x2 - Soundcraft 500 - Meyer	(8) Meyer MSL-3 - (4) Meyer 650R2 Martin LE200 Meyer UPA-1	Crest 6001. 3501 - Crest 6001 HH V800 Crest 6001	Bob McFee (H) Russel Ryan (B,M)
Bill Cosby Rocky Mountain Sound April Saddle Dome Calgary, Alberta	TAC Scorpion 32x8x2 - (* from house console) - BSS FDS 360/Adamson	(26) Adamson MH225 (26) Adamson B218 - Electro-Voice FM 1502	QSC MX1500 QSC MX2000 - Bryston 4B	Ken Brault (H,M) Ken Friesen Michael Kidder
Collin James Jason Sound Industries May Western Canada	Soundcraft 2400 42x10x2 - Soundcraft 800 32x12 - BSS MCS	(12) JSI J63 (6) JSI J62 (8) JSI J1 JSI J7	Carver 1.5 Carver 1.5 Carver 1.5 Carver 1.5	Wayne Williams (B,H) René Spooner (B,M) Glen Collett (aH) Grant MacAree (aM)
k.d. lang & the reclines Half Nelson Systems April Ontario	Soundcraft Series4 40x16x2 - Soundcraft 500 40x12 - Meyer	(8) Meyer MSL-3 - (4) Meyer 650R2 Meyer UPA-1 HNS 115 Wedge	Ashly FET500 - Ashly FET500 Ashly FET500 Ashly FET500	Grant McArry (B,H) Ron Johnson (B,M) Dave Lawler
Rita MacNeil Audio Concept A.C. April - May Eastern Canada	Yamaha PM-3000 40x8x2 - TAC Scorpion 30x12 - BSS FDS 360, Meyer	(8) Meyer UPA-1 (12) Martin RS1200 - AC 212	Australian Monitor AM900 QSC 3500 - Australian Monitor AM900	Al Strickland (H) Dave Hillier (M) Paul Sarrauff (T) Pierre Guilloffe (aH) Aidan MacCormack (aM)
MTV World Music Video Awards National Show Systems April 14 Toronto	Yamaha PM-1800 40x8x2 - Soundtracs 32x12 - BSS FDS 360/Adamson	(18) Adamson MH225 (18) Adamson B218 - NSS UMW Wedge	QSC MX1500 QSC MX1500 - QSC MX1500	Brad Mulligan (H) Perry Disera (M) Rob Sandolowich Jamie Howieson
Connie Scott Rent-A-Rig Touring May Ontario	Midas Pro40 32x8x2 - TAC Scorpion 40x12 - BSS FDS 360	(8) Pepper Pak (12) Martin 215 - RAR Custom	QSC 3800 Crest 5001 - Crest 3501 QSC MX1500	N/A (B,H) Darryl Moore (M)
4th Annual Boatshow Kostar Sound March Olympic Stadium Montreal	Soundcraft 500 32x8x2 - Soundcraft 400 24x6 - BSS FDS 360/Adamson	(8) Adamson MH225 (8) Adamson B218 - Martin LE1000	QSC 3500 QSC 3800 - QSC MX1500	John Young (H) Scott Hamilton (M)

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## LIVE • SOUND

onstage as well.

Byron remarks, "Lately we've been touring with **Gordon Lightfoot** and **Bruce Cockburn**. Another regular client is **The Nylons**. Also, we've been doing some industrial work. At Band Aid we don't bid on the rock shows much because it is too competitive. The summer is our hot time of the year for business." Recent equipment purchases include the Yamaha PM3000 console and Crest 6001 amplifiers.

**Audio Concept A.C. Inc.** (514-527-8366) is headquartered in Montreal, Quebec, and has an additional office in Toronto. Company president **Jacques Tessier** says, "Our client base is primarily in two areas—concert shows and corporate industrial work. We do tours throughout Canada and the U.S. with many of the major Canadian rock acts, like **Glass Tiger, Honeymoon Suite, The Box, Kim Mitchell** and others. Convention work accounts for most of our industrial business. We are busy most of the year except for a period around January, because of the severe winter." The company began in 1981 and can now put out six systems at a time. Currently, Audio Concept has tours out in eastern Canada with singer **Rita MacNeil** (see "On the Road") and French Canadian artist **Richard Seguin**, who is very popular in the Quebec area. Other work includes dates with the **Montreal Symphonic Orchestra** and the **Metropolitan Symphonic Orchestra**. In the summer the company provides audio for free outdoor symphony concerts attended by more than 60,000 people.

Audio Concept's main P.A. gear includes 40 Martin RS1200 bins and a Meyer system composed of 16 MSL-3s and 14 650 subs, along with additional Meyer UPA-1 cabinets. Proprietary monitor enclosures and several Meyer UM-1 wedges are used for the stage. Australian Monitor AM900 amplifiers power both monitor and main P.A. systems, with QSC 3500s driving the Martin speakers. Mixing console inventory shows two Yamaha PM3000s, a Midas Pro40

and two TAC Scorpions for the house. Three Scorpion monitor consoles handle the stage.

**Half Nelson Systems** (705-674-1450) is located in Sudbury, 200 miles north of Toronto. The company stocks three complete sound reinforcement systems as well as a rental department for smaller pro audio equipment. Half Nelson is also a lighting company with its own trucks, and it builds road cases as well. "Basically we have two divisions in our company," explains co-owner **Dave Lawler**. "One is for touring and the other is for installations and rentals. Mainly we do non-rock jobs like country music, corporate and special events. We're specialists in outdoor summer festivals, and this summer is filled with festival dates. We try to get the entire production into a 26-foot, double-axle truck. We just finished touring with k.d. lang & the reclines (see "On the Road"), Rita MacNeil, and are currently on a lengthy tour with **Sharon Lois and Bram**, a children's show with three one-hour performances a day in soft-seaters throughout Canada and the U.S. A Meyer speaker system is being used." In 1986, Half Nelson worked the Canada Pavilion at **Expo '86** in Vancouver. The company also provided sound for the opening Arts Festival performances at the Saddle Dome for the **1988 Winter Olympics** in Calgary. A 1,000-voice choir and a full orchestra were featured.

Half Nelson has one of the largest Meyer cabinet inventories in Canada, as well as some older Martin equipment. Its proprietary, bi-amped monitor enclosures are loaded with JBL components. House mixing consoles include a Soundcraft Series 4 and a Midas Pro5. A Soundcraft Series 4, Midas Pro4 and Soundcraft 500 are used onstage. A 40x12 Soundcraft 500 monitor console has been modified with Penny & Giles faders and revamped grounding; bar graphs were added to replace the standard meters. Ashly FET 500 amplifiers are used for both the house and monitor systems.

**David Bennett** started **Westbury Sound & Lighting** (416-

# Arrays, Arcs & Point Sources

Sound reinforcement systems use multiple loudspeakers to increase the power of sounds, so that artists can communicate with large audiences.

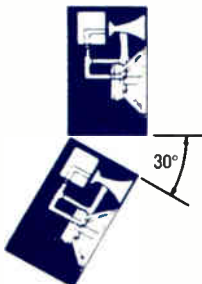
To perform accurately, a reinforcement system must act like a single sound source, radiating a coherent arc of sonic energy. The only way to do this is with a *curved array* in which the speakers combine acoustically to produce a single wavefront.

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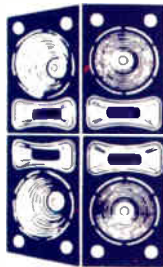
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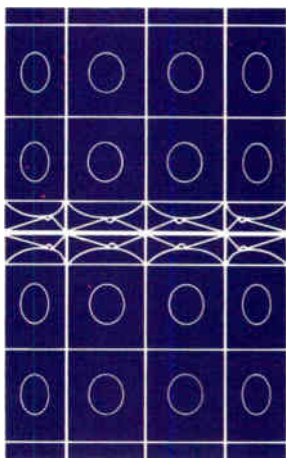
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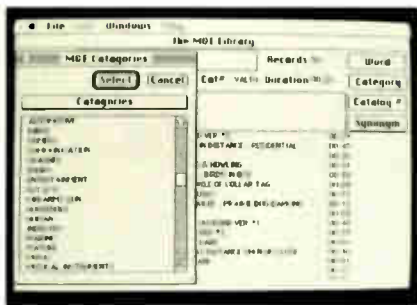
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## LIVE · SOUND

752-1371) in 1971 and later merged with **Mike Tilka**. Located in Scarborough, Ontario, Westbury is a full-service company with sound reinforcement, lighting, sales, rental, repair and installation departments. Its large rehearsal studio has recently seen the likes of **Bad Company** and **George Benson**. Westbury has worked with just about every major Canadian act at one time or another, as well as most traveling acts that have come to Toronto. Since '85, Westbury has been the audio consultant and contractor for the televised Juno Awards—the Canadian equivalent of the Grammy Awards. The company toured Canada this past winter with **Tom Cochrane**. Currently its biggest Canadian client is the massively popular children's entertainer **Raffi**, who toured the U.S. and Canada for eight months last year.

Westbury's main P.A. is a two-box system with proprietary enclosures loaded with E-V and JBL components. The 48-cabinet main P.A. system can be divided into two smaller entities. Also available is a smaller Turbosound TMS-3 system. Recently, Westbury purchased an Electro-Voice Delta Max speaker system. Amplifiers are mainly QSC 3800s and MX2000s, along with a wide variety of Yamaha models. Mixing console inventory shows two Yamaha PM3000s, several smaller Soundcraft and Soundtracs mixing boards for the house, and a Midas Pro4 and a 32-channel Soundtracs for the stage.

**Rocky Mountain Sound** (604-255-5787), previewed in this column in October '88, now has representation in three of Canada's major markets—Vancouver, Calgary and Toronto. **Charlie Fournier** is managing the newest location in Toronto. In other recent developments, Rocky Mountain purchased Crest Professional Series models 8001, 6001 and 4800 amplifiers to power 32 new Adamson Acoustic Design main P.A. cabinets. The additional boxes, delivered in early May, give the company more than 100 pieces of the Canadian-manufactured

Adamson product in stock, making it one of the biggest sound reinforcement outfits in Canada. Owner **Fred Michaels** comments on the Adamson cabinets, "They are reliable and efficient, and I like their vocal imaging. There are less lobing errors than other setups, and the top end holds together quite well at the very high frequencies. The E-V DH1A compression driver works well with the horn."

Recent work for Rocky Mountain included a recent **Bill Cosby** show (see "On the Road") for 18,000 people at the **Saddle Dome** in Calgary, Alberta, that used 52 Adamson cabinets. The company services many festivals and community events like the Calgary Folk Festival, the Music Fest in Toronto, and Vancouver's Sea Festival International. Eastern Canada's **Le Bruit Bleu** was the main sound contractor for the International Opera Festival events that used Rocky Mountain's boxes for delay towers. Unfortunately, I was unable to preview **Le Bruit Bleu** in this issue but look for something soon on this sound reinforcement company from Quebec.

Michaels comments on recent trends in Canadian sound reinforcement: "It is more expensive to operate and the income is downscale in the last few years. The trend is for one-truck tours. The Adamson enclosure is very attractive for this reason because it packs so well."

**Rent-A-Rig Touring Systems Inc.** (519-745-8423) is a sound and lighting company started in 1979 by **Kevin Pepperall**. Located in Kitchener, Ontario, about 45 minutes southwest of Toronto, Rent-A-Rig works many U.S. county fairs in the summer. Pepperall states, "More than half our business is in the U.S. We stay away from the bidding wars in Canada as much as possible. Much of our U.S. business is in Ohio and Michigan doing county fairs lasting anywhere from three days to a week. June through September is our heaviest season. Last year we worked with artists such as **Lee Greenwood**, **Gary U.S. Bonds**, **Fabian**, the **Beach Boys**



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## SOUND ON STAGE

TOGETHER AGAIN WITH  
FRANK, LIZA & SAMMY

ILLUSTRATION BY JIM PEARSON

**by Mike Stande**

One of the highest-grossing box office draws in the United States last year was the "reunion" tour featuring Frank Sinatra, Liza Minnelli and Sammy Davis Jr. Each a time proven crowd-pleaser in his or her own right, these three performers together packed large sports arenas with enthusiastic audiences.

"You can't argue with success," comments A-1 Audio owner Al Siniscal, whose firm has provided sound system services for this Together Again tour since it first hit the road in early 1988. "These entertainers are fabulous. Seeing the three of them together on one stage is a thrill." Siniscal's company supplied the touring show with an innovative hanging system for arena dates performed in the round across the nation. The 1988 touring season took the Together

Again team to major venues in cities like Chicago, Atlanta, New York and Cincinnati. The season wrapped up with a sold out concert at the Los Angeles Forum.

**MAIN SOUND SYSTEM**

A total of 32 MSL 3 enclosures from Meyer Sound Labs were arrayed in four groups of eight. Each group of cabinets faced approximately a quarter of the arena audience. Hung within the square lighting truss grid, the four arrays provided 360-degree coverage for arenas with up to 20,000 seats.

A 1 Audio covers each Meyer enclosure with a neutral gray, all-weather, nylon carpet. The company has fabricated compact, custom steel, hanging brackets that facilitate quick and easy assembly of hanging arrays. All hardware parts are secured with steel

aircraft-cable safety links.

For front-area seating coverage, groups of smaller Meyer UPA-1A enclosures were suspended from the hanging truss grid, and additional speakers were located at stage level in the center of the room, offering a finely detailed front-fill music system to the closest seats. Tickets for these seats cost up to \$250 each for the L.A. Forum show, which was a benefit for one of Sinatra's preferred charity organizations.

Crest Model 4000 and 8000 amplifiers powered the loud-speaker enclosures. Housed in A-1's compact road electronics racks, four of the high-powered dual-channel amps were combined with Meyer system processors. A separate 30-amp electrical circuit was available at the rack for each pair of Crest amps.

A rhythm section and 33-piece orchestra with string, reed, brass and percussion sections traveled with the show. House soundmixer Dan Kasting used a Yamaha PM-3000 40 mixing console. "Performing concerts in the round can be different," Kasting says. "Often, the arena is not symmetrical in four directions and there are more reflective surfaces on one or more sides, even though the stage is set up in the middle of the room. It's important to have control over the levels of the different parts of each array."

Matrix outputs on the PM-3000 fed the upper and lower sections of each of the four loudspeaker arrays; great care was taken during setup to achieve a balanced sound throughout the audience area. During system check and sound check, strolling technicians with





**One of the four groups of eight MSL-3 loudspeaker enclosures, arrayed for 360-degree coverage.**

wireless intercoms relayed information back to the sound mixing position.

"One of the best things for us about this hanging system is the speed with which we can get it out of the truck and put it up," says Kasting. "Getting the load-in and setup out of the way is a priority. Everything about the enclosures, rigging gear, amp racks and cabling has been designed to make using this system as easy as possible. We'd rather spend time working with sound than setting up hardware."

#### STAGE MONITORS

The stage monitor mixing position was located in the orchestra pit enclosure, in close proximity to the main system amp racks. Operated by Connie Fernstrom, the monitor system centered around a Yamaha PM-3000-40. Klark-Teknik DN360 graphic equalizers, dbx 165 compressor/limiters and Crest 4000 amplifiers were close at hand.

Compact Meyer enclosures were positioned at four corners of the stage to provide a "vocal wash" for the performers. "These singers like to work the entire stage and don't care to be confined to one spot," says Fernstrom. "They are used to working by hearing low-level monitor reinforcement that

they can walk in and out of, and also by hearing what is going on in the audience area. The stage sound can't cover up the house sound as they perceive it on stage; they are not as comfortable when that happens."

Fernstrom also kept a close eye on the entertainers' wireless microphone systems, the new Shure W15HT diversity antenna units equipped with SM87 head capsules. Eight units were carried with the show, although only three were used at one time. Additional units were set at different radio frequencies to allow a quick swap in cities where RF interference was a problem.

"Each one of them has a different microphone technique, and it has been a challenge getting used to the three separate sections of the show," notes Kasting. "When the three work together, though, a blending takes place, due to their years of familiarity with each other."

The Together Again lineup drew well-heeled, older music fans. This crowd expected to hear every word of each song, and to catch every subtle nuance when Ol' Blue Eyes told a story or Liza flashed a smile. "We've approached the sound from a vocals-first perspective," Kasting says. "The orchestra is made up of pros and the musical director does a good job of handling the dynamics there. So for us, the singers' voices are very important. We can't afford to have complaints about poor intelligibility get back to them... and they have a lot of friends out here in the audience!"

The main task at this show appears to have been making sure that the lyrics reached to the back of the hall, no matter how large the venue. The choice of sound system, method of system assembly and the mixing techniques used all reflect a sensitivity in this direction.

"Sing it to me, Frank!" sighed a woman seated near the mixing console during Sinatra's portion of the show. Frank did sing it to her... and A-1 Audio's compact in-the-round audio system helped her to hear it the way she always remembered it. ■

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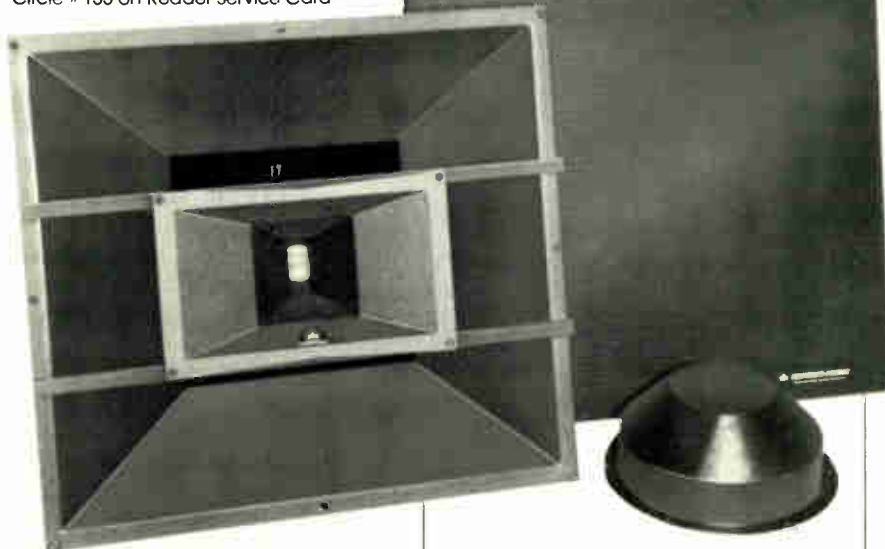
**Bose 302 Series II Bass System**

New from Bose of Framington, Mass., the 302 Series II Acoustimass system is designed specifically for bass reinforcement with the Bose 802-II loudspeaker. The Acoustimass technology moves sounds into the listening environment via two masses of air, permitting greater output from a smaller enclosure. The 302-II contains two 12-inch MB-12 woofers, each in discrete Acoustimass enclosures, and can handle up to 600 watts with a maximum SPL of 124 dB (600 watts at one meter).

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watts/channel into eight ohms and 200 watts mono into a four-ohm load.

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**Renkus-Heinz Coax Horns**

Designed to provide even, accurate coverage in a small space, the Coax60 and Coax90 horn systems from Renkus-Heinz (Irvine, Calif.) combine an HF horn and driver in the mouth of a mid-frequency horn, providing pattern control from 250 to 17k Hz. The \$2,900 package includes an SSD5600 mid

tions. It can be programmed and controlled via MIDI. The unit includes front panel controls for frequency,  $\pm 12$  dB of cut/boost in 1dB steps (or  $\pm 6$  dB cut/boost in 0.5dB steps) and features 100-year, nonvolatile memory and combining filters for a smooth response. The MIDI Pod is priced at \$595.

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**Carver PM-100 Amp**

The PM-100 from Carver Corporation of Lynnwood, Wash., is a stereo, one rack-space, Magnetic Field power amplifier. Weighing only 13 pounds, the PM-100 features front panel gain controls, dual LED meters, clipping eliminator circuitry, series parallel mono capability (including 70V line operation), a headphone output, and XLR, TRS and barrier-strip inputs. FTC (20-20k Hz) power specs include 110

driver and SSD3301 HF driver mounted on a Renkus Heinz constant-beamwidth horn. Options include weatherproof front and rear covers.

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**MicroAudio MIDI Pod EQ**

The MIDI Pod from MicroAudio of Portland, Ore., is a  $\frac{1}{3}$ -octave, single-channel, 28-band equalizer designed for pro sound applica-

**Galaxy Hot Spot II**

The revised Hot Spot from Galaxy Audio of Wichita, Kan., offers numerous improvements over its predecessor, including 15-volt phantom power and balanced inputs. Featuring more than 35 watts of continuous power,  $\frac{1}{4}$ -inch and XLR input jacks, external speaker output and a 2-channel mixer with 3-band EQ, this nine-pound unit can be mounted on a mic stand or used in floor or desktop applications.

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by Philip De Lancie

# DAT FOR PROS

## SWIFT START, UNCERTAIN FUTURE



# W

hile the impasse over consumer introduction of DAT drags on and on, the configuration seems to be gaining rapid acceptance for various professional applications. It took years for EIAJ standard consumer digital gear like the Sony PCM-F1 to become common in recording studios, mastering rooms and cassette duping facilities. As an affordable way to make high-fidelity reference copies, production masters or even original mixes, DAT seems to be following in the same footsteps, but at a much accelerated pace. Of course, digital audio in general is more accepted now than when the F1 debuted almost ten years ago. The speed of the DAT bandwagon is even more impressive considering most of the DAT machines in use in the States have been available only on the "gray market," imported without authorization of the manufacturer or its U.S. representative.

It seems unlikely that hardware makers can recoup all their research, development and manufacturing costs by giving up on the consumer market and targeting DAT exclusively toward professionals. But until the holdups on the consumer side are resolved,

they have only professionals to sell to. As previously reported, a number of companies are marketing professional DAT products, among them Sony, Panasonic, Tascam, Fostex and Nakamichi. With XLR analog input/output connectors at +4 level, and two or three types of digital ins/outs, these more costly machines are designed to interface with other studio equipment more easily than the gray market, consumer models. And the format's timer and search features, designed for consumer convenience, make it simple to locate material on a tape. That's an important point in DAT's favor compared to using F1 systems, where cue points picked up on one deck's tape counter are likely to be meaningless on any other deck.

Like F1, however, DAT's effectiveness as a truly professional system is still limited. As of this writing, no editing system is available, though that may come given sufficient demand. Until it does, editing within program material is out of the question. Tight spacing between bands when assembling mixes song-by-song onto a sequenced master is not feasible, as the machines need a little time

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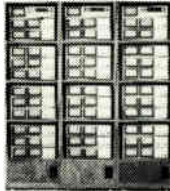
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to settle into sync from pause. Further, no provision was made in the original specification for recording SMPTE time code (which can be recorded on F1 using one of the analog audio tracks). Work is now under way on rectifying that omission, though you have to wonder whether the modifications required to professionalize the format can be achieved without undermining the attractive price/performance ratio that is currently the source of much of DAT's appeal.

Even if these hurdles can be negotiated successfully, DAT's long-term place in the studio is not necessarily assured. In spite of its limitations, the format offers a combination of quality, convenience and affordability that makes it unique. But with recordable CDs nearly ready to roll (reportedly), those who are willing to wait will soon have alternatives. CD-R developer Taiyo Yuden ("After-Mix," April 1989), conscious of the same copyright considerations that face DAT manufacturers, has chosen to avoid confrontation for the time being by pledging to restrict nonprofessional access to the technology. And Yamaha's Programmable Disc System (PDS) is far too costly and involved for consumer use. So if and when these systems are ready for widespread distribution, which is supposed to be within the year, manufacturers will be targeting professional buyers, urging them to consider whether optical disc systems might not make better sense than DAT for many applications.

A number of unanswered questions about CD-R make it difficult to make an informed comparison. Regarding price, Taiyo Yuden says it plans to sell blank discs for less than \$10, but the cost of the recorder itself has not been announced. Including the necessary EFM encoding, it could be fairly high. Sonically, DAT boasts a higher sampling rate at 48 kHz, but the CD's rate of 44.1 kHz is widely regarded, for better or worse, as an acceptable standard. CD-R does not (as I erroneously reported in April) have to be recorded continuously from start to finish, as long as the disc's table of contents is completed after recording. Whether assembly editing to disc leaves audible artifacts between bands is yet to be revealed.

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ference between the systems is that DAT allows erasure and re-recording, whereas erasable CDs are not expected for another two to three years. CD-R is a WORM (Write Once-Read Many) format, which may turn off some of those looking for a recording studio mix machine. If the blank discs are inexpensive, however, and start/stop recording is glitch-free, one could mix multiple takes to disc and then play back the preferred one from a conventional CD player to CD-R for assembly of a sequenced master.

For work that is normally done in a continuous pass anyway, like production masters and reference dubs, CD-R's write-once limitation would be no real obstacle. And in certain situations, the most obvious of which would be making refs for CD mastering clients, the CD format would present clear advantages. With CD-R, or a similar system, the client would get a ref that not only looks and acts like the final product, but is also playable on millions of readily accessible playback machines. That would allow listening under a variety of conditions to en-

sure that the product sounds as desired. Until DAT develops some kind of installed base outside of the professional realm, it's just not as useful a tool for this purpose as recordable CDs would be.

The subject of developing an installed base of consumer machines brings us back to a familiar cast of characters, which includes hardware manufacturers, the Recording Industry Association of America (RIAA) and International Federation of Phonogram and Videogram Producers (IFPI). You may recall from our last episode of "As the DAT Turns" (March 1989) that the feuding factions (hardware makers vs. record companies) finally came together to discuss the possibility of agreeing to come together to discuss the possibility of agreeing. After that icebreaker, industry movers in the European Japanese Business Round Table set up an April meeting in Amsterdam of a joint working group to begin consideration of the numerous technical, legal and commercial factors involved in balancing the interests of the various parties.

According to RIAA vice president Hilary Rosen, participants in the meet-

ing are not at liberty to disclose much about what was discussed and what progress, if any, was made. Further get-togethers are planned, so one assumes that the outlook is not entirely bleak. This incremental movement after several years of deadlock may be cause for hope, but it also points up how difficult the issues are and how far there is yet to go. The stakes are extremely high, because both sides realize that the decisions reached will set a precedent that is likely to be followed with respect to all types of recordable audio media for years, or perhaps decades, to come. No wonder hardware manufacturers were terrified of conferring even the slightest validity to record company concerns that home taping may be detrimental to the interests of copyright holders. Dialog on that issue became possible only as evidence mounted (based on disappointing response to DAT where it is already available) that the format would not fly without software support from the major labels. Even so, those companies now participating in the search for solutions have only come aboard individually rather than under the auspices of the Electronics

# DAT

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Industry Association of Japan (EIAJ).

Though it has been hard to agree that there may be a problem, agreement on a solution is likely to be far more elusive. Technical proposals were set back by the CBS copy-code's dismal performance in last year's National Bureau of Standards tests. Research has continued on alternative systems, and a technical approach is sure to have its adherents when options are discussed within the working group. But a "spoiler" approach is far from universally desired. GEMA, West Germany's performance and mechanical rights licensing organization, has taken the position that devices designed to prevent home taping are actually illegal under German law. As reported in *Billboard*, the group has come out in favor of a blank tape royalty as a means of compensating artists for the use of their work by home tapers. That idea should sound familiar, because it's been around the block a few times in the U.S., though it never made it through Congress.

Given the disparate interests involved, the debate threatens to split not only along hardware/software lines, but between various factions among copyright holders. Should discussion become sufficiently divisive, hardware makers might be able to gracefully withdraw, claiming they cannot negotiate with parties that cannot agree among themselves. Having "done their best" to address copyright concerns, they might then feel free to go ahead with DAT introduction in the U.S., supporting the move with software releases from the major labels they had the foresight to acquire.

• • •

In October 1987, "After-Mix" focused on DAAD (Digital Audio Analog Duplication), the high-speed cassette duplication master from Concept Designs that substitutes mass digital storage for the traditional bin-loop. The system is now about to go into production in its first full-scale commercial facility, a Weaverville, N.C., plant operated by Sonopress. The cassette duplication company is part of West Germany's Bertelsmann Music Group, which owns the RCA, Arista and Ariola labels. The move to DAAD is part of a general expansion at Sonopress, which boasts a current production of 450,000 cassettes per day at the site. Plans call for boosting daily output to 500,000 and adding cassette shell manufactur-

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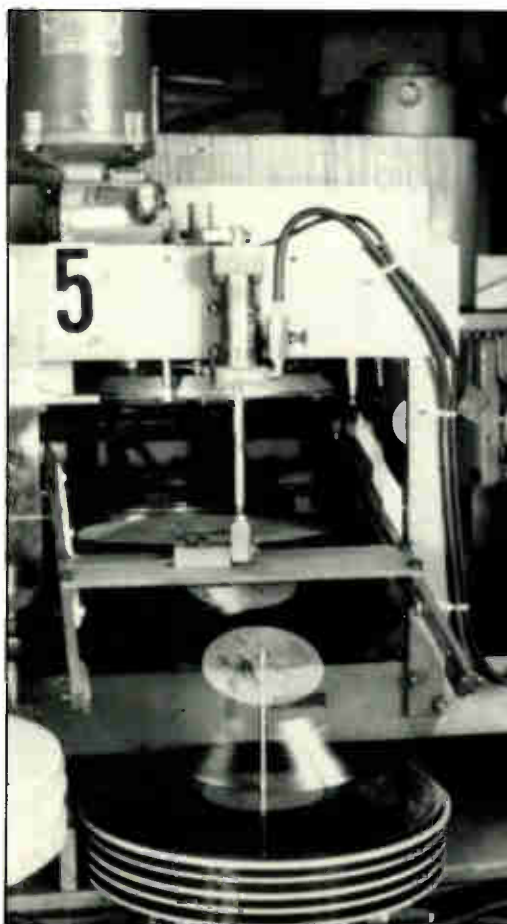
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ing capability. To accommodate the changes, the company is increasing plant space from 105,000 to 175,000 square feet. Twenty molding machines and seven assembly machines will be added for the shell manufacturing. Worldwide, Sonopress duplicates about 130 million cassettes annually for BMG and custom clients.

Meanwhile, in Los Angeles, MCA is opening a new production studio complex that will handle product preparation for domestic and international manufacturing. The facility features two CD mastering rooms equipped with Desktop Audio workstations from Sonic Solutions. The Macintosh II-based system is an outgrowth of capabilities developed for master tape restoration with Sonic's No-Noise ("After-Mix," September 1987). Now incorporating editing and EQ/enhancement functions, the workstations will be MCA's primary CD prepping tool for both new releases and reissues. To keep up with increased demand, MCA hopes to process 12 CDs per day at the complex, which also includes four transfer and editing suites, two cassette mastering rooms, offline video editing and tape storage vaults.

Americ Disc North America, a Canadian optical disc replicator based in Quebec, has opened a New York sales office in a bid at grabbing a share of the U.S. CD market... A booklet offering guidelines for effective handling of super-length audio pancakes has been prepared by Agfa Technical Support Services. A copy of the *High Speed Audio Duplication Guide*, which includes a detailed discussion of slave alignment procedures, may be obtained by contacting your local Agfa salesperson or regional offices in Atlanta, Chicago, Dallas, Los Angeles and San Francisco... Northeastern Digital Recording has been retained to digitally remaster the entire David Bowie catalog on RCA. The collection, which includes 18 masters spanning 12 years of Bowie's career, is to be released on CD by Rykodisc. ■

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

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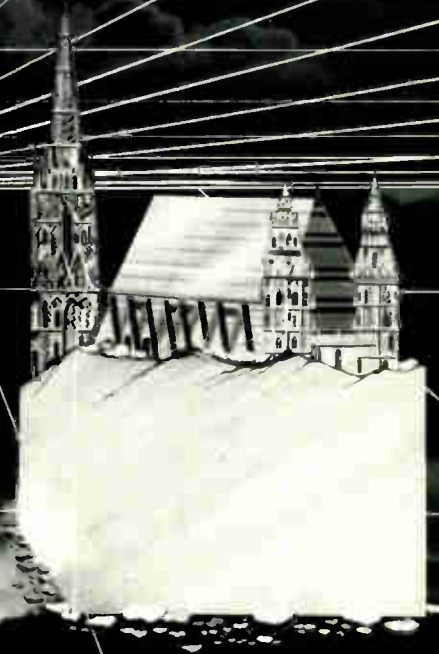
The acoustics of old world cathedrals and many other sonic environments, have been ruthlessly copied for the DPR 20.

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WorldRadioHistory

by Lou CasaBianca

# SEEING IS BELIEVING

## MICROSOFT'S FOURTH CD-ROM CONFERENCE

**T**he theme of the fourth Microsoft CD-ROM Conference, "Seeing is Believing," focused on interactive multimedia and the coming of age of the CD-ROM industry. The event, which took place last March in Anaheim, California, saw a few firsts: the entry into multimedia computing of the venerable IBM and Intel; CD-ROM/XA (eXpanded Audio) specifications from Sony, Philips and Microsoft for industry standardization of Adaptive Pulse Code Modulation (ADPCM) audio on CD-ROM; and demonstrations of *desktop* systems that can create CD-Audio or CD-ROM discs, developed by Optical Media International and Meridian Data.

In an environment dedicated to the concept that multimedia makes for better presentations, the keynote speech presented by BBC/PBS alumnus James Burke used absolutely no sound or visuals. Nevertheless, his wit and rapid-fire delivery kept an audience of 2,000 fully absorbed throughout an information-packed outline of his concept of the origins of the multimedia universe. In less than an hour, Burke covered a vast array of topics, from the big bang theory and molecular biology to hieroglyphics and the creation of print media.

Perhaps Burke's most innovative viewpoint was that once multimedia computing is a reality, the human mind—as a multidimensional and as-

sociative thought-processor—will finally have a creative tool worthy of its potential.

Another interesting fact was revealed when Julie Scherwin, president of Info Tech, presented the results of a survey conducted by the Optical Publishing Association (OPA). Based on more than 100 interviews in six countries, the survey documented the existence of 580 CD-ROM titles and an installed base of 171,290 drives, creating an industry valued in 1988 at \$406 million. This Optical Publishing

Industry Assessment can be obtained (\$150 for OPA members, \$300 for non-members) from the Optical Publishing Association at 1880 Mackenzie Dr., Suite 111, Columbus, OH 43220; (614) 442-1955.

**Macromind Inc. introduced Director, its newest video animation program for the Macintosh.**



### THE WORD FROM MICROSOFT'S BILL GATES

Microsoft chairman Bill Gates called CD-ROM/XA "the missing link" in multimedia applications of CD-ROM. Interleaved, compressed audio now permits synchronized sounds and images on CD-ROM. Reminding the audience that some 20 million DOS and 3 million Macintosh computers are out there, Gates said that software leads hardware. He predicted that multimedia "beachheads" will be established first in business, because of the benefits of increased learning speed, better comprehension and cost savings. The consumer ap-

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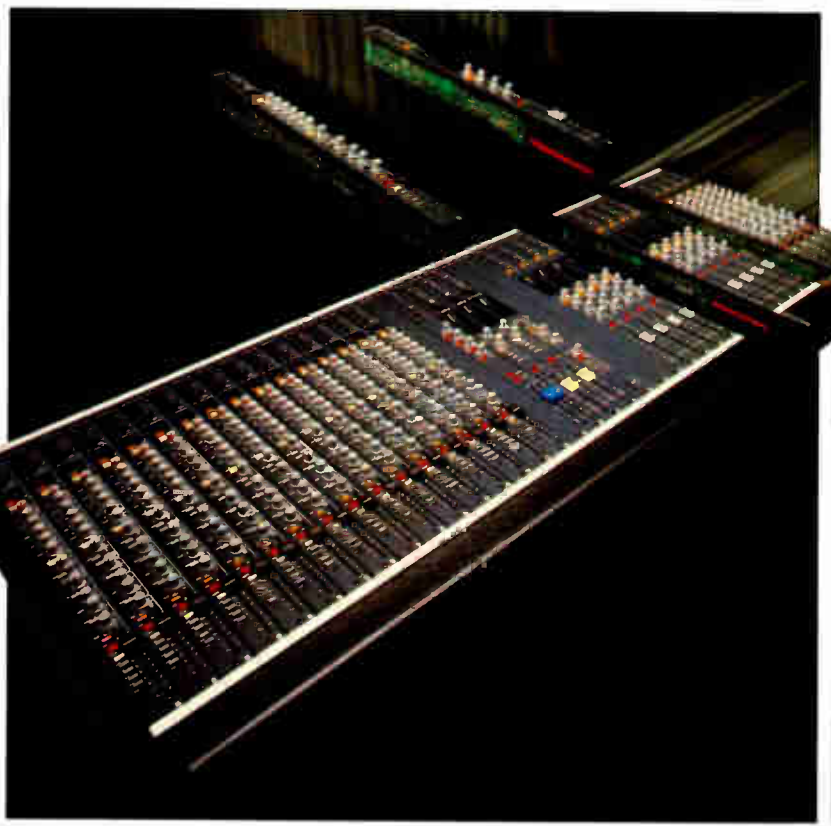
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## INTERACTIVITY

plications of the '90s, he said, would comprise catalogs and self-guided learning, motivational and entertainment programming.

### INPUT FROM SONY

Michael Schulhof, vice chairman of Sony USA, and Dr. Toshi Doi, a direc-

## BIG BLUE ENTERS THE SCENE

The most portentous announcement at the conference was IBM's entry into multimedia computing. It felt rather incongruous listening to IBM vice president James Cannavino forecast the future possibilities of PC multimedia. Most of the audience not only had "seen the future" years ago, but almost all the visions he cited already



Optical Media International demonstrated its new TOPIX CD-R Spectrum System, which can perform data capture, editing, indexing, formatting and encoding. It will directly output CD-ROM, CD-ROM/XA and CD-Audio media onto a compact disc in minutes.

tor of Sony Corporation, led a presentation that stressed the importance of long-term standards. They pointed out that the lack of multimedia standards could be seen as a problem or an opportunity. For better or worse, the NTSC standard served as a platform for the billion-dollar black-and-white TV industry. These standards will set the course for the next 25 years.

Schulhof and Doi reminded the audience that the laser videodisc is a powerful, interactive, multimedia format with existing standards and an installed base. With this in mind, Sony will soon market a CD-ROM/XA "starter kit" to help PC/AT developers bring ADPCM sound into their platform. With Sony's HDTV, CD-ROM, Unix-based computer systems, digital audio and international domination of consumer electronics, the company certainly is positioned to be a vital player in the multimedia arena.

exist in some form. Despite IBM's use of Windows and DVI (Digital Video Interactive), the company must significantly enhance the puny sound capabilities of the PC before attempting to meet the potential for audio in multimedia. Nonetheless, IBM's involvement brings interactive multimedia into the corporate mainstream, and IBM's proprietary agreement with Intel means that DVI will be part of the PS/2 Microchannel-80386 platform.

### INTEL-IGENT MOVES

Intel Corporation's David House, senior vice president, reviewed Intel's acquisition of the DVI technology from GE's David Sarnoff Labs. (DVI combines interactivity and PC graphics with full-color, full-motion video, stills and audio.) The acquisition has positioned Intel as a key player in the DOS multimedia world. Intel's Pro750

—CONTINUED ON PAGE 150

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## BOB MOULD'S LIFE AFTER HUSKER DU

For nearly a decade, the Minnesota-based band Husker Du crisscrossed the country, playing their intense, energetic rock and roll for anyone who would listen. In an American heartland more attuned to mainstream hard rock than punk vitality, Husker Du were viewed by many as rebellious outsiders. They put out their own records on independent labels, booked their own tours, but still managed to build a large, loyal following through the years. "I think Husker Du was a great band," says Bob Mould, the guitarist and de facto leader of the group until it disbanded in January of '88. "We stood for dealing up some serious honesty about the way things really are in this country and about doing things on your own terms. I'm really proud of what we accomplished, but at the

same time, personally, I wanted to move on."

After Husker Du's fractious demise, Mould "went into hibernation at home and started writing new songs and recording them on my small 8-track setup," he says. "It was the first time I'd had the luxury of sitting around writing songs; to work on music as a craft rather than a profession." What started as demos for his own amusement gradually evolved into Mould's first solo LP, *Workbook*, released this spring by Virgin Records. With its simple instrumental beds dominated by acoustic and electric guitars and the occasional cello, and its prominent layered vocals, *Workbook* represents a considerable departure from Husker Du's sonic attack, a fact that may alienate some old fans, while making the album more accessible to others. Clearly, this was a very personal album for Mould, who enjoyed the challenge of working in a solo setting for a change.

"When you work with people for a

### Bob Mould

number of years, you become very aware of their capabilities and limitations, and you start to become a creature of habit," he comments. "Working as an individual, you have the luxury of experimenting with the things you really hear in your head, rather than just what's proper for those players. The trick, then, is to find people who are flexible enough to play different styles."

Though Mould did round up a few outside players for these sessions (the most notable being drummer Anton Fier) this still has the sound and feeling of a true "solo" album—it is dominated by guitar textures and Mould's singing, which, in this context, occasionally recalls Peter Gabriel's reedy baritone. Mould produced the sessions himself, and he acknowledges, "You have to be a little schizophrenic to pull that off. You have to be able to be really critical of yourself." He says engineer Steve Hagler also was helpful in that regard: "He'd tell me when something was really bad, though I usually knew that myself," he notes with a laugh.

Most of the basic tracks for *Workbook* were laid down over the course of about a week in Studio B at Minneapolis' Paisley Park Studios, a facility Mould describes as "world class all the way." He spent another two weeks on overdubs at Grog Hill Studio, near Woodstock, NY. An admitted workaholic, Mould put in countless long hours alone at different stages of the project, and some of that solitude is reflected in the songs on *Workbook*.

"A lot of [the record] is about being isolated and taking inventory of your life and relationships," he says. "It's a real one-on-one record, which is a change for me. You know, with a band you always want the air of democracy to shine through, and I think it's great when that's genuine—it has real power. But this is different. This time I wanted people to know who I am."

—Blair Jackson





## STEVE LUKATHER: PRISONER OF ROCK AND ROLL

"I'll sleep when I'm dead," cracks a very weary looking Steve Lukather, quoting a Warren Zevon lyric that has been his unspoken philosophy through years of writing hit songs, playing guitar on a multitude of sessions and working with Toto the past decade.

It's his credo more than ever now, though, because he's in the midst of making his first solo album. All his musical buddies have been encouraging him to make this album, he explains as we make our way through the halls of The Complex, where he and Greg Ladanyi are busy mixing. Even his Toto cohorts have been completely supportive during the hiatus.

"I wouldn't have done it without the blessing from the other guys in the band," Lukather stresses. "If it wasn't for those guys, I wouldn't be able to do this at all. I owe my whole career to those guys. When I was a kid, they gave me a shot and let me be in the band."

*Pinned* is the album Lukather says he has always wanted to make; it's rock and roll from beginning to end. And you can tell that by some of the company he's been keeping, such as Eddie Van Halen, who co-wrote and

### Steve Lukather

co-produced "Twist The Knife."

"It's not something he normally does, but he went out on the limb for me," Lukather says. "He helped me get it down on tape. I'm used to making super-tight records, and I wanted a looser thing. We met somewhere in the middle. It's one of my favorite songs on the album because it sounds sort of nasty."

Early in the project, the two songs he worked on with Danny Kortchmar helped set the raw pace of the album, even though there are a couple on the more commercial side (one written with Richard Marx, another written with Billy Steinberg and Tom Kelly). Going to New York and working with Steve Stevens (Billy Idol) also helped aid and abet the rock and roll focus.

"'Darkest Night of the Year' was the first thing we wrote together," Lukather notes. "At first it started out as a Steely Dan kind of shuffle, and he said, 'No, no, let's get to the straight eighths, man,' and he straightened me right out. All of a sudden it became this intense, hard-edged rock and roll tune. He didn't play on that song, but he did play on 'Fall Into Velvet,' which is a really trippy song. The band was myself, Steve on guitar, Jan Hammer on keyboards, Will Lee on bass, Thommy Price on drums. All the solos were spontaneous and they all happened live. The basic track was all live. We rehearsed the actual song part because it's kind of involved, but we never rehearsed the solo parts. We got it on the second take, all the way through."

The vocals weren't as easy as those solos, though. They were the hardest part of the album for Lukather, who doesn't usually sing more than a couple of songs on a Toto album. Randy Goodrum was of particular help with that, however.

"Randy is a wizard with the vocals. I can comp other people's vocals really well as a producer, but when it comes to my own voice, I hear everything that's wrong with it. I'm really sensitive about it. To a fault.

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## MUSIC & RECORDING

"I didn't double any of the lead vocals on the whole album, though. It instantly sounds good when you do, even though it takes a lot of work to make them sound that way. I just wanted it to sound like you could see the guy singing the song instead of, 'Gee, that sounds really good, but what is that going to sound like live?'"

"There weren't any tricks in getting the tracks," he adds. "I wanted to keep it real people playing in a room. The effects came in at the

mixing point."

Working with so many different people at such a variety of studios (he applauds engineer Shep Lonsdale for his easy adjustment), Lukather knew all along he wanted one mixer to thread it all together.

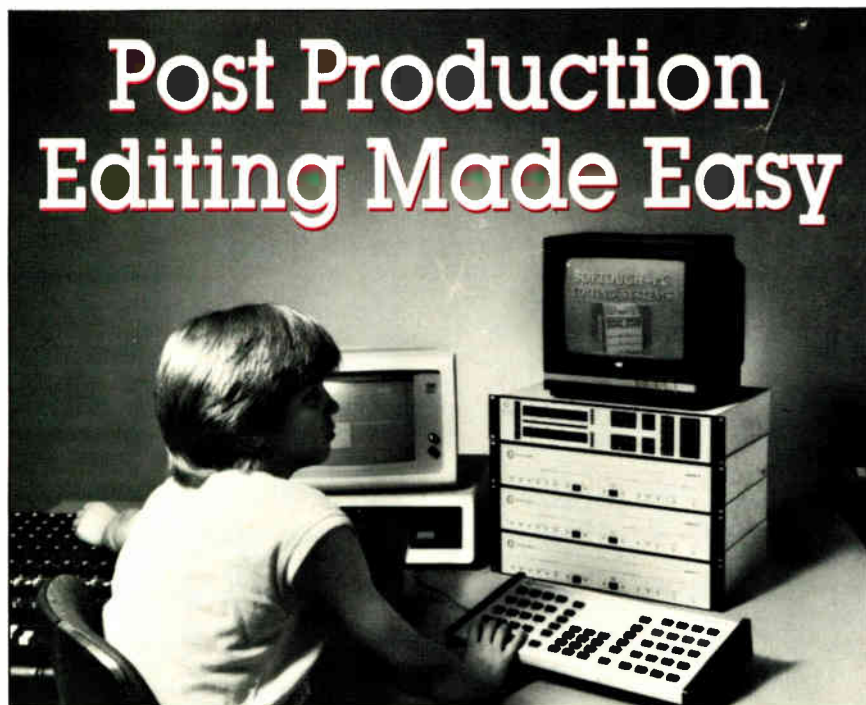
"My initial choice was Neil Dorfman, but he waited until the last minute and bailed out on me. Then my friend Greg Ladanyi came through, and he really was the better one for the job because I had worked with him before and he's more rock and roll."

Asked about the mixing and the effects used on the album, Ladanyi

laughs, "Lukather is the effect. The other stuff is just a bunch of toys. Seriously, though, it really is about Luke. We kind of mold the effects around his personality, more than trying to effect something for the sake of the effect," explains Ladanyi, citing the B.A.S.E. (Bedini Audio Spacial Environment) unit as one of their primary tools. "I've been with this guy for about 15 years, so I think I know a little about what he's trying to do with his music and this album. For me, the best part is just being able to mix some music that I know is a part of him."

"I'm really having fun, as neurotic as I might seem," Lukather concurs. "The stress factor is way high, though. I paid more dues on this, mentally and emotionally, than on any other record I've ever done. It's a fear of failing," he says, and then laughs at his own honesty. "The whole point is you want people to like it and buy it. I didn't spend nine months to make a home demo for myself to get off on. I still hear things that are wrong with it, but at a certain point you have to let go. I could be working on this until I'm 90. And still not like it. I'm still [mentally] doing overdubs on the first Toto album."

—Robyn Flans



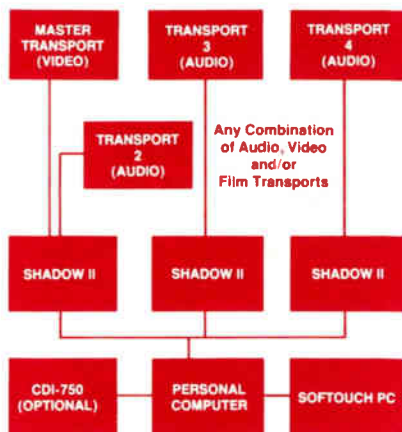
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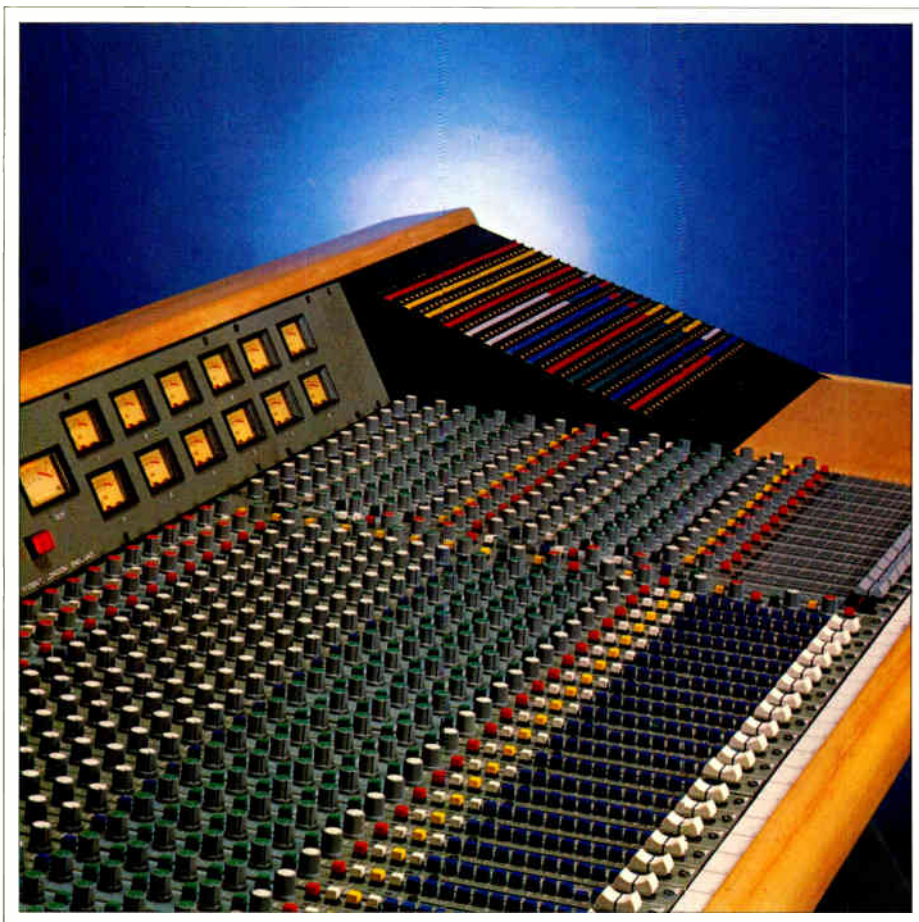
## APPLE VS. APPLE A TECHNICAL DEFENSE OF THE COMPUTER GIANT

Any form of legal action tends to be complicated, and nowhere is this more the case than when technical matters are involved. Add in the rather special nature of the music industry, and you can rest assured that the course of litigation will not be smooth.

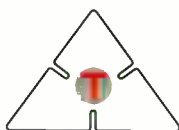
It looks as if the suit between Apple Corps and Apple Computer Inc. will carry all the hallmarks of a long, drawn-out and (probably) technically inaccurate legal argument.

Apple Corps, the company owned by the three surviving ex-Beatles and the estate of John Lennon, is claiming in the High Court that Apple Computer, the innovative, international computer corporation, well-known for its Macintosh range of machines, is in breach of a 1981

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agreement concerning the use of the Apple trademark. This agreement stated that Apple Computer was not to use the trademark on "any apparatus specifically designed and intended for synthesizing music." The ex-Beatles are claiming that the computer company has indeed used the trademark on such devices for several years and is looking for alleged past royalties, damages and 15% interest.

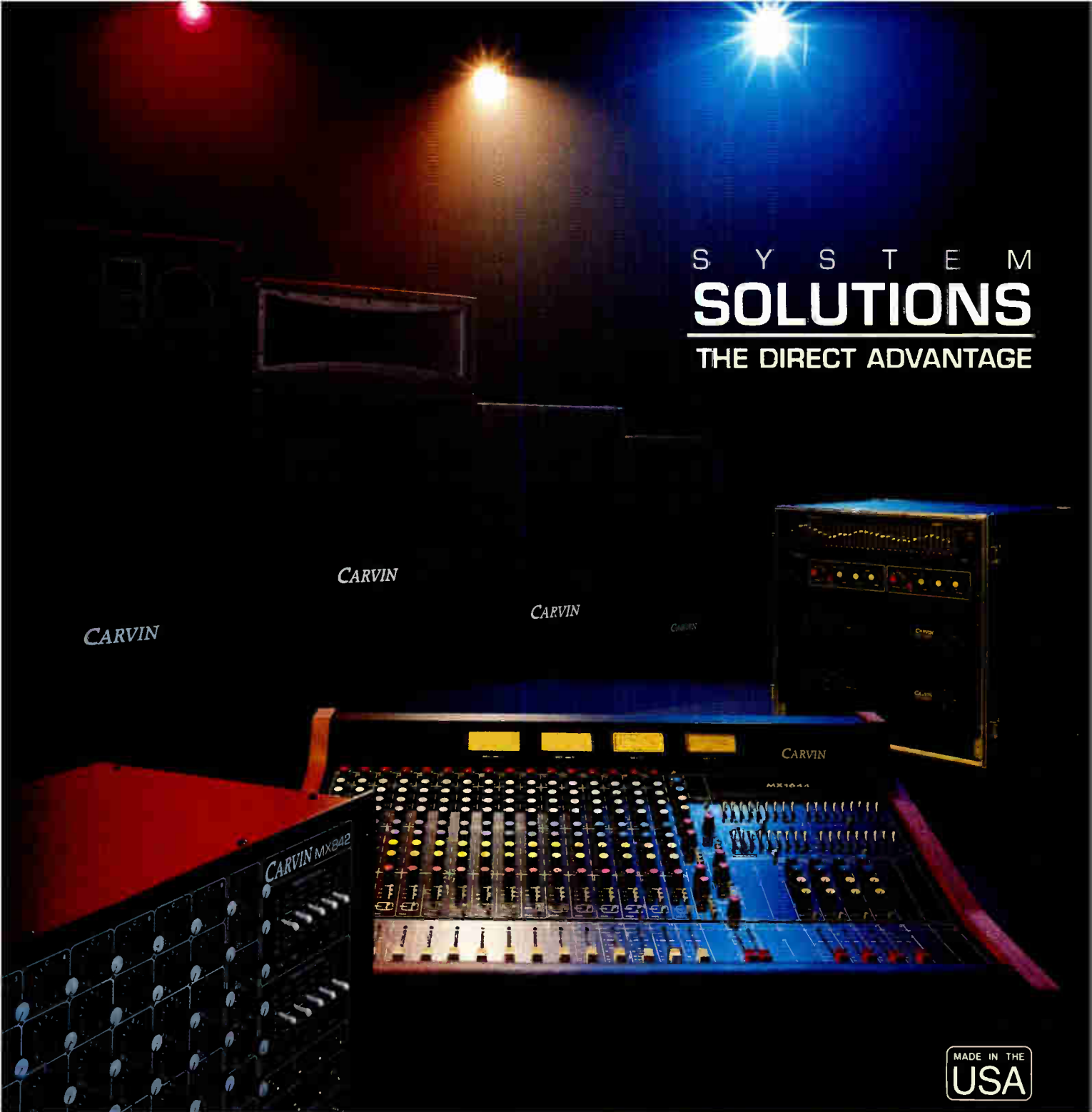
The phrase, "any apparatus specifically designed and intended for synthesizing music" indicates, of course, how the case *ought* to come out in the end. Apple computers, like virtually all other home computers (and many larger ones), have been capable of producing sounds approximating music since their inception. Early on, programs appeared to make the Apple II "beep" in tune when a key was pressed—although these programs were not produced by Apple, but by third parties.

Later, companies like Mountain Hardware and Alpha Syntauri produced hardware and software combinations that connected to the Apple II and enabled the complete system to produce music. These systems were the forerunners of modern MIDI-based computer music systems.

Today the Apple Macintosh is the leading computer for the professional musician in the United States. Many third-party software manufacturers produce sequencing and other program packages for the machine, which is at the heart of MIDI music suites all over the Western world. But does that make the Macintosh an "apparatus specifically designed and intended for synthesizing music"?

The Macintosh, like the Atari ST or the IBM PC, is a piece of equipment capable of virtually an unlimited range of functions. Which functions are offered in a given environment depends entirely on the software and peripherals attached to the machine. While it can become a computer-based MIDI music system with the addition of a MIDI interface, some MIDI control programs and a collection of synthesizers, it can just as easily become a desktop-publishing system with the addition of a printer and a page-makeup program. With a good graphics package it can

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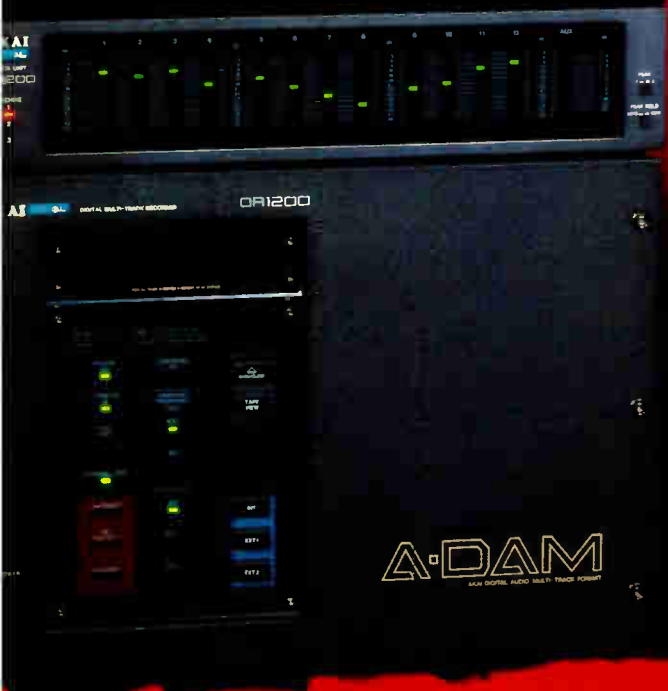
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become a personal computer-based graphic design system. And so on.

The point is that Apple computers, like most others, are general-purpose devices, even if they happen to provide the best way of doing something specific. And because a general-purpose computer has become the foundation for a specific application, it does not follow that it was designed solely for that application.

Even the Apple IIGS (the successor to the Apple II), which has a sophisticated sound generator chip that can be programmed to produce many synthesized musical sounds, is a general-purpose machine. Having an internal sound generator doesn't turn a computer into a synthesizer.

The one possible area where Apple Corps' claim may be considered valid, in technical terms, is in the Apple MIDI interface, a device available only in the last few months. But even this is merely a serial data standards converter and doesn't truly constitute an "apparatus specifically designed and intended for synthesizing music." It's specifically designed for musical applications, sure, but synthesizing music? No.

The fact that Apple Corps is suing in Britain is ironic, to say the least. Apple Computer's British subsidiary, Apple UK, has, unlike its California parent, never been interested in the music applications of its machines. Promoting the Macintosh as a corporate business computer rather than a tool for the "creative professional," it doesn't even sell the Apple MIDI interface. And while half the new-products pages in Mac magazines in the U.S. are devoted to new music products, in Britain you have to look very hard to find a mention of the field. That's why the Atari ST is the leading computer in Britain for musical applications.

On technical grounds, the ex-Beatles' suit just doesn't hold water. Unfortunately, in technical arguments like this, the truth is not always the most important thing. Some commentators have suggested that Apple Corps' action is designed to try to put the ex-Beatles in a good light at a time when they may face the loss of the Apple trademark altogether for failing to exercise their contractual rights.

Apple doesn't make musical instruments or "apparati." It makes computers. What people do with those computers should be a matter for the users' imagination and creativity—not a legal decision.

—Richard Elen

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will be of particular interest to *Mix* readers—its centerpiece is a series of articles under the umbrella title "The Unseen Hand: How Producers Shape the Country Sound." It includes a concise overview of the producer's role in country music through the years; first-person recollections by country pioneers Owen Bradley and Chet Atkins; interviews with current producers such as Kyle Lehning, Tony Brown and Jim Ed Norman; and an excellent historical piece on Ralph Peer and the legendary 1927 "Bristol sessions," which represented the first recordings by such early country legends as Pop

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Stoneman, the Carter Family and Jimmie Rodgers.

Other features in the new issue include an in-depth interview with Charlie Louvin of the Louvin Brothers, a look at how Elvis Presley went from the country music circuit to national stardom over the course of a few months, and a gallery of Peter Nash's photos of contemporary country singers like Lyle Lovett, Ronnie Milsap and Nanci Griffith.

Put out by the Nashville-based Country Music Foundation, *The*

*Journal of Country Music* is published three times a year, and is available by subscription only. Every issue is packed with articles about country music's past and present. The writing is generally lively, even when it's historically detailed, and the photography is always top-notch.

To subscribe, send a check for \$15 to *The Journal of Country Music*, 4 Music Square East, Nashville, TN 37203-9891, and specify if you'd like to start your subscription with the country producers issue (Vol. 12, No. 2).

—Blair Jackson

## "MUSIC TO BE BORN BY": MICKEY HART'S LABOR OF LOVE

One of the most interesting relationships in the record industry these days is between Grateful Dead percussionist Mickey Hart and Rykodisc, the progressive, mainly CD company based in Massachusetts. As coordinator of the Rykodisc series called "The World," Hart has overseen the release of a number of fascinating ethnic music projects, most of them produced by Hart over the years. But for good, old-fashioned eccentricity, nothing tops Hart's *Music To Be Born By*, performed by Hart, bassist Bobby Vega, reed man Steve Douglas and, last but definitely not least, the fetus of Hart's son, Taro!

"People play music while women are giving birth in many cultures, but not ours," Hart explains. "I wanted to do that as well, so I started thinking about composition when Mary [Taro's mother] was pregnant. I couldn't imagine what kind of music she wanted to hear.

"Finally, about five or six days before she gave birth, I took the baby's heartbeat off a fetal monitoring machine and recorded it on a Nagra. I went back to my studio, overdubbed some percussion and Bobby Vega put on a little bass line. It went on for about 30 minutes. I put it on cassette, took a blaster down to the hospital and the baby was born to this music—his own heartbeat! The doctors and nurses at Marin General Hospital loved it! It's like they were doing a little dance during the birth."

Taro was born six years ago, but in the years since, word of Hart's birthing music circulated in different circles, and a number of other children have been brought into the world accompanied by tapes supplied by the Harts. After Hart signed his contract with Rykodisc, he took the original tapes to his Studio X in Petaluma, California, remixed it with engineer Tom Flye, and added a wooden flute track by Steve Douglas. The CD/tape now runs 70 minutes. If you can't find it, contact Rykodisc at Pickering Wharf, Bldg. C-3G, Salem, MA 01970.

—Blair Jackson

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## INTERACTIVITY

—FROM PAGE 139

Application Development Kit, which includes a circuit board, software, support tools and services, is now available for applications development; its Pro750 End-User Kit allows playback of DVI applications. The current Intel 82750 chip set delivers a 100:1 compression ratio and 70 minutes of full-motion video, using the 648 megabytes of storage available on a CD-ROM disc.

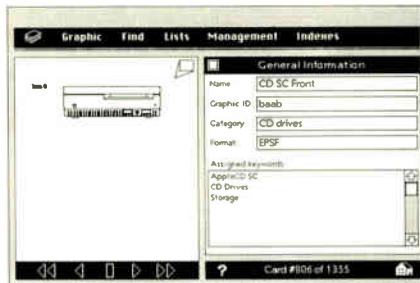
### WHEREFORE ART THOU, CD-I?

CD-I technology was conspicuously absent from the exhibit, the result of a last-minute decision by Philips' American Interactive Media (AIM) to pull out. Members of AIM management were present at a hospitality suite, opting for a low-profile presence. The decision to use CD-I's ADPCM audio scheme within the CD-ROM platform was made on the basis that it makes CD-ROM a more viable format to CD-I, especially when tied into DVI. The supposed advantage for the CD-I camp is that CD-ROM/XA will serve as a bridge from CD-ROM to CD-I. Time and the marketplace will decide how these formats coexist.

### HYPER TO THE CORE

While most companies *talked* about their multimedia plans, Apple Computer actually demonstrated products and applications, taking the conference theme quite literally. In addition

HyperSource ToolKit



to its new Macintosh IICX, Apple demoed the *HyperSource ToolKit* and the *HyperCard CD Audio Toolkit*.

HyperSource automates the process by which Macintosh graphics files in various formats can be integrated into one graphic database. The CD Audio Toolkit is a set of extensions designed to give HyperCard users control of, interaction with, and random access to audio tracks on any CD; the stack included provides an interactive tour

of Beethoven's Ninth Symphony. The kit will be available this fall from the Apple Programmers and Developers Association.

### MACROMIND MAKES THINGS EASIER

Macromind chairman Marc Canter presented *Director*, the latest incarnation of *VideoWorks*. No one doubts the power of VideoWorks, but its learning curve requires the kind of commitment that perhaps only a developer can afford. The new program is much easier to use, and for the first time puts animation within the grasp of the average user. Director imports files from other programs and offers many easy-to-use features, including pre-programmed effects and animation moves.

### EDUCATION + ENTERTAINMENT = EDUTAINMENT

Computer graphics pioneer and director of Odyssey Filmmakers Ltd., Bob Abel, demonstrated a CD-ROM edutainment product based on Picasso's *Guernica*. One of that artist's most recognized masterpieces, *Guernica* is a visceral statement about the horrors of war. By clicking on the onscreen images within the painting, you can learn about Picasso, the Spanish Civil War and the politics and historical background of the time; pull-down menus and a video window serve as gateways into this potent educational experience. Using off-the-shelf products from Apple, Macromind, Mass-Micro, Pioneer, Electronic Arts and Silicon Beach, Abel's *Guernica* project was the conference's most impressive demo.

The theme "Seeing is Believing" was realized in a number of other outstanding CD-ROM applications. Microsoft vice president Min Yee and his associates at Microsoft Press (who managed and produced the conference) are to be congratulated for a virtually flawless presentation.

The conference sessions are now available on audio cassette and videotape. For information contact: Sherrie Eastman, CD-ROM Conference Planner, Microsoft Corp., Box 97017, Redmond, WA 98073; (206) 882-8080. ■

*Lou CasaBianca is involved professionally in advanced music, film and television production, interactive authoring and visual design, and computers in media production.*



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boards include features like three band mid-sweep EQ, in-line monitoring, solo and stereo LED meters. And, Seck consoles make mixing with effects simple. You can layer effects through 6 aux busses and 4 aux returns, plus use the pre-fader inserts to enhance individual tracks.

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by Paul Potyen



# SOUTHWEST STUDIOS

## ASSIMILATE A NEW TECHNOLOGY



**A**lthough the dust has not settled regarding the future of digital audio tape (see this month's "Insider Audio"), the pro audio industry shows signs that it is willing to befriend this somewhat beleaguered new kid on the block. Our latest survey of recording studios in the Southwest reveals that DAT is being called into service for a variety of uses.

### BETTER SAFE(TIES) THAN SORRY

Marie Ravenscroft, studio manager and co-owner of Chaton Recordings in Scottsdale, Arizona, uses a Sony 2500 R-DAT machine for several reasons: to make safety copies; as a master for running cassette copies; as a medium for mastering to CD; and as a

convenient, compact, storage format. "I'm very much in favor of it," she declares. "It's also a format that musicians love, and it's a cost-saver for them when they're pressing CDs. I recently finished a four-package CD of the Phoenix Symphony, and I'm providing R-DAT for all of that material."

Another Southwest facility that uses Sony's 2500 DAT machine is Inside Track Studios in Denton, Texas, particularly for making safety copies. Co-owner Jim Vincent says, "Our bigger projects are mostly mixed to 1/4-inch, but everything is also mixed to DAT, if not for the main format, at least for a safety copy. We have a commercial production company that serves 35 states across the country, and all its work is mixed and stored on DAT.

Anything we can do with DAT, we are doing, because of its storage capability and size."

Further west, in Nevada, a Panasonic DAT machine can be found at Powerhouse Recording of Las Vegas. Powerhouse's Paul Badia notes, "We do a bit of everything—industrial film scores, jingles and album projects, with producers like Steve Dorff and artists such as the Four Tops. We use DAT to archive mixes. We mix to DAT all the time, but what are they good for? Very few of my customers have DAT machines. And we haven't run into any mastering labs that are thrilled about getting masters on DAT."

Tony Rodriguez of Future Audio in Dallas reports that his studio recently bought a Panasonic SV-3500 DAT deck to use "primarily for mixdown. Since we bought automation, we can get by without editing most of the time. If we do need to edit, we take [the DAT] over to another facility to have it transferred to a 1610 format for editing. The whole idea of DAT is to get into digital cheaply. I don't understand why more people aren't mastering to DAT."

### MASTERING FROM DAT

Rodriguez offers his thoughts on what Powerhouse's Badia perceives as a

Fostex D20



problem, in the area of mastering from DAT: "Local mastering labs have a problem mastering from DAT [if they don't have a 1610] because their lathes need pre-signal from the tape to know how far to cut; the DAT machine won't give them that. When you master from a reel-to-reel machine with several playback heads, one head can be used to preview to the lathe. If you had a SMPTE DAT recorder—such as the Fostex Model D20—you could record SMPTE on the DAT machine and on the center track of a preview reel-to-reel. At the same time, you copy the digital information from the DAT to the preview deck. If you slave the preview deck to the DAT machine, you can use it to preview the audio information from the DAT. It's no more elaborate than buying a 1610 machine, and you could then handle tapes from any studio that owns any kind of DAT machine."

Among those studios preparing to acquire a DAT machine is Arlyn Studios in Austin, Texas. Following a recent upgrade that included Studer A820 24-track and 2-track, 1/2-inch recorders, the studio ordered a Tascam DAT recorder. Mike Stewart, an independent engineer and producer who works solely at Arlyn, is enthusiastic about using the new DAT machine. "We were considering other models, but the one by Tascam has really good specs, and sounds pretty good. I know we'll mix on it. And we'll be using it for safety backups and for copy and transfer work," he conjectures.

Stewart also anticipates the imminent arrival of the DAT demo tape. "I also manage a couple of bands," he

**One of the first professional units on the market, the Sony PCM-2500 has been a popular choice among Southwest studios.**



explains, "and I've recently been in New York and L.A. representing a band called Poi Dog Pondering. There are DATs in every A&R office I go to. I don't know that they are accepting DATs on a demo basis right now, but they are definitely listening to master recordings of their artists prior to release. So that's one way I'm going to be using it."

"The two mastering labs I've used recently—Westlake and Capitol—are doing DAT transfers," continues Stewart. "Capitol transfers it to a 1610, which is used for transfer to the lathe. The impression I get is that it's like PCM: lots of people mix to PCM, but it has phasing problems in the high end and tracking errors when you go from studio to studio. They believe that DAT is a step up [from PCM]. As the technology improves, we'll see

fewer problems with the phasing above 10 kHz, and the consistency of DAT tape versus the PCM/VCR format will continue to improve. There will emerge a whole area of 'non-expensive' record making, where people will do it whether it's the 'right' thing to do or not. For people who don't have big recording budgets, DAT is a real advantage, because they can do tons of mixes without having to spend a lot of money.

"I've mixed on PCM and sent it to Eddie Schreier at Capitol, and even though he hates it because of its problems, he dumps it onto a 1610, where the phasing problems in the high end aren't quite so bad, and transfers to the lathe. That's the way it will be with DAT," concludes this Texas engineer.

"DAT is absolutely included in our future," says Bill Moss, studio manager of Vintage Recorders in Phoenix. "As a storage medium it can easily take the place of a PCM-701. In terms of live recording, it's another option, along with our Mitsubishi X-80 and our [Sony PCM-] 701. In terms of remote recording, it absolutely makes sense.

"We're finishing a new high-quality studio right now," adds Moss. "It's a George Augspurger-designed control room with Augspurger speakers and bi-amped, Perreux power amps." Equipment includes a new SSL console and digital tape recorders: Sony 3324 24-track and Mitsubishi X-80 2-track. "As far as I know," says Vintage's owner Merel Bregante, "we're the only fully digital recording studio around here.

"I've done some live-to-2-track re-



**Panasonic SV-250**



**Tascam DA 50 Pro DAT**

note recording to a Sony DAT machine," continues Bregante, "and it's wonderful. There's a tremendous amount of potential for us in that. With two DAT machines, we can dump from a CD sound effects and/or needle-drop library to DAT and go to either room to do our final production work. DAT is a real plus as a production tool. We also do a lot of location recording, and now I will have the attractive alternative of recording directly to DAT.

"In terms of mastering, before we got the Mitsubishi we would mix and sequence at 30 ips, 1/2-inch, in the analog domain, then transfer the final mix to a Sony PCM-701. We would store it on Beta, 1/2-inch or 3/4-inch videotape. That's cool, but you can't edit it. Same thing with DAT. But it's a fine stereo 2-track medium for storing mixes."

#### **SOME WATCH FROM THE SIDELINES**

Not all studio owners are standing in line to order DAT machines. Craig Parker of Cereus Recording in Tempe, Arizona, says, "We haven't installed a DAT player yet. We're taking a wait-and-see attitude for the time being." The studio has been using the F1 format with 3/4-inch tape for several years and recently installed 24 channels of Dolby SR and a remote control for its Adams-Smith 2600 synchronizer (and three-machine video sync). "We like the fact that we can use SMPTE time code on a tape with SR. With DAT you have to do another track to store the SMPTE information."

John Wagner of the Albuquerque, New Mexico-based John Wagner Recording Studios confesses, "I don't feel comfortable about DAT at this time. There's so much up in the air about machines and formats." Wagner recently completed a new studio at his location, for a total of three rooms. "We added a 3,200-square-foot facility

and moved our 24-track audio/video post into it. I'm using the Yamaha DMP7s with Steinberg automation in there. In the old audio post room we set up a 16- and 8-track Fostex system, and put an 8-track Fostex in our third room. Those rooms are now prima-

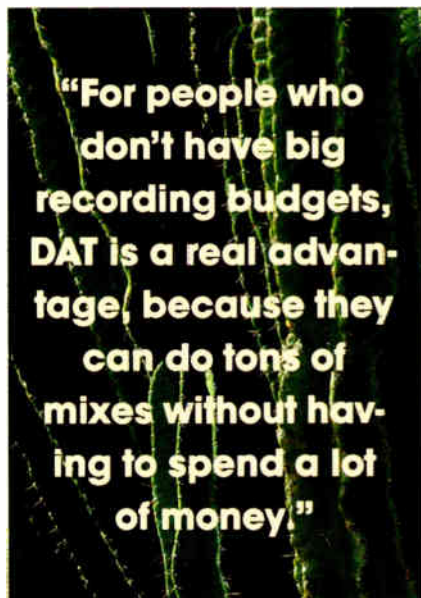


PHOTO: LUIS CASTANEDA

rily used for video and radio production.

"I have an Adams-Smith interlock system, so some type of good time code method is important to me," continues Wagner, "and Fostex's DAT is the only one with that provision at this time. But it costs more than we're willing to spend. My thinking is, for 99 percent of my clients I don't see where it would be an asset.

"I've thought about using DAT for digital mastering. Because I have a complete interlocked video system, I'm still thinking about doing some F1-type mixing. I can edit and mix to my 3/4-inch deck. If I do any record mastering in the near future, I would

probably go that way rather than with R-DAT."

Tracy Davis, co-owner of the Dallas studio Planet Dallas, agrees. "We're not currently using DAT. We have talked about it, and we'll probably be using it in the future for mastering."

#### **DAT IN THE DIGITAL HOME STUDIO**

An interesting report on the use of DAT comes from John Moran, who owns and runs Digital Audio Services in Houston. His facility is yet another that has recently opened a new room dedicated to audio-for-video. "We have a Sony 3324 and a 1610 paired up with a D2 [digital video system] using [TimeLine] Lynx synchronizers. We built the room with Texas Video & Post, which has three edit rooms with all the video toys. We're the first organization in the Southwest to offer digital audio and digital video production.

"We will be digitally mixing Timbuk3's new album for IRS Records, which is scheduled for release in September. Timbuk3 [Barbara K and Pat McDonald] built a studio behind their house, where they record their tracks using a Fostex D20 DAT recorder locked to a Fostex 8-track analog machine. They print one or two tracks at a time through the DAT and then to the 8-track. Then they change DAT cassettes and record two more tracks. The 8-track is used as a monitoring device as they assemble their tracks, with SMPTE going on track 8.

"We're also getting a Fostex D20 for our studio," adds Moran, "and we will transfer the DAT tracks they provide to one of our 3324 recorders, using a Sony sampling frequency converter to lock to our DAT machine. Jeffrey Loesser, the engineer on Lou Reed's last record, will mix the tracks to 1610 format.

"As far as we know, this is the first digital multitrack recording ever done at home. It's one more step in the home studio market, where we are seeing equipment performance improve as the price of equipment falls. The trend of the large facility operating as a mother ship for the artist's home studio has definitely been in evidence for the past few years, and we believe this Timbuk3 DAT project is probably the most state-of-the-art example of that trend." ■

*Mix associate editor Paul Potyem promises dat dis will be da last time he ever uses a corny, overused pun on DAT.*

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SOUTHWEST  
STUDIOS

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 control room at Cereus Recording in Tempe, Arizona, features a 24-input Soundcraft 1600 console and Tascam 85-16B and Soundcraft 762 multitrack recorders. Owners Allen and Diane Moore recently added a remote compact controller to their Adams-Smith 2600 synchronizer allowing three machines of video sync. Also included in the upgrade was a Technics SL-P770 CD player and 24 channels of Dolby SR. The adjacent studio measures 40 x 25 feet and includes a Steinway grand. Photo: Eric Cianciarulo.

## CONTENTS

158	BUSINESSPAGES!
161	LOCATION INDEX
162	24 TRACK
167	8,12,16 TRACK

*Mix* listings procedure: Every month, *Mix* mails questionnaires to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a Boldface Listing (name, address, contact) and an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Director's Department, 6400 Hallis Street #12, Emeryville, CA 94608; toll free 800-344-LIST!

**Upcoming Directory Deadlines:**

New Products/AES Issue: **July 17, 1989**

North Central U.S./Canadian Studios: **August 16, 1989**

Mastering, Pressing & Tape Duplication Facilities: **September 18, 1989**

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### Services & Equipment Offered:

**Luscar control room** 415 sq.ft. **Studio:** 450 sq.ft. **Console:** Sony 3036 w/ VCF meters/automated. **Recorders:** Sony PCM-3324 digital multitrack, (2) PCM-3402 DASH. **Processing:** Lexicon (incl. 480L), Valley People, Neve, Drawmer, UREI, Klark-Teknik, Roland. **Sync:** Soundmaster audio editing system. **Monitors:** S.O.T.A. CF2000. **Mics:** AKG, Beyer, B&K, Neumann, RCA, Sennheiser, Sony. **Project Studio:** 25,000+ cu.ft.: a media theater/studio

connected to all control rooms with a building-wide system of audio, video, cue, intercom, optics LAN/digital data lines. Meyer 500s, Colortran lighting system, Yamaha MIDI Grand and Disklavier. **E.A.R.S. control room:** Primarily for MIDI sampling/synthesis, composition and soundtrack preparation; connected to project studio for production recording. With Soundcraft 1624, Tascam MS-16/ATR 60-2 trk, Fostex sync, Roland and Yamaha synths, Mac II, S.O.T.A. 750s.

## HBO STUDIO PRODUCTIONS

120A East 23rd St., New York, NY 10010 (212) 512-7800

Now HBO Studio Productions is at the leading edge in audio, too! We've designed our post audio suite to the same standards of excellence that have made us a leader in the video production and post-production fields for over 15 years. In addition to providing services for Home Box Office, Inc., we have maintained an active roster of commercial and corporate clients.

Our new audio suite is only one part of a major expansion that has taken HBO Studios into the growing area of digital post-production. The room is designed around the Solid State Logic 6000 console with G Series software and a programmable equalizer offering up to 48 channels of input. ATRs include the Otari MTR-100A 24-track.

The Adams-Smith 2600 synchronizer offers user-friendly computer control. And for further creative possibilities, we've added the AMS AudioFile—a digital disk recorder for eight tracks of sound layering and editing with total random access. A comfortable sound booth for recording voice-overs adjoins the suite, and a digital sound effects library is available at no cost.

**HBO Studio Productions** offers two videotape soundstages, 1-inch and interformat editing, a film transfer suite, digital print production, video graphics and special effects, and satellite transmission services (arranged and provided by Home Box Office Communications, Inc.).

**HBO**<sup>®</sup>  
Studio Productions

**BUSINESSPAGES!**

# KAJEM VICTORY

1400 Mill Creek Road  
Gladwyne, PA 19035  
(215) 642-2346  
FAX: (215) 923-1280

**ARM, MIDI, APPV**

**Kajem Victory** is one of the country's premier residential studios. Located in a secluded Civil War gun factory among woods and waterfalls, Kajem's famous "Ambient Drum Room" (50' X 35' X 25') is the talk of rock and roll: *Cinderella, Queensryche, Metalchurch, Warlock, Tangier, Faith 'n Fear, Dream Theater.*

Additionally, 48-track SSL w/ Total Recall facilities and Focusrite, Massenburg EQ plus a host of outboard gear makes **Kajem Victory** an ideal mix room. MIDI facilities and VAPP are also available.



#### Services & Equipment Offered:

**Owners:** Joe Alexander, Mitch Goldfarb, Sam Moses, Kurt Shore. **Studio Manager:** Monica Tannian. **Dimensions:** Control Room A: 25' X 20', Studio A: 35' X 30' X 13'. Ambient Room: 50' X 35' X 25'. Control Room E: 22' X 20', Studio E: 35' X 20' X 15'. **Consoles:** SSL 4048 with Total Recall, Sony MXP-3036. **Audio Recorders:** Otari MTR-90, Studer A80, Sony/MCI JH-24, Studer A80 2-Trk 1/2".

Studer B67 2-track 1/4", Otari MTR-10 2-track 1/4" with Dolby SR. **Auxiliary Equalization:** Focusrite, Massenburg, API, Pultec. **Main Reverb/Delay Systems:** AMS RMX, AMS DMX, Lexicon 480L, EMT 251, Sony DRE-2000. Vintage mics, compressors and amps. **Other:** two-bedroom luxury condo with indoor/outdoor swimming pool available.



**The Los Angeles Recording Workshop** is L.A.'s premier intensive hands-on training school for recording engineering. Our students train in six different recording studios, on six different consoles. Our training includes 24-track session procedures in four 24-track recording studios, MIDI and synthesizer techniques in our SMPTE-MIDI lockup recording studio, microphone theory and application, studio

maintenance and session troubleshooting, standard and elevated tape alignment, live sound engineering techniques, analog and digital recording techniques, music business for engineers, tape editing techniques, outboard equipment techniques and intensive ear-training and critical listening. No experience required. Just come ready to learn!

## LOS ANGELES RECORDING WORKSHOP

12288-X Ventura Blvd.  
Studio City, CA 91604  
(818) 763-7400

**ARM, MIDI, SR, SDS**

**The Los Angeles Recording Workshop** offers daytime and evening, full-time and part-time schedules. Hands-on training in small groups of six to eight students. Housing available in two dormitories, and transportation available from Burbank Airport. Job placement assistance and internship assistance available to all graduates. Our graduates are working with major artists, in major studios, all around the world. We are approved for job training by the California Department of Education and are fully accredited by ACCET. Financial aid is available to those who qualify. Call or write for our brochure and demonstration soundsheet.



## MIDDLE TENNESSEE STATE UNIVERSITY

PO Box 21, Murfreesboro, TN 37132 (615) 898-2578

Is analog recording dead? What are the limits of digital recording and editing? What are the ethical/legal considerations of sampling? These are the kinds of questions that students in the Recording Industry Management (RIM) program at Middle Tennessee State University tackle in class and hands-on lab situations. MTSU has one of the largest and best-equipped audio programs in the nation. It has been nominated a fifth straight year for a Technical Excellence and Creativity (TEC) Award. Students learn the practice and theory of recording in two studios on campus—a 24-track digital room with digital editing and a 16-track analog room. A new \$15 million Mass Communications building will house two new recording studios,

a 12-station MIDI lab and a TV soundstage, as well as the rest of the accredited School of Mass Communications. It is scheduled for completion during the fall of 1990.

Students majoring in RIM learn the music business and audio engineering. There are required minors in Mass Communications and either Electronics, Music Industry or Business Administration. The program leads to a four-year Bachelor of Science degree. Students from many Southeastern states may qualify for in-state tuition through the Academic Common Market Program. For more information write: Geoffrey Hull, chairman, Recording Industry Management.

## THE RECORDING WORKSHOP

455-X Massieville Rd., Chillicothe, OH 45601 (800) 848-9900 (614) 663-2510

The Recording Workshop offers an intensive, 7-week, 300-hour program designed to prepare assistant recording engineers. For students seeking a concentrated, short-term course of study, The Recording Workshop is the world leader.

Emphasizing hands-on experience, 205 hours are spent in the studio and 95 hours in the classroom. Working individually and in small groups of three to six, students get experience in recording, mixing, song production, commercial production, editing and maintenance. In lecture, students receive a broad study of audio engineering and music business practices.

Our six-studio recording complex features two 24-track automated studios, two 16-track studios, an audio-for-video/post-production stu-

dio, an ear-training studio and an editing lab. Our extensive equipment inventory represents a wide variety of manufacturers and provides students with experience on the hardware that is most popular in the job market, including the latest in MIDI and digital recording technology.

Workshop graduates receive carefully prepared performance evaluations and demo tapes of their mixing, commercial and editing projects. Free studio time is available to record original material.

Job placement assistance and internships are provided for qualifying graduates. The Workshop offers low-cost, on-campus housing, and financial aid is available.

(Ohio State Board of School and College Registration #80-07-0696T)



## STUDIO SUPPLY COMPANY

1717 Elm Hill Pike, B-9, Nashville, TN 37210 (615) 391-0050  
FAX: (615) 391-4092 Dallas: (214) 358-0050

Since 1971, Studio Supply Company has designed and equipped studios for major artists and producers such as Willie Nelson, Mickey Gilley, Chips Moman, Paul Kennerley and Emmylou Harris, Frederick Knight, The Castle, Scene Three Video... the list goes on. Our most recent achievement is the creation of Studio Builders, a division of Studio Supply headed by John Alderson and Harold Lee Rekart. We have recently completed several studios for major artists and producers utilizing design and construction techniques that are not only quick to build, but affordable as well. This is achieved without cutting corners, using conventional techniques (this is not modular construction), but with no wasted time or materials. Our crew is on

the job site from start to finish, not on the other end of a pager or fax. We specialize in the medium-budget studio, but room performance, both in frequency response and reverb time, is accurate and predictable. And no AC hum or air conditioner noise. Finally, a way to have your studio built on-time, on-budget, and sonically on-the-mark. For design, construction, new and used equipment, leasing arrangements or complete "turnkey," call us in Nashville or Dallas today.

Studio Supply Company. Since 1971, providing the professional audio industry with state-of-the-art acoustic design, professional equipment sales, service and installation.

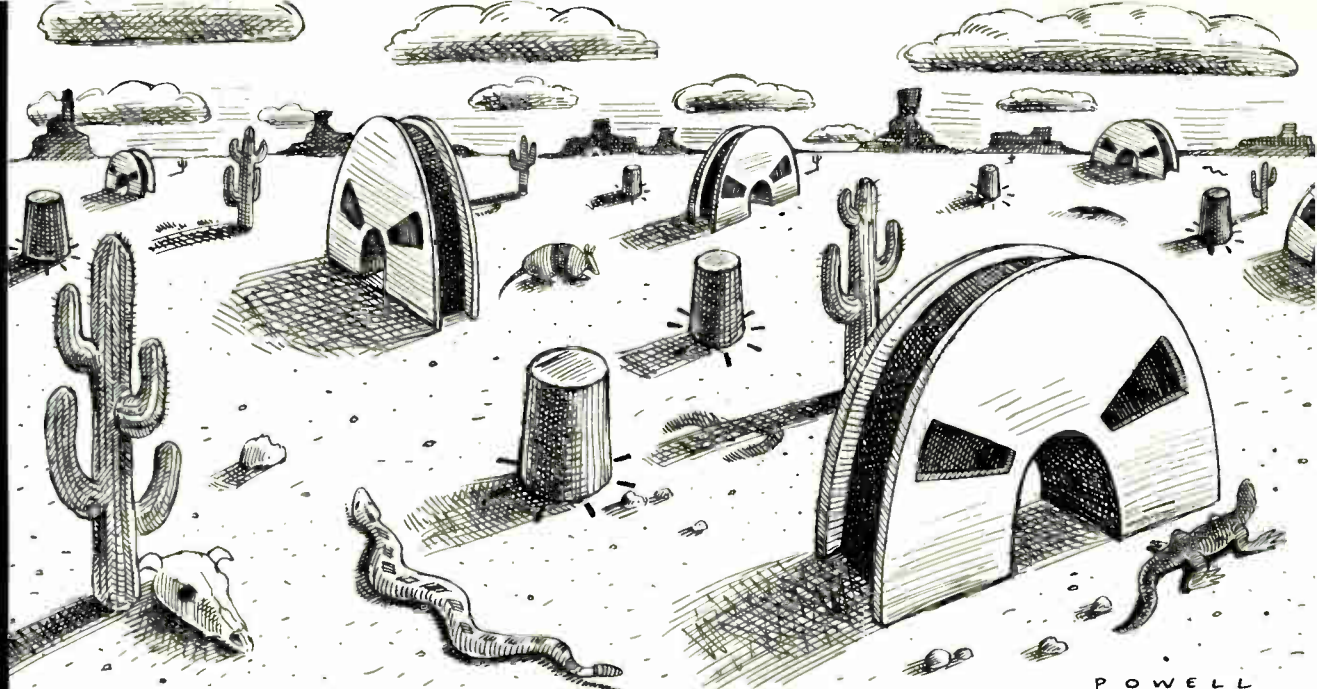
## BusinessPages! Services Key

BusinessPages! half-page ads feature a box with letter abbreviations for the types of services the advertiser offers. The key to these business services is as follows:

<b>ARM</b>	Audio Recording, Music	<b>MIDI</b>	MIDI Production
<b>APPV</b>	Audio Post-Production for Video	<b>APPF</b>	Audio Post-Production for Film
<b>VP</b>	Video Production	<b>SDS</b>	Studio Design/Supply
<b>TD</b>	Tape Duplicating	<b>CDP</b>	Record/CD Pressing
<b>CDM</b>	Record/CD Mastering	<b>RLR</b>	Remote/Location Recording
<b>SR</b>	Sound Reinforcement		

BusinessPages! ads are available in both 1/4- and 1/2-page units; all production costs for ad preparation are included in the low ad rates (including color separations from supplied photo or logo). For complete information on how your facility can have a low-cost, four-color BusinessPages! ad, contact Mix Directories toll-free: (800) 344-LIST. All space reservations and materials are required by the seventh of the month, two months prior to publication.

**BUSINESSPAGES!**



# LOCATION · INDEX

## FOR

# SOUTHWEST STUDIOS

### MEXICO

- Chihuahua**
- 16 Meca 3 . . . . . 167
- Contadero Cuajimalpa**
- 24 Contadero Audio . . . . . 162
- San Luis Potosi**
- 24 Imagen-Ingenieria Electroacustica  
Del Centro . . . . . 163

### ARIZONA

- Flagstaff**
- 8 Mudshark Recording Studio . . . . . 168
- Nogales**
- 24 Gravity Recording Studio . . . . . 163
- Paradise Valley**
- 24 Pantheon Industries . . . . . 165
- Phoenix**
- 16 Aaztec Recording and Tape  
Duplicating, Inc. . . . . 167
- 24 Audio-Video Recorders of Arizona . . . 162
- 8 BPL's Banjo Brass Studio . . . . . 168
- 16 Lambchops Studios . . . . . 167
- 24 Vintage Recorders . . . . . 166
- Scottsdale**
- 24 Chaton Recordings . . . . . 162
- 16 Scottsdale Conference Resort . . . . . 167
- Tempe**
- 24 Cereus Recording . . . . . 162
- 8 Tempest Recording . . . . . 168
- Tucson**
- 24 Jim Brady Recording Studios . . . . . 162
- 24 Westwood Recording Studios . . . . . 166

### ARKANSAS

- Bryant**
- 8 Crystal Recording Studios . . . . . 168
- Hope**
- 16 Webb Sound . . . . . 168

### Hot Springs

- 16 Christian Brothers Recording . . . . . 167
- Siloam Springs**
- 16 The Production Co. . . . . 167

### NEVADA

- Las Vegas**
- 24 Powerhouse Recording . . . . . 165
- 24 Soundworks Recording Studios . . . . . 166

### NEW MEXICO

- Albuquerque**
- 24 John Wagner Recording Studios, Inc. . . 166

### OKLAHOMA

- Broken Arrow**
- 16 The Twenty-Fifth Track . . . . . 168
- Norman**
- 16 Carumbo Recording . . . . . 167
- Oklahoma City**
- 8 Ambient Sound Productions . . . . . 168
- 24 Studio Seven . . . . . 166

### TEXAS

- Arlington**
- 16 Patrick McGuire Recording . . . . . 167
- Austin**
- 24 Austin Recording Studio . . . . . 162
- 16 Austin's Riverside Sound . . . . . 167
- 24 The Production Block . . . . . 165
- 24 Studio D Productions, Inc. . . . . 166
- Baytown**
- 16 Saturn Productions . . . . . 167
- College Station**
- 24 Brasswind Recording Studio, Ltd. . . . . 162
- Dallas**
- 24 Crystal Clear Sound . . . . . 162
- 24 Future Audio . . . . . 163

- 16 Hai Tex Studio . . . . . 16
- 24 Jam Creative Productions, Inc. . . . . 16
- 24 January Sound Studios, Inc. . . . . 16
- 24 Omega Audio & Productions, Inc. . . . . 16
- 24 Planet Dallas Studios . . . . . 16
- 8 SOC Recording . . . . . 16
- Decatur**
- 8 Unreel Sound . . . . . 16
- Denton**
- 24 Inside Track Studios . . . . . 16
- Dickinson**
- 24 Limelight Recording Studio . . . . . 16
- El Paso**
- 24 April Recording Studios/Crystal Ram Publish  
ing B.M.I. . . . . 16
- Fort Worth**
- 24 Eagle Mountain Recording Studio . . . . . 16
- Houston**
- 24 Digital Services Recording Studios . . . 16
- 8 Bob Green Productions, Inc. . . . . 16
- 24 Rampart Studios . . . . . 16
- 24 Rivendell Recorders . . . . . 16
- 16 Smith Sound Recording . . . . . 16
- 24 The Space Station Sound Studio, Inc. . . 16
- Irving**
- 24 Dallas Sound Lab . . . . . 16
- 24 Midcom, Inc. . . . . 16
- 24 Tele-Image, Inc. . . . . 16
- Midland**
- 24 Nomountain Recording . . . . . 16
- San Antonio**
- 12 Digital Image Recording Studio . . . . . 16
- 16 Editpoint Audio Agency, Inc. . . . . 16
- 16 New Age Recording . . . . . 16
- Tyler**
- 24 Robin Hood Studios . . . . . 16
- Weslaco**
- 24 Master Productions Recording Studio . . 16













# 8&12&16 TRACK

## STUDIOS

[16] **AAZTEC RECORDING AND TAPE DUPLICATING, INC.;** also *REMOTE RECORDING*; 1110 E. Missouri, Ste. 400; Phoenix, AZ 85014; (602) 279-0808. Owner: Ron Briskman, Wayne Vican. Manager: Robin Gero.



**AUSTIN'S RIVERSIDE SOUND**  
Austin, TX

[16] **AUSTIN'S RIVERSIDE SOUND;** also *REMOTE RECORDING*; 7617-A E. Riverside Dr.; Austin, TX 78744; (PO Box 33207, Austin, TX 78764); (512) 385-4060. Owner: Herschel Cunningham. Manager: Herschel Cunningham. Engineers: Richard Mullen, Layton DePenning, Eddie Habib, Bill Johnson, Walter New. Dimensions: Room 1: main cutting room 30 x 40. Room 2: live corridor 30 x 30. Room 3: live sound room 14 x 30. Room 4: control room 15 x 20. Mixing Consoles: Ramsa WR-8816 16 x 16. Audio Recorders: MCI JH-24-16 16-track, MCI JH-110B-14-2 2-track, Sony PCM-701 2-track digital. Echo, Reverb & Delay Systems: Lexicon 224, MXR digital delay. Other Outboard Equipment: (4) Lexicon Dyna-Mite noise gate, EXR exciter, (4) dbx compressor and de-esser, (2) UREI 530, (3) UREI 535, (2) UREI 1176LN peak limiter, UREI LA-4 compressor, (2) parametric EQ. Microphones: Neumann U87, Neumann U47, (2) AKG 414, (5) Sennheiser 421, E-V RE20, (4) Shure SM57, (3) Beyer M88, Beyer 201, AKG 451, (2) Countryman, (3) Shure SM58, Beyer M500. Monitor Amplifiers: Crest, Biamp. Monitor Speakers: E-V Sentry 500, Yamaha NS-10M, JBL 4311. Musical Instruments: Yamaha acoustic grand piano, Hammond organ w/ Leslie, other instruments available for rental. Rates: Available upon request. Ask for Herschel.

[16] **CARUMBO RECORDING;** also *REMOTE RECORDING*; 1301 Magnolia St.; Norman, OK 73072; (405) 329-1765. Owner: Michael McCarty. Manager: Michael McCarty.

[16] **CHRISTIAN BROTHERS RECORDING;** also *REMOTE RECORDING*; 125 Albert Pike; Hot Springs, AR 71913; (501) 623-6512. Owner: Dan Kellerby. Manager: Dan Kellerby.

[12] **DIGITAL IMAGE RECORDING STUDIO;** 555 Cicero; San Antonio, TX 78218; (512) 656-1382. Owner: Jim Waller. Manager: Suzell Waller.

[16] **EDITPOINT AUDIO AGENCY, INC.;** 1241 W. French; San Antonio, TX 78201; (512) 737-EDIT. Owner: Donnie Meals. Manager: Tom Howard.

[16] **HAI TEX STUDIO;** 2107 S. Edgefield; Dallas, TX 75224; (214) 946-7947. Owner: Hai Tex Productions. Manager: Andy Chiles.

[16] **LAMBCHOPS STUDIOS;** also *REMOTE RECORDING*; 323 W. McDowell; Phoenix, AZ 85003; (602) 254-3849. Owner: Rick Lamb. Manager: Shelley Standing. Specialization & Credits: Lambchops Studios is an award-winning audio production and sweetening complex specializing in radio/TV

spots and industrial projects of all types. We have two 16-track recording/sweetening studios with full SMPTE/MIDI capability, a separate listening room with music and sound effects libraries on CD, a tape duplication operation and complete phone patch capabilities. Our three staff engineers are experienced composers and are much in demand for jingle and post-score work. Lambchops is also the most widely used independent voice-casting service in Arizona, popular with clients all over the country. In business since 1977, Lambchops Studios offers the technical expertise, creativity and knowledge of the business that brings producers back time and again. We have an extremely efficient operation dedicated to giving our clients the very best in quality service day in and day out. For rates and information, call studio manager Shelley Standing.

[16] **PATRICK MCGUIRE RECORDING;** 1402 Rockdale; Arlington, TX 76018; (817) 467-1852. Owner: Patrick A. McGuire. Manager: Patrick A. McGuire. Engineers: Patrick McGuire, David Morgan. Dimensions: Studio 20 x 22, control room 10 x 12. Mixing Consoles: D&R 4000 Series 24 x 24 in-line. Audio Recorders: Fostex E-16, Sony PCM-2500 2-track Pro DAT digital, Otari 5050BII 2-track. Cassette Recorders/Duplicators: Tascam 122. Noise Reduction Equipment: Dolby C 16 tracks (internal on E-16). Synchronization Systems: Fostex 4030, Fostex 4035, Fostex 8700, Fostex 4050. Echo, Reverb & Delay Systems: Eventide H3000 Ultra-Harmonizer, Yamaha REV5, Yamaha SPX90II, ART 01a. Other Outboard Equipment: UREI LA-4 compressor/limiter, Aphex Dominator/limiter tri-band 2-channel, Tascam PE40 4-channel parametric EQ, Aphex Type B Aural Exciter, Rane RA27 room analyzer/graphic EQ, Rane GE27 graphic EQ. Microphones: (2) AKG 414EB, AKG P-48, AKG D-12E, Sennheiser MD-431, AKG D-1200, (3) Audio-Technica ATM63, (2) Audio-Technica ATM10R, Audio-Technica ATM11R, E-V RE11, Shure SM57, (2) Crown PZM 30GP. Monitor Amplifiers: Crown D-150A. Monitor Speakers: (2) JBL 4411, (2) Auratone 5C. Musical Instruments: Yamaha G3 6' grand piano, Yamaha DX7IIIFD, Yamaha RX5 digital drum synth, Yamaha FG335E acoustic electric guitar, Alembic bass guitar, Steinberger bass guitar, Yamaha BB3000S bass guitar. Other MIDI Equipment: Fostex 4050 autolocator, Alesis MMT-8 sequencer. Rates: \$35/hr. Block rates available.

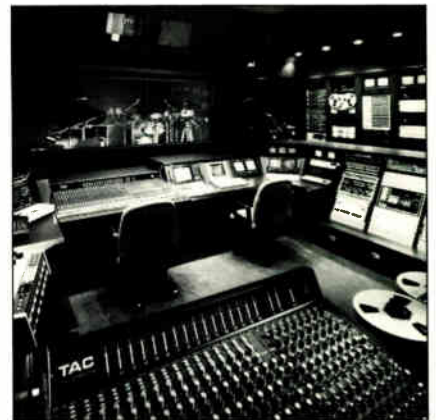
[16] **MECA 3;** Vte. Guerrero #608-2; Chihuahua, Chihuahua, Mexico; (52) (14) 15-47-49. Owner: Adolfo Trespalacios. Manager: Martha Laguette. Engineers: Alfredo Llagona Perez. Dimensions: Studio 30 x 12, control room 20 x 15. Mixing Consoles: Tascam M-16 18 x 16, Tascam M-1 8 x 2. Audio Recorders: Soundcraft 380 Series 16-track 1", Tascam 42 2-track 1/2", Revox A77 full track, Tascam 38 8-track. Cassette Recorders/Duplicators: Yamaha. Echo, Reverb & Delay Systems: Yamaha SPX90, Yamaha REV7. Other Outboard Equipment: (2) Symetrix 522 compressor/expander/duck/gate. Microphones: (3) AKG 414EB, Neumann U89, E-V RE20, AKG 451, (2) AKG D-224, (4) Shure SM57, Shure SM58, E-V condenser lavaliere. Monitor Amplifiers: Hafner 110. Monitor Speakers: Klipsch Heresy. Musical Instruments: Wurflitzer upright piano, Simmons SOS-9 drums, acoustic percussions, Fender Precision bass, Gibson Les Paul guitar, others. Rates: \$30 U.S. Call for package rates. Specialization & Credits: Northern Mexican music (Norteno), jingle production (based in Mexican musicalization). Ask for complete productions in Spanish.

[16] **NEW AGE RECORDING;** also *REMOTE RECORDING*; 8607 Wurzbach Rd., U-105; San Antonio, TX 78268; (512) 641-9818. Owner: Richard Veliz. Manager: Richard Veliz. Engineers: Richard Veliz, Keith Harler. Dimensions: Room 1: studio 10 x 12, control room 20 x 18. Room 2: studio 10 x 8, control room 10 x 16. Mixing Consoles: TAC Scorpion 24 x 16, Akai 12/14 12 x 12, Yamaha DMP7 8 x 2, (2) Kawai MX-8R 8 x 2. Audio Recorders: Otari MX-70 16-track, Akai 12/14 12-track, Tascam 48 8-track, MCI JH-110 2-track w/center-channel time code, Ampex ATR-104 4-track. Cassette Recorders/Duplicators: (2) Tascam 122B, (4) Tascam 32 2-track dubbing machine. Noise Reduction Equipment: Burwen noise filter, Fox custom CX 18 channels. Synchronization Systems: Adams-Smith Zeta-3 w/autolocator remote, Synchronous Technologies SMPL system. Echo, Reverb & Delay Systems: Eventide Ultra-Harmonizer, (3) Yamaha SPX90, Lexicon

PCM60, Roland SDE-3000, Yamaha REV7, Alesis Microwerb, Alesis MIDverb. Other Outboard Equipment: dbx 166, dbx 160X, (2) Orban 536A, (2) Aphex Type C Aural Exciter, Ashly Audio SC-33 noise gate, (2) White Instruments 4400 EQ, Sansui PCX11 digital processor, Technics SU-100 digital processor, Rockman stereo chorus delay/sustainer, (3) Ashly Audio SC-50 comp/limiter. Microphones: (2) AKG 460JULS, (2) AKG C-414EB, (6) Shure SM57, (2) Shure SM58. Monitor Amplifiers: Rane HC-6 headphone amp, Yamaha P2201. Monitor Speakers: (4) Electro-Voice Sentry 500, (4) Yamaha NS-10M, (2) Auratone. Musical Instruments: Kurzweil 250 soundblocks A.B.C.D, Korg M-1, Roland D-50, Roland D-110, Yamaha TX802, Yamaha TX316, Akai S900 Kurzweil K-1000, Roland MKS-20 digital piano, Alesis HR-16 drum machine, Yamaha RX5 drum machine, Yamaha PMC1 MIDI drum kit, Roland MT-32, Roland MKS-30, Southworth Jam Box/4+, Opcode time code machine. Other MIDI Equipment: Macintosh Plus w/Performer 4.1, Midi Paint, Opcode editor librarians, HyperStudio, Mirage rack-mount sampler. Video Equipment: Sony VO-5800 3/4", Panasonic AG-2400 1/2", Panasonic PV-1730 hi-fi stereo 1/2" Panasonic BTS-1900N 19" color monitor. Other: Gibson '61 ES335 guitar, Fender '64 Stratocaster, Fender '61 Jazz bass, Fender '59 Telecaster, Martin '68 D18, Roland GP-8 EFX processor. Rates: Call for information.

[16] **THE PRODUCTION CO.;** also *REMOTE RECORDING*; 510 N. Mt. Olive; Siloam Springs, AR 72761; (501) 524-4626. Owner: Ken Flory. Manager: Norma Flory.

[16] **SATURN PRODUCTIONS;** also *REMOTE RECORDING*; 807 E. Fayle St.; Baytown, TX 77520; (713) 420-3189. Owner: Richard Cagle. Manager: Richard Cagle.



**SCOTTSDALE CONFERENCE RESORT**  
Scottsdale, AZ

[16] **SCOTTSDALE CONFERENCE RESORT;** also *REMOTE RECORDING*; 7700 E. McCormick Pkwy.; Scottsdale, AZ 85258; (602) 991-9000. Owner: Scottsdale Conference Resort. Manager: Brian Court. Engineers: Brian Court, John Haro, Mike Floor. Dimensions: Studio 21 x 26 control room 20 x 18. Mixing Consoles: TAC Scorpion 24 x 16, TAC Scorpion 16 x 8, Soundcraft 600 16 x 8, (2) Tascam M312B 12 x 4, Tascam M5 8 x 4. Audio Recorders: Otari MX-70 16-track, Otari MTR-12 2-track w/center-track time code, Otari 5050 MkII 2-track, (3) Otari 5050B 4-track, (2) TEAC 3440 4-track. Cassette Recorders/Duplicators: (2) Tascam 122, Nakamichi MR-1. Tascam 234, Tascam 133 Noise Reduction Equipment: (8) dbx 150X Type I. Synchronization Systems: (2) Adams-Smith 2600 synchronizer, Adams-Smith reader, Adams-Smith writer. Echo, Reverb & Delay Systems: Lexicon 200, (4) Yamaha SPX90, Lexicon PCM42, Yamaha REV7. Other Outboard Equipment: Eventide H949, (3) Gatec noise gate, (3) dbx 166 comp/limiter, (2) Symetrix 522, Scamp rack, Tascam PE40 parametric EQ, Aphex II Aural Exciter, Studio Technologies AN-2 stereo simulator, (2) dbx 903 comp/limiter, (3) Klark-Teknik DN360 graphic equalizer, (3) 10-band EQ, (2) comp/limiter, para EQ, (4) dbx 905 parametric EQ, dbx 902 de-esser. Microphones: (2) Neumann U89, Neumann U47, (4) Shure SM81, (2) Shure SM85, (2) Sennheiser 421, (2) E-V RE20, (2) E-V PL80, (30) Shure SM58, (3) Shure SM57, (2) Crown P3M, E-V BK1. Monitor Amplifiers: (2) Crest 3000, (3) UREI 6300, (3) Symetrix A220. Monitor Speakers: (2) JBL 4430, (2) Tannoy SRM-12B, (2) JBL 4408, (6) JBL 4401, (2) Auratone 5C. Musical Instruments: Roland D-50, Roland S-10, Yamaha RX11, Roland TR-505 Yamaha DX7, Yamaha TX7, Yamaha TX812, Yamaha FB-01, (3) Fender guitar, GK guitar amp, Fender Pro Reverb, Ludwig Custom drum set, (2) Steinway 6' grand piano. Other MIDI Equipment: Video Macintosh, Total Music software, Korg MIDI patch bay. Video Equipment: Grass Valley BV0UL switcher w/interface, Convergence 204 editor, Sony BVU-950 recorder, (3) JVC CR-850U 3/4" recorder, (3) Sony 5850 recorder, Ikegami HL79, (3) Ikegami ITC730, Quantafont graphics. Other: (30) Projector multi-image show, (2) AVL Genesis multi-image computer, com-

-CONTINUED ON NEXT PAGE

# 8&12&16 TRACK

STUDIOS

—CONTINUED FROM PREVIOUS PAGE

plete darkroom, color, E-6, C41, printing, Oxberry Pro 3 pin-registered camera, 7-watt Argon laser. Specialization & Credits: Specializing in original music composition, commercial production, audio/visual soundtracks, post-production audio-for-video and voice-over production. Also complete video production and industrial multi-image staging. Located in luxurious resort setting with golf, tennis, complete health spa and fitness center and easy access to Sunbelt activities.

[16] **SMITH SOUND RECORDING**; 7015 Villa Del Sol; Houston, TX 77083; (713) 498-0297. Owner: Dennis Smith. Manager: Dennis Smith.

[16] **THE TWENTY-FIFTH TRACK**; also *REMOTE RECORDING*; 309 E. Vicksburg; Broken Arrow, OK 74011; (918) 455-2459. Owner: Walt Bowers. Manager: Walt Bowers.

[16] **WEBB SOUND**; also *REMOTE RECORDING*; Rte. 2, Box 137-D; Hope, AR 71801; (501) 234-5701; (501) 777-5512. Owner: Bruce Webb. Manager: Kristi Heaton.

## 4 & 8 track

[8] **AMBIENT SOUND PRODUCTIONS**; NW Oklahoma City; Oklahoma City, OK 73107; (405) 949-1602. Owner: Doug Matthews.

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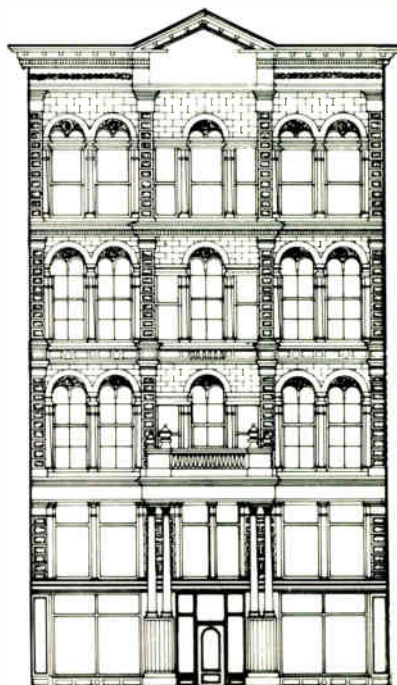
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to modern-day, digital equipment. You have to learn to interface with both domains. A lot of engineers' favorite equipment is analog. By going into a mixture of both [analog and digital], you have a nice, creative setting that tends to be very productive."

Timothy Miller of Northeast Community College adds: "It's going to be a digital future, but I wonder if it's going to be all-digital. I would like to see us go to a full digital system with editing, and still have the analog for

our freshmen."

The ability to adapt to whatever might come up in the "real world" requires students to know both domains. Geoffrey Hull of MTSU says, "Analog will be around for a long time, and digital is radically changing. Students have to be flexible enough to cope with both no matter where they're recording. *And* they are going to encounter a heavy dose of MIDI control devices."

The education of tomorrow's engineers is becoming more complex, not

less. Ken Pohlmann describes the task that faces recording school programs: "Back in the old days there was audio. Then off in the corner someplace, like a stepchild, was digital audio. Now, digital audio is growing to such an extent that you really can't treat it as a separate topic. It is so germane to all parts of the audio business right now that we're going to have figure out a different way of treating it." ■

*Tom Kenny is an assistant editor at Mix.*

## Choosing a Recording School: 15 POINTS TO CONSIDER

### 1. Length & Purpose of Program:

Will you be in school for seven weeks, three months or four years? Are you committed to earning a degree, or will a certificate do?

**2. Accreditation:** You most likely can trust a school that's accredited by a reputable body—a state or federal department of education; National Association of Schools of Music (NASM); National Assoc. of Trade & Technical Schools (NATTS); or National Trade School Congress (NATC). But just because a school isn't accredited doesn't mean it's a "fly-by-night" operation.

**3. Prerequisites:** Entry to an in-depth electronics course often requires a solid, formal background in mathematics and physics.

**4. Program Philosophy:** Does the educator first teach the academic, theoretical side of recording, or head right for the faders? Offer a balanced mixture of book/lecture teaching and hands-on training? What's the ratio of studio time to class time, and how often does the school let you actually use the equipment yourself? Does the school expose students to audio's past, present *and* future? And the all-important question: does the school teach equipment maintenance and troubleshooting techniques?

**5. Interdisciplinary Opportunities:** Does the school delve more into music composition and production, or music recording? Audio-for-video? Radio production? Soundtracks for film? Multimedia?

Live sound and location recording? Corporate and industrial uses of audio? All of the above? How much time is devoted to each area? The more facets of audio covered by the program, the better your chance of finding a job in this age of studio diversification.

**6. Job Placement Opportunities:** Does the school assist the student in the agonizing weeks following graduation—offering help with resume writing, or providing real job leads or the names of facilities that have hired other graduates?

**7. Track Record:** What percentage of the program's graduates have found work in recording, production or a related field? Will the school provide you with their names so you can call them to discuss the program?

**8. "Real-World" Exposure:** Does the school provide students with the chance to record live sessions, for instance, where you meet with local musicians, set up in a studio, record basics, do overdubs, mix and premaster?

**9. Teaching Devices:** Do educators use "the real thing," textbooks, technical audio journals and/or audio-visual aids? Do they teach theory using a book, or using a book and equipment? Does the school have its own in-house multitrack studio, or do students travel to nearby professional facilities where the school buys session time?

**10. Internship Program:** Does the school require the student to work in a studio as an intern (great experience, no pay)? Few studio managers will hire graduates who haven't enjoyed the real-life experiences offered by internship. If the

answer is "yes," must you find your own internship position—which gives you job-hunting chops—or does the school set it up for you?

**11. Financial Considerations:** Will paying for your education leave you bankrupt? If so, does the school grant scholarships, offer loans or otherwise help students secure financial aid? Can students purchase recording equipment through the school at special student prices?

**12. Business & Management Courses:** Does the school expose students to the business of recording or economics of studio management?

**13. Private or Public Institution?:** State-owned schools often are better funded than private ones, but it takes longer for them to acquire new equipment because all purchases must be approved by the state. Red tape and magnetic tape just don't mix.

**14. Location:** If the school or program location is close to a thriving audio/music or video/film production marketplace, the employment potential is greater (if you wish to stay in the area).

**15. Reputation:** A well-known, well-connected school tends to attract the attention of equipment manufacturers who are willing to set up mutually beneficial relationships with the school, thereby allowing students to learn the ropes on specific (and usually popular) types of systems and gear.

Finally, after narrowing your choice to two or three schools, visit each one, if possible. Check out the state of their equipment and the overall attitude; and talk to some students and faculty. Good luck!

—Linda Jacobson

## FIELD · TEST

—FROM PAGE 91

a tape. When microphones are used, the auto PNO does not operate. Program numbers must be entered manually by pressing "play" while recording.

I had mixed feelings about the "end search" feature, which allows rewinding to check out a previously recorded section and then with the press of a button, moves to the end of the last recorded piece on tape. This reduces the possibility of recording over the end of a section accidentally. Of course, if you skip any significant amount of tape without recording, the "end search" feature will not work. It will only find the end of your first recording selection, creating the potential for a dangerous accident.

The "skip" buttons allow fast access to program either for immediate play or for cueing. By the way, the "skip" feature works even if you did not assign program numbers, as the machine always assigns a start ID number. A memory feature allows up to 32 programs to be arranged in memory and then played back randomly in the order you specify. I found this to be handy also.

Tightly cued playbacks—sample

guish the last indicators that mean the difference between a good and useless recording.

I have to admit that I'm disappointed with the tape counter. Why would Panasonic not put a real-time counter on this machine? Everyone operates in real time, and if you bring a remote tape into the studio to edit on a different machine, all of your cues are meaningless.

All specifications were confirmed for this machine; in fact, Panasonic left ample headroom in the specs as the machine measured better than anything published.

There is no doubt that the SV-250 sounds good. I would have to describe it as a soft-sounding digital machine, much warmer than other DATs I have heard. Because of some of the operational functions, I would not want it as a primary machine, but it could be a great portable addition to a home or studio DAT.

I should offer this word of warning to those of you who may decide to gray market the Technics SV-MD1 Japanese version of the SV-250. On the Technics version, the meters read the DAC for level and overload, not the input stage. This means that you can overload the mic preamp or line-input stage and never see it on the meters.

### SV-250 Digital Audio Portable Tape Recorder



transfers, for instance—were a bit tricky with the SV-250. I presume this is caused by the way the tape engages the head, but the machine does a little dance before playing, sometimes cutting off the start of your sample.

Here are a few observations about monitoring levels on the SV-250. Do not adjust recording level with the mic limiter engaged. This will give you a false reading and mess up your recording. It's a real pain having to check the limiter switch before each recording. A handy light for illuminating the LCD display panel makes viewing the panel quite easy. The overload indicator could be a bit clearer: you have to keep an eye peeled to distin-

Since you cannot monitor off tape while recording, you won't know your tape is unlistenable until playback, and then it is probably too late! The machine simply will not show overload at the input stage until you have the record level control up above a certain gain point. The amount of harmonic distortion is incredible at low gain stages. The SV-250 has reworked the input stage for the U.S. market, so don't fool yourself. ■

*Bob Hodas is an independent audio engineer whose credits include Windham Hill Records, The Doobie Brothers, The Village People and Mickey Hart.*

## One Step Ahead

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# ADVERTISERS INDEX

## PAGE ADVERTISER

- 163 A & R Record and Tape Mfg. Co.  
36 Adamson Acoustic Design  
108 Advance Recording Products  
112 Agfa  
45 The Aircraft Music Library  
146 Akai  
87 Alesis  
71 Allen & Heath  
27 Alpha Audio Acoustics  
106 Amek  
55 American Pro Audio  
134 AMP Services  
18 Ampex Recording Media  
95 AMS Industries  
123 Anchor Audio  
133 Apex Machine Company  
59 Aphex Systems  
61 API Audio Products  
111 Applied Research Technology (ART)  
164 A-R Editions  
110 Sam Ash Music  
12 Sam Ash Professional  
132 Audio Gallery  
68 Audio Images  
57 Audio Logic  
148 AudioLine  
41 Beartracks Recording Studio  
110 The Bertech Organization  
24 BGW Systems  
122 Bose  
12 Brainstorm  
42-43 Bryston  
88 Burlington Audio-Video Tapes  
27, 125 Cal Switch  
145 Carvin  
75 C.A.S. Productions  
142 Cipher Digital  
150 Clarity Cassette Duplication  
56 Community  
79 Conservatory of Recording Arts  
and Sciences (Arizona)  
131 Crown  
73 CT Audio Marketing  
96 The Cutting Wedge  
149 D & R USA  
34 DAR Digital Audio Research  
32 The DAT Store  
108 De Wolfe Music Library  
89 DIC Digital Supply  
31, 33 Dolby  
26 Drawmer  
135 Dynacord  
113 EAR Professional Audio/Video  
121 Electro-Voice  
72 Ensoniq  
109 Europadisk  
103 Everything Audio  
67 First Light Video Publishing  
52 Fostex  
141 Full Compass Systems  
66 Full Sail Center for the Recording Arts  
120 Gefen Systems  
129 Gotham Audio  
69 Grove School of Music  
23 The John Hardy Company

## PAGE ADVERTISER

- 44 HRC Magnetics  
97 Hybrid Arts  
74 Institute of Audio Research  
19 JBL Professional  
30 Josephson Engineering  
139 JRF Magnetic Sciences  
134 JVC Disc America  
130 KABA Research & Development  
107 Leonardo Software  
156 Lexicon  
163 LT Sound  
123 MacPherson Loudspeakers  
60 George Massenburg Labs  
119 Meyer Sound Laboratories  
21 Midia/MIDI Boost  
144 Milab/Klark-Teknik  
IFC Mitsubishi  
158-160 Mix BusinessPages!  
81, 168 Mix Publications  
91 MusiCity  
1, 90 Rupert Neve, Inc.  
68 Northeast Community College  
98 Orban  
7 Otari  
60 Paisley Park Studios  
35 Peabody Conservatory  
118 Penn Fabrication  
100 Polyline  
147 Prosonus  
113 Pulizzi Engineering  
133 QCA Custom Pressing  
114 Ramsa  
155 Rane  
70 Recording Institute of Detroit  
73 The Recording Workshop  
70 Rhythm City  
48-49 RolandCorp US  
53 Russo Music Center  
101 Sanken  
75 Schirmer Books  
151 Seck  
11 Sennheiser  
127 Shure Brothers  
13, 15, 17 Solid State Logic (SSL)  
8 Sony Professional  
BC Soundcraft  
IBC Soundtracs  
99 Sprague Magnetics  
130 Studio Consultants  
138 Studiomaster  
41 Summit Audio  
39 Tannoy  
20, 37 TASCAM  
67 Technical Institute of Hutchinson  
44 Thoroughbred Music  
40 3M Corporation  
46-47 360 Systems  
143 Trident  
117 Turbosound/EdgeTech  
137 Valley International  
96 Vertigo Recording Services  
4-5 WaveFrame  
125 Whirlwind/U.S. Audio  
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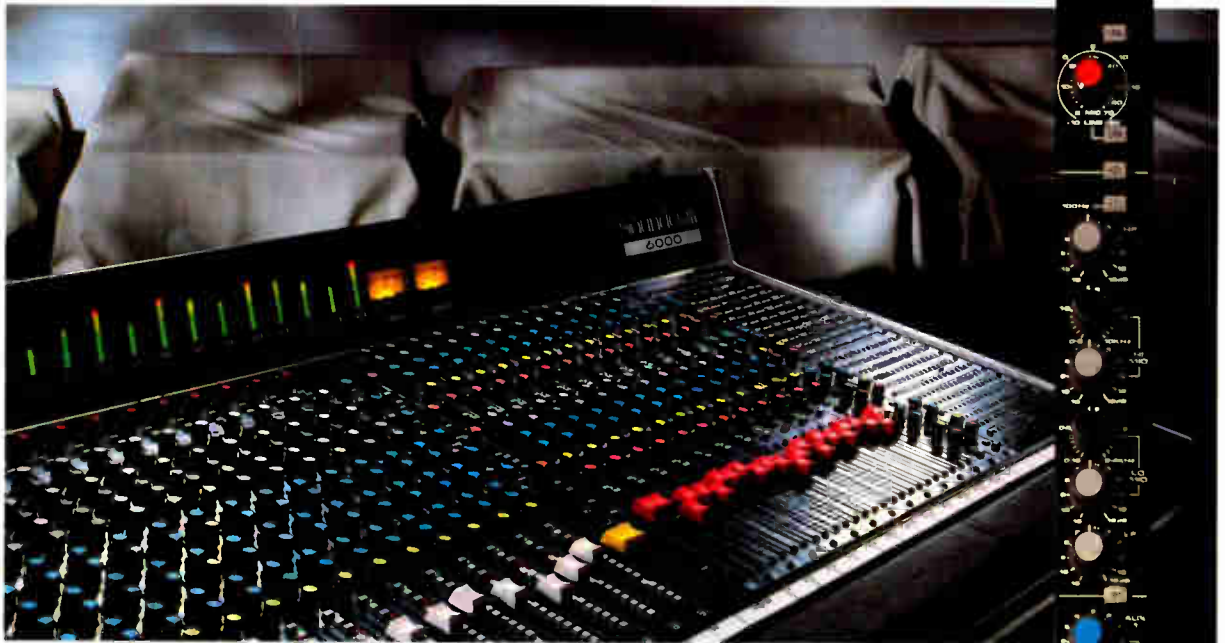
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