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# MIX

## New Developments In Studio Monitors

## Engineers' Tips On Orchestral Recording

PROFESSIONAL RECORDING · SOUND AND MUSIC PRODUCTION

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### International Recording—From Ireland to Africa

Home Alone with Phil Collins



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TC CHASE SET UP

VARI VARI SET

RESET

SHUTTLE JOG

PLAY STOP REC LOCATE

# MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

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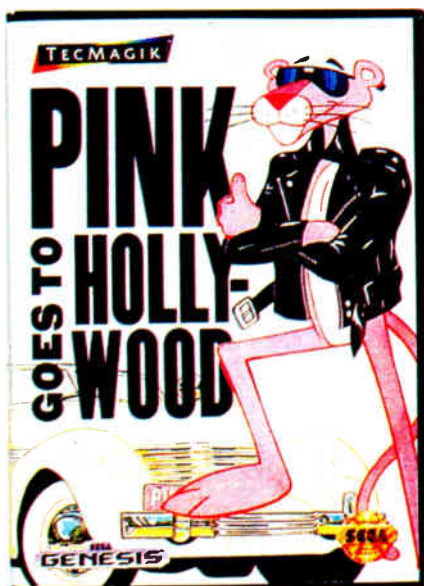
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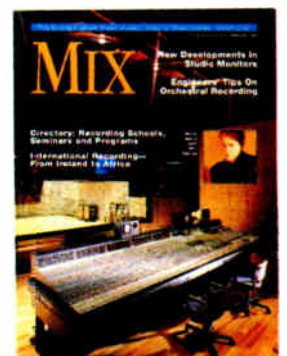
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## DIRECTORY

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**Cover:** Consipio Studio recently opened in Tokyo, Japan. Concept is by Yukihiro Takahashi, planning by Shinichi Tanaka, design by Yohji Yamamoto, and management by Nobuyuki Takahashi. The main control room features a new Over Quality OQM-8196 96-channel console with GML automation and monitors by Dynaudio Acoustics. The large tracking room is flanked by two isolation areas and a Bösendorfer piano booth. **Photo:** Tatsuhiro Hattori.



**ALESIS**  
**MONITOR ONE™**  
STUDIO REFERENCE MONITOR

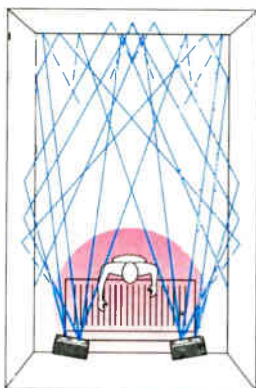


# The Truth From

**T**he truth...you can't expect to find it everywhere you look, or *listen*. But when mixing music, hearing the truth from your monitors will make the difference between success and failure. You'll get the truth from the **Alesis Monitor One™ Studio Reference Monitor**.

## Room For Improvement

Fact: most real-world mixing rooms have severe acoustical defects. Typical home and project studios have parallel walls, floors and ceilings that reflect sound in every direction. These reflections can mislead you, making it impossible to create a mix that translates to other playback systems. Trying to solve the problem with acoustical treatments can cost megabucks and still might not work. But in the near field, where direct sound energy overpowers reflections, reverberant sound waves have little impact, as shown in the illustration. The Monitor One takes full advantage of this fact and is built from the ground up specifically for near field reference monitoring.



*Does your living room double as your mixing suite? The pink area in the illustration shows where direct sound energy overpowers reflected waves in a typical mixing room. The Monitor One helps eliminate such complex acoustic problems by focusing direct sound energy toward the mixing position, instead of the love seat.*

Working close to the sound solves the room problem but creates other problems, such as high frequency stridency and listener fatigue (typical of metal-dome and composite tweeter designs). Our proprietary soft-dome pure silk tweeter design not only solves these problems, but delivers pure, natural, incredibly accurate frequency response, even in the critical area near the crossover point (carefully chosen at 2500 Hz).

## The Truth From Top To Bottom

The Monitor One gives you all the truth you want in the mids and highs, but what about the low end? You probably know that the inability to reproduce low frequencies is the most common problem with small monitors. Most of these speakers have a small vent whose effect at low frequencies is nullified by random turbulence, or they're sealed, which limits the amount of air the driver can move. Such speakers give disappointing results in their lowest octave.

The Monitor One overcomes wimpy, inaccurate bass response with our exclusive SuperPort™ speaker venting technology.

The ingenious design formula of the SuperPort eliminates the choking effect of small diameter ports, typical in other speakers, enabling the Monitor One to deliver incomparable low frequency transient response in spite of its size.



*Alesis SuperPort™ technology gives you the one thing that other small monitors can't: incredibly accurate bass transient response. No, the SuperPort doesn't have a blue light, but it makes the picture look cool.*

The result? A fully integrated speaker system that has no competition in its class. You'll get mixes that sound punchier and translate better no matter what speakers are used for playback. Whether you mix for fun or for profit, you want people to hear what *you* hear in your mixes. The Monitor One's top-to-bottom design philosophy is a true breakthrough for the serious recording engineer.



**ALESIS**  
MONITOR ONE™  
STUDIO REFERENCE MONITOR

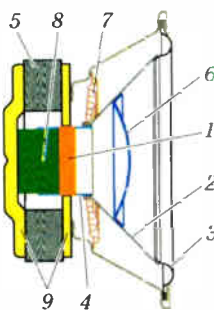
# Left To Right

## Power To The People

High power handling is usually reserved for the big boys. While most near field monitors average around 60 watt capability, the Monitor One handles 120 watts of continuous program and 200 watt peaks...over twice the power. Also, its 4 ohm load impedance allows most reference amplifiers (like the Alesis RA-100™) to deliver more power to the Monitor One than they can to 8 ohm speakers. That means the Monitor One provides higher output, more power handling capability, and sounds cleaner at high sound pressure levels. If you like to mix loud, you can.

## The Engine

Our proprietary 6.5" low frequency driver has a special mineral-filled polypropylene cone for stability and a 1.5" voice coil wound on a high-temperature Kapton former, ensuring your woofer's longevity. Our highly durable 1" diameter high frequency driver is ferrofluid cooled (costly, but it's the best way to cool a tweeter), to prevent heat expansion of the voice coil which inevitably leads to loss of amplitude and high



A cross section of the Monitor One's proprietary Alesis-designed 6.5" low frequency driver.

1. 1.5" voice coil
2. Mineral-filled polypropylene cone.
3. Damped linear rubber surround.
4. Kapton former.
5. Ceramic magnet.
6. Dust cap.
7. Spider.
8. Pole piece.
9. Front and back plates.

frequency response. Combined, these two specially formulated drivers deliver an incredibly accurate, unhypped frequency response from 45 Hz to 18 kHz,  $\pm 3$  dB. The five-way binding posts provide solid connection, both electronic and mechanical. We even coated the Monitor One with a non-slip rubber textured laminate so when your studio starts rockin', the speakers stay put. Plus, it's fun to touch.



The Monitor One's five-way binding posts accept even extra-large monster wire, banana plugs and spade lugs. Hookup is just, easy and reliable.

## The New Alesis Monitor One™

You don't design good speakers by trying hard. It takes years and years of experience and special talents that only a few possess. Our acoustic engineers are the best in the business. With over forty years of combined experience, they've been responsible for some of the biggest breakthroughs in loudspeaker and system design. The Monitor One could be their crowning achievement. They're the only speakers we recommend to sit on top of the Alesis Dream Studio™.

See your Authorized Alesis Dealer and pick up a pair of Monitor Ones. Left to right, top to bottom, they're the only speakers you want in your field.

The Monitor One is the speaker for the Alesis Dream Studio™. Need more information about the Alesis Monitoring System? Call 1-800-5-ALESIS. See your Authorized Alesis Dealer. Monitor One, SweetPort, RA-100 and the Alesis Dream Studio are trademarks of Alesis Corporation. © Alesis is a registered trademark of Alesis Corporation.

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# FROM THE EDITOR

**T**he beautiful new Japanese studio adorning this month's cover, Tokyo's Consipio, could just as believably be in the U.S. or England, Australia, the Caribbean, South Africa, Italy...you get the picture. For all of the differences in business and culture worldwide, the recording industry is remarkably similar from country to country. Music may vary, but plop yourself down in any studio on this planet and chances are you'll be up and running in no time.

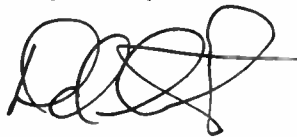
Recording equipment, techniques and attitudes are pretty much the same wherever you go, as are the problems of trying to make it in the biz. Whether or not this is any consolation to studio folks in this country today, it is a remarkably good situation looking to the future.

We are lucky because so many businesses and industries will have much more difficulty implementing today's technological breakthroughs than ours will. The commonality of global recording will cut much of the governmental and cultural red tape as we continue moving toward a world market in recording and production. But we need to be prepared and informed if we are going to use these developments to our advantage.

As telecommunications costs and availabilities soon allow us to add musicians to our records from nearly anywhere on the globe, we must be prepared to make the process smooth and successful. Likewise, as we increase international distribution of our product through computer networks and infotainment pipelines, we must learn the legal and financial ways to make these developments economically viable.

Understanding the technology goes a long way toward giving a recording professional job skills throughout the world, but the subtleties of world commerce have not been stressed in recording education until recently. We can expect these issues to be a quickly growing part of a recording school's curriculum. Teaching these skills will make students more employable and offer greater creative and business reach to the studios in which they eventually will work.

Keep reading,



David Schwartz  
Editor-in-Chief

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#### TG500 TONE GENERATOR

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- 16 way multi-timbre
- 8 MB of ROM samples
- Expandable sample RAM
- MSRP: \$1495.00

**“They'll be talking about this one.”**

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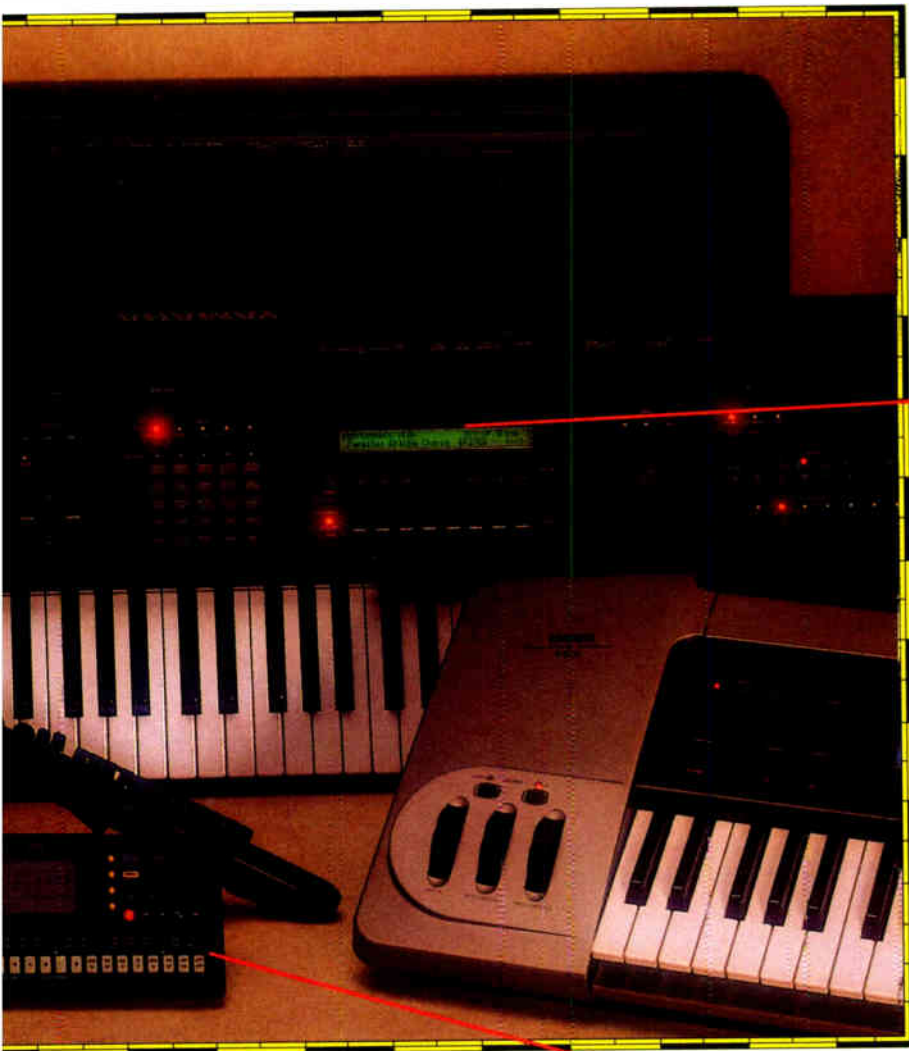
#### TG300 TONE GENERATOR

- Second generation AWM2 sampled voices
- 32-note polyphony
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- Mac/IBM Interface
- MSRP: \$TBA

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# CURRENT

## **SPARS LAUNCHES L.A. CHAPTER**

The Society of Professional Audio Recording Services recently established a Los Angeles chapter, modeled on the successful New York City chapter. SPARS president Howard Schwartz explained that the New York chapter meets regularly, engaging in discussions about equipment, manufacturer demos, billing and collecting problems, and problems with other studios.

He adds, "It has become very difficult to operate in a vacuum, and SPARS has given its members the opportunity to communicate with each other for over 14 years. You get out what you put in, but magnified many times. Los Angeles facilities need to talk to each other. We're in the business of communicating, so let's do that. Don't stand on ceremony. Try to forget the past. This is a whole new SPARS that is coming your way." For more information, call SPARS at (800) 771-7727.

## **1994 TEC AWARDS PRODUCT NOMINATIONS SOUGHT**

The Technical Excellence & Creativity Awards nominating panel is currently accepting product nominations for the Tenth Annual TEC Awards. To qualify for review, your product must have been released and in commercial use during the eligibility year of March 1, 1993, to February 28, 1994.

Categories are: Ancillary Equipment, Computer Software/Peripherals, Microphone Technology, Sound Reinforcement Loudspeaker Technology, Studio Monitor Technology, Musical Instrument Technology, Signal Processing Technology, Recording Devices/Storage Technology, Sound Reinforcement Console Technology, Tape/Disc Manufacturing Technology and Record-

ing Console Technology.

Those wishing to nominate products should include the following information: product name and qualifying category; date first commercially available (proof of shipment may be required; beta test sites do not qualify); and a contact name and telephone number.

Send the information to: TEC Awards, 6400 Hollis St. #12, Emeryville, CA 94608; Attention: Karen Dunn. All entries must be post-marked by Monday, February 28. Late submissions will not be accepted. For more information, call (510) 939-6149.

## **GLUCK DEPARTS SIEMENS, MASSAM NEW PRESIDENT**

John Gluck, former president of Siemens Audio Inc., recently left the company for personal reasons and returned to England. His replacement is Frank Massam, formerly sales and marketing director of AMS Neve. Massam has been active in the recent restructuring of Siemens, helping to regionalize the company and increase direct communication between its U.S. customer base and AMS Neve headquarters in the UK.

## **NEW SALES, MARKETING PERSONNEL AT OTARI**

Some big changes in sales and marketing at Otari: John Carey, former vice president of sales and marketing, left the company after 12 years to take the position of vice president of marketing worldwide for E-mu Systems. James Goodman was promoted to marketing manager, and Lee Pomerantz to national sales manager.

"With the introduction of the new Concept 1 console and continued strong sales for recorders, business has improved over last

year," said Otari president Jack Soma. "James and Lee are both dynamic, seasoned managers, with over 25 years of industry experience between them. I am confident that with these changes our success will continue."

## **STUDER REORGANIZES**

In an effort to streamline the organization, Studer Revox AG is reorganizing some of its subsidiaries. In the U.S., some activities of Studer Revox America Inc. have been taken over by Studer Editech Corp. located in Menlo Park, Calif., but the existing branches in L.A., Nashville and New York will remain unchanged.

Studer France SARL, Revox France SA, Numisys SA and Studer Digitec SA will be merged to form a new company called Studer SA, which will be located in Chatou, Paris. Studer Revox UK will close its Revox operation in Thatcham, and the Revox activities will be integrated into the existing Studer operation in Borehamwood.

Simultaneously, the company is integrating its semipro products, Revox-Pro, into the Studer pro product line, making for a clearer demarcation between consumer (Revox) and pro products.

## **DOLBY RESTRUCTURES CUSTOMER SERVICE**

Dolby Laboratories recently made organizational changes that included three promotions. Director of marketing and sales Bill Mead was promoted to VP, film marketing, and is working with studio distribution and marketing divisions to apply and promote Dolby Stereo film sound technologies. His other marketing duties continue, except for marketing of pro

—CONTINUED ON PAGE 16



# The More Sophisticated Woofer & Tweeter

Differential Material Technology (DMT™) is the study of Different materials and their relative behavior when in intimate contact. The starting point of any high grade professional monitoring system is properly engineered drivers that naturally work well together. With this established, the crossover can be designed purely for the function of filtering between high and low frequency drivers rather than the complex function of addressing limitations of the drivers themselves. Through the use of computer circuit analysis software, this would seem a simple task... But in the real world, not only do components not behave as their mathematical models predict, but components inter-react with the powerful magnetic and acoustic fields present within a loudspeaker system. Understanding and measuring these effects is extremely difficult, and rather than ignoring these previously unexplored aspects of crossover design, Tannoy's DMT research team has spent a great deal of time investigating the interactions of each element within the speaker system's design... Particularly through extensive listening tests.

Tannoy considered the new Dual Concentric driver as a complete system to both generate the signal and control the wavefront. The low frequency cone is designed and injection molded to work with the new Tulip HF waveguide so that the driver system shows no discontinuities of the response or wavefront at the critical crossover area. Research into component behavior and empirical tests showed that when a capacitor is encapsulated in vibration absorbing material, its noise performance noticeably changes, dramatically improving both the sonic texture and dynamics of the loudspeaker system; and so the DMT capacitor was born. Every aspect of Tannoy custom capacitor's, from the type of film employed to the high purity copper used for termination leads, has been optimized for sonic performance. Tests have also shown that reducing the effect on inductor coils of the immense internal

vibrations experienced within a loudspeaker cabinet, can improve overall system bass and midrange resolution. Consequently, within the DMT II crossover, Tannoy used coils vacuum impregnated with a resin selected to reduce vibration.

With the mechanical aspects of the DMT crossover design largely resolved, Tannoy engineers addressed the problems of interaction with magnetic fields within the system. Air cored inductors radiate a significant measurable magnetic field which can affect nearby components and the inductors are themselves affected by the driver's magnetic radiation. It was found that creating a split crossover, with the inductor mounted on the cabinet's cross-brace away from the other crossover components and driver magnets, produced sound quality improvements that more than justify the additional manufacturing costs.

The final components to come under scrutiny in the DMT system were internal connection cables. By using custom manufactured braided Teflon Kimber Kable, unwanted signals ordinarily induced into the internal wiring from within static and magnetic fields can be virtually eliminated, yielding substantial audible improvements.

The DMT II system is a result of using the best analytical tools, test equipment and computer analysis available, together with intuitive design ideas thoroughly tested by an extensive program of listening tests.



Tannoy / TGI North America Inc. (519) 745-1158 Fax: (519) 745-2364

# THE X-TRA POWER OF PEAVEY

## INTRODUCING THE PEAVEY CS<sup>®</sup>-X SERIES

For many years, the Peavey CS<sup>®</sup> Series has lead the field in high performance power amplification. The CS Series has become legendary for ruggedness, dependability and superb performance with completely unmatched patching/plug-in capabilities. Now, Peavey is proud to announce the new CS-X Series with dramatically improved performance specifications at no increase in price! This startling achievement is made possible by Peavey's high volume production, state-of-the-art manufacturing, and advanced audio technology.



CS<sup>®</sup> 1200 X

## X-TRA POWER.

The new CS-X Series power amplifiers reliably drive two ohm loads to extremely high power levels while maintaining current four and eight ohm ratings. For example, the industry leading CS-800 now delivers 600 watts RMS per channel into 2 ohms!

### CS 400 X

- 210 W RMS into 4 ohms
- 300 W RMS into 2 ohms (per channel)
- 420 W RMS into 8 ohms
- 600 W RMS into 4 ohms (bridged)

### CS 1000 X

- 525 W RMS into 4 ohms
- 750 W RMS into 2 ohms (per channel)
- 1050 W RMS into 8 ohms
- 1500 W RMS into 4 ohms (bridged)

### CS 800 X

- 420 W RMS into 4 ohms
- 600 W RMS into 2 ohms (per channel)
- 840 W RMS into 8 ohms
- 1200 W RMS into 4 ohms (bridged)

### CS 1200 X

- 630 W RMS into 4 ohms
- 900 W RMS into 2 ohms (per channel)
- 1260 W RMS into 8 ohms
- 1800 W RMS into 4 ohms (bridged)



# X-TRA PERFORMANCE.

Along with increased power, the new CS-X Series maintain awesome industry standards for bandwidth, slew rate, distortion specifications and overall performance excellence and versatility.

- DDT<sup>®</sup> compression with LED indicators and defeat switch
- Slew Rate: 40 V/microsecond, stereo mode, each channel
- Power Bandwidth: 10 Hz to 50 kHz @ 4 ohms, rated power
- Total Harmonic Distortion: Less than 0.03%, rated power
- Hum and Noise: 100 dB below rated power, unweighted
- Auto 2-speed fan cooling
- Independent channel thermal / fault protection
- Transient free turn on / off
- Recessed crossover socket for plug-in modules

- 2 recessed balanced input transformer sockets for PL-2's
- Single XLR & dual phone plug inputs each channel
- Phone plug inputs are quasi-electronic balanced
- XLR input can be transformer balanced
- Dual phone plug and 5-way binding post outputs each channel
- DDT activation LED & power LED each channel ( 1000X and 1200X

feature a power LED array and thermal indicator each channel)

- Rear panel DDT defeat & bridge mode select slide switches

Peavey's CS<sup>®</sup> Series plug-in modules offer you utmost patching flexibility allowing biamp and triamp configurations with various crossover points available



**CS<sup>®</sup> 1000 X**



**CS<sup>®</sup> 800 X**  
World's Best Selling Power Amplifier



**CS<sup>®</sup> 400 X**



**CS<sup>®</sup> 200 X**

## NO X-TRA COST!

Incredibly, all the extras have not increased the cost of these world-standard amplifiers (the CS 800 X is still only one dollar per watt)! Only from a company with nearly thirty years of power amp experience could you expect this. A company with the power of high volume production and advanced manufacturing technology...

The X-tra Power of Peavey.



**PEAVEY ELECTRONICS CORP.**

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TEL. (601) 483-5365 FAX (501) 486-1278  
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# INDUSTRY NOTES

Carl J. Yankowski was named president and chief operating officer of Sony Electronics Inc., based in Park Ridge, NJ. Yankowski comes most recently from Polaroid Corp., where he was group vice president for the company's Asia/Pacific region. At Sony Dynamic Digital Sound Inc. in Culver City, CA, Kevin Dauphinee was appointed senior vice president, operations...Former DOD vice president of marketing Ferdinand Boyce recently started an independent rep company, Ferdinand Boyce and Associates. Based out of Seattle, the company is representing DOD, DigiTech, Audio Logic and Allen & Heath products in Washington, Oregon and Alaska. In other DOD news, the Salt Lake City-based company appointed Suzi Loritz to the position of marketing coordinator...David Kimm joined Apogee Electronics Corp. (Santa Monica, CA) as vice president of sales and marketing. Kimm came to Apogee from JBL Professional, where he was director of the Soundcraft and Electronics Groups...Anders Fauerskov was hired as the new managing director at Denmark's T.C. Electronic...Euphonix (N. Hollywood, CA) expanded its UK operation in conjunction with Studio Sales Ltd., which will now trade as Euphonix UK. The UK operation is headed by producer and composer Steve Levine and includes a fully operational control room featuring a CS2000 digitally controlled mixing system...Electro-Voice (Buchanan, MD) promoted Janine Masten to director of sales and marketing for pro sound reinforcement. Also, Chris Alfiero was named market development manager for pro sound products...New customer service/technical support specialist appointments at Crest Audio (Paramus, NJ): Dave Fox is supporting Crest consoles, Russ Bonagura is handling amps and Ted Rook is

the new international service person for consoles and amps. Also, some hires in the Crest engineering department: Dennis Fink is chief engineer, digital systems, and Greg Hanks is system design engineer. Beverly Brignolo joined Crest as customer service manager, and Kris Gustafson joined as marketing administrator...ATI Inc. (Columbia, MD), maker of the Paragon live sound touring console, hired Richard Josephs as production manager. Josephs comes to ATI from Soundcraft Electronics UK...Loudspeaker manufacturer Bullfrog Inc. is back in business. The company became SoundTech when it was sold in the '80s. Original owner Bob Bloss is again owner and president of the new Bullfrog, and Larry Truman is national sales manager...Rep company Priority Communications recently moved. The new address is 70 N. St. Joseph, Niles, MI, 49120; phone (616) 683-4400, fax (616) 683-4499...Jeff Kelm was promoted to director of engineering at Vega (El Monte, CA)...The Mark IV Pro Audio Group (Buchanan, MI) is now responsible for all sales and distribution of high-end DDA mixing consoles in the U.S....Throckmorton Sales is Bag End Loudspeaker Systems' (Barrington, IL) new rep in Missouri, Iowa, Kansas, Nebraska and southern Illinois...M&P Technologies Inc. (Exton, PA), the marketing and distribution arm of Selenium loudspeaker components, appointed George M. Conneen Co. Inc. as its rep for eastern Pennsylvania and southern New Jersey...SKMA Inc. (Long Beach, CA) appointed Peter Piotrowski as manager of technical services...Beginning in fall 1994, the University of Hartford's Hart School will offer a B.A. in performing arts management. Directed by Harmon Greenblatt, the program will provide students with career training in the various fields of arts management. ■

—FROM PAGE 12, CURRENT

audio products in the Western hemisphere, as well as sales administration responsibilities, which have been passed on to David Watts, VP, technical marketing.

In addition, David Gray was promoted to VP, Hollywood film production, giving him technical and managerial responsibility for all film dubbing activities in the L.A. area. Similarly, Michael Di Cosimo is now VP, East Coast division, with responsibility for all tasks related to film dubbing in the New York Area.

## **BOSE ACQUIRES U.S. SOUND**

Bose Corporation recently purchased U.S. Sound, manufacturer of specialty pro sound reinforcement loudspeaker systems, from Carver Corporation. Founded in 1983, U.S. Sound was acquired by Carver in 1992.

Bose employed U.S. Sound equipment in conjunction with its own speakers at the Olympic Ceremonial Stadium in Albertville, France. "We learned at the Olympics that [U.S. Sound's] Coherent Zone technology provides high-quality sound reinforcement in long-throw applications," said David Bell, manager of the Professional Sound Systems group at Bose. "The U.S. Sound approach accomplishes at higher cluster-to-listener distances what Bose speakers have done for years at lesser distances. Combining our strengths to reach the whole sound reinforcement market made sense for the Olympics and makes sense for the future."

## **CORRECTIONS**

Corrections to the December Mastering, Pressing, Tape Duplication and Compact Disc Facilities directories: Daniel Kincaid Productions in New York does CD premastering/editing and has worked with Alan Menken. Phylco Audio Duplication's name was misspelled; the company no longer works with video. ■

What's more fascinating than  
a man who can sing  
two notes at the same time?



*Imagine if you will the sound of a bullfrog swallowing a whistle. That's the startling result achieved by the throat-singers of a South Siberian Shangri-la called 'In a.*



USE READER SERVICE CARD FOR MORE INFO

World Radio History

# A mixing system that and digital at the



## *That's the AT&T DISQ™ Digital Mixer Core.*

Up until now, it's been the same old song. Your studio either stays analog or goes digital.

But all that's changing thanks to the AT&T DISQ Digital Mixer Core.

Invented by the company that's been involved with audio since its inception, this remarkable system offers you the unheard of. Namely, the capability to go back and forth between analog and digital. At the mere press of a button.

## *Analog is still music to many artists' ears.*

After all, many rock musicians still prefer analog. To their way of thinking, digital lacks a certain wallop.

The great thing about the DISQ System is that it supports analog lovers while giving them the option of evolving to digital.



## *Others are really digging digital.*

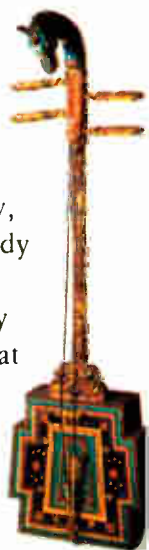
On the flipside, there are artists and producers—be they in Contemporary Pop, Country, Jazz or R&B—who are already sold on digital. They feel it lets them hear nuances they never heard before. And that digital is important in editing and mastering.

The bottom line? The DISQ System lets you cater to the exact tastes of any client.

## *Adding digital by adding to your analog system.*

The DISQ System works in tandem with your existing analog boards.

Meaning you avoid the big learning curve a new digital console requires. So when clients ask for a certain sound,



# can be analog same time.



an engineer still knows which of 3,000 faders and knobs to move a mere fraction of an inch to give 'em what they want.

## *Spend half as much to do twice as much.*

Besides the incredible flexibility the DISQ System's capabilities afford you, there's also the cost savings.

Because you simply add the DISQ System rack to your existing hardware, there's not a ton of pricey equipment to buy. Or install. Meaning your downtime is kept to a bare minimum.

## *Add other stuff anytime down the line.*

You won't get hit up for lots of gadgets when you want to upgrade, either.

Typically, all it takes is new software.

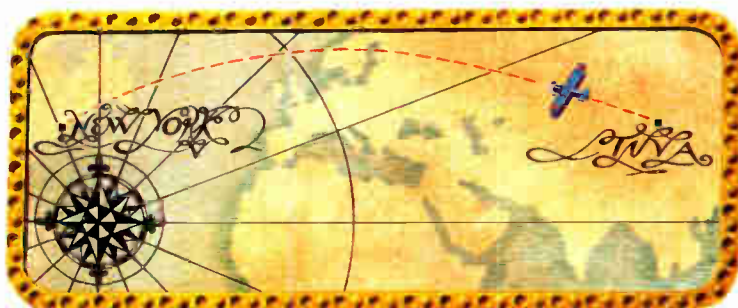
In fact, the DISQ System is so flexible that mixing board functions can be changed with a mere tweak.



## *AT&T Bell Labs: A name that's pure platinum.*

Not surprisingly, the technology for the DISQ System came from the best R&D (not to be confused with R&B) facility in the world—AT&T Bell Labs.

A mixing system that's both analog and digital. It's not impossible. It's the AT&T DISQ Digital Mixer Core. For details, call 1 800 553-8805. Outside the U.S. and Canada, dial 919 668-2934.



*If the Tivvans wanted to use the DISQ System to make an album, they might have to travel to a city many Americans find foreign.*



©1993 AT&T

USE READER SERVICE CARD FOR MORE INFO

by Stephen St.Croix



## UNO, DOS, TRES

**W**e came to be, and here we are. So much for the history lesson. So we are what we came to be. Yeah, yeah, I know. But it's true, we are what we are, and we had very little direct control over how we got here. Because of that, we don't usually spend much time thinking over what we are and how we came to be. We just take it for granted, though there was that profoundly introspective period in history, 1960-1969. Many of you spent a lot of time pondering the basic questions of life then, I would guess. Only much later in life did we collectively discover that the answer was in fact... 42.

In any case, here's the count-down. We have two of a lot of stuff—hands, feet, eyes and ears. That's a pretty good deal, because it allows us the distinction of bipedal ambulation, an only slightly silly and embarrassing method of travel. On the other hand (foot?) having only one leg would necessitate a sort of hopping approach, which, while fine for some of the population, would cer-

tainly alter the basic demeanor of a large Yankee Stadium crowd.

One eye would have kept monacles in style and would have ensured a national speed limit of about 15 miles an hour. Holograms would be really cheap, because you could make real bad ones, or even fake them altogether, and nobody would ever know.

Still, we do for some reason have only one of several things. In spite of common knowledge ("two heads are better than one"), we simply accept the arbitrary limitations imposed upon us by having only one.

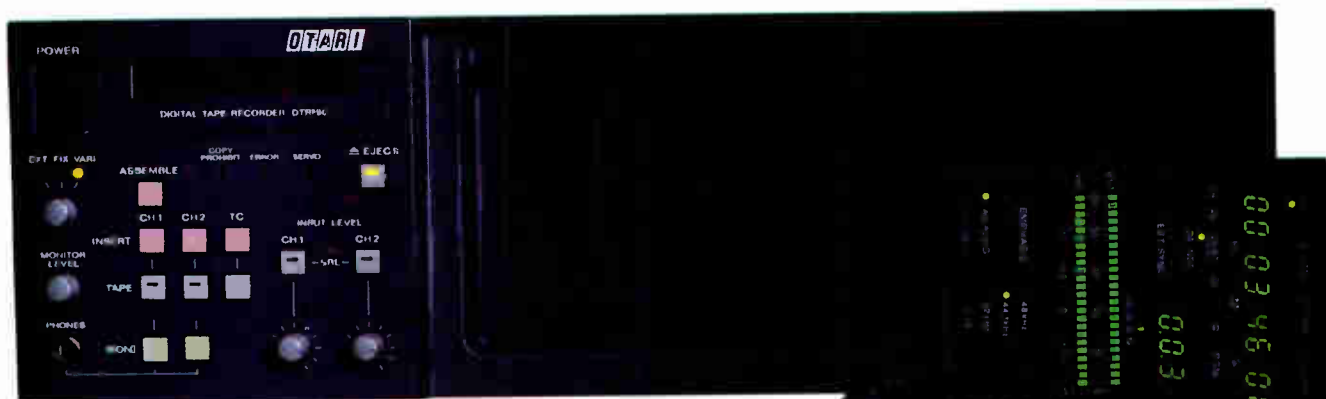
One ear: headphones would be real cheap, cassettes would cost half as much, and there would be 144 minutes of music on a single CD.

### **BUT, NO...**

So even as we rejoice in the design that gives us two ears for stereoscopic hearing, may we wonder at the marvels we will never know in the true Three-Dimensional audio world that surrounds us. For that we

ILLUSTRATION: AD McCALLEY

**OTARI'S NEW R-DAT:  
PROFESSIONAL QUALITY WITHIN YOUR REACH.**



When you've had enough of unreliable "warmed-over" consumer decks, we've got a *professional* R-DAT for you at an affordable price.

Our new DTR-90 delivers the rock-solid reliability and superb sound that have made Otari audio machines the choice of professionals everywhere, and at the same time delivers all the performance and features you'll ever need.

For example, so you can make changes fast and easily, the DTR-90 is the only R-DAT available with individual record insert on Ch. 1, Ch. 2 and time-code channel. And its user-friendly front panel features an LCD screen that gives you powerful functions often relegated to DIP switches in other R-DATs—you can even detach the control section of the front panel and use it as a remote unit!

You'll also appreciate the optional Time-code Card with its chase synchronizer for tight lock with VTRs and ATRs, as well as features like read-after write and punch-in, punch-out.

And if you need a complete electronic editing system, you can't do better than couple the DTR-90 with Otari's CB-149 editor for flawless digital editing.

For the complete story on this quality-built and affordable R-DAT, call Otari at (415) 341-5900.



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# The Serious

## **THE TASCAM DA-88 THE DIGITAL MULTITRACK DECK FOR SERIOUS PRODUCTION**

It's true. The first machine designed specifically for low cost digital multitrack production is now available. And it comes to you from the world multitrack leader, TASCAM. It's simply the most advanced, well thought out and heavy duty digital 8-track deck you can buy. The best part is, it's incredibly affordable.

The DA-88 is built for production. The integrity of TASCAM's design is evident in every facet of the deck. From its look and feel — to its exceptional sound, unsurpassed features and expansion capability.

## **GOES FASTER, LASTS LONGER AND TAKES A BEATING**

While we admit that it's an elegant looking machine, it's tough to see its finest asset. The tape transport. Designed and manufactured by TASCAM specifically for the DA-88, it's fast, accurate and solid. And that's what counts in production — in personal studios, project studios or in those demanding high-end facilities.

You'll notice it uses superior Hi 8mm tape, giving you a full 108 minutes of record time. What's more,

the transport is lightning fast and yet so quiet you'll barely hear it blaze through a tape.

We didn't stop there. Because production environments are notorious for constant, if not abusive, shuttling, punching, 24-hour operation — you get the idea — the transport was designed and built to take a beating.

Even more impressive is the transport's responsiveness. Take a look at the front panel. Notice the shuttle wheel? Turn it just a bit and the tape moves at one fourth the normal play speed. Turn it all the way and it flies at 8 times faster. Do it all night if you want. It's quick, smooth and it's precise. Need to get to a location quickly? Accurately? Shuttle a bit and you're there. The location is easily viewed on the DA-88's 8-digit absolute time display — in hours, minutes, seconds and frames. With the optional SY-88 sync card it displays timecode and offset, too.

## **YOU ALREADY KNOW HOW TO OPERATE IT**

Unlike other digital multitrack decks, the DA-88 works logically and is simple to operate. Like your analog deck. All functions are familiar and easily operated from the front of the deck.

*Adding the optional SY-88 synchronizer card is as easy as changing a Nintendo® cartridge. With it you're SMPTE and MIDI compatible. And no matter how many DA-88s you have locked up, you need only one sync card. Other optional accessories include AES/EBU and SDIF2 digital interfaces allowing the digital audio signal to be converted for direct-digital interfacing with digital consoles, signal processors and recording equipment.*



# s Machine



Take punching-in and out, for example. You have three easy ways to do it. You can punch-in and out of single tracks on the fly. Just hit the track button at the punch-in point. Hit it again to punch-out. You can use the optional foot switch, if you like.

Or, for multiple tracks, simply select the track numbers you want to punch, push play, and when you're ready, hit record to punch-in, play to punch-out.

Finally, for those frame accurate punch-ins, you've got auto punch-in and out. In this mode you can rehearse your part prior to committing it to tape.

No matter which way you choose, your punch-in and out is seamless and glitch free due to TASCAM's sophisticated variable digital crossfade technology.

That's not all, you also can set your pitch ( $\pm 6\%$ ), sample rates (44.1 or 48K), as well as crossfade and track delay times. All from the front of the DA-88.

## COMPLETE SYNCHRONICITY

There's more. Add the optional SY-88 synchronizer card to just one of your DA-88s and you've got full SMPTE/EBU chase synchronization. The best part is, you can record time-code without sacrificing one of your audio tracks. You also get video sync input, an RS-422 port to allow control of the DA-88 from a video editor, and MIDI ports for MIDI machine control.

## A DIGITAL RECORDING SYSTEM THAT GROWS WITH YOU

The DA-88 is truly part of a digital recording system. Start with 8 tracks today — add more tomorrow.



Adding tracks is as simple as adding machines — up to 16 for a total of 128 tracks. They interconnect with one simple cable, and no matter how many DA-88s you have, they'll all lock up in less than 2 seconds.

Controlling multiple machines is made simple with the optional RC-848 remote. With it you can auto locate and catch 99 cue points on the fly. It comes complete with shuttle wheel, jog dial, RS-422 and parallel ports, and it controls other digital and analog machines, too.

## LISTEN TO THE REST

Of course, the sound quality is stunning. With a flat frequency response from 20Hz to 20kHz and dynamic range greater than 92dB, it delivers the performance you expect in digital recording.

So get to your authorized TASCAM dealer now. Check it out. Touch it. And listen to it. Once you do you'll know why the TASCAM DA-88 is the serious machine for digital production. The TASCAM DA-88 is the choice of studios worldwide. And at only \$4,499, it should be your choice.

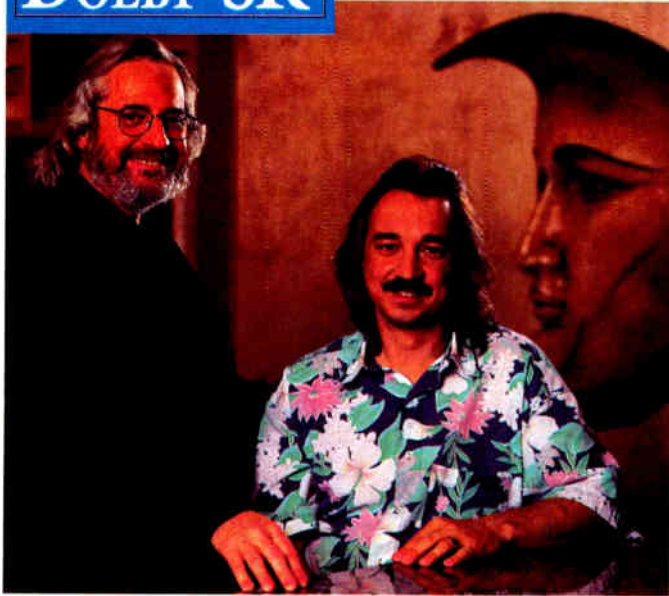


**TASCAM**<sup>®</sup>  
Take advantage of our experience.

7733 Telegraph Road, Montebello, California 90640  
(213) 726-0303

Crescent Moon  
Studios

DEMANDS  
DOLBY SR



Bill Sumner

Phil Ramone and Eric Schilling, Studio A, Crescent Moon Studios

**"D**olby SR's colorless noise reduction lets you paint the sound you want and keep the recording budget down."

"People have forgotten how good the low end sounds at 15 ips on an analog machine—smooth, warm and extended. I use the Dolby SR process for its sound quality, and it has the added benefit of being cost-effective."

**Phil Ramone**, Producer

"With the recent addition of Dolby SR, our analog 24-track has come into major use at Crescent Moon. We get the best of both worlds: the low noise floor of digital with the warmth of analog recording. And with the added revenues, our Dolby SR system has already paid for itself in less than a year."

**Eric Schilling**, Chief Engineer, Crescent Moon Studios

Crescent Moon Studios, Miami, FL, provides Gloria Estefan and outside clients with digital and analog capability in its mixing room and three recording studios.



*Christmas Through Your Eyes*  
(Epic/Sony Music Entertainment Inc.),  
Produced by Phil Ramone, recorded/mixed at  
Crescent Moon Studios, Inc.



Dolby SR: now over 73,000 tracks worldwide.

USE READER SERVICE CARD FOR MORE INFO

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**Dolby**  
World's Best Sound

FAST LANE

would need...but wait.

Two eyes are good. Since they are side by side along the horizontal axis, we are really quite good at perceiving depth upon the surface of that plane. We had to be good at it in the old cave days to survive—if you couldn't tell how far away a brontosaurus was you might rapidly end up as a foot-photo. Then your bloodline would cease—no chance of your great, great, great grandchild some-

Release recorded music  
from being the pretender  
that it is today. Let it  
be able to capture the  
dimension that our ears  
can capture.

day mixing live sound for Prince.

Okay, it's pretty obvious that as most of our early animal enemies approached on the ground (and still do), this type of bi-optical arrangement suffices. But again, we take the condition without examining the alternatives. Our very thinking is totally structured by the powers and limitations of our sensory organs. Try this: When we look in a mirror, *left and right are reversed, but up and down are not*. We actually treat left and right differently than up and down. We may even perceive them differently.

**BUT, OH...**

The deal with the ears is even worse. Here (ha) we have a situation where there is no denying the secondary importance of locating acoustic events on the vertical axis. The structure and mechanics of hearing, the very system used for determining location of a sound, differs for the horizontal and vertical planes! We have two ears on opposite sides of a rather convenient acoustic separator—a sort of gobo if you will—the head. They are about one millisecond apart (in speed-of-sound-at-sea-level terms), so that delay is used to compute the horizontal position of an acoustic event. But as we twist the plane of



## THE SOUND OF OUR COMPRESSION IS MUSIC TO *THE EAR*.

### Introducing the new AUTOCOM from Behringer.

Uli Behringer knows great sound when he hears it. Nicknamed "The Ear" since childhood, his special gifts as a musician and engineer are reflected in every one of his products.

So it makes perfect sense that his new AUTOCOM Compressor/Limiter produces the smooth, musical sound that immediately distinguishes Behringer processing in any setting.

But Behringer also wanted to make the AUTOCOM incredibly easy to use. So he developed an intelligent "AUTO" processor that automatically sets attack and release times based on the dynamic content of the program material, without any "pumping" or "breathing."

He also included manually adjustable attack/release times for more sophisticated control over the

compression. And a switchable Soft/Hard Knee function that lets you vary the AUTOCOM from softer, "musical" compression to a harder, limiter-type effect.

For added flexibility, the AUTOCOM operates in dual mono or true stereo. Endowed with Behringer quality down to the smallest detail, it features servo balanced inputs and outputs and a five year warranty.

The new AUTOCOM from Behringer. The Ear for musical compression.

**THE PERFECT EAR.**



For more information about Behringer Signal Processing, please call 1-516-932-3810 or write to Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068.

Behringer is exclusively distributed in the U.S. by Samson Technologies Corp.

motion until it is vertical, we're hammered. We switch to System 2—the inferior one for less likely situations.

Since there is no interaural delay data to help, we're stuck with pineal interference. It's a great additional subsystem for fine-tuning the initial interaural data on the horizontal plane, but it's kind of dismal when we ask it to solve the problem alone, as it is basically for movement along this vertical plane.

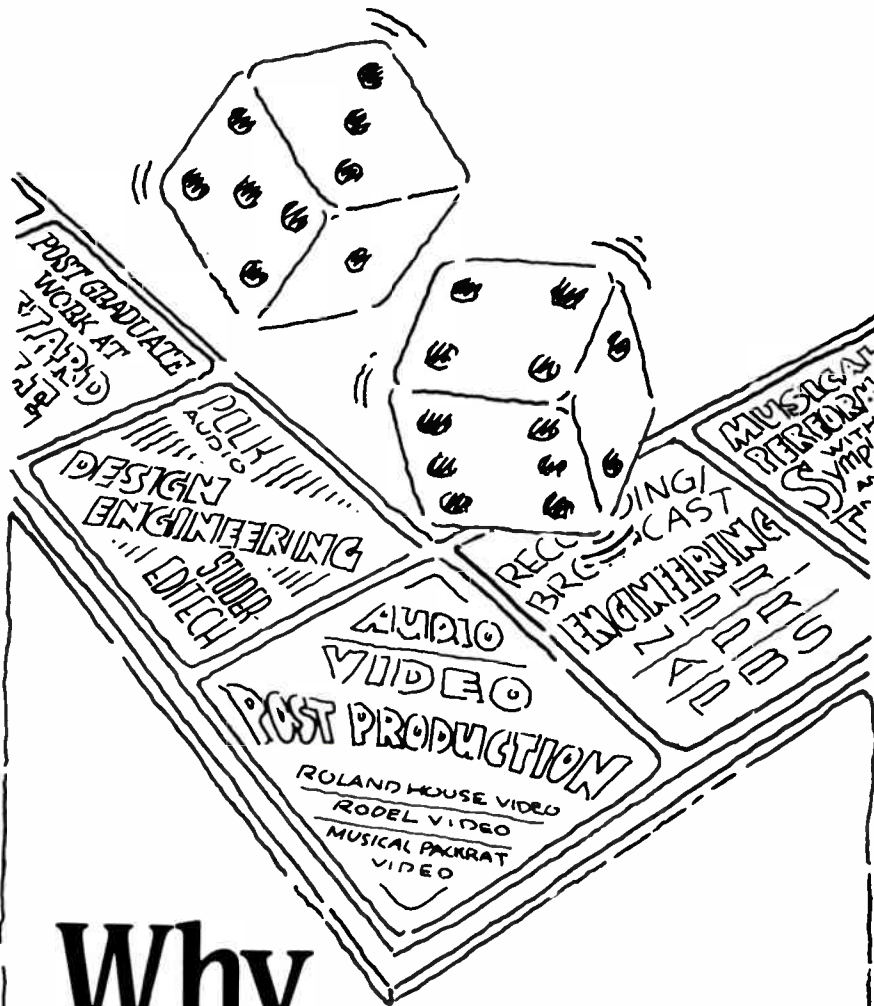
We are land-bound surface dwellers, and it shows in our very brains and bodies, in our ideas and language. So we're all like Cylons [Slit-eyed robots from *Battlestar Galactic—Eds.*] or the audience in a super wide Cinemascope theater—we perceive life, both audibly and visually, through a little horizontal slot. What a system. If you don't think so, check out a full-face motorcycle helmet. A little horizontal slot, carefully thought out and designed to provide maximum facial protection with minimum interference of perception.

#### BUT, SO...

So I am not all that interested in the endless years of development and failure in spherical 3-D audio. I *am* very interested, however, in realistic dynamic and static panning of the real 2.5-D audio that we *can* actually sense. Let's design some panpots that pan, some mixing boards that actually place tracks where the little pointers on the knobs point. Let's finish up the unfinished business of recorded stereo audio. Let's complete the job and develop technology that can build a true stereo image; a field with width and depth like we hear and sense in a live classical performance or when we walk down a city street.

Release recorded music from being the pretender that it is today. Let it be able to capture the dimension that our ears can capture. Come on, I'm not asking all that much. After all, I'm not asking for it to capture that other axis that we can't perceive well. That alone saves a third in production costs. ■

*Mr. St. Croix has long felt that the narrowing of sights to the scope of the problem gives you more time to improve on the quality of the answer within that problem. Fortune cookies notwithstanding.*



# Why throw the dice?

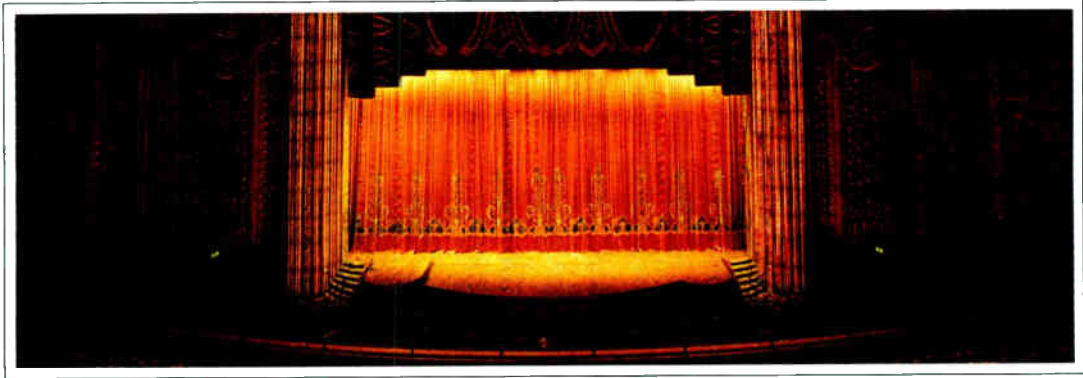
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**World Radio History**

# Hands-On Education

## NEW FACILITIES FOR SCHOOLS

**T**hirty years ago, the route to a career in pro audio was through on-the-job training and experience. You may have worked as a gopher in a studio or hashed it out as an apprentice at a venue or on the road. Study and reference materials were practically nonexistent, and schooling in the field was nearly impossible to come by.

Now books are written on all aspects of professional audio, and entire university curricula are devoted to the topic. Across the country,

a variety of institutions offer programs ranging from single classes to bachelor's degrees and graduate study.

Quite a few of these institutions feature excellent, well-equipped learning facilities, with technology and facilities comparable to the best the professional world has to offer. Pictured here are new facilities at seven educational institutions. For more information on particular programs, please consult with the individual schools or refer to the schools directory at the back of this issue.



PHOTO: STEVE STERBACK/PLATINUM CREATIVE

### **Full Sail Center for the Recording Arts, Winter Park, Fla.**

*During the past year and a half, Full Sail continued to expand its audio, video and film facilities, forging major educational partnerships with manufacturers including Peavey, TDK, Lexicon and Montage. Shown here is the school's new Peavey Lab, a multistation MIDI suite featuring a full complement of Peavey equipment. Other new additions at the school include a Studer Dyaxis suite, a CMX edit suite, a complete film grip truck, a Video Toaster 4000 Lab and a plethora of new equipment.*

### **Five Towns College, Dix Hills, N.Y.**

*When Five Towns College moved to an expansive 35-acre campus last year, construction began on state-of-the-art audio and video recording facilities. Recently completed were advanced recording/teaching facilities, including 16-, 24- and 48-track digital recording studios designed by John Storyk. Pictured is the 24-track MIDI production room, which features iso booths for voice-over work and is large enough to accommodate a full-sized band.*



PHOTO: BILL DRAPPEN

**Berklee College of Music, Boston**  
 New facilities at Berklee include this room, L17, a multiworkstation teaching facility for professional-level MIDI, hard disk audio production and music for video. Also



PHOTO: BOB KRAMER STUDIO

new are a project studio, mix room, multimedia lab (created in partnership with various companies, including Opcode) and a music synthesis lab. The school's Studio A features a newly installed SSL 4000 G Series console, and a second SSL room is now under construction.



PHOTO: RUDY APAS

**The City College of New York**

This is the control room (with 56-input DDA AMR24) at City College's recently constructed Sonic Arts Center. The Center also comprises four MIDI studios, a synthesis lab and peripheral labs. Designed by Center director Paul Kozel and Paul Special of Special Audio Services, the new facilities are linked by more than 7,000 ties, allowing for convenient interlinking of gear. Much of the extensive equipment is housed in modular racks for easy movement between studios.

**University of Massachusetts at Lowell**

The newly formed Center for Recording Arts, Technology & Industry at the UMass-Lowell grew out of the university's degree program in Sound Recording Technology. This 24-track control room (featuring a Soundcraft TS-24) is a centerpiece of the program and was designed by Bob Alech of Alecronics Inc. The program's other facilities include two large studio/rehearsal spaces, studios for 8-track recording, video post-production and MIDI composition and production; entry-level studios; a critical listening classroom; and a complete maintenance lab.



PHOTO: BOB ALACH

**Belmont University, Nashville, Tenn.**

This is the view into Studio A, as seen from Control Room A, at the new 9,000-square-foot Center for Music Business at Belmont; the console is a Sony MXP-3036. Designed by Russ Berger, the well-equipped facility includes two state-of-the-art control rooms and studios, four



PHOTO: TOM GATLER

iso booths, a MIDI pre/post-production room, six practice/writer rooms, a maintenance shop and a variety of specialized classrooms. The Center is linked via fiber optics with much of the campus to provide onsite remote recording.

**Southwest Texas State University, San Marcos, Texas**

Southwest Texas recently purchased Fire Station Studios, which the school operates commercially and as a classroom and laboratory for its program in Sound Recording Technology. On commercial sessions, students in the SRT program usually work as second engineers, and the studio also serves as a television/film soundstage. Other facilities at SWT include a Macintosh computer lab, an electronic music/MIDI lab and a variety of audio labs. This is the view inside the main studio at Fire Station, looking toward the control room, where the school recently installed an Otari Series 54 console.



PHOTO: DONALD P. ANDERS

# With over 20,000 ADATs already in use all over the world, Alesis has made more digital multitrack tape recorders



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And with good reason. Alesis was founded on digital technology, so we know what it

takes to make the best-selling digital multitrack. The Alesis ADAT® Digital Audio Recorder's sound quality, sample accurate synchronization capability (ADAT Synchronization Interface), fiber-optic digital interface (ADAT MultiChannel Optical Digital Interface), and wide range of peripherals available now, give ADAT owners the creative flexibility they need.



The Alesis AI-1™ ADAT to AES/EBU and S/PDIF Digital Interface with sample rate converter lets you transfer audio digitally to or from the ADAT system and external units such as DATs, CDs, and other digital recording formats.



The Alesis AI-2™ Multi-Purpose Audio/Video Synchronization Interface by TimeLine (the leader in synchronization products) connects ADAT to the world of video, film and multi-media production using SMPTE, 9 pin and TimeLine Lynx control protocols.

## Focus on Compatibility™

Its revolutionary impact on the recording industry has made ADAT the de facto standard in digital multitrack. The enormous number of ADAT users worldwide, the fact that Fostex has licensed the ADAT format for their own digital recorder, and the growing list of leading companies focusing on industry compatibility by becoming members of The ADAT Group™, all mean that when you choose ADAT, you're compatible with a vast array of music and audio equipment, now and in the future. And, you're supported by a network of professionally trained Authorized ADAT Service Centers worldwide.



## The ADAT Format – made for multitrack

ADAT records eight tracks of 16-bit linear, 48 kHz sample rate audio, with no data compression "tricks" or channel sharing. We chose Super VHS® (S-VHS®) tape as a foundation, then designed ADAT's data structure and heads specifically for the rough-and-tumble, back-and-forth, punch-in-and-out environment of multitrack recording. To make sure that recording one track wouldn't disturb any other track, we divided each helical scan into



An 8 track, 8mm recorder's helical scan: there are only four audio data blocks, forcing each track to share a block with another.

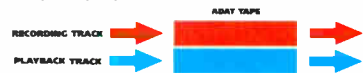


An ADAT's helical scan: ADAT tracks are safely separated into 8 discrete data blocks. (Both vertical dimensions enlarged for clarity)

eight separate data blocks. Some digital recorders combine data from two different channels into the same data block on tape, which means that each time you record a track, another track must be read into a buffer and actually re-recorded even though it is in "safe" mode.



The 8 track, 8mm helical scan format risks introducing errors into "safe" tracks each and every time you press record.



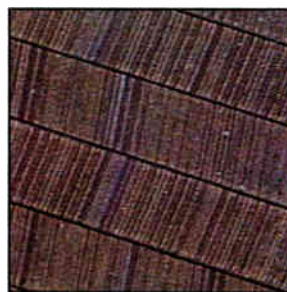
The ADAT format records each track discretely, as all professional multitrack recorders should.

## Bigger is Safer

Microscopic contaminants in the studio aren't just probable, they're statistically inevitable. If the format can't overcome them, they'll cause mistracking, noise, distortion, even total muting of the audio. Formats smaller than S-VHS are more vulnerable to contaminants, dropout, and misalignment, especially when exchanging tapes between machines. One 8mm digital format attempts to squeeze the same amount of sound into one-tenth the tape area that ADAT does. ADAT's S-VHS tape offers more total surface area

to meet the demands of digital recording, and its wider 100 micron tracks are five times less vulnerable to being derailed by dust. Because even though technology makes it possible to make formats smaller and smaller, dust stays the same size.

Actual microscopic comparison of the ADAT tape format and the 8 track, 8mm helical scan format (enlarged approximately 100 times).



ADAT's wide 100-micron tracks offer an extra margin of safety for digital audio.



The 8mm's 20-micron tracks squeeze more data into the same area, with little room for error.





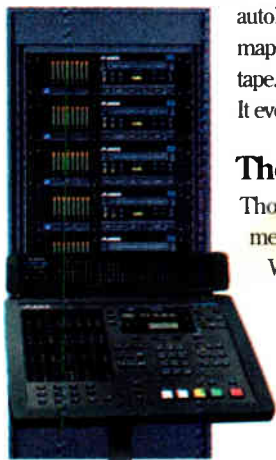
# than any other company. More than Sony. More than Mitsubishi. More than Yamaha, Akai, and Tascam combined.

## More than just a tape recorder— The ADAT System

ADAT, when combined with the BRC™ Master Remote Control, is a complete digital recording and digital editing system with features that no other recorder, analog or digital, can match. The BRC is a full-function autolocator and MIDI/SMPTE time code chase-lock synchronizer. Plus, it controls digital copying between ADATs, like a disk-based recorder, but much simpler to use.

The ADAT MultiChannel Optical Digital Interface digitally transmits up to eight ADAT channels at once over a single fiber optic cable to any track on any ADAT in the system without repatching, all in the digital domain. Now you can "fly in" that perfect vocal part to multiple locations in seconds, with absolutely no generation loss. And our new QuadraSynth™ keyboard has an ADAT digital interface so you can record it without ever leaving the digital domain.

A fiber optic cable for digital connection is included with every ADAT.



The BRC™ Master Remote Control shown with optional RMB™ Remote Master Bridge, supercharges your ADAT System by adding SMPTE and MIDI synchronization, storable autolocation points, copy and paste digital editing and more.

## ADAT/BRC digitally stores important session notes

Instead of scribbling notes on cumbersome studio track sheets, the BRC lets you store 400 autolocation points, 20 Song start points, punch in and out points, MIDI tempo maps, SMPTE offsets, and more in the two-minute data header of the ADAT tape. The BRC's alphanumeric display lets you name each cue point and song. It even has a handy built-in list of 16 standard cue point names you can edit.

L14 "CHORUS 1"  
00:25:38:15

Unlike analog autolocators, the BRC can recall 460 points, storable on each ADAT tape for later recall, so you can keep your mind on the project instead of having to remember minutes, seconds and frames.

## The ADAT Worldwide Network

Thousands of ADAT Worldwide Network™ multitrack recording group members are reaping the benefits of choosing The ADAT System. As WWN members, they are able to collaborate and exchange ADAT tapes with other talented musicians, producers, composers and engineers throughout the world. Alesis is proud that so many creative people worldwide are using this American-made product, making ADAT the most popular digital multitrack tape recorder in history. The recording professionals below don't endorse ADAT, they use it every day. Their credentials speak for themselves. Visit your Authorized ADAT dealer and see what the new standard in digital multitrack recording can do for you.



**Dave Rouze**  
Technical engineer for Larry Carlton, currently using ADAT to record all Larry's live concerts. 2 ADATs and a BRC.



**Jay Graydon**  
Two time Grammy® Award winning (twelve nominations) producer, engineer, writer, and guitarist. 4 ADATs and a BRC.



**Owen Bradley**  
Country Music Hall of Famer. Producer of many legendary country music artists. 9 ADATs and a BRC.



**Francis Buckley**  
One of the top dance and pop engineers in Hollywood. 4 ADATs and a BRC.



**Web Staunton**  
Grammy-nominated chief engineer and studio owner. 3 ADATs and a BRC.



**Mick Guzauski**  
L.A.'s leading platinum platinum mixdown engineer. 4 ADATs and a BRC.



**Andy Hilton**  
Owner and Chairman of the largest pro-audio equipment-for-hire company in the U.K. and Europe. Plenty of ADATs.



**Ray Benson**  
One of country music's hottest producer/arranger/writers. 3 ADATs and a BRC.



**Tom Size**  
Has engineered and mixed a wide range of music from rock to legendary jazz. 3 ADATs and a BRC.



**Russell Brower**  
Two Emmys (eight nominations). Sound designer and producer for film, television and major theme parks. 2 ADATs and a BRC.



**Tim Wilson**  
Consultant and system designer for leading recording artists and songwriters. Has installed more ADATs than he remembers.

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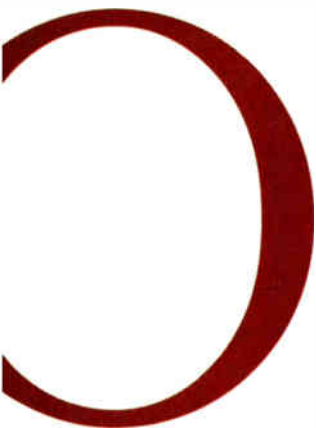
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# ORCHESTRAL

# RECORDING

## **SOME HAVE CALLED ORCHESTRAL RECORDING**

the pinnacle of audio engineering. True or not, symphony orchestras present the recordist with a lifelong challenge. And though top symphony engineers routinely disagree over technique and sonic objective, all agree that recording the symphony orchestra is one of the most satisfying endeavors in professional audio.

Though recording engineers readily admit that there is no "best way" to record the orchestra, it might be argued that a "quality" symphonic recording is what pleases discriminating record buyers, movie goers and radio listeners. And, as with most audio recording, sonic quality is dependent upon an infinite number of factors, such as repertoire, concert hall, climate, players, instruments, conductor, producer, microphones, mic placement, mic pre-amps, cables, mixer, recording format, reproduction path and much more.

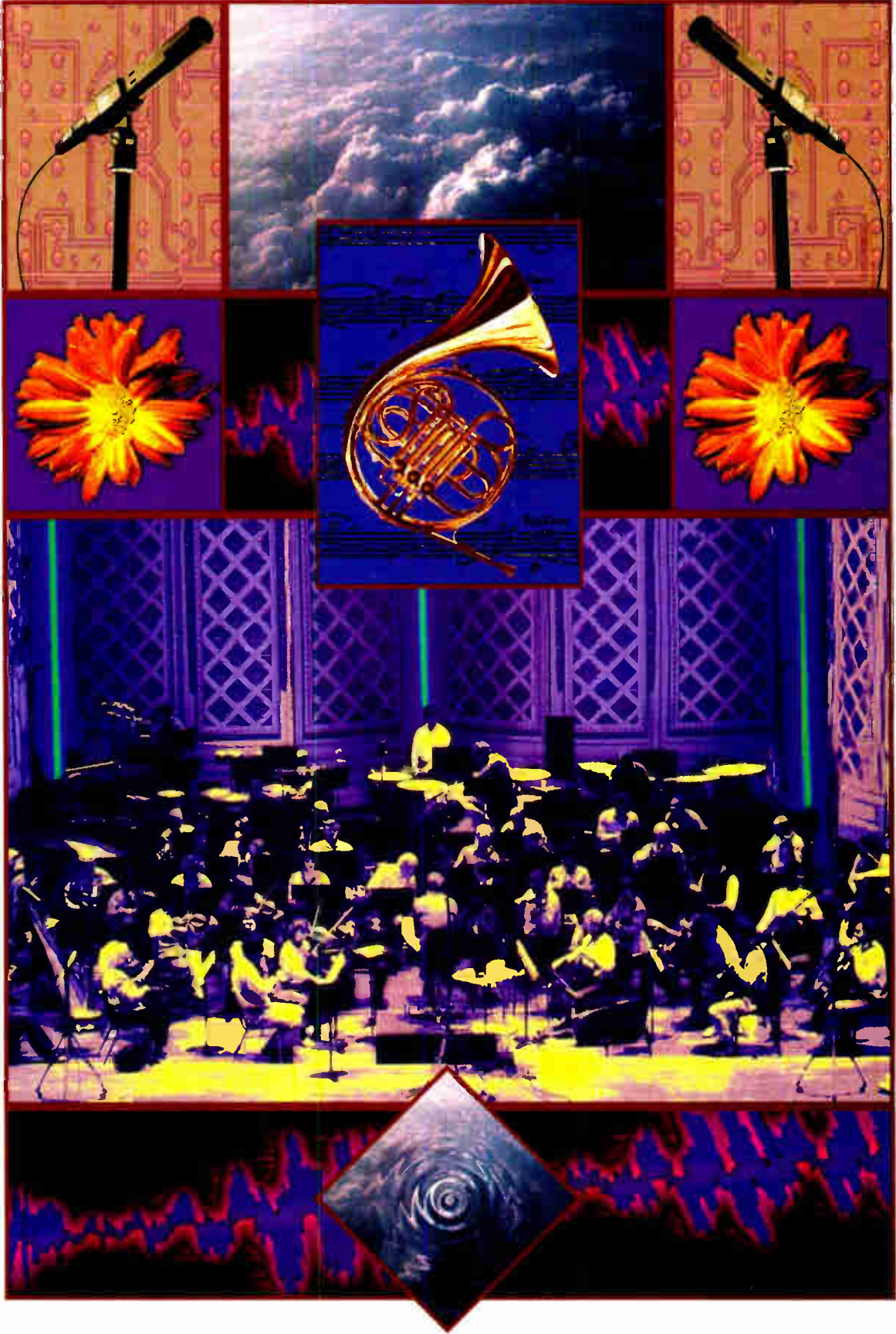
With so many variables, recording the symphony orchestra is clearly not for the novice. It requires at least a working familiarity with acoustic instruments, music theory, score reading, acoustics and classical repertoire, so aspiring symphonic recording engineers are well advised to prepare in multiple disciplines. Physicist Don Hall's *Musical Acoustics* is an excellent first reference for the aspiring recordist, providing an in-depth characterization of orchestral instruments and acoustic space.

For better or worse, the character of modern orchestral recordings varies widely depending on the philosophy of each label. Not sur-

With  
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orchestra is  
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the novice.

BY JOHN LA GROU





ORCHESTRA PHOTO: GEORGE PETERSEN PHOTO COLLAGE: TIM GLEASON

# Owning a Real Neumann Just Got a Lot Easier

You've put a lot of money into your studio... expensive consoles, recorders, processing, etc. But your recordings just don't measure up to your expectations. Chances are, the problem is with the most important (and most often overlooked) part of your signal chain... the microphones.

Virtually every major recording produced during the last 50 years has utilized Neumann microphones on vocals and critical tracks. And with good reason. Neumann microphones sound better. The warmth. The texture. The velvety smooth richness that cannot be duplicated. It's called the "Neumann Sound."

The TLM 193 is a large diaphragm cardioid condenser microphone with state-of-the-art specifications. Frequency response of 20Hz to 20kHz, dynamic range of 130dB, self noise of 10dB-A, and maximum SPL of 140dB.

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prisingly, experienced listeners can often identify a recording company simply by the overall sound of the orchestra. Modern production values range from two-microphone simplicity to 48-track mixes and more, from the immediacy of the conductor's vantage point to deep concert hall ambience.

Due to the high costs associated with symphonic recording, most labels don't have a budget for sonic experimentation on major projects. Even during rehearsals, it's difficult to consider substantial changes or alternatives: It's usually set up and roll. As such, engineers will generally specify in advance a proven array of recording gear based on their experience with repertoire, hall, orchestra, and production goals, making only nominal refinements during rehearsal.

In my experience with nearly 100 symphonic recordings, I've discovered a few truisms. Foremost of these, and perhaps most frustrating, is that acquiring a realistic string ensemble sound is elusive—an ongoing compromise between sparkle vs. stridence, warmth vs. dullness, space vs.

**O**ne thing we listen for is a musical ensemble cohesiveness without losing the tactile presence of individual instruments. Frequently, the room has much more to do with this than microphone technique.

—*Jack Renner*

flatness: variables dependent upon the hall and shell, style of music, quality of playing and audio path.

Consider a violin section playing a unison octave above open E. Each player will commonly be slightly above or below true pitch as each instrument and playing technique offers up slightly different partial recipes—an intermodulation nightmare for microphones and audio path.

In the concert hall, our ears perfectly understand the reality of the strings and orchestra; they are our ultimate reference for accurate reproduction. Microphones, unfortunately, are not ears. Speakers are not concert halls. Even with fine recording and reproduction equipment, the

gulf between reality and recording is substantial, though advancements in technology will continue to bring us closer to the concert experience. For now, as well-meaning forgers of the concert experience, we are called upon to create a believable approximation.

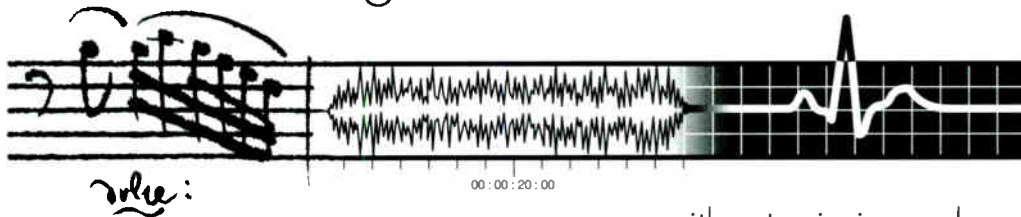
I talked with four of today's leading symphonic recording engineers. Here's what they said.

**JACK RENNER**

As chairman and co-founder of Telarc Records, Jack Renner is one of the world's authorities on recording the orchestra. Having engineered hundreds of classical music sessions, Jack is known for his ability to main-

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tain consistently high-quality and uniform recordings without an abundance of microphones.

"Talk about good timing," Renner exclaims, "I just finished a lecture on orchestral recording at the Cleveland Institute of Music. I'll recap my lecture for you:

"Before the orchestra arrives, I will have treated the room for overt reflections, noise sources and so forth. You can judge the acoustics of a room by clapping your hands and listening for first reflections, standing waves, flutter echo and so on. If I'm unsure, I'll ask some musicians to come in and play for a while.

"In my opinion, mid-band decay is very important, as is uniform decay over all bands. A minimum of 2-second mid-band decay is desirable for pleasing ambience. Newer halls tend to be 1.7 seconds or less in the mids, which can make for a dry recording. In some halls, the low-band decay is longer than the higher-band decay times, causing muddiness.

"To improve reflectivity, we sometimes place sheets of plywood over plush seats. To reduce uneven

decays, we've used drapes, carpet, RPG diffusors and other such methods. We avoid stage shells whenever possible; you quickly lose a sense of air and space. One thing we listen for is a musical ensemble cohesiveness without losing the tactile presence of individual instruments. Frequently, the room has much more to do with this than microphone technique.

"While we're adjusting the room, we'll also be determining microphone technique. We like to use the smallest number of microphones required for a fine recording. On a smaller orchestra, say for a Mozart work, we can often use just two microphones. This preserves imaging very nicely and, by nature, injects no multimic blurriness.

"On large orchestras, we'll generally open three or four front mics. And if the room is really dry, we'll place a pair of ambience mics out in the hall. A typical mic array starts with a pair of Neumann M50s on a 24-inch stereo bar a few feet behind the conductor. We begin at 10 feet high, pointing the mics at the front row of winds, and angled at 90 de-

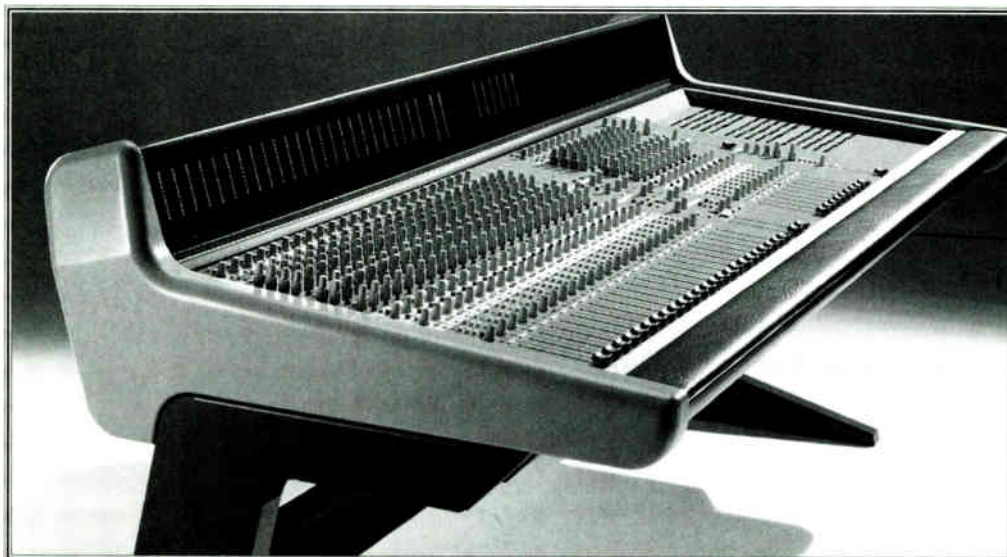
grees to each other. The center mics are panned about 4 and 8 o'clock, the flanks hard left and right.

"The flanking microphones are typically Schoeps MK-2, spaced anywhere from 10 to 15 feet on each side of center with identical points as the main pair and leveled 2 to 3 dB down from the mains. Microphone selection is also dependent on the humidity of the room. Humidity plays a major role in the sound and decay characteristics of any room.

"In our experience, we've found that a dryer climate dulls the sound and lowers decay time. In a humid region, decay time is increased, and the sound becomes brighter. We've found that a relative humidity in the 50 percent to 60 percent region is ideal for balanced room acoustics. We bring a hygrometer to every session and make adjustments based in part on humidity readings."

Since Renner avoids opening additional microphones whenever possible, I ask about his disposition toward spot miking. "The only spots I use with any regularity are on the woodwinds, though it's the excep-

## IF SILENCE IS GOLDEN, THIS CO



*The D&R Orion. From its Hi-Def™ EQs to its fully modular design, from its custom-welded RFI-killing steel frame to its incredibly flexible floating subgroups, the handcrafted Orion is every bit a D&R.*

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**B**esides the live noise, an audience is like a large absorptive carpet—unless, of course, you have a room full of bald guys!

—Jack Vad

tion—not the rule,” he replies. “I like sub-cardioids here, such as the Schoeps MK-21, spread about 3 or 4 feet and pointed off-axis from the front winds. In rare situations, we might also spot the basses, harps or other instruments that require an uncommon highlight.

“On soloists, I try to orient the player or singer so that the main pickup is from the main microphone array, using additional soloist mics for focus. On smaller ensemble sessions, we’ve even placed soloists, including piano and vocals, directly in the center of the orchestra. If needed, I’ll typically use cardioids or sub-cardioids on a stereo bar for additional coverage of soloists. I don’t like mono mics on soloists, or, in general, on any orchestral recording.

Mono mics start to sound like the talent is in a tunnel.

“For choirs behind the orchestra, I’ll generally place four MK-21s across the front of the choir. The pattern allows a broader pickup while maintaining rejection from the back.”

Renner continues with an overview of signal path: “In our own tests, we have heard differences between long runs of various cables; we are using cables manufactured by MIT and Monster. We run all microphone preamps on stage and send line level to the control room, or in the case of the Cleveland Masonic Auditorium, the women’s powder room. We’ll often treat the control room with absorbers in the front and dif-

fusers in the rear.

“Unless we’re running a two-mic recording, all lines are mixed into a Ramsa console heavily modified by John Windt. The Ramsa feeds our custom 20-bit A/D converter, which is archived on a Mitsubishi X-86, and backed up on DATs and 1630. On-site, we monitor with John Otvos’ Waveform Mach 7 speakers.

“The final editing is done on a Sonic Solutions at our studios in Ohio. We’ve been using the Apogee UV 22-bit converter with very good success. So far, it’s the best-sounding way we’ve heard to get from 20 bits to 16 bits.”

Renner summarizes his philosophy of orchestral recording: “Telarc has a commitment we keep on all sessions and subsequent CD releases. We believe it’s our responsibility to re-create as close to reality as possible the intent of the conductor and performers. We don’t intrude on the performance; rather, we’re there to accurately re-create it.”

#### **JACK VAD**

As recording engineer for the San Francisco Symphony, Vad’s record-

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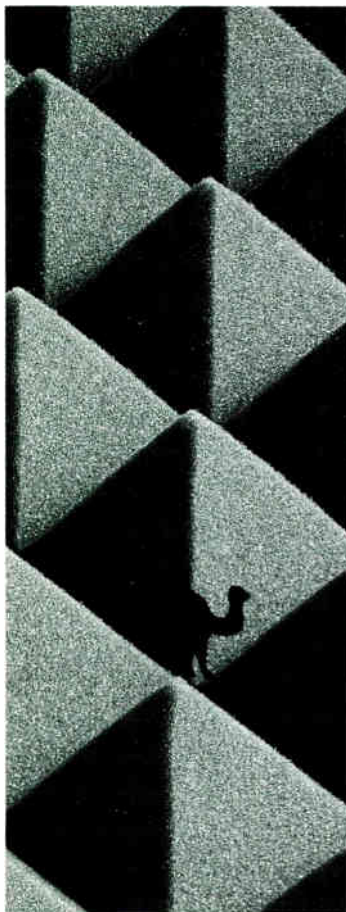
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ings are heard domestically on more than 400 radio stations each week. Working with a live orchestra, Vad often deals with different rules than those followed by closed-session recordists. From Davies Symphony Hall in San Francisco, he shares his experience with us.

"There are inherent recording compromises made to accommodate an audience," Vad notes. "Room noise is a constant headache. Audience comfort requires major HVAC. Live performances require lots of lighting, with its potential for hum. Alarm watches and pagers always seem to blurt out during delicate passages. And, besides the live noise, an audience is like a large absorptive carpet—unless, of course, you have a room full of bald guys! The effects of the audience are carefully considered during rehearsals, so much so that Davies Hall uses wall banners—essentially long strips of carpet—which are lowered during rehearsals to emulate audience absorption.

"So I start with a minimally reverberant, noisy environment and work from there—listening to room absorption and its effect on the music. In addition to audience absorption, a packed Davies Hall has a peculiar phenomenon: At around 300 to 600 cycles, things just sort of dip. There's also a large flying reflective canopy directly over the stage. The canopy reflections are brutal: exacerbating intermodulation distortion problems, reducing the sense of natural space in the recording. The canopy turns the stage into a gun barrel shooting acoustic energy, which is fine for the audience but a torment on microphones.

"In a formal recording environment, musicians can be placed to suit the recording. In a live environment, placement decisions are based on visual considerations and performance balance to the seats." With all these challenges, it should be no surprise that Vad has developed a recording technique that works around the negatives and emphasizes the music itself.

"We use very little stage miking, as it begins to look like sound reinforcement. Most mics are hung from above and aligned during rehearsals. I've experimented for years on various techniques and, mostly due to live noise, I've focused on direct, near-field techniques with omnidirectional mics limited to the main array.



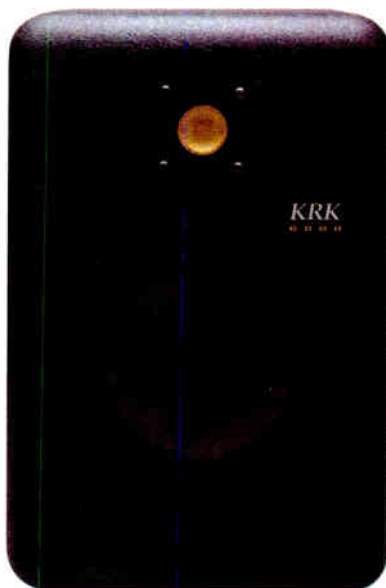
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"Because the program may range from Haydn to Mahler on any given evening, mics are chosen and arrayed for best overall coverage on all pieces; a sort of zone defense. It's sometimes a trade-off, but we know our limits and will often place certain mics that are opened on one piece only."

At this point, Vad expresses his concern that our interview not become an "equipment list" and explains why: "Having proper tools is important in any job. And we have the best. However, a concern of any symphony-recording engineer should be the development of artistic priority. There are many successful approaches to recording orchestras, all offering different musical pictures. Developing this personal sense of musical and artistic accuracy is crucial. Technical decisions should lead to a consistent goal."

"Our most important mics are in the front of the orchestra. We're currently using an equally spaced array of four Neumann KM-100s with free-field equalized capsules. The outside pair is panned hard left and right, the inner pair gently left and right.

Front mics are on 6-foot spacing centers, about five feet away from orchestra front, 10 feet high, and angled down at 30 degrees with the inner pair attenuated about 3 dB and gently curved off at 30 Hz.

"In my experience, if the strings are right, everything else tends to follow nicely. The strings should sound like a developed section, not just a few players on stage front. We've tried dozens of fine mics up front, but the Neumanns offer a manageably soft image of the strings and shell reflections, whereas brighter mics have gotten beamy and timbrally out of control.

"On the woodwind spots, I like MK-21, AK-40 or AK-43 capsules. In fact, for a majority of spot applications, these are three of my favorites. Occasionally, I'll place two mics over the tympanis, about three feet above and split between the drums for broadest coverage.

"For guest soloists, including pianists, I've been using the Neumann GFM flat on the stage near the talent, though vocalists sometimes get a [Neumann] KM-150 on a stand about six feet away. Choirs with orchestra are

miked with an array of B&K cardioids.

"French horn spots are always a puzzle in a live Davies recording. In formal sessions, horns can be maneuvered around for best sonics. For a live date, we don't have that liberty. Our solution, albeit less desirable, is to place KM-140s on goosenecks just behind the horns, at horn level, used very sparingly.

"Other instruments or sections that could get spotted include the harp, piano, percussion, tuba and so forth. Trumpets and trombones, however, speak for themselves. Our spot mics in general contribute very little to the overall mix. They slightly accent the instrument's presence without sounding like there's an additional microphone.

"Microphones are mixed through a Studer 962 console, sometimes via external mic preamplifiers. The stereo mix is converted to 16-bit digital through an Apogee AID-500. We record up to five performances in the same concert series on a Sonic Solutions disk-based editor with 10 gigabytes of hard disk storage.

"After all the concerts are compiled, the conductor, backup con-

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#### JOHN EARGLE

A former AES president with a recording career spanning more than three decades, John Eargle has been keeping busy engineering classical recordings for Delos Records. To date, Delos has released nearly 50 symphonic recordings engineered by the Grammy-nominated Eargle.

"The first thing I listen for in an unknown venue are early reflections from the shell and canopy," says Eargle. "Fast, focused reflections can be devastating to a symphonic recording. In such cases, I'll either move the orchestra out farther into the hall or deaden the shell, or both. Some halls have add-on stage extensions for this purpose.

"A larger stage is desired for a wider audio image, assuming the players can still hear each other. I like to arrange the orchestra a little

differently than you normally see in a live concert. Moving the horns left of center often helps with spatial counterpoint on loudspeakers. The Seattle Symphony recordings are always arrayed in the 19th century European style with the first violins stereo left and the second violins

then begins to make microphone and audio path decisions. "I really prefer four microphones across the front of the stage," he says. "My main pair are near-ORTF cardioids a few feet behind the conductor and between 9 and 12 feet high. [Originally developed by French National

I like to arrange the orchestra a little differently than you normally see in a live concert. Moving the horns left of center often helps with spatial counterpoint on loudspeakers.

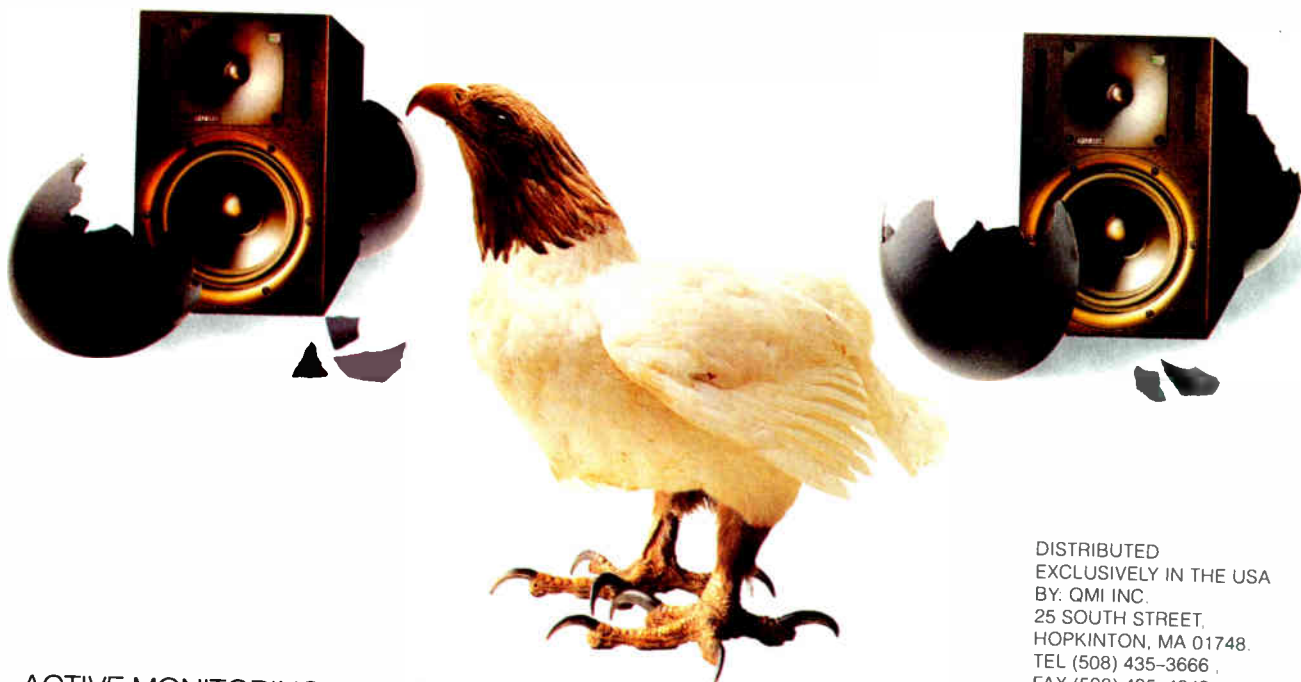
—John Eargle

stereo right." [Check out The Symphonic Sound Stage (Delos CD #3502) for John Eargle's primer on symphonic recording, including some beautifully recorded examples—author.]

After Eargle is satisfied with the orchestral placement and hall modifications necessary for recording, he

Broadcasting, ORTF is a stereo technique using closely spaced capsules—17 cm apart, with each pointed outward 55 degrees off axis—Eds.] The second pair are flanking mics, usually omnis. I place flanking mics near the 1/3 points of the orchestra's front (side to side) dimension. The flanks are generally gained 6 dB

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lower than the main pair.

"These four microphones are sometimes sufficient for an entire orchestral recording," says Eargle, though most of the time he finds it advantageous to place spot mics in various sections of the orchestra. Concerning spot mics, he warns novice recordists: "Don't jump into spot miking hastily. There are many potential pitfalls, and it's better to move slowly. Experiment with simple spot techniques and consider alternatives before opening up a stage full of microphones. For instance, the conductor can simply ask a player or section to play louder or move closer to the main microphones.

"I rarely spot the percussion, though some of the more traditional highlights include the harp and concerto soloists. An ORTF pair about 10 feet high can often be used successfully in spotting the woodwinds. Another common spot is a single mic close to the front row of double basses. This helps deliver articulation without building up mush. Ultimately, spot miking should be used for focus, not loudness.

"When recording a soloist, such as a piano or violin, with an orchestra, I'll place the talent in front of the conductor for good eye contact. Soloists will generally be miked with a pair of microphones, usually ORTF on piano." Eargle warns, "be prepared to ride gain when close-miking a soloist. Things can get out of

the orchestra with a large choir. He says, "a choir can be tricky. Sometimes, the entire choir will be asked to move into different parts of the hall for tests. On most of my choir work, they end up behind the orchestra. However, there have been instances where we actually placed the choir in the main seating area, around rows four to ten, facing the orchestra, with excellent results. We may use as many as 15 microphones during a complex work for orchestra, choir and soloists.

"I generally use very little EQ; perhaps a little room rumble filtering or a gentle lowpass filter knee on strings. Once all the microphones are set and balanced through the mixer, I usually record direct to 2-track. Whenever possible, we're converting and recording at 20-bits for the archives and simultaneously into redundant DAT machines. The DAT master is edited entirely in the digital domain for CD release. If compression is required, we'll normally do it by hand.

Eargle's closing words of wisdom for orchestral recordists: "Work closely with the conductor, know the score, know the hall and let your imagination be on hand at all times."

#### BRUCE JOHN LEEK

Anyone familiar with vinyl mastering knows Bruce Leek as one of the most prolific disc cutters in recent history—over 20,000 platters mas-

It's usually not necessary to spot-mike a concert band, though sometimes a celeste or harp does get covered up. In such cases, I'll place a stereo pair for spot (MKH 40s).

—Bruce John Leek

hand if you're not careful. A little artificial reverb may also be necessary help to match the close-miked soloist's sound with the natural room ambience on the orchestral microphones. By the way, I never use artificial reverb on the main microphones unless the hall is just unbearably dry."

Often, Eargle is asked to record

tered. And while Bruce continues to master fine audiophile vinyl, his main interest is recording the symphonic wind orchestra, otherwise known as the concert band.

Though less popular than the customary symphony orchestra, symphonic winds remain prominent in schools and military institutions, as well as sharing a stage in many

—CONTINUED ON PAGE 179

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# New Developments in Studio Monitors

by  
George  
Petersen



Apogee MPTS-1 System

When it comes to describing technological changes in audio and electronics, adjectives such as “revolutionary” usually pop up. Yet, in the area of loudspeaker design, advancements are usually better described as evolutionary. After about two-thirds of a century of loudspeaker developments, sound is still typically reproduced by a system of coil, magnet and cone-based transducers. It's pretty basic stuff—or is it?

By examining some recently unveiled studio monitors, we can see where trends for future designs are headed. Ready? Let's take a look under the hood.

## **SURROUND SOUND**

Several companies, such as JBL (Northridge, Calif.), Shure (Evanston, Ill.) and USCO Audio (Hollywood, Calif.), have marketed products designed for surround mixing applications, but a more recent entry into this market was made by Apogee Sound Inc. of Petaluma, Calif.

Primarily known for its sound reinforcement speakers, Apogee has introduced its first studio monitor, the MPTS-1 system. The system was designed by the THX division of LucasArts Entertainment and is intended specifically for post-production mixing rooms, dubbing stages and professional screening rooms. The speakers in the system are only 18 inches deep, which means they can



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MPTS-1 is an electronically controlled, tri-amped system with two enclosures for each screen channel. The mid-high cabinet is separate from the LF enclosure and has a special mount with tilt and pan adjustments. A minimum of four surround cabinets and a subwoofer complete the package. The processor that controls the system provides perforated screen loss compensation, time and frequency domain correction, active crossovers and remote switching with the standard ISO 2969 "X" equalization curve for film mixing or flat response for video projects.

You can expect more surround sound monitoring systems to be released in the near future, as studios respond to the growing demand for surround sound product, whether it's for a television show, feature film, video release or surround-encoded CD project.

#### DOWNIZING NEAR-FIELDS

It's no secret that compact monitors for near-field listening have been popular additions in large and small studios, as well as traveling companions for independent engineers and producers. And this trend hasn't gone unnoticed by speaker manufacturers, who continue to offer more downsized products. Improvements in driver technology have led to bigger sound from smaller boxes.

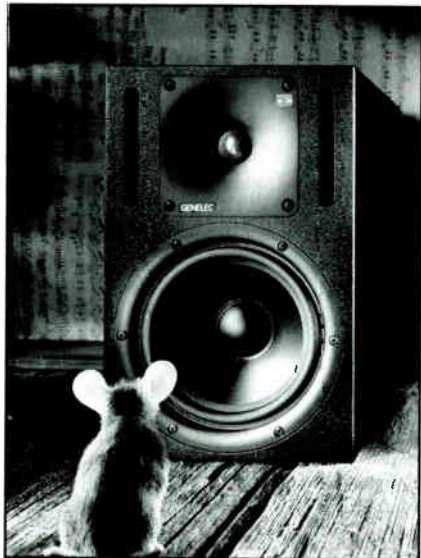


**Alesis Monitor Ones**

and the quest for accuracy in these compact designs continues.

Available in mini-cabinets (15x8x8-inch), the Monitor Ones from Alesis (Los Angeles) are a two-way design with a 6.5-inch low-mid driver and a 1-inch dome tweeter. The speakers are said to handle 120 watts of continuous program material, helped in part by the ferrofluid-cooled tweeter. Now becoming more commonly used in HF, MF and—occasionally—LF

drivers, ferrofluid within the magnet gap reduces the chance of thermal damage to the voice coil, and its viscous property can help prevent over-excursion. And though the Monitor One's rubber-textured finish has no effect on audio performance, it does



**Genelec 1030A**

keep the monitor from sliding off of a slippery console bridge.

Formed in 1990 by famed British studio designer Andy Munro and Dynaudio A/S of Denmark, Dynaudio Acoustics (distributed in the U.S. by AXI Marketing of Boston) offers products ranging from the \$39,999, 10,000-watt M4(4) system to the company's newest, the BM10. Priced at \$999 a pair, the BM10 is a two-way system with a 7-inch woofer and 1-inch Hexacoil aluminum-dome tweeter. The monitor is said to handle 1,000-watt transients, although long-term power handling is approximately 100 watts.

Genelec has achieved an excellent reputation for its high-end, powered monitor designs, but at last month's NAMM show, its American distributor, QMI of Hopkinton, Mass., unveiled the new 1030A, priced at \$1,998/pair. The compact 12x8x9.5-inch cabinets house not only the 6.5-inch woofer and 1/2-inch metal dome tweeter, but also internal bi-amplification capable of more than 115 dB at one meter. The system's -3dB down point is stated as 50 Hz, and the monitors should be available next month.

A couple of years ago, Tannoy (distributed by TGI of Kitchener, On-

tario, Canada) updated its large studio speakers with the radical space-frame technology used in its Monitor Series models. Now Tannoy is focusing on its popular PBM Series, the newest incarnation being the PBM Mark II. All of the Mark II woofers have injection-molded (rather than vacuum-formed) cones of mica-impregnated polyolefin and nitril rubber suspensions, said to provide an additional half-octave of LF extension. And in keeping with the downsizing concept, Tannoy has expanded its PBM-8 and PBM-6.5 Series with the PBM-5, a compact two-way design with a 5-inch LF driver and 1-inch dome tweeter.

KRK Monitoring Systems (distributed by Group One Ltd., Farmingdale, N.Y.) makes a variety of large and small studio monitors, and at AES, the company unveiled the Model 6000, priced at \$649/pair. The 6000s combine a 1-inch Kevlar tweeter—the material used in bulletproof vests—with a 6-inch polyglass woofer. KRK also has replaced the enclosure designs in its other compact monitors (models 7000B, 9000B and 13000B) with stepped front panels that offer improved phase alignment.

Horns and close-field speakers may seem an incongruous combination, but Solo Electronics (Hayward, Calif.) may have pulled it off. The



**Solo Electronics H500**

H500 is a three-way system with two 8-inch polypropylene woofers, 1-inch metal dome tweeter and a 2-inch diaphragm compression driver mounted on a wide-dispersion exponential wood horn. The compact 24x15x17-inch cabinet is finished in cherry veneer and weighs 70 pounds, including the internal 14-component crossover. Retail is \$2,480/pair.



## BIGGER AND BETTER

Over the past decade, so much attention has been paid to near-field speakers that some might think that manufacturers have abandoned research into larger studio systems. Fortunately, this is not the case. Lately there has been increased interest in large monitor systems that provide big, big bass. Obviously, much of this demand has been driven by the hot-selling rap, hip hop and house music markets.



Tannoy PBM-5

At AES, JBL—hardly a newcomer to the studio—showed a prototype of its model 4496, a high-end, high-performance studio system that draws on some of the company's developments in sound reinforcement speakers. The system, slated for release later this year, has two 14-inch woofers, mounted above and below a 1.5-inch-exit compression driver; it's developed into a single component with an Optimized Aperture™ constant-directivity horn with a 100-degree horizontal dispersion that matches the woofers. All of the drivers in the system are neodymium-based, and the woofers have a Thermal Management System™ that uses both forced-air cooling and convection cooling (the aluminum frame surrounding the magnet assembly is designed to act as a heatsink).

A JBL ES52000 digital controller—originally developed for live sound applications—is programmed to include zero-phase-shift FIR crossover filters, signal delays for transducer alignment and digital domain equalization. The enclosure is the same height as a UREI 813, although it is much narrower, which allows a range of horizontal aiming adjustments when

placed in an 813 soffitt.

Another large studio system shown at AES is the High Output Series from Hot House Professional Audio of Highland, N.Y. The SD 312 full-range monitor is designed to provide wide bandwidth (25 to 25k Hz) response at levels approaching 140 dB. Inside each cabinet, three long-throw, 12-inch Tannoy woofers with 3,800-watt handling reproduce low frequencies, while mids and highs are covered with a 10-inch Tannoy Super Dual driver.

This Dual-Concentric MF/HF driver is said to handle 1,400 watts; the coaxial HF driver has a 2-inch throat.

Power is provided by five Hot House M500 HV mono block amplifiers (two bridged pairs on the LF/MF sections; one on the HF driver). For applications requiring higher SPLs or extended bass, an optional subwoofer is available—the same size as the SD 312, but with four 12-inch drivers. In addition to the necessary crossovers and amplifiers, the Hot House system includes some highly visible stickers that warn about the dangers of listening at high-decibel sound pressure levels.

That one development may be the best idea of all. ■

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# IRELAND'S AUDIO ENGINEERING

**A SENSE  
OF PLACE**

**by Paul Tingen**

Ireland has delivered its fair share of famous poets and writers, but music is what the country *breathes*. Folk music is played and sung in pubs across the country, and the depth and richness that this tradition provides the Irish people is shared with the rest of the world by the

many top artists that this small island of 4 million people has born: names such as Van Morrison. The Chieftains, Clannad, Enya, Hothouse Flowers and U2.

A strong artistic awareness penetrates all areas of Irish life. Take, for example, the tax law that exempts artists residing in

Ireland for more than a year from paying taxes on any original works of art for which they are not commissioned.

And then there's the fact that, quite simply, Ireland is an inspirational place. Dublin, the capital, is its creative center, but pride of place really comes from the incredible

**Ireland is graced with spectacular cliff edges, beaches and lush  
countrysides interspersed with lakes, thatched  
cottages and the ancient castles that  
Audio Engineering turns  
into recording studios.**



***Elsinore House's control room where U2 recorded Achtung Baby***

landscape. Embraced by the wild Atlantic, Ireland is graced with spectacular cliff edges, beaches and lush countrysides interspersed with lakes, thatched cottages and ancient castles.

Ironically, the much-be-moaned wet climate makes it easy for artists to concentrate and look inward, so that, taken all together, the Irish countryside is an ideal place to create. It was, for example, in the tranquil grandeur of Galway in West Ireland that the Nobel prize winner W.B. Yeats wrote his

***Spiddal House where the Waterboys recorded***

best poetry. And this type of atmosphere—according to Terry Cromer and Julian Douglas of Audio Engineering—has also made an essential contribution to

some very successful recording projects over the last five years.

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**Carrigrohane, a 16th century Tudor house located beside an older Norman castle in County Cork, Ireland**

a mid-18th-century house just outside Dublin, Douglas recounts, "In 1988 The Waterboys were recording an album in Windmill Lane Studios in Dublin. They were at it for a year and were going through an artistic hell: complete writer's block. In desperation, they decided to record in a country house far away from town and called us. Once they were down in Galway, their minds exploded with inspiration, and the album, *Fisherman's Blues*, was completed in six months."

Audio Engineering is Ireland's largest pro audio hire and sales company. It was founded by Cromer ten years ago, shortly after the Irish recording industry placed itself on the international recording map with the legendary Windmill Lane Studios. The 1988 Waterboys' recording project in Spiddal House in Galway, a site they used again in 1990 for their *Room to Roam* album, was part of a larger trend during the '80s, when an increasing number of artists preferred to record at home or in the homey surroundings of a normal house, rather than in regular recording studios.

Surveying the unusual surroundings of the old Irish house that Cromer and Douglas have chosen as the place to talk about their recording ventures, one can easily believe that it could blow the creative lid. Killadoon House is an enormous building, set on a large estate, with much of the original 18th and 19th century ceilings, wallpaper, furniture and art still in place. There are Georgian, Victorian and Napoleonic bedrooms, Venetian marble tables and 1790s scrollback chairs. In the hallway hang the 12-foot-wide antlers of

an Irish elk, hunted to extinction 2,500 years ago. The living room and adjacent ballroom are also quite impressive, each measuring roughly 45 feet by 22 feet, with an 18-foot high ceiling. Although Killadoon has not been used for recording so far (Cromer and Douglas have it under option for this purpose), it's in this type of house that Audio Engineering usually locates its rustic recording projects, and control and recording rooms are built in similarly extravagant, huge rooms.

Producer Daniel Lanois is a well-known exponent of this approach, where atmosphere is considered more important to a performance than acoustic separation and control. His first work with U2 on *The Unforgettable Fire* was recorded in Slane Castle, near Dublin, so it doesn't come as a surprise that U2 feature prominently in Audio Engineering's recording-in-country-houses story. After a couple of months of work at Hansa Studios in Berlin in late 1990, U2 recorded most of *Achtung Baby* during a six-month recording spell in a country house right by the sea, just outside Dublin, for which AE provided equipment and maintenance.

Trevor Horn is another artist who has taken advantage of AE's unique services. He was residing in the Irish countryside during the summer of 1992 to work on a Rod Stewart album, record the music for the movie *Toys* and mix the single for Mike Oldfield's *Tubular Bells II* when he asked AE to supply equipment and logistic support. It was after working with Horn that Cromer and Douglas realized they had a winner on their hands and decided to market the idea in earnest. Audio Engineering went on to contribute to the recording of U2's *Zooropa* during the first half of 1993.

Lighted by the flickering fire, Julian Douglas slowly sips a glass of Irish whiskey and elaborates as to why Audio Engineering thinks recording in country houses is such a great idea: "For certain artists, it's a way of inspiring them and making the technology take a backseat to the atmosphere and the environment. We play down the importance of technology because it helps these artists free their creativity and give better performances. What we do is find a house that inspires them and build a studio in it around their needs. Recording studios are great,

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but some people need something a little different. It's an exciting thing to do, for us, because each job is different, both in terms of the houses that we use and the equipment that we install."

Douglas carries on to explain that, although AE has a number of houses under option, the houses are chosen and rented on a per-project basis, according to the preferences of the client, who is given the choice of joining in the search or giving AE some specifications and leaving the house-hunt to the Irish company.

Engineer Robbie Adams, who worked on both *Achtung Baby* and *Zooropa*, echoes Douglas' words and mentions a few other advantages of recording in houses: "You can adapt the furniture and the lighting and just generally create a homey, relaxed feeling, which is very conducive to work. Working in houses also gives you total privacy—as soon as you walk in the door, it all belongs to you. Another important advantage is that it's very cost-effective: You can hire in the equipment as you go along, start off with a very basic control structure and gradually change or expand the equipment as and when you need it."

Although it all sounds easy and romantic—find an idyllic, remote house, chuck some equipment in it, hire a cook and off you go—there's a lot more to it. Terry Cromer asserts that a great deal of expertise is necessary to cope with potential problem areas like transport (especially getting the mixing desk inside), maintenance (sometimes air condi-

tioning has to be installed to keep the equipment in good condition), reliable power supply (AE always installs and runs the electricity off of an independant generator), control room and recording room acoustics and monitoring.

"It's essential that the engineer and producer can honestly rely on the sound," Cromer says. "If they have any doubts about what they're hearing, they're not going to be very confident. Obviously, the current preference for near-field monitoring makes life easier, but I'll still invite the engineer and producer to sit in the 'control' room for a couple of days before the project starts so they can familiarize themselves with the sound whilst we make acoustic adjustments to the room, according to their preferences."

In the case of Trevor Horn, this meant installing an 8-foot by 4-foot false ceiling just above his Euphonix desk and some diffusers in the back of the room. Horn's "control" room in 18th century Woodstock House, 25 miles south of Dublin, was similar in size to the large rooms in Killadon and was ideal for the masses of MIDI gear and keyboards that Horn had set up. A studio owner himself, Horn had brought much of his own equipment to Ireland. He'd started off mixing the *Tubular Bells II* single on a Yamaha DMC1000 digital desk before bringing over his new Euphonix desk, the first in Europe. He also used two Sony 3324A digital multitracks. For this project, AE only supplied monitor systems (Westlake BBSM12 and Quad 520

amp) and some other bits and pieces that Horn didn't have.

Douglas explains that, in this situation, AE mainly served as a service and backup organization. "We made sure that things ran smoothly for him, that he was comfortable and had everything he needed. He was in a foreign country, so he needed a company based here to organize things like travel, taxis, flights and so on. We also took care of maintenance and the logistics of getting all the L.A. and New York session musicians over."

However, in the case of both U2 projects, *Achtung Baby* and *Zooropa*, AE supplied almost all equipment, as well as taking care of maintenance and acoustic treatments. The Irish sessions for *Achtung Baby* started in February 1991, in a house called Elsinore, close to the village of Dalkey just south of Dublin. It was nick-named Dog Town by the band because, says Cromer, of its "tackiness. But it was just 20 yards away from the sea, and they loved that, especially given the dramatic weather in winter. The room was actually quite narrow, because this really was quite a modern house." The band initially started out using AE's Soundcraft 6000 44-input desk, with an Otari MTR100 analog 24-track with Dolby SR, and ATC100A, Westlake BBSM12 and Yamaha NS10 monitors. Then the band switched to AE's Neve, a unique, reconditioned, '70s 36-channel EMI desk; engineers Adams and Flood used the preamps and EQ modules to put things to tape until the Neve desk came in. The Soundcraft figured mainly as a studio monitoring desk.

The backing tracks were put down as collective band recordings in a converted garage underneath the "control" room, with communication with the engineer via monitors and mics. Guitar and bass amps were placed in adjacent rooms for separation, as was Joe O'Herlihy, the band's live mixer, who took care of the monitor mixes with the help of a Ramsa P.A. desk. The band apparently hate headphones, so all monitoring was done using their onstage monitors. Virtually all overdubs were recorded in the control room, with Bono hand-holding an SM58 while listening back through big EV wedges. To the obvious question comes Robbie Adams' shoulder-shrugging reply: "Spill? What about

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it? They didn't worry about spill..."

In July the band moved to Windmill Lane for the mixing stage, with Daniel Lanois and Flood mixing in the regular SSL room, and Steve Lillywhite and Adams mixing on the Neve MI, installed by AE with extensive outboard gear in the live room. While mixing, both parties could wave at each other through the glass. "It was very funny, with people hectically running from one room to the other and sending tapes around and doing last-minute overdubs," Cromer says.

For *Zooropa*, most recordings were done in a rehearsal studio in Dublin on AE's Soundcraft 6000 desk. Initially intended to be just an EP, the project quickly got out of hand, and AE installed a simple but complete studio in the rehearsal room. Adams, who like Lanois is a nonbeliever in automation, even mixed some tracks live on the Soundcraft. (Other mixes were done in the new Windmill Lane.)

So far, all the country house recording projects overseen by AE have been unequivocal successes. Cromer and Douglas believe that, in addition to the appeal of the rural environment, it helps that the houses are so large that people can have privacy within, retreating to their bedrooms or a library, or hanging out in a common relaxation room. AE makes provisions for the use of acoustic instruments in the latter, usually making sure there's a piano, plus a Soundfield mic in the ceiling connected to some hidden tape recorder, so that lucky jams can be recorded.

AE's enthusiasm for this way of recording shows when Julian Douglas suddenly gets up, points with his whiskey glass in his hand at our surroundings and exclaims, "Can you imagine coming down here with a band and engineer and producer? The whole atmosphere of these places is really special, with open fires in all the rooms and four-poster beds in the bedrooms. Obviously, the acoustics and equipment have to be right and completely professional, but at the same time, they're not the important part. Think of coming down here in the morning and looking out at the fields and mountains. That to me is the real excitement of this way of recording; that's what makes it different." ■

*Paul Tingen is a writer and musician based in England.*



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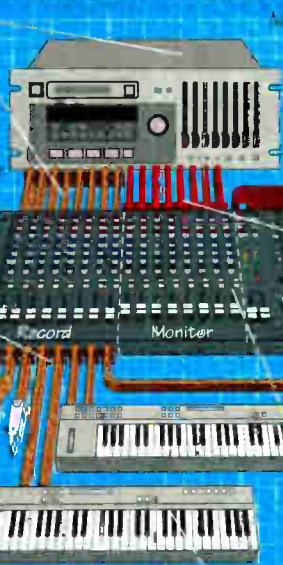
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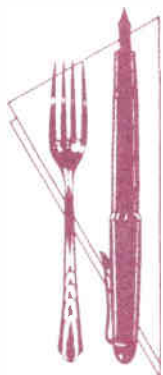
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by Mr. Bonzai

# BRIAN MASTERSON

## THE VU FROM IRELAND



Brian Masterson, Irish engineer and studio owner, has become an important creative force in the musical renaissance of the Emerald Isle. His studio, Windmill Lane, is to U2 what Abbey Road was to the Beatles, and he has hosted the likes of Willie Nelson, The Chieftains, Hothouse Flowers, The Waterboys, Def Leppard, Meat Loaf, Elvis Costello, Mark Knopfler, Sinéad O'Connor, Johnny Cash and, most recently, the Rolling Stones.

Born into a family with strong roots in traditional music, Masterson worked as a bass player in various jazz/rock bands of the '70s. His formal education was in electronics, which dovetailed nicely into the recording work that continues as his passion to this day. His involvement in day-to-day studio operations has contributed greatly to his reputation among the Irish masters, as well as visiting artists, producers and engineers.

The first incarnation of Windmill Lane was established by Masterson and partners in 1978 at the site of an old mill. When his partners decided

to move into television, Masterson chose to stay with music, purchasing the studio's name and equipment. In 1991, he joined forces with respected engineer Andrew Boland, owner of Ringsend Road studios, and moved his operation there. Housed in a former power station, Windmill carried on and expanded to the premier World Studio Group facility it is today.

We first met at the recent TEC Awards in New York City. Being of Irish descent (Darby O'Bonz, County Cork), it was my pleasure to introduce Masterson as a presenter of the TEC Award for Excellence in Institutional Achievement. Later that weekend, we shared an early lunch overlooking Times Square. Imagine the lyrical gifts of Irish speech and the intelligent twinkle in his smiling eyes.

**Bonzai:** Let's go back to the prehistoric days of Brian Masterson working at an 8-track studio in Dublin. Anything funny happen?

**Masterson:** Two things that I can easily recall. One night, we went in to





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derstand how really uncommunicative it is?

**Bonzai:** How does your background in rock music fit with your work in the more traditional Irish forms of music?  
**Masterson:** The band I played in was primarily into the jazz/rock idiom, but growing up in Ireland, I was always aware that there was this other music 'round. It's not uncommon for it all to sound the same, particularly the dance tunes such as reels and jigs, if you don't take the time to penetrate the first layer. As I started to work as an engineer, quite a few of my clients were traditional musicians, and it opened me up, and I grew to love this music and appreciate it, and hopefully to understand it. I also discovered the incredible talent, dedication and virtuosity of the players. Some of these players of traditional Irish music are just absolute masters, up there with Ravi Shankar.  
**Bonzai:** Why is there suddenly this Renaissance, or new focus on Irish music, and everyone in the world looking at Ireland?

**Masterson:** I don't know. I have a half-theory that it's a part of this whole swing back from machine-controlled music to real music. I don't say that everything that comes out of a sequencer is wrong or bad, but there certainly was a time when it was awful. Now, some of the better aspects have been drawn into the general world of music. But all the time, I see people that are trying to get back to music, interaction between musicians in real time. If you look to traditional Irish music, I would put it up there with the whole jazz idiom in terms of virtuosity and instant interaction. It sounds like just "playing the tunes," but the variations happen all the time. And so, good music is getting out to a wider audience, and like a rolling stone, it's suddenly going at great speed.

**Bonzai:** You are known for the excellence of your microphone technique. Do you still find that you have to experiment and vary your style from player to player?

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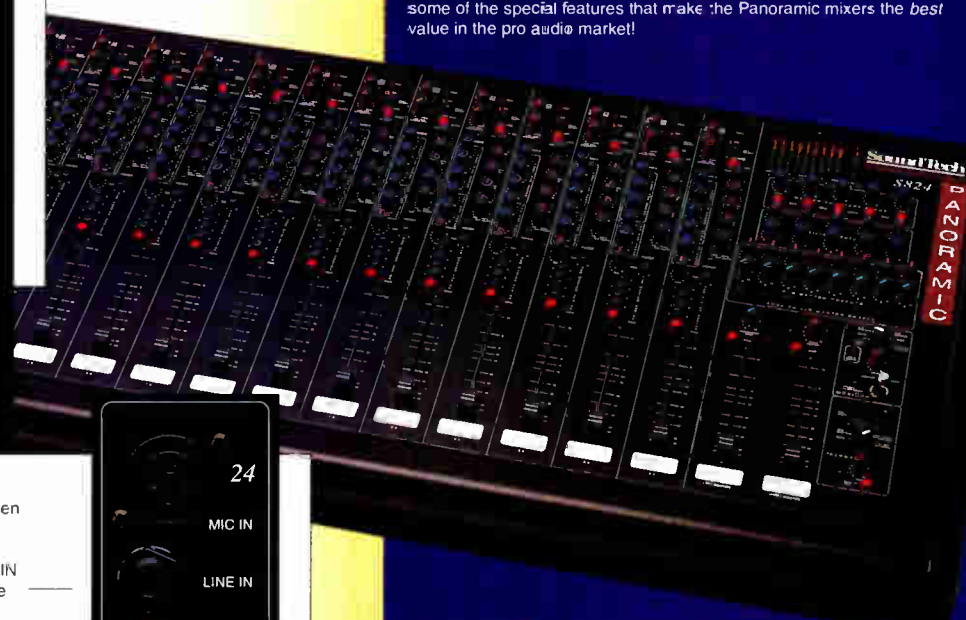
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World Radio History

record this strange group consisting of two 12-string guitarists, a sitarist and a guy playing the Indian flute. At the time, there were no electronic tuners, and we started about nine o'clock at night. By one o'clock, they still couldn't get their instruments in tune. We never put down a note on tape, and the flute player got very annoyed. He was brilliant, you know, but there was nobody to accompany him.

Another really funny thing was... I'm sure you've had them over here, but there was a spate of "how to relax" records and "how to stop smoking" records. I had the great misfortune to record "how to relax." I was waiting for this guy, and I knew he was a clinical hypnotist. This was shortly after I'd started, and I was thinking, "Hold on a minute, how am I going to do this? If I concentrate on what he is saying, I am going to fall asleep!" I thought about this long and hard and figured the only way to do it was to get him to say something else, like "Mary Had a Little Lamb" to get the levels set up. And then, I planned to walk around the control room very

determinedly and try and listen, but not stop walking.

He arrived in a flashy car and obviously knew what he was doing. He came in, we shook hands, and he sat down in the booth and got out his script. I asked him to read a bit from *The Irish Times*. He didn't question that, and I got my levels. Then I told him to begin, and I started walking around the control room with my back to him—just to make sure I didn't fall under his spell.

I heard him start to read, "The title of this record is how to...to...re... re...relax." He was stuttering all the way and then said, "Stop, stop...I can't go on!" He said, "I'm not usually like this, but I'm terrified about being in a recording studio." After many, many cups of tea, I managed to calm him down to where he only stuttered once in every paragraph. I ended up one of my first sessions by editing and removing 56 stutters.

Bonzai: This was in the early days of your career, about 1978?

Masterson: Well, the original Windmill Lane opened in '78, so this must have been around 1976. I did my probationary period in an 8-track

studio with a wonderful old Neve desk. I worked there for a week as an assistant, and then the engineer suddenly got a better offer and left. I was told on a Friday that I was starting on Monday as an engineer.

Bonzai: I understand you were also a musician. What kind of bass?

Masterson: I played mainly the upright bass, but also the bodhran, an Irish goatskin drum.

Bonzai: How did your experience as a musician help in your engineering?

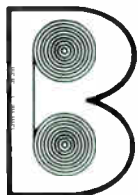
Masterson: For me, it's everything. I believe that the technical side is something that one can pick up quite quickly, whereas the whole musical side, the understanding and the feeling of what music is, for me, has best come from my years as a musician. It also gives me some understanding of what it's like to be on the other side of the glass. For instance, people trying to explain things through a set of headphones when they could just come in the control room and tell you, for a quarter of the time it would be all that much easier and that much nicer. How many engineers have been spoken to through a set of headphones? How many un-

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derstand how really uncommunicative it is?

**Bonzai:** How does your background in rock music fit with your work in the more traditional Irish forms of music?

**Masterson:** The band I played in was primarily into the jazz/rock idiom, but growing up in Ireland, I was always aware that there was this other music 'round. It's not uncommon for it all to sound the same, particularly the dance tunes such as reels and jigs, if you don't take the time to penetrate the first layer. As I started to work as an engineer, quite a few of my clients were traditional musicians, and it opened me up, and I grew to love this music and appreciate it, and hopefully to understand it. I also discovered the incredible talent, dedication and virtuosity of the players. Some of these players of traditional Irish music are just absolute masters, up there with Ravi Shankar.

**Bonzai:** Why is there suddenly this Renaissance, or new focus on Irish music, and everyone in the world looking at Ireland?

**Masterson:** I don't know. I have a half-theory that it's a part of this whole swing back from machine-controlled music to real music. I don't say that everything that comes out of a sequencer is wrong or bad, but there certainly was a time when it was awful. Now, some of the better aspects have been drawn into the general world of music. But all the time, I see people that are trying to get back to music, interaction between musicians in real time. If you look to traditional Irish music, I would put it up there with the whole jazz idiom in terms of virtuosity and instant interaction. It sounds like just "playing the tunes," but the variations happen all the time. And so, good music is getting out to a wider audience, and like a rolling stone, it's suddenly going at great speed.

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**Masterson:** Well, the funny thing about U2 is that it seems to me the gap between nobody knowing about them and then everyone knowing about them seemed awfully short. I don't



remember U2 doing those steps that every other band or artist seems to do. One minute they were four guys playing in the Baggot Inn, one of these stomping grounds in Dublin where you cut your teeth, and the next minute they were pretty big. It seemed to happen overnight. I'm sure they don't remember it that way, and I'm sure their manager Paul McGuinness would disagree. One of the reasons it happened so quickly, apart from the band's talent, was Paul's talent as manager. I remember them coming in for the early stuff: Kevin Killen did some of the work, and Pat McCarthy, Kevin Maloney.

U2 have done something that I don't believe anyone else has ever done of their stature—they've still kept Dublin as the center of their universe. You still find them in the local pub. And they've put a lot of effort back into the Dublin music scene. In America, if you are a success, I guess it's all right to drive up in a big car and flaunt it, but there is something different in Ireland, something to do with our history. Very often, you tend to be a little ashamed of success and try to hide it, not make a big thing about it. They have found a happy medium. Everyone knows it's *telephone numbers* when you talk about their income—they don't deny it, but they aren't terribly comfortable with it. They are still absolutely loved in the country, and in Dublin. They are successful but haven't changed.

**Bonzai:** How does your work as a live mixer keep you fine-tuned as a studio engineer?

**Masterson:** Well, there are two aspects. The most important is that, if all your music comes through two loudspeakers, you never really appreciate what it sounds like in the room, but more importantly, you miss the excitement, commitment, adrenalin, whatever it is that comes from a live situation. I can almost feel it through the mixing desk. Also, it's great to get out, and I love traveling. I feel that the best way to travel is to incorporate it with work. I've been to some great places: China with The Chieftains, back in '84-'85; symphony orchestras in East Berlin. Without the work, I never would have gotten there, and as a tourist, I never would have gotten through to the people like you do when you're working. You're suddenly connected with a lot of real people.

**Bonzai:** Do you carry much equip-

ment with you, like favorite microphones?

**Masterson:** If it's an indoor gig in a nice hall, then I would carry some microphones with me. But if it's a festival outdoors, what works in the studio doesn't work in that situation. You rely on getting specs ahead of time and go with rock 'n' roll mics. There's no point in being arty-farty about your 414s.

**Bonzai:** Could we talk about your work as a scoring engineer?

**Masterson:** What I love about that work is it's much like a live gig—a great feeling of immediacy when re-

ording an orchestra in the studio. Time is of the essence because of the sheer cost of having that many people there. Budgets are tight, so there is a fantastic feeling of "Let's get this done." You have to get your sounds together in five or ten minutes and be ready to roll. I just think that the best instrument in the world for expression, power, color, everything, is an orchestra. Some of the rock 'n' roll guys should go to a symphony concert—it would just blow them away.

**Bonzai:** How big is your main room?

**Masterson:** Well, we've had a 90-piece orchestra in there, but that many

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players tend to dry up the room some. Ideally, the room takes 60 to 70, which is quite a good size. We have a man in Dublin, Bill Whelan, who is a very well-respected composer and producer, and he's put together IFO, Irish Film Orchestras. He books the right musicians for the right jobs. Elmer Bernstein is one client who has availed us of those services, has become a good friend and is very supportive of our scoring growth.

**Bonzai:** How is the economy in Ireland now?

**Masterson:** Holding its own. The Irish pound was devalued, but not by as much as some of the other currencies in Europe. Our economy is based on two extremes, agriculture and the high-end software development. We have the highest proportion of third-level [University] graduates in Europe. There are certain things that are exceptionally good in Ireland, and education is one of them. Health service is another. Obviously I am biased, and I dearly love the country. It's a lovely place to live: It's clean; the people are unbelievably friendly; we've got our health service and education worked out. What we don't do is manufacture cars or machinery, and probably never will.

**Bonzai:** What about the technology you have at your studio?

**Masterson:** I suppose you must talk about the analog/digital thing. For what it's worth, I felt that digital up until now was appalling. Some of the early systems were horrific. If I was to name names, I would have to name them all. The first multitrack machine that sounded good to me was the 3324-S, and also the 48-track. I've always been a big fan of analog and Dolby SR. There are certain definite advantages to having everything in the digital domain, given that the conversions are up to scratch. Until now, analog has always been the clear winner, but I'm no longer sure. I'd say it's 50/50, and you still get something from analog that you don't get from digital—that indescribable something in the sound. Personally, I feel it's a matter of the sampling rate, that cutoff of response above 20 kHz, which analog handles differently. I read that Rupert Neve feels that in the console you have to go right out to 60, 70, 80 kHz.

**Bonzai:** The Irish have a good, healthy tradition of humor and death. When

you're laid out in the casket, Brian, and they have the beer bottles next to you to keep them cold, what kind of music shall we listen to?

**Masterson:** Charming interview. [Laughs] Well, it would really cut them up, but I think it would have to be a slow *air* played on the Uilleann pipes. I've been to funerals where this has happened, and it's just that one pipe in the church. That's it.

I think it's part of the Irish nature: If we are sad, we like to go over the top and be really sad. There may be some similarities between the Irish way and the Jewish way. When they are sad they are really sad, and when they are happy they have great happy music. We are also quite extreme: dancing reels and jigs and extraordinarily happy music. A lot of the poetry is based on all those hundreds of years of oppression and being ruled, I guess. Dreams of freedom. And the slow airs are mourning something or other, perhaps battle-related.

**Bonzai:** Let's say a producer is reading this story and feels Ireland might be a great place to work. Is it pretty easy to get there, adjust, find accommodations?

**Masterson:** Oh yes. I remember an early session with a composer who called and was so worried if it was necessary to bring a hot water bottle! He didn't think that the hotels would have heating. But we have some great hotels—here's the sales pitch—take the Shelbourne, for instance, overlooking the green, a very old hotel, very gracious and yet modernized.

**Bonzai:** Cheaper than New York?

**Masterson:** [Laughs] Oh yes. Anything that has to do with space and land is cheap in Ireland. It can be expensive to eat out, but the food is brilliant. But staying at a hotel is inexpensive, as is renting or buying a house. And you can go from London to Dublin in 50 minutes by plane. Another comfort to visiting artists, producers and engineers is the fact that we speak English, more or less. They'd have a ball, that's for sure. With studios nowadays, you take good equipment for granted, and we have a great maintenance guy. What's extra about coming to Ireland is the warmth and friendliness of the people. We are unjaded people. And I defy anyone not to take something from the musical ethos and atmosphere of Dublin. ■

*Roaming editor Mr. Bonzai: Leprechaun or banshee? You be the judge.*

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by Dan Daley

# DIFFERENT DRUMMERS

## ENGINEERS TALK ABOUT MIKING AFRICAN PERCUSSION

**P**aul Simon's *Graceland* may have drawn the most attention to it, but it has been there all along: the pervasive and seminal influence of African percussion instruments and playing techniques in contemporary music.

In a meeting of ancient instruments and modern recording, BOP Studios (in Mmabatho, Bophuthatswana, South Africa) has become a sort of nexus of old and new. The relatively new studio has been handling a wide range of projects, many

er at BOP and a resident of South Africa, originally from Zimbabwe. He was working on Studio A's Focusrite desk with Mango Groove, a South African pop group, last spring. Mitchell, tall, lanky and soft-spoken, has been recording African percussion sounds for years, integrating them into contemporary pop records. He's learned a few arcane bits about that craft not normally found on most sessions.

"Drum skins are normally made of cowhide on true, traditional African drums," he explains. "You don't want to just get out there and start banging away on them. The skins need to acclimate themselves to the studios. I use some sort of heater to warm them up to pitch. The skins have to stretch to sound the way they're supposed to." Five to ten minutes with a hair dryer usually does the trick, according to Mitchell.

The djembe is a West African drum that's large and elongated, with skins at both ends. Mitchell says, after experimentation, that an AKG 414 on the upper, tenor skin captures the higher registers best; an EV RE20 captures the deeper bottom skin. The mics usually get set up on low boom stands to accommodate the drummer, who plays while kneeling. For ambient miking, he uses a pair of Manley tube mics set up several feet away.

For marimbas, which are often used in an orchestral fashion—tenor, alto, soprano and bass—Mitchell uses one or two microphones per marimba, using his ear for placement after listening to the individual players.

The African talking drum is one of the most interesting of all percussion instruments. It's cylindrical, with in-



**Miriam Makeba with Alan Gregorie, who engineered and mixed her album *Sing Me a Song* at BOP**

of which involve popular South African acts like Mango Groove, as well as returning exiles such as Miriam Makeba—acts that incorporate traditional African percussion as part of a modern sound.

Recording the percussion instruments of Africa poses a pleasant challenge to both local and visiting engineers. Richard Mitchell is a staff-

terwoven cowhide strings running from one end to the other. It's held under the arm, and pitch changes are achieved by increasing and decreasing pressure on the strings. The strings tighten or loosen the drum heads, which are played with a hooked beater.

"The player moves around a bit while playing, since it's a pretty physical instrument," Mitchell explains. He determines just how physical the player is on a given day and places a close-in AKG 414 based on that. Then he mixes in Neumann tube 87s for ambience.

If you think that's physical, try the foot shaker, a pod filled with seeds worn around the ankle. "We record that pretty much like recording Foley," Mitchell says. "Usually, there's more than one player, and I use a stereo microphone setup. The mics are panned hard left and right, and the movement of the players gives you some interesting and random panning effects."

Mitchell likes to record percussion in the middle of the large rooms at BOP, as well as on the sizable drum riser at the rear of the studios. "These are performances with very physical instruments," he explains. "You have to treat the recording of them as such and give them the feeling that they're giving a performance the way the drums were meant to be used."

Alan Gregorie, a New York engineer whose credits include a staff stint at Soundworks Digital and tours with Jason & the Scorchers, as well as a string of dance, rock and pop remixes, was at BOP in April working on Miriam Makeba's new record. He encountered a one-of-a-kind, five-string, stand-up double bass on that session, played by producer Victor Mazono.

"It had a pickup on the bridge, so at first I tried taking it direct through a Manley DI box," Gregorie says. "But I couldn't really capture the way this instrument actually sounded. It had an incredible low end to it. I've miked acoustic basses before and usually used Neumann 87s or 67s on them with good results. But the mic closet at BOP is pretty extensive, so I kept on pulling new microphones out and trying them until I settled on a Neu-



**Control Room 1 at Plus XXX Studios with owner Claude Sahakian**

## Plus XXX Studios

Plus XXX Studios (Paris) opened 14 years ago as a 24-track mixing site. Since then, it has blossomed into a notable facility where music on reel is turned into smash hits.

Last year, Plus XXX owner Claude Sahakian decided to take a giant step forward and switch gears. With an ambitious five-month, \$2 million upgrade, he enlarged Plus XXX into a three-studio complex. French acoustician Christian Malcurt, whose projects include Studio 8 at IRCAM and Le Voyageur II mobile studio (*Mix*, June 1990), designed the facility's three large, well-appointed control rooms, which are home to France's only Genelec monitoring system. Today, Sahakian's three-story facility is a stylish workplace with a bright, warm atmosphere.

On the first floor, at the end of a slightly sloping corridor, Studio 1 is a 1,881-square-foot recording area with three video-linked isolation booths. Overlooking Studio 1 is a 538-square-foot control room, featuring a 60-input Neve VR Series console with a custom film-monitor module, Flying Faders and Recall capabilities. This new room was designed to accommodate tracking, scoring and mixing, especially for film. The monitoring system includes two flush-mounted Genelec 1035A mains, one custom Genelec in the center and two custom sub-bass monitors in the front, plus Genelec 1031As in the rear for 6-track film mixes. Sony PCM-3348 and PCM-3324, Otari MTR-90 and Studer A820 (C-

inch with Dolby SR A) recorders are located in a separate, air-conditioned machine room. Studio 1's mahogany wood interior was designed by Italian decorator Roberto Bacchiochi.

On the second floor, in addition to Plus XXX Studios' offices and a full-service restaurant, is the brand-new pre-production/MIDI/overdub Studio 3. Control Room 3 is equipped with an SSL 4048 E Series console (G Series computer with Total Recall), Genelec monitors and a wide variety of outboard gear, including a Digidesign Pro Tools 8-track hard disk recorder/editor.

On the third (top) floor, in the 18x25-foot Control Room 2, an SSL 4064 GTR Series console is



**Studio 1 at Plus XXX Studios**

the centerpiece. Dolby surround mixing is also proposed for this room, which features a Genelec S30 monitor placed between two Genelec 1035As and four Genelec 1019s mounted in the rear. The live 753-square-foot Studio 2 can hold up to 20 musicians.

Skylights shed natural light from the top floor through the entire complex, contributing to the rooms' aesthetic appeal. Plus XXX has a long list of international clients, including Arthur Baker, Eurythmics, the Gipsy Kings, Herbie Hancock, Neneh Cherry, Yes, and a number of top producers, such as Stuart Bruce, Bill Laswell, Malcolm McLaren and Phil Ramone. Apparently, the sky is the limit at this newly renovated, creative and productive facility.

—Guillaume Schouker

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mann TLM-170, which I had been using for vocals and drum ambiences, and I placed it right off one of the F-holes. That got the sound we were looking for onto tape. In fact, I wound up using no EQ at all recording the bass, and I'll probably have to roll some bottom off for the mix."

For the traditional trap kit on the basic track sessions, Gregorie used more room ambience than he ordinarily does, taking advantage of the high ceilings and hard merbeau wood surfaces in Studio B. Two levels of ambient tracks were recorded: the closer-in using B&Bs, and the farther ones using the TLM-170s and Manley tube mics, both in stereo pairs.

On another track, Gregorie tried a pair of U67s using various pattern settings. "I wound up going with a cardioid pattern on them," he says. "There was something about the way that pattern captured the room sound that was nice and tight and very musical. The omni pattern gave me too much of the back wall's reflections. And as a result, there was very little processing on the drums at all. It was very natural-sounding."

On a marimba track, Gregorie uses a pair of AKG 414s on the instrument in one case, moving them around to catch the crispness of the high-pitched marimba. On other marimbas, he used a U47 to catch the low C of bass versions, with a Beyer ribbon mic on top. "For the bottom on an instrument like that, you need to use some kind of large-diaphragm microphone," he explains.

As unique as the instruments were, the players' approaches were just as different, and Gregorie says he had to adjust his own attitude to match the new environment. "As an engineer, I was trying to relate to the session," he says. "I started out pulling out some tricks I had from working with reggae bands like Steel Pulse. But before long, I found that the players and the instruments were influencing me. I had some trepidations, not the least of which was the fact that this was the first time I was working on a Neve VR. But, between the players' vibes and a fast reading of the Neve manual, the anxieties basically disappeared on the first day." ■

*Dan Daley is Mix's East Coast editor. Any continent, as long as it's the East Coast.*



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## BITS AND PIECES

### UK

London's Strongroom studio complex purchased an SSL 4056 G Plus console with Ultimotion, the first of its kind to be installed in England. The Strongroom, which houses two multitrack studios and eight pre-production rooms, recently hosted sessions with Tina Turner, Orbital and The Levellers... Snaptrax, a new audio post-production company based at Denham Film Studios (Uxbridge, Middlesex), opened for business using SSL Screensound. The new system was tested on post-production work for the *Jeeves and Wooster* TV series based on the comic novels of PG. Wodehouse... Steve Mac of Skratz Music (Chertsey) purchased a Soundtracs Jade 48PB... Ken Barratt, chairman of Sony Broadcast International, announced his early retirement. Barratt, who is one of the founders of SBC, will continue to act as one of

the company's key advisers on technical and industry issues... Sony Classical was awarded the Gramophone Engineering Award for the London Symphony Orchestra and Chorus' recording of Debussy's *Le Martyre de Saint Sebastien*... Pro-Bel Ltd. provided audio reference and distribution equipment for Air Studios' new headquarters at Lyndhurst Hall in Hampstead. Pro-Bel's system includes 44.1kHz and 48kHz master Grade 1 reference generators for the new digital dubbing suites and flexible distribution frames, which house a variety of amplifiers, switchers and word clock generators. Artists who recorded during the first six months of operation at the new facility included Dire Straits, Gloria Estefan and Henry Mancini...

### EUROPE

Digidesign and X-ART Studios opened the first Digidesign Pro School in Europe. The Pro School, located in the X-ART complex (Pinkafeld, Austria), was designed to educate novices and professionals in the techniques of



**X-ART's extensive facilities were designed by L.A.'s studio bauton.**

hard disk recording using Digidesign products, including Pro Tools, Post-View, TDM and Session 8. X-ART, which also houses music-recording and video post-production facilities, was named Digidesign's exclusive Austrian distributor... Masters Studio (St. Gallen, Switzerland) purchased the first SSL 4048 G Plus console to be installed in continental Europe; the console is housed in a control room redesigned by Andy Munro...

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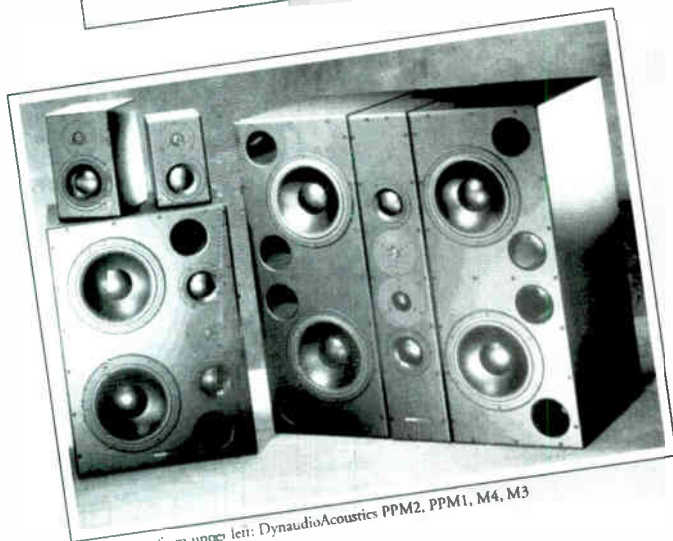
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BASF presented the tenth annual Golden Bobby Award to Carl Sonke Albrecht for his production of Peter Fessler's song "Don't Pass Me By." The award was given at the International Broadcasting Exhibition in Berlin... Freddy Potargent was appointed Apex's (Hasselt, Belgium) head of engineering. Potargent previously worked as a hardware/software engineer for Philips' CD control systems... The second Radio Montreux international radio symposium and technical exhibition will be held June 9-11. Subjects to be discussed include The Regulation of Radio in the Year 2000, Financing New Technologies, The Impact of DAB on Radio and Central Eastern Europe Radio... Elektroson B.V. and Gateway Productions B.V. (both in The Netherlands) developed a computerized Hindi/English dictionary on CD-ROM. The dictionary is being made available to language educators and governmental institutions worldwide, as well as India-based English teachers, international businesspeople, etc...

### AUSTRALIA

ARX Systems, a Melbourne-based manufacturer of audio signal processing equipment, power amplifiers and processed loudspeaker systems, appointed Novalite Professional Lite & Sound Pte Ltd. its exclusive full line distributor for Indochina. Novalite also represents ARX in Singapore... Australian Monitor (Gladesville) hired Iain Everington as its national sales manager. Everington is the former sales director of Allen & Heath, UK, and a founder of AMS International, a Sydney-based high-tech import company...

### ASIA

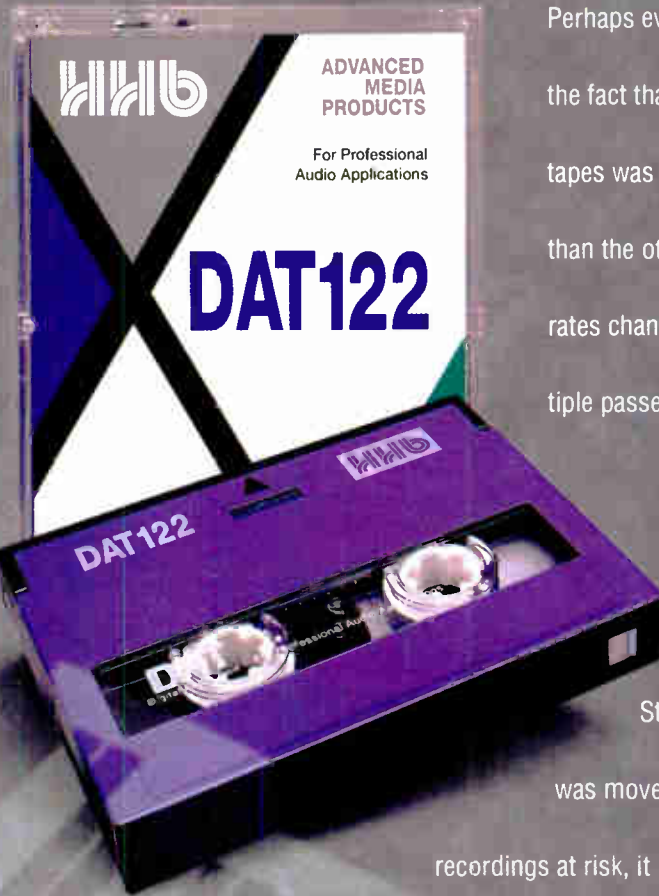
Selbu Digital Communications Audio Studio (Tokyo) purchased an AT&T DISQ Digital Mixer Core. This facility, which features Neve and SSL consoles and Sony digital multitrack recorders, has hosted sessions with Herbie Hancock and Chick Corea, as well as numerous Japanese recording artists... Landmark Studios (Yokohama) installed two SSL 4072 G Plus consoles, the first delivery in Japan. Landmark is situated in Landmark Tower, Japan's tallest building... Korea's Sountec Studios and TaeSung Records both installed SSL 4000 G Plus consoles. ■

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by Paul Potyten

# MUSIC FOR VIDEO GAMES

## THE PROMISES AND PITFALLS OF PRODUCING SOUNDTRACKS FOR INTERACTIVE GAMES

P

roducing soundtracks for video games? Get serious! What could be interesting about writing dopey, repetitive melodies that will be played back through a 3-inch speaker?

Well, the technology is quickly growing up here, just as it is in other multimedia niches. It's certainly still true that cartridge-based video game delivery systems, like Sega Genesis and SuperNintendo, tend to be very restrictive. The PC-based games that take advantage of the proliferation of audio cards like Creative Labs' SoundBlaster are somewhat less restrictive in terms of their audio capabilities. And CD-ROM platforms that push the technological interactive envelope—such as Philips' CD-I and the newly launched 3DO system—are pointing the way to the future of mass-market video games.

But some audio pioneers feel that even the most restrictive of these environments offer more than enough creative rewards to offset the limitations they face. Mark Miller founded Neuromantic Productions about three years ago after a stint at Digidesign. To date, he has produced music and audio for more than 40 games, including Viacom New Media's *Rocko's Modern Life* for SuperNintendo and TecMagik's *Pink Goes to Hollywood* for SuperNintendo and Sega Genesis. He is currently working on music for some upcoming 3DO titles, and he's just finished a couple of cuts on a Capitol Records audio CD release in conjunction with Virgin Games. "It's an *Interactive Greatest Hits, Volume 1*," says Miller. "The songs come from a Genesis release from Virgin called *Robocop vs. Terminator* that I com-

posed. They're more fully orchestrated versions of those tunes."

### FIRST, THE BAD NEWS

Miller confirms that there is what is traditionally thought of as a down side as well as an up side to com-



Mark Miller

posing music for interactive video games. "The down side is that the cartridge-based video game delivery systems tend to be more limited than CD-based systems, in that they contain a sound chip with a limited number of voices, and the quality of the sounds is limited."

To produce sound for a video game machine, you generally need a development station, which includes software that allows you to emulate and control the functions of the

sound chip in the machine. Then you need a mechanism for creating and storing composition data. No cartridge systems use MIDI as such because MIDI contains a lot more data than a video game is capable of using. In some cases, producers use a very stripped-down subset of MIDI.

Music must be conceived with the specific machine architecture—and the constraints of the project's sound design—in mind. A composer must be intimately familiar with the capabilities and the limitations of the machine they are writing for. For example, it doesn't make sense to write music for a full symphony and then attempt to realize it on a six-voice machine. Instead, you should

***Pink Panther* screen capture from the *Pink Panther Goes to Hollywood* Genesis game**

try to conceive of it as chamber music, which can more readily be realized on a six-voice system.

Most cartridges range in capacity from 400 to 1,400 kilobytes. Graphics and programming data usually take up most of that space, so the amount of memory available for sound on a project is often a serious limitation. On *Pink Goes to Hollywood*, Miller came up with a creative and technical specification based on TecMagik's decision to use the *Pink Panther* theme.

"When I watched *Pink Panther* cartoons, it became obvious that Henry Mancini's beatnik jazz theme was used throughout, with stylistic variations corresponding to the setting," Miller says. "For SuperNintendo, which uses a sample-playback system for the instruments, all of the instruments for eight different versions of the theme—from early English folk music to big band jazz—fit in about 48 kilobytes. In a typical project, all of the music composition data—the sound effects, whatever speech there is—and the interactive logic all have to fit in anywhere from 40 kilobytes to 240 kilobytes.

"When you're designing music for these platforms," Miller continues,

"you start with a knowledge of how much memory you have and how you'll break it down for the resources you need. The challenge is to decrease the size and scope of your possibilities until they match the capabilities of the target platform, and then approach the project with enthusiasm. As a composer, you can easily get hung up wanting

posed up four octaves and used very convincingly as a lute."

**NOW THE GOOD NEWS**

Miller emphasizes that the reason to choose to work within these limitations is interactivity. "That's what makes this all exciting," he says. "Even with the advent of machines that can play back Red Book audio,



PHOTO: MIRSCH, GEOFFREY '1993

more instruments and longer loops. Because of the playback systems for these games and the audio bandwidth of the sounds, it makes the most sense to focus your resources on a bandwidth between 250 Hz to 10 kHz, so when it plays back on a TV speaker, it creates the illusion that it's a big, powerful mix that is limited by the TV.

"Because of these limitations, composition must be partnered with very clever arranging and good sound design in order to create the illusion of having more than you really have," he says. "*Pink* is a good example of that. It's a tiny amount of memory for instruments, which we worked for weeks to optimize, and brilliant orchestrations by Ted Allen of the eight versions of the theme, to the extreme that in the Sherwood Forest version, the acoustic bass sample is trans-

it makes sense to continue using synthesized audio in this environment."

The modified MIDI spec that is used to define the compositional information also contains the basis for a very simple programming language. So you can build into the music the ability to modify itself *as it's playing* to match what is going on on the screen.

Miller elaborates: "In the Genesis game *Tasmania*, we wrote a jazz vamp with acoustic bass, trombones and trumpets at the corresponding point in the game that the Tasmanian devil is trying to climb up to the top of a tree with about 20 branches. When he gets to the top, he can hop into a balloon and take off. We created a program that plays music corresponding to each particular branch

—CONTINUED ON PAGE 177



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by Philip De Lancie

# SONIC'S DISCVIDEO BRINGS CD-R TO THE MOVIES

I

n the decade since the compact disc began its ascent to dominance in the prerecorded music industry, the once ubiquitous LP has been driven to near extinction, and the compact cassette has been knocked into the back seat. The CD's fidelity and convenience—not to mention the enduring futuristic appeal of digital and lasers—combine to make a powerful adversary for alternative formats.

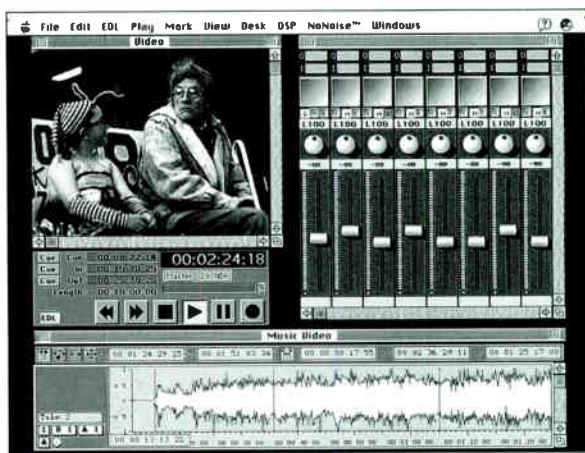
Now the CD is poised to repeat history in a new arena. This time, under the name Video CD, it will take on the venerable VHS format in the huge video rental and sell-through market.

Video on CD is not new. Various versions have been floated over the years, enough to confuse even veteran consumer electronics format-watchers. But two important factors are different this time, one being the existence of an international standard for the video and audio compression required to get usable running time on a disc. Under the MPEG-1 encoding scheme, a Video CD will be able to hold up to 74 minutes of linear (noninteractive) programming, enough for many special-interest titles. Feature films will be stored on two discs.

The second important element is the cooperation of the major consumer electronics hardware manufacturers in support of the Video CD standard. Sony, Philips, Matsushita and JVC issued the standard for the format jointly, with other companies

falling in behind.

Because of the amount of data compression required, Video CD won't deliver the improvements in quality that CD-Audio brought to the music market. Its main appeal for the film industry is its ease of manufacture, which translates into lower costs. That factor will become especially important in the future as megachannel cable networks give consumers the choice between driv-



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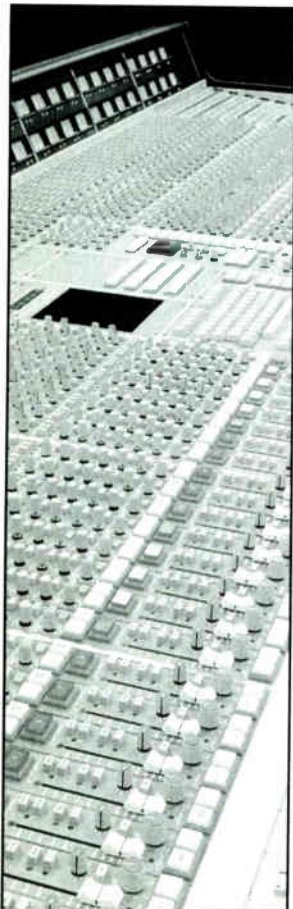
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ing to the video store or watching movies-on-demand at home.

Video CD proponents are hoping that if movies are as cheap as CDs, consumers will opt to buy rather than pay the cable company. With instant access to up to 99 tracks on the CD, consumers may get hooked on the joys of "scene surfing." Indeed, this may prove to be as much "interactivity" as most couch potatoes need or want.

Video CD is expected to debut in the U.S. by mid-1994 in two forms. Dedicated players will reportedly be priced under \$500. Adapters allowing the discs to play on existing CD-Audio players with digital outs—potentially opening up about 35% of the installed base of CD players to the new format—should sell in the \$200 range. There is also speculation that some of the dedicated players will have ports for plug-in modules, allowing the consumer to add the interactive capabilities of formats such as 3DO or Sega CD to the basic movie player.

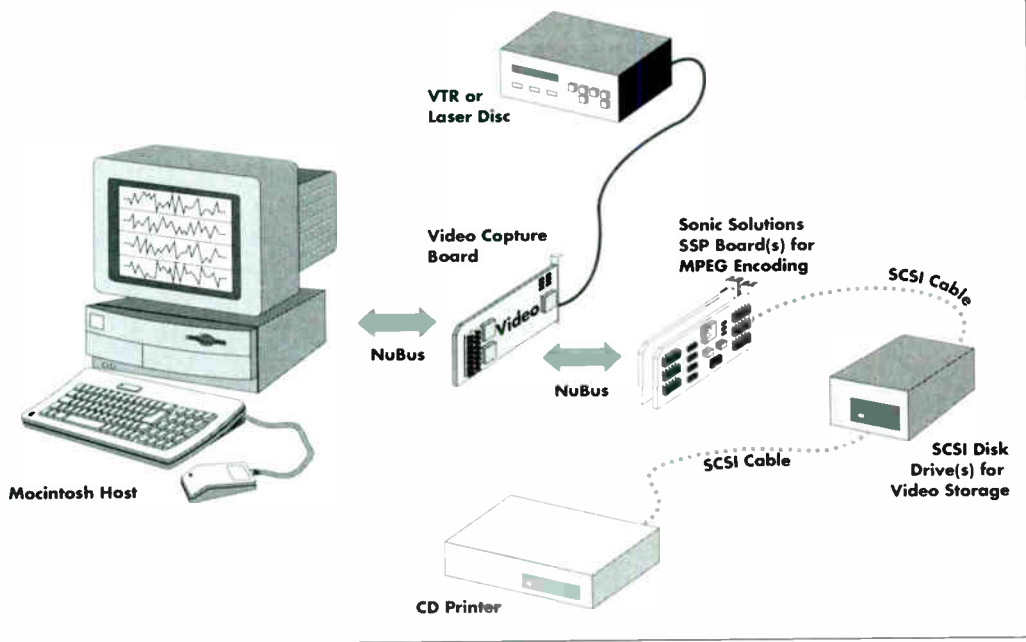
Video CD also has been designed to be cross-compatible with Full Motion Video titles for Philips CD-I players equipped with an FMV cartridge. These titles, including some feature films, have already begun to appear in the market. In response to the imminent arrival of Video CD, digital audio workstation maker Sonic Solutions has been developing an extension of the Sonic System that would allow the recording of Video CDs onto CD-Rs.

The company hopes this new capability will help position its customers, many of whom are involved in master preparation for CD-Audio, to get in on the master prep market for the new format as well. Sonic's Video CD system was far enough along to be announced and demonstrated at the AES convention in October. But the product, called DiscVideo, is not expected to be ready to ship before the NAB show in March. For a preview of DiscVideo's capabilities and an explanation of how they fit in with the needs of current Sonic System owners, I spoke to the company's president, Bob Doris, from his offices in San Rafael, Calif.

*What will the DiscVideo option support as far as the various forms of*



## Sonic Solutions DiscVideo™ Video CD Mastering System



**Video data is captured onto hard disk by the Video board. The Sonic Solutions SSP board(s) then perform MPEG-1 encoding of video and audio. After compression, the material can be sequenced and subcode information applied. The finished project is then transferred to CD-DV via the Sonic CD Printer.**

*CDs that include video?*

Basically, we will be offering some level of support for three formats: CD-I FMV, Karaoke CD and Video CD. We will provide the ability to input and sequence both MPEG video and MPEG audio, and to perform subcode editing. We will also provide at least minimal application support for CD-I FMV and Karaoke CDs. In order to play on CD-I players, for instance, Video CDs need a little bit of a CD-I application program on the disc. The application makes a virtual control panel on the screen so you can

stop and start, slow forward, advance to a track and all the other usual stuff. The Video CD standard

—CONTINUED ON PAGE 83

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# MULTIMEDIA CHIP SHOTS

## OMF INTERCHANGE TOOLKIT

The Open Media Framework™ Interchange Toolkit from Avid Technology (Tewksbury, MA) is a software package that lets developers add support for OMF Interchange to any digital audio, video, graphics or animation application. Priced at \$499, the Toolkit includes object code, portable C source code, a reserved UID, documentation and integration support; an object code-only version is \$50. The Toolkit is available for Macintosh, Silicon Graphics, Sun and PC platforms, and other versions are being developed.

Circle #200 on Reader Service Card

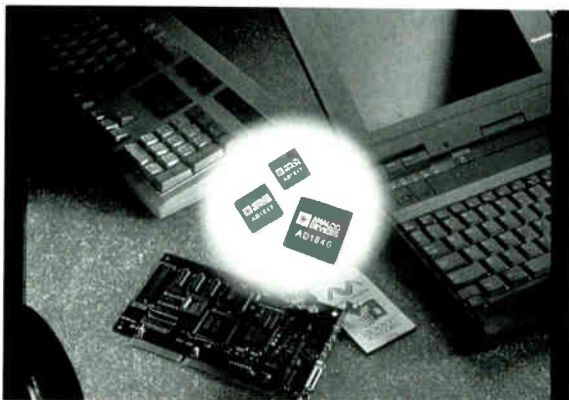
## GLYPH TECHNOLOGIES SCSI STORAGE

Start-up firm Glyph Technologies Inc. (dist. by ThinkWare, San Francisco) has introduced a series of fast, affordable SCSI storage devices for music recording and multimedia production. A dual-speed CD-ROM drive featuring Direct Sample™ allows digital sampling from any audio CD. Also available are three hard disk units (248MB, 580MB and 1.2GB) and a 3.5-inch, 128MB rewritable MO drive. All units are 19-inch rack-mountable and will also be offered in non-rack versions.

Circle #201 on Reader Service Card

## GRAVIS ULTRASOUND AUDIO BOARD

UltraSound is a wavetable synthesis audio card from Gravis (Burnaby, B.C.) that delivers CD-quality sound for \$199. It supports 32 digital voices and ships with 192 16-bit General MIDI patches. Users also can store samples in onboard RAM, enabling the design of custom patches. Featuring Focal Point™ 3-D technology, UltraSound is supported by many games and applications and is backward-compatible with a Sound Blaster emulator. The UltraSound



## ANALOG DEVICES SOUNDPORT STEREO CODECS

Analog Devices (Norwood, MA) introduced two low-cost 16-bit stereo, CD-quality codecs for high-performance audio on the IBM PC. Both single-chip, sigma-delta codecs support Windows Sound System and Compaq Business

MAX, with 3-D, standard MIDI support, 256K onboard memory (expandable to 1 MB) and a SCSI interface for support of double-speed CD-ROM drives, also is available for \$299.95.

Circle #202 on Reader Service Card

## PINNACLE SIERRA OPTICAL DRIVE

Pinnacle Micro (Irvine, CA) has introduced the Sierra™, an optical drive that holds 1.3 GB of data on a single 5.25-inch removable cartridge. The unit offers 19ms effective access time, 2MB/second throughput and 4,500rpm rotation. Other features include a selectable read ahead and write behind cache, segmented cache, direct mapping for fast look-up, write recording to minimize mechanical access for seeks, adaptive cache to datastream and a zero-redundancy cache. Sierra cartridges are compatible with ISO, ANSI and ECMA standards, as well as standard plastic media from DOT, Verbatim, Sony, 3M, MKC and Hoechst. The drive retails for \$2,995 (Macintosh) and \$3,195 (PC); cartridges are \$250 each.

Circle #203 on Reader Service Card

Audio. The AD1847's serial port allows direct interface to a DSP or system I/O chip and fits in low-cost, 44-lead PLCCs or TQFPs, rather than 64- or 68-lead packages; it retails for \$7.50 at OEM prices. The AD1846 (less than \$8.00) is pin- and register-compatible with the AD1848K and offers 70dB dynamic range.

Circle #204 on Reader Service Card

## ALTEC LANSING ACS3 COMPUTER SPEAKER SYSTEM

Altec Lansing (Newton, NJ) introduced its latest audiophile-quality computer speaker system, the ACS3, which includes two self-



powered, shielded satellite speakers and an amplified subwoofer. The system is priced at approximately \$200.

Circle #205 on Reader Service Card

## ASYMETRIX MEDIABLITZ! 3.0 MULTIMEDIA UTILITY

Asymetrix Corporation (Bellevue, WA) is now shipping an upgraded version of its MediaBlitz! multimedia utility for Windows. Version 3.0 software allows users to combine and synchronize sound, graphics, video and animation into a complete multimedia score. The scores can be used by themselves or within any application that supports object linking and embedding. Features include a set of media editing tools, extended graphics and text support, and transition effects. Suggested retail price is \$95.

Circle #206 on Reader Service Card

## TURTLE BEACH MULTISOUND MONTEREY AND RIO

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IBM-compatible PC sound card from Turtle Beach Systems (York, PA). The new card, an enhanced version of the popular MultiSound card, features SampleStore and 256K of sampling RAM (upgradable to 4 MB using standard SIPP's). This feature allows any .WAV file to be used as a MIDI instrument. Also new is WaveFront (an onboard 32-voice General MIDI sample playback synthesizer) and an effects processor for MIDI playback. Suggested retail price for MultiSound Monterey is \$599.

Turtle Beach is also shipping Rio, a General MIDI synthesizer card that uses WaveFront to provide 32 voices

of 16-bit instruments for \$249.

Circle #207 on Reader Service Card

#### COMMFORCE 4-SIGHT ISDN MANAGER

Commforce (West Des Moines, Iowa) introduced the 4-Sight ISDN Manager, a Macintosh utility that allows large files (sound, video, graphics, etc.) to be transferred at speeds over 750K per minute—far faster than modems. Also offered are a Serial Redirector and Comms Toolbox utility, which provide a direct serial connection between remote locations at 128 Kbps, giving any communication package the poten-

tial to run at high speeds over an ISDN or Switched 56 connection.

Circle #208 on Reader Service Card

#### SUNRIZE INDUSTRIES STUDIO 16 V3.0

Now available from SunRize Industries (Campbell, CA) is Version 3.0 of the Studio 16 hard disk recording/editing software. The major new feature is an intuitive timeline-based cue list, which allows control of audio production through pointing and clicking. Also new are automatic fades and crossfades, automated mixing, automated punch-in/out, external MIDI mixer support, SMPTE chase, assignable tracks and multiple digital audio card support. Compatible with the Amiga 2000, 3000 and 4000, plus NTSC and PAL, the Studio 16 V3.0 ships with either the AD516 digital audio card (\$1,495 for the package) or the AD1012 (\$595).

Circle #209 on Reader Service Card

#### FWB HAMMERTM PE STORAGE SYSTEMS

FWB Inc. (San Francisco) announced a new line of low-cost mass storage systems for the Macintosh. Designed for use with entry- to mid-level systems, the drives are packaged with the Hard Disk Tool-Kit™ Personal Edition SCSI utility software. The line of SCSI-2 hard disk drives come in capacities from 170 to 545 MB, with seek times of 12 to 17 ms. Removable media include a 128MB MO drive with seek time of 30 ms and rotational speed of 3,600 rpm, plus SyQuest drives in 42MB/5.25-inch, 84MB/5.25-inch and 105MB/3.5-inch formats.

Circle #210 on Reader Service Card

#### SYQUEST SQ1080 DISK DRIVE

SyQuest announces the development of the SQ1080, the first PCMCIA removable hard disk cartridge drive for palmtops, notebooks, pen-based computers, personal digital assistants or any device with a Type III or Type II stacked interface slot. Using a 60MB or 80MB, 1.8-inch cartridge, the unit offers a Mean Time Between Failure rating of 150,000 hours, a 32K buffer and average access time of 16 ms. The sustained transfer rate is 1.6 MB/sec with an 80MB cartridge and 1.3 MB/sec with a 60MB cartridge. Estimated retail for the drive and one cartridge is under \$300, while additional cartridges will be around \$40; delivery is scheduled for mid-1994.

Circle #211 on Reader Service Card

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supplied with not just one, but an incredible *five* CD-ROMs, free! These discs have been created by Akai and some of the foremost sound library developers in the world: East-West Communications, The Hollywood Edge, and InVision Interactive. This fact alone makes the CD3000 an unbeatable value. From there, you can go on to use any CD-ROMs created for Akai samplers.



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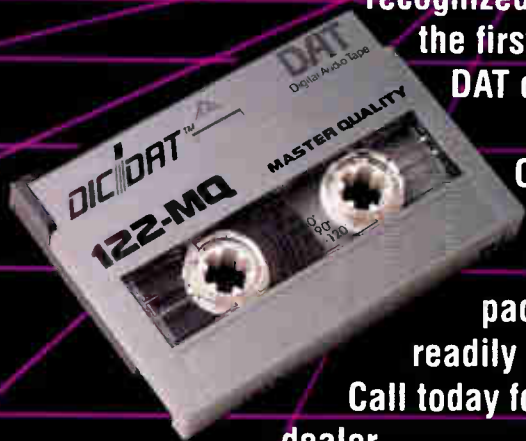
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—FROM PAGE 77, TO THE MOVIES WITH CD-R

requires you to have at least this very small CD-I application on the disc. We are talking with our customers to determine how far they want us to go in providing full-blown authoring capabilities for CD-I, as opposed to simply the ability to sequence the videos. We will be guided by our customers as far as how much demand they feel from their clients, and for what.

*You refer to sequencing the video. Is that process similar to sequencing audio tracks for an audio CD?*

You can analogize it pretty closely to that. In a CD prep environment, people lay out their tracks in the order they like and add the subcodes. Typically, they also like to perform some limited editing without having to go back to their original source, such as doing fade-ins and -outs, and perhaps some not-too-elaborate editing within the tracks, like taking out a chorus if a track is too long. Similarly, we feel that what we have to pro-

vide for video is the ability to move the tracks around relative to one another, apply subcodes and perform certain kinds of limited editing functions that are useful in that context. But I don't want people to think that this is going to be a full-blown video editing system. It won't be.

*Will the subcodes allow consumers the same control over the video as they now have with audio on CD? That is, can they use their player controls to go from track to track and to search forward and back within tracks?*

Yes.

*Which of Sonic Solutions' existing customers do you see having an interest in DiscVideo?*

First, almost all the people who currently use the Sonic System for CD prep work.

*Even if they are currently in a strict record company situation?*

Yes. The reason is that two of the proposed applications for Video CD formats are the release of videos and

movies on CD and the release of music videos on CD. When you think of the people in the entertainment industry who are already well-equipped and whose job it already is to take a piece of compiled program material and get it ready for replication on CD, there isn't a more on-target group than the people who use the Sonic System for CD prep work today.

*And you think they will be able to easily make the transition into dealing with video?*

That's right.

*What other Sonic customers might be interested?*

One group is the people doing sound-for-picture work or audio-for-video post. Our plan allows them to work with a kind of intermediate-level video that uses intra-frame compression, without the inter-frame compression that is part of the full MPEG encoding. They will cut sound on the Sonic System with that video as a guide, and then they will want to cut a Video CD as a quick

# COMPRESSED COMPRESSOR



Meet the little cousin to the widely acclaimed DC 24... but don't let the size fool you. The FSC 22 is very big on performance and features. Like switchable attack/release response, dual-mode metering to display either gain reduction or output level, and an Input Trim switch to match -10dBV or +4dBu systems for minimum noise and maximum headroom. It's even got those clever new Neutrik connectors that accept three-pin or 1/4" connectors!

Back these features with the superlative VCA performance that made the DC 24 famous, and you've got yourself a top-notch compressor/limiter that's ideal for studio or home recording, live sound, broadcast or post-production. Mount two horizontally for 4 channels in a 19" 1U space. Or rack-'em up vertically for 20 channels across for patching into console inserts.

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## QSI TECH UPDATE

**NEW ACQUISITION:** two components from the Cedar Real Time Audio Restoration System—the DC-1 Declicker and CR-1 Decrackler.

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reference. For producers and ref work, the semi-random-access capability of the disc will be just great. Another group is the corporate A/V market, where these Video CDs are going to find many applications. When you think of the uses to which videotape is put in a corporate setting, from sales presentations to training, I think it will be more convenient for them to go onto CD. In those sorts of applications, the semi-random-access capability pays off.

*The data bandwidth of a CD is about 150 kilobytes per second. On a CD-Audio disc, that is all used for Red Book audio. With Video CD, that bandwidth has to be shared between audio and video. So what level of audio fidelity can Video CD deliver?*

Video CD uses MPEG-1 audio compression, which is part of the Musicam family of compression schemes. It is about 7:1 compression. So it simply is not going to be as good as something like DCC or MiniDisc. But I have little doubt that we will get at least to the level of VHS audio. That is *not* a very hard target to hit. The interesting thing about these compression algorithms is that while the decoding is always fixed, because the decoder chips are built into the playback hardware, there is some latitude given to DSP practitioners like us as to how the encoding algorithm is actually implemented. Given our thorough understanding of DSP technology, we think we can—in addition to simply doing a decent implementation of the MPEG audio—add something to the party. We all recognize that in order to squeeze the audio and video onto a CD, you are talking about some trade-offs being made. But hopefully we can do a very good job with the algorithm and impress people with the fidelity that comes out.

*So you are still working on the encoding algorithms?*

That's right. It isn't just a matter of getting program material encoded. Ninety percent of the development effort goes into making the encoding efficient for our customers. There is the actual speed of the encoding, but also the matter of how the encoding gets done in a working environment.





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### How will the existing audio manipulation tools in the Sonic environment relate to working on audio for CD Video?

The existence of noise in the incoming audio signal tends to addle these types of compression schemes. It interacts in a very odd way with them and can produce some artifacts. So there is a significant advantage to being able to use NoNoise to pre-process the audio before you go through the compression.

### Aside from noise, though, what about pre-EQ to compensate for the effects of the data compression algorithm on the sound?

Absolutely. There is a tremendous advantage to being able to do those things to the sound in the same environment where you do the data compression, because it is only after you hear the signal compressed and decompressed that you can get a sense of what is happening to the audio. This is exactly what audio mastering has been for the last 30 or

40 years. You get a piece of material and you do things to it based on the release format.

### Can you do the MPEG audio compression separately in real time so that you can hear what you need to do to the sound without waiting each time for the video processing? Yes.

### What are the hardware and software components of the DiscVideo system?

For existing Sonic System users, there will be a software option, which will allow non-real-time video encoding, real-time audio encoding and the basic sequencing steps that I spoke of earlier, all using the existing Sonic DSP hardware. This option also includes one additional piece of hardware, which is a decoder board so that you can output the signal on SCSI and send it to a hard disk or to a CD recorder. And you can also see it and hear it on video and audio monitors. The price will be on the order of \$20,000 to \$25,000. One additional NuBus card installed in the

Mac will be required to do real-time video encoding on NTSC or PAL analog video input. For that, we are talking about another \$15,000 to \$20,000. A second card will be required if they want more than just composite video input, such as D-1.

### So potentially you have up to three additional NuBus cards as well as the two audio DSP cards in the Sonic System. Might that be a problem, given that even most of the high-end Macs now have only three card slots?

No. We have many Sonic System users now that use an expansion chassis.

### What would be the typical signal flow through the system from a client's input media out to a finished CD-R disc?

First, there is a capture step. The material is played into the system and recorded onto the hard drive in either a pre-processed state, from which it is MPEG-encoded out of real time, or it is real-time encoded

—CONTINUED ON PAGE 177

## Announcing Acoustic Tools for Project Studios: Low-Cost, High-Performance, Complete Room Packages

*"In response to numerous requests from Project Studio owners for a low-cost system offering RPG's industry reference acoustic technology, we developed three new high-performance, fire-safe acoustic tools using an innovative plastic molding technology and new leading-edge acoustics research. The result is a powerful and affordable complete room package system, which can be installed in hours and is yours for a song." Dr. Peter D'Antonio, President/CEO*

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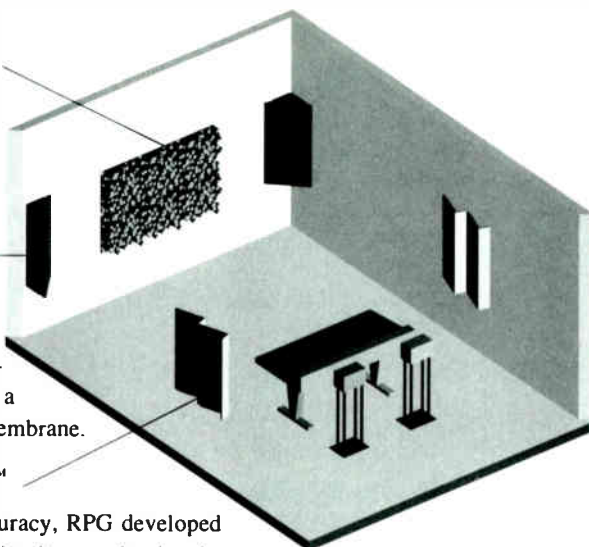
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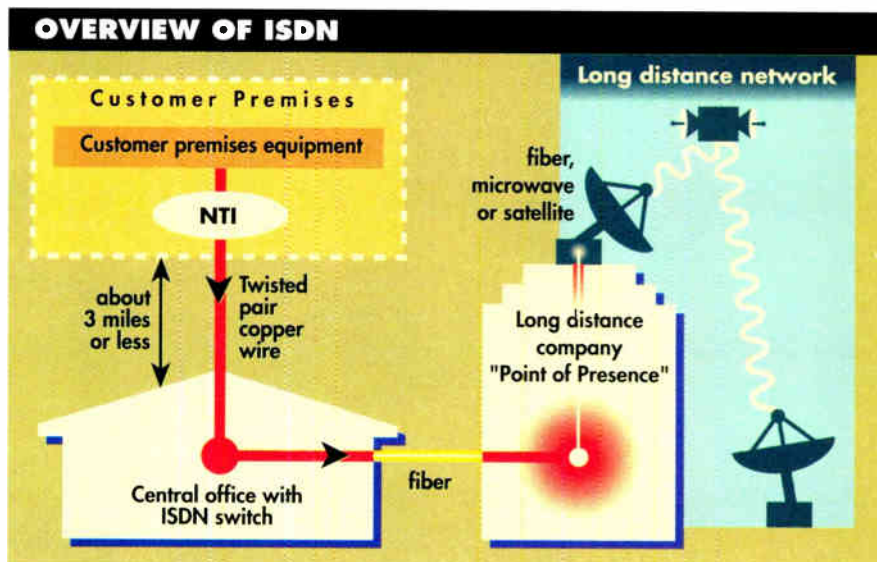
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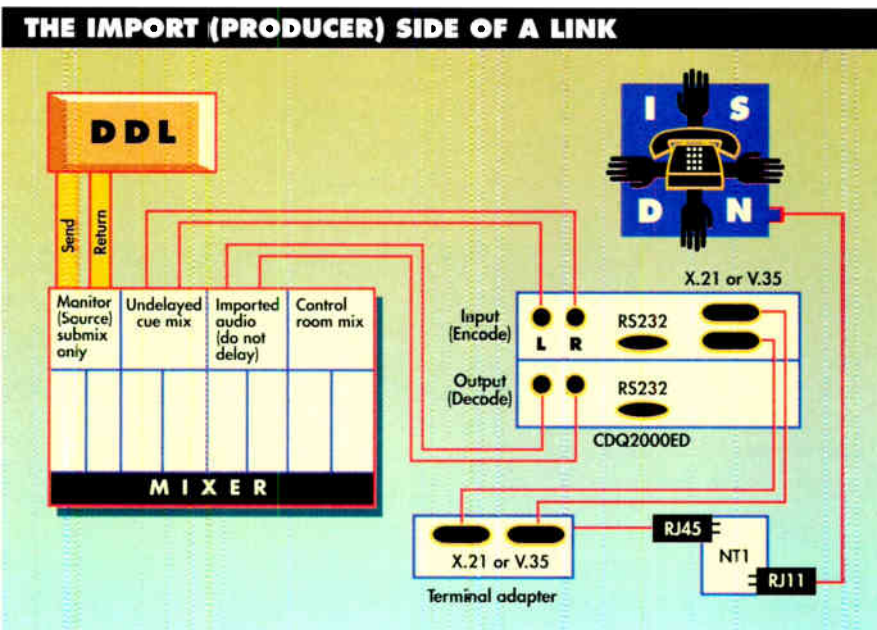
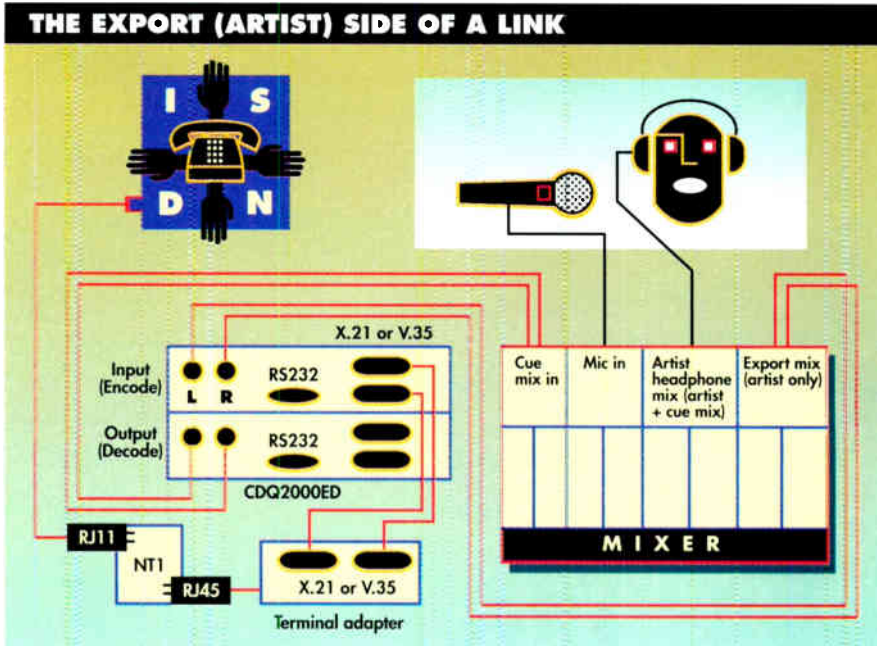
# PHONE IT IN

## Music Over ISDN For Individuals And Project Studios

by Dave Immer

I am a composer/arranger living in New York City. Five years ago, I began pursuing ways to send music over phone lines with little or no compromise in audio quality and at a cost that an individual or project studio could justify. I wanted to be able to have an interactive "session" with someone across town or around the world, plus I wanted to be able to simply "dial-up" that person as I would with a regular telephone call. Today, Basic-Rate ISDN lets me do this in two ways: fast file transfer between computers and "real time" with a high-bandwidth audio codec.





CHARP ILLUSTRATIONS DAVI EMBER

#### WHAT IS ISDN?

Integrated Services Digital Network is the public telephone service of the near future, and it is just now coming online in the United States. For years, it has been available in Europe, Japan, Australia and elsewhere around the world. ISDN basic rate service divides a standard telephone line into three digital channels capable of simultaneous voice and data transmission. The three channels, also known as 2B+D, include two "bearer" or B channels at 64 kilobits per second and a D channel at 16 kbs.

ISDN is the cheapest, most flexible way for an individual or small business to use a wide-area, all-digital network. Monthly charges are more than standard



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phone service (\$27 in L.A., \$38 in NYC, \$95 in Portland, for example), but usage charges (dollars per time unit) for domestic U.S. are roughly two times that of a standard call. Modems don't really cut it for sending audio files, because the files are big, and it takes a long time. But you can deliver ten to 15 times the amount of data over ISDN in the same time that a "fast" (14.4 kbs) modem could over a standard phone line, for only two times the phone charges. (Actually, it's 100 times faster than my 1.2 kbs modem!) ISDN has a fast enough data rate to handle real-time stereo audio using various data reduction algorithms. The regional Bell operating companies estimate that 50% of the phone lines in the U.S. will be ISDN-capable in 1994. (To make an ISDN call, both caller and recipient must have the service.)

For example, recently I got a call from Quick on the Draw in London wanting to do some recording with Boy George and Quentin Crisp here in New York. Quentin wouldn't fly to the UK. The day of the sessions, George and Quentin came to the stu-

dio, sat in front of their mics and put on headphones. Meanwhile, the engineer at Angell Sound in London dialed my ISDN phone number from his terminal adapter, connected both B channels, and in about five seconds, both his and my CDQ2000s were locked. In London, the producer was sitting behind the console listening to New York mics, and when he pressed the talkback button, George and Quentin heard him in their cans 4,000 miles away. *Voilà!* A virtual overdub room is as close as a telephone call. And even though I do it often, it's still somewhat startling to hear full-bandwidth audio coming over the phone when the other party says, "Hello, New York..."

#### ISDN AVAILABILITY

Call your local phone company and ask to speak with the representative that handles Switched Digital Services for small businesses. Outside the U.S., it also may be offered under residential service. Give the person your telephone number and ask if ISDN is available. There may even be an ISDN information number that

you can call. Some regional Bell companies, like Pacific Bell in California, are aggressively pushing ISDN, with an installation fee of only \$70.75 (they waive a \$150 ISDN fee if you stay connected for two years) and charges of around \$27 a month. A bargain.

Pac Bell's deployment schedule calls for 95% of all its switching offices in California to be ISDN-equipped by 1997; presently, the number is about 65%. Call Pac Bell's automated toll-free number (800) 995-0346 for availability. This number also offers a data-fax service whereby you can order product descriptions, technical specifications and pricing information. (Pac Bell calls its ISDN single-line service "SDS IS," and the other regional Bells have different names for the service.)

In Tennessee, ISDN is being promoted aggressively by the State Public Service Commission through a program called TN FYI. Call Bell South at (800) 428-ISDN. Some of the regional Bells are not yet as ISDN-friendly as others, but they all are implementing ISDN; you just have to

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## One World, One Studio, One Sinatra

by Mr. Bonzai

Frank Sinatra's *Duets* is a stunning work, shaped by producer Phil Ramone, recorded and mixed by the "Unforgettable" Al Schmitt, assisted by Dave Reitzas and the cream of the world's engineering community. Okay, Sinatra laid down a track in Hollywood and later "joined" Charles Aznavour via the Entertainment Digital Network, but who can resist the seasoned camaraderie of "You Make Me Feel So Young"? and Bono telling the Chairman: "Blue eyes...wake up to reality!" What a concept.

I was very lucky indeed to witness Sinatra and the A-player orchestra assembled for the biggest project in the 50 years of Capitol Records. The pressure was on, and Ramone's confidence in technology and Schmitt's touch paid off beautifully. Sessions took place all over the globe, with artists working at their chosen spots, at their own pace. This is at the slicing edge of the highest technology, and at the helm are the living masters of the craft. Doing it via the EDnet hookups isn't just for any artist, but this is Sinatra—the 77-year-old, unpredictable Sinatra—and without the new modus operandi, it probably wouldn't have happened. Phone it in, "fly" it in, let the technology serve the art—the punch and the texture of the finished record is the only test of excellence.

I spoke with Tom Kobayashi, president of EDnet, and he explained: "None of the singers actually sang live with Mr. Sinatra. For long-distance sessions, the tracks were played from either Capitol Records in Hollywood or from Hit Factory in New York and sent via T1 fiber-optic telephone lines to studios in other parts of the world. Since fiber-optic signals travel at the speed of light, the only delay that must be adjusted for is the slight encoder/decoder processing time needed for conversion to digital. At the other end—i.e., Carly Simon in Boston, Gloria Estefan in Miami or Charles Aznavour in London—it's just like being in the next room. You listen to the track and sing when and where the producer suggests—the only difference is that the control room is thousands of miles away. A typical four-track session, stereo back and forth, costs \$150 an hour."

Basically, *Duets* is the logical step in recording magic that began years ago when Les Paul and other mad scientists decided to play with time and space. Overdub, comp the vocal from a hundred takes, pitch shift, push the envelope. If you are an artist, you can make your masterpiece. If you're not, you're not. Hit record, bottom line.

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#### ORDERING THE SERVICE

Since ISDN is pretty new, not many people who handle individual customer accounts in the phone company have had the occasion to deal with it or become familiar with its lexicon, uses and pricing. As a result, ordering the service can be fraught with misunderstanding. It would be wise to double-check quoted prices by calling an alternate ISDN product rep. The service should conform to the National ISDN-1 Standard, but if a vendor-specific ISDN service is all that's available (as with Pac Bell), go for it.

Ask for alternate circuit-switched data or voice on one B channel and circuit-switched data on the other (this is sometimes called a "type A" line). Circuit-switched data on both B channels will work also ("type E" line). You don't need any optional features. Find out if the central office (the other end of your telephone wire) uses an AT&T 5ESS or a Northern Telcom DMS-100 switch, whether it is two- or four-wire service, and confirm that it will work with the terminal equipment you plan to buy. Save jack installation charges by mounting an RJ-11c box yourself before the installation date. Expect installation charges of \$150 to \$400. For now, use AT&T as the long-distance carrier, as ISDN interoperability between the Big Three carriers in the U.S. is not happening yet.

#### THE EQUIPMENT

Basically, here is what you need to accomplish the two types of transmission:

1) RJ-11c Jacks: You need two at the point of entry of the wire and one near the location of the terminal equipment. Available at Radio Shack for \$3.95 each.

2) Telephone Station Wire, 4-Conductor: This runs between the point of entry and terminal equipment. Available at Radio Shack for \$11.95/100 feet.

3) AT&T NT1U-200 or Equivalent: An ISDN network terminator; it protects the network from electrical disasters that may happen on either end, cleans up the digital transmission and is the first piece of user equipment the network "sees." Available from telcom vendors at \$300 to \$500 each—it also may be included

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with some terminal adapters.

4) Mac NuBus or PC ISDN Card: To send data, such as digitized audio or video files, for later playback on another Mac or PC, OST (Chantilly, Va.) offers a card and software (\$1,295, expected to be available in January 1994) that will combine the B channels for a 120 kbs data rate.

5) Terminal Adapter: A digital version of a modem, this device goes between the NT1 and the codec. It dials the numbers, receives the calls and controls the connection on both B channels and the D channel. The Controlware (Neptune, N.J.) CITAM at \$1,195 manages two separate B-channel calls. Adtran (Huntsville, Ala.) will be coming out with a unit in mid-1994 for around \$1,300 that includes the NT1, supports the aggregation of the B channels and allows two separate 64 kbs calls to be made.

6) High-Bandwidth Audio Codec: With a technique that sums redundant information between two stereo channels and masks aliasing within sub-bands having the most energy at any moment, the CDQ2000ED (\$7,000 from CCS, Holmdel, N.J.) on both

ends provides very good sound at only 128 kbs. There is a caveat. Because the data reduction is severe (12:1) at 128 kbs, it's best to limit the program to one transmission. If you cascade or resend the same material, audible aliasing begins to accumulate, and it sounds much worse than generational loss or enharmonic distortion in analog recording. For this reason, processing of the audio (EQ, compression) is best done before it gets sent. At 256 kbs (ISO MPEG layer 2 Musicam), it's good for around five transmissions and is less sensitive to post-processing. At 384 kbs, you can go perhaps 15 times, but those data rates require fractional T1 lines, or additional ISDN lines and more expensive equipment. Remember, we're trying to keep this as low-cost as possible.

#### USING IT

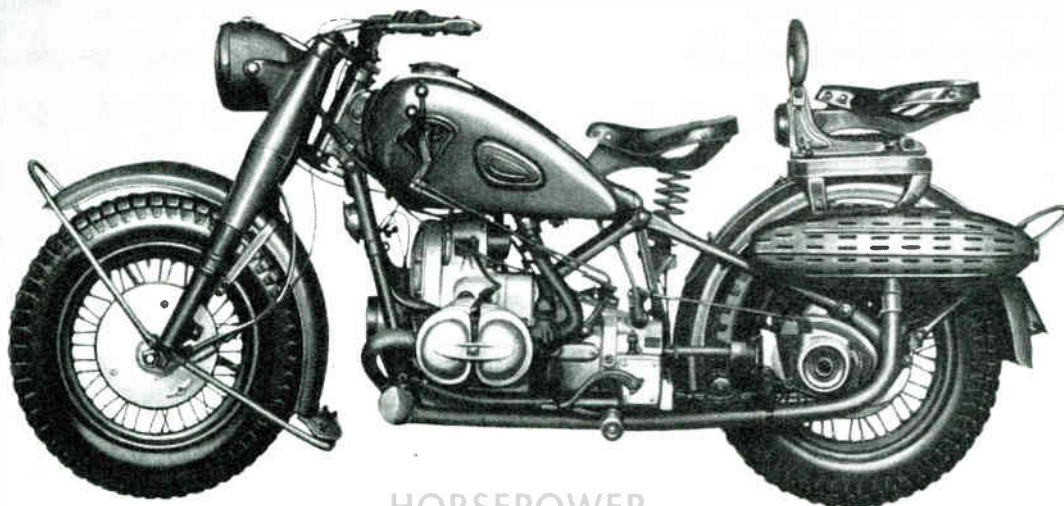
With a Mac ISDN NuBus or PC card on both ends, you can do fast file transfers between computers. If the card aggregates the two B channels, it should take about 14 minutes to send a one-minute 44.1kHz stereo file (10.6 MB at 120 kbs). It's not as

slick as real-time audio, but it's fast enough to be very useful in many situations. Syncing a received sound file to SMPTE playback is a snap, because the start point gets sent with the file. Also, the files are not reduced or altered in any way. They can be resent with no degradation—a major advantage over the codec system.

"Almost" real time: A nice thing about ISDN is it is full-duplex or bi-directional, meaning you can send and receive totally different data in both directions at the same time. When using the CDQ2000ED codec for recording overdubs, this enables you to send a cue mix to an artist in a remote city, delay the mix sent to your monitor speakers by under a second, not delay the received artist's solo signal, mix the two and make critical production judgments and give direction in real time. Later, the overdub would have to be slid back for listening without the monitor mix delay, which would be easy with Pro Tools, Dyaxis or other workstations.

For locking audio to video, you can send audio synched to a remote VCR by receiving SMPTE time code

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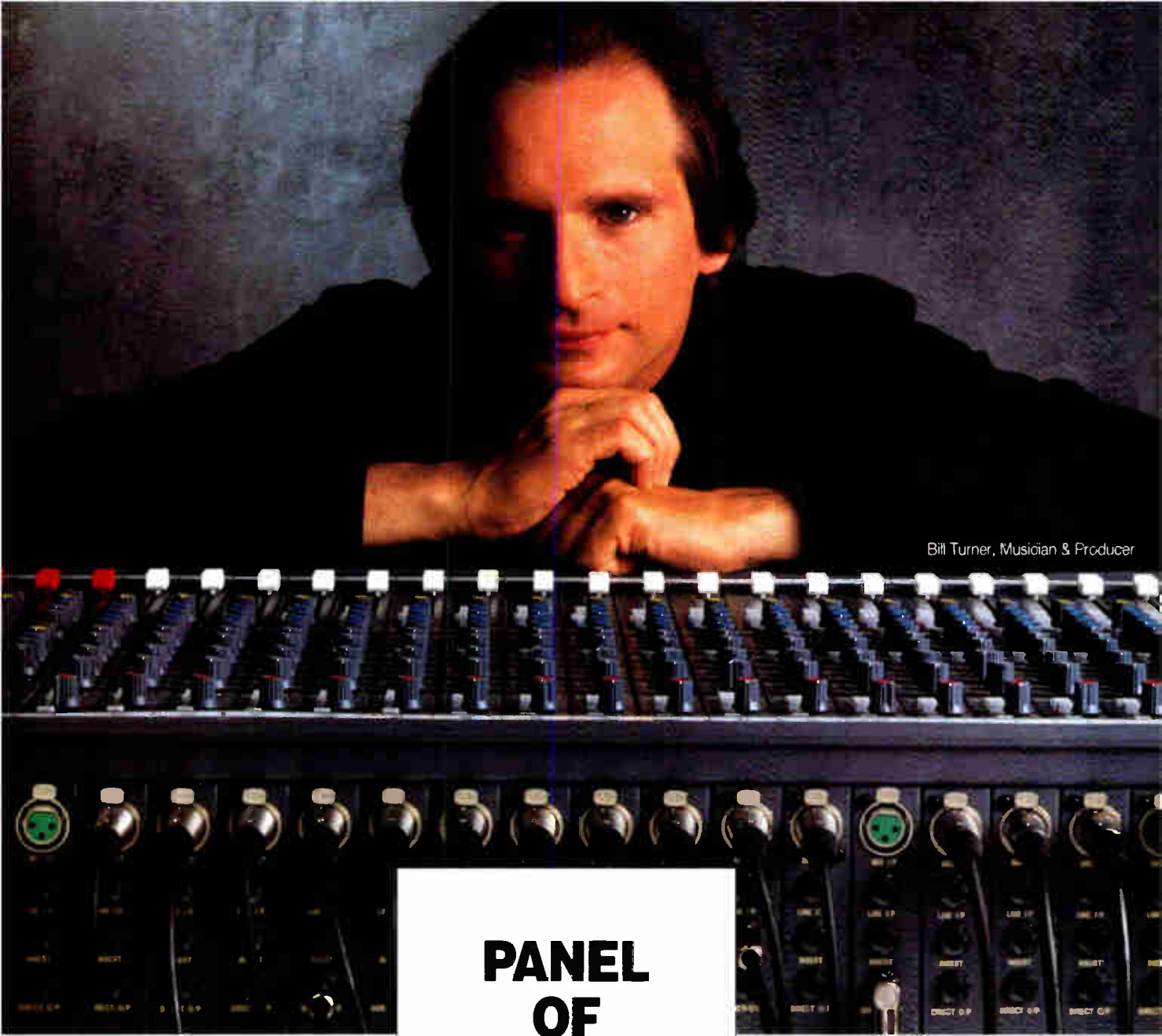
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Bill is equally talented as a producer in his Brooklyn, New York, studio, Bill Turner Productions (BTP). "Being an independent producer, we often have to create the product on location and many times outdoors. This is the trickiest... anything can happen outdoors. We eliminate a lot of the 'gremlins' by using only the parts and connectors we feel are the best...and that

translates to Switchcraft. We never leave the studio without Switchcraft."

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and compensating for the codec and propagation delays by making the start point 3 to 18 frames earlier. You won't be able to play along with another live performer on the other end due to the time it takes the codecs to code the audio, send it over and decode it. Expect a one-way delay of under one-third of a second. A subset of Entertainment Digital Network (EDnet), the Digital Patch System will provide you with an encrypted CDQ2000ED and the other equipment (buy or 36-month lease) and the digital lines. With Digital Patch, you can connect with the other 70 or so subscribers (mostly in the U.S., with a few in Canada and overseas). These users cannot connect with the generic, unencrypted CDQ2000s.

Philosophically, I am of the get-your-own-ISDN-line-and-terminal-equipment school. It will be cheaper (especially if you use it a lot), you'll be connecting to more people in more ways, and you will have empowered yourself with the knowledge of how to obtain and use ISDN.

#### THE BOTTOM LINE

If you already own a Mac or PC with an audio card, and have an ISDN-capable telephone number, you should be able to get an ISDN card and software for your computer, the NT-1 Network Terminator, and installation of the phone lines for around \$2,000. This is the system to get first.

For those of you who must have real-time stereo audio, the CDQ2000ED is the way to go. To my knowledge, this box is the only one that pulls off great-sounding stereo over a basic rate ISDN line. Unfortunately, it is quite expensive (expect to spend \$9,000 when adding in the cost of the Terminal Adapter, the NT1, line installation and other stuff), so leasing or renting may be appropriate. For instance, one could own an ISDN line with an ISDN NuBus card and simply rent the codec and terminal adapter for around \$75/hour when real-time audio was absolutely essential. Rental companies take note.

My recommendation is to have both capabilities if you own a Mac or PC, as each method complements the other. For instance, you could listen to a remote performance over the codec and be in control of a remote Mac with Pro Tools through the asynchronous RS-232 port on the CDQ2000, using an application called

Timbuktu Remote (Farallon Systems, Alameda, Calif.). When the performance is complete, you could then do a fast file transfer with the ISDN expansion card. This way, you could work in (almost) real time but would end up with an unreduced audio file. A four-minute mono file would take about half an hour to send. (A one-minute Avid video file at AVI-quality would take about half that time.) Prices for hardware, software and network bandwidth will continue to fall. A user group will be forming in early 1994.

ISDN offers exciting new ways to

produce and market your music, and as the use of ISDN and faster switched digital services grows, so will the size and breadth of the available talent pool. ISDN is the way players, singers, songwriters, arrangers, producers, labels and agencies can afford to connect their offices and project studios to each other and to the larger "Mother Ship" recording and broadcast studios around the world. ■

*Besides composing and arranging music for movies, television and radio, Dave Immer is owner of DIGIFON—ISDN Audio Worldwide.*

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# PRODUCT

## CRITIQUES AND COMMENTS

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# W

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### D&R ORION CONSOLE

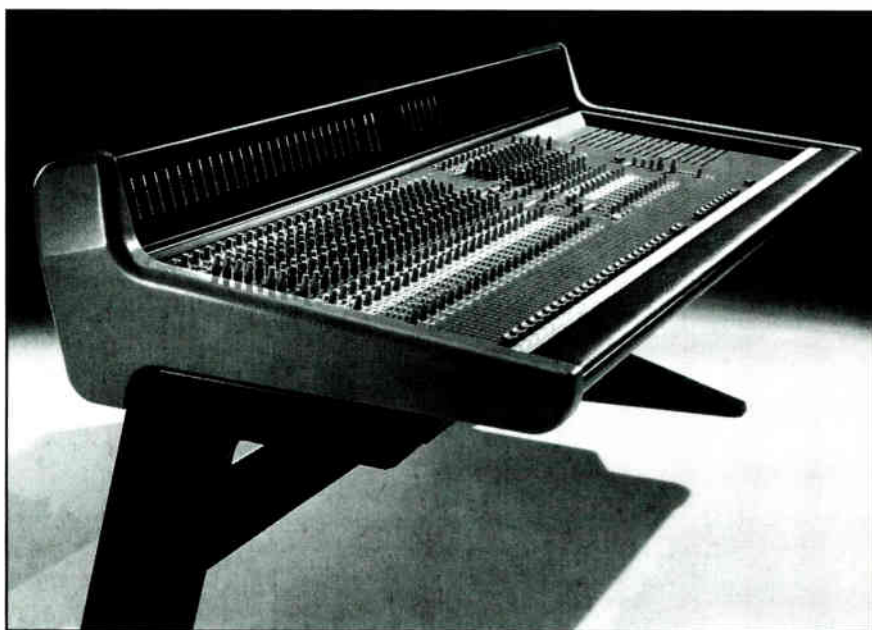
When one thinks of The Netherlands, tulips, windmills and boats drifting along colorful canals are the images that come to mind. But Holland is also home to a number of high-tech companies such as Philips and D&R Electronica. Over the years, D&R has catered to an appreciative audience of recording and broadcast professionals throughout the European community, and its console line is starting to make serious inroads into the North American market.

Although D&R offers a wide vari-

ety of consoles, ranging from the entry-level Vision to the top-end Avalon, the mid-priced Orion is the company's most popular model. Designer Duco De Rijk has paid special attention to the sound quality in all of D&R's consoles, and his philosophy is that, whether you choose a simple or complex mixer, the audio quality should be excellent. The main difference between the D&R models is features rather than performance.

Orion is an in-line recording console, available in standard configurations ranging from 16- to 48-input/output modules, providing 36 to 120 inputs, respectively (with the included dual stereo effects return modules) in mix. Options include a pedestal stand; up to 456-point TF patch bay; and PowerMute, PowerVCA/Dynamics or PowerFade (moving fader) automation packages.

In North America, D&R consoles are sold factory-direct, beginning at \$12,995 (U.S.). Some typical models, such as an Orion 24 (64 inputs in mix)—which would retail for \$26,300



ety of consoles, ranging from the entry-level Vision to the top-end Avalon, the mid-priced Orion is the company's most popular model. Designer Duco De Rijk has paid special attention to the sound quality in all of D&R's consoles, and his philosophy is that, whether you choose a simple or complex mixer, the audio quality should be excellent. The main difference between the D&R models is features rather than performance.

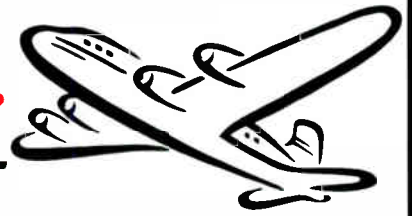
Orion is an in-line recording con-

—goes for \$17,895; and a 32-channel patch bay model (88 inputs in mix) sells for \$25,795, more than \$12,000 under D&R's comparable retail. Bear in mind that these are typical models, and users could custom-configure the Orions with various options (or short-load a longer frame for later expansion) to suit different needs or specific applications.

Standard features on the Orion include +48VDC phantom power and phase reverse switching on all mic

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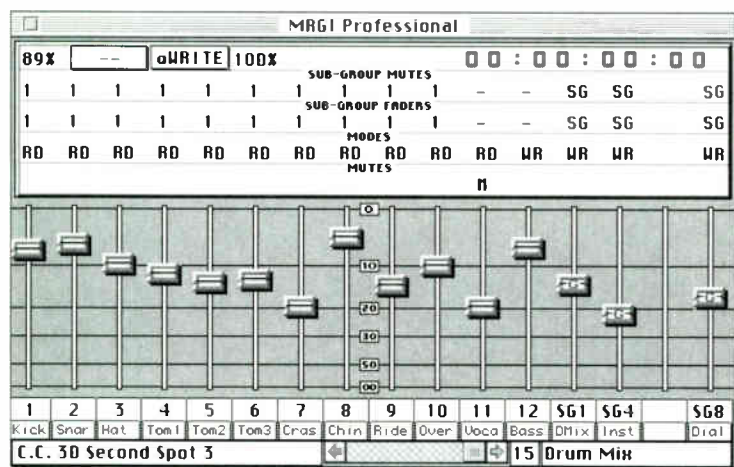
inputs; eight aux sends (with pre/post-fader switching on 1-4); 100mm long-throw channel faders; fader reverse switching; phase metering; high-resolution 25-segment LED bar graph meters on the stereo outputs; 11-segment LED meters on all in-line channels; 100Hz (-9 dB/octave) switchable highpass filters; and 4-band sweepable equalization with a  $\pm 16$ dB range. The LF and HF sections of the latter are shelving type and are hard-wired into the main channel pathway; the LMF and HMF bands are

peak type (with a fixed Q of 1.5) and can be switched to be in the channel or tape monitor pathway. An EQ defeat switch is also provided. Aux sends 1-2 and 3-4 are pre/post-fader switchable; 5-6 and 7-8 are post-fader only. As with other boards in its price range, one set of aux send knobs controls the 5-6 or 7-8 pairs; a switch lets the user decide between the two.

Whether the console has a patch bay or not, all channels also have connectors for the XLR mic input and five  $\frac{1}{4}$ -inch TRS jacks (line and monitor inputs, monitor and channel in-

sert points, and group output). The TT patch bay option requires the space of 14 modules but is laid out with plenty of room to see what you need to patch. There are jacks for 120 tieline points, plenty for the bulging outboard racks in today's studios. All connections to the 456-point patch bay are made via 66 25-pin D-sub connectors, which are becoming more common on consoles such as those from Tascam and DDA, as well as the Tascam DA-88 and Fostex RD-8 modular digital multitracks. The Orion manual contains detailed sections outlining the patch bay wiring and installation procedures, as well as complete schematics for the console.

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**JLCOOPER ELECTRONICS**

Orion has a sonic transparency that I rarely encounter in consoles in this price range.

A unique feature of Orion is the "Floating Subgroup System." Though the console is an 8-bus design, FSS allows the user to bus any number of channel inputs to any channel number—other than the first eight—without using the patch bay. For example, if you want to route some inputs to tracks 23 and 24 of a tape machine, you can assign any number of channels to buses 1/2 or 3/4 and press the "From Sub 1/2 or From Sub 3/4" switches on console channels 23 and 24, thus automatically feeding those tape tracks. FSS is a clever, timesaving approach to studio routings, without having to pay for a lot of (typically unused) extra buses.

Other than figuring out the FSS system, Orion operations are fairly simple. One minor exception to this is the fact that a green LED lights when the mutes are active. This took a bit of getting used to; on most consoles, a green LED near the fader refers to channel "On." The solos operate in-place, so the operator can check the placement of any channel in the stereo mix. And speaking of solos, a solo level adjust pot in the master section gives the operator a

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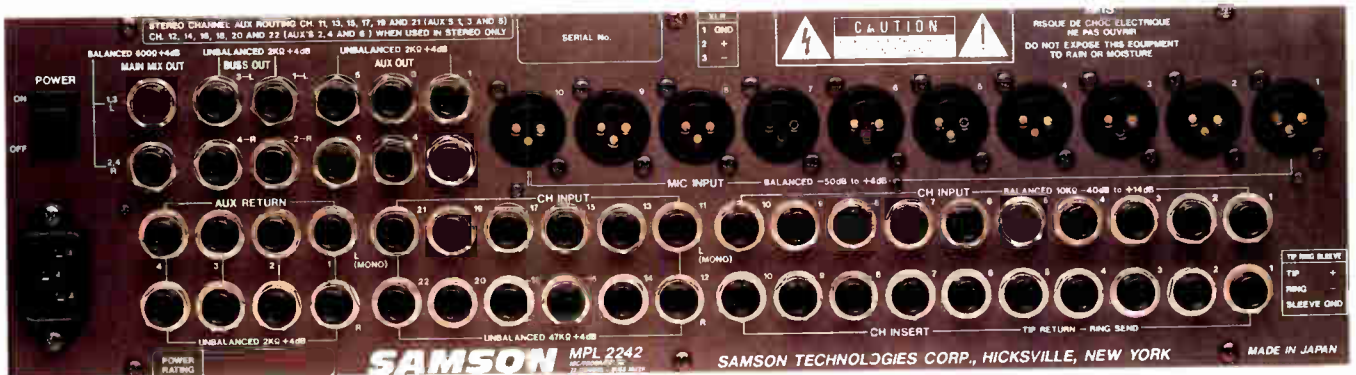
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$\pm 10$ dB control for adjusting the overall level of the solos in the control rooms, so whether you prefer a loud or soft solo, *you* determine how you want to work. Another nice touch in the master section is inset trim pots under the 100/1k/10k Hz oscillator switches, for precision calibration of tones.

Anyone who regularly reads this column knows I have a particular dislike for concentric knobs, but on the Orion's EQ and aux send sections, these controls didn't bother me for a couple of reasons. First of all, the knobs are tapered for easy access to the lower knob; and second, the controls are spaced far apart, so I could get to them without changing the settings on adjacent controls. I liked the feel of the 100mm channel faders, although the short 60mm faders on the dual stereo return modules had a stiff feel, perhaps to afford more control in the shorter throw.

One of my first projects on the Orion was mixing a traditional jazz trio, with trap drums, bass and electric guitar. The kick had that traditional boomy jazz sound, and a quick touch of EQ added a bit of snap, which I liked. Overall, I found the equalization to be pleasant and musical, whether used on vocalists, narration, drums or guitar—either acoustic or electric. By the way, the guitar player on that jazz date was accompanied by the also-traditional buzzes and hums created by a combination of cheap 1970s-era effects and a grounding problem on an antique ES-335. The easy solution would have been to gate the offending noises, but there were a lot of subtleties in the performance. Gating would have cut out the noise and the notes, so I went in with the EQ, which nicely took care of the problem without added harshness.

In fact, Orion has a sonic transparency that I rarely encounter in consoles in this price range. This led me to investigate the board further, so I started with the mic preamps, which measured out at 0.003% THD at 1 kHz and a frequency response that was -0.2 dB from 20 to 20k Hz. In the 40 to 40k Hz range, the mic preamps were a ruler-flat  $\pm 0.1$  dB. THD at 1 kHz from channel input to output measured as 0.009%, much better than the claimed spec of 0.015%; and even with all faders and



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## LAPTOP MIDI PRO



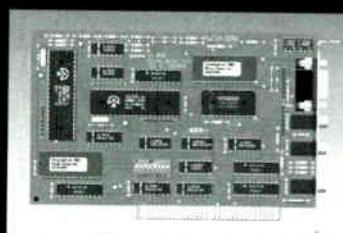
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channels set to unity gain, THD (at 1 kHz) was only 0.030%. Frequency response (any input to output) also came in under spec, at  $\pm 0.2$  dB from 20 to 20k Hz. Obviously, these guys are serious about audio.

Overall, I was impressed with the D&R Orion. The sound and transparency of the console are first-rate; the price is affordable, and the board's few shortcomings—such as a lack of a control room dim (attenuator) switch, rotary pots instead of short faders on the monitor inputs and concentric controls—are minor and would not affect performance.

I liked the floating subgroups and soon became dependent on (if not addicted to) the phase meter. Of course, if you want more, you can always add the mute, VCA or moving fader automation options.

D&R USA, Route 3 Box 184-A, Montgomery, TX 77356; (409) 588-3411.

#### USCO AUDIO DFW-3 MONITORS

"Good things come in small packages," or so the old saying goes. But the quality of small studio monitors—particularly in the mini-sized range—is often compromised by size restrictions.

One exception to this problem is the DFW-3 reference monitor from USCO Audio. Unlike the typical mini-monitor—which may merely be a scaled-down version or a consumer model—the DFW-3 was designed with console-top applications in mind.

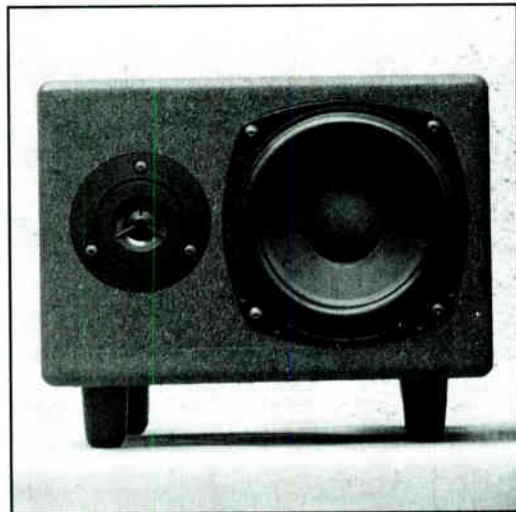
The secret to the DFW-3's design is a 6.5-inch, down-firing woofer placed on the underside of the enclosure, which is supported by small rubber feet. The speaker is a three-way system, in mirror-imaged pairs combining a 1-inch dome tweeter crossed over at 4.7 kHz to a 5.25-inch paper cone midrange driver; below 280 Hz, the 6.5-inch underbelly woofer takes over. The 9.5x9.5x8-inch cabinet is constructed of MDF and finished with a tough gray coating. On the back panel, gold-plated, five-way binding post connectors accommodate wire up to 12-gauge; one appreciated touch is the use of oxygen-free cable for all the internal wiring. Power handling is rated at 100 watts of music.

Having used these monitors over a period of months, my reaction to

the DFW-3s is quite favorable. If you prefer a speaker that lies to you or provides unnecessary bass emphasis, you'll have to look elsewhere. What the DFW-3s offer is a natural, uncolored, hype-free reflection of what goes in, and that's what I like in a speaker. The stereo imaging is good, and the monitors are non-fatiguing—even during extended listening sessions.

There are, however, a few limitations to the design—after all, physics can only do so much in a small box: The frequency response drops sharply under 80 Hz, to a -3dB down point at 60 Hz. However, if you want more bass, USCO offers several optional subwoofers, which should do the job. An optional matching center channel speaker is available, as are rear surround speakers and a flight case for the traveling engineer.

Besides lifting the DFW-3 to a proper height for the down-firing woofer to function, the rubber feet also isolate the speakers from the console top, thus reducing the chance of unwanted resonances or vibrations. My console has a sub-



#### USCO DFW-3

stantial meter bridge that accommodates the DFW-3s nicely, but if your board's meter bridge is narrow, you'll have to build some stands for the speakers.

Retailing at \$690/pair, the USCO DFW-3s are priced above the typical compact studio monitor, but if you're looking for big performance from a little box, these are worth checking out.

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## MANHATTAN PRODUCTION MUSIC SOUND EFFECTS

It isn't typical practice for an audiophile record label to operate a production music division, but this is certainly the case with New York-based Chesky Records and its sister company, Manhattan Production Music. Now when such an arrangement also expands to include the release of a sound effects library, something big is bound to happen, and that something is "The Audiophile Sound Effects Series."

In recording this five-CD set (more CDs in the series are planned for

The most noticeable thing about the Audiophile Sound Effects Series is the absolute clarity of the recordings.

later release), engineer Jeremy R. Kipnis relied on a single-point stereo microphone and a portable DAT deck. The set is entirely composed of new, digitally recorded sounds: There are no "stock" or "remastered" effects from previous collections.

The five discs include "Automotive," "Sounds of the City," "Transportation and Rural Sounds," and two volumes of the "Home Environment." Each has 99 tracks, with a variety of short effects and longer ambiances.

"Automotive" focuses on five different vehicles: domestic cars (small, mid-size and big), a van and a foreign car. The effects were recorded from interior and exterior perspectives, and there are enough door slams, starts, revs, honks and windshield wipers to handle most needs.

"Sounds of the City" seems fairly obvious and provides ambiances of playgrounds, parks, traffic, crowds, stores, banks, construction and parades, but the disc also includes computer effects, telephones, sirens and a trip to the dentist.

"Transportation and Rural Sounds" has trains, planes and subways, along with highway walla, street am-

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bience, trucks and a bus terminal. The rural section on the second half of the disc has pastoral and farmyard ambiances, Foley-style footsteps (on gravel, dirt, mud and sticks), water and rain sounds, cats, dogs, cows, turkeys and roosters.

The "Home Environment" discs are just what you'd expect: kitchen and food sounds (eating/drinking/cooking), clocks, appliances, doors (front, sliding and garage doors) and bathroom effects—shaving, hair dryers, tub and toilet sounds and more.

A list of each disc's tracks is printed on the tray insert and booklet that come with each CD, and although the library is fairly small at this point, some sort of cross-index card would help in finding certain effects. For example, the last two cuts on the "Rural" disc are long shopping mall ambiances. You could regard these as the "bonus cuts" you sometimes find on CDs, but who'd think about looking on that particular disc for mall walla?

The most noticeable thing about the Audiophile Sound Effects Series is the absolute clarity of the recordings, which are whisper-clean and provide a wide dynamic range. Most of the effects have a certain closeness that makes the listeners feel like they are in the middle of the sound wash. The stereo effects are striking, whether they're distant—bus depot, farm ambience, etc.—or close up: The dental effects are not intended for those suffering from dentist-phobia! Of course, if the stereo spread is too wide, you can always pan-pot the effect in for a smaller spread.

Priced at \$395 for the five discs, Manhattan's Audiophile Sound Effects Series is a useful studio addition, either as a starter set or as a supplement to an existing collection. There are certain effects missing from the set, such as guns, explosions and everybody's favorite "car skid and crash," but the series is young and still expanding, and Manhattan plans to add more discs in the future. So far, they're off to a great start.

Manhattan Production Music, 311 West 43rd St., New York, NY 10036; (212) 333-5766. ■

Mix senior editor George Petersen is the author of Modular Digital Multi-tracks: A Power User's Guide, available through Mix Bookshelf.

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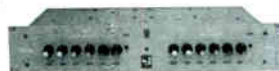
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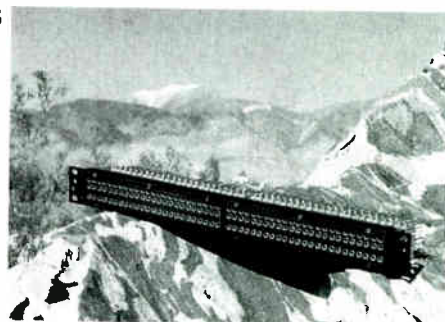
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by Lisa Richmond



# MACKIE 24x8 CONSOLE

**F**inally it's here. The mixer that everyone *is* talking about and *was* waiting for.

With a retail price of \$3,995, the Mackie 24x8 console offers a major price/performance breakthrough. Just five years ago, purchasing a 24-track digital recorder and 24x8 console required dropping about \$150,000. Today, you can buy a 24-track modular digital multitrack system (Alesis, Fostex or Tascam) and a Mackie 24x8 for about a tenth of that amount. More boom for the buck.

## THE BASICS

The Mackie 24x8 is a 24-input, 8-bus in-line console that gives you 24 mic/line inputs for tracking and 56 inputs for mixdown (24+24+8) and six stereo aux returns. It is expandable in groups of 24 input channel strips, which are added to the existing bus structure of the console. That gives

you up to 192 inputs if you're willing to forego your buses. Because you can't get everything for nothing, some minor features—such as phase-reverse switches and onboard tone oscillators—have been omitted.

The chassis is of sturdy steel construction with sealed rotary potentiometers and solid metal jacks, and the power supply is housed in an external rack-mount chassis. The board operates at +4 dBu, though it is globally switchable to -10dBV conversion on all tape returns and submaster/tape outputs without having to open up the board. This provides instant operation for balanced studios and the increasing number of unbalanced studios. Electronically balanced main outputs (on 1/2-inch TRS and XLR jacks) are standard.

Each of the 24 channels has a 1/4-inch line input, 1/4-inch TRS insert point, 1/4-inch direct out, a switchable XLR

input to handle either mic or line level signals, and a trim control. The mic/line switches are located beyond the end of the channel strips and are somewhat challenging to get to and see because of all the patch cables coming out of the same area. Six auxiliary sends are provided, each with onboard pre/post switch, designated in pairs, which are useful for quickly switching from tracking to mix mode. There are four dedicated controls for the six sends; a switch near the 3/4 pair changes them to operate

as sends 5/6.

A flip switch at the top of each channel routes the tape return to either MIX-B or the main channel pathway. Each strip has a 4-band equalizer section plus a low-cut filter and an EQ in/out switch. The equalizer can be split between the main channel signal and the MIX-B signal. The in-line monitoring section (MIX-B) provides level and pan control, and aux 3/4 or 5/6 can be routed for use with MIX-B.

Status indicators on each channel include signal present (-20dB) and overload bi-color LEDs, which are useful to determine if the channel

has any output, especially if you don't have the MB24, 12-LED bar graph meter bridge option (\$795). Each channel also has a solo switch (in stereo), mute, pan and bus assigns; +48 volt phantom power is provided in groups of eight channels. The faders are long-throw 100mm.

The first of the four bands of the EQ section is hi-mid, offering a true parametric design with bandwidth variable from three octaves to 1/2 octave,  $\pm 15$  dB of equalization and a variable frequency center from 500 Hz to 18 kHz. This band's parametric design is useful in wideband adjustments for a more natural sound or in narrow-band for specific corrective adjustments. The upper-end frequen-

**With a retail price of \$3,995, the Mackie 24x8 console offers a major price/performance breakthrough.**

cy range of the sweepable select is particularly useful for adding punch to tracks or brightening up a hi-hat.


The low-mid section is sweepable between 45 Hz and 3k, with a fixed bandwidth of two octaves with  $\pm 15$  dB of equalization. The high and low shelving EQ sections are located beneath the midrange section. Although this is a different approach than most of the boards I've used, it is logical because it is located right above the MIX-B section, as the shelving EQ can be routed to MIX-B for either tracking or mixing.

The high EQ is a fixed 12kHz shelving equalizer with  $\pm 15$  dB of equalization available. The low EQ has fixed 80Hz shelving with  $\pm 15$  dB of equalization. Often I prefer 80 Hz to 100 Hz for boosting bottom end. The low-cut switch inserts an 18dB/octave low-cut filter at 75 Hz into the main channel signal.

The six aux sends with the "pre" switch engaged are pre-fade and pre-mute, naturally. Initially, I found this annoying for playback because if the client wants you to temporarily omit a track from their headphone

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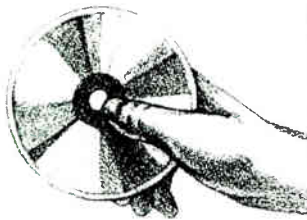
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## FIELD TEST

mix, you have to turn down the corresponding rotary knobs. A way to get around this when you're tracking is to use aux 3/4 or 5/6 for cue send (which is preferred for this board), then switch the 5/6 shift button in or out on the channel you wish to delete from the headphone mix—basically using it as an on/off switch.

Also, if you are using 3/4 or 5/6 for cue send, you don't have the ability to route aux 3/4 or 5/6 to effects. So, in order to get reverb on playback—or for monitoring in both the headphones and control room speakers—the tracks that need reverb, vox and snare, for example, need to be either patched into unused tape returns (if available) and then routed to MIX-B, or patched into unused channel strips using the line-in jacks; same difference—you need the open channel inputs. As an alternative, you could use aux 3 or 5 as a mono cue send or 4 or 6 as a mono effects send.

### THE MASTER SECTION

The master section is laid out in a simple, easy-to-get-around manner. It includes an aux send section, with each of the six sends having master level controls and solo buttons. In addition, the section has a master solo LED. Because of the flat design of the board, I had a hard time seeing this light, as it is partially hidden behind the MIX-B level control. A 2x4 (not Mackie, but Douglas fir) under the back helped with the angle and improved visibility—perhaps Mackie could offer this as an option on future consoles. The master MIX-B monitor section includes a level control and an assign-to-L/R mix button. The master section does not have an internal oscillator.

The routing capabilities of the headphone section are unique. In addition to having two stereo outputs for headphones, each section contains a stereo level pot, stereo solo switch and five choices from which to select your headphone signal: monitor, MIX-B, aux sends 3/4, aux sends 5/6 and external. At the flick of a switch, you can send musicians the mix that you're listening to. The external input is useful for click tracks or other cue information.

The monitor section contains volume controls for both the control room and studio, as well as five

choices to select the signal you are monitoring: L/R mix, MIX-B, 2-track, external and mono. The mono switch is convenient to quickly check for phasing, while the solo section contains a level control that is necessary and handy for the post-fader stereo solo signal. In addition, Mackie has added a "Rude Solo Light," which, according to the literature, is the "most obnoxious solo light allowed under international trade and safety regulations." It is really not that big, but it gets the job done and provides for instant onboard humor.

The talkback section has a level control and four momentary buttons for assigning the talkback: aux send 1, aux send 2, tape submasters, and

**I expect the Mackie 24x8 will find a comfortable home in small and home studios, as well as broadcast and live applications.**

phones and studio. I find momentary talkback switches to be a hassle. Because you're usually sitting right in front of the console or closer to the side of the master section, it is inconvenient to hold down the button while making patches or adjustments with one hand as the clients converse. And often, the clients end up blocking your view of the board as they hold down the talkback button while carrying on a conversation. Perhaps more appropriate would have been a push-on/push-off switch with a "Rude Talkback Light" to alert the engineer when the talkback button is engaged.

Each of the six stereo returns has a solo button and level control. Six stereo returns can be useful, especially if you are operating a 24-track studio. Because I operate a 16-track facility, I prefer to use the channel inputs and corresponding faders. Each of the stereo returns has quite a few useful routing capabilities, including both headphone mixes, all submasters and L/R mix. A MIX-B routing switch would have been useful here.

The submaster section of the board incorporates 100mm long-throw faders with individual peak meters. The "zero" reference on the meter refers to either +4dBu or -10dBV depending on the position of the level switch on the back of the board. Each submaster has a solo button, a mono L/R assign and a left or right assign for stereo bussing, and there is an insert point for each subgroup.

The back of the board has 24 submaster/tape outputs incorporating a triple bus system normalizing your submasters to tape ins on the multitrack. When you send a signal to submaster 1 output, for example, it appears at submaster outputs 1, 9 and 17, which simplifies operations with 8-, 16- or 24-track recorders.

#### SPECS

Using a Neutrik A-1 Test System, I checked out the board's frequency response. I was impressed that the frequency response is completely flat between 50 Hz and 20 kHz and flat to within  $\pm 0.5$  dB between 20 Hz and 40 kHz. I then tested the THD+N with all the channels, submasters and MIX-B inputs at nominal and all the

effects returns all the way up. I found that even with all channels assigned, the harmonic distortion reading was about 0.069%. These measurements are slightly higher than the published specs, but then how often do you use the entire board in this way?

#### THE FUTURE

As this issue was going to press, Mackie was about to start shipping both the optional meter bridge and the 32x8 console, which is identical to the 24x8 but offers more inputs and retails at \$4,995. Also upcoming is an automation system.

Although Mackie has an excellent reputation for great-quality boards loaded with lots of useful features at hard-to-match prices, they haven't earned points for the timely release of this mixer (originally due out in July '92). With reservation, and my fingers crossed, I await the automation package.

I expect the Mackie 24x8 will find a comfortable home in small and home studios, as well as broadcast and live applications. With excellent sonic quality, frequency response, harmonic distortion and crosstalk

specs, available number of inputs, plenty of headroom, good-quality mic preamps, and the upcoming automation package, the price of the Mackie 24x8 seems insignificant. Also worth mentioning are the friendly and knowledgeable customer service humans available through an 800 number to answer any questions "regarding this product, any product... or fishing," according to the product development manager.

One last thing I want to mention is that the manual is entertaining and thorough. For example, there is a heading called "Rationale for Using a Bus." The first reason is that "it's there, it's easy and it sounds great." The second is that "you meet interesting people on the bus." I say that in this case, it's not always on time, but the fare is right, and it's certainly worth waiting for.

Mackie Designs, 20205 144th Ave., Woodinville, WA 98072; (206) 487-4333, (800) 258-6883.

*Lisa Richmond is the owner and operator of Dance Home Sound, a commercial recording facility located in Emeryville, Calif.*

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by Dave Tosti-Lane

# SOFTWARE AUDIO WORKSHOP

For the past year, I've been using a high-quality digital audio workstation for live effects and music in theater and dance at Cornish College of the Arts in Seattle. I've long needed a way to take projects out of the studio for editing during odd times that open up during the day, and to allow access to multiple projects. The Software Audio Workshop presented an interesting solution. SAW is a Microsoft Windows-based program that, with appropriate hardware, allows recording of stereo signals that can be assembled into multitrack sessions of up to four stereo tracks and mixed to produce a final stereo program. Bob Lentini, the creator of SAW, is an experienced sound engineer and musician who turned to software design to enhance his time in the studio.

For a sound editor working against deadline on an audio project, speed is nearly everything. You already knew that, but perhaps you didn't know you could have that speedy editing system without spending \$10,000 to \$15,000. The SAW feels and performs significantly faster than the more expensive system I have been using for the past year. Time from double-click of the icon to SAW's main screen was less than three seconds on my 486/33, and the time needed to open a previously recorded 2-minute, 30-second music bed into a new SAW session was, incredibly, less than two seconds! It takes a minimum of 20 seconds to get from icon to edit screen in my primary system, and loading of a similar music file into a new session would take much longer than two seconds. This kind of speed advantage can amount to a substantial savings in time over the course of a project.

One of the things that makes SAW

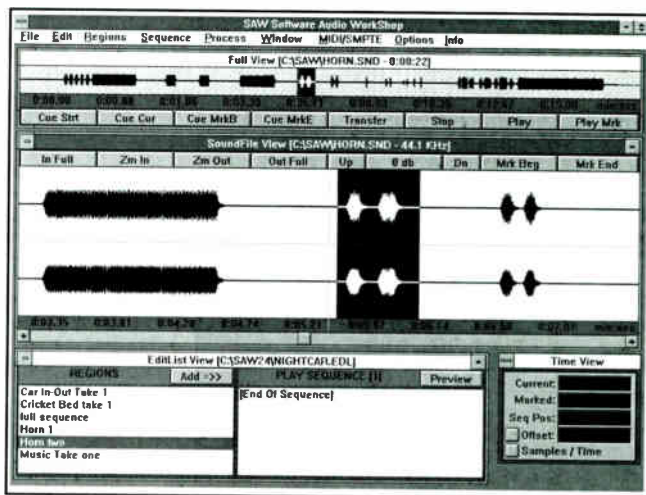


Figure 1

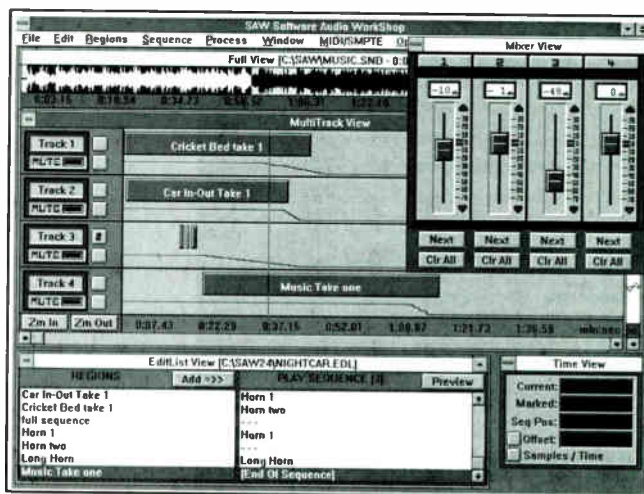


Figure 2

such a powerful addition to the studio is its ability to run well on inexpensive hardware. I was well into a demo of the program before being informed I was watching it on a 40MHz 386 with no co-processor. (SAW does not use floating-point calculations, so it doesn't need a co-processor.) The responsiveness of the demo system and the scrolling display had convinced me that it must be at least a 486/66 processor.

## RECOMMENDED HARDWARE

Virtually any 486 class system would perform well with SAW. I suggest going with at least a 486/33DX: 8MB RAM is a minimum for Windows, and 12 to 16 MB will speed things up dramatically. With dropping prices, it probably makes even more sense to get something like a 486/66DX2, though I found the speed on a 486/33DX with 12MB RAM to be acceptable, especially with a reasonably fast hard disk. I tested with a series of IDE drives, with access times around 12 ms. Better choices for an audio system would be fast SCSI drives—the larger the better. Currently selling for less than \$1,000, 1.2GB drives are the logical choice for such a system. At press time, typical street prices for a 486/66DX2 with 16MB RAM, accelerated 24-bit video, 250MB internal drive, and a 14-inch, high-resolution monitor were around \$2,300. That price usually includes Microsoft Windows and other applications software. Similarly equipped 486/33 machines are available for less than \$1,500. The SAW application retails for \$599.

—CONTINUED ON PAGE 114

## On the Road With SAW

SAW is proving valuable in live sound performance applications. I spoke with Arty Congero, chief touring sound engineer for Paul Anka, about how a system like SAW can be used in a live concert touring format.

"It's a beautiful thing," he says. "The only problem with SAW is that, once we began using it in the show, we found that we can no longer do without it. It's incredibly faster than our previous method of using DATs for cues, and I am 100 percent confident when cueing from SAW. SAW affords me so much flexibility that I am able to handle the inevitable show change-ups and other edits quickly and easily. Our recent tour took us to many countries and, although the SAW system was always shipped as extra baggage, it was my most reliable piece of gear—period."

Congero uses SAW for every performance as a live playback vehicle for show announcements. In order to provide the very recognizable signature openings to numbers expected by audiences, SAW is used to play a stereo mix of the opening few bars of familiar tunes, mixed along with the live musicians through the house mixer. This not only satisfies the audience's desire to hear the favorite opening, it frees the musicians from having to begin each number in a strictly stylized manner.

"In a live situation," Congero continues, "SAW is a very reliable and stable alternative to our previous DAT methods. It feels more natural to me and allows me to accomplish literally unbelievable changes just minutes prior to a show. In many cases, I have various sequences pre-laid out, and I am able to make a complete changeover in seconds with 100 percent confidence that I will hear what I am expecting."

"The ability to experiment and save a variety of sequence and production possibilities is invaluable. Our artist has gotten used to SAW's speed and flexibility to the point that it would be a problem not to have SAW with our show."  
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—FROM PAGE 113, SOFTWARE AUDIO WORKSHOP

Interface cards for SAW range widely in price. I tested with the least-expensive option, the Creative Labs Sound Blaster 16 (street price around \$190), and with the most expensive, the Digital Audio Labs CardD (priced around \$795). (I did not test with the mid-priced Turtle Beach Multisound, which costs about \$500.)

The Sound Blaster 16 is often thought of as a game board, but with SAW, it can do some impressive work. SAW is fully functional with the SB16: You can build 8-track multitrack mixes; record; edit and playback audio sequences; and do all the varipitch, mixing, volume changes and fades that you can with other cards. The trade-off is its lack of digital inputs and outputs and in the use of 1/8-inch mini Walkman-type jacks instead of phono jacks.

CardD offers a choice of unbalanced -10dB or +4dB line-level inputs and outputs (phono jacks), and 64-times oversampling on the A/D converter. With the optional CardD I/O (about \$295), capability is enhanced with S/PDIF (and IEC) direct digital input/output. (See sidebar on CardD.)

With the addition of a Music Quest MQX-32M or 16S MIDI/SMPTE card, SAW can respond to and generate MIDI and SMPTE time code. This includes the ability to receive MIDI Trigger and assign regions to MIDI Notes, the ability to Chase and Trigger to SMPTE time code, generate SMPTE time code as master and write SMPTE time code to tape. Street prices for the MIDI/SMPTE cards are in the vicinity of \$190.

I installed SAW on a 486/33 with 12MB RAM and a 486/66DX2 with 16MB RAM. It ran astonishingly fast on both systems. Lentini took advantage of 386 32 Bit-Register Assembly Language to bypass the usual display slowdowns, and as a result, this program really screams. The speed of access for sound files and the ability to change the display quickly enough to allow scrolling of the waveform as the music plays are truly amazing. No waiting for “Scroll After Playback.” You can also zoom the display or expand the window to full screen without interrupting playback. There is even a remote recording feature that I’m using as I type this. A small transport window is visible, and I’m able to type away at full speed with

no apparent degradation of the keyboard response while recording is going on. I can see the elapsed time and the remaining disk time as well as a display of the number of samples recorded in this session and the current headroom margin. When the recording is done, I hit the "stop" button, and exiting the remote window returns me to SAW's Record SoundFile View.

#### OPERATION

SAW's opening screen (Fig. 1) offers several "views" of the current sound file. The Full View window shows the complete sound file, with time displayed below in minutes and seconds. Picking a point with the Mouse Left button and then clicking the Mouse Right button in this region begins play of the sound file at the point selected. During playback, you can "jump" to another play location with the mouse at any time. A row of buttons beneath the Full View window allows cueing of the play position cursor, transfer of the current cursor position to the SoundFile View window, playing of the file from the cursor position, playing of marked regions of the file and looping of a marked region.

Below the Full View window is the SoundFile View, where a great deal of the working SAW session will be spent. The SoundFile View displays the left and right tracks of the current stereo sound file. It can be zoomed out to show the complete file or zoomed in to one sample per pixel, and these zooms are nearly instantaneous. I keep mentioning speed because speed of display handling is absolutely critical in terms of any software's ability to save session time. Fast display redraw lets you concentrate on the project, thus reducing frustration levels by several "dB."

Zooms are "smart." That is, when you zoom in or out on a file, the current cursor position in the sound file will always be placed at the center of the screen, meaning no time is lost finding your place after a zoom in. There are buttons at the top of the SoundFile View for instant full-in and full-out zooms, as well as incremental zoom-in and zoom-out. Keyboard shortcuts can speed these and other operations in the program.

Up and Down buttons step the vertical resolution of the display; the "0 dB" button sets vertical display resolution so digital "full-signal" (clip-



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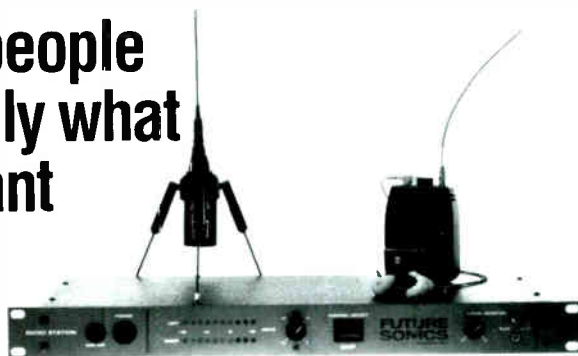
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ping) is at the top and bottom of the channel display. The Up button "remembers" its previous level, so you can easily toggle between the 0 dB display and the magnified display.

The last two buttons are the Mrk Beg and Mrk End buttons, which are used to establish beginning and end points for Regions (highlighted area, Fig. 1), which are the basic building blocks used to create sound sequences in SAW. A region is a defined portion of a sound file—either a small segment, such as the two horn blasts shown in Fig. 2, or sometimes the entire file. Once a region is defined and saved to an EditList, it can be recalled at any time.

Regions can be pasted into other sound files or even mixed into other regions, resulting in a digitally mixed combination of the two original sounds. This mix can be previewed and the relative level of the two files adjusted before execution. After the mix, it is possible to undo the operation. It is a simple matter to build complex sound compositions by creating a blank work file and pasting

and mixing regions from multiple sound files into the work file without changing the originals. As regions are pasted into a file, they can be "varipitched," shifted up or down in pitch by as little as a tenth of a semitone or as much as an octave. Addi-

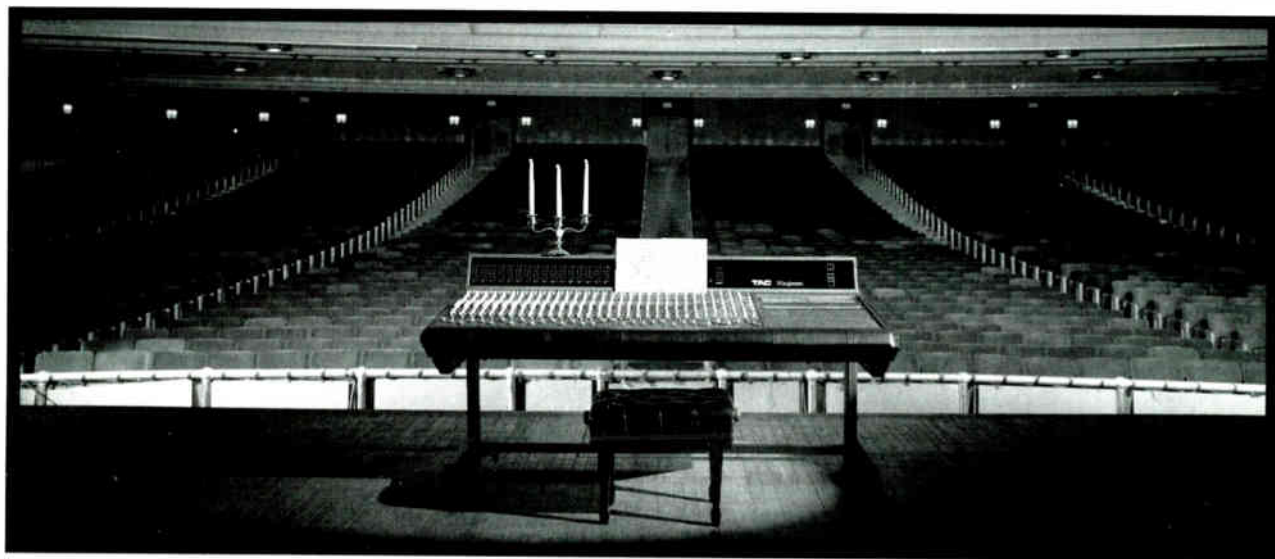
**SAW is too useful and too reasonably priced to ignore, and it offers exciting possibilities for extending adequate access to sound designers and students.**

tional options include Paste and Reverse, and Paste and Convert Sample Rate (rates are dependent on the sound card).


Below the SoundFile View is the EditList View, which contains the Re-

gions list and the Play Sequence list display. All regions defined in the current session or edit list show up in the Regions list. Double-clicking on a region name in the list nearly instantaneously opens the appropriate sound file and highlights the selected Region. Regions from previously saved edit lists can be brought into the Region list for inclusion in the current project. Regions can be assembled into Play Sequences by adding them to the Play Sequence list using the Add button. When the Play Sequence window is made active (by clicking in the window), pressing the space bar or the right mouse button will commence playback of the play sequence, and all regions in the list will play sequentially, as if they had been spliced together. When SMPTE modes are engaged, it is possible to assign SMPTE cue times to sequence list entries so that they will sync to SMPTE time code arriving at the MIDI/SMPTE card input.

The sequence can have up to 400 regions from up to 40 different sound files. It is possible to adjust the start and end points of adjacent regions in a play sequence to achieve very



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By J.L.Cooper and Steinberg

Mixing with Spirit Auto becomes even more powerful and intuitive when you team it up with high quality custom software, taking it beyond the range of many big studio systems. Both J.L.Cooper and Steinberg have developed software specifically designed for the Spirit Auto. First and foremost is the increased fader resolution that comes with using either package. A full 256 steps are available on each fader. This doubles the resolution of standard MIDI automation systems. In addition, VCA virtual groups can be assigned for more effective mixing control. Softmix by J. L. Cooper offers a graphical fader interface with an Edit Decision List detailing all the automation events for off-line editing and a host of other features for the Apple Macintosh. Read, Write and Update modes can be selected from the console without relying upon a mouse. The Spirit Automation Software package from Steinberg provides graphical on-screen editing with cut and paste of mix data - just like using your sequencer package. The automation software runs concurrently with Cubase, too, allowing you to mix "live" sequenced data.

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smooth transitions. The basic idea is to find "zero crossing" points in each file. By zooming into the sample level in the SoundFile View, you can define the end-point of the first sequence so that both channels are crossing the "0" signal level, then do the same with the beginning point of the second region. With zero energy at the splice, there will be little chance of any audible pop, especially if you are careful about matching levels of the signals adjacent to the splice. Special Break Regions can be inserted into the sequence also. These are blank region entries that serve to stop playback until the operator starts it again by pressing the space bar or right-hand mouse button. Using break regions, you can have a sequence of several regions that play, then wait for further operator action to play the next sequence.

To the right of the EditList View is the Time View, which displays various time references for the program such as the Current time at the playback position of the active window, the length of the currently marked area in the SoundFile View, the time elapsed in the Play Sequence up to the currently highlighted region, and an Offset feature that allows resetting the "0:00" time reference. As with all the time-related displays in the software, when SMPTE modes are selected, the displays change to SMPTE time code readouts. In addition, the Time View can be switched to read in number of samples rather than in time. The MultiTrack View, in conjunction with the EditList View, allows assembly of a nondestructive mix composed of up to four stereo tracks.

The Mixer View (Fig. 2) lets you fade tracks in and out and create crossfades between regions. By holding the Shift key down while selecting a region with the mouse, you can slide the region around, changing its position in the mix. Double-clicking on a region opens that region in the SoundFile View for adjusting region begin- and end-points, or for finding a specific point in the waveform. (Cursor placement is consistent from view to view.) The entire mix can be pasted to a blank sound file or simply mixed down to DAT.

Recording is accomplished by selecting Record Soundfile from the File menu, which opens the Record SoundFile View. VU meters include

## Digital Audio Labs CardD and I/O CardD

The premium sound card for use with SAW is the CardD from Digital Audio Labs. This is a 16-bit ISA Bus add-in card for AT-compatible 386 and higher computers, offering high-quality stereo A/D and D/A conversion at sample rates of 48 kHz, 44.1 kHz and 32 kHz, selected by software.

Single-ended RCA (phono) inputs and outputs are jumper-configured for +4 dB, -10 dB and consumer line-level. A/D conversion is via a dual 16-bit delta-sigma converter with 64-times oversampling and a stated THD at 1 kHz of .003%, crosstalk of -95 dB. D/A is handled by a dual 18-bit converter with 8x oversampling.

Installing the CardD is refreshingly straightforward. The concise User's Guide includes clear diagrams and tables for setting a few jumpers; in the vast majority of cases, the factory defaults will work fine.

The I/O CardD installation was even simpler. There was only one jumper to deal with, again factory-defaulted to the most common position and clearly diagrammed and explained in the User's Guide. A ribbon cable connects the CardD and the I/O CardD. External connections are also RCA, conforming to the S/PDIF and IEC formats and allowing direct digital-domain transfer of audio to and from the CardD. During my testing, I also was able to connect the AES/EBU in/out of my Sony TCD-D10 PRO II portable DAT to the I/O CardD, using a simple XLR-RCA adapter set (pins 1 and 3 to shield, pin 2 to hot).

I found the CardD to be noise- and trouble-free, with high-quality construction and implementation. I highly recommend it for use with SAW. The included software for DOS is absolutely no-frills, but it works fine for recording and playback of sound to the hard drive. A Microsoft Windows sound driver is also included with the CardD, though the DOS recording program cannot be used from within Windows. (Digital Audio Labs also offers The EdDitor for DOS and The EdDitor for Windows for stereo recording and editing of two tracks only.)

Digital Audio Labs, 14505 21st Ave. N. Suite 202, Plymouth, MN 55447; (612) 473-7626. —DTL

peak indicators and a margin display to help track headroom while recording. The display shows elapsed time in the current file, remaining time available on the drive, number of samples and margin to clipping. Buttons for choosing sample rate, analog or digital input (depending on sound card used), a retake button, and the remote record feature mentioned earlier are included.

The version of the SAW software I evaluated does not support simultaneous record and play, though this is one of the highest priorities for development at Innovative. [Note: As of December, the company was shipping a version of the software that included this feature—Ed.]

Other future developments under consideration include digital graphic equalization, manual waveform drawing and editing, and multicard operation to allow true hardware-based multitrack recording.

This review process happened to coincide with one of my theatrical sound design projects, and I took advantage of the system to do some of the initial recording and editing for

the show. I quickly found that, for some operations, I preferred SAW to the more expensive system installed at the studio. Ultimately, about half of the show was actually built using SAW and transferred to the studio/booth system for incorporation into the show. I will be adding at least one SAW station to the tools we use in regular production: It is too useful and too reasonably priced to ignore, and it offers exciting possibilities for extending adequate access to sound designers and students. If you work with digital audio or are considering doing so, it's definitely worth your time to take a good look at SAW, even if you are already using another editor. After all, were you satisfied with a single tape deck before you moved into the digital domain?

Innovative Quality Software, 2375 E. Tropicana Ave. Ste. 259, Las Vegas, NV 89119; (702) 733-7854. ■

*Dave Tosti-Lane is a theatrical sound designer currently serving as chairman of the Performance Production Department at Cornish College of the Arts in Seattle.*

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# NEW PRODUCTS



## SOLID STATE LOGIC SL 8000 GB

SSL (U.S. offices in New York City) unveiled the SL 8000 GB, a new on-air console that combines the advantages of the SL 8000 Multi-Format System with master status switching that quickly reconfigures the board for broadcast, record or remix applications. Additionally, the SL 8000 GB can accept cassettes (sections) from SSL's SL 5000 Series mixers for specialized requirements.

## TEKTRONIX AM700 AUDIO MEASUREMENT SET

The AM700 from Tektronix Television Products (Beaverton, OR) is a compact, stand-alone audio test and measurement system. Unlike other analyzers, the AM700 includes the capability of measuring performance in the analog or digital domains, without adding options or external devices. The system includes analog and digital generators, analog and digital acquisition units, internal CPU and monochrome VGA display (no external PC required), and onboard storage. The user interface is based on Tektronix's popular VM700A video measurement set, and inputs and outputs include balanced/unbalanced analog stereo, AES/EBU and S/PDIF digital, optical and digital audio reference I/O.

Circle #228 on Reader Service Card

## AKG C3000 MICROPHONE

Retailing at \$695 (about half the price of the industry-standard C414), the new C3000 from AKG (San Leandro, CA) is a large-diaphragm condenser mic designed for studio, broadcast or live sound applications. The C3000 has two selectable polar patterns (cardioid or hypercardioid), a switchable -10dB pad, bass roll-off switch and an internal windscreen. The mic uses a dual-capsule design, and both capsules are floated in an elastomer suspension for optimum rejection of mechanical noise.

Circle #229 on Reader Service Card



## DIGITECH TSR-24 UPDATE

DigiTech (Salt Lake City) upgraded its \$800 TSR-24 reverb/effects processor with powerful new reverb presets and expanded programming capabilities. The TSR-24 allows users to program an unlimited number of effects algorithms by stacking modules in any chosen order, even using a module more than once, if desired. More than five seconds of full-bandwidth processing is provided by 256K of dynamic RAM, and an optional expansion module doubles the unit's memory and processing power.

Circle #226 on Reader Service Card

## EV/DYNACORD DRP 10

Electro-Voice (Buchanan, MD) introduces the EV/Dynacord DRP 10, a stereo reverberation and room simulator with a wide array of individual and multi-effects capabilities. The unit includes 240 factory effects, and up to six simultaneous effects, such as reverb, delay, modulation and pitch shift, can be edited and stored in an additional 259 user registers. Specs state an over-90dB dynamic range, while distortion through the effects chain is said to be under 0.03%. Full MIDI control is included, and the DRP 10 retails at \$1,250.

Circle #227 on Reader Service Card

**SADIE VERSION 2.0**

Studio Audio Digital Equipment Inc. (Ann Arbor, MI) released Version 2.0 of its PC-based workstation. SADiE 2.0 features two inputs (AES/EBU, S/PDIF or analog) and two or four analog or digital outputs; the system also supports 18-, 20- and 24-bit operations but only in 2-channel mode.

SADiE features up to 8-track playback with real-time mixing; real-time crossfade calculation; nondestructive editing; SMPTE time code support with chase or trigger lock; real-time 3-band parametric EQ; reverse playback; digital compression/limiting; frequency-dependent noise reduction; varispeed playback; PQ code editing for CD prep; trackball or mouse scrubbing; and backup to DAT or SCSI devices. Systems are priced from \$6,995.

Circle #230 on Reader Service Card



**OBERHEIM OBMx SYNTH**

Incorporating 20 years of development with modern components and MIDI, while retaining a traditional analog signal

path, is the OBMx from Oberheim (Oakland, CA). The synth has exten-

**SONEX FABRIX FOAM**

Illbruck (Minneapolis, MN) has expanded its Sonex product line with Sonex Fabrix, created from a fire-resistant fabric and melamine foam and available in a variety of colors. The new material is designed for applications such as offices and meeting rooms, where some absorption is necessary but a product more aesthetically pleasing than thick foam is required.

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**FOCUSRITE RED 3**

The third module in the Red Range line from Focus-



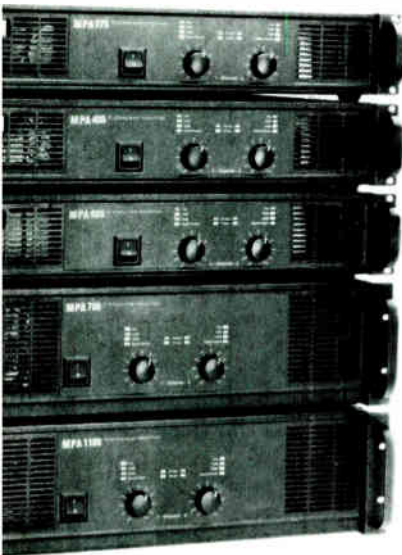
rite (distributed by Group One of Farmingdale, NY) is the Red 3, a dual-channel compressor/limiter. Packaged in a distinctive red chassis, Red 3 features transformer-coupled inputs and outputs, a switch for linking the two independent channels for stereo operation, balanced key inputs and two illuminated VU meters. The system uses the Focusrite VCA, the same as used in the ISA 130 and ISA 131 modules.

Circle #232 on Reader Service Card

sive front-panel control, with 32 knobs and 59 switches for easy signal manipulation; it features up to 12 stereo polyphonic voices, each voice having two oscillators (and noise generators), four multistage envelopes, two filters and three LFOs. Classic Oberheim and Minimoog filters are included, and 128 presets can be replaced by custom user sounds. The basic two-voice unit is \$2,149; two-voice expander boards are \$769.

Circle #233 on Reader Service Card





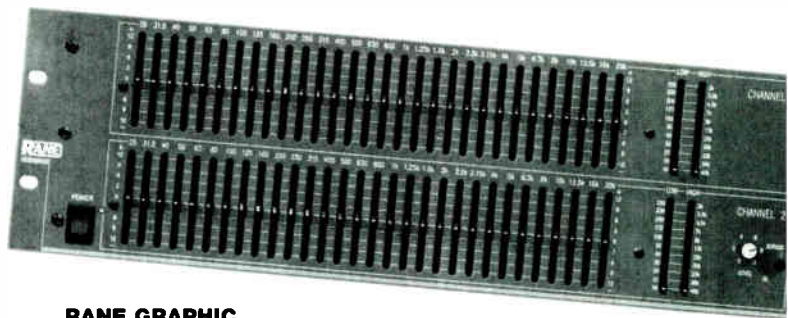
**JBL MPA AMPLIFIERS**

JBL Professional (Northridge, CA) announces a new line of 2-channel power amplifiers, with five models ranging from 275 to 1,100 watts per channel into 4 ohms (20-20k Hz, 0.1% THD). The models are the MPA275, MPA400, MPA600, MPA750 and MPA1100, with the number in each referring to the amp's output power. The series includes Open Input Architecture™ allowing the use of removable input cards for custom configurations. Among the optional cards are a 2-channel, two-way crossover and a -18dB/octave sub-bass crossover for implementing a separate sub-bass feed and mix from the mixing console. Also on the rear panel are balanced XLR and barrier-strip inputs, polarity reverse jumpers and a stereo/dual-mono/bridged-mono switch; outputs are five-way binding posts and Neutrik Speakon connectors.

**DEMARIA TUBE DIRECT BOX**

The ADL 200 DI from Anthony DeMaria Labs (New Paltz, NY) is a stereo direct box that combines discrete components, a vacuum-tube circuit and custom audio transformers for a warm, punchy sound. Each channel has a ground lift switch and a buffered/direct switch, providing the option of routing the signal through the tube circuit or going direct. The half-rack unit is AC-powered and can be used with bass, guitar, keyboards and other stereo sources.

Circle #234 on Reader Service Card



**RANE GRAPHIC EQUALIZER**

Rane (Mukilteo, WA) announces the GE 60 stereo 1/2-octave graphic equalizer,

featuring two channels of 30-band interlocking constant-Q filters on 45mm sliders. The three-rackspace unit includes sweepable high- and low-cut filters, along with input level controls, overload LEDs and hard-wire bypass with LED indicator. Active balanced inputs/outputs are available simultaneously on XLR, 1/2-inch TRS and terminal strips. Retail is \$849.

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**HOT OFF THE SHELF**

Silver Sonic T-14 is a new audiophile-quality, 14-gauge speaker cable with OFC copper conductors, thick silver plating and Teflon dielectrics; the manufacturer, D.H. Labs, is also releasing microphone and digital interconnect cabling. Call (313) 851-1296...Music Sales Corp. has released *MIDI for the Professional*, (\$19.95) by industry insiders Tim Tully and Paul Lehrman, with 240 pages of in-depth tech info and creative techniques for getting the most from your MIDI rig. At bookstores or mail-order through Mix Bookshelf, (800) 233-9604 or (510) 653-3307...Up-town Automation now of-

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# MIX DIRECTORIES

## ☞...WE'RE MOVING...

The Mix Directories, a recording industry standard since 1977, will be leaving the pages of *Mix* as of the March 1994 issue. But don't worry—subscribers will still receive their complete regional listings of recording industry facilities, services and suppliers with more categories, businesses and details than ever before!

**MIXPLUS**

- \* Audio and video production facilities
- \* Equipment repair, maintenance and rental services
- \* Manufacturers and retailers of audio and music products
- \* Independent record labels, promoters and distributors
- \* Marketing and promotion services
- \* Industry publications and information resources
- \* Other new categories like toll-free tech support hotlines, local musicians' unions, trade show dates and phone numbers, and much more.

## Introducing the MixPlus Directories

	Listing Deadline	Display Deadline	Release Date
<b>MIXPLUS EAST</b>	3/4/94	4/15/94	6/22/94
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<b>MIXPLUS CENTRAL</b>	6/17/94	8/15/94	10/15/94

### Notes for businesses who should be listed:

- 1) If you've listed with us before, expect to receive your questionnaire 6-7 weeks before the application deadline or call (800) 344-5478.
- 2) List in every region where you solicit business. For example, CD manufacturers, tape duplicators and recording schools should list in all regions.
- 3) Qualified businesses will receive one "Basic" listing in their primary category at no charge. A "Basic" listing includes name, phone and contact only.
- 4) Guaranteed regional distribution of each MixPlus Directory will include more than 38,000 qualified industry professionals: all regional subscribers to *Mix* magazine, *Electronic Musician* magazine and Mix Bookshelf. Additional single-copy and wholesale purchases will be available through Mix Bookshelf.

## ☞...WE'RE IMPROVING

### Also Introducing The Studio Showcase Pages

Beginning in the March 1994 issue, *Mix* magazine is launching a new monthly advertising section just for audio and video production facilities. The Studio Showcase Pages are a focused advertising buy, the most cost-effective way for your facility to get repeated national exposure in the professional marketplace. They are an excellent supplement to regular *Mix* Display advertising, and are also a great way to reinforce your listings in the new MixPlus Directories.

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## SOUND FOR FILM

## MAKING THE MOST OF YOUR MASTER

by Larry Blake

Quality control in the world of post-production sound requires minimal intervention on the mixer's part. One can assume that every company that will be handling our precious mixes follows long-standing guidelines and engineering practices. Mixers

your mix only means that it sounds as good as *you* can make it. There's still *plenty* of opportunity for other people to screw up the mix. This is in contrast to the world of record production, where the options are relatively limited—the consumer is responsible for the upkeep and maintenance of his or her own stereo! The path of post-production audio has considerably more twists, turns and transfers. First of all, let's make a

ing. Stupid transfers have many recognizable symptoms: They often occur in some anonymous machine room in the middle of the night, with little input, much less supervision, from anyone associated with the mix itself. As a result, stupid transfers are a breeding ground for trouble, with no resistance given to that fun fellow Murphy.

Is there any hope of protecting a mix short of only playing it in your studio for paying consumers? Indeed there is, and all it takes is a little persistence coupled with a willingness to have said persistence be interpreted by others as obnoxiousness. You undoubtedly will run across many people who will be threatened by your presence. Certain phrases will be uttered over and over: "We do it this way for Spielberg," "This will work just fine," and that perennial favorite, "No one else has ever complained."

As long as you are polite and respectful of the other person's point of view, you have no reason to apologize for your stick-to-it-ive-ness. (It also helps to be right!) 'Tis far better to be a pest to a machine room operator than to explain to the director why the mix that sounded so good at the studio sounded like fecal matter over the air.

Probably the best thing you can do to anticipate problems is to follow your mix all the way to the consumer's ears, omitting no step. This process is more applicable to television than to feature films, because television distribu-

—CONTINUED ON PAGE 126



PHOTO ILLUSTRATION: TIM GLEASON

can sleep in peace, secure in the knowledge that their work and reputations are safe.

If you believe the above, I have some land in Southwest Louisiana that might interest you.

No, I'm sorry to report that the completion of

distinction between a smart transfer and a stupid transfer.

A smart transfer is any recording generation that is either necessary (like a final mix) or is done under controlled conditions by (usually) talented personnel, as in disc(k) master-





## MIXING UNDER PRESSURE SHAWN MURPHY/FILM SCORING ENGINEER

by Maureen Droney

Need the soundtrack for a \$60-million movie recorded tomorrow? Got 80 union musicians on a scoring stage, along with the producer, composer, arranger, music editor and their various assistants? Got picture projection, clock control, streamer generation, 16 headphone feeds and union breaks?

No problem, if the guy in the hot seat is mixer Shawn Murphy. If any of you record engineers out there are still inclined to spend all afternoon on a guitar solo, well, don't even bother applying for this job. The name of the game here is guaranteed results. Great sounds, on schedule, with no problems. And with Murphy, people know that's what they are going to get. You've heard his work—from *Dances With Wolves*, *Jurassic Park*, *Batman* and *Ghost*, to *Patriot Games*, *Dick Tracy* and *Tim Burton's The Nightmare Before Christmas*. From *Schindler's List*, *Swing Kids* and *Dracula*, to *Cape Fear*, *Pretty Woman* and *Field of*

*Dreams*. He's recorded more than 200 scores over the past 13 years, following

**Above: Shawn Murphy at the Neve console, Todd-AO Scoring Stage, Studio City, Calif.**

**Right: Full view of the Todd-AO control room  
Below: The orchestra setup for *The Pelican Brief* at Todd-AO**

more than 30 of them to the mix stage for re-recording. He was nominated for an Academy Award for re-recording *Indiana Jones and the Last Crusade*.

One of the most in-demand sound engineers in the film world, Murphy brings a wealth of experience to his craft. After receiving his M.F.A. in tech-

nical theater production from Stanford University in 1972, he worked in production for radio, television and film, including stints with Filmways/Wally Heider, CBS Television and Disneyland. Murphy currently is supervising sound mixer for Todd-AO/Glen Glenn Studios in

—CONTINUED ON PAGE 180



PHOTOS MAUREEN DRONEY



tion involves many more generations.

First, you should find out the producer's legal delivery requirements and what they expect of you. Armed with this knowledge, you should then go to the network (or distributor, in the case of a feature film) and find out how you can integrate your program with their long-established policies and procedures. You then start to come up with a sensible flow chart leading up to what piece of tape will be broadcast. Keep in mind that it will do you no good to deliver to them a tape format that they can't handle (say, D-1 digital video-

tape), regardless of your good reasons for wanting it. I am, of course, referring to the distribution/delivery copies here, and this is not to say that your Master Master shouldn't be of the highest quality you can convince your producer to afford. In that regard, you should be a pit bull.

I have had great results using Sony DASH multitracks to do final mixes and print masters, and while I have never done an A/B test comparing a recording made on a 3348 to one made on 24-track analog with Dolby SR, I can only assume that the results would be damn close. Having said that, why do I go to the trouble (and

ask that producers go to the extra cost) of renting digital multitracks?

First, I like the lack of tweaking that comes with the digital territory; I have other things I want to worry about at a final mix. Second, I like it for archival reasons. I end up using two 60-minute, 1/2-inch reels (24-track, for compatibility with all DASH machines) for the print masters and two reels for print masters and various versions. Thus, all master materials can be held in one hand and cloned in four hours flat. I then have an exact duplicate that would occupy 120 1,000-foot rolls of full-coat or 12 rolls of 2-inch tape. Sure, you *could* copy all of the above, but I don't think anyone really does, and you would have to take a generation loss, SR or no SR. The final reason concerns the ability to clone TV mixes to digital videotape, again without the worry and question of alignment. (I've never used PD digital multitracks, although I'm sure the same advantages apply.)

Back to the process. Concerning contracts: read them, understand them but don't necessarily follow them. "What the !?%\$@," you are probably saying. Let me explain. Contracts are written by lawyers who frequently know as little as possible about sound and are still allowed to work in "the business." Consequently, what do they do when drawing up contracts but...copy *old* contracts, along with their outdated delivery requirements that were written during the Dark Times (i.e., when most films and all TV programs were in mono). Therefore, while it might be easier to follow the letter of the contract, it's up to you to make sure that the elements you deliver reflect the real-world needs of stereo mixing.

For example, regardless what your producer's contract says, you should convince him or her to spring for a stereo music and effects mix. This should consist of the stereo music and stereo sound effects final mix "stems" *and* additional material that "fills" holes left by the omission of the production dialog track. In other words, you will have a stereo element that is ready for the addition of foreign-language dialog. This is an important delivery requirement (contractual or not) and should be done immediately following the "domestic" mix.

Music and effects mixes for feature films usually are delivered on

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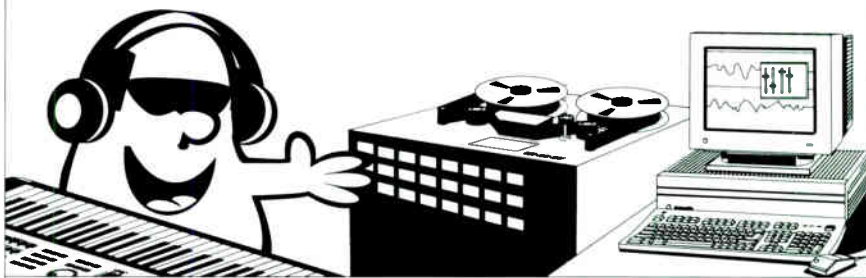
Dolby SR-encoded 35mm 4-track (left-center-right-surround). Many studios have been modifying this to the six-track format, with a normal LCRS M&E on tracks 1-4, "controversy" items on track 5, and original-language dialog on track 6. Having everything on one piece of film makes for much more convenient dialog replacement, because they can play back the M&E either with the original dialog or the newly recorded material to try to match the character of the original mix. The "controversy" track would contain items such as a Spanish-language TV program playing in the background: You would probably want to keep it "as is" for foreign-language dubs, but it would be safest to keep it separate. In the past, this material might have been on another unit of mag film, which is only asking for trouble; it probably wouldn't get played because nobody knew about it. Remember to provide a cue sheet for location of the "controversy" items.

In all situations—feature films or television—it is incumbent on the mixer to be extremely anal about tones and documentation. Give those people in the anonymous machine rooms anything less and you have no right to expect good transfers. Remember the first law of alignment tones—when copying masters (and not doing any sort of mixing), copy the tones across. Do *not* generate new tones during transfers because they will not reflect the precise level/headroom, equalization or phase characteristics of the mix. Original tones have a "Rosetta stone" ability to tell you exactly which transfer along the way deviated from proper reproduce characteristics.

In this regard, the mix must reflect the real-world limitations of the delivery medium—a TV mix that contains peaks 25 dB above the 0 VU reference level simply will not translate. I'll get back to this crucial issue of dynamic range in detail in April. Meanwhile, next month I plan to talk about time code. After all, it's NAB time. Stay tuned. ■

*Larry Blake is a sound editor/re-recording mixer who lives in New Orleans because of reasons too numerous to mention, although a Pimm's cup on the courtyard of the Napoleon House Bar would give you a good start.*

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# NEW PRODUCTS FOR FILM/VIDEO SOUND

## VEGA MINIATURE LAVALIERS

Vega (El Monte, CA) introduced two new lavalier mics that measure only 0.20 by 0.59 inches. The LM-210, for use with Vega 77/DIII and T-677 transmitters, comes prewired with a Lemo connector; the LM-210X has a mini-XLR connector for use with Vega T-17, T-25, T-37 and many older Vega bodypacks. These condenser, back-electret mics have omnidirectional pickup patterns, with a full-range 50-20,000Hz response. A detachable lavalier clip and foam windscreens are standard.

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## BRAINSTORM SR-26

Brainstorm Electronics (distributed by Audio Intervisual Design of Los Angeles) debuts its SR-26 Dual Time Code Distributor/Reshaper, a single-rackspace unit that cleans up time code and distributes it through six individually buffered outputs. Its two inputs can be used separately, as a 1x4 master and 1x2 slave, or as a single 1x6 unit. Addition-

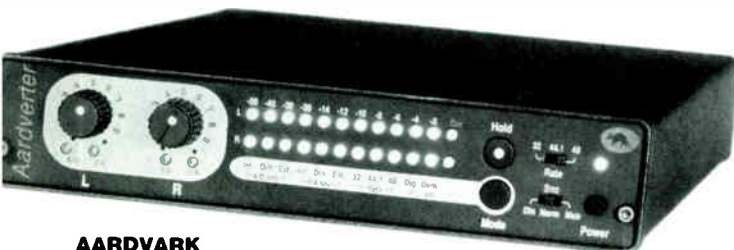
## NEW COOPER MODULES

Cooper Sound Systems (San Juan Capistrano, CA) announced new modules for the CS-106 +1 professional audio mixer, allowing the location recordist to configure the console to fit any production need. Users can select from four to seven mono inputs, stereo modules with M/S decoders or the new D-1 aux module. In addition to providing two extra isolated outputs, the latter converts the CS-106 +1 into a 6x4x Aux mixer that interfaces directly with the Nagra-D digital 4-channel location recorder. Standard features on the CS-106 +1 include three discrete monitor outputs with tape returns, talk-back and communications, remote roll, PPM or analog meters, and 12-hour powering on 12 "D" batteries.

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## SSL SCREENSOUND V5

Solid State Logic (USA offices in New York City) added a new high-speed processor to its ScreenSound digital audio-for-video editor. The update brings an extended range of operational features, such as jog and shuttle on the desk, edit peel, global edits, autoconform and reconform. ScreenSound V5 also offers VisionTrak, an integral, disk-based video option, with up to one hour of random-access video and instantaneous location of audio and video to any frame. Standard features on the system include simultaneous sound and picture recording, ADR countdown overlays and integrated machine control.



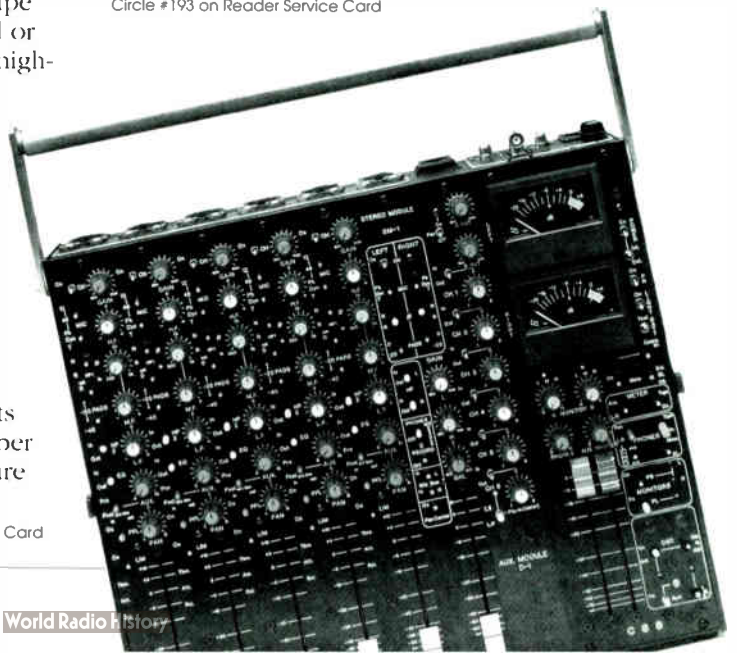
## AARDVARK A/D D/A CONVERTER

From Aardvark Computer Systems (Ann Arbor, MI) comes the AARDverter, a compact 1.5x12-inch unit that includes digital-to-analog and analog-to-digital converters as well as on-board DSP functions, such as DC offset removal, bar graph PPM, 1kHz tone output and digital silence. Converters are delta-sigma Crystal; rear panel XLRs accommodate balanced analog signals and professional AES/EBU-92 digital I/O; all levels are controllable via recessed trimmer screws. The unit supports 44.1, 32 and 48kHz sampling rates and retails at \$2,995.

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ally, the SR-26 can drive long cables (for remote or live broadcast applications) and can reshape time code in rewind or FFD modes so that high-speed readers can track the master transports accurately. Inputs and outputs are balanced XLR (also usable in unbalanced systems), and the unit automatically detects any time code format, with the outputs reshaped into a proper SMPTE/EBU or square waveform.

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by Dan Daley

# REMIXER BONZAI CARUSO

## PROJECTS GO TO THE CLUBS

**T**he one place you'd expect to find the project studio is in the subterranean world of club-remix dance music. It's custom-made: Dance is MIDI- and virtual-based; the production is the thing, with the song and the artist often secondary considerations. Dance music is perfect for the sole proprietor who wants to get down alone and create.

What has kept that from being the norm is the fact that a lot of urban artists and producers don't come from engineering backgrounds. There are people who are masters of scratchin' who can't tell line level from mic level. And they don't have to, as long as there's a professional studio that can interface between the talent and the tape. And frankly, so much goes into a good dance record that anything less than pro quality is not going to make it. Rap, maybe, but not the really good dance stuff. I mean, it's easy to distort a 12-inch woofer, unless you know what you're doing.

But the projects are coming into their own in dance, as younger engineers move out of staff gigs and make reputations for themselves. The project studio is less a conceit than a practical tool for this type of user. And the good ones know when they have to get on the subway and go to Chung King or Unique to finish up.

### REAL STUDIO BACKGROUND

"Bonzai" James Caruso is one of these. He'd just turned 30 when he was named one of *Billboard's* most promising producer/mixers in 1993.

After high school, Caruso dual-tracked, studying at Manhattan's Institute for Audio Research and interning at Secret Sound before it closed at the end of the Jack Malkin

era. Malkin moved him along, and soon he was flying the board for artists like Ice-T, the Sugar Hill Gang, Melle Mell and Hiram Bullock.

Caruso hit a motherlode in 1984, when he hooked up with a pair of producers, Clivilles and Cole (who would become C&C Music Factory). Bonzai (the name is a remnant from the days he raced motocross dirt bikes) worked with them as engineer on a wide range of projects, includ-



**Bonzai Jim Caruso**

PHOTO: MICHAEL DEL ROSSI

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World Radio History

ing Natalie Cole, Luther Vandross, Freddie Jackson, Seduction and Taylor Dane. His own production career took off with artists from the next strata down, including Martha Wash, Corina and Pajama Party, leading to recent mixing gigs for Madonna ("Deeper and Deeper," "Rain" and "Fever"), Sir Mix-A-Lot ("Baby Got Back"), Ice-T ("Dick Tracy"), George Michael ("Killer/Papa Was a Rolling Stone") and Cathy Denis ("You Lied to Me"). He recently had a solo album, *Parade*, released on the Class X label.

Bonzai's project room is a tenth-floor, L-shaped studio overlooking a lake in Flushing Meadows Park in Forest Hills, Queens, where he lives with a significant other. The equipment list reflects some shrewd buying; he's been a Mackie user for a long time, now using two CR 1604 mixers ganged together, as well as a Fostex 450 and Boss BX-16. He relies on the Tascam SM-16 1-inch multitrack for the rare times he goes to tape. Bonzai likes Ataris and uses Creator software. Signal processing includes all the cheap dates: Yamaha, Alesis, Roland and BBE. Lots of keyboards, the usual suspects. Three-foot air spaces between the thick-walled apartments help keep his studio free of neighbors' complaints.

#### NEVER SEE TAPE AGAIN

The club remix of the George Michael cut is a good representation of Bonzai at work in his home studio. "Killer/Papa Was a Rolling Stone" was a live cut delivered on five reels of 2-inch tape. At Battery Sound, where Bonzai does much of his studio work, he slaved the verse vocals off the 1-inch, 16-track format and made one long mono sample of them, and then sampled the chorus vocals to an Akai S-1000 sampler in stereo, saved to a Syquest removable hard drive. He then picked among other sound elements, taking some horn parts and sampling them, as well. Back at home, he began constructing a new track from scratch with the sampled and taped vocals locked to the sequencer.

"This stuff never sees tape again until the final mix to DAT," Caruso says. After a percussion track is built, he sets about layering with synths. "I've been trying to use more analog sounds lately," he explains. "Every-

one's heard the M1 and P3 stuff eighty million times by now, and you can pick those sounds out on records. I've been using [analog] synths like the Juno 100 and the Korg EX 8000, which had MIDI in them from the factory. And I've been collecting sampled analog synth sounds now for ten years, so I have a pretty extensive library of them to fool with. I think that's the real key to my studio."

#### SHAKIN' THE JEEP

The vocals are almost an afterthought in club mixes. "They tend to

get mixed way down," he says. "What really matters in a club mix is the bottom. The club stuff doesn't have to sound sonically pretty and shimmery and clean." On the low end, Bonzai mixes off a combination of Yamaha NS-10 monitors and a pair of Sony MDR-V6 headphones. "I know it sounds strange, but I really get a very good approximation of what the low end is going to sound like on club speakers in those headphones," he says. The largest monitors he owns are a pair of Verit Series II with 12-inch woofers, but he says he hardly ever uses them.

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# CONTINENTAL

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"What you want to listen for is whether or not the kick is eating the bass, or the bass is eating the kick," he explains. "The way to do that isn't so much equalization as it is picking the right samples in the first place. You want to make sure that the frequencies inherent in the samples are compatible with each other, then get a good balance between them. You can also separate them by changing their pitch instead of EQing. Then, I use the headphones again to make sure that the combination of kick and bass isn't overwhelming the track. It's got to be in proportion—it can't drown out the rest of the track, but at the same time, you want to make sure it shakes the room or the Jeep."

Other than that, it's all feel, according to Bonzai. He is partial to the down-priced effects, and his rack is laden with them. "That's what really made all this project studio stuff happen: the effects," he says. "It's unbelievable what you can do with inexpensive signal processing." And it makes a difference in the mixer's bottom line, as well.

Bonzai says that, once everything was said and done, he didn't really see a profit on the George Michael cuts; too much of the budget—and club remix budgets aren't anything that Def Leppard would get wet over—gets eaten up by commercial studio rates of \$120 an hour or more. "The money goes fast on 48-track time," he says ruefully. "The home studio acts as a counterbalance to that. Plus, it lets me have a certain amount of freedom from the clock. If I need to, I can take a four-hour break and take a walk around the lake and clear my head out before a mix. And that has a certain value, too."

Bonzai mixes to a Panasonic 3700 DAT, as hot as possible, at 44.1 kHz. He goes with the lower sampling rate in order to maintain compatibility, he notes, with a wider array of digital I/O structures, such as Sound Tools. As for pushing the red line on the DAT meter, he claims that coming dangerously close to clipping actually has a beneficial effect on the sound of DAT.

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*Dan Daley is Mix's East Coast editor. The clubs are one of the reasons he still keeps the New York apartment.*



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by Dave Lawler

## Jammin' With Phish



At the Warfield Theater in SF are (L to R): Page McConnell, Trey Anastasio, Mike Gordon and John Fishman

**N**o one seems to be able to pigeonhole the band Phish. You hear things like, "A little Frank Zappa, mixed in with the Allman Bros. jammin' thing, a healthy helping of the Dregs, sometimes reminiscent of Gentle Giant." All of these styles remind you of, but do not accurately describe, the unique sound of the New England-based Phish.

The band formed in a Vermont rehearsal house eight years ago and has since developed an extensive following of "Phish-Heads," as well as a reputation for spontaneity with a touch of zaniness. There is substantial musical energy erupting from this four-piece band. Although the music is very progressive, the artists seem to have foregone some of the trappings of '90s touring. Most notable is the adherence to traditional musical instruments such as the grand

piano, Hammond B3 and Fender Rhodes. Only one guitar and bass are carried, plus a spare for each guitarist. Furthermore, all of this is presented as a MIDI-less performance. In a nod to the Grateful Dead, Phish allows its fans to record their shows and set up a "tapers' area" adjacent to the FOH. As testimony to the group's popularity, their summer '93 tour took place mainly in large sheds.

Handling the audio requirements for Phish since the band outgrew its own system has been Snow Sound of Middlefield, Conn., mainly a regional company that handles music tours, conventions, TV work, special events, sports and political engagements, as well as installation and sales. Bob Neumann has been with the company since its inception in 1977. Snow Sound has expanded to its present full-time staff of eight

plus several contract workers.

Snow Sound has been working closely with Crest Audio as the beta test company for the Century 40x8 mixing console. Several versions of the FOH desk have toured with Phish, and Neumann says, "This unit has a very low noise floor, sounds great, is clean and has great dollar value. I have never owned a console that did not have one technical problem ever while touring."

Snow Sound's main speaker system for this tour comprised 42 Crest 8001 powered, proprietary trapezoidal enclosures (which Neumann designed and developed), each with two 12-inch drivers and a 2-inch horn. These are augmented by 16 McCauley dual 18-inch (EX-loaded) subwoofers stacked on the ground. It is difficult to design a system that can be flown and stacked without com-

PHOTO: STEVE EMMINGS

promise in many types of venues, but this rig seems to have met that criteria.

The FOH mix position is filled by Paul Languedoc, who also builds all of the band's guitars and cases. Today, his system includes:

- FOH Drive Rack—three Klark-Teknik DN360 EQs; two BSS Varicurve FCS 926 EQs; four BSS FDS 360 crossovers w/opti cards; a BSS TC804 time corrector; four Aphex Expressors and one TC Electronic 1280 digital delay.

- FOH FX Rack—two Lexicon LXP-1s; two LXP-5s; an LXP-15; two Eventide H3000s; a Pioneer CD player; Panasonic SV-3700 DAT machine; Tascam 122 MK cassette deck; dbx 162 limiter; two Aphex 612s and two Aphex 900 Series racks with ten Expressor modules and ten gate modules.

Freelance monitor engineer Peter Schall has lived stage right at the console since Phish's

beginning. He says, "You have to watch these guys very closely during the show. We have developed a system of hand signals they give me for mix adjustments, and it's really easy to miss something if your attention wanders for a moment."

Schall has modified the moni-



L to R: McConnell, Gordon, Anastasio and Fishman

tor system as the artists' requirements have changed over the years. The current rig includes a Yamaha 40x12 console; four Klark-Teknik DN 360 EQs; a Meyer CP10 EQ (piano insert); a

K-T DN 60 spectrum analyzer; ten EV CX4 crossovers; Carver PT1250 amplifiers; a Jensen 40x3 transformer splitter; ten EV DML 1122 wedges; two EV DML 1152 wedges; and a McCauley 850 sub (EV-loaded).

Each musician receives a stereo mix, and sidefills are used on occasion, but "they seem to always migrate slowly onstage," Schall says. He also is planning to integrate in-ear monitor systems for each member before the '94 spring tour rehearsals. The various systems will be auditioned at the AES and NAIMM shows, he says.

Phish owns all the microphones they use, most of which are permanently mounted on the equipment. These include a Beyer T6X 480 for vocals, Sennheiser 409 for guitar, Demeter DI for bass, two AKG D12s and a Sennheiser 409 on the Leslie, an EV RE27 on the kick drum, Shure SM 57s on the snare, AKG 460 on the hi-hats, Sennheiser 409s on the toms and

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three 460s as overheads.

The 7-foot, 4-inch Yamaha C7 piano, played by Page McConnell, was totally isolated inside and underneath with 1/4-inch Plexiglas. During the show, the lid remains fully open, which necessitates such isolation, as no pickup system is used. The entire inner rim of the piano is lined with 1-inch Sonex egg-crate foam, with the Plexiglas areas over the permanently mounted mics to prevent standing waves. The bottom of the piano is also lined with foam under the Plexiglas. All this isolation seems to make the piano very acoustically dead, but it works well in the miked format.

Miking for the piano consisted of an EV RE38, AKG 451 and 414 (soundhole), another 414 (open high-end strings) and a Countryman Isomax C (underneath). Monitors were three C-Ducers. Although I have never seen so much hardware in a piano and was dubious about phase cancellation, the audio quality and superior isolation were well worth the effort.

Another audio component worth mentioning was the Snow Sound electrical distribution, which was manufactured by Motion Laboratories, a company that also constructs Chain Motor Distros and Lighting Electrical Distros. It's a modular, rack-mountable system available with many options in single- and three-phase configurations. The safety bases were covered.

The Snow Sound system and the audio team were versatile enough to tackle sheds, arenas, open fields, large clubs and theaters with ease, and it exhibited consistent sound quality and coverage throughout the summer. ■

*Dave Lawler, production manager for Phish's summer '93 tour, is an audio engineer, stage manager and piano technician.*

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# SOUND REINFORCEMENT NEW PRODUCTS

## TURBOSOUND TCS

The TCS Series from Turbosound (available from Audio Independence Ltd., Mazomanie, WI) is a series of compact, bi-ampable, three-way enclosures. The first in the series, the TCS-612, has a trapezoidal design with a vented 12-inch woofer, 6.5-inch cone midrange on a fiberglass horn, and a coaxially mounted tweeter. The system uses the LMS-660 controller, which provides 24dB/octave crossover filters, output limiting, time/phase alignment and a voltage-dependent filter to increase LF response at low input levels. Constructed of marine-grade birch plywood, the TCS-612 includes a stand socket and integrated flying points.

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## BGW/MCCAULEY POWERED SUBWOOFER

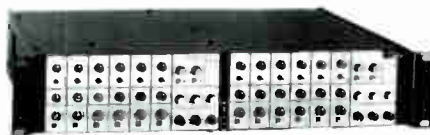
Designed as a joint venture by BGW Systems (Hawthorne, CA) and McCauley Sound (Puyallup, WA), the Model 2200 is a self-contained powered subwoofer available in either fixed-installation or touring enclosures. The 2200 has four McCauley 15-inch woofers (rated at 600 watts each) and a custom version of the BGW GTA 1,000 watt channel power amplifier, bridged for 2,200-watt output. The unit includes highpass and lowpass filters, allowing the use of full-range or band-limited inputs; it features looping XLR and barrier strip connectors, locking gain control, remote turn-on, anti-clipping circuit, twist-lock AC input and a variety of filter frequencies selectable via DIP switches.

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## JBL HF DRIVERS

From JBL Professional (Northridge, CA) come new high-frequency compression drivers, available in 8-ohm (H Series) or 4-ohm (J Series) versions. The Model 2451 uses neodymium magnet technology for a lower weight and slightly improved performance characteristics over the new 2447 model, which employs a conventional ferrite magnet. All are 1.5-inch exit designs, with Coherent Wave™ phasing plugs for coupling directly with Optimized Aperture™ Bi-Radial horns for lower distortion and more consistent control (to 20 kHz) than previous models. Designed for fixed-installation or touring applications, both models have rim-centered diaphragms for simple field replacement.



## SENNHEISER VHF WIRELESS

Rounding out the ProForce line of microphones is the BF1051 handheld wireless system from Sennheiser (Old Lyme, CT). This VHF system can operate on two switchable frequencies, and a true diversity receiver constantly monitors both signals, selecting the strongest of the two. The mic is a supercardioid design for maximum feedback rejection and features an internal antenna, as well as recessed switches for on/off, mic sensitivity and channel selection.

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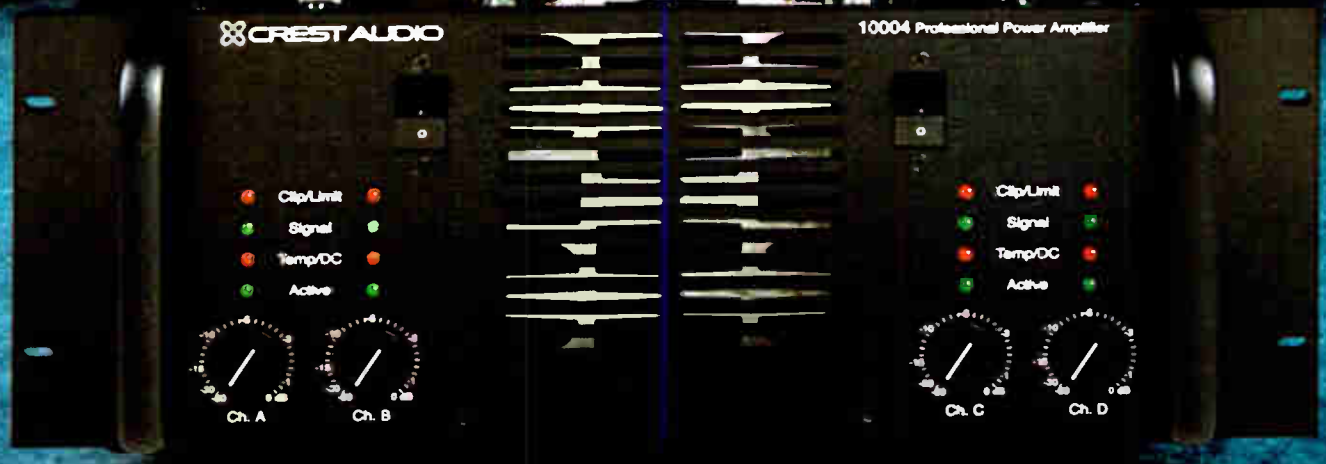
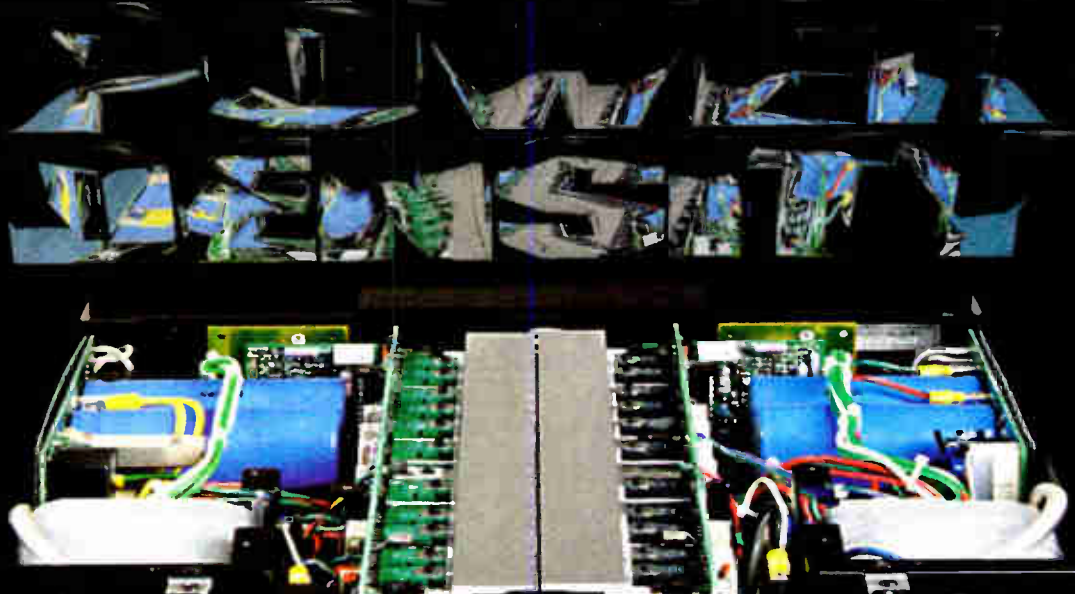


## APOGEE CRQ-12 EQUALIZER

Apogee Sound (Petaluma, CA) announces the CRQ-12, a dual-channel parametric equalizer designed for live sound applications.

The CRQ-12 has 12 fully parametric filters (each adjustable in three ranges from 20-20k Hz), four shelving filters and four adjustable 12dB octave filters—all configurable in three modes of operation. The modes offer flexible internal routing to the unit's four independent output level controls. For example, six filters feeding the first set of outputs could equalize a central cluster, with the balance between the inner and outer speakers adjustable via separate gain controls. The six remaining filters could be used to equalize other feeds such as under-balcony speakers, and the independent highpass and lowpass filters, along with the high/low shelving filters, also could be used on each of the two channels. All inputs and outputs are balanced XLR-type.

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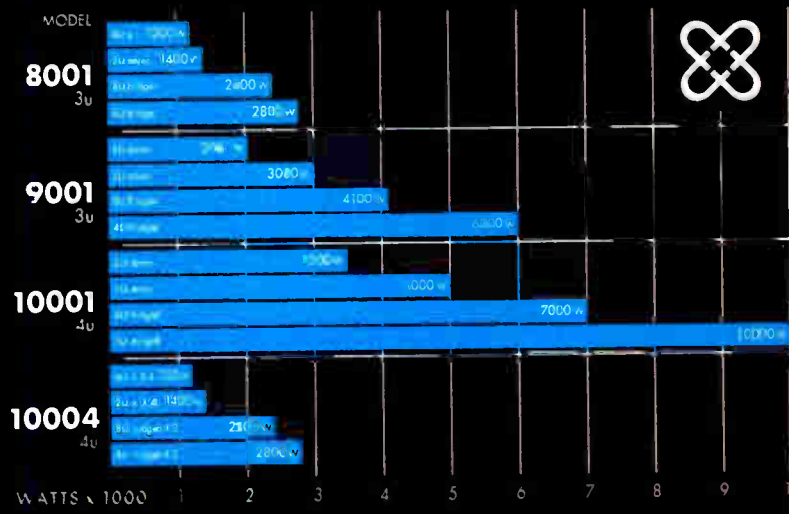
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## HOME ALONE WITH PHIL COLLINS

by Bruce C. Pilato

"If I'm on my own, I can think of no reason I shouldn't sit up there in my home studio and work and just really have fun," says soft-spoken English singer/songwriter/musician/producer Phil Collins, as he sits in a conference room in Atlantic Records' New York office. "I just like to try and write, and then try and demo the ideas that I'm writing. It's the most fun I can think of. Of course, if I've got my family there, then obviously that's a different kind of day completely."

Collins, who as lead singer and drummer for Genesis and as a solo artist has sold more than 60 million records, is in town promoting his latest effort, *Both Sides*, which marks quite a departure for him. Far from the sort of slick, highly accessible pop he's known for, *Both Sides* is a frequently dark and highly introspective musical work. It is truly a solo album in every sense of the word: Collins wrote and produced it—in his home studio just outside of London—sang all the vocals and played all the instruments. Certainly, it's a unique-sounding record for a major pop superstar, in some ways analagous to *Nebraska*, Bruce Springsteen's 1982 album of stark home recordings.

"I've always noticed that my demo lead vocals had more heart than the recorded versions done in the studio with the headphones and people hanging around," Collins says.

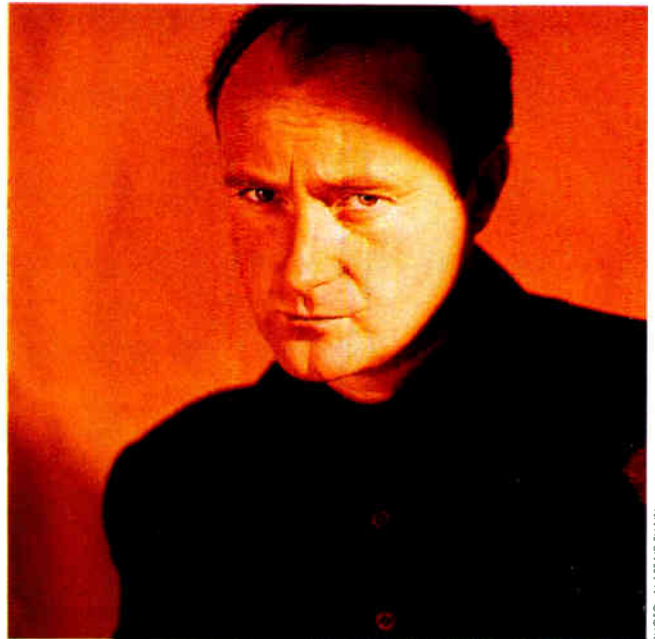


PHOTO ALASTAIR THAIN

"So this time, I had the lyrics written, and I recorded all the lead vocals in the upstairs room at my house. All in all, it's the most enjoyable album I've ever made." Collins rerecorded the drum tracks and a few other parts at The Farm studios, but all in all, the record is Phil Collins, home alone.

**Mix:** *Both Sides* takes a lot of chances from an artistic standpoint. It isn't much like the other consumer-friendly solo albums you have released.

**Collins:** Well, *Face Value* was really kind of different because nobody really knew what to expect. And consequently, I guess it surprised people because "Something in the Air" drew people into it. But I must admit, I felt that when I finished this record, I kind of thought, "Well, where does this fit in?" I said to my wife, "Who's going to buy this, whom is this going to appeal to?" because there are a lot of

fans out there that I meet that say, "Hey Phil! 'Su Su Suddio!'" Now, I'm happy with that, but when they hear this record, there's nothing for them on this. I'm proud of "Su Su Suddio"—it's a song that's brought me to so many people—R&B has been very important to me, and it's not to say that I won't do that again. I just didn't write that this time. It didn't come to me, so I didn't pursue it.

**Mix:** Part of the downfall of doing an album where you do everything is you don't get much input from other people. How did you deal with that?

**Collins:** There are outside influences. I played things to my wife as I was writing them, and I played things for Tony Smith, my manager, as I was writing them. When I had all the demos done, I was thinking by that time I was going to play all the instruments myself, and I had done demos with all

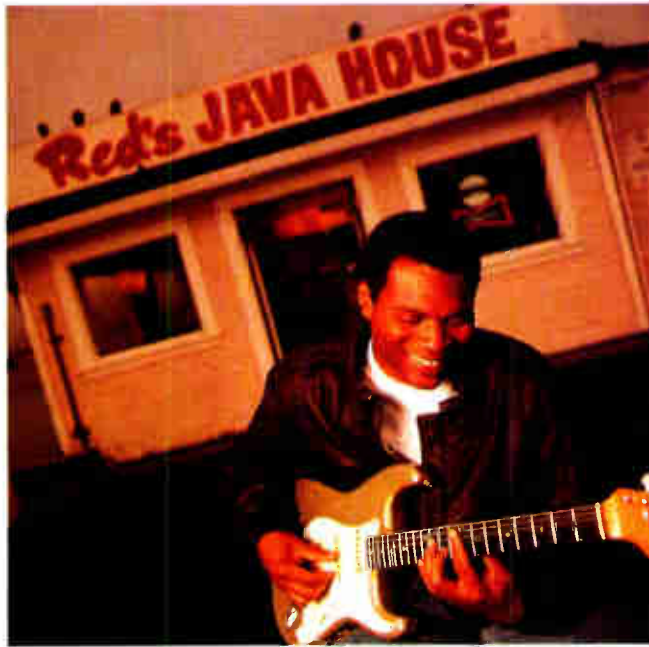
—CONTINUED ON PAGE 144



## ROBERT CRAY: BACK TO BASICS

For Robert Cray, his latest album represents both a new direction and a return to his roots. *Shame + A Sin* marks the first time Cray has produced a record on his own after a long, fruitful association with Dennis Walker. It is also probably the purest blues record he's made in many years, which is welcome news for those who worried that the singer-guitarist's past couple of more R&B-oriented albums were a bit on the slick side.

Through the 1980s, Cray established himself as perhaps the most thoughtful and original voice working in contemporary blues—a



brilliant singer-guitarist-songwriter who fused elements of blues, soul and pop into his own, instantly recognizable idiom. *Shame + A Sin* retains the patented Robert Cray Band sound of

recent years while venturing deeper into more traditional blues territory. In places, the record even sounds like it might have been cut at Chess Studios in Chicago in the late '50s,

and indeed that was part of the intention.

Working with engineer Steve Savage at Studio D in Sausalito, Calif., Cray and his superb band—drummer Kevin Hayes, bassist Karl Sevareid and keyboardist Jimmy Pugh, augmented by sax player Edward Manion and trumpeter Mark Pender (a.k.a., The Miami Horns)—aimed for a rougher, more live feel than their past several studio outings.

"The sound of some of those great old blues and R&B records was definitely in our minds," Cray says. "When we got the go-ahead to make a blues record, we thought of old records by Elmore James or Howlin' Wolf or Muddy

—CONTINUED ON PAGE 146

## PRODUCER/MUSICIAN BEN KEITH: FROM PATSY CLINE TO "HARVEST MOON"

Over the course of nearly 40 years in Nashville, steel guitarist extraordinaire Ben Keith has built a mile-long resume that includes sessions with everyone from Patsy Cline (that's him on "I Fall to Pieces") and Faron Young to Emmylou Harris and Johnny Cash. Yet if you ask the soft-spoken steel man to name his favorite musician he's worked with, he'll probably cite an artist who represents the antithesis of the typical Nashville cat: Neil Young.

Since playing on Young's enormously successful 1972 *Harvest* album, "I think I've done something with him just about every year, whether it's playing on an album or touring with him."

Keith says. And he's co-produced three of Young's best records: *Comes a Time* (1978), the criminally underrated *Old Ways* (1986) and, most impressive of all, Young's most recent studio album, *Harvest Moon*.

"I really like the way Neil works," Keith says. "He works quickly and he goes for feel instead of doing everything over and over again until he thinks something is 'perfect.' In fact, when I first started working with him, I'd be surprised—we'd do a take, and he'd say 'Okay, that's great,' and we'd go on to the next one. I'd be thinking, 'That's it?'" he says with a laugh. "But he knew what he was doing."

—CONTINUED ON PAGE 149

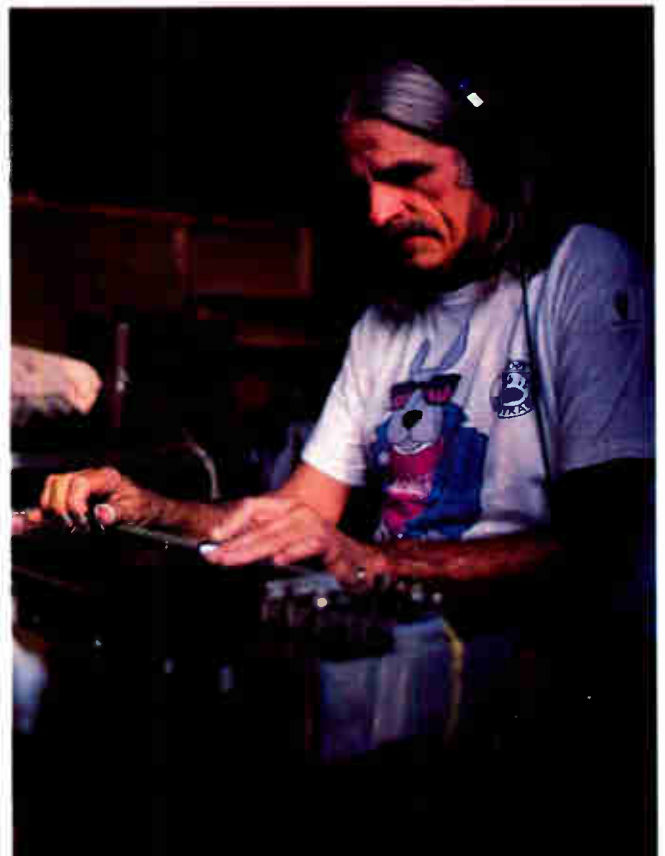


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## Craig Chaquico Takes The "Acoustic Highway"

It's nice to be surprised. Craig Chaquico, former heavy axe slinger for Jefferson Starship, is the last guy I expected to make a lovely album of acoustic guitar-driven instrumentals. After all, I've seen the guy in his guitar-hero pose—mouth open, hair flying, fingers moving like lightning down the fretboard. And, truth be told, years ago in pursuit of a story, I was a willing passenger in a Porsche that he drove at *insane* speeds on a twisty mountain road—he even did a 360 just to rattle me (it worked). Yet here's his album, *Acoustic Highway* (on the Higher Octave Music label), lodged for months near the top of *Billboard's* New Age chart! Guess it's time to call him Mr. Sensitive.

Actually, that's a cheap shot, because in fact Chaquico *is* a nice guy and he's always had a knack for tasteful, tuneful playing when it was required (which wasn't that often) in the Starship. *Acoustic Highway* is a very pleasant *divertissement*, a richly textured instrumental voyage through real and imagined places, courtesy of Chaquico's sparkling guitars and the keyboards and percussion of his co-producer/co-writer Ozzie Ahlers.

Chaquico appreciates the irony of being lumped into the "new age" category but explains, "New age to me is probably something different than it is to most people. To me, Hendrix was new age: When he did '1983...A Merman I Should Be' on *Electric Ladyland*, that was new age. Pink Floyd, too. To me, new age is a type of music that can take you on a cerebral journey. I really got into the production in that way, so you hear the lead melody on the guitar, but you're also subtly distracted by things on the left and right. I'm trying to take the listener on a 360-degree trip."

Although he doesn't have much prior production experience, Chaquico has worked closely with a number of top producers (including Ron Nevison, Larry Cox, Tom Lord-Alge and Mutt Lange), and he's always made tapes at home. "In the Starship,

I made very elaborate demos using an Otari 8-track," he says. *Acoustic Highway* was recorded entirely at Chaquico's own Lunatunes Studio, adjacent to his Marin County, Calif., home, with Chaquico engineering himself.

"The acoustic guitar is all DI," he says. "I tried a whole bunch of acoustic/electric guitars that had a jack on them, and I found the Wash-



burn to be the best. And what made it so convenient for me is I could plug into the Washburn, go into a limiter and noise gate and then go straight to tape [he has a Fostex recorder], and then monitor through my board [actually two Carvin MX1688s] but not record with any of the effects. It made for a real clean recording, and then later we could add ambience with signal processing—reverbs, delays, chorusing and things like that.

"A lot of the reverb was PCM 70—I think I used the 'rich chamber' setting, and then another setting that gave my guitar an acoustic quality," Chaquico explains. "It enhanced the things I like to hear when I play acoustic in a nice room: a little of the room around me, the squeaking of the strings. I used a limiter to bring that out and compress some of the harsh overtones you sometimes get with a direct. If you play really hard by yourself acoustically, the guitar itself absorbs those peaks, but when

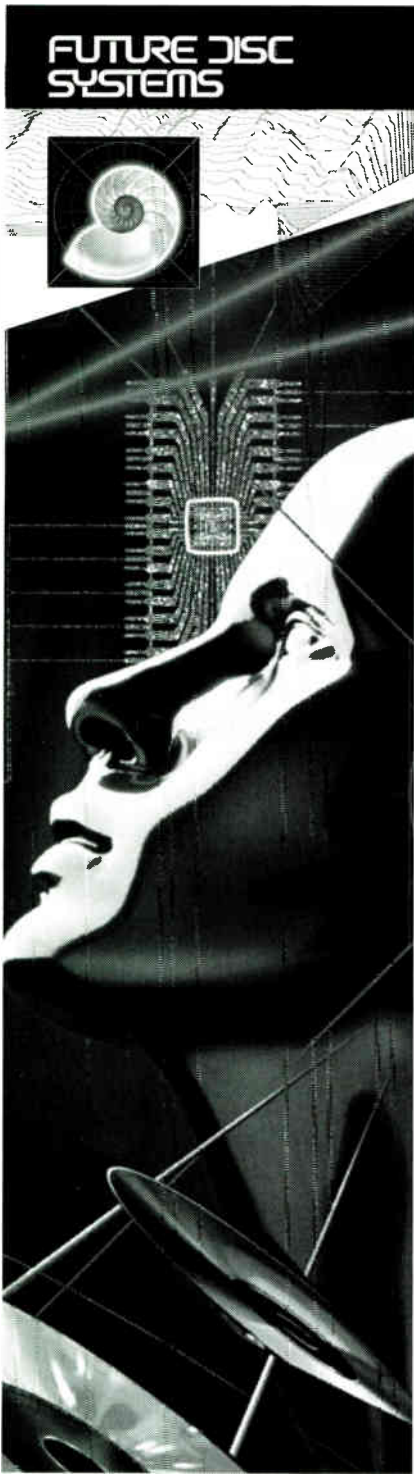
you're recording direct, those peaks come out way too loud.

"I tried to add effects that slightly exaggerated what I heard naturally in the guitar," the Talkative One continues. "I used some nice, subtle stereo panning delays that I programmed in beats-per-minute to the tempos of the songs. And then we actually have track sheets that say 'shimmer' and 'jangle' and 'harmonic' on them, because what I'd do is add little tracks, over the melody, sometimes just accenting a single note, to give the music a little more depth. For a shimmer, I'd very lightly brush my fingers over the strings and lightly voice those strings while holding the note I'd already precisely played on the regular track. It was hard to do, too, because to add a shimmer or finger squeak, it had to be totally in time or else it would sound muddy. But with the Fostex 4050 autolocator, it was pretty easy: You can program nanoseconds to punch in and out of.

"Then I got into sound effects," he adds, "little subliminal stuff like faint slide guitar lines that you might not notice unless you really listened for them, but which you'd miss if they weren't there. I suppose the average listener will probably just hear it all as sweet-sounding acoustic guitar music—that *is* the illusion we tried to create—but I wanted it to be more, too. I think it's exciting when you listen to music and you feel like you're inside some large painting, inside a frame. That's what I tried to do here."

The CD was mixed by William Aura, Chaquico and Ozzie Ahlers at Auravision Studios in Ojai, Calif., and mastered by Joseph Steiner III at Quadtech Studios in L.A. Chaquico has only good things to say about his label, Higher Octave Music, noting, "They wanted me to make the record I wanted to make and not worry about whether it would fit in one format or another." Fans of Chaquico's rocking side needn't worry that their boy has gone soft on 'em, however: He also is part of a hard rock band called Big Bad Wolf, and I hear *they* turn it up to "11." ■

*Blair Jackson is Mix's managing editor.*



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—FROM PAGE 140, PHIL COLLINS

instruments played by myself: I played the bass, guitar, keyboards onto my home [Akai] 12-track machine. I got Paul Gomersall, an engineer, to listen to it, and I said, "You like this stuff? I'd like you to engineer this. I want to produce it myself. I don't want a co-producer on this." That's why I didn't use Hugh Padgham. Hugh has an opinion that he voices. I didn't want that. I didn't want to entertain that concept. I wanted an engineer who had an opinion if I asked him for it, and that's why I picked Paul. He actually did the last live Genesis album. He was such a happy guy, a nice guy to have around.

He heard the material and he said, "I love it! You know what we should do? We should do this album, just have the songs that have the same mood, which is what I wanted you to do." Before, my albums used to be up-down, up-down, up-down, R&B-ballad, R&B-ballad, R&B-ballad—like a roller-coaster sort of thing. I didn't want to do that anymore. I wanted to create an album that would sustain a mood, like the last Miles Davis album, like the Weather Report albums. Paul was totally into that. His favorite albums are like that. You put it on because you want to feel like that. And so, we actually eliminated a few songs that didn't fit into that. So I got Paul's feedback. And during the six weeks in the proper studio doing the drums and mixing, there was an assistant engineer, as well as the crew.

**Mix:** Do you think any of the performances suffered because they were layered by one person as opposed to being layered by a band?

**Collins:** It has to sound like a band in the end. You get a song like "We're Sons of Our Fathers," which has a long fade, and with little phrases coming up here and there—that could be a band in there playing just like the old band used to. But it wasn't. Every album I've ever done has been done like this. I've never had a band in the studio. The only other time I've had a band in the studio was "You Can't Hurry Love." That was a three-piece: me, the bass player and a guitar player. I never worked as a band.

**Mix:** What gear do you have in your home studio?

**Collins:** I have an Akai recorder,

which actually started eating my tape! About three-quarters of the way into it, it started to chew my tape up, so I panicked! I went into the studio to copy my tapes, and that was the time I heard these tracks in a professional studio, and I said, "This is clean! This is good enough for an album!" So, it kind of convinced me that this was the way to go. So, I went back at that point, after having copied everything, and did my lead vocals.

**Mix:** Did you use the same machine, or did you get a new one?

**Collins:** Same machine. Since the album, I've gotten two ADATs, and I've got two 16-tracks. The album is actually done on just a 12-track. I've got a Studiomaster desk, which I guess is like 24 or 16 inputs, something like that. But, it's got very limited EQ. Anyways, it's a 32-track desk. I've got a Yamaha Grand electric piano, and I've got a digital workstation, an O1/WD Korg. I've got SB1200 drum machines, an A3, and a Roland D50. I use Wellin Speakers, and I've got a Yamaha CP7 and BMIS digital reverb. It's all in a room about this size [11'x14'].

**Mix:** You did most of the vocals at home. Was it hard to get a good sound out of that small room?

**Collins:** I recorded without headphones on when I did the vocals at home. I've never really been happy with singing with cans on. I'll do it. But because a lot of these are guide vocals, and I was really sort of flying by the seat of my pants, I'd say, "Let's try another track; press the button," and I would just sing into the microphone. The speaker was here, the microphone's here, the other speakers over there. I would just use real severe compression on that. But, I would actually be singing without headphones, with the music coming out the speakers, and I didn't think I could use them because of all the spill going on. After, we soloed these tracks, and there was nothing apart from my voice. Barely, you'd hear just as much spill from the headphones, which surprised me and the engineer. This meant I could use my lead vocals cut at home. On the song "I've Forgotten Everything," that *is* the demo, which I cut moments after I wrote it.

**Mix:** Going back a few years, there used to be a lot of talk about the "Phil Collins drum sound." It was very distinct. Where did that come from?

**Collins:** Well, the first time I came into contact with anything with that big roomy ambient sound—apart from listening to John Bonham playing, because I think a lot of what we do with drum sound now stems from “When the Levee Breaks,” “Kashmir” and tracks like that from Led Zeppelin—came while I was doing Peter Gabriel’s third album at The Townhouse in London. I’d been on the road a lot with Peter as his drummer, which a lot of people don’t even know about. I was still with Genesis, but he didn’t have a band, so I just went on tour as his drummer, and we used to do “And the Lamb Lies Down” at the end together. So when we got to the studio, there was Steve Lillywhite producing, Hugh Padgham engineering, me, Peter and a couple of other musicians. We were starting to get a drum sound, and Peter said to me, “I don’t want any cymbals on this record. Not any metal, no cymbals, just drums!”

**Mix:** That was Robert Fripp’s idea! He went through a period while producing Peter’s solo album and his LP, *Exposure*, where he didn’t want cymbals.

**Collins:** That’s right. So I was just playing the drums without the cymbals, and Hugh was getting the sound, setting these noise gates up, and I started playing this John Bonham part. The drum room at The Townhouse is stone, so there was a lot of echo—you use noise gates and it cuts it off. Suddenly, I was playing with the sound, because I have to have the sound in my headphones. I’m playing with it because I wanted to create a part from the sound we were hearing. I played the snare drum, and when the gate cut off, I’d play something else. So, the length of the gate dictated how fast I was playing, and eventually I got this pattern. Peter put his hand on the intercom and said, “Phil, play that—don’t play anything else—just play that for ten minutes.” So, we rigged up the drum machine, and I played that for ten minutes, and at the end of the session, I went in and heard it. We did have a couple of tracks, but when we heard it, I said, “What’s that going to be used for?” He said, “I don’t know. I’m going to use it on something.” I said, “Well, all right, can I have a tape of it, too? Because I’d like to have a tape of it; it’s a great sound. If you don’t use it,

I’d like to use it.”

I kind of felt that we composed it together and reached that point together. It ended up on “Intruder,” and I said, “Please, can I have a writing credit? Can you just put: ‘drum patent by Phil Collins?’” Then, after having done that album—that was around ’78, I guess—I was starting to write *Face Value*. Hugh Padgham used some sounds I’d never heard before—I got on very well with Hugh—so we started talking about doing an album together. We then used elements of that song on *Face Value* and on “In the Air Tonight.” Actually, it isn’t as ambient as everybody says it is. Everyone thinks of it as this big drum sound. It’s loud, and it’s punctual, and it’s slightly distorted because of overloading the gates. It certainly isn’t like “Intruder.” But because “Intruder” came out first, when *Face Value* came out, I got some flack because I was said to be imitating Peter’s sound, which was, in fact, my sound as much as Peter’s.

**Mix:** Today, Gabriel is regarded as a real recording genius. What did you learn from working with him, from the Genesis days or the solo days?

**Collins:** When we were doing the Genesis stuff, we never really got to true innovative stuff in the studio. He left before we ever really got a chance to experiment. The only time I felt we actually came close to anything interesting, soundwise, was with *The Lamb Lies Down*. Brian Eno was upstairs at Island Studios doing *Taking Tiger Mountain By Strategy*, and we were downstairs doing *The Lamb*. Peter was a fan of Roxy Music and Eno, so he went upstairs and asked Eno if he’d come downstairs to put his voice through the synthesizer. As payment for that, I was sent upstairs to play with Eno. I went upstairs and played on all his early albums, and then *Before and After Science* and *Music for Films*. Since [our Genesis days together], I love what Peter does. It’s totally original, especially the sampling he does.

**Mix:** Who are some of the producers you admire?

**Collins:** George Martin, Phil Spector, Phil Ramone—people like that. Actually, I marvel at some of the rap producers. Even though I hate what Dr. Dre is saying lyrically, when you listen to some of these records from a studio point of view—from a mix point of view—they’re very, very

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clever guys. I like the sounds. They're soft. I'm a big fan of Madonna, you know. I'm probably swimming against the stream here, but I think Madonna makes great records, with those soft drum machines.

**Mix:** Finally, is there any truth to the rumor that you, Sting, Bruce Hornsby and Eric Clapton will do an album together in 1994?

**Collins:** It's only a wish. It would be fun. I'd be up for doing it, but you'd have to get the other three to do it. You wouldn't have to convince me—you'd just have to get all the managers to agree on it! ■

—FROM PAGE 141, ROBERT CRAY

Waters, where the bass drum was real boomy. So we did things like take the bass drum head off and take the padding out to go for the big boom sound. Sometimes it got to be too much, so we'd throw one pillow in there," he adds with a laugh.

"We had a piano tuner come in and de-tune some of the strings of an upright piano and make it a little out-of-tune," Cray continues. "We wanted to go in and have fun and just wail, maybe recapture some of that old sound and feeling. We were careful not to over-rehearse the material before we recorded it, and we tended to just do a few takes of each song so it stayed fresh-sounding."

"A lot of the decisions we made happened because we wanted it to have that older sound," engineer Savage agrees. "For amps, we used mainly these new reissue Tweed Bassmans that are exactly like the old ones, down to the point where the speakers are hard-wired into the chassis, so you can't unplug the speakers. We ended up using them for almost everything, and that had a fair amount to do with getting a rougher sound. When I was mixing, I used a lot of [Lexicon] 480 chambers, but not using the same 'concert hall' settings you hear everywhere; instead I used ones that have that '50s sound to them.

"We only used a little reverb on drums because Studio D has great natural room reverb—that was also a nod to the older records, when the sound of a room was more important," Savage continues. "Also, for years engineers used to spend hours trying to get the ring out of a snare drum, but here we spent hours trying

to open up the snare drum even more to get *more* ring and put more note into the snare drum. We put a lot of note into the bass drum on this record, too."

On one song (the tax lament "1040 Blues"), Savage even recorded Cray's lead vocal through a heavily distorted old Shure bullet harmonica mic in an effort to dirty up the sound. It's not quite Howlin' Wolf, but it's still effective. For the rest of Cray's vocals, Savage chose a tube Neumann U47 mic.

To record the basics, Savage says, "I had everyone in the main room except Jimmy Pugh, who was off in an iso area. I had Robert sort of gobbed off and had his guitar amp in another iso area, which was large enough that I could use a close mic, which was a 57, and then a tube 67 as a far mic—six or eight feet from the amp. I had the bass amp in an iso area, too. Robert sang what turned out to be mostly guide vocals, but probably half of the solos we ended up using came from the basics. Actually, he probably redid more of his rhythm tracks. He really agonizes over the rhythm parts. The feel is super-critical to him, and he really is nitpicky about it. But the solos are more inspiration, so if he's got a good one already, he won't keep trying for another one." Savage mixed the record at San Francisco's Different Fur studio.

Cray admits he was a little nervous about taking the producing reins alone, "because I wasn't sure I wanted the responsibility," he says. "But I'd been at Dennis Walker's side for so many years, I knew I had learned enough to try it. It helped, of course, that I was working with my band, who are all good friends and who have real good ideas about recording and arrangements, and with Steve Savage, who engineered our last record [*I Was Warned*]. I think I'd like to try it again, but I'm not out there trying to become a producer or anything."

"He was very clear about what he wanted, particularly for his guitar and vocal performances," Savage adds. "Generally, he was pretty relaxed, and it was an open affair where everyone participated. He was into trying different things, and that made it fun for everyone. When you're doing something different, it gives the project a fresh energy, and I think you can hear it in the music." ■

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2	NEW	▶	STUDIO TOM BRAND NEW D4	16" MAPLE TOM w/VERB	303	450	52	HI ROOM TOM SR-16	10" MAPLE
3	NEW	▶	BIG "O" BRAND NEW D4	DOUBLE HEAD KICK w/VERB	304	NEW	▶	WET HALF BRAND NEW D4	HALF OPEN HA
4	5	52	RIM SHOT ROOM SR-16	BRASS PICCOLO w/VERB	305	327	52	RIM 2 CENTER SR-16	ARTICU
5	10	156	BIG FOOT HR-16:B	SINGLE HEAD 26" MAPLE	306	123	208	DOUBLE HEAD	DOUBLE HEAD KIC
6	NEW	▶	SLAM BRAND NEW D4	POWER TOM w/VERB	307	223	156		
7	23	156	COMBO SNARE HR-16:B	PICCOLO PLUS WOOD	308	401	5		
8	NEW	▶	BIG BALLAD BRAND NEW D4	WOOD SNARE w/BIG VERB	309	NEW			
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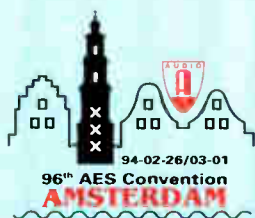


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—FROM PAGE 141, BEN KEITH

Besides, compared to the time Keith worked with Bob Dylan & The Band, doing just one or two live takes with Young was luxurious: "Dylan sometimes wanted to keep what I thought was the *rehearsal*." In contrast, Keith says, many Nashville producers insist on so many takes they work the life out of a song. "A lot of times they're trying so hard to get some exact thing, they miss out on the overall feeling of the song. It's frustrating as hell."

**"A lot of times  
[on Nashville sessions]  
they're trying so hard to  
get some exact thing, they  
miss out on the overall  
feeling of the song. It's  
frustrating as hell."  
— Ben Keith**

Through the years, Keith has worked in just about every Nashville studio (as well as many others across the country), and he confesses that he prefers many of the older rooms to the current "hot" studios. "I love David Briggs' House of David," he says. "That has a nice feel to it. Quadraphonic was a great studio, and the old Philips studio used to be good, too. I liked the old CBS Quanset Hut. I liked the places that had the old room echoes and the organic stuff. I like a good-sounding room."

Redwood Digital studio on Neil Young's ranch in Woodside, Calif. (south of San Francisco), combines the best of the old and the new in studios, Keith says. *Harvest Moon* was recorded on Sony 48-track digital recorders, but through a pair of old boards—a Neve 8078 and an ancient UA tube board that Young acquired years ago from Wally Heider's old studio. (They don't call Redwood Digital "The Home of Digitube" for nothing.)

"Also, Neil's got this rehearsal stage outside on this nice slope," Keith says, "and under that stage he's got these echo chambers that he kind of copied from Sunset Sound in Hollywood: They're these huge rooms with tile on the walls, floor and ceiling, a speaker at one end and a mic on the other. That's what you hear on *Harvest Moon*. It's real

echo. The control room is in another building probably a hundred feet from there." The record was engineered by John Nowland and Tim Mulligan, who are to be applauded for their imaginatively atmospheric sonic approach. "We wanted to do a real natural-sounding record, and I think it came out great," Keith says. "I'm real proud of it."

Keith has a small recording setup of his own at home, including Sound Workshop and Mackie boards, ADAT recorders and a fair amount of out-board gear. "I wanted it all to be portable," he says. "It's all about the size of a big filing cabinet; I can wheel it anywhere. I took it to New Orleans not too long ago to do Pat McLaughlin's record, and it worked great. I've used it a lot on my own stuff, recording in this cabin I have here in the woods."

His "own stuff" has included a 1990 solo album (on the French En Pointe label), which featured guest appearances by friends like J.J. Cale and the late Paul Butterfield, and a Christmas album (slated for fall of this year) that includes Young, Linda Ronstadt, Nicolette Larson and Johnny Cash, among others. No doubt there will be more projects with Young up the road, and Keith says his work will be very well represented on the eventually forthcoming *gigano* box of Neil Young rarities being slaved over at Redwood Digital. "I've been on two or three albums of Neil's that never came out at all," Keith says, "and there's some really good music there. Like we did an album of Hawaiian music called *Big Pearl* that I loved; some of that will probably be in the box."

Keith is one of those rare individuals in the music business who seems completely relaxed about his career—past, present and future. He has an awe-inspiring body of work behind him (besides his Young records, I'm partial to Emmylou Harris' debut, *Pieces of the Sky*), friends and admirers at every level of the business, and bankable chops as both a performer and producer.

"Sometimes sessions can be long and they're not always that interesting, and it can turn into a 'job,'" he says, reflecting on his four decades in the business. "But with Neil, it's always fun, and I try to bring some of that spirit to whatever I do, because in the end you can hear that in the music." ■

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# FEEDBACK

## THE CORRECT PREAMP

Thank you so much for the fine article on producer Pete Anderson [*Mix*, September 1993]. Pete has been a favorite client of ours for many years, and we appreciate his kind words regarding Mad Dog Studios.

In the interest of accuracy, however, we would like to give credit where credit is due. While we do own several pieces of Summit Audio gear and plan to purchase more in the near future, the microphone preamps that Pete loves so much are in fact the Hardy M-1s made by the John Hardy Company.

*Michael Dumas  
Mad Dog Studios  
Venice, CA*

## MAINTENANCE IS A MUST

I have just completed reading your fine article "A Short Course in Studio Maintenance" in *Mix*, October 1993. To your article, I say BRAVO!

My personal background covers some 13 years with the former CBS Studios, now Sony Music, and presently 12 years in the Technical Support Operation of Sony Professional Products Co. Over the past 25 years, I have used, repaired and seen a lot of professional audio and video equipment.

The education and experience that I acquired a long time ago confirm that maintenance is a key to any operation's success. A facility may have the finest acoustic design that money can buy. It may have the most modern equipment available in today's market. Still, at the bottom line, if the equipment doesn't work, the studio is not in business.

My years of experience tell me

that preventive maintenance alone will eliminate more than 90% of all equipment failures. The designs and manufacturing techniques used in today's modern audio and video equipment target high-quality and long-term reliability. At the same time, the items that are "consumable," such as tape heads, faders, fans, etc., have operation life cycles that are generally well-known in advance. The user can often identify these items by referring to the maintenance manual or by contacting the manufacturer. Today, many manufacturers identify when things must be aligned or replaced.

In closing, I cannot reiterate too much about cleaning. Cleaning must be viewed as a never-ending process. Many facilities only address the cleaning issue after a fault occurs. The problem may be simple like a dirty tape head or a noisy fader. The outcome leaves equipment down and often results in lost time, lost dollars and typically a damaged reputation.

In today's tough economic market, I know that it is very often difficult to justify a routine maintenance program to the company accountant or GM. On the other hand, ask which will cost the most: maintenance or a facility that is not booked or has found it necessary to cancel sessions? By the way, those canceled sessions typically end up being booked at a competitor's studio.

*Bob McGraw  
Sony Professional Products*

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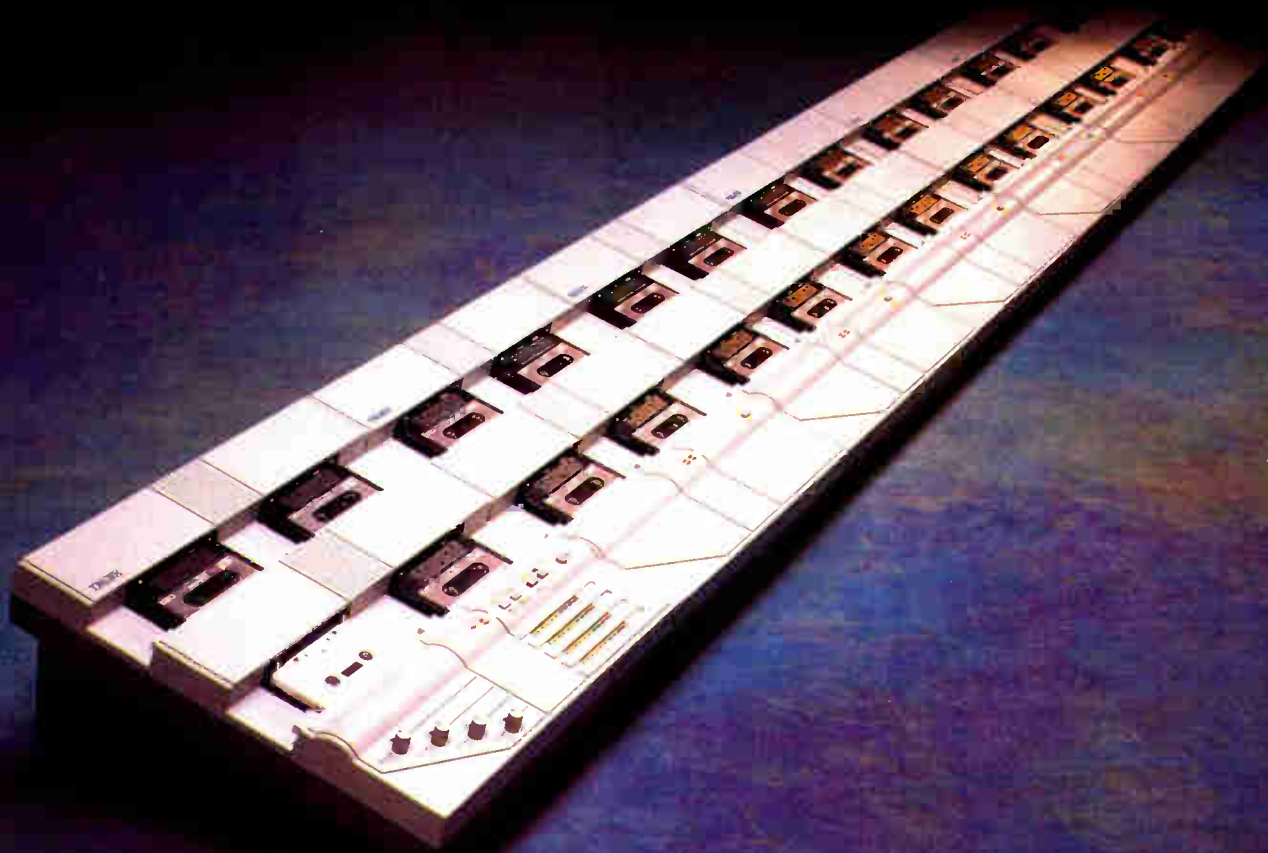
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by Philip De Lancie

# TAPE & DISC NEWS

## COMPTON'S STAKES PATENT CLAIM TO MULTIMEDIA

**C**ompton's NewMedia, the nation's largest distributor of CD-ROM titles, dropped a bombshell at the giant COMDEX computer show in November in Las Vegas with the announcement that it had been granted a patent covering basic processes underlying multimedia production and delivery. The news caught most industry observers by surprise and has, not surprisingly, engendered a response of disbelief and hostility.

According to Compton's, the patent identifies the company as the owner of an invention described as "a database search system that retrieves multimedia information in a flexible, user-friendly system. The search system uses a multimedia database consisting of text, picture, audio and animated data. That data-

base is searched through multiple graphical and textural entry paths."

Compton's will pursue its patent rights in both the CD-ROM and on-line network markets. The company is offering multimedia developers various options for compliance, including entering into a joint venture relationship, making a distribution arrangement with Compton's Affiliated Label Program, using Compton's SmarTrieve technology to develop their products, or simply making royalty payments.

Resistance to Compton's patent will be stiff. The patent claims, based largely on work the company did to create its oft-bundled *Multimedia Encyclopedia*, will be challenged by competing multimedia developers, who are expected to maintain that the patent is overly broad and that Compton's 1989 work was predated



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by numerous other systems with similar approaches and capabilities (known as "prior art" in patent-speak).

A mere two weeks after Compton's announcement, the *San Francisco Examiner* reported that the Multimedia Developer's Group was joining with the Interactive Multimedia Association and the International Interactive Communications Society to "pool funds and resources to help developers fight Compton's demands." Given that the IMA alone includes member companies such as Microsoft, Apple, Intel, Sony and IBM, Compton's can expect a vigorous battle.

If the challengers win a Patent Office review of Compton's claim, the patent may eventually be limited, perhaps gutted. But if the patent is upheld, those who have infringed by refusing to pay Compton's royalties—and there are likely to be many in that position—would be liable for up to three times the original fees. Until the situation is resolved, meanwhile, the Compton's patent adds yet another risk to this booming yet unsettled market.

## KODAK TO PUSH 3-INCH PHOTO CD

The Eastman Kodak company plans to introduce an 80mm version of the Photo CD format for use in notebook and laptop computers and personal digital assistants. Expected to be available in late 1994, the smaller discs are intended to complement rather than replace the current full-size (120mm) version, and will be playable in all existing Photo CD-compatible drives. According to Kodak, Panasonic demonstrated a laptop computer using an 80mm CD-ROM drive at COMDEX. The 80mm form factor is the same as that used by the music industry for the 3-inch CD singles that came out a few years back and passed quickly from the scene.

## CONSUMER CD-R MAY STIR LABEL RESPONSE

Visitors to last fall's Japan Audio Fair were able to see prototypes of consumer CD-R recorders from Yamaha, Kenwood and Pioneer. As reported in *Billboard*, the companies have yet to announce launch dates for the machines, which are expected to debut in Japan in the \$4,500 range and fall off later to under \$1,000.

The possibility that CD recording

may eventually fall within the budget of the masses is raising some eyebrows at record labels, prompting them to look into how prerecorded discs can be enhanced to keep them more attractive than home recordings. *Billboard* reports that this subject was an important area of discussion at a joint meeting of record industry trade associations RIAA, IFPI and RIAJ held (coincidentally?) in Japan immediately after the close of the Audio Fair.

According to the report, Ed Outwater, chairman of the RIAA's engineering committee, noted the importance of maintaining the prerecorded CD as the "benchmark in terms of audio quality." Outwater spoke not only of the fidelity improvements that would be possible using higher data density on the disc, but of adding lyrics, bios and other "consumer-friendly forms of information" to the CD's unused subcode channels.

Although this idea has been around under the name CD+G since the CD was introduced, players enabling consumer access to the data via TV have never caught on. But with multimedia such a hot item, and CD-R potentially a real concern, the day may come when limited multimedia elements are a standard feature of CD-Audio releases.

## HIGH-DENSITY VIDEO ON CD

Video on CDs that conform to current compact disc standards is about to make its way to the consumer marketplace (see page 72). But work still continues on ways to improve image quality and/or lengthen playing time through increasing data density, though such discs would technically fall outside the official CD standard and might not play on existing drive mechanisms. At a recent SMPTE conference in Los Angeles, Optical Disc Corporation demonstrated one example of high-density recording by mastering a CD that held 30 minutes of "broadcast-quality" (CCIR 601 resolution) video. The company, which manufactures CD-mastering systems, claims the demonstration was the first time that picture quality of that resolution was successfully played from a CD. ODC also demonstrated standard-density Video CD (White Book) discs mastered with its machines.

## SPLICES

Music Annex (Fremont, CA) donated duplication services for the fourth

annual *Sampler for AIDS Relief*. The benefit project, organized by radio station KKSF, features performances from a variety of artists—including Sade, Annie Lennox and Pat Metheny—who have donated their royalties to the San Francisco AIDS Foundation. Music Annex also arranged for donations of duplication materials from vendors BASF and Michalex...BASF reports growing support for its EcoShuttle packaging for pancake tape. By November 1993, 13,500 orders had been placed for tape in the reusable/recyclable molded plastic cases. According to BASF, that translates into 18,258 cubic feet of waste "no longer destined for landfills"...Digital Audio Disc Corporation announced the replication of its 50 millionth CD-ROM at its plant in Terre Haute, IN...Fujii International (Northridge, CA) announced improvements in two audio cassette tape lines manufactured for the company by Greencorp Magnetics in Australia. The pancake tapes affected are the XD38 high-grade gamma ferric and the XD36, a music-quality tape "priced like a voice grade." Fujii also is selling replacement pinch-rollers for Gauss high-speed duplicators...Versadyne (Campbell, CA) continues to make inroads into the Latin market with the sale of a 1000 Series system, including a 1/2-inch master and three slaves, to Co Discos in Medellin, Colombia. The company also appointed Bob Megantz of Taraval Associates (San Jose, CA) as its representative in Brazil...Kao Optical Products (Lancaster, PA) is now selling CD-R discs in 63- and 74-minute capacities...DB Plus in New York City reports recent mastering sessions with Hugh Masekela, Javon Jackson and Johnny Maestro...Across the river in Hackensack, NJ, Ray Janos was at Trutone mastering a Jimmy McGriff release for K-tel, along with releases on the Matador, Ichiban, Get Hip and Caroline labels...In San Francisco, Rocket Lab engineer Paul Stubblebine mastered the latest from blues harpist Charlie Musselwhite, while Marc Senasac worked on an upcoming release from Jim Chappell...HMG Ltd. will duplicate the three-cassette video series "Living With Alzheimer's" for the Long Island Alzheimer's Foundation. LIAF hopes to reach an estimated 12 million to 15 million caregivers with "how-to" information about the disease.

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# C O A S T

## L.A. GRAPEVINE

by Fred Jones

The Sunset Marquis, known by many in this business as a hangout for the rich and famous, has gotten into the stu-



**On the big island of Hawaii, Kris Kristofferson added backing vocals and harmonica to the latest release from Hawaiian reggae outfit Marty Dread and Culture Shock. The CD was produced by Dread, Rick Keefer and Jack Miller at Sea-West Studios. Pictured are Dread and Kristofferson.**

dio business. Now you can book a room in the hotel *and* book time in their state-of-the-art recording studio.

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—CONTINUED ON PAGE 158

## SESSIONS & STUDIO NEWS

by Jeff Forlenza

### NORTHEAST

At Sear Sound in New York City: Lenny Kravitz overdubbed vocals and guitars with producer David Dominich and engineer Henry Hirsch for his next release, and jazzman Andrew Cyrille was editing and sequencing his latest release for Black Saint Records with engineer Jon Rosenberg...At Manhattan's Quad Studios, hot producer Ben Wisch (Mark Cohn) was working with East/West artist Tony Cary...Ruffhouse Recording artists Fugees were working with Joe "The Butcher" Nicolò at Philadelphia's Studio 4. Manuel Lecuona and Dirk Grobelny assisted on the hip-hop sessions...Caroline artists Fudge recorded their latest album at Boston's Q Division with producer Eric Masunaga and engineer Rich Costey...At Showplace Studios in Dover, NJ, Texas-based band Sunset Heights tracked and mixed their latest album for Viceroy Music with producer Pete Brown. Brown is famous for co-writ-



**Monster Mellencamp drummer Kenny Aronoff stopped in at Philly's Sigma Sound to add drums to Blood Records artist Pat Godwin's latest release, Excess in Moderation. (L to R) Bassist Kjell Benner, Godwin, Aronoff, producer David Ivory and album coordinator Vince Kershner.**

ing classic Cream tunes such as "Sunshine of Your Love," "White Room" and "Politician," which was covered by Sunset Heights on their album. Ben Elliott engineered the Texas rockers with assistant Rick Deardorff...

### SOUTHERN CALIFORNIA

At Red Zone Studios in Burbank, Chrysalis artists Slaughter were working with producer/engineer Dana Strum and assistant Scott Sebring; producer John Porter tracked solo artist Ian McNabb (formerly of Icicle Works) with engineer Joe McGrath for a This Way Up/PolyGram release...CeCe Peniston was at Skip Saylor Recording (L.A.) remixing her single "I Will Be Received" with producer Richard Wolf and engineer Ken Kessie for A&M Records...At Hollywood's Brooklyn Recording producer Peter Asher tracked Geffen recording artists The Semantics with engineer Frank Wolf...Alice In Chains were at Scream Studios (Studio City) finishing their new Sony Music album with mix engineer Toby Wright...

### NORTHWEST

Producer/engineer Chris Kathman was at San Francisco's Sound & Vision Studios recording and mixing concert harpist Boris Goldmund's *Wiggle* CD. S&V staffer Buddy Saleman assisted the harp sessions that featured Goldmund's harp, Charles Moselle's woodwinds and Kathman's MIDI programming...Maruga Booker (percussionist for George Clinton and Merl Saunders) completed tracking his album, *Spirit Mountain*, at San Francisco's Pyramid Sound. George Clinton's longtime engineer Bob Dennis was flown out for the Musart project. Pyramid engineer Kim Foscatto assisted the tracking

—CONTINUED ON PAGE 160



# C O A S T

## SOUTHEAST SPOTLIGHT

by Jeff Forlenza

We're talking Nashville, Atlanta, Miami, New Orleans and other Southern sound cities in this month's Coast. So tune up that old dobro and grab a mint julep as we check in with some studios in the Southeast region of the United States.

Atlanta's Purple Dragon Recording recently expanded its single-room facility when owner Stanley Gaines acquired the other half of the building that the studio leases. The expansion, which doubles the studio's square footage to 2,400, includes a new MIDI room and an additional iso booth. For a long time, Gaines says he resisted the idea of adding a sec-

ond studio: "One room is more manageable and keeps the client feeling special," he says. "The MIDI room, which goes direct to tape, will pretty much pay the cost of the expansion, so I don't expect to be raising rates." The room, which has been used by a client base of R&B and rock artists since it opened three years ago, goes for \$1,250 per day. Purple Dragon is also planning to add Ultimotion to its SSL console.

Also in Hot Lanta, Kala Studios recently installed a 40-channel Trident Series 90 console. Kala is fully owned by Atlanta-based Ichiban Records. The facility is run by Frank "Buzz" Amato, who says, "The studio was designed to operate as a separate entity from the label but could be used by Ichiban's artists as the need arose." The 24-track, fully automated studio has seen sessions by Kris Kross, Tag Team and George Clinton.

In Miami, Criteria Recording Studios recently reopened its Studio D,

—CONTINUED ON PAGE 161

**New River Studios (Ft. Lauderdale, FL) recently celebrated its tenth anniversary. The renovated Studio A is seen here.**



PHOTO: MARK DIAMOND

## NY METRO REPORT

by Dan Daley

Classic Sound (no, not another vintage-trend studio unless you count Chopin and Mozart as vintage) recently opened in Manhattan. Owners Tim Martyn and Tom Lazarus specialize in classical music recording, editing and mixing for clients such as Sony Classical, Deutsche Grammophone and



PHOTO: MICHAEL GLUCK

**Francis Manzella designed Manhattan's newly completed City Sound Productions.**

Angel/EMI. The two opened their space in October—4,000 square feet on the Upper West Side. Walters-Storvik did the design, which includes three editing suites with a 22.25Hz design, and free-standing B&W 801 monitors. Consoles are by Neotek, Amek and Studer; storage includes Sony 1630 and several Yamaha DMR master recorders, as well as Sonic Solutions and DAE-3000 editing systems. The studio also features the Harmonia Mundi BW102 redithering process to

—CONTINUED ON PAGE 178

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—FROM PAGE 156, L.A. GRAPEVINE

about in these pages back in June of '93, was formally unveiled at a star-studded event held on the four-and-a-half acres of lush tropical gardens and two swimming pools hidden away at 1200 North Alta Loma Road in West Hollywood, just below the Sunset Strip. It is a joint venture between the Sunset Marquis and musician-composer Jed Leiber, who needed a place where he could work on projects while in L.A. Leiber approached the hotel management with the idea of putting in a studio. A deal was struck where the hotel would provide the space, and Leiber would equip the facility.

1,200 square feet was quite literally carved out of the Marquis' underground garage, and the facility was designed and engineered to be a state-of-the-art workspace, including a 15-foot by 18-foot music-recording studio and a 25-foot by 18-foot screening room with a 100-inch video projection system and full Dolby surround sound. The equipment list is first-rate: a Euphonix 112-channel mixer, 48-track digital/analog tape recorders and a 16-track hard disk system.

One feature of the studio that will be of great interest to the guests of the hotel is the TV monitors that the Sunset Marquis has installed in its new lounge, "The Whisky," just off the lobby. When the studio is booked, they will show live pictures of what is going on inside. This means that A&R people will be able to sit in the lounge and watch artists at work...Yeah, right. From my experience with what goes on in recording sessions, I don't think this feature will last very long. Though it may convince some visiting screenwriter to option the videotape for a TV series or movie.

Pfeifer Music Partners moved into a twin 24-track facility that was formerly occupied by Music Animals and the Post Complex. In 1988, composer Howard Pfeifer had become a small partner in Music Animals, but "the financial burdens of building and operating a major studio complex were simply too much for the partnership to bear," he says. After the demise of Music Animals, he opened PMP with a determination to stay out of the studio business, simply open an office and rent studio time as necessary. This, of course, meant that he was doomed

to go back into the studio business.

Within nine months, Pfeifer was so busy with the new venture that he needed to have his own studio. When some of his former co-workers became available after the demise of Music Animals, Pfeifer seized the opportunity to lease space at his former location and install a new, more efficient facility. Along with studio manager Scott Taylor and chief engineer Jim Baldree, they chose Amek's new *BIG* console and Studer Dyaxis II digital workstations.

That venerable old mainstay of the Hollywood media recording business, Buzzy's Recording Services, just completed a major upgrade of its studio facilities. First, DAWN II digital audio workstations were purchased. Larry Lantz said, "After putting all of the appropriate workstations through their paces—setup, live recording and posting a radio spot—we found it to be the fastest and best suited to our style."

Buzzy's also upgraded its Soundmaster computer control system with the new System Seven software, which offers what Soundmaster calls ION or Integrated Operating Nucleus. This new software allows them to control the DAWN workstations, along with DAT machines, ATR 100 reel-to-reel tape recorders and audio consoles. Buzzy's will also add several Tascam DA-88s and Apogee 500E converters. Chief engineer Andy Morris says that he chose the Apogees "because they are an industry reference point for sound quality and their unique work clock circuitry, which allows us to lock all the digital systems to house sync."

Morris is also excited about the A-to-D converters because he is going to be installing them as the front end to the IDB DDD-2 (Direct Dial Digital) network so that he will have an incredibly clean signal for transmission purposes. IDB's DDD-2 Network (a competitor to the EDnet network) uses ISDN/Switched 56 phone lines to send full 20kHz stereo bi-directionally with time code.

Now it's time for me to fold up my tent and steal off into the night, because this will be my last "L.A. Grapevine" column. Maureen Droney will be taking over next month. It has been a real pleasure to have held this spot, but as they say in the Firesign Theater, "I'm going back to the shadows again..." ■

# NASHVILLE SKYLINE

by Dan Daley

Sony/Tree International's \$3-million renovation project is almost complete. The Music Row studio within the publishing complex, redesigned by the Russ Berger Design Group, will house a 2,000-square-foot studio with a control room, three isolation booths and a machine room. The studio will be equipped with a Sony console and tape machines.

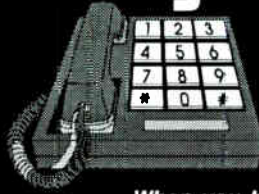
Emerald Recording opened a B room on its main level where the radio broadcast studio was. Radio production will move upstairs. The new room, which is based on a Mitsubishi X-850, a Mackie eight-bus console (possibly the first such pairing for a Mackie) and a Pro Tools system, is aimed down-market, at \$500 per day.

The Sound Emporium, owned by producer Garth Fundis, expected to have its structural and acoustical renovations completed by the middle of this month, according to studio manager Denise Tschida. The studio added approximately 4,000 square feet to its overall size, moving offices to accommodate a new lobby, kitchen and conference room. Also, the ceiling of Studio B was removed to enhance its acoustic properties. Structural work was performed by Mike Chappell & Associates. Technologywise, Emporium added a Formula 8 cue system, two new isolation booths and an Otari synchronization system to Studio A.

Southern Sound in Knoxville is a new from-the-ground-up construction, a single-room 24-track facility designed by Steve Durr with a 66-input DDA Profile console and 16-foot ceilings. Nashville's Backman Construction did the building, with carpenter Dave Mattingly supervising.

Ocean Way has moved ahead with its Nashville studio plans. Clean-up crews have cleared out the Tony Alamo church on MSW, and at press time construction of a two-room facility was slated to start by the beginning of the year, according to Ocean Way owner Allen Sides estimated the first room would be ready to open within three months. Both rooms will have large recording spaces and separate client lounges. Studio A's console will be a modified, discrete Neve with GML automation; no decision

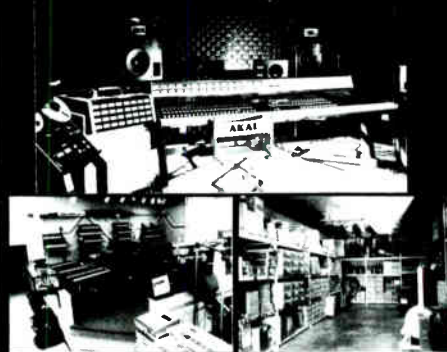
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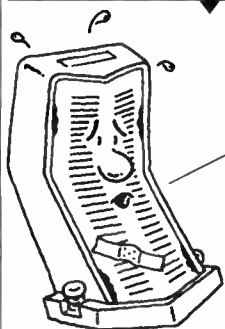
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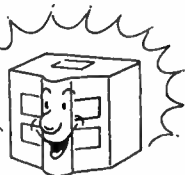
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yet on Studio B's console. Sides remains in partnership with Kiva Recording's Gary Belz; former partner Bill Schnee is not in the picture at the moment, although Sides says "anything can happen."

Ocean Way continues to hold the nearby St. Bernard's property in escrow, and Sides says it could become a second facility at some point, although no decision has been made on that. In terms of rates, the new studio will have a rate structure that reflects its upper-echelon equipment and design, according to Sides. Upper-end Nashville rooms generally go for between \$1,800 and \$2,200 per day.

In other new studio news, contemporary Christian/pop producers Dino and John Elefante are closing down their Los Angeles-area studio and moving to a brand-new \$2.5-million facility they're building in Franklin, Tenn., near Cool Springs.

The studio, which is being built from the ground up in a 1950s diner-style motif, will have two rooms designed by British architect Chris Huston. Consoles at the Elefante's 6,500-square-foot Sound Kitchen Studios are a vintage Neve 48-input 8180 with Flying Faders, a 12-input Neve sidecar and a 40-input Trident 80B.

Multitracks are Otari MTR-90 MkII and MCI, two of each. Monitoring is by Tannoy.

The tentative move reported in my last column by former Masterphonics partner Milan Bogdan to open a mastering room at Woodland Digital is off, at least for the foreseeable future. Woodland principal owner Bob Solomon found himself in the midst of what he called a "hostile takeover" attempt by former engineer Dave Cline and former studio manager Jake Nicely. Solomon, who owns 80% of the studio stock, said he was confident that the matter would resolve itself with him retaining full ownership and his staff intact.

Bogdan said that a combination of the unsettled situation at Woodland and uncertain financing for his mastering operation led him to terminate the plans, although Solomon said that they may be revived at some future date. Meanwhile, Bogdan has taken what he called a permanent position at Emerald Recording as studio manager, replacing Nick Sparks, who is now working as a freelance engineer. Sparks' first gig as a freelancer? Back at Emerald the very next week.

Please fax Nashville studio news to Dan at (615) 646-0102. ■

—FROM PAGE 156, SESSIONS & STUDIO NEWS  
sessions, which were then mixed at Dennis' Detroit studio, Disk Ltd... Studio D Recording (Sausalito, CA) had Marc Russo (formerly with the Yellowjackets and the Kenny Loggins Band) tracking his first solo release for JVC Records. Russo is co-producing the fusion tracks with engineer/producer David Hentschel...

### NORTH CENTRAL

American Empire group Arson Garden was at Pachyderm Studio (Cannon Falls, MN) overdubbing and mixing their new release with producer/engineer Tom Herbers and assistant Brent Sigmeth. Also at Pachyderm, Touch 'N Go artists Arcwelder tracked their latest with producer/engineer Brian Paulson...At Chicago's Paragon Recording Studios, rockers Elemental Soup mixed their five-song cassette for Du Jour Records with producer Scott Walbridge and engineer Thom Fiegle...At Electro-Sound Recording in Kent, OH, Witch Hazel tracked and mixed material for a

Bubblegum Smile Records release. Mike Crooker produced, and Greg D. Feezel engineered...

### SOUTHWEST

Longhorn Sound Studio (Clyde, TX) had country artist Eli Daniel tracking a three-song acoustic demo, and rockers Annex tracked a three-song demo. Randy McCoy engineered both projects...At Planet Dallas, Rick Rooney remixed a Tripping Daisy song for Island Records...

### STUDIO NEWS

L.A.'s Loyola Marymount University's recording arts program recently upgraded two of its primary recording facilities. A TimeLine MicroLinx synchronizer and an 8-track DAWN random-access editing system were installed in their post-production suite. A 4-track Pro Tools 2 system and 16 tracks of Alesis ADAT were added to the music production studio. Both rooms added Quadra 800 computers with NEC 5FG monitors...The Bugtussle Recording Company (Bryant-

ville, MA) finished a major upgrade/expansion. Structurally, a new room was added to double the size of the studio. New gear includes a Mackie 24x8 mixer, EAW monitors and assorted outboard boxes and microphones... Studio .45 (Hartford, CT) installed a Malcolm Toft Associates Series 980 console. Designed by Malcolm Toft, co-founder of Trident Audio, the 980 features 64 inputs with the classic English sound and layout of Trident boards. Additionally, Studio .45 now features a control room designed by Brett Heinz using materials provided by Systems Development Group. ■

—FROM PAGE 157, SOUTHEAST SPOTLIGHT

which primarily serves as a MIDI tracking and vocal room with a renovated API 2488 console. Other Criteria additions include a wide assortment of vintage gear and two new digital workstations: a Digidesign Pro Tools/Sound Designer and a Sonic Solution SonicStation II. Recent projects at Criteria include Extreme, Yngwie Malmsteen and Mariah Carey.

Masterfonics in Nashville has been putting the first installed DISQ digital mixer core from AT&T to good use recently. Producer Brian Malouf brought in Warner Bros. gospel act Take 6 from L.A. to mix on the new system. Also using the DISQ was Country Music Association's vocal group of the year, Diamond Rio, along with producer Monty Powell and engineer Mike Clute. Of the DISQ, Clute reports, "the EQ is stunning, and the system's practically invisible to use."

On the banks of the New River in Ft. Lauderdale, Fla., New River Studios recently celebrated its tenth anniversary. As part of the celebration, chief engineer Larry Janus designed a renovation of their Studio A, which included raising the ceiling. On the multimedia front, New River is digitally linked to Selkirk Video Production two blocks away for video post-production. Recent New River clients include Skid Row, Extreme and Jimmy Buffett.

Also in the Sunshine State, Greg Rike Productions in Altamonte Springs, Fla., is an audio and video production facility featuring two audio/video suites and Pro Tools digital editing capabilities. Recent GRP sessions included '70s rockers Foghat ("Fool for the City" and

"Slow Ride") tracking six new songs for Rick Rubin's American Records.

In the Crescent City—New Orleans—Steve Himelfarb closed his New Orleans Recording Company after two years and a Gold record from working with Aaron Neville. Himelfarb cites artistic rather than financial reasons for the closing and reports that the studio gear was sold piecemeal to other studios in the New Orleans area. Himelfarb will pursue his engineering and producing talents from an independent base in Nashville. Now that he knows the rigors of studio managing, Himelfarb claims he'll be the best client a studio could hope for. His upcoming projects include recording Buckwheat Zydeco for Music for Little People at Dockside Studios in Lafayette, La.

On the other end of the spectrum, Dinosaur Productions recently opened on Magazine Street in New Orleans. Richard Pattison and David Newsome opened Dinosaur to capture New Orleans' indigenous music and then try to get it into the hands of labels' A&R representatives. Pattison was a staff writer for MCA for 20

years and retains ties with MCA and Arista. It's a total production company with live sound and songwriting services in-house. The house engineer is Richard Bird, and Dinosaur gear includes a TAC Scorpion console, a Studer A80 24-track, and Yamaha and Lexicon outboard. Recent sessions at Dinosaur included Four for Nothing, a caribbean-flavored reggae act.

Nashville's Music Row Audio recently held "The Dobro Summit." World-class dobro players, including Jerry Douglas, Mike Aldridge and Gene Wooten, were joined by guest musicians like Bela Fleck and Sam Bush for an in-studio mountain jam tracked for Sugar Hill Records. Jerry Douglas produced, and Bill VornDick engineered the dobro sessions at Music Row.

Also in Nashville, Sound Emporium Studios has been extremely busy. Recent Emporium sessions include Dolly Parton and producer Bruce Watkins doing demos for Velvet Apple Music, and Willie Nelson was working with producer Steve Linsey and engineer Gabe Veltri on an album project for Warner Bros. ■

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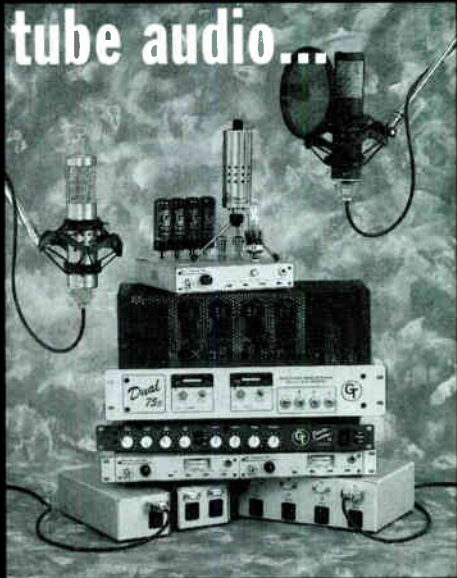
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# Recording Schools **SEMINARS AND PROGRAMS**



ILLUSTRATION BY JACK MORTENSBAK

Following is a briefly annotated list of schools and programs with offerings 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.

## EASTERN

### ALABAMA STATE UNIVERSITY

Program Name: Music Media Technology, School of Music; Montgomery, AL 36101-0270; (205) 293-4341; FAX: (205) 834-6861.

**Chief Administrator:** Dr. Thomas Hager, dean, School of Music. **Program:** The Music Media concentration is an educational option for those interested in pursuing a music career. The Music Media concentration combines a traditional-performance music education with music technology leading to a Bachelor of Arts degree in music. Selected specialized coursework offered: Beginning and Advanced Recording, Physics of Music, Audio Production for Video, Digital Signal Processing for Musicians, Television Production Techniques and Recording Practicum. Internships and Scholarships are available. The Music Media digital production facility is housed in The School of Music, featuring equipment by most major audio and MIDI manufacturers.

### THE AMERICAN UNIVERSITY

Program Name: Audio Technology, 4400 Massachusetts Ave. NW; Washington, DC 20016-8058; (202) 885-2743; (202) 885-6000. Admission. Chief Administrator: Romeo Segnan. Program:

The American University Physics Department offers a Bachelor of Science degree in Audio Technology. It concentrates on technologies of electronic sound recording and production. It is multidisciplinary and utilizes other departments for courses in mass media, music, theater production, business and computer science. The program's faculty consists of three full-time and several adjunct professors providing individualized guidance for students. The adjuncts are drawn from the community of professional practitioners in the Washington area, many of whom are graduates of the program. The main studio has a 24x16x2 TAC Scorpion mixing console, Studer A80 M411 tape deck, Panasonic SV-3700 DAT mastering deck, two Revox 2-track mastering decks, and a full range of analog and digital signal processors. Our electronic music labs have various analog and digital synthesizers, samplers, MIDI controllers, IBM, Mac and Atari computers, 8-4- and 2-track tape recorders, and mixing consoles. We also host a student chapter of the Audio Engineering Society. Program acceptance demands at



THE AMERICAN UNIVERSITY  
Washington, DC

least 2.0 GPA; unlike other programs, no audition is necessary. Internships and Cooperative Education are available.



APPALACHIAN STATE  
UNIVERSITY  
Boone, NC

### APPALACHIAN STATE UNIVERSITY

**Program Name:** Music Industry Studies. **Broyhill Music Center;** Boone, NC 28608; (704) 262-6441; FAX: (704) 262-6446. **Chief Administrator:** John A. Charriello. **Program:** Appalachian State University School of Music is pleased to offer a degree program leading to a Bachelor of Science with a major in Music Industry Studies. The program, established in 1972, is dedicated to the highest ideal of broad-based training in all areas of the music industry. Our students are able to attain concentrations in studio management, production, promotions and music merchandising. All students are well-grounded in the disciplines of recording engineering, MIDI, studio management and music business. This philosophy enables our students to successfully establish careers in professional areas of music business or recording industry. During the course of study, students have hands-on training in a 24-track digital studio, advanced MIDI hardware and software, as well as access to the combined knowledge of our Music Industry Studies Advisory Board, which is comprised of consummate industry professionals. Appalachian State University School of Music is NASM accredited and the Music Industry Studies Program is NAMBI affiliated.

### THE ART INSTITUTE OF ATLANTA

**Program Name:** Music Entertainment Management. 3376 Peachtree Rd. NE; Atlanta, GA 30326; (800) 275-4242; (404) 266-1341; FAX: (404) 266-1347. **Chief Administrator:** Sheila Day, dir. of admissions. **Program:** Through The Art Institute of Atlanta's intensive education, Music Entertainment Management students are exposed to developments in one of the highest growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in-depth in the program. Production is also a major focus for the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to the final playback. In addition to industry fundamentals, each Music Entertainment Management student is given guidance in resume preparation and interpersonal communication skills.

### THE ART INSTITUTE OF FT. LAUDERDALE

**Program Name:** Music and Video Business. 1799 S.E. 17th St.; Ft. Lauderdale, FL 33316; (800) 275-7603; (305) 527-1799. **Chief Administrator:** Eileen Northrop, dir. of admissions. **Program:** Through The Art Institute of Fort Lauderdale's intensive education, Music and Video Business students are exposed to developments in one of the highest growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in-depth in the program. Production is also a major focus for the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to the final playback. In addition to industry fundamentals, each Music and Video Business student is given guidance in resume preparation and interpersonal communication skills.

### THE ART INSTITUTE OF PHILADELPHIA

**Program Name:** Music and Video Business. 1622 Chestnut St.; Philadelphia, PA 19103; (800) 275-2474; (215) 567-7080; FAX: (215) 246-3339. **Chief Administrator:** Robert Gioella, pres. **Program:** Through The Art Institute of Philadelphia's 24 months of intensive education, Music and Video Business students are exposed to developments in one of the highest-growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in-depth in the program. Production is also a major focus for the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to final playback. In addition to industry fundamentals, each Music and Video Business student is given guidance in resume preparation and interpersonal communication skills. Students completing the program receive an Associate in Specialized Business Degree and may utilize our Employment Assistance Department.

### THE ART INSTITUTE OF PITTSBURGH

**Program Name:** Music and Video Business. 526 Penn Ave.; Pittsburgh, PA 15222; (800) 275-2470; (412) 263-6600; FAX: (412) 263-6666. **Chief Administrator:** Lee Colker, director of admissions. **Program:** Through The Art Institute of Pittsburgh's intensive education, Music and Video Business students are exposed to developments in one of the highest-growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in-depth in the program. Production is also a major focus for the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to the final playback. In addition to industry fundamentals, each Music and Video Business student is given guidance in resume preparation and interpersonal communication skills.

### AUDIO RECORDING TECH. INSTITUTE

**Program Name:** Theory & Practice of Audio Recording. 440 Wheeler Rd.; Hauppauge, NY 11788; (516) 582-8999; FAX: (516) 582-8213. **Chief Administrator:** James J. Bernard. **Program:** A comprehensive, hands-on course in the theory and practice of audio recording. The program consists of four levels: Basic Audio A101. Advanced Audio A201, Recording Workshop A301 and MIDI Technology M401. Each course is 10 weeks, 3 hours per week, and provides extensive experience with the studio equipment. Audio Recording Tech Inst. (ARTI) was established in 1969 and maintains very limited enrollment per class; it also offers affordable tuition with financing and realistic employment opportunities. Initially, qualifying graduates may use all ARTI studios for their own private sessions as a member of the Recording Engineers Association. This exclusive Association offers the graduate important, professional studio experience in preparation for eventual employment in the industry. Presently, ARTI has two school locations in Long Island, NY, Orlando, FL, and our newest to open in Daytona Beach, FL.

### BARTON COLLEGE

**Program Name:** Music Recording Technology Program. College Station; Wilson, NC 27893; (919) 399-6486; FAX: (919) 237-4957. **Chief Administrator:** Dr. Gayla Turk, dir. **Program:** Barton College is a four-year liberal arts school offering the degree Bachelor of Science in Music Recording Technology in the Department of Communication, Performing and Visual Arts. The program requires music study, including music theory, music history, ensemble participation, private lessons on a major instrument and conducting. The technical courses include electronic music, acoustics of music, sound synthesis, recording techniques, production techniques and studio management. The program concludes with an eight-week internship in an established studio. For more information, contact Dr. Gayla Turk, Director of Music Recording Technology, Music Division, Barton College, Wilson, NC 27893. Phone: (919) 399-6486.



BELMONT UNIVERSITY  
Nashville, TN

### BELMONT UNIVERSITY

**Program Name:** Music Business. 1900 Belmont Blvd.; Nashville, TN 37212-3757; (615) 386-4504; FAX: (615) 385-4516. **Chief Administrator:** Robert E. Mulloy, Director of Music Business. **Program:**

—LISTING CONTINUED ON NEXT PAGE

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## Recording Schools

### Seminars and Programs



—LISTING CONTINUED FROM PREVIOUS PAGE

Established in 1972. The program leads to a Bachelor of Business Administration (BBA), a professional degree. Students who complete the degree requirements graduate with a major in Music Business. The program stresses a strong liberal arts emphasis and is not a "trade school" program. Forty-eight courses offered allow for electives to determine the industry direction of the student. The program discourages the "glamour and glitter" concept. A 9,000-square-foot Center for Music Business houses two state-of-the-art control rooms and studios; a pre/post production MIDI room; six practice writer rooms; a 10 station Music Technology classroom; an all purpose classroom; a central machine room; engineering shop and storage. The facility is available to Music Business majors. An industry intern program complements the academic work. An active Music Business Board of Advisors from the Nashville Music Industry serves as an advisory system for the program. The program stresses the real-world application to the academic classroom setting. Nine full-time faculty/staff and 12 adjunct professors.



BERKLEE COLLEGE OF MUSIC  
Boston, MA

### BERKLEE COLLEGE OF MUSIC

**Program Name:** Music Production and Engineering and Music Synthesis Departments. **1140 Boylston St., Boston, MA 02215; (617) 266-1400. Chief Administrator:** Don Puluse, Chairman of Music Technology Division. **Program:** The Music Technology departments of Music Synthesis and Music Production and Engineering offer extensive hands-on experience and education in audio engineering, production, and the use of synthesizers and computers in writing, recording and performing music. Our faculty are seasoned professionals, active in the music industry in New York and Boston. Facilities include 3 music synthesis labs with 34 individual DAWs, MIDI-equipped ensemble and recital rooms, an array of multitrack, digital/video post-production, and project studios. In addition to receiving a four-year degree or diploma, the Berklee student benefits from a rich and diverse musical environment, as well as from cultural exchange with our large body of international students. Music Technology alumni are employed by major record companies, recording post-production studios and equipment manufacturers throughout the world.

### CAYUGA COMMUNITY COLLEGE

**Program Name:** Audio Production, A.A.S. Degree. **197 Franklin St., Auburn, NY 13021; (315) 255-1743; FAX: (315) 255-2690. Chief Administrator:** Steven Keeler.

### COLLEGE OF ST. ROSE

**Program Name:** Music Technology and Entertainment Arts. **432 Western Ave., Albany, NY 12203; (518) 454-5178; FAX: (518) 438-3293. Chief Administrator:** M.A. 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 engineering, MIDI and television production. The Music Department also offers minor concentrations in Music Business and Music Technology. Admission is by audition. Catalog and application information: CSR Admissions Office, (518) 454-5150. Program Director: Mary A. Nelson, (518) 454-5278.

### DUQUESNE UNIVERSITY

**Program Name:** Bachelor of Music in Sound Recording Technology. **600 Forbes Ave., Pittsburgh, PA 15282; (412) 396-5486. Chief Administrator:** Dean Michael Kumer; Thomas J. Kikta Jr., dir. Rec. Arts.

**Program:** Duquesne University's four-year program fills a void in existing offerings by combining the artistic and technical aspects of today's musical fields into a single, comprehensive package. In addition to instructions on their major instrument, students will gain exposure and hands-on experience in such areas as electronics, acoustics, recording theory, music production, MIDI, computer sequencing and notation, digital audio and music management. Duquesne University is the official U.S. Training Site for C.E.D.A.R. (Computer Enhanced Digital Audio Restoration). Students will also complete traditional elements of the music curriculum such as piano studies, music theory, solfège, eurhythmics, composition, conducting, and music history and literature. All recording training takes place in Duquesne's Studios, the School of Music's multitrack/MIDI facility, which houses a 24-track studio as well as a PCM 1630. For additional information and equipment list, please contact the Sound Recording Technology Department at (412) 396-5486 or by fax at (412) 396-5479.

### ELIZABETH CITY STATE UNIVERSITY

**Program Name:** Music Industry Studies. **Campus Box 780; Elizabeth City, NC 27909; (919) 335-3377; FAX: (919) 335-7408. Chief Administrator:** Vince Corozine, dir. **Program:** Elizabeth City State University has developed an innovative curriculum designed to prepare students for today's music industry. As an alternative to the strictly traditional music degree program, the BS degree in Music Industry Studies combines a traditional music curriculum with industry-related courses and experiences to prepare well-rounded graduates who are knowledgeable in all aspects of the music industry. Within the Music Industry Studies Degree Program, Elizabeth City State University offers a concentration in Music Business Administration and Music Engineering & Technology. The Music Business Administration concentration focuses on music business, management, marketing, sales, publishing, record production, retailing promotion and live concert production. The Music Engineering & Technology concentration is based on state-of-the-art 24-track recording and MIDI/electronic music studios. The curriculum incorporates studies in studio recording, production, digital audio, MIDI/electronic music, computer applications, acoustics and studio design. Students develop the technical skills and creativity necessary to be competitive and successful in the recording industry. The professionally equipped production studios enable students to produce, record, and market actual products as a major component of the instructional process.

### FINGER LAKES COMMUNITY COLLEGE

**Program Name:** Music Recording. **Lincoln Hill; Canandaigua, NY 14424; (716) 394-3500. Chief Administrator:** Frank Vergel, Gary Zetling. **Program:** Finger Lakes Community College offers a two-year Associate's Degree in Audio Recording, with students receiving extensive hands-on training needed to achieve a thorough understanding of modern recording. A combination of analog and digital equipment provides 24-track recording, along with sampling, sequencing, and SMPTE interlock technology. A recent expansion at the college has allowed the music recording program to move into a new 13-room complex designed by John Storyk of the Wallers-Storyk Design Group. Recording areas include a new 2,200-square-foot Rehearsal Room featuring variable acoustics. Courses include Audio 1, 2, 3 with Audio 4 being either an independent recording project or an internship at an outside facility. Focus of the program is to provide students with the proper training needed for entering today's recording field.



FIVE TOWNS COLLEGE  
Dix Hills, NY

### FIVE TOWNS COLLEGE

**Program Name:** Audio Recording Technology. **305 North Service Rd., Dix Hills, NY 11746; (516) 424-7000; FAX: (516) 424-7006. Chief Administrator:** Dr. Martin Cohen. **Program:** Five Towns College offers accredited two- and four-year degrees. Our unique three-point programs were developed to provide students with the tools needed to succeed as engineers and producers or music or film/video soundtracks. In this "triple threat" program, students receive intensive instruction in audio recording, a comprehensive music education and through our extensive internship and job placement program, students can take advantage of the college's close proximity to New York City. Facilities at our new, 34-acre campus include five John Storyk-designed recording studios in formats from 8- to 48-track, including a hybrid digital/analog control room complete with an SSL 4048 G series console with Total Recall, a 24-track MIDI suite with Pro Tools, video editing suites/soundstage, and a large collection of industry standard outboard and microphones including a Lexicon 480L, Eventide H3000, TC2290, Tube Tech EO's, etc.

### FLORIDA STATE UNIVERSITY

**Program Name:** School of Motion Picture, Television, and Recording Arts. **Tallahassee, FL 32306; (904) 644-8747. Chief Administrator:** Dr. Raymond Fielding, Dean. **Program:** FSU's new Film School offers intensive professional programs in narrative (story) filmmaking, on both graduate and undergraduate levels. The four-year undergraduate program leading to the BFA degree is located on the main campus in Tallahassee. The two-year graduate conservatory program leading to the MFA degree is located in Sarasota. In both programs, audio design is an important part of the training. Each program has its own studios and post-production facilities that are among the best in the country for teaching purposes. Altogether there are a total of four mix theaters at which students have the option of mixing from traditional dubbers or from multitrack machines or from computer 16-track Foley/music recording studios, and fully-equipped transfer suites complete the facilities.



FULL SAIL CENTER FOR THE RECORDING ARTS  
Winter Park, FL

### FULL SAIL CENTER FOR THE REC'G ARTS

**Program Name:** Recording Arts Specialized Associates Degree and/or Video and Film Production. **3300 University Blvd., Winter Park, FL 32792; (407) 679-6333; (800) CAN-ROCK; FAX: (407) 678-0070. Chief Administrator:** Jon Phelps, Ed Haddock, Garry Jones. **Program:** Degree programs in audio and/or video and film cover the major aspects of their respective industries, including recording engineering, audio for video and film, sound reinforcement, entertainment business, digital audio workstations, video/film production, and post-production. Over 2,700 contact hours of training are offered with more than 1,350 hours in hands-on labs utilizing equipment including NEVE, SSL, Studer, Otari, Ampex, Synclavier, Dyaxis, Opus, Digidesign, CMX, Chryon, Grass Valley, Sony, Ampex, Ikegami and Montage gear. Optional six-week externships. Short courses available. Full Sail is accredited by CCA, licensed by the state of Florida, offers financial aid to those who qualify, and offers lifetime job placement assistance. Call and schedule your tour of the facilities. We take your dreams seriously!



INSTITUTE OF AUDIO RESEARCH  
New York, NY

### INSTITUTE OF AUDIO RESEARCH

**Program Name:** Recording Engineering and Production (REP) Program. **64 University Pl., New York, NY 10003; (800) 544-2501; (212) 777-8550. Chief Administrator:** Albert B. Grundy, Miriam Friedman. **Program:** IAR offers a 900-hour program that offers both the technical knowledge and hands-on experience required for a career in the recording industry. The program features classroom and hands-on opportunities in audio electronics, acoustics, microphone characteristics, selection and placement, sound reinforcement, consoles, tape machines, dynamic processing devices, etc. Digital audio and editing are featured, with MIDI sequencing programs including Digital Performer and Sound Tools. Students experience recording sessions with Trident and MCI consoles, Studer tape machine, Tascam ADAT, Dolby A and SR, and the latest outboard gear. Students study critical music industry issues such as recording contracts, producer deals, sampling rights and copyright. By virtue of IAR's unique NYC location, students benefit from internships and job placement at top recording facilities, such as Electric Lady, Power Station and the Hit Factory. Students record top-quality NYC musicians in the recording workshops, and New York offers the hottest music scene in the world, around the clock. IAR's graduate placement provides employment opportunities in diverse areas including recording studios, post-production, live sound, film, video and television, studio management, etc.



### JAMES MADISON UNIVERSITY

Program Name: Music Industry Program. College of the Arts; Harrisonburg, VA 22807; (703) 568-3854; FAX: (703) 564-1431. Chief Administrator: Robert W. Smith.

### LEBANON VALLEY COLLEGE OF PENN.

Program Name: Sound Recording Technology. 101 N. College Ave.; Annville, PA 17003-0501; (717) 867-6285; FAX: (717) 867-6124. Chief Administrator: Barry R. Hill. Program: Located in Pennsylvania's beautiful Dutch country, Lebanon Valley College provides a refreshing atmosphere for those serious about entering the music-recording industry. The Bachelor of Music degree program in Sound Recording Technology offers an interdisciplinary course of study in music, recording arts, MIDI, digital recording & editing, and computer applications. Our facilities include analog 24- & 16-track recording studios along with the Pro Tools digital recording & editing system. LVC is a small college providing close contact with instructors and extensive hands-on experience. Lebanon Valley College is accredited by the National Association of Schools of Music; tuition is \$13,700 per year.



MEMPHIS STATE UNIVERSITY  
Memphis, TN

### MEMPHIS STATE UNIVERSITY

Program Name: Commercial Music Program CFA-232; Memphis, TN 38152; (901) 678-2559; FAX: (901) 678-5118. Chief Administrator: Larry Lipman. Program: Memphis State offers the Bachelor of Music in Commercial Music with concentrations in Recording Technology and Music Business. Fully accredited by NASM. CMUS majors won the prestigious NARAS Student Music Award in the Jazz/Big Band category. Our program stresses a thorough understanding of fundamental concepts, yet places equal emphasis upon developing the student's ability to quickly adapt to new practices, technologies and creative directions. Our instructors possess a broad knowledge of music industry practices and 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 digital audio workstation. (See Southeast Studios Directory for complete equipment list.) The Memphis arts community offers a dynamic environment, providing students with diverse cultural opportunities and a rich assortment of internship possibilities. Scholarship funds are available for exceptional students and many states offer financial assistance through the Academic Common Market. A commitment to personal attention and quality instruction requires that enrollment be limited and based on selective procedures.

### MIAMI SUNSET SENIOR HIGH SCHOOL

Program Name: Electronic Music/Television Production. 13125 SW 72nd St.; Miami, FL 33183; (305) 385-4255; FAX: (305) 385-6458. Chief Administrator: Daniel B. Sell. Program: Sunset offers a four-year curriculum in television production. Students in television work in a four-camera color studio with computer-assisted editing, computer graphics, telecine and interformat dubbing. Students produce commercials, live closed-circuit broadcasts, daily news, and record schoolwide events including multicamera 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 the school's Yamaha P.A. system. Most projects include combining television, recording and sound reinforcement equipment. These programs are open to all students enrolled at the school.



MIAMI-DADE COMMUNITY COLLEGE, KENDALL CAMPUS  
Miami, FL

—SEE LISTING TOP OF NEXT COLUMN

### MIAMI-DADE COMMUNITY COLLEGE

#### KENDALL CAMPUS

Program Name: Sound Engineering. 11011 SW 104 St., Rm 8242; Miami, FL 33176; (305) 237-2265. Chief Administrator: Harold Harms, Director of Sound Engineering. Program: Sound engineering studies at Miami-Dade Kendall are associated with the Music Department. This is a natural relationship because sound engineering students require a wide variety of sound sources to sharpen their skills in the production of professional music. Successful sound engineers have musical backgrounds coupled with technical skills and a broad range of practical experience. Sound engineering course work is only part of the picture at Miami-Dade South. The Sound Engineering program is set up to provide students with opportunities to gain practical experience. Students gain "hands-on" experience doing multitrack recording for student projects, sound reinforcement for campus events and "on-location" recording for music department programs. These combinations of activities provide sound engineering students at Miami-Dade Kendall a wealth of opportunities for the application of job-related skills. On-campus studio features 4-, 8-, 16-track recording, MIDI workstations, 2-track analog and DAT mastering together with a full complement of professional microphones and outboard gear.



MIDDLE TENNESSEE STATE UNIVERSITY  
Murfreesboro, TN

### MIDDLE TENNESSEE STATE UNIVERSITY

Program Name: Recording Industry. PO Box 21-MTSU; Murfreesboro, TN 37132; (615) 898-2578; FAX: (615) 898-5682. Program: The Recording Industry Department offers a B.S. degree program with concentrations in either Production & Technology or Operations & Administration. Offering 29 different courses, the program covers all areas of the industry. Minors are available in Mass Communications, Entertainment Technology, Music Electronics, Business Administration and Marketing. On-campus facilities include 3 recording studios (1 with Dolby Surround, two with digital multitracks), two DAWs, a nine-station MIDI lab, a digital editing suite, remote video and audio recording and video production and post-production studios. Thirteen full-time faculty are on campus to assist students who come from 35 states and several foreign countries. This program has received 8 TEC Award nominations and a NARAS Student Music Award. The program supports a student AES chapter and is SPARS affiliated. Tuition per semester, in-state \$740. Out-of-state \$2,774. Residents of certain southern region states qualify for in-state status.

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Hampton Falls, NH

#### MUSIC BUSINESS SEMINARS LTD.

Program Name: Doing Music & Nothing Else: The Music Business Week. 87 Lafayette Rd.; Hampton Falls, NH 03844; (800) 448-3621; (603) 929-1128. Program: Celebrating its 8th anniversary, MBS Ltd., with sponsorship from *Musician* magazine, presents "Doing Music & Nothing Else: The Music Business Weekend Seminar." The program is a weekend-long, classroom-style, multimedia educational experience presented in 35 major cities each year. The curriculum is designed for men & women of all ages, all styles of music, bands and soloists, who are pursuing a career in original music songwriting, recording and/or performing. Learn how to establish appropriate goals, attract a songwriting or recording contract, book profitable gigs, raise capital and more. Aftercare opportunities include toll-free telephone counseling with instructor, two free directories (A&R and T-100), PAN membership, etc. Seminar is also available on audio tapes with workbook. This is the only music

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## Recording Schools

Seminars and Programs



—LISTING CONTINUED FROM PREVIOUS PAGE

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### NEW SCHOOL FOR SOCIAL RESEARCH

**Program Name:** Audio Engineering Certificate Program. **66 W. 12th St., New York, NY 10011; (212) 229-5873.** **Chief Administrator:** Fred Winston, Director, Guitar Study Center. **Program:** The Certificate Program in Audio Engineering is a five-course sequence which examines and explains the equipment, procedures, techniques and underlying theoretical principles of contemporary multitrack recording. The curriculum combines hands-on studio experience with lectures and classroom study, culminating in an internship for those who successfully complete all course requirements. Classes meet in outside studios. All are taught by established professional engineers who present state-of-the-art knowledge in a relaxed, informative atmosphere. While focused on providing students with the skills needed by recording engineers, the program is open, and of great use, to any and all musicians/writers/arrangers/producers who recognize that the increasingly technological nature of contemporary music demands knowledge of, and the ability to function within, the modern recording studio. All courses offered three semesters yearly. **Tuition & Fees:** \$1,940-\$2,060. Certificate registered with State of New York.

### NEW YORK UNIVERSITY

**Program Name:** Music Technology. **35 W. 4th St., Rm. 777; New York, NY 10003; (212) 998-5422.** **Chief Administrator:** Kenneth Peacock. **Program:** NYU's Music Technology track prepares students for careers in recording engineering, production and post-production, audio/video mastering, audio maintenance and repair, computer programming and software development. The facilities include two recording suites, four computer music laboratories, an AV and film music-editing studio, an analog synthesis studio and two research and development facilities which use Macintosh, IBM, and NeXT computers. The Arts & Media Studio gives students exposure to advanced computer music and multimedia platforms. Students may participate in a wide-ranging internship program, spending a semester in a professional environment such as a record company, recording studio or publishing house. Students may earn a Bachelor of Music degree in either Music Business or Music Technology, or a Master of Music degree in Music Technology. Honors students may participate in the new Stephen F. Temmer Tonmeister program. All degrees are fully accredited through the National Association of Schools of Music.

### NORTHEAST BROADCASTING SCHOOL

**Program Name:** Recording Arts. **142 Berkeley St., Boston, MA 02116; (617) 267-7910; FAX: (617) 236-7883.** **Chief Administrator:** Robert Matorin, dean; Steven Drown, chairman of recording arts program. **Program:** The Recording Arts Program at the Northeast Broadcasting School is designed to develop the specialized skills and creative techniques students need to pursue careers in music recording and audio engineering. The Recording Arts Program features intensive studio instruction, internship programs and life-long professional placement assistance and career planning. New facilities include a 24-track ADAT studio with BRC and a Tascam M3700 automated mixing console, (2) MIDI studios equipped with Macintosh IIsi with Studio Vision and Sound Tools software, JD-800 and ADAT. Applicants for the Recording Arts program must have a high school diploma or its equivalent, submit an admissions application and participate in an admissions interview. Tuition for the Day Division is \$8,200; the Evening Division \$7,200. Financial aid assistance is available to students who qualify. The Northeast Broadcasting School is accredited by the Accrediting Commission of Career Schools/Colleges of Technology. Classes begin in the winter, spring and fall.

### THE OMEGA STUDIOS' SCHOOL OF APPLIED RECORDING ARTS AND SCIENCES

**Program Name:** Studio Techniques, Advertising Production, MIDI, Music Business. **5609 Fishers Ln., Rockville, MD 20852; (301) 230-9100; FAX: (301) 230-9103.** **Chief Administrator:** W. Robert Yesbek. **Program:** The Omega Studios' School, presently in its 15th year, offers five comprehensive certificate programs including Recording Engineering and Studio Techniques (164 hours, \$4,240), Electronic Music Synthesizers and MIDI (80 hours, \$1,815), Live Sound Reinforcement (96 hours \$2,210), Audio Production Techniques for Advertising (96 hours, \$2,210), and Music Business (52 hours, \$1,015). The courses include lectures and workshops covering acoustics; microphone, signal processor and tape machine theory (both 24/48-track analog and 32-track digital); console opera-



THE OMEGA STUDIOS' SCHOOL OF APPLIED RECORDING ARTS AND SCIENCES  
Rockville, MD

tion (taught on SSL, API, NEVE and Audiotronics consoles); computer sequencing; synthesizer operation and programming; basic electronics; advanced electronics/techniques; digital electronics; audio-for-video; jingle production and voice-over techniques; direct-to-disc digital recording and editing; and music business. All engineering programs include extensive hands-on training in all of Omega's control rooms, classrooms and studios. Approved by Maryland Higher Education Commission and approved for veterans training, and certain courses are available for accreditation by the American University in Washington, D.C.

### PEABODY INSTITUTE

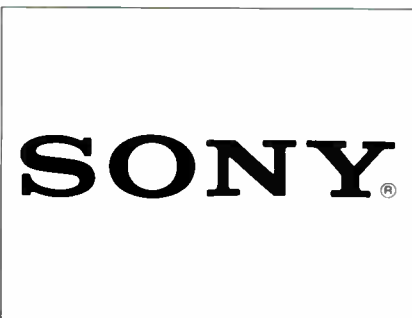
#### JOHNS HOPKINS UNIVERSITY

**Program Name:** Bachelor of Recording Arts and Sciences. **1 East Mt. Vernon Pl., Baltimore, MD 21202; (800) 368-2521.** **Chief Administrator:** Alan P. Kelauber. **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 ten 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 classroom 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.

### PURCHASE COLLEGE

#### STATE UNIVERSITY OF NEW YORK

**Program Name:** Studio Composition (Bachelor/Master of Fine Arts). **735 Anderson Hill Rd., Purchase, NY 10577-1400; (914) 251-6700; FAX: (914) 251-6739.** **Chief Administrator:** Donald Steven, dean of music. **Program:** The BFA/MFA studio composition programs at Purchase College are unique combinations of commercial composition, production training and rigorous requirements in our classical conservatory. Three years of classical theory, ear training and keyboard skills. Multitrack studies with top commercials engineers/producers from nearby NYC. Digidesign/Macintosh workstations for MIDI, software synthesis and editing. Multimedia collaboration. Private study with major studio talent in the metro-NYC area. Extensive internship placement. Graduates leave with a thorough understanding of the recording studio as a writing and production tool, as well as a comprehensive and innovative musical education. **Studios:** 24-track digital studio, 8-track digital studio, Sound Tools II (w/Pro Tools) Mac IIcx/Microtek studio, Studio Vision w/Audio-media Mac IIsi/Runner studio. All studios are Mackie/Yamaha equipped. **Tuition:** \$2,650/yr in-state, \$6,550/yr out-state. Send for our sample CD.



SONY PROFESSIONAL AUDIO TRAINING GROUP  
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### SONY PROF'L AUDIO TRAINING GROUP

**6500 N. Congress Ave., Boca Raton, FL 33487; (407) 998-9922; FAX: (407) 998-6700.** **Chief Administrator:** Bob McGraw. **Program:** Factory and custom on-site training classes are provided by the SONY Pro Audio Training Group for SONY professional audio prod-

ucts. We offer technical service training designed to provide the service engineer with the knowledge to service and maintain SONY professional audio products and applications classes structured to provide the student with the knowledge to effectively operate specific SONY professional audio equipment. Classes range from one-day seminars to eight-day technical service training classes. Electronics experience and/or a two-year electronics degree is recommended for these courses. All courses stress hands-on time to enable the student to become confident with the operation and the service of the particular SONY product. For more information regarding factory training or to arrange on-site training at your facility, please contact us.

### STATE UNIV. OF NEW YORK AT ONEONTA

**Program Name:** Bachelor of Arts in Music Industry. **SUNY Oneonta, Dept. of Music; Oneonta, NY 13820; (607) 436-3415/3412; FAX: (607) 436-2107.** **Chief Administrator:** Dr. Robert Barstow. **Dr. Janet Nephle.** **Program:** No entry audition required; includes specialized studies in record marketing and merchandising, retail music industry, publishing, copyright and intellectual property law, international music business, agents, managers and attorneys, music and movies, video, cable. Studies in music technology including MIDI, analog and digital recording. Every student serves an internship in the Music Business. Music department requirements include courses in music history and literature, theory, and performance. Business department requirements include courses in marketing, management, accounting, business law and economics. General college distribution requirements must be satisfied.

### STATE UNIV. OF NEW YORK AT FREDONIA

**Program Name:** Bachelor of Science in Sound Recording Technology. **SUNY Fredonia, School of Music; Fredonia, NY 14063; (716) 673-3221; (716) 672-3151; FAX: (716) 673-3397.** **Chief Administrator:** David Kerzner, Chair, Sound Recording Technology. **Program:** Applicant must satisfy the academic entrance requirements; an audition is required. Studies include general college curricula, music, physics, acoustics, electronics, recording basics, techniques and practices of the recording industry, sound practicum, seminar, and electronic music composition. Studio and performance recording are required for practicum/lab sessions. Graduation requirements include 650 hours or session/lab experience. Internships are encouraged. Facilities include: analog 1/4" 2-track, 1/2" 4- and 8-track and 2" 24-track recorders, and 2-channel digital recorders; Pro Tools, Sound Tools, Aemk, Soundcraft, and Ramsa consoles; and a wide variety of professional microphones and signal processing. Sound Recording Technology is a degree program of the Fredonia School of Music and is fully accredited by the National Association of Schools of Music. SUNY Fredonia maintains a fully chartered Audio Engineering Society student chapter. **Tuition:** In-state \$2,650/year, Out-of-state \$6,550/year.

### UNITY GAIN RECORDING STUDIO

**Program Name:** Audio Recording Comprehensive Program. **2976-F Cleveland Ave., Fort Myers, FL 33901; (813) 332-4246; FAX: (813) 334-3450.** **Chief Administrator:** Anthony Iannucci. **Program:** Fort Myers' high-tech recording institute offers a 48-week program in Audio Recording. Classes are limited to five, providing each student with semiprivate instruction. Our 144-hour program includes over 100 hours of hands-on time using the institute's professional multitrack facility. The program comprises four levels: Introduction to Audio Engineering, Advanced Techniques in Audio Engineering, MIDI Theory and Practical Application, and The Audio Recording Workshop. Throughout the course, each student participates in recording 15 different musical groups utilizing analog and digital recorders. Students learn on new state-of-the-art digital audio editing equipment. Equipment used in lab includes: Soundtracs PC MIDI 24 console; Lexicon, Eventide, Korg, Aphex, and dbx outboard gear, MAC LC, Professional Performer sequencer, Akai S950 sampler, Proteux XR-1, and Roland D-50 synthesizer; AKG, Sennheiser, Electro-Voice, Neumann and PZM microphones. Upon completion of the program, each student receives a certificate of completion and is provided with placement assistance in the area of his/her choice. For further information, or to receive a free catalog, please call or write.

### UNIVERSITY OF HARTFORD ENGINEERING

**Program Name:** Acoustics and Music. **200 Bloomfield Ave., West Hartford, CT 06117; (203) 768-4792; FAX: (203) 768-5073.** **Chief Administrator:** Robert D. Celmer.

### UNIV. OF MASSACHUSETTS, LOWELL

**Program Name:** Sound Recording Technology. **One University Ave., College of Fine Arts; Lowell, MA 01854; (508) 934-3850; FAX: (508) 934-3034.** **Chief Administrator:** Dr. William Moylan. **Program:** The University of Massachusetts, Lowell offers three degree programs in Sound Recording Technology: the Bachelor of Music degree with a major in Sound Recording Technology, and minors in SRT for Electrical Engineering and Computer Science majors. The program's facilities include: 24-track studio (automated and digital), video post-production and 8-track studio, Sound Synthesis and MIDI studio, Beginning Mixing, Sound Synthesis and Editing studio, Maintenance & Repair Laboratory and Critical Listening Classroom. The major program is the Bachelor of Music degree in Sound Recording Technology. It produces musically sophisticated and sensitive professionals with sufficient technical knowledge to excel in the present production industry and to easily keep pace with the changing technology. The program combines studies in physics, electrical engineering, computer science, and calculus with traditional studies in music, and at least nine courses in the art, practical applications and technology of audio recording. Our interns have been placed "from Tanglewood to Hollywood." 1992 TEC Award nominee.

## UNIVERSITY OF MIAMI

**Program Name:** School of Music; Music Engineering. **School of Music; 1314 Miller Dr.; Coral Gables, FL 33124; (305) 284-2245; FAX: (305) 284-6475. 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 Music Engineering degree. Courses in 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. Only students of the highest caliber are considered for admission to these programs. The two principle recording studios house automated Sony MXP-3036 and MXP-3056 consoles, two Sony PCM-3324 digital multitracks, APR-24 and APR-5002 recorders, Digidesign Pro Tools, Audio Kinetics synchronization system, Sony 3/4" video recorders, a Synclavier system and extensive computer equipment. Our recent graduates enjoy a high placement rate with audio manufacturers and studios, and have engineered Gold, Platinum and Grammy-winning albums.

## UNIVERSITY OF MIAMI

**Program Name:** BS in Electrical Engineering w/Audio Engineering option. **Dept. of Elec. & Comp. Engineering; PO Box 248294; Coral Gables, FL 33124-0640; (305) 284-3291; FAX: (305) 284-4044. Chief Administrator:** Dr. Tzay Young. **Program:** The Department of Electrical and Computer Engineering at the University of Miami has created a new degree program providing a Bachelor of Science in Electrical Engineering degree with an option in Audio Engineering. This is the first degree program of its kind in the United States and offers the opportunity to receive a BSEE degree that combines traditional electrical engineering studies with audio and recording courses taught by the School of Music's Music Engineering faculty. Students have access to digital audio workstations, digital and analog signal processing equipment, audio test equipment, and a variety of computer platforms in both the College of Engineering and the School of Music. Candidates must show a record of high scholastic achievement (musical audition is not required). For more information, contact Reuven Lask at (305) 284-3345.

## UNIVERSITY OF NEW HAVEN

**Program Name:** BA/BS in Music & Sound Recording; BA in Music Industry. **300 Orange Ave.; West Haven, CT 06516; (203) 932-7101. Chief Administrator:** Michael G. Kaloyanides, Guillermo Mager. **Program:** The University of New Haven offers a Bachelor of Arts and a Bachelor of Science in Music and Sound Recording as well as a Bachelor of Arts in Music Industry. All Programs include courses in music history, theory, musicianship and performance. The recording classes, which include Recording Fundamentals, Multitrack Recording I and II, and Recording Seminar I and II, cover such topics as acoustics, recording-related electronics, multitrack recording, equipment maintenance, sequencing, digital audio and MIDI. The Bachelor of Science program provides a stronger background in the science and technology of recording through courses in calculus, physics and electrical engineering. The music industry program includes courses in music production, promotion, publishing and distribution, accounting, management, marketing, copyright law and concert management. Facilities include a new 24-track on-campus recording facility designed to excel as both a teaching and professional recording environment, a 16-track recording studio, and a concert hall designed for 16-track recording. Minors are available in Electrical Engineering, Communication, Computer Science, Management and Marketing.



## ENTERTAINMENT INDUSTRY CENTER UNIVERSITY OF NORTH ALABAMA

UNIVERSITY OF NORTH ALABAMA  
Florence, AL

## UNIVERSITY OF NORTH ALABAMA

**Program Name:** Entertainment Industry Center/Commercial Music Program. **UNA Box 5060; Florence, AL 35632-0001; (205) 760-4342; FAX: (205) 760-4368. Chief Administrator:** Dr. Newton J. Collins, dir. **Program:** The EIC currently has one 16-track recording studio with plans underway for significant expansion. The EIC serves as the coordinating point for Entertainment Industry programs in cooperation with various schools and departments of the University. Current offerings via the Department of Music lead to a Bachelor of Arts or Bachelor of Science degree in Commercial Music. Requirements include General Studies, 50-58 semester hours (BA) or 45 hours (BS); Music Core, 46 hours; Prescribed Business Administration Minor and Supporting Courses, 24 hours; Commercial Music/Entertainment Industry and Recording Courses, 18 hours including Survey of the Music Industry, Music Publishing,

The Record Company, Studio Techniques, Production, Commercial Music Practicum/Internship and electives such as Popular Songwriting, Electronics, etc. Curricular offerings and additional Entertainment Industry degree programs are currently planned. Music Department is an accredited member of the National Association of Schools of Music (NASM) and School of Business is an accredited member of the Association of Collegiate Business Schools and Programs (ACBSP).



UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE  
Asheville, NC

## UNIV. OF NORTH CAROLINA AT ASHEVILLE

**Program Name:** Bachelor of Science in Music with Recording Arts. **UNCA Department of Music; Asheville, NC 28804-3299; (704) 251-6432; FAX: (704) 251-6385. Chief Administrator:** Dr. Wayne J. Kirby. **Program:** Bachelor of Science in Music with Recording Arts, Bachelor of Arts in Jazz Studies, or Bachelor of Arts in Music. 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 houses a 24-track 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 and 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 \$775, out of state, approximately \$3,590. Limited enrollment by audition. Scholarships available.

## FRED VAIL MUSIC INDUSTRY WORKSHOPS

**Program Name:** Challenges of the Recording Industry in the '90s. **2808 Azalea Place; Nashville, TN 37204; (615) 297-0700; FAX: (615) 297-1413. Chief Administrator:** Fred Vail. **Program:** A 35-year veteran of the broadcasting and music industries, Vail is an ideal choice for speaking engagements, recording studio workshops and seminars, motivational talks and private consultations. As president of Treasure Isle Recorders Inc., Nashville, and a former manager of the Beach Boys, Vail has spoken to numerous groups, organizations, colleges and universities throughout the United States, Canada, United Kingdom and Europe, including Vanderbilt University, Riverside College, California State University, Middle Tennessee State University, Belmont College, University of Alabama, N.A.C.A., American Defense Institute and the Trebas Institute, Canada. Vail's career covers five decades and includes work with the Four Seasons, Jan and Dean, the Righteous Brothers, Alabama, Dolly Parton, James Taylor, The Byrds, Linda Ronstadt, Glen Campbell, Slaughter, Grand Funk, and B.B. King, among others. "Vail genuinely understands the concerns of struggling musicians and what is now required to break into the music business." Johnson City (Tennessee) Press "...the most constructive advice we received in Nashville." "Up Country" Darryl R. Safter, Farmington, Maine.

## CENTRAL

## THE ART INSTITUTE OF DALLAS

**Program Name:** Music and Video Business. **Two Northpark, 8080 Park Ln.; Dallas, TX 75231; (800) 275-4243; (214) 692-8080; FAX: (214) 692-6541. Chief Administrator:** Randy McKinley, dir. of admissions. **Program:** The Art Institute of Dallas offers an Associate of Applied Science Degree for graduates of their Music and Video Business Department in Audio and Video Production. Students may elect one of three career tracks which are available in Audio, Video and Entertainment Business. The program offers a strong concentration of music business courses including Copyright and Publishing, Entertainment Law, Artist Management, Concert Promotion, Retail and Wholesale Merchandising, Broadcast Advertising, Selling Techniques for the Audio and Video Industry, and several levels of Audio and Video Production. Students learn from professionals who are currently working in the field. All equipment and campus studio facilities are of broadcast quality. Students also utilize professional, off-campus studios leased for specific projects. More than 1,000 students are enrolled at The Art Institute of Dallas.

## THE ART INSTITUTE OF HOUSTON

**Program Name:** Music and Video Business. **1900 Yorktown St.; Houston, TX 77056; (800) 275-4244; (713) 623-2040; FAX: (713) 966-2700. Chief Administrator:** Cherie McNeil, director of admis-

sions. **Program:** Through The Art Institute of Houston's intensive education, Music and Video Business students are exposed to developments in one of the highest-growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in-depth in the program. Production is also a major focus for the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to the final playback. In addition to industry fundamentals, each Music and Video Business student is given guidance in resume preparation and interpersonal communication skills.

## AUDIO ENGINEERING INSTITUTE

**Program Name:** Basic Audio Engineering, Advanced Audio Engineering. **2815 Swandale Dr.; San Antonio, TX 78230; (210) 340-8776. Chief Administrator:** Marius Perron III.

## BALL STATE UNIVERSITY

**Program Name:** Music Engineering Technology. **MET Studios; Muncie, IN 47306; (317) 285-5537; FAX: (317) 285-5401. Chief Administrator:** Dr. Cleve L. Scott. **Program:** Music Engineering Technology is a Bachelor of Music degree that combines a departmental major in Music Engineering Technology with a minor in applied physics. This is a four-year program designed to diversify musicians and prepare them for employment in sectors of the music industry that represent new areas of music creation, as well as traditional areas of music performance and music distribution. The music curriculum includes concentration on contemporary composition, individual musical performance, music arranging, sound synthesis and analysis, recording technology, sound reinforcement and computer applications. The applied physics requirements involve electronic theory, which includes digital and analog circuits and calculus.

## CEDAR VALLEY COMMUNITY COLLEGE

**Program Name:** Commercial Music/Recording Technology. **3030 N. Dallas Ave.; Lancaster, TX 75134; (214) 372-8127; FAX: (214) 372-8207. Chief Administrator:** Roger Dismore.

## THE CLEVELAND INSTITUTE OF MUSIC

**Program Name:** Audio Recording degree program. **11021 East Blvd.; Cleveland, OH 44106; (216) 791-5000; FAX: (216) 791-3063. Chief Administrator:** Tom Knab, department head. **Program:** The Cleveland Institute of Music, one of the top tier music conservatories in the country, provides the setting for learning audio/music production while pursuing a BM degree in Audio Recording. Courses cover audio system design and operation, digital audio, advanced microphone techniques, multitrack recording, signal processing, acoustics (Techron TEF 20 Hi), maintenance, digital editing (Sonic Solutions), audio-for-video (Digidesign Pro Tools) and MIDI/synthesis. Internship, independent projects and four years of professional experience in audio service round out the program. Classical music recording studies are conducted under the guidance of multiple Grammy winner Jack Renner of Telarc International. Acoustics studies are undertaken with Dr. Peter D'Antonio of RPG Diffusor Systems. The Institute offers excellent orchestras and top-quality musicians for collaboration. Musical and aural acuity as well as technical excellence are emphasized. Three well-equipped studios and limited enrollment allow for plenty of hands-on studio time and personalized instruction. Advanced (FDDI) fiber-optic network/digital audio facilities. Strong musical and academic requirements. Minor in Electrical Engineering available through Case Western Reserve University.

## COLLIN COUNTY COMMUNITY COLLEGE

**Program Name:** Commercial Music. **2800 East Spring Creek Pkwy.; Plano, TX 75074; (214) 881-5978; FAX: (214) 881-5103. Chief Administrator:** Keith Hays, prof. of music, dir. of Spring Creek Recording Studio.

## COLUMBIA COLLEGE

**Program Name:** Sound Technology. **676 N. LaSalle; Chicago, IL 60610; (312) 482-9068. Chief Administrator:** Douglas R. Jones. **Program:** Columbia College Chicago offers a 4-year, Bachelor of Arts in Sound Technology. It is designed to educate tomorrow's audio professional. Our curriculum includes classes in recording, video and film post-production, acoustics, sound contracting, systems design, CAD, analysis, digital audio, psychoacoustics and more. The program is housed in the Columbia College Audio Technology Center, the Radio/Sound Department's newest facility. Acquired in January of 1993, the ATC covers 14,000 square feet and includes two complete film mix suites, a video post-production suite, 24-track music recording studio, two voice-over production studios, transfer and dubbing facilities and classroom/laboratories.

## DEPAUL UNIVERSITY SCHOOL OF MUSIC

**Program Name:** Sound Recording Technology (Bachelor of Science in Music). **804 W. Belviden Ave.; Chicago, IL 60614; (312) 362-6844; FAX: (312) 362-8215. Chief Administrator:** Edward Koehler, Associate Dean. **Program:** DePaul's SRT program features practical training in a top Chicago studio; music, electrical engineering, and liberal arts classes at the University. It is one of six majors available to students in the School of Music and is focused on career preparation for the recording industry. The excellence of the SRT program relies on a collaboration with Streeterville Recording Studios, where facilities include the NEVE VR and SSL consoles, as well as Synclavier and Audiofile digital audio workstations. On campus, students apply their skills to a variety of recording projects, using the University's own Studio DePaul. Preparatory work includes such classes as "Sound and Acoustics," "Linear Integrated Circuits,"

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## Recording Schools

Seminars  
and  
Programs



—LISTING CONTINUED FROM PREVIOUS PAGE

"Digital Circuits", and "Computer Interfacing." Applicants should have strong academic abilities and an interest in the performance and appreciation of music. For additional information, call the Coordinator of Admissions at 1-800-4DePaul ext. 6844

### ELMHURST COLLEGE

**Program Name:** Music Business Program. **190 Prospect; Elmhurst, IL 60126; (708) 617-3515; FAX: (708) 617-3738. 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 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 with digital mastering online in the college's new Computer Science and Technology Center, courses ranging from Music Theory to MIDI, recently expanded practice and recital facilities, and an artist faculty of over 40. Industry support is provided in the form of scholarships from trade organizations such as NAMM and NARAS, corporate sponsorship, a student chapter of MEIA and an intern/job bank. Offering students individualized instruction in music business for over 20 years, Elmhurst provides a specialized career track integrated with-in a four-year degree.



GREENVILLE COLLEGE  
Greenville, IL

### GREENVILLE COLLEGE

**Program Name:** Contemporary Christian Music. **315 E. College Ave., P.O. Box 159; Greenville, IL 62246; (800) 345-4440; (800) 248-2288 (IL); FAX: (618) 664-1748. Chief Administrator:** Ralph Montgomery. **Program:** The Contemporary Christian Music program is a four-year degree program in which students may elect an emphasis in studio recording. Studio A is a 24-track MCI room equipped with a JH-600 Series console, fully automated, and a Digidesign Sound Tools II Digital Audio Recording System. The program covers acoustics, mixing consoles, automation, MIDI, SMPTE, live sound reinforcement and media writing and production. Engineers, producers and artists from the contemporary Christian music industry speak with students each month. For an emphasis in studio recording with a Christian liberal arts education, contact Greenville College.

### HUTCHINSON TECHNICAL COLLEGE

**Program Name:** Audio Technology. **2 Century Ave.; Hutchinson, MN 55350; (800) 222-4424; (612) 587-3636. Chief Administrator:** David Igl. **Program:** Two-year intensive technical audio program. AAS degree option. Extensive hands-on training in audio electronics, studio and remote recording, systems design and installation, acoustics, signal processing and sound reinforcement for pro sound market. Lab and practical applications prominent. Personalized instruction allows students to enter throughout year. Receive credit for previous experience and work at accelerated pace. Students active in AES. State school, low tuition. Graduates available throughout year. Extensive cooperation with employers for internships and supervised work experience. Our graduates have the mix of technical skills and applications for today's pro sound market.

### INDIANA UNIVERSITY

**Program Name:** Associate of Science in Audio Technology/B.S. in Audio Tech. **School of Music; Bloomington, IN 47405; (812) 855-1900/1087; FAX: (812) 855-4936. Chief Administrator:** Dr. David A. Pickett. **Program:** The IU Audio Department offers two degrees. 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 and multitrack studio techniques. Applicants must demonstrate an interest in the musical activities of the School. The Bachelor of Science in Audio Recording is a four-year program that offers training in audio recording and reinforcement, with emphasis on classical music engineering and production techniques. Applicants for the Bachelor's degree must demonstrate a keen interest in classical music and aptitude for core music studies. Performance not required. Classes in recording techniques, electronics, acoustics, maintenance and musical styles. Professional recording equipment includes 2-track digital with hard disk editing and 2, 4, 8 and 16 track analog. Students record all official concerts ranging from solo and chamber music through symphony, 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. University financial aid and some work scholarships are available. Departmental assistance offered in job placement.

### INTERLOCHEN CENTER FOR THE ARTS

**Program Name:** Recording Services Technical Internship. **PO Box 199; Interlochen, MI 49643; (616) 276-7200; FAX: (616) 276-6321. Chief Administrator:** David Greenspan. **Program:** Experience the "Magic of Interlochen"! We offer one-semester internships in recording services at our world-renowned Arts Academy, plus summer internships at our Fine Arts Camp. Duties include, but are not limited to, recording and/or sound reinforcement of concerts, lectures and seminars. Requires basic recording skills and the ability to work in teams. A good knowledge of classical/jazz music plus sound reinforcement skills very helpful. Accreditation is dependent upon school requirements. To become part of our exciting environment, call or write for an application.

### INTL. COLLEGE OF BROADCASTING

**Program Name:** Audio/Recording Engineering. **6 S. Smithville Rd.; Dayton, OH 45431; (513) 258-8251; FAX: (513) 258-8714. Chief Administrator:** J. Michael LeMaster. **Program:** The two semester Recording/Audio Engineering diploma program at the International College of Broadcasting teaches the operation of professional recording and sound reinforcement equipment, as well as preparing the student for the varied technical opportunities that exist in the music industry. This includes music theory, music history, music as an industry, songwriting, publishing, copywriting and business communication. A combination of lecture classes and in-studio hands-on training is used. Students will actually participate in the recording of musical artists and bands, performing tasks from controlling the consoles to doing the final mixdown for the finished recording, commercial production work, tape editing, dubbing, live sound reinforcement and a variety of other tasks related to the recording industry. Graduates of the ICB program will be prepared for entry level positions in the recording/audio engineering field.

### MCLENNAN COMMUNITY COLLEGE

**Program Name:** Commercial Music. **1400 College Dr.; Waco, TX 76708; (817) 750-3483; FAX: (817) 756-0934. Chief Administrator:** David Hibbard. **Program:** Broad-based program offering three degrees (A.A.S.) in Audio Technology, Songwriting/Composition, and Performance, with a new degree pending in Music Industry Management. Full-time faculty are all active professionals in the areas of recording, performance and composition. About 100 student majors with over 20 ensembles actively performing and recording music in all styles of contemporary and traditional music. Program is housed in the Performing Arts Center and has a 24-track recording studio and a fully equipped MIDI facility. The audio technology curriculum requires the development of skills in performance, composition and management in addition to the areas of production, engineering and maintenance. As part of their course work, students must successfully plan, develop, record and manage recording projects.

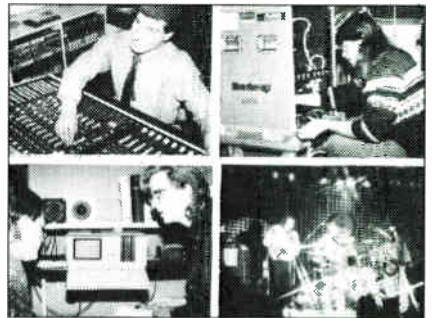
### MOORHEAD STATE UNIVERSITY

**Department of Music; Moorhead, MN 55663; (218) 236-2101. Chief Administrator:** Robert Pattengale, dept. chair. **Program:** The Department of Music offers NASM-accredited bachelor degrees in Performance, Music Education and Music Industry and Master degrees in Music and Music Education. Introductory-Advanced Audio Production and Electronic Music classes are offered sequentially with instruction in analog and digital recording, synthesis, and MIDI technology. An annual recording project, "Dragon Tracks" (available upon request), features student engineers, composers, ensembles and musicians. Hands-on training and work study is also available for location recording and sound reinforcement in both commercial and classical music applications. Three studios are used in the course sequence, with Studio A featuring a large performance room, isolation booth, and "splayed wall" control room. Equipment includes a Soundcraft 600 mix desk, digital 16-track and stereo recorders, extensive outboard processing equipment and a full complement of professional microphones. A complete array of sequencers, synthesizers and samplers is augmented by extensive software for sequencing, composition and printing on the Macintosh computer.

### MUSIC TECH

**Program Name:** Recording Engineer Course. **304 N. Washington Ave.; Minneapolis, MN 55401; (612) 338-0175; FAX: (612) 338-0804. Chief Administrator:** Jon Dressel. **Program:** Music Tech is a NASM-accredited Music School which offers diploma programs in Recording Engineering. Curriculum includes emphasis in Recording, Music, MIDI, Music and Recording Business, Sound Reinforcement, Studio Maintenance courses, Music and Media Production,

and Acoustics. Intensive 1,200-hour year long courses are offered at both basic and advanced levels. Students entering the basic course are encouraged to complete the advanced course as well. Over 7000 hours in each course is spent in the studio. Our facilities include a 9-room, 3,000-square-foot recording complex including two 24-track control rooms, a digital editing lab, and two MIDI production suites. Additionally a significant amount of studio time is spent in Minneapolis recording studios. The backbone of our program is our faculty, which includes three studio owners, two studio managers, an acoustical designer, six songwriters, and thirteen recording engineers with credits from the Allman Brothers to Prince to Hank Williams Jr.



NORTHEAST COMMUNITY COLLEGE  
Norfolk, NE

### NORTHEAST COMMUNITY COLLEGE

**Program Name:** Audio and Recording Technology. **801 E. Benjamin; Norfolk, NE 68701; (402) 644-0506. Chief Administrator:** Timothy Miller. **Program:** Northeast Community College offers a two-year Associate of Applied Science in Audio and Recording Technology. The Audio and Recording Technology program is a balanced mix of audio theory, studio techniques, electronics, hands-on lab experience, concert sound reinforcement, T. E. F.™, concert lighting, music, music theory, MIDI and digital audio. Our on-campus facilities include a Sonic Solutions digital production suite, as well as 16- and 8-track music production. New classes start each August, with very affordable tuition. Northeast Community College is accredited by the North Central Association of Colleges and Schools and the Nebraska State Department of Education.

### OHIO UNIVERSITY

**Program Name:** The Audio Professional Production Sequence. **School of Telecommunications; 253 Radio-Television Bldg.; 9 South College St.; Athens, OH 45701-2979; (614) 593-4860. Chief Administrator:** Jeff Redefler. **Program:** The four-year program in Telecommunications leads to the Bachelor of Science degree in Communications. This is a broadly based liberal arts curriculum with an emphasis on media studies, music recording, audio post-production for video and/or desktop production. The Professional Audio Production Sequence incorporates course work in multitrack recording, music production, media production, music, electronics, film, hearing and speech sciences, computer applications in music, as well as many other related courses. Audio production courses stress technical theories, practical skills (with much hands-on training) as well as artistic considerations. Teaching facilities include a 16-track ADAT featuring a Soundcraft 24x8 console, Digidesign Pro Tools Digital Audio Workstation, as well as a full assortment of mics and outboard processing equipment. Other campus facilities include a Synclavier studio and a film sound mixing studio. In addition to in-class experience, students gain experience through one of Ohio University's public radio or television stations and through an extensive internship program. Admission is highly competitive, and financial aid is available to qualified students.

### OKLAHOMA STATE UNIVERSITY

**Program Name:** Music Business/Music Tech Workshop. **Seretean Center, Rm. 132; Stillwater, OK 74078; (405) 744-6133; FAX: (405) 744-7074. Chief Administrator:** William Ballenger.



RECORDING INSTITUTE OF DETROIT  
Eastpointe, MI

### RECORDING INSTITUTE OF DETROIT

**Program Name:** Recording Techniques. (also Golden Section Recording); **14611 E. 9 Mile Rd.; Eastpointe, MI 48021. (810) 779-1388;**

**(800) 683-1743. Chief Administrator: Robert Dennis. Greg Reilly.** Program: Established in 1976, The Recording Institute of Detroit offers an extensive, 351-436 clock-hour program in analog/digital multitrack recording, MIDI and music technologies (38-45 weeks). The school offers three 48/24-track studios and classroom facilities. Equipment includes Solid State Logic 4000 G Series, Tascam, API and Yamaha digital consoles; Lexicon 480L, 224X plus 22 other delay/reverb units, including actual EMT plates; 15 tape machines including 24-track, Tascam DA 88 digital and DAT units; 24 synthesizer/sound modules/sampler units; sequencing on Amiga and Macintosh computers and Akai MPC 60; loads of additional outboard gear, Tascam 688 workstations for home recording training and MIDI programming. Students attend a minimum of 10 hours per week with an additional 25 hours per week provided for additional help or exposure at no charge. The school publishes its own text, dictionary, and recording/music industry magazine. The end of the program features individual student engineering with instructor feedback on results. Our self-paced music theory classes feature computer-assisted songwriting. Our study skills training uses Hubbard Study Technology, which helps students self-learn equipment from manuals and use new equipment more fully. Internships are included in the program, and job placement assistance is available (over 90% placement rate 1992-93). Tuition is \$3,397 for entire program (or \$799 for first class). Digital Technology class available April 1994.



THE RECORDING WORKSHOP  
Chillicothe, OH

## THE RECORDING WORKSHOP

**Program Name:** Recording Engineering and Music Production Program. 455-X Massieville Rd.; Chillicothe, OH 45601; (800) 848-9900; (614) 663-2510; FAX: (614) 663-2427. **Chief Administrator:** Jim Rosebrook, director. Program: An intensive seven-week, 300-hour program designed to prepare entry-level recording personnel—the original “hands-on” school for students seeking concentrated training in the creative operation of professional recording equipment. Over 200 hours are spent in-studio. This experience includes session setup, mixing techniques, recording, mixing, studio etiquette, song production, commercial and audio-for-video production, editing, and equipment maintenance. In lecture, students receive a broader study of audio engineering and music business practices. Our six-studio recording complex features two automated 24-track studios, two 16-track studios, an 8-track media production studio with Digidesign Pro Tools, a hard disk digital editing/DAT mastering studio and a conventional editing lab. In-studio class size is three to six students, lecture class size is 48. We have internship and job placement services. We offer low-cost, on-campus housing. Financial aid is available. The Workshop has been a TEC Award nominee and is approved by the State Board of Proprietary School Registration. Please call for a free brochure.

## SMITH/LEE PRODUCTIONS MEDIA SCHOOL

**Program Name:** Basic Recording Techniques, Advanced Recording Techniques. 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 Techniques and Advanced Recording Techniques. The Basic Recording Techniques 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 Techniques 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. Smith/Lee Productions Inc. offers courses quarterly for eight weeks, meeting once a week. These courses are excellent training for students, professionals, musicians, record producers and recording artists. Now offering university credit through a local university.

## SOUTH PLAINS COLLEGE

**Program Name:** Sound Technology, Performing Arts Technology. 1401 S. College Ave.; Levelland, TX 79336; (806) 894-9611. **Chief Administrator:** John Hartin. Program: Sound Technology: The Sound Technology program trains you for a career as a recording engineer, sound reinforcement specialist or broadcast audio technician. Training facilities include: Tom T. Hall Studio with 36-channel Sony automated console, 24-track analog recording with synchronization to video and Studer Dyak workstation; Waylon Jennings studio with AMEK Mozart 34 channel console and 24-track recorder, adjoining MIDI/synth studio, 12-track digital demote studio and studio and electronic lab. Two-year program awards Associate of Applied Science degree. Contact: Jerry Stoddard. Performing Arts Technology: The Performing Arts Technology program prepares you to work

as a production manager or technician in video production facilities, entertainment venues and theaters. The program provides training in video and audio production, TV, film, stage and concert lighting and rigging, stagecrafts and business management. Training facilities in facilities include three TV studios including the 60'x60' Tom T. Hall studio. Equipment includes Grass Valley switchers, Sony A/B roll editor, Dubner character generator, Ampex ADD, Sony CCD cameras. Sony 3/4" SP tape recorders with time code, and Strand-Century lighting. Two-year program awards Associate of Applied Science degree. Contact: Pat McCutchin.

## SOUTH PLAINS COLLEGE

**Program Name:** String and Fretted Instrument Repair, Commercial Music. 1401 S. College Ave.; Levelland, TX 79336; (806) 894-9611 ext. 280. **Chief Administrator:** John Hartin. Program: String and Fretted Instrument Repair: A unique nine-month certificated program provides you with luthery skill, a trade that will place graduates of the program among a specialized and highly marketable group of craftsmen. You will gain experience in minor repair as well as full-scale restoration and construction of all types of fretted instruments. Facilities include workstations for 15 students. Contact: Harry Miller. Commercial Music Programs: South Plains College has a literal smorgasbord of music programs in the commercial realm. Country music, bluegrass music, rock, contemporary Christian, gospel and jazz are available. One of the highlights of the Country music program is the Country Caravan, an annual summer traveling music production featuring students and faculty. The Bluegrass music program includes such renowned faculty members as banjo artist Alan Munde, and guitarist Joe Carr. Several degree plans are available including a program combining Performing Arts Technology with a music performance option. Contact: John Hartin.

## SOUTHERN METHODIST UNIVERSITY

**Program Name:** Dual degree in Music (B.A.) and Computer Science (B.S. or B.A.). Division of Music; Dallas, TX 75275; (214) 768-2643; FAX: (214) 768-3272. **Chief Administrator:** Martin Sweidel.

## SOUTHWEST TEXAS STATE UNIVERSITY

**Program Name:** Sound Recording Technology. 601 University Dr.; San Marcos, TX 78666; (512) 245-8451; FAX: (512) 396-1169. **Chief Administrator:** Mark C. Erickson. Program: Southwest Texas State University is the only university in the state to offer a baccalaureate degree in the field of Sound Recording Technology. SWT owns and operates the "Fire Station," a multipurpose recording facility housing both analog and digital 24-track recorders, a 36-channel Ddari Series-54 console w/DiskMix 3 automation, and numerous professional microphones and outboard devices. Students participate in commercial recording sessions while pursuing their degrees. Students have access to a Macintosh lab and electronic music lab, which contains contemporary MIDI devices, a 16-track recorder, and personal computers. Admission is competitive, with less than 15 students admitted annually. Program applicants should have significant musical abilities, well-developed aural skills, and possess competencies indicating an ability to complete calculus and other technical courses. The curriculum emphasizes recording, music, math/science, and an internship. Graduates receive a Bachelor of Music degree with an emphasis in Sound Recording Technology.

## TRANS AMERICAN SCHOOL OF B'CASTING

**Program Name:** Recording and Music Technology. One Point Place, Ste. 1; Madison, WI 53719; (800) 236-4997. **Chief Administrator:** Chris Hutchings.

## UNIVERSITY OF WISCONSIN, OSHKOSH

**Program Name:** Music Merchandising—Recording Technology Emphasis. 800 Algoma Blvd.; Oshkosh, WI 54901; (414) 424-4224. **Chief Administrator:** James Kohn. Program: The recording technology emphasis is an option of the music merchandising program, one of the majors offered by the Department of Music of UW-Dshkosh. 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 program offers 16-track recording, automation, MIDI sequencing, time code, and a full array of outboard gear. Recording technology students at UW-Dshkosh have won two of the ten NARAS Student Music Awards given in 1990 and 1991. The Department of Music at UW-Dshkosh is accredited by NASM. Early application for admission to the University is advised. Classes begin after Labor Day.

## WEBSTER UNIVERSITY

**Program Name:** Audio Production Emphasis in Media Communications. 470 E. Lockwood; St. Louis, MO 63119; (314) 968-6924; FAX: (314) 968-7077. **Chief Administrator:** Barry Hufker, ass't prof. media comm. Program: Webster University is an Associate member of the Society of Professional Audio Recording Services and active in the St. Louis chapter of the Audio Engineering Society. The school offers a four-year program for students interested in music recording, audio for video/film, theatre sound design, multimedia and radio/television broadcasting. The flexible design of Webster's undergraduate program enables individuals to pursue career goals within the context of a liberal arts curriculum. Webster University strives to produce well-rounded audio professionals with sufficient education and experience to compete in the student's field of interest. Hands-on production is emphasized. Students completing the program and passing faculty-judged portfolio reviews will receive a B.A. degree in Media Communications with an "Audio Production Emphasis." Each member of the faculty is a current professional in the field of audio and music. Audio classes meet and projects are completed in the University's three audio studios. Students may also study at Webster's four European campuses.

## WESTERN MICHIGAN UNIVERSITY

### WESTERN SOUND STUDIOS

School of Music, W. M. U.; Kalamazoo, MI 49008; (616) 387-4720. **Chief Administrator:** John Campos. Program: Western Sound Studios is a 24-track studio located in the school of music at W.M.U. The studio offers a unique opportunity for the student who wishes to gain hands-on multitrack recording and mixing experience without being committed to a major or minor in audio. Unlike other schools, where courses in audio are open only to students in a particular program, students in any curriculum at W.M.U. (i.e., music, business, EE, communications) may take our courses. A select number of students, with permission of the director, can devise what is known as a Student-Designed Curriculum, combining audio with another discipline to create a major specific to the student's goals. Two courses are currently offered, with independent studies available thereafter for those who wish to gain further experience. Our students benefit from the flexibility that comes from using a studio that is not overrun with audio engineering majors. The quality of the students' work has been recognized with 1990 NARAS Students Music Award in the Pop/Contemporary category, a 1992 Downbeat International Student Music Award for Best Live Engineered Recording and 12 other Downbeat awards.

## WESTERN

## THE ART INSTITUTE OF SEATTLE

**Program Name:** Music and Video Business. 2323 Elliott Ave.; Seattle, WA 98121; (800) 275-2471; (206) 448-6600. **Chief Administrator:** Doug Worsley, director of admissions. Program: Through The Art Institute of Seattle's intensive education, Music and Video Business students are exposed to developments in one of the highest-growth industries in the nation. Copyright Law, Broadcast Media Marketing, Music Publishing, and the fine points of Artist Management and Representation are among the targeted topics covered in depth in the program. Students learn the practical application of creative and technical considerations on broadcast-quality equipment. Each student is given the opportunity to work on a project and take it to completion...from pre-production planning to the final playback. In addition to industry fundamentals, each Music and Video Business student is given guidance in resume preparation and interpersonal communication skills.

## ASPEN MUSIC FESTIVAL & SCHOOL

**Program Name:** Edgar Stanton Audio Recording Institute. Box AA; Aspen, CO 81612; (303) 925-3254. **Chief Administrator:** Lee Warren, Dean. Program: The Edgar Stanton Audio Recording Institute of the Aspen Music Festival and School is an intensive, full-time clinic workshop, conducted in Half Session I (June 15-July 20, 1994), which helps prepare students for a career as a recording engineer. Participants may assist in recording daily concerts and rehearsals of the festival. A full range of recording experience is offered on state-of-the-art equipment provided by AKG Acoustics, Aphex Systems, JBL Professional Products Division, Lexicon, Neumann Inc., Sennheiser Inc., Shure Brothers Inc., Soundcraft, Pacific Audio-Visual Enterprises, and Westlake Audio. Faculty is drawn from noted representatives of the recording and broadcasting industries.

## BARTON AUDIO RECORDING SCHOOL

**Program Name:** Hands-On Recording Techniques. 4718 38th Ave. NE; Seattle, WA 98105; (206) 525-7372. **Chief Administrator:** Kearney W. Barton.



BEACH BOYS BIG SUR STUDIO SCHOOL  
FOR THE RECORDING ARTS  
Big Sur, CA

## BEACH BOYS BIG SUR STUDIO SCHOOL

**Program Name:** Audio Engineering/Music Career. Big Sur, CA; (408) 667-2988; (602) 241-1019; FAX: (602) 241-0645. **Chief Administrator:** Billy Moss. Program: The Beach Boys Recording Studio is located in a remote Beach area of the Big Sur Coastal region of California. For those potential students who are serious about learning the arts of recording and obtaining a career in the music business, this environment provides the ultimate opportunity to combine learning with the top professionals in the field as well as studying in a world class studio with teachers and lecturers drawn from the best in the industry in a setting that allows the student total concentration on his or her chosen career. Classes are limited in size and are run on a limited basis. Please call Billy Moss at Vintage Recorders in Phoenix, Arizona for further details (602) 241-1019.

## Recording Schools

Seminars and Programs



### BRIGHAM YOUNG UNIVERSITY

**Program Name:** Sound Recording Technology. Dept. of Music, 20A KMB; Brigham Young University; Provo, UT 84602; (801) 378-6395. **Chief Administrator:** Ron Simpson. **Program:** Sound Recording Technology is taught at B.Y.U. as a professional specialization within the Bachelor of Arts degree program in Music. A 24-track studio is dedicated to student projects, and there are smaller production and MIDI rooms, as well as access to a second 24-track studio equipped for professional film projects. Students receive hands-on experience working with recording and reinforcement of on-campus concerts and recording and producing a variety of student creative projects in all styles. The challenging classroom work is both theoretical and practical in nature. While students are expected to be music majors, the coursework is also available as an elective package to some non-majors.

## CALIFORNIA INSTITUTE OF Concert Sound Engineering

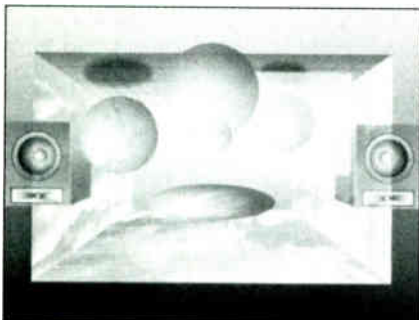
CALIFORNIA INSTITUTE OF CONCERT SOUND ENGINEERING  
Anaheim, CA

### CALIFORNIA INST. OF CONCERT SOUND ENG.

**Program Name:** Concert Sound Engineering Program, 2201 E. Winston Rd., Ste. J; Anaheim, CA 92806; (714) 776-7414. **Chief Administrator:** Jim Paul. **Program:** Our 15-month Concert Sound Engineering Program offers a comprehensive education for individuals seeking a career in the exciting world of Live Concert Sound Reinforcement. Successful graduates are qualified for employment by national touring companies, regional and local sound companies, nightclubs, churches, theaters and performance venues. In-depth lectures are provided by working sound engineers. Troubleshooting, repair and equipment maintenance are included. Mixing labs, using state-of-the-art equipment are an essential part of the curriculum. Students mix a wide variety of musical groups on a weekly basis under the guidance of a qualified instructor, learning skills normally acquired only on the job. Our advanced students, in preparation for employment, are required to plan, staff, manage and mix off-campus concerts and shows in a real-world environment, complete with all the associated challenges. A demanding program, but well worth it. Extensive Job Placement and Financial Assistance programs for qualified students.

### CALIFORNIA INSTITUTE OF THE ARTS

**Program Name:** Composition/Music Technology and New Media, 24700 McBean Parkway; School of Music; Valencia, CA 91355; (805) 253-7816; FAX: (805) 254-8352. **Chief Administrator:** David Rosenboom.



CALIFORNIA RECORDING INSTITUTE  
Menlo Park, CA

—SEE LISTING TOP OF NEXT COLUMN

### CALIFORNIA RECORDING INSTITUTE

**Program Name:** Recording Arts and Technology, 970 O'Brien Dr.; Menlo Park, CA 94025; (415) 324-0464. **Chief Administrator:** David A. Gibson. **Program:** One-year program and six-week classes in the San Francisco Bay Area at two campuses—The Music Annex in Menlo Park and Virtual Studios in San Francisco. Hands-on intensive program with a wide array of complimentary classes. Classes in The Art and Technology of Production, Equipment Maintenance, MIDI and Computers, The Music Business, Live Sound Reinforcement and Television/Video Production. You will get extensive hands-on time in five studios on the same equipment used by top professionals in the industry—four 24-track studios (one automated!), 16-track studio and MIDI/mastering studio. The program also utilizes "The Virtual Mixer," which uses visuals of the mix to teach "Mixing Theory." The visuals help describe different structures and styles of mixes that can be created for different styles of music and songs. Not only can you "see" everything you do in the mix, you can use images of the sounds between the speakers to mix with! Serious internship program and placement assistance. Call or write for free brochure.



CALIFORNIA STATE UNIVERSITY,  
CHICO  
Chico, CA

### CALIFORNIA STATE UNIVERSITY, CHICO

**Program Name:** Recording Arts (BA and minor). **Department of Music;** Chico, CA 95929; (916) 898-5152. **Chief Administrator:** Raymond Barker, Keith Seppanen. **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. Facilities include a 24-track control room, a performance studio, an electronic music studio and a video post-production room. A music major in the Recording Arts option will take courses in music history, music theory, composition with electronic media, audio recording, electronics, and selected additional courses such as audio-for-video and the music industry. Call or write for information packets.



CALIFORNIA STATE UNIVERSITY,  
DOMINGUEZ HILLS  
Carson, CA

### CALIF. STATE UNIV., DOMINGUEZ HILLS

**Program Name:** Audio Recording and Music Synthesis (ARMS), 1000 E. Victoria Ave.; Carson, CA 90747; (310) 516-3543. **Chief Administrator:** Dr. Rod Butler. **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.

### CITY COLLEGE OF SAN FRANCISCO

**Program Name:** Broadcasting Department and Media Support Services, 50 Phelan Ave., A6; San Francisco, CA 94112; (415) 239-3351;

FAX: (415) 239-3694. **Chief Administrator:** Francine Podenski, chair, broadcasting dept.

COGSWELL  
POLYTECHNICAL COLLEGE

COGSWELL POLYTECHNICAL  
COLLEGE  
Cupertino, CA

### COGSWELL POLYTECHNICAL COLLEGE

**Program Name:** Bachelor of Science degree in Music Engineering Technology, 10420 Bubb Rd.; Cupertino, CA 95014; (408) 252-5550; FAX: (408) 253-2413. **Chief Administrator:** Eric Peterson, dept. co-chair. **Program:** A program of study offering the only Bachelor of Science degree in Music Engineering Technology in the world. It is a degree program combining mathematics, science, electronics, computers, and music, located on the campus of a respected private, fully accredited (academic) engineering college. The 8/16/24-track labs are accompanied by a MIDI and a sound design lab as well as the latest in electronic labs. Two complete video and imaging labs are available for electives in sound and video graphics. Located in the heart of Silicon Valley, adjacent to key music hardware, software, and sound design companies. A trimester system allows for traditional (4-year) or three year graduation program.



College for  
Recording Arts

COLLEGE FOR  
RECORDING ARTS  
San Francisco, CA

### COLLEGE FOR RECORDING ARTS

**Program Name:** Sound Engineering/Music Production Business, Bi-Cultural Foundation Inc.; 665 Harrison St.; San Francisco, CA 94107; (415) 781-6306; FAX: (415) 781-0115. **Chief Administrator:** Leo De Gar Kulkka. **Program:** One-year course for recording engineers and others intent on a career in the music/recording industry. C.R.A. is accredited by ACCSCT, and provides approved training to veterans. C.R.A. is approved to issue M-1 visas to nonimmigrant students who are eligible as prescribed by the U.S. INS. Diploma Course approved for more than 600 hours of instruction by the Council for Private Postsecondary Education. Start Dates: February, June, October.

### COLORADO CNTR. FOR REC'G ARTS & TECH.

2602 S. Miller Drive #204; Lakewood, CO 80227; (303) 988-9113; FAX: (303) 988-9257. **Chief Administrator:** John Mikity, Mike Pappas. **Program:** An intensive 28-week program that concentrates on four primary areas of study: 24-track Recording Engineering, Computer Music Operation (MIDI), Music Business Law and Video Production. Class size is limited to eight students per section to ensure maximum hands-on learning. Students will study all aspects of multitrack engineering, basic and advanced sequencing and programming techniques, and digital workstation functions. The Music Business Law course examines publishing, contract analysis, record and concert promotion, artist management, material placement and copyrighting. Video Production offers a comprehensive overview of the art of lighting, shooting and editing video. Classes are individualized, real-world learning experiences taught by professional engineers, attorneys and industry representatives. The program is designed to increase your total awareness of the music business. Courses are conducted in either a standard semester or concentrated short-term course format. The main audio studio has a Trident TSM 52 input console with full moving fader automation, Otari MTR-90 MKII 24-track recorder with Dolby SR noise reduction, Studer A-80 mastering deck, 8 tracks of Pro Tools, a full range of digital and analog outboard gear, and a large collection of tube microphones and vintage gear. Call for brochure and curriculum outlines.

## COLORADO INSTITUTE OF ART

**Program Name:** Music and Video Business. 200 E. 9th Ave., Denver, CO 80203; (303) 837-0825; (800) 275-2420; FAX: (303) 860-8520. **Chief Administrator:** Robert Yablans. **Program:** The 24-month Music & Video Business program at The Colorado Institute of Art offers intensive technical and business preparation designed to prepare you for a variety of entry-level positions. Taught by an experienced group of professionals, you'll study sound design for recording sessions, learn how to write, produce and budget videos, study copyright law and concert production. You'll also utilize computers and learn the marketing, sales, promotion, legal, financial and business management sides of the industry. In addition to lectures, you'll work in the Institute's 24-track recording studio and video production facilities with CMX video editing equipment, MIDI and digital recording, teleconferencing and produce live audio and video remotes of concerts and special events. The Colorado Institute of Art is accredited by the Accrediting Commission of Career Schools/Colleges Technology. Graduates receive an Associate of Applied Science degree. Financial aid, veterans benefits, scholarships, employment assistance and housing assistance provided for eligible students. High school graduation or GED required. Day and evening classes.

## CONSERVATORY OF REC'G ARTS & SCIENCES

**Program Name:** Master Recording Program. 1110 E. Missouri Ave., Ste. 530; Phoenix, AZ 85014; (800) 562-6383; FAX: (602) 230-7235. **Chief Administrator:** Kirt R. Hamm. **Program:** The college began in 1980 in New York City. Over the past 12 years, the curriculum has been developed to ensure the best possible success of the students. The Master Recording Program is taught by industry experts who currently work in the audio industry. The class size is limited to ten students in order for the student to receive hands-on intensive training. The Master Recording Program is a six-course curriculum, career-oriented training for entry-level positions in a variety of areas of the music and recording industry. Examples are: assistant engineer for audio studios, post-scoring facilities and sound reinforcement companies, mixer, music/audio producer, professional business position such as manager, agent, record label staff, promotion or sales people for professional audio. Real-life experience is achieved through the internship portion of the curriculum. This allows the student to apply the training in a professional studio, live sound company or record label.

## FULLERTON COLLEGE

**Program Name:** Music Recording/Production. 321 E. Chapman Ave., Fullerton, CA 92632; (714) 992-7296. **Chief Administrator:** Alex Cima. **Program:** Fullerton College is a fully accredited public California community college offering terminal 2-year and transfer programs. Our recording program was nominated for a TEC Award in 1985. We have a 24-track recording studio and an electronic music lab. We also offer a music business class which covers copyrights, recording and publishing contracts. Altogether these classes comprise the core of our Music Recording/Production Certificate. Our program offers a great way to learn recording and obtain a college education at an affordable cost.



**GOLDEN WEST COLLEGE**  
Huntington Beach, CA

## GOLDEN WEST COLLEGE

**Program Name:** Commercial Music/Recording Arts. 15744 Golden West St., Huntington Beach, CA 92647; (714) 895-8780; FAX: (714) 895-8243. **Chief Administrator:** David Anthony. **Program:** A well-deserved international reputation has brought students from around the world to this "model" program. The program is unique in the generous amount of "hands-on" time and experiences available in the three well-equipped studios and four workstation/labs. **Studio A features:** MCI 24-track recorder, 40-channel Neotek Elite automated console, Q-Lox synchronizer, Lexicon 224XL reverb, digital recording plus extensive outboard signal processing. **Studio B features:** Neve 16-channel mixer, MCI 16-track recorder, digital recording and editing, plus analog and digital signal processing. **Studio C features:** a mixing capacity of over 60 inputs, 16-track recorder, extensive signal processing and an array of over 60 MIDI-sequenced synthesizer channels (Yamaha TF modules, Kurzweil 250, Roland D-50, D-110, S-550 sampler, Proteus 1 and 2, Korg D1W, drum machines, plus much more!) The system is controlled by a Macintosh computer system and various software programs. The program is an integral part of the college's Academy of Creative Technologies and as such offers cross discipline learning with the Television Production and Operations and Theater Technology programs. A leader in music technology since 1972.

## LONG BEACH CITY COLLEGE

**Program Name:** Commercial Music Program. 4901 E. Carson St., Long Beach, CA 90808; (310) 420-4309; (310) 420-4517; FAX: (310) 420-4118. **Chief Administrator:** Priscilla Remeta. **Program:** Facilities include 24-track, 16-track (TEAC and Fostex), 8-track and 4-track studios. A state-of-the-art MIDI classroom comprises 21 individual computer-controlled songwriting stations. Each station is equipped with a Macintosh, synthesizers, 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. New facilities are currently under construction. A video production studio and 23 more MIDI stations. Music/video production and newly remodeled recording facilities will double the amount of hands-on student labs.



**LOS ANGELES RECORDING WORKSHOP**  
Studio City, CA

## LOS ANGELES RECORDING WORKSHOP

**Program Name:** 300-hour Recording Engineering Program, 300-hour Video Operator Program. 12268 Ventura Blvd., Studio City, CA 91604; (818) 763-7400. **Chief Administrator:** Christopher Knight. **Program:** The Los Angeles Recording Workshop is a hands-on training facility that offers the following programs: 300-hour Audio Engineer Program; 300-hour Video Operator Program; and 600-hour Video Production Technician Program. Think of us as a "driving school for audio and video training." A truck driving school would have trucks, instead we have audio and video equipment. Lots of it. 10 mixing consoles, three 24-track multitracks, a 16-track, an 8-track, three fully-equipped recording studios, including our Audio-Video Post-Production Studio, three Video Editing Bays including our A-B Rolls Video Production Suite with full Digital Video Effects, Sound Tools Hard-Disk Digital Editing, and a six-console 24-track MIXLAB where you can practice mixing until you're blue in the face! Our hands-on sessions are always small, usually 5 or 6 people, so you really learn it by doing it. We're nationally accredited by ACCET, we're certified by the U.S. Dept. of Education, and we're approved by the Immigration and Naturalization Service to admit foreign students and to issue I-20's. Full and part-time schedules are available, as are dorm-style housing and job placement assistance, and financial aid is available to qualified applicants. Call or write for our free catalog.



**LOS MEDANOS COLLEGE**  
Pittsburg, CA

## LOS MEDANOS COLLEGE

**Program Name:** Recording Arts. 2700 E. Leland Rd., Pittsburg, CA 94565; (510) 439-0200. **Chief Administrator:** Frank Dorririe. **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 faculty honored with ten Grammy nominations make the Los Medanos Recording Arts program the finest in Northern California. Fees: California residents \$10.00 per unit; out-of-state \$110.00 per unit plus enrollment fee.

## LOYOLA MARYMOUNT UNIVERSITY

**Program Name:** Recording Arts. **Communication Arts Dept.:** Loyola Blvd. at W. 80th St., Los Angeles, CA 90045-2699; (310) 338-3033 (office); FAX: (310) 338-3030. **Chief Administrator:** Patricia

Oliver, Chair; John Michael Weaver, program coordinator. **Program:** LMU Recording Arts is a four-year program that offers students the opportunity to explore both the aesthetic and technical challenges of sound design and recording, through in-depth study and hands-on experience. Emphasis is placed on both the art of music recording and the creative use of sound in film and television. Students take classes in mass communications, art of cinema, screenwriting, film and television production, sound design, recording technology, acoustics, production and post-production sound, recording practices and techniques, studio maintenance, digital audio, advanced recording and related music courses. Among LMU's recording facilities are a 16mm film re-recording studio, a video-assisted film and television post-production suite, and a multitrack recording studio containing equipment from AKG, Alesis, Ampex, Digidesign, JBL, Lexicon, Neumann, Orban, Otari, Sennheiser, Sony, TimeLine, Trident and UREI. Class enrollments are limited to ensure that the needs of the individual student are met.

## NORTHWEST MUSIC & RECORDING

**Program Name:** Recording Techniques and Technologies I & II. 1911 SW Campus Dr., Ste. 378; Federal Way, WA 98023; (206) 874-2706; FAX: (206) 874-2706. **Chief Administrator:** Bill Gibson. **Program:** Recording Techniques and Technologies I & II are hands-on recording classes, held in a state-of-the-art 24-track recording studio in Seattle, WA. No more than 8 students enrolled in any class, leaving maximum student/teacher interaction. Instructor is Bill Gibson, author of the internationally acclaimed *Hit Sound Recording Course* and best-selling video tape *Killer Demos-Hot Tips and Cool Secrets for the Home Multi-track User*. Course content includes basic room acoustics, mike design and techniques, MIDI, signal processing, recording a band, mixdown, editing, and automation. Emphasis is on the student accomplishing each task on each piece of equipment rather than simply watching the instructor. Recording Techniques I includes 24 hours of training. Recording Techniques II totals 28 hours. Both classes take place in a very highly regarded and active professional, commercial studio in downtown Seattle. For further information, call (206) 874-2706 today.

## PRAIRIE SUN AUDIO ENGINEERING

**Program Name:** Recording and Engineering. PO Box 7084; Cotati, CA 94928; (707) 795-7011; FAX: (707) 795-1259. **Chief Administrator:** Mark "Mooka" Rennick. **Program:** We offer a full-time, hands-on course in engineering and audio production. Classes are taught in two world-renowned recording studios. We cater to everyone, from novice to expert, to enable our students to take on most audio situations, both studio and live. Featured are two automated 24-track studios with a large collection of vintage and modern microphones. Classes cover tracking, mixing, editing, splicing, calibration, alignment, mic type and placement, plus studio recording skills. Some of our clients include: Damn Yankees, Faith No More, The Tubes, Van Morrison, the Doobie Brothers, Exodus, Testament and Tom Waits. Our school offers more than just classes and a diploma. We feel this will prepare you for the real world of recording. Classes meet two times a week, so for those looking for a full-time curriculum, PSR may not fulfill all your needs. Great for California and Northern State areas. Call or write for a free brochure.

## RECORDING ASSOCIATES

**Program Name:** Sound Recording and Mixing. 5821 SE Powell Blvd., Portland, OR 97206; (503) 777-4621. **Chief Administrator:** Jay Webster. **Program:** Video programs available; two hours at \$39 answers beginners' most-often-asked questions—connectors, connections, phasing, microphones, tone control, room tuning, mixing boards, sound mixing, band setup, recording, echo/effects and more. 12 hours at \$239 is a must for the pro or soon-to-be-pro. Here's the relationship between theory and the choices you make operating equipment and effects: vocabulary, basic theory, adv. theory, connectors, connections, phasing, mic theory, mic application, adv. mic theory, tone theory, adv. tone theory, tone application, acoustics, room tuning, studio consoles, console operation, mix theory, adv. mix theory, compression, recorders, maintenance, echo, reverb, other effects, production and studio tips, glossary, and more. Students enrolled in the 12-hour course who complete the final quiz with a passing grade will be issued a certificate of completion. You may write or call for free assistance in answering test questions or questions in general regarding sound and recording.

## R.O.P. MENDOCINO COUNTY OFFICE

**Program Name:** Radio/Recording Technician. PO Box 226; Mendocino, CA 95460; (707) 937-1200. **Chief Administrator:** Paul Tichinin; Bob Evans, instructor. **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, Panasonic SV-3500 DAT, Soundcraft Spirit auto mixing board, Yamaha SPX90, Korg DVP-1 digital video processor, Macintosh Quadra w/Studio 3, Pro MIDI interface, Opcode Vision sequencer, DX-TX librarian, Deluxe Music Construction Set, Roland SDE-3000 digital delay, Yamaha DX7, Sequential Circuits, MAX, Korg D5B, Casio C7-100, Yamaha DX100, SDB9 digital drums. Mics: Sennheiser 421, AKG condensers, Shure SM57, 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.

## Recording Schools

Seminars  
and  
Programs



SACRAMENTO CITY COLLEGE  
Sacramento, CA

### SACRAMENTO CITY COLLEGE

**Program Name:** Associate in Arts Degree: Commercial Music. 3835 Freeport Blvd.; Sacramento, CA 95822; (916) 558-2130; FAX: (916) 441-4142. **Chief Administrator:** Don Young. **Program:** The Commercial Music Associate in Arts Degree offers four areas of emphasis: Audio Production, Music Business Management, Songwriting and Performance. Students in Audio Production work in our 24-track recording studio with Otari/Sound Workshop Series 54 automated console, Otari MX-80 MTR, Digidesign Sound Tools, Lexicon, Eventide, Aphex, Adams-Smith outboard gear as well as three smaller 8-track studios. (34) MacIntosh computers are used for training in MIDI, and the College has a full Electronics Technology Dept. Undergraduate tuition is \$13 per unit for California residents.

### SF STATE UNIVERSITY EXTENDED EDUCATION

**Program Name:** Music/Recording Industry Certificate Program (MRI). 425 Market St., 2nd Flr.; San Francisco, CA 94105; (415) 904-7700; FAX: (415) 904-7760. **Chief Administrator:** Mary Pieratt. **Program:** The Music/Recording Industry Certificate Program (MRI) offered through San Francisco State University focuses on the music business and studio engineering. Classes offer academic credit and are taught by Bay Area professionals in the field. The program is designed for both students and professionals who want to gain experience and education in the music industry through a structured course of study. Musicians, managers, agents and engineers will benefit from courses that cover a wide range of topics. Courses include audio engineering (beginning, intermediate, advanced, mixing and MIDI), offered in all 24-track studios, artist management, music video, songwriting, industry history, publishing, artist and repertoire, legal aspects, music media, career options, concert booking and production, and the history and aesthetics of popular record promotion. New courses offered regularly. Expand skills with one or more classes or earn the MRI certificate. Courses are offered evenings. Formal university application is not required.

### SAN FRANCISCO STATE UNIVERSITY

**Program Name:** Broadcast and Electronic Communication Arts. 1600 Holloway Ave.; San Francisco, CA 94132; (415) 338-1787; FAX: (415) 338-6159. **Chief Administrator:** Dr. Ronald J. Compesi; Dr. John E. Barsotti, audio coordinator. **Program:** A four-year Bachelor of Arts program in Broadcast and Electronic Communication Arts (Radio-TV) with an audio production emphasis. Class in audio production covers basic audio theory and production, aesthetics of sound, radio production, music recording and mixing, audio for television, video and multimedia. Dedicated facilities include one fully equipped recording studio, four audio production labs, campus cable-FM radio station, three television studios, and online and offline video editing systems. The recording studio utilizes the 2" 24-track recording format and up to 500 virtual MIDI tracks using a 386 MS-DOS computer, and is equipped with digital recording, sampling and processing equipment. Our flexible Master of Arts program can accommodate graduate students with an interest in audio production, aesthetics and/or criticism.

### SONY INST. OF APPLIED VIDEO TECH.

**Program Name:** Audio for Video/Post-Production Audio-for-Video. 2021 N. Western Ave.; PO Box 29906; Los Angeles, CA 90029; (213) 462-1982; FAX: (213) 462-3559. **Chief Administrator:** Mike Alvarez. **Program:** Emphasis: Pre-production planning, production techniques through the use of field exercises and demonstration, troubleshooting (production and post-production), post-production audio-for-video: offline and online editing process (lecture and

# SONY

SONY INSTITUTE OF APPLIED VIDEO TECHNOLOGY  
Los Angeles, CA

demonstration), trend analysis and tours of top industry post-production facilities. Workshop schedule: 5 days, offered once per quarter, \$1,299.

## SOUND MASTER



RECORDING ENGINEER  
SCHOOL  
AUDIO/VIDEO INSTITUTE

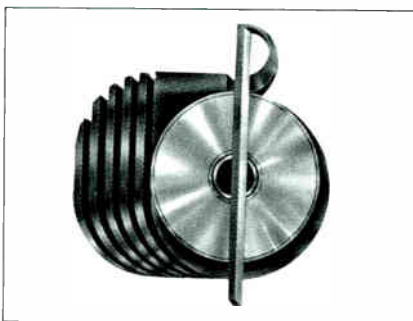
SOUND MASTER RECORDING STUDIO  
North Hollywood, CA

### SOUND MASTER RECORDING STUDIO

**Program Name:** Record Engineer / Video Production. 10747 Magnolia Blvd.; North Hollywood, CA 91601; (818) 650-8000. **Chief Administrator:** Brian D. Ingoldsbys. **Program:** The Sound Master Recording & Video Institute offers training in Recording Engineering, Audio/Video Post Production, Technical Maintenance, Mastering and Synchronization. The training is designed for both novices and working engineers wishing to broaden their knowledge in the field. Day and evening classes are available. Sound Master is accredited by ACCET, and financial aid is available for those who qualify. For information please call (818) 650-8000.

### SOUTHWEST INSTITUTE

**Program Name:** Audio Recording Engineering. 4831 N. 11th St., Ste. C; P.O. Box 17010; Phoenix, AZ 85011; (602) 241-1019; FAX: (602) 241-0645. **Chief Administrator:** Billy Moss. **Program:** The 16-week, 200-class-hour course is designed to teach audio recording and engineering. The program progresses from a classroom study of basic recording concepts, moving quickly to hands-on, student-engineered sessions, using state-of-the-art recording equipment, thereby gathering knowledge of the many aspects of audio recording. By starting with the basics, then working through the fully automated digital mixdown (SSL 4040 E/G, Sony 3324), this course will enable graduates to successfully compete in any audio recording environment as fully qualified, entry-level audio engineers. Class size is limited to 4 students per class to ensure comprehensive work loads, with a major emphasis on hands-on training. Cost of the program is \$3,500, which includes all materials, fees, and textbooks. For students wishing to continue their training, SWIRAS offers a 16-week Internship Program, where the student will be learning in actual working sessions, advancing and honing their skills; this program is also \$3,500. The Southwest Institute of Recording Arts and Sciences is fully licensed by the Arizona State Board of Private Post Secondary Trade Schools and is approved to grant a certificate of completion upon graduation of any or our courses.



TREBAS INSTITUTE  
Hollywood, CA

—SEE LISTING TOP OF NEXT COLUMN

## TREBAS INSTITUTE

**Program Name:** Recording Arts & Sciences: Recorded Music Production; Audio Engineering Technology, Music Business Administration (M.B.A.) 6464 Sunset Blvd., The Penthouse; Hollywood, CA 90028; (213) 467-6800. **Chief Administrator:** David P. Leonard. **Program:** Established in 1979, one-year program. Almost 100 courses to choose 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. Diplomas in Recording Arts & Sciences (w/specialization in Production and Engineering) and M. B. A. One entrance scholarship offered at each of four campuses across North America, valued at \$5,000 each. Goldmark Memorial Scholarship for advance studies at each location. Other Awards of Merit available. Consult admissions office. Transfer of credits between campuses. Facilities: professional multitrack recording studios, electronic music/synthesis/MIDI studios, electronics lab, computer labs, audio/video post-production mixing lab and analog/digital mastering rooms (at selected campuses). Resource center including library of several thousand volumes (books, magazines, articles) on the music business, audio engineering, recording and music production. Accredited by ACCET. Internships, Job placement. Graduates working with major record companies, studios and artists. TEC Award nominee: Recording School Program of the year 1989 and 1990.



UCLA EXTENSION  
Los Angeles, CA

### UCLA EXTENSION

**Program Name:** Certificate Program in Recording Engineering. 10995 Le Conte Ave.; Los Angeles, CA 90024; (310) 825-9064; FAX: (310) 206-7382. **Chief Administrator:** Lisa Herring, program counselor; 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, UCLA Extension has 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, film and television audio post-production, 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 challenges of rapidly evolving technology and a dynamic sound recording market. Prerequisite classes are available through UCLA Extension. The Certificate in Recording Engineering is a State of California-approved program of significant educational accomplishment in a professional field. Additional certificate programs are offered in the music business, songwriting, electronic music, film scoring and film/television/video. Call or write for the Professional Studies in the Entertainment Industry course catalog.

### UNIVERSITY OF ARIZONA

**Program Name:** School of Music. Music Building; School of Music; Tucson, AZ 85721; (602) 621-1341; FAX: (602) 621-8118. **Chief Administrator:** Jeff Haskell. **Program:** A recording studio production class is offered. 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 digital recording and editing capabilities. The studio is comprised of much high-quality equipment, including over 32 professional mics from Bruel & Kjaer, Neumann, Sennheiser and Shure, Apogee A to D converters and a complete MIDI studio. The recording studio is very accessible to students and faculty for gaining experience in writing, producing, and performing in professional-quality recordings. The University of Arizona School of Music is accredited by the National Association of Schools of Music.

### UNIVERSITY OF COLORADO AT DENVER

**Program Name:** Music Technology and Recording Engineering. Department of Music; Campus Box 162, PO Box 173364; Denver, CO 80217-3364; (303) 556-2727; FAX: (303) 556-2335. **Chief Administrator:** Roy Pritts, Rich Sanders. **Program:** This program is designed to provide professional training for musicians, educators, producers and media personnel seeking employment in audio related careers. A Bachelor of Science degree in Music is offered, as well as graduate and undergraduate studies in Reinforcement, Recording, Applied Synthesis, Digital Music Techniques, Studio Calibration/Maintenance, Music Video Production, Audio Sweetening, Music on the Personal Computer and Internships. Musical training is offered with large and small ensembles, solo and group instruction and general musicianship. This program is supported by studies in Music Business, Performance and in Scoring and Arranging.



Facilities include two 16-track studios with Neve and Audionics consoles, automated mixing, two MIDI/tapeless studios, five performing suites, Macintosh/IBM Kurzweil computer/keyboard labs, DAT, Hard Disk recording, and extensive microphone holdings. An internship program with SPARS provides onsite learning across the nation. Graduate degrees in allied areas are available.

### UNIVERSITY OF DENVER LAMONT SCHOOL OF MUSIC

**Program Name:** Bachelor of Music in Commercial Music. 7111 Montview Blvd.; Denver, CO 80220; (303) 871-6400. Chief Administrator: F. Joseph Docksey, III, director.

### UNIVERSITY OF SOUTHERN CALIFORNIA

**Program Name:** Recording Arts Workshop. USC-School of Music, MUS 409; Los Angeles, CA 90089-0851; (213) 740-3224; FAX: (213) 740-3217. Chief Administrator: Richard J. McIlvery. **Program:** The Bachelor of Science Degree at USC is a four-year program offered through the School of Music that prepares students for careers in professional audio, education, production and other related fields. In addition, there is a minor in music recording designed for Electrical Engineering majors, but open to other disciplines as well. A certificate program is also offered to those who already possess a college degree and desire instruction in music recording. This program can be completed in one academic year. Candidates for the bachelor degree in music recording are expected to play and audition on a musical instrument, participate in musical ensembles, study music composition as well as the technical aspects of recording. Classes are given in the School of Music's recording studio featuring a Solid State Logic console, Mitsubishi X850, Studer A800 24-track, JBL and UREI monitors and amps. Faculty for the program are recruited from the music industry in Los Angeles and selected for their particular expertise in a field within professional audio. Applicants should submit paperwork by March 1, 1994, for the Fall Semester. Those interested should write or call for a detailed brochure.

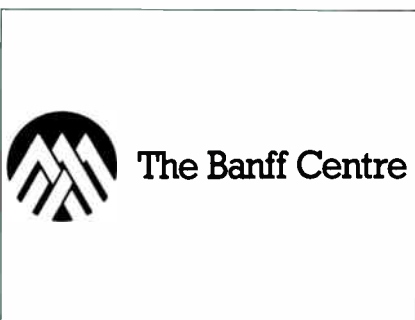
### OUTSIDE U.S.



ALTA DENSIDAD ANALISTAS  
Guadalajara, Jalisco, Mexico

### ALTA DENSIDAD ANALISTAS

**Program Name:** Sound Reinforcement Engineering (Ingeniería de Sonido). Calderon de la Barca 188; Guadalajara, Jalisco, Mexico; (913) 6-15-34-65; (913) 6-15-64-11. Chief Administrator: Mauricio Ramirez Perez. **Program:** Schedule: Tuesday, Wednesday and Thursday (11 a.m.-3p.m.). Duration: 8 weeks. Maximum number of pupils: 16. Cost: US \$250. Total hours: 96. Include: text in Spanish, practice with professional equipment. Topics included: acoustics, amplifiers, sound analysis, enclosures, speaker, wire and cable, connections, decibels, equalization, electricity, specifications, mixers, microphones, signal processors, crossovers, mixing techniques. Curso de: "Ingeniería de Sonido Para Sistemas Musicales de Refuerzo de Sonido." Horario: Martes, Miercoles y jueves de 11 a.m. a 3 p.m. Duracion: 8 semanas. Numero maximo de alumnos: 16. Costo: NS 800. Total de horas: 96. Incluye: texto en Español, Clases practicas con equipo profesional. Temas que incluye: acustica, amplificadores, analisis de sonido, baffles, bocinas, cableado, conexiones, decibeles, equalizacion, especificaciones, mezcladoras, microfones, procesadores de señal separadores de frecuencia, tecnicas para mezclar.



THE BANFF CENTRE FOR THE ARTS  
Banff, AB, Canada

—SEE LISTING TOP OF NEXT COLUMN

### THE BANFF CENTRE FOR THE ARTS

**Program Name:** Media Arts Audio Associateships. Office of the Registrar; PO Box 1020, Stn. 28; Banff, AB, Canada T0L 0C0; (403) 762-6180; FAX: (403) 762-6345. Chief Administrator: Kevin Elliott. **Program:** Audio recording associateships are offered to creative engineers with mature artistic insight and advanced technical skills (significant professional experience within an artistic environment, or a master's level degree in music and sound recording). Associate engineers receive full scholarship, room and board, and stipend. They work in a recording complex that includes 24-track digital, 16-track analog/MIDI and multiple digital audio work stations. Activities are driven by proposals from composers, musicians and audio/video/performance artists whose work lends itself to sophisticated and experimental applications of audio technology. Associate engineers collaborate creatively and provide technical expertise and operations for these projects. Duties include multitrack productions; audio-for-video; support for computer music and MIDI/interactive performance and recording; live-to-2-track studio; and location recording (classical, new music and jazz). Associates generally continue for one to two years.



HARRIS INSTITUTE FOR THE ARTS  
Toronto, ON, Canada

### HARRIS INSTITUTE FOR THE ARTS

**Program Name:** Recording Arts Management (RAM) & Producing/Engineer Program (PEP). 118 Sherbourne St.; Toronto, ON, Canada M5A 2R2; (416) 367-0178. Chief Administrator: John Harris. **Program:** RAM—Recording Arts Management (904 hours), PEP—Producing/Engineering Program (901 hours). One-year Diploma programs are taught by leading industry professionals and culminate in the formation of production and management companies and Internship placements in studios and companies within the industry. Full and part-time programs start every October, February and June. Harris Institute for the Arts is registered and approved by the Ministry of Colleges and Universities in the Province of Ontario. Six industry-funded scholarships are awarded for academic excellence. Financial assistance is available to qualified students. For further information and to receive a syllabus, contact the Office of the Registrar, Stan Janes at (416) 367-0178.



INSTITUTE OF  
COMMUNICATION ARTS  
Burnaby, BC, Canada

### INSTITUTE OF COMMUNICATION ARTS

**Program Name:** Recording Arts Masters Program. 3246 Beta Ave.; Burnaby, BC, Canada V5J 3H1; (604) 298-5400; FAX: (604) 298-5403. Chief Administrator: Niels Hartvig-Nielsen. **Program:** The Institute of Communication Arts truly is a school that will put you in "A Class of Your Own." ICA programs facilitate career preparation through intensive training and extensive studio access. ICA's one, two and three year programs allow individual equipment access unparalleled by other schools. ICA's programs attack learning from three angles. Fundamentals (theory), practical instruction (hands on) supported by extensive lab access enabling students to gain speed and confidence through practice and application. The net result of this top notch approach is that the quality of ICA graduates is one of the best in the industry. ICA is pleased to announce its affiliation with Digidesign of Menlo Park, CA as a designated PRO School instructional center. Programs: Recording Arts Masters Program, Interactive Multi Media, Music Management and Marketing, Digital Audio Production, Digital Music Production, PRO School™ (trademark Digidesign).

### MCGILL UNIVERSITY, FACULTY OF MUSIC

**Program Name:** Master's of Music in Sound Recording. 555 Sherbrooke St. W.; Montreal, QC, Canada H3A 1E3; (514) 398-4538. Chief Administrator: John Grew. **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, Advanced Digital Editing and Post Production, Audio with Vision, Studio Equipment Maintenance, Digital Studio Technology, Audio Measurements, Computer Music/Sampling, MIDI, Classical Music Production, Audio Research. Facilities: two concert halls, one recital hall, four control rooms, one two-room studio, 24-track and 2-track digital recording, computer-assisted mixing, digital editing on DAE 3000, Sonic Solutions, Dyaaxis, computer/MIDI/electronic repair shop. Costs/tuition: Canadian citizens \$1,350 CDN/year, foreign students \$7,600 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.



MEDIA PRODUCTION FACILITIES  
London, England

### MEDIA PRODUCTION FACILITIES

**Program Name:** Advanced Sound Recording & Production Techniques. Bon Marche Bldg., Ferndale Rd.; London, SW9 8EJ England; (44) 71-737-7152; FAX: (44) 71-738-5428. Chief Administrator: Paul Halpin. **Program:** This one-year, full-time program, composed of 3-month modules that may also be taken independently, commences January, May and September annually. Directed by our Grammy award-winning course leader, Simean Skoffield, the program combines lectures from leading audio industry professionals with extensive hands-on experience in state-of-the-art facilities. Media's 24-track studio features a 32-channel automated console with Superloc and Virtual Dynamics, Otari multitrack, an extensive range of outboard effects, mikes, etc. Our MIDI programming suite provides a variety of computer-based sequencing and editing software, plus hard disk recording. Additionally, an extensive series of lectures presented by SYPHA and Richard Salter of Focusrite, tricks-of-the-trade seminars with notable British recording engineers/producers, audio post-production by Robin Cox-Yeldham, exposure to a wide range of pro-audio systems and studios, facilitated by support from companies such as Akai, Amek, Ampex, API, BSS, Korg, Neve, SSL, 3M, Spectral Synthesis, etc. Videographics and short courses available.



MID-OCEAN RECORDING STUDIOS  
Winnipeg, MB, Canada

### MID-OCEAN RECORDING STUDIOS

**Program Name:** Audio in Media. 1578 Erin St.; Winnipeg, MB, Canada R3E 2T1; (204) 774-3715; FAX: (204) 775-9102. Chief Administrator: Doug Blakely. **Program:** Audio in Media is an intensive 18 week, 425 hour course designed to prepare successful graduates for entry level positions in a variety of audio-related fields. We believe that a proper balance of theoretical and practical training is what it takes to get your career in radio production, sound for television/video, live sound reinforcement, or studio production started in the right direction. Students train in two 24-track studios, an extensive MIDI studio with 8-track analog, SMPTE and video as well as direct-to-disk digital audio workstations. Enrollment is limited to 8

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## Recording Schools

### Seminars and Programs



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Students per course with start dates in September and February.  
Send for a free brochure and application.



ONTARIO INSTITUTE OF AUDIO RECORDING TECHNOLOGY  
London, ON, Canada

### ONTARIO INST. OF AUDIO REC'G TECH.

**Program Name:** Audio Engineering. 502 Newbold St., London, ON, Canada N6E 1K6; (519) 686-5010; FAX: (519) 686-5060. **Chief Administrator:** Paul Steenhuis. **Program:** Intense. Thorough. Concentrated. Professional staff, professional 24-track studios and a fully integrated program of study converge on ALL ASPECTS OF AUDIO/MUSIC TECHNOLOGY. Courses include: Acoustics, Audio for Visuals, Computer Sequencing and Automation, Digital Recording/Editing, Equipment Alignment, Live Sound, MIDI, Music Business, Music Theory, Music Production, Psychoacoustics, Recording Engineering, Sampling, Signal Processing, Studio Electronics, Synchronization, Synthesis Techniques, and a great deal more! WE DELIVER: Highly personalized instruction on hundreds of hours of lab time, no more than 3 students per instructor/recording labs, extensive individual workstations. All lectures delivered in our own studios. Est. 1983. Registered and approved by the Canadian Ministry of Education and the U.S. Dept. of Education. Graduate program and graduate placement assistance. Financial assistance may be available to qualified students. O.I.A.R.T. is an OUTSTANDING, competitively priced private school truly unlike any other. No bureaucrats or retirees, no pretensions, no hidden fees. Compare before you choose. Then live it. For 8 months. Solid.



RECORDING ARTS PROGRAM OF CANADA  
Stoney Creek, ON, Canada

### RECORDING ARTS PROGRAM OF CANADA

**Program Name:** Diploma Program in Audio Engineering and Production. PD Box 11025, 984 Hwy. #8; Stoney Creek, ON, Canada L8E 5P9; (905) 662-2666; FAX: (905) 662-2666. **Chief Administrator:** John Keca. **Program:** A Diploma program in Recording Engineering and Production. Over 60% of the curriculum is dedicated to practical, hands-on instruction. Classes limited to 12. Our Ontario facility, 45 minutes west of Toronto, features a Neve 50 series custom 36 channel console. Our 4 studio inventory also includes TAC Scorpion 28x12x24, and two Soundtracs 24x8x16 consoles, multi-tracks, Sony MCI-JH 24-track, Alesis ADAT 24-track Tascam 16-track, two digital audio workstations, extensive MIDI systems, two sync systems for film, a wide variety of mics and processors, and a Yamaha baby grand. Tuition: \$5,150 Cdn. approx. \$3,900 U.S. Est.

1983. R.A.P. is recognized by the Ministry of Education and the U.S. Dep. of Ed. Financial aid is available to those who qualify under Canada Student Loans Plan, Provincial Student Loans Plan, USGSL.

### RECORDING ARTS PROGRAM OF CANADA

**Program Name:** Diploma Program in Audio Engineering and Production. 34 Chemin des Ormes; Ste-Anne-des-Lacs, QC, Canada J0R 1B0; (514) 224-8363 phone/fax. **Chief Administrator:** John Keca. **Program:** A diploma program in recording engineering and production. Over 60% of the curriculum is dedicated to practical, hands-on instruction. Classes limited to 12. Our Quebec facility, 45 minutes north of Montreal, features a Neve 50 series custom 36 channel console with Optifile 3D automation, Studer A80 Mark IV, processors: Lexicon 480L, PCM70, PCM42, and UREI LA-4 compressors, Drawmer gates and compressors, Tube Tech, Summit Tube EQ, ISA 115, Eventide H3000SE, dbx 162, dbx 166, mics: AKG, Neumann, Sennheiser, Shure, digital audio workstations, extensive MIDI systems, sync systems for film. Tuition: \$5,150 Cdn., approx. \$3,900 U.S. Est. 1983. R.A.P. is recognized by the Ministry of Education and the U.S. Dep. of Ed. Financial aid is available to those that qualify under Canada Student Loans Plan, Provincial Student Loans Plan, or USGSL.



SAE SCHOOL OF AUDIO ENGINEERING, ADELAIDE  
Adelaide, Australia

### SAE ADELAIDE

**Program Name:** Audio Engineer Diploma. 18-20 Deeds Road; Camden Park 5038; Adelaide, Australia; (61) 8 376-0991; FAX: (61) 8 376-1887. **Chief Administrator:** Michael Davison. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. Production Course, 3 months, Post-Graduate; Studio production procedures containing lectures from top industry professionals. Tonmeister, 12 months (part time), Post-Graduate; Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles, Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars: Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE AMSTERDAM

**Program Name:** Audio Engineer Diploma. Vondelstraat 13; 1054 GC; Amsterdam, The Netherlands; (31) 20 689-4189; FAX: (31) 20 689-4324. **Chief Administrator:** Guy Nicholson. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. Production Course, 3 months, Post-Graduate; Studio production procedures containing lectures from top industry professionals. Tonmeister, 12 months (part time), Post-Graduate; Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles, Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars: Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE AUCKLAND

**Program Name:** Audio Engineer Diploma. 18 Heather St.; Parnell, Auckland, New Zealand; (64) 9 373-4712; FAX: (64) 9 373-4713. **Chief Administrator:** Andy Jenkins. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. Production Course, 3 months, Post-Graduate; Studio production procedures containing lectures from top industry professionals. Tonmeister, 12 months (part time), Post-Graduate; Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles, Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars: Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE BERLIN

**Program Name:** Audio Engineer Diploma—German Program. Seestrasse, 64; 1000; Berlin 65, Germany; (49) 30 456-5137; FAX: (49) 30 456-5173. **Chief Administrator:** Mr. Thomas Nommensen. **Program:** (Applicable in Germany, Austria and France, and taught in German and French). European Administration Office: SAE Amsterdam, contact Mr. Guy Nicholson. International Course Director: Mr. Tom Misner, contact SAE Sydney. Audio Engineer (Diplomstufe), 18 months: This course is a combination of the English Diploma 15 month program and the 3 month Production course. Covers all subjects as per above English program. Tonmeister Program - 12 months, Post Graduate Program: These programs are conducted at our Frankfurt, Vienna and Munich schools, and have the same course prerequisites as the English program. Each campus specializes in various forms of music, e.g. Vienna-Classical, London-Dance, Munich and Frankfurt-Hard Rock and Metal. Tonassistenten-Kurs, 6 months: Course divided into monthly blocks covering basic electronics and audio technique, MIDI Sequencing and Sampling, Microphone technique, effects processors, Studio procedure and live sound. Seminars and Short Courses: Neve VR automation, SSL Workshop, Digital and Hard Disc Recording, Studio Maintenance, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE BRISBANE

**Program Name:** Audio Engineer Diploma. 22 Heussler Tce., Milton 4064; Brisbane, Australia; (61) 7 369-8108; FAX: (61) 7 367-0143. **Chief Administrator:** Mr. Michael Quinn. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. Production Course, 3 months, Post-Graduate; Studio production procedures containing lectures from top industry professionals. Tonmeister, 12 months (part time), Post-Graduate; Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles, Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars: Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE FRANKFURT

**Program Name:** Audio Engineer Diploma. Homburger Landstrasse, 182; 60435; Frankfurt a. M. 50, Germany; (49) 69 543262; FAX: (49) 69 548-4443. **Chief Administrator:** Mr. Bernhard Birkner-Horlacher. **Program:** German Language (Applicable in Germany and Austria). European Administration Office: SAE Amsterdam contact Mr. Guy Nicholson. International Course Director: SAE Sydney contact Mr. Tom Misner. Audio Engineer (Diplomstufe) 18 months; This course is a combination of the English Diploma 15 month program and the 3 months Production Course. Covers all subjects as per above English program. Tonmeister Program 12 month Post-Graduate program: These programs are conducted at our Frankfurt, Vienna and Munich Schools and have the same course prerequisites as the English program. Each Campus specializes in various forms of music, e.g. Vienna-Classical, London-Dance, Munich and Frankfurt-Hard Rock and Metal. Tonassistenten-Kurs, 6 months; Course divided into monthly blocks covering basic electronics and audio technique, MIDI Sequencing and Sampling, Microphone technique, effects processor, Studio procedure and Live Sound. Seminars and Short Courses: Neve VR automation, SSL Workshop, Digital and Hard Disc Recording, Studio Maintenance, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE HAMBURG

**Program Name:** Audio Engineer Diploma. Heidenkampsweg 84, 1st floor; Hamburg 20097, Germany; (49) 40 233676; FAX: (49) 40 233602. **Chief Administrator:** Jochan Muller. **Program:** German Language (Applicable in Germany and Austria). European Administration Office: SAE Amsterdam contact Mr. Guy Nicholson. International Course Director: SAE Sydney contact Mr. Tom Misner. Audio Engineer (Diplomstufe) 18 months; This course is a combination of the English Diploma 15 month program and the 3 months Production Course. Covers all subjects as per above English program. Tonmeister Program 12 month Post-Graduate program: These programs are conducted at our Frankfurt, Vienna and Munich Schools and have the same course prerequisites as the English program. Each Campus specializes in various forms of music, e.g. Vienna-Classical, London-Dance, Munich and Frankfurt-Hard Rock and Metal. Tonassistenten-Kurs, 6 months; Course divided into monthly blocks covering basic electronics and audio technique, MIDI Sequencing and Sampling, Microphone technique, effects processor, Studio procedure and Live Sound. Seminars and Short Courses: Neve VR automation, SSL Workshop, Digital and Hard Disc Recording, Studio Maintenance, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE KUALA LUMPUR

**Program Name:** Audio Engineering Diploma. Lot 5, Jalan 13/2; 46200 Petaling Jaya; Selangor D. E., Malaysia; (60) 3 756-7212; FAX: (60) 3 757-2650. **Chief Administrator:** Georg Moik. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. Production Course, 3 months, Post-Graduate; Studio production procedures containing lectures from top industry professionals. Tonmeister, 12 months (part time), Post-Graduate; Advanced program that requires

a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE LONDON

**Program Name:** Audio Engineer Diploma. **United House, North Road; London, N7 9DP United Kingdom; (44) 71 609-2653; FAX: (44) 71 609-6944. Chief Administrator:** Mr. Michael Pollard. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**

### SAE MELBOURNE

**Program Name:** Audio Engineer Diploma. **2nd Floor, 14-16 Fitzroy St., St. Kilda 3182; Melbourne, Australia; (61) 3 534-4403; FAX: (61) 3 525-3542. Chief Administrator:** Mr. Tony Corr. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**



SAE SCHOOL OF AUDIO ENGINEERING, MUNICH  
Munich, Germany

### SAE MUNICH

**Program Name:** Audio Engineer Diploma. **Hoferstrasse, 3, 8000; Munich, Germany; (49) 89 675167; FAX: (49) 89 670-1811. Chief Administrator:** Mr. Rudiger Grieme. **Program:** German Language (Applicable in Germany and Austria). **European Administration Office:** SAE Amsterdam contact Mr. Guy Nicholson, International Course Director; SAE Sydney contact Mr. Tom Misner. **Audio Engineer (Diplomstufe) 18 months.** This course is a combination of the English Diploma 15 month program and the 3 months Production Course. Covers all subjects as per above English program. **Tonmeister Program 12 months Post-Graduate program:** These programs are conducted at our Frankfurt, Vienna and Munich Schools and have the same course prerequisites as the English program. Each campus specializes in various forms of music e.g. Vienna-Classical, London-Dance, Munich and Frankfurt-Hard Rock and Metal. **Tonassistenten-Kurs 6 months:** course divided into monthly blocks covering basic electronics and audio technique, MIDI sequencing and sampling, microphone technique, effects processors, studio procedure and Live Sound. **Seminars and short courses:** Neve VR automation, SSL Workshop, Digital and Hard Disc Recording, Studio Maintenance, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### SAE PARIS

**Program Name:** Audio Engineer Diploma. **45 Ave. Victor Hugo/Bat 286; Aubervilliers; CEDEX 93534, France; (33) 1 4811 9696; FAX: (33) 1 4811 9684. Chief Administrator:** Mike Bruck. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures

containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars and Special Courses; Summer Recording Workshop, full time summer program in the English Language.**

### SAE PERTH

**Program Name:** Audio Engineer Diploma. **42 Wickham St.; East Perth 6000; Western Australia; (61) 9 325-4533; FAX: (61) 9 325-4533. Chief Administrator:** Nick Hassall. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**



SAE SCHOOL OF AUDIO ENGINEERING, ADELAIDE  
Coatbridge, Scotland

### SAE SCOTLAND

**Program Name:** Audio Engineer Diploma. **33 Coatbank Street; Coatbridge, ML5 3SP Scotland; (44) 236 436 561; FAX: (44) 236 422 600. Chief Administrator:** Gordon McMillan. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**

### SAE SINGAPORE

**Program Name:** Audio Engineer Diploma. **122 Middle Road; Midlink Plaza #04-08; Singapore 0718; (65) 334-2523; FAX: (65) 334-2524. Chief Administrator:** Mr. Georg Moik. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a degree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**

### SAE SYDNEY

**Program Name:** Audio Engineer Diploma. **68-72 Wentworth Ave.; Surry Hills 2010; Sydney, Australia; (61) 2 211-3711; FAX: (61) 2 211-3308. Chief Administrator:** Mr. Tom Misner. **Program:** Audio Engineer Diploma, 18 months part-time, 9 months full time; covers all aspects of Audio Engineering and Theory with individual practical time for each student. Topics include: Sound for Live/PA, Theatre, Film and Broadcast, MIDI and Sampling, Music business and contracts, Digital editing and Console Automation. **Production Course, 3 months, Post-Graduate:** Studio production procedures containing lectures from top Industry professionals. **Tonmeister, 12 months (part time), Post-Graduate:** Advanced program that requires a de-

gree in music technology as entrance. Conducted at our campuses equipped with Neve consoles. **Studio Assistant, 6 months (part time); course in monthly blocks — basic electronics and audio technique, MIDI and Sampling, Microphone technique, effects processors, Studio and Live Sound. Seminars; Neve VR, SSL Workshop, Hard Disc Recording, Classical Recording, Live Sound, AMS Audiofile and Sampling.**

### SAE VIENNA

**Program Name:** Audio Engineer Diploma. **Leystrasse 43, A-1200; Vienna, Austria; (43) 1 330-4133; FAX: (43) 1 330-4135. Chief Administrator:** Peter Pichler. **Program:** German Language (Applicable in Germany and Austria). **European Administration Office:** SAE Amsterdam contact Mr. Guy Nicholson. **International Course Director:** SAE Sydney contact Mr. Tom Misner. **Audio Engineer (Diplomstufe) 18 months:** This course is a combination of the English Diploma 15 month program and the 3 months Production Course. Covers all subjects as per above English program. **Tonmeister Program 12 month Post-Graduate program:** These programs are conducted at our Frankfurt, Vienna and Munich Schools and have the same course prerequisites as the English program. Each Campus specializes in various forms of music, e.g. Vienna-Classical, London-Dance, Munich and Frankfurt-Hard Rock and Metal. **Tonassistenten-Kurs, 6 months;** Course divided into monthly blocks covering basic electronics and audio technique, MIDI Sequencing and Sampling, Microphone technique, effects processor, Studio procedure and Live Sound. **Seminars and Short Courses:** Neve VR automation, SSL Workshop, Digital and Hard Disc Recording, Studio Maintenance, Classical Recording, Live Sound, AMS Audiofile and Sampling.

### TREBAS INSTITUTE

**Program Name:** Recording Arts & Sciences: Recorded Music Production; Audio Engineering Technology. **451 St. Jean St.; Montreal, QC, Canada H2Y 2R5; (514) 845-4141. Chief Administrator:** Lyne Cholette. **Program:** Established in 1979, one-year program. Almost 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. **Diplomas in Recording Arts & Sciences (w/specialization in Production and Engineering) and M. B. A.** One entrance scholarship offered at each of four campuses across North America. **Goldmark Memorial Scholarship** for advance studies at each location. Other Awards of Merit available. **Consult admissions office, Transfer of credits between campuses.** Facilities: professional multitrack recording studios, electronic music/synthesis/MIDI studios, electronics labs, computer labs, audio/video post-production mixing lab and analog/digital 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. **Accredited by ACCET.** Internships. Job placement. **Graduates working with major record companies, studios and artists.** **TEC Award nominee: Recording School Program of the Year, 1989 and 1990.**

### TREBAS INSTITUTE

**Program Name:** Recording Arts & Sciences: Recorded Music Production, Audio Engineering Technology. **410 Dundas St. E.; Toronto, ON, Canada M5A 2A8; (416) 966-3066. Chief Administrator:** George Hood. **Program:** Established in 1979, one-year program. Almost 100 courses to choose 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. **Diplomas in Recording Arts & Sciences (w/specialization in Production and Engineering) and M. B. A.** One entrance scholarship offered at each of four campuses across North America. **Goldmark Memorial Scholarship** for advance studies at each location. Other Awards of Merit available. **Consult admissions office, Transfer of credits between campuses.** Facilities: professional multi-track recording studios, electronic music/synthesis/MIDI studios, electronics labs, computer labs, audio/video post-production mixing lab and analog/digital 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. **Accredited by ACCET.** Internships. Job placement. **Graduates working with major record companies, studios and artists.** **TEC Award Nominee: Recording School Program of the Year, 1989 and 1990.**

### TREBAS INSTITUTE

**Program Name:** Recording Arts & Sciences: Recorded Music Production; Audio Engineering Technology. **112 E. 3rd Ave.; Vancouver, BC, Canada V5T 1C8; (604) 872-2666. Chief Administrator:** Sarah-Jane Franklin. **Program:** Established in 1979, one-year program. Almost 100 courses to choose 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. **Diplomas in Recording Arts & Sciences (w/specialization in Production and Engineering) and M. B. A.** One entrance scholarship offered at each of four campuses across North America. **Goldmark Memorial Scholarship** for advance studies at each location. Other Awards of Merit available. **Consult admissions office, Transfer of credits between campuses.** Facilities: professional multi-track recording studios, electronic music/synthesis/MIDI studios, electronics labs, computer labs, audio/video post-production mixing lab and analog/digital 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. **Accredited by ACCET.** Internships. Job placement. **Graduates working with major record companies, studios and artists.** **TEC Award Nominee: Recording Program of the Year, 1989 and 1990.**

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—FROM PAGE 86, TO THE MOVIES WITH CD-R as it is recorded on the drive.

*So if you don't have the hardware option with real-time encoding, you need huge amounts of hard disk space to store the uncompressed video.*

It is significant; there's no doubt about it. But there is an initial decimation process, before the MPEG encoding, so that the video is stored in SIF resolution, which is the basic number of lines and bits from which the MPEG encoding is done. That gets the video down from 21 MB/second to about 3.2 MB/second, which is what is actually stored on disk. So depending on whether you have the hardware encoding card, the video goes on the hard drive in either SIF or MPEG format.

The audio, meanwhile, is always handled through the Sonic System DSP card and is real-time encoded. Then, if your video is in SIF, you compress it to MPEG in the background while you perform other

tasks in the foreground on the Sonic System. The only exception is if you have the smaller, single-board Sonic Station system, in which case you won't be able to do anything else while you process the video.

When everything is fully compressed, you get down to sequencing and subcode editing. The user interface for that will be a direct extrapolation of our current interface. You can either edit graphically on the screen or go to a separate PQ window and work on a text list. And then you are ready to write to a CD-R disc. You can write the disc in the background, and once it pops out, you can stick it in your Video CD player or your CD-I FMV player.

*Current CD specifications limit the total playing time of Video CD to 74 minutes, which means that feature films will need to be replicated onto two discs. However, development has been underway for some time on higher-density CDs that could hold two times or more data. Since DiscVideo uses CD-R as the output media, do you foresee any problems*

*getting reliable CD recording at higher densities?*

In the early days of CD-R, getting a reliable 63-minute recording was a bit of a struggle. But since the current generation of recorders have become available, reliable 80-minute CDs are very much a reality. So if there is a need to go further, I think the technology ends up being developed to go further.

*Given Sonic Solutions' audio orientation, what impact would you envision that higher-density VCDs might have on the original audio CD? I'm thinking of things like 20-bit audio or multichannel sound.*

I don't know. It would be pretty interesting, though, wouldn't it? I don't think the industry has really explored the boundaries yet. Three or four years ago, most people thought 16-bit linear PCM was where it was. But that isn't where it stops. The story will go on. ■

*Phil De Lancie is a mastering engineer at Fantasy Studios, Berkeley, Calif.*

—FROM PAGE 73, MUSIC FOR VIDEO GAMES

that he's on. When he jumps to another branch, the program switches to another intro sequence and then a new vamp, as long as he's on that branch—all in time, and in a way that makes sense musically. It's a 20-stage, self-modifying sequence that follows Tas around the tree, equating the different branches with different key signatures. Finally, it plays a little ending sequence when he jumps into the balloon.

"The fun part," Miller continues, "is when you can actually create a program of interactive musical sequences that correspond to the activity controlled by the person playing the game. The composer doesn't necessarily need to be able to be the person doing the programming, but they need to be programming-savvy."

In fact, it's not a giant step from composer to programmer for those who have embraced pseudo-programming endeavors like MacroMe-

dia Director or HyperCard, or even sophisticated MIDI gymnastics. In fact, the technical staff of many high-tech audio companies are filled with part-time and ex-musicians, bearing out the common wisdom that music and math share a certain *je ne sais quoi*.

"You would think that this form of interactive composition could get very complex very fast," says Miller. "But it turns out that the subtle changes undoubtedly go unnoticed, since, really, this music is not being listened to with the player's full attention. It's a soundtrack, and it's designed to enhance the player's experience rather than be the focus of it. So less is more, and the maximum impact is achieved by the use of very simple algorithms very cleanly tied to large quanta in the game state."

The different platforms have different strengths and weaknesses, and they need to be taken into account at the beginning of the development process if you are intending to go to multiple platforms. Refer-

ring to the *Pink* project, Miller says, "We started on SuperNintendo. While in some ways it's a higher-quality machine because you're using digital audio, it is by far the more restrictive environment. Every instrument costs you dearly in terms of memory. The processor that runs the music on the SuperNintendo is much less powerful than that for the Genesis. For that reason, you need to be more careful about the music you write for it. Also, memory management in the SuperNintendo is much more complex than in the Genesis, in part because of the digital audio in the former."

After carefully designing the instrument sounds, Miller creates an environment that's based around a real-time MIDI system and emulates the response of these particular instruments in the SuperNintendo. The music is then converted and tweaked at the bits-and-bytes level to make it survive the translation into the actual game machine environment. "A lot of work goes into compensating for things like volume

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response, lack of velocity information, pitch bend issues and the like," says Miller.

"You also have to think about sound effects at the beginning of this process," he adds, "because they take up a certain amount of space. They are in many ways more important than music for user feedback, so they need to be mixed hot and sound good with the music. So sound effects design needs to be an integral part of the development process. You make a lot of sound effects out of instruments, and vice versa when you're getting to the end of a project."

Miller says that musically the two versions of *Pink Panther* didn't diverge a lot. "In the Genesis environment, the descriptions of the instruments tend to be a lot smaller, and you tend to get a lot more instruments," he explains. "However, if you're trying to create real acoustic-sounding instruments, FM synthesis is notoriously bad at doing

that. The biggest divergence was that we were not able to come up with a convincing saxophone in a 4-operator FM synthesis environment. There's still a presence of saxophones, but they're not featured lead instruments.

"The real challenge on the Genesis was in the mixes," Miller adds. "You're going from eight voices to six. I spent a couple of weeks coming up with a good FM horn section. Each instrument has to occupy a specific bandwidth so that, when combined, the overall effect is a fatter sound. You have no signal processing. The nice thing about the Genesis was the ability to use a slightly different tweak of a particular patch for every phrase because the palette was much bigger. With the SuperNintendo, all you have is eight sounds. Period." ■

*Mix associate editor Paul Potylen was once addicted to Tetris. He quit cold turkey very late one night when, in a sudden fit of sanity, he erased the program and threw away the master disks.*

—FROM PAGE 157, NEW YORK METRO

bit-map the 20-bit audio to 16 bits.

City Sound Productions moved into a combination project/commercial studio in the Broadway/Houston Street neighborhood. The facility was designed by Francis Manzella's FMRTS firm to be a "contemporary, real-world approach to acoustics and studio design," according to studio owner Bob Kirschner. Construction was done by Charlie Hoyle of Tatrix and wiring by Will Schillinger of Wilbur Systems. Equipment is based around 16 tracks of ADAT with BRC, a Soundtracs Studio Megas 70-input console, Tannoy DMT 15/Hot House monitors, and a combination of vintage and contemporary outboard gear.

Speaking of MDM-based facilities: Blank Tapes in Stamford, Conn., added two more ADATs for a total of six of the Alesis units, which with the five AKAI A-DAM systems it already operates, gives the studio 120 digital tracks, possibly the largest MDM installation on the East Coast. (You got a bigger one? Fax me.) The studio also recently added a third Alesis BRC controller unit, SSL Logic

FX compressors, three MicroLynx synchronizers, DINR noise reduction and a Steinberg Time Bandit compressor/pitch controller. The studio also added video with an Avid on-line system.

BearTracks Recording, in Suffern, N.Y., installed a 72-input, 48-bus Focusrite console with Flying Faders automation, replacing an SSL 4048 board. According to studio manager Chris Bubacz, the new console is part of an overall upgrade of the facility, which will include new wiring and ground schemes, refurbishment of the Augspurger monitor system and general cosmetic revamping. The automation will be interfaced to the Studer A-820 decks via Motionworker, a software control package.

Hit Factory announced some new management appointments. Carl Segal is the new booking manager; former Master Disk general manager Linda Duffany has been named studio manager for mastering; and George Englis was promoted to manager of Hit Factory Broadway.

Please note: Daley's correct fax in New York is (212) 685-4783. The October issue had a typo. ■

well-known concert halls world-wide. In Japan, for instance, the symphonic concert band has become mainstream, drawing capacity crowds and spawning a long list of new recorded works. Having engineered more than 1,000 concert band recordings to date, Leek is arguably the world's most prolific engineer in this milieu.

"A large symphonic wind ensemble generates a tremendous amount of acoustic energy," Bruce explains. "It's a remarkable experience to be in a 500-seat hall with 300 musicians playing *fortissimo*. This happened a few years ago at Texas A&M. Often, the marching band will use a row of long-bell herald trumpets. They're quite loud, and it often poses a balance problem to the engineer. Imagine also the sound of 15 tubas in unison. We blew the roof off the place, and the recording turned out exceptionally powerful.

"In general, however, the concert bands I record are around the same size as a conventional symphony or chamber orchestra, usually ranging from 40 to 100 players. Instead of first and second violins, we'll have a section of clarinets. Instead of bass, cello and viola sections, we'll have wind sections in various ranges. Ever see a bass sax? It's as tall as a string double bass and sounds like nothing you've ever heard.

"Save for strings, the rest of the orchestra remains pretty much the same: flutes and other woodwinds in the middle, percussion in back and sides, and brass in back stretched left to right."

Many of Leek's recordings are major classical works transcribed for the concert band. Bruce states that "highly percussive pieces, such as 'The Rite of Spring,' require a dryer hall for the winds to develop and balance with the percussion. A Mozart wind piece, by contrast, seems to record better in a smaller hall that has substantial reverberation. Two of the greatest concert band halls are Royce Hall at UCLA and Ogden Hall at Hampton University in Virginia.

"If the band is polished and tight, I like to capture a closer, more direct sound. On the other hand, if the band has a few weak players, I'll generally back up and focus on a wash of direct and reflected image. It's interesting how a microphone

movement can change the apparent quality of a concert band. Besides, I'm asked to make the band sound good. I must be doing something right because most of my work is repeat business.

"I usually start with an array of four MKH-20s across the front. The inside mics are 3 feet to 6 feet apart, 6 feet to 8 feet high, angled down between 10 and 30 degrees and pointing about 30 degrees off center, and placed inside the conductor. All measurements vary and depend on arrangement highlights and ensemble size. The outside mics are spaced about 20 to 20 feet apart, lifted a bit higher and with a steeper point angle. I like a pair of ambient mics in the hall, as well; usually AT 4049 omnis.

"It's usually not necessary to spot-mike a concert band, though sometimes a celeste or harp does get covered up. In such cases, I'll place a stereo pair for spot [MKH 40s]. The spots are not prominent in the mix. In fact, if you can tell I've used a spot mic, then I haven't done my job. Occasionally, I'll add a bit of reverb to the spot to blend it with the main mics, especially when the mains are pulled back."

During the last AES convention in New York, Leek helped engineer a live jazz date with Dave Brubeck at the Blue Note. I visited Leek in the Blue Note production room-cum-broom closet and noticed a raft of esoteric cable. Bruce comments, "I've done a great deal of listening tests on cables and find that there are noticeable differences between manufacturers and models. The most accurate copper cables I've heard for recording are the Proline CVT by MIT. I use them for all symphonic recordings, as well.

"I'm also a big fan of outboard preamplifiers, which I keep as close to the microphones as possible. From the preamps, line level signal is sent to a mixer and converted through [Lexicon 2020] 20-bit A/D. I'll run [Panasonic] SV-3700 DAT machines for the master 2-track and digitally edit at a later date, though my favorite 2-track recorder for audiophile work is Wilson Audio's 1/2-inch 30 ips Studer using [3M] 996 tape and no noise reduction; the 3dB down point is 50 kHz!" ■

*John La Grou is an engineer, musician and inventor.*

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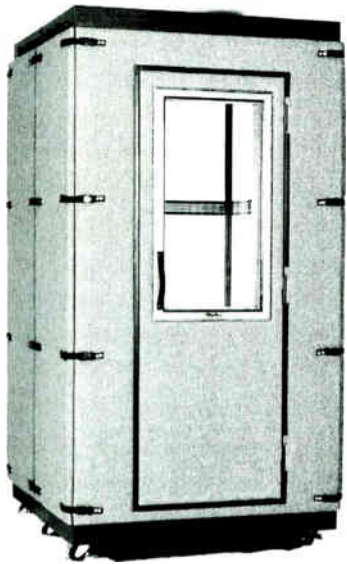
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—FROM PAGE 125, SHAWN MURPHY

Studio City, Calif., where he was responsible for renovating the former Evergreen stage on the CBS lot, which some call the most technologically advanced in the world.

**Mix** visited Murphy at Todd-AO where he was recording with composer James Horner for the new Julia Roberts film *Pelican Brief*. The 82-piece orchestra included 32 violins, three pianos and a harp, yet the mic setup seemed deceptively simple. We had a lot of questions, and at lunch in the studio commissary, Murphy had time to answer a few.

**Mix:** How far in advance do you know the composition of an orchestra for a specific session?

**Murphy:** Generally, a week or more, but I will say that we often have changes and additions right up until the day of score. Even though you may know that you have 26 violins scheduled, it's fairly common to walk in on the day and find a saxophone or a drum set that you did not know about. It can be a bit disconcerting—you walk in and the cartage fellows are setting up a drum set and saying, "Where do you want it?"

**Mix:** You came in at 7 this morning for a 10 a.m. start. How many people do you have to help you set up?

**Murphy:** The crew on this particular session is three: two assigned to the stage and one to the control room. That's normal for a large orchestra. The crew here is familiar with the two or three basic orchestral setups that I like to use, and the variations are whether they are more squared-off or wrapped around in the strings, where the risers are used, where the harps and pianos are located, how close or distant the brass are.

**Mix:** How do you decide what those variations will be?

**Murphy:** Sometimes by the type of score. From talking to the composer, I will find out if it is mostly strings or if it's very active, with a lot of chases and action cues. That will determine where you place things. Whether you want an antiphonal effect, or whether you would tend to stack the horns behind the woodwinds. Or you might like a more homogeneous sound that you would get by putting the horns in the center behind the woodwinds and rolling the percussion off to the left

behind the strings. It depends on the composer and the music.

**Mix:** So you might go for more isolation of the aggressive instruments for an action movie?

**Murphy:** Not more isolation; more real stereo. Very stereo in the room vs. something more homogeneous that gives you a big orchestral picture without things coming far left and right. A lot of it is working with different composers and knowing what they would like to hear and how they write. Certain composers emphasize a certain orchestral timbre. For Danny Elfman, it's low strings and woodwinds—you know that a lot of bass clef instruments are going to be featured. In Danny's score, you might have a lot of bass clarinet and contra bassoon with bass sax and celli and basses, so you try to seat them in a way that they will naturally fall left and right, and their parts will complement each other and be easily heard, as opposed to stacking them all up in the middle where it would be harder to differentiate the parts.

**Mix:** Is leakage a concern for you?

**Murphy:** It's a concern only if it's bad-sounding—if it sounds bad off-axis or it's leakage mostly consisting of slap off walls or reflections that are coming back out-of-phase. In this sort of ambient-miking setup, if you seat the orchestra properly and work on the balance in the room, by and large you will have lots of isolation, no matter what dynamic people are playing at. You'd be amazed if you solo up certain mics. In an orchestra that has no baffles in it, like today, if you solo the woodwinds or the harp, who are sitting in the front where you might think there would be a lot of spill, it's quite clean. It's because there is a true dynamic out there; you don't have to force levels, and you don't have to worry about excessive leakage because the instrument is acoustically sitting in a place that is complementary to the part it is playing.

Of course, one way to get rid of bad-sounding leakage is to not use very many mics.

**Mix:** Right. I notice you close-miked very few instruments.

**Murphy:** Almost nothing. The harp, the celeste, the pianos.

**Mix:** Even the piano mics are set three or four feet above the soundboard.

**Murphy:** Yeah, about a meter away



on the pianos. We actually closed in a bit on the harp today when we noticed in the score a repetitive 16th-note figure that we needed to hear. Normally we would mike it a bit farther away.

Percussion is primarily overhead mics, not tight. I don't care for tight-miking. It's also hard to mix in. When you are going for some sort of realistic perspective, close mics don't help you. They destroy the perspective. Pretty soon you've got things poking through the picture in an unnatural way.

**Mix:** So you make a lot of your artistic decisions at the top with your seating of the orchestra.

**Murphy:** Right. How tightly you pack them in, how far back you push the percussion or brass from the main mics, and recognizing the radiation pattern of the instruments. Proximity to the main microphones controls the depth.

**Mix:** You use a lot of tube mics in your setup. I'm a bit surprised you find them reliable enough.

**Murphy:** Yes, today the setup is about 50-50. Of course, if you are going to embark on a big tube mic session, you have to have spares, and you have to be able to change over quickly, and the guys on the stage can do that very fast.

I tend to go with tube mics on the main system and solid-state mics up close a little more. I don't find the noise floor of tube mics excessive. With an NC 25 or 30, the mic is not that noisy. And I like the warmer character and the overload characteristics.

**Mix:** What are your favorite choices for string mics?

**Murphy:** Well, I don't use them! My basic system involves five mics: three M-50s and two wide mics. I add a couple of surround mics, then I put a closer picture on the strings and woodwinds that I record but probably don't listen to, and a closer picture on the first bass, harp and keyboards, which I will listen to.

Today there is also a pair of B&Ks on the tree that we are just goofing off with. We goof off on almost every session with something—testing a preamp, a mic or a cable—print them and listen to them later.

I do record a left-center-right for the strings. Generally I don't use them, but if I do have to use them, they are there. Today the mics are Neumann I-40s. They might be B&K

4011s, AKG C-12s or the VTL C-12 equivalent with the large capsule on violins. On violas, either Schoeps or B&K 4011s. Celli, depending on over or under the [music] stand—like on Danny Elfman we might tend to go in close—ends up C-37As or U67s. Over the stands, Schoeps or occasionally Sanken CU41. On basses, under the stand 67 tube, over the stand Schoeps or Sanken CU41. Again, on the basses it's a choice whether you are going for a lot of tone on the low end or precision on the string, which is determined by the music. You might go half and half: some over the stand and some under. Your choices are determined by whether you need a lot of presence, impact and detail or do you want it to be sweet-sounding.

**Mix:** What is the pair of mics you have in front, up about ten feet high?

**Murphy:** Those are the VTL [Vacuum Tube Logic] tube mics—large capsule, multiple-pattern condenser tube mics. I'm using them for wide left and right. In the format I'm using, they are string boosters, and they pull the sides out wider for the Dolby matrix.

I also like to record a surround track for the dubbing mixer, whether or not they use it. I have a pair of tube mics in the back of the room going to the surround, and they are stereo. They are basically ambient mics. On this session, I'm using Schoeps with the MK-3 capsule, which has the most high end. Because they are reverberant field microphones, you want to get them flat in the far field. Sometimes we use Sennheiser MK20s with the top end tipped up, sometimes B&K, omni of course; no benefit to a cardioid mic that far away.

**Mix:** What preamps do you use?

**Murphy:** I use the Avalons. I think they are the most tube-like solid-state preamp. I also have a set of Boulders that I use all the time. I have GMLs, and today we are trying the Millennia. I have a set of tube preamps made by Vacuum Tube Logic that are very simple, one-stage triode preamps, which on some material sound really wonderful. They have a much richer harmonic content than solid-state preamps, maybe less "real" but really kind of a wonderful sound.

**Mix:** Do you bypass the console when recording?

**Murphy:** Yes, straight to the ma-

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chine. We also have a set of cables that run through a trough in the floor so that we don't have to use studio wiring, just dedicated XL cables directly to the preamps and then directly to the machines.

**Mix:** Do you prefer to record to analog?

**Murphy:** Yes. Today is digital only because we have to do a lot of passes; we are adding synthesizers and singers. I don't like to make a lot of passes using analog masters. If I know that the score is just orchestral, I like to use analog. I prefer the sound. The alignment that I like is not elevated: 185. Dolby SR on Ampex 456, which I like because whether I'm here or in London or on any stage, it's the same, and reliable. We run at 15 ips for the low end.

**Mix:** Your tape alignment is at 0 over 185?

**Murphy:** Yes. It means we have lots of headroom, and our transients aren't rolled off on percussion or any sparkling material that contains a lot of peak-to-average range. You are not hitting the tape too hard. I think that's a concern because a lot of people look at a VU meter and think it's fine, but of course the peak ratio can be much too high. You don't hear it for a while, but the tape is saturated and it's rolling off transients, and it doesn't sound as good. The SR takes care of the low-end noise.

I prefer analog. I can't think of a digital recording we've done for John Williams, with the exception of the *Schindler's List* remote in Boston, where we just simply didn't want to drag two analog 24s and all the SRs out. But we did use 20-bit converters so that we got better resolution on the main system.

**Mix:** You don't use compressors.

**Murphy:** No, I don't use any dynamic processing at all, and very little EQ. I tend to like to equalize the bus feeds rather than the individual elements. The EQ provided by the microphone and the mic position is what I'm after.

**Mix:** What do those bus feeds consist of?

**Murphy:** Today we're doing a 4-track mix: left, center, right and surround. I'm using Cello equalizers, which are the best EQ I've heard in terms of broadband program EQ. If you start to crank a lot of EQ on the individual instruments, you really hear it, and it alters the characteristic

of the leakage, so you're fighting the fact that in order to make the direct sound right on a certain mic, you've got badly EQ'd leakage to deal with.

**Mix:** Like hi-hats in your snare drum.

**Murphy:** Right. Usually the cure for something not sounding right is to take the EQ off.

**Mix:** Did you always know that, or did it take you a long time to learn?

**Murphy:** [Laughs] Well, the quicker you realize it, the better off you are. In terms of orchestral recording, the real magic happens out there, and it's up to me to be able to hear that. It's in the writing and the playing and the conducting. But the more mics, the more processing, the more it gets in the way. The fewer the microphones, the better the setup, the better the players can hear each other, the less in the signal path, the better off you are.

**Mix:** Are you usually the re-recording mixer as well as the scoring engineer?

**Murphy:** Usually not. Over the course of a year's time, I might work on the score to 20 or 25 pictures, and I would only dub two or three of them. For instance, this year *Jurassic Park* and *Nightmare Before Christmas* will probably be the only two that I will dub. Schedulingwise, it just usually doesn't work out.

**Mix:** You are premixing to six tracks of the 48-track as you are recording. Is that mix likely to be used for the final?

**Murphy:** Yes, the live mixes are very often used. With certain composers, like John Williams and John Barry or James Newton Howard, the live mixes are used about 95 percent of the time. With James Horner, some live mixes are used, but since we often overdub on his projects, they often get mixed again.

**Mix:** Do you think we will soon see a digital final product and the end of 6-track sprocketed?

**Murphy:** No. Despite the use of workstations in production nowadays, and I think most editors would agree, the format that is the most economical and the fastest to make changes in features is still sprocket mag, in terms of the post-production process.

For the release formats we already have digital; we have DTS and SR-D. To deliver that kind of format to the theater is very good. You can be on 35mm print, you don't have to

blow up a 35mm to 70mm in order to fit the 6-track mag on it, you don't have the deterioration of the mag stripes and the limited level you can put on a 100nwb mag stripe. But in terms of production, it's not going to change. It's extraordinarily expensive, and it needs so much storage capacity. Think of the number of tracks you have to store and the amount of time of each. It's just an immense task. People do use Pro Tools and PostPro and that sort of thing and use them in a limited manner...but that's a supplement, not instead of mag.

**Mix:** What's the worst mistake you can make on a scoring session?

**Murphy:** Not checking. You noticed he [James Horner] didn't ask for a playback of the last thing that we did. Well, I played it back.

**Mix:** How much can you normally get done in a day?

**Murphy:** Today we got about 18 minutes—eight to nine minutes per [three-hour] session. That's good. Some days you only get five per session, and every now and then you'll do phenomenally well and get ten

or more.

**Mix:** You started out working in theater and radio.

**Murphy:** I sort of earned my way through college working at radio stations and in the theater. I worked for KKHI in the San Francisco Bay Area for a time. They used to go out and record the symphony and different ensembles all the time, and I did that. I was the youngest and the engineer most willing to carry around Ampex 350s in the station wagon. I also taught theater technology in college for a while, then worked in sound reinforcement and production, then recording television shows and wound up at CBS mixing television shows. I started mixing film in about 1980.

**Mix:** What skills are different for a film mixer as opposed to a record mixer?

**Murphy:** Well, if you're going to be a scoring mixer, and especially a re-recording mixer, you have to have some sort of a dramatic sense. You can't just focus on the music even if you're the music mixer, because it's not the whole show, is it? You have

to tell the story. Sometimes you may make a flute that's 80-feet-wide.

**Mix:** What's your advice to someone starting out to be a film mixer?


**Murphy:** You have to have patience. I think the film business is more conservative and less willing to take risks on unknowns. You have to prove to people over and over again that you are capable of doing good work and managing a session like this every day, no matter what the requirements. And that takes years. Lots and lots of experience, and lots and lots of time. You also have to know when a good opportunity presents itself and be prepared to take it. When someone gives you a chance to do something important, you have to be there and be able because you may not ever get that chance again—to step forward and show your talents and do a good job. ■

*Maureen Dronney, an engineer and production manager based in Los Angeles, spends her spare time searching out great Italian restaurants.*

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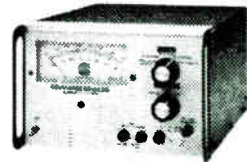
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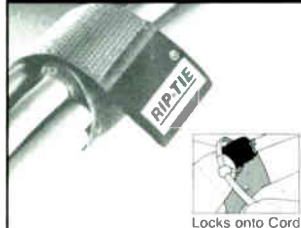
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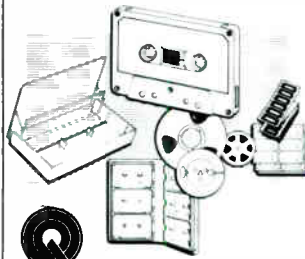
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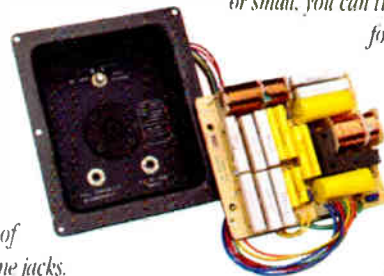
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