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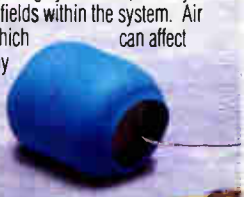
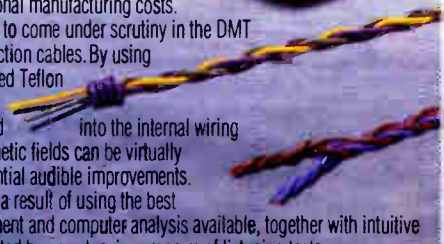
Differential Material Technology (DMT™) is the study of Different materials and their relative behavior when in intimate contact. The starting point of any high grade professional monitoring system is properly engineered drivers that naturally work well together. With this established, the crossover 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.

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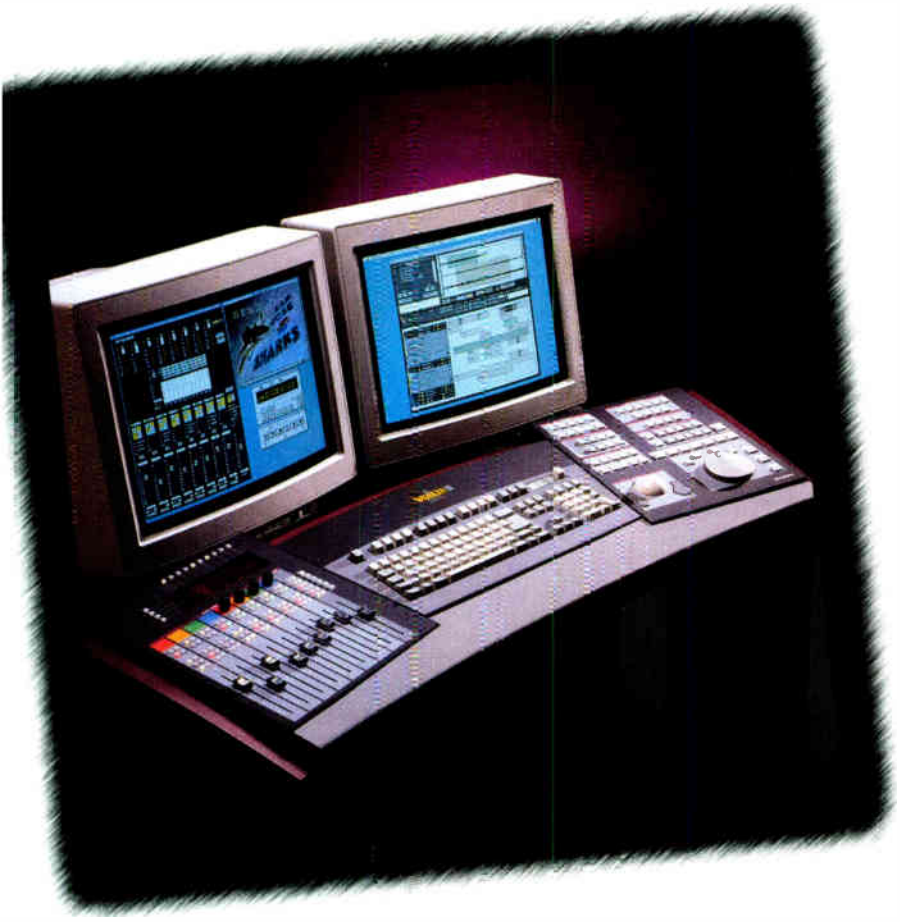

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MIX

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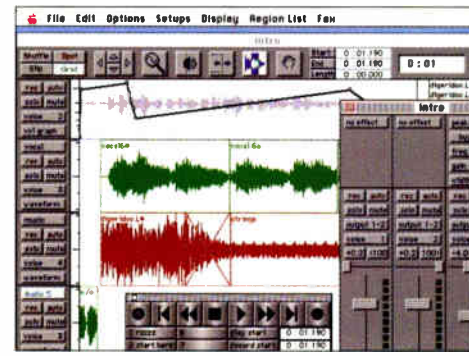
MARCH 1994, VOLUME 18, NUMBER 3

PAGE SFP-32

AUDIO

PAGE 165

AUDIO AND MULTIMEDIA



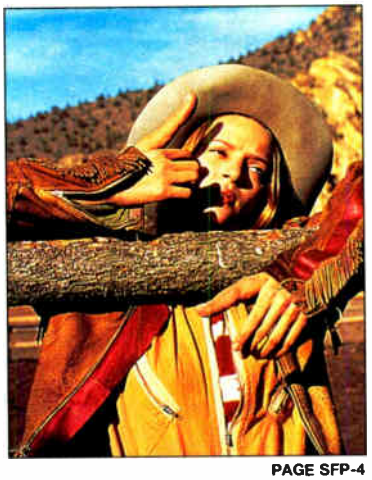
PAGE SFP-40

SOUND-FOR-PICTURE SUPPLEMENT

(See supplement cover on page 33 for details)

PRODUCTS

LIVE SOUND



PAGE SFP-4

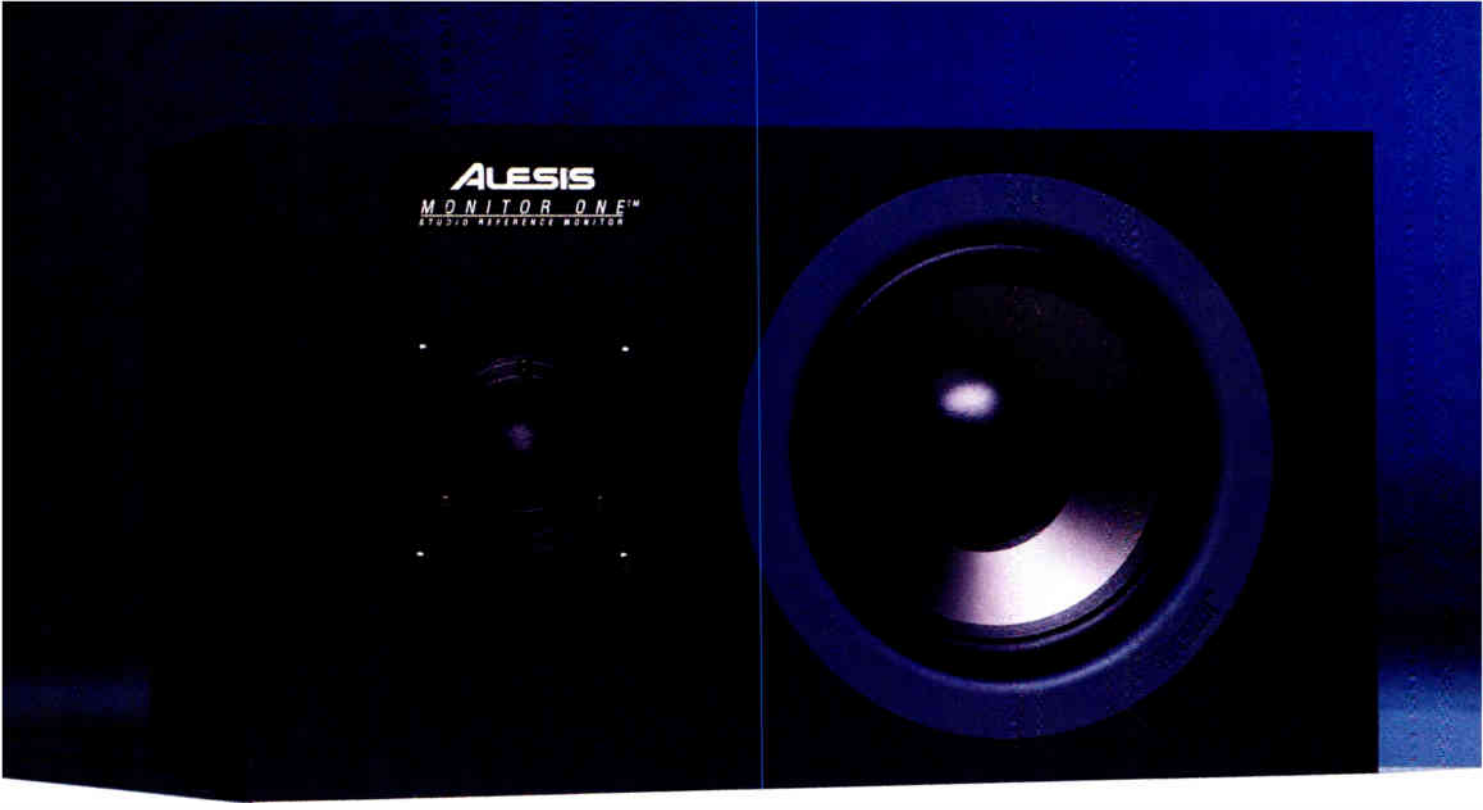
PAGE SFP-14

PAGE 96

MUSIC

DEPARTMENTS

Cover: Pacific Ocean Post Sound (Santa Monica, Calif.) recently installed the first fully automated Neve Capricorn digital console in North America. Residing in POP's all-digital sound facility, the 96-input Capricorn has been used for the mix on Steven Bochco Productions' weekly episodes of *NYPD Blue* for ABC Television. POP Sound's 17,000-sq-ft. classic mediterranean building includes five digital mixing suites, voice-over booths, ADR/Foley stages, offices and a rooftop patio. **Photo:** Ed Freeman. **Inset photo:** Jay Blakesberg. **Screen photo:** Steven Bochco Productions/ABC Inc.

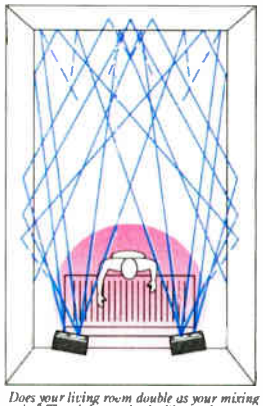


The Truth From

The 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).

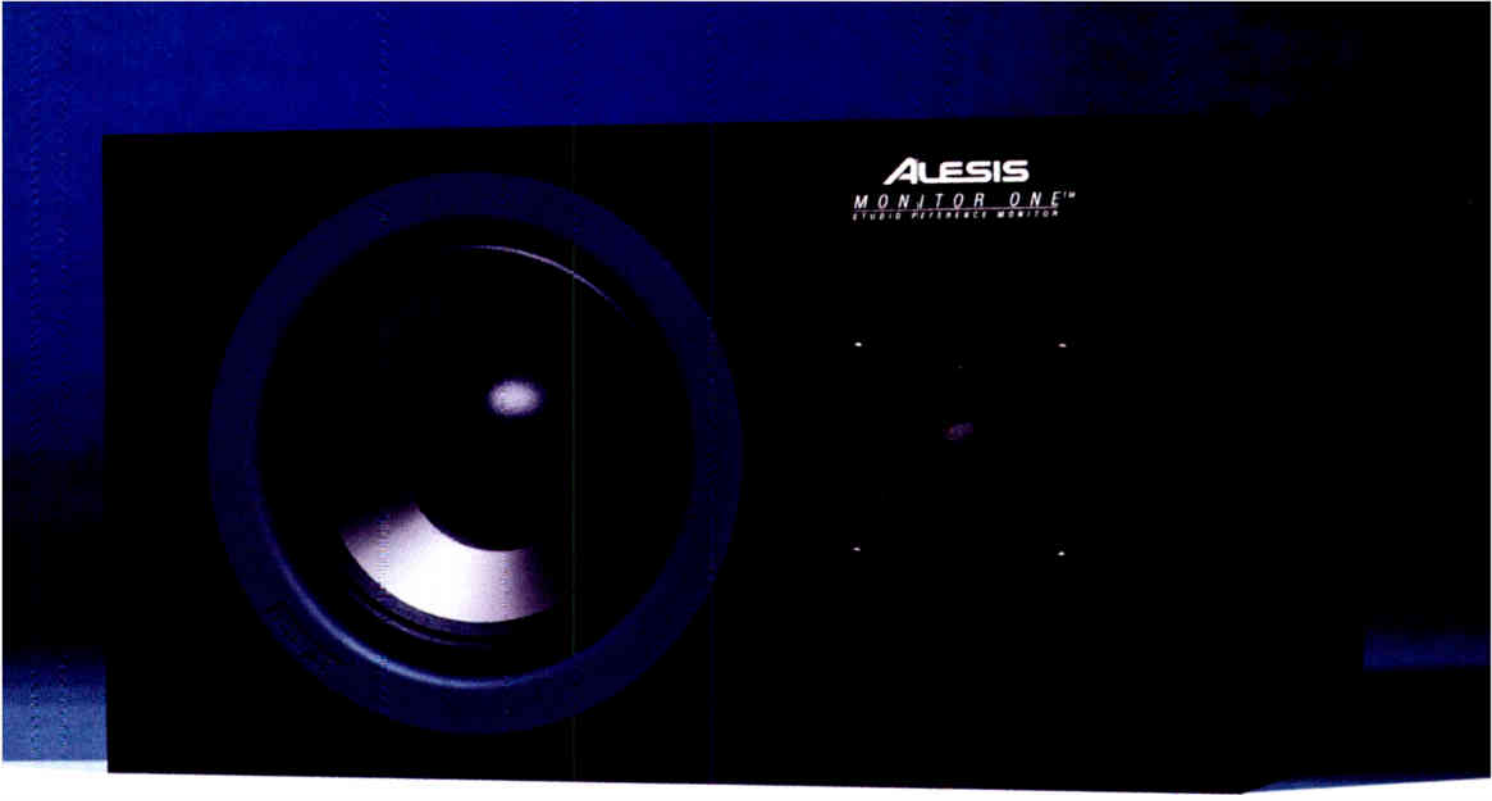
The Truth From Top To Bottom

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.



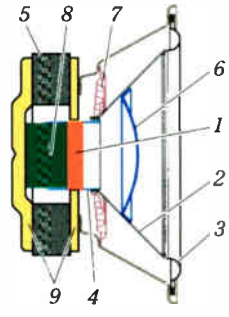
Left To Right

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.

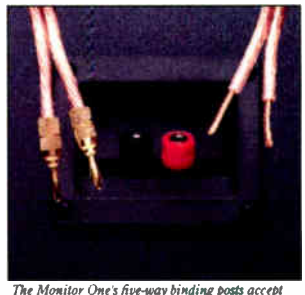
The Engine

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 frequency response. Combined, these two specially formulated drivers deliver an incredibly accurate, unhyped frequency response from 45 Hz to 18 kHz, ±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.



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.



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

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ALESIS
STUDIO ELECTRONICS

FROM THE EDITOR

In keeping with the spirit of change that has characterized 1994 so far, we want to tell you about a major development in the way we will be presenting our directory information. Over the past several months, we have conducted extensive surveys to determine how our databases can best serve our readers and the industry at large. Beginning with this issue, we have implemented the most sweeping upgrade of our directory services since we began publishing 17 years ago.

All of the listings that used to be printed in *Mix* will now appear in a new publication called *MixPlus*, which will have separate Eastern, Central and Western regional volumes for the U.S. and Canada. Many new services, such as tech support hotlines, 24-hour repair services, independent record labels, promoters and distributors, will also be included. *MixPlus* will be sent free of charge to *Mix* subscribers, as well as to *Electronic Musician* readers and Mix Bookshelf customers, providing much higher exposure for those listed.

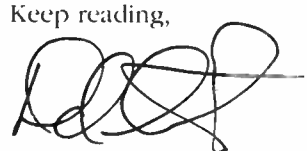
As a consideration to the companies and facilities that would still like to appear in the pages of *Mix*, a new monthly section called Showcase will be available starting with this issue. For more information on *MixPlus* and Showcase, call toll-free (800) 344-5478.

This month we've put together a special Sound-for-Picture supplement. Associate editor Tom Kenny has keyed off of this year's NAB convention to offer a wide-ranging look at audio applications and technological developments in the booming audio market for film and television. Highlights include an expanded product section, a feature on DAT location recording and a close look at the do's and don'ts of time code.

We'd also like to introduce you to two new editors. Mark Frink has taken over the title of Sound Reinforcement Editor. Mark has worked in sound reinforcement for many years and brings a strong background in language and economics to the working world of the live sound professional. Mark has some exciting ideas to share with *Mix* readers, so be sure to see what he's up to in our Live Sound pages.

Our second new editorial personality is Maureen Droney, an accomplished L.A. recording engineer who will carry on the tradition of the "L.A. Grapevine," the Southern California focus of our Coast to Coast section. Maureen will report on the L.A. studio scene—business news, trends, sessions or whatever she digs up. If you have information to pass along to Mark or Maureen, their contact numbers are listed in their respective parts of this month's issue.

Keep reading,



David Schwartz
Editor-in-Chief

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CURRENT

NAMM REPORT
by George Petersen

Let's be blunt. Mid-January of 1994 will not be remembered as the optimum time for the National Association of Music Merchants to have hosted its annual winter show in Anaheim, Calif. Just four days after a massive 6.6 earthquake devastated the San Fernando Valley north of Los Angeles, and as one of the worst cold spells on record disrupted shipments and air travel in the Midwest and East, the timing of the annual winter NAMM was hardly fortuitous.

Therefore, it was no surprise that the overall attendance at the show was somewhat down when compared to past years. However, most of the exhibitors I spoke with reported increased orders and good business. Somehow, the *serious* buyers managed to find their way to the Anaheim Convention Center, thus turning this particular NAMM into a successful event.

And despite the occasional aftershocks rumbling across California's Southland, there was plenty to see on the show floor. Probably the single most talked-about product was Yamaha's new VL1 Virtual Acoustic Synthesizer, said to be the world's first real-time application of computer-based physical modeling for musical sound synthesis.

"The VL1 is the first entirely new type of instrument to come along in a very long time," said Yamaha Corp. of America's president, Masahiko Arimoto. The VL1's modeling is based on "instruments"—preprogrammed voices that provide the fundamental tone or timbre, which are controlled via assignable parameters (such as throat, pressure, embouchure, tonguing, pitch and damping in woodwinds) and tailored with modifiers (harmonic manipulators, filters, equalization, etc.). Intended as a lead instrument, the VL1 has a 4-octave keyboard with internal digital signal processing and an onboard floppy disk drive.

And for those whose keyboard chops are less than ideal, WaveAccess, of Berkeley, Calif., demonstrated its WaveRider system, which converts brainwaves, muscle or cardiac activity, and/or galvanic skin resistance to MIDI data. Information from head- or armbands is sent to a peripheral box connected to any Windows-compatible PC, where the data is sent to a sound card or to external MIDI devices. A Macintosh version is also in the works.

Perhaps one of the most noticeable trends at the show was the emergence of affordable, in-line 8-bus consoles designed for the project studio market. With the increasing popularity of modular digital multitracks, such as the ADAT format machines and Tascam's DA-88 recorders, the market for mixers to accompany these decks is growing by leaps and bounds.

Mackie Designs (Woodinville, Wash.) showed its 24x8 and 32x8 models with meter bridge and outboard sidecar options, and Alesis plans to start shipping its X2 mixer soon. Available in 16/24/32-frame sizes, the Spirit LC from Soundcraft (Northridge, Calif.) is an 8-bus recording board featuring 3-band EQ with sweepable lows and mids, eight aux sends and seven aux returns. Distributed by Samson Technologies of Hicksville, N.Y., Soundtracs' Topaz has 4-band EQ with sweep mids, six aux sends, four stereo aux returns, and automated VCA faders and mutes. Retail is $3,995 for a 24-channel Topaz; a 32-channel model is $4,995. And new from Tascam (Montebello, Calif.) is the M-2600, an 8-bus recording model that has 4-band mid-sweep EQ (splittable between the channel and tape inputs), one stereo aux pair and four mono aux sends. The 16-channel M-2600/16 is $2,999; the M-2600/24 is $3,799, and the M-2600/32 is $4,699.

However, one of the best parts of any NAMM show is surprise unveilings. AKG announced the formation of a new wireless products division with its first product, the WMS900, a modular UHF system designed for high-end, no-compromise performance. Also in the line is the WMS100, a cost-effective VHF system; other wireless products will be shown later in the year. In another departure from the norm, Peavey launched a new, high-tech line of acoustic drums, which float the drum shell using The Radial Bridge System™, a design where no mounting or tuning hardware contacts the shell. Inexpensive? Not exactly. A six-piece kit lists at just under $3,500.

A more interesting debut from the folks at Peavey is "Patrick," an in-store computer kiosk that provides music store customers with detailed, up-to-the-minute information about Peavey products—at the touch of a button. Patrick also can print out product spec sheets and let users watch informational videotapes.

As always, NAMM is a time for celebrating, with ample parties, hoopla, concerts and fun. ART marked its tenth anniversary with a host of new products; DOD saluted its 20th as the proud parent of a new 120,000-square-foot manufacturing facility, completed last year; Hammond celebrated its 60th anniversary and continues to

—CONTINUED ON PAGE 16

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

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.

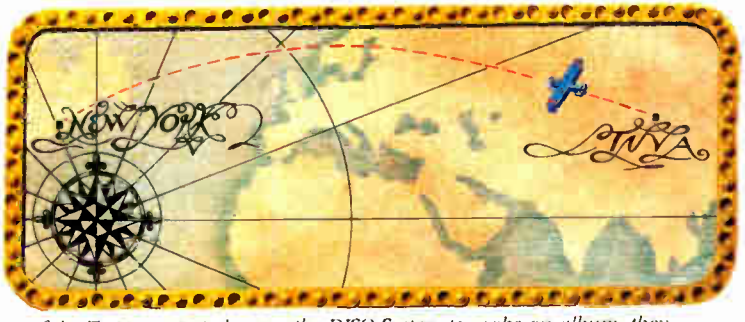
Typically, all it takes is new software.

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

AT&T

INDUSTRY NOTES

JBL Professional (Northridge, CA) appointed **Mick Whelan** to the position of product manager for large touring and permanent-install sound systems design. Also at JBL, **Thomas Weeber** was hired as sales and resource manager...**Steve Payne** joined Paramus, NJ-based **Crest Audio** in the position of division manager, stocking dealer market, for pro amps. Also, **Sam Spennacchio** was promoted to national sales manager of Crest consoles... **Peter Kehoe**, former Siemens Eastern region manager, joined **AT&T Digital Studio Systems** as Central/Eastern U.S. regional manager. Based in New York, Kehoe is directing sales of the DISQ Digital Mixer Core ...Swiss manufacturer **Sonosax** purchased the assets of **Digital Audio Technologies**, makers of the Stellavox and StellaDAT recorders. These recorders and other Sonosax products are distributed in the U.S. by new offshoot Sonosax USA Inc., located in North Hollywood, CA, and headed by **Manfred Klemme**, formerly of Nagra...**Bob Fulton** is the new president and CEO of **Carver Corp.** (Lynnwood, WA). He replaces **Tom Graham**, who continues as a consultant to the company and member of the board of directors. **Pat Mountain** was promoted to vice president of sales and marketing ...**Craig Paller** was named market development manager for **Electro-Voice** (Buchanan, MI)...**Apogee Sound Inc.** (Petaluma, CA) hired **Christopher Buttner** to the newly created position of marketing and media specialist...**Ampex Corp.** (Redwood City, CA) recently opened European headquarters for its subsidiary Ampex Media Europa B.V. in Nijmegen, the Netherlands. The company also formed a strategic alliance with TCG, a leading third-party transportation and logistical support company, also based in Nijmegen...**Eastern Acoustic Works**, Whitinsville, MA, hired **Joseph Manning** to its international sales management team. Manning is heading up sales in Asia, Australia, South America and Africa. Also at EAW, **James J. Kawalek** was appointed to the newly created position of product specialist...In an effort to streamline internal administration, affiliated firms **Group One** and **Celco** officially merged in January, retaining the Group One name. The company also appointed three new regional managers: **Marty Druckman** is West Coast sales manager, **Tim King** handles the Midwest, and **Brad Hanson** covers East Coast sales ...**Avid Technology** (Tewksbury, MA) appointed pro audio dealer **AudioTechniques** as its exclusive NYC rep...**QMI** (Hopkinton, MA) was appointed exclusive U.S. distributor for British-made **SoundField** mics. QMI also hired **Nicoll Public Relations** as its new U.S. PR firm... Melbourne, Australia-based **ARX Systems** hired **John Root** as sales and marketing manager for the U.S., Canada and Mexico. The company also hired two new distributors: **Audium S.R.L.** is handling Italy, and **Merheim** covers the Netherlands...**Jon Dressel & Associates Inc.** formed an agreement with **API Audio Products Inc.** (Wheaton, IL) to provide technical service and support for API gear...**Mike Bogen** joined the staff of New York City's **Dale Electronics Corp.** as director of pro audio sales...**Bag End**'s Northwest rep, **Roger Ponto Associates Inc.**, added **Karl Wahlenmaier** to its staff ...**Audio Wave Productions** moved to 1026 Garland Ave., San Jose, CA 95126; fax (408) 277-0272...**Barry Diament Audio** moved to 171 Rochelle St., City Island, NY 10464; phone (718) 885-2212, fax (718) 885-2293...**Studio Supply Co.** of Dallas recently expanded its operations with the addition of three new pro audio specialists. **Roland Antoine** and **Mike Rutherford** will work out of the Dallas office, and **Bruce Coffman**, formerly of LD Systems, will operate out of the new Houston office. ■

—FROM PAGE 12, CURRENT

make organs, Leslie cabinets and digital pianos; and Celestion—the oldest manufacturer of professional loudspeakers—is a ripe-old 70 and still keeps the industry rockin'.

NAMM returns to Nashville, the Music City, from July 30-31, this summer. In the meantime, we'll present our complete show coverage, with more NAMM goodies, next month. See you here.

MFEA DISTRIBUTES TEC AWARDS FUNDS

The Mix Foundation for Excellence in Audio recently distributed more than $25,000 from the proceeds of the 1993 Technical Excellence & Creativity Awards. A check for $12,500 was presented to the House Ear Institute and its Hearing Is Priceless campaign. The remaining funds were given to the Society of Professional Audio Recording Services, the AES Educational Foundation, Hearing Education Awareness for Rockers (H.E.A.R.) and seven schools with established TEC Awards scholarships. They are Berklee College of Music; Full Sail Center for the Recording Arts; Institute of Audio Research; Middle Tennessee State University; University of Massachusetts, Lowell; University of Miami and University of Southern California.

QMI DISTRIBUTES NEXO

Nexo, one of Europe's largest manufacturers of pro sound reinforcement products, selected QMI as its agent for the U.S. market. Dominant in a number of markets worldwide, and with production going full bore, Nexo is ready to embark on structured growth plans in the U.S., beginning at the NSCA show in April.

CORRECTION

In the January '94 directory of Sound Reinforcement Companies, Showco's proprietary monitor loudspeakers were incorrectly identified. The correct name is PRISM SRM². ■

QUALITY MIXING THAT'S WITHIN EVERYONE'S REACH

New technology brought down the cost of digital multitracks, samplers, keyboards and rackmount sound modules, enabling you to add more equipment to your studio. But now you're paying the real price: your mixer's inputs are inadequate, your recordings seem noisier – and you think you can't afford a better console.

Think again. The 8-bus Studio LC does much more for much less than any other mixer in its class. It juggles all your instruments, mics, signal processors and effects units effortlessly. It's so quiet, its transparent to digital recordings, and it's compact enough for even the smallest studio. Studio LC comes in 16, 24 and 32 channel frames and it has features you expect from a mixer costing twice as much: 82 inputs at mixdown (32 channel frame), 8 aux sends and 7 returns as standard, powerful 3-band EQ. It even has features you wouldn't expect, like a submixer input, a true Solo-in-Place facility, fully balanced inputs and ground compensated outputs.

UP TO 82 INPUTS AT MIXDOWN

8 BUS GROUP SECTION

8 AUX SENDS & 7 STEREO RETURNS

But how's it done? Uncompromising design drawn from 21 years of know-how, plus the most advanced mixer production line in the world, that's how. There are no cut corners, no cheap components, no skimpy circuits – just audio engineering at its best.

There's just too much to tell you about Studio LC in a one-page advertisement so if you're ready for a better mixer, write, call or fax for full details.

At last, Spirit Studio LC brings quality studio mixing within your reach.

Soundcraft JBL Professional,
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Northridge, CA 91329, U.S.A.
Tel: 818-893 4451. Fax: 818-893 0358.
Flashfax: 818-895 8190 – Ref Nº 254

SPIRIT
By Soundcraft

A Harman International Company

NEW

by Stephen St.Croix

DIGITALIS PART 1

(OR: I DON'T THINK THIS SOUNDS QUITE RIGHT)

IN THE BEGINNING

There is no question that the key to true happiness is getting your clock cleaned. After you have had your clock cleaned, everything not only seems better, it *is* better. Life is more enjoyable, you are more relaxed, everybody seems a little nicer. Fewer headaches, smoother days. Or...

Or you can just continue to go through your life with a dirty clock. You'd be surprised how many do just that.

Here we go. Digital is great. It's wonderful, it's marvelous, it's...well, you know, it's *digital*. We all rely on it more every day. But did you ever stop to think that all this great digital magic that we are buying—with its awesome accuracy and unprecedented repeatability—is limited by a common weakest link? Well, it is. All these hypercool digital dream machines need *clocks*. They certainly won't run or even boot without a clock, and how well they work depends on how stable the final clock is at the D-to-A converters. Sort of their own little digital "hearts." Aaaah. Isn't that cute? Little digital hearts.

Anyway, these little hearts are the absolute reference for what goes on in there and for how the stuff you want to process or record gets in and out. And these little reference clocks are, in fact, *analog*! Oh my! What's an engineer to do?

ROCK ON

Well, you could...get your clocks cleaned. Digital clocks start off as slaves to analog crystals. A clock circuit is basically a rock, a capacitor, a resistor or two, and very simple digital signal shaping. When it's exposed to electrical current, the little slab of rock vibrates at a frequency that depends on its size and thickness. What? You say the rocks at your house don't do this? Actually, if they are properly cut, you stand a pretty good chance that a few of them will.

So what do we have here? Your digital equipment is controlled by a timing circuit made by Barney Rubble. A rock from your back yard is chiseled down to a little slab, and then the obvious happens—something we would instantly see as log-

ILLUSTRATION: ANDREW SHACHAT

DIGITAL EVOLUTION

Technology evolves. The market develops. DIC Digital excels.

As one of the original suppliers of DAT tape to the professional, DIC Digital recognized industry demands. As a result, we were the first DAT supplier to offer a truly professional DAT cassette.

Once again DIC Digital is leading the way by introducing recordable CD's. Our discs are fully compatible and bear the "compact disc" logo. DIC Digital's CD-R's are readily available in 18, 63 and 74 minute lengths. Call today for the name of your nearest DIC Digital dealer.

THE ULTIMATE IN SOUND

DIC DIGITAL™

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Phone: 201-692-7700 or 1-800-328-1342, Fax: 201-692-7757

ically unavoidable if we were the experts: It is immediately bestowed with the honor and responsibility of controlling *everything the human race sees and hears* from its digital world. Cool.

To make matters even a little more silly, for digital data to move from one machine to another, the clocks must be the same: truly identical. But since these clocks come from our analog world, they *aren't* exact. In fact, they are dramatically less "identical" than you would ever think. Their frequencies are never the same; they drift in their own directions at their own rates, and they jitter. Boy, do they jitter.

All equipment must either lock or data-rate convert if it wants to dance. The first approach—locking—is obvious. One device must relinquish control (ignore or stop its own heart) in order to slave to the other. Only then, with the machines all actually using the same clock, can data flow. Remember from grade school how terrible it was when you tried to dance and both of you led or both followed?

In the second approach, all clocks are allowed to careen through space and time at their own rates, and the data is then "gearboxed" or sample-rate converted. The problem with this is that it is inherently a destructive (data-modifying) process. Bits of data are either thrown out, repeated or synthesized to make up timing differences. Somebody who you don't know designed the piece of gear and decided when and how this should take place—not you.

Each of these methods introduces its own errors, and the multitude of variations and implementations have their own idiosyncracies, or idioasyncracies, as it were. In the historic words of *SNL*'s Roseanne Rosannadanna, "If it's not one thing, it's another."

PAY TO PLAY, PRAY FOR THE DAY WHEN WE CAN SAY, "IT DID IT MY WAY"

Yes, boys and girls, real-world clocks are jittery, plain *dirty*! What are we gonna do about it? We're going to clean those clocks. This is something that you can do at home.

Now I want you to stop reading for just a moment and go up to your parents (or spouses) and ask them for five dollars. Now put it in an envelope and send it to me. I'll let you know in Part Two how many I got. Okay, good. Now back to the secrets of how to clean your own clock.

There are three basic areas to cover: setting up an environment where your gear can generate the best possible clocks, hooking things up so that the datastream suffers as little damage as possible while it is passing digital I/O from one piece of equipment to another, and tricks to repair the damage that *is* going to take place anyway.

1) THE BIG HAND IS ON THE THREE, AND THE LITTLE HAND IS MOVING ALL OVER THE PLACE

Let's start at the start: generating the best possible clock. Since your crystal is a rock, it is subject to the laws of physics—most notably that its dimensions change as a function of temperature. The rock *du jour* works by resonating, so a change in its physical dimensions unfortunately causes a change in its resonant frequency; it drifts as it warms. Oops. Some designers use little ovens that bring the crystal up to some temperature that it can maintain and then keep them there for as long as the gear is up.

Serious Automation

CS2000

Digital Control Studio System

The new CS2000 digital control studio system from Euphonix leads the industry in computer aided mix management. With the powerful Version 2.0 software the CS2000 incorporates features that take it beyond any other system on the market.

Screen based interactive graphics supplement the controls and indication on the console surface. Intuitive displays provide the engineer with instant feedback on session and mix status.

The system includes SnapShot Recall™, for instantly resetting everything on the console, and an updated Total Automation™ mixing package.

Total Automation has many new and innovative features. Play back a mix and all console settings are instantly recalled together with the dynamic automation. Over 99 levels of undo are instantly available to the engineer in the form of mix passes.

The new template software allows the engineer to preset the level of automation for every control on the console. Those familiar with conventional systems can simply start by automating lower faders and mutes, moving on to upper fader, pan, aux send, and input gain automation when the session demands it.

For total control and creative flexibility, no other system competes with the CS2000.

Euphonix

Worldwide Sales: 10647 Riverside Drive, N. Hollywood, CA 91602 • (818) 766-1666 • FAX: (818) 766-3401
U.S. Central Region: 1102 17th Ave. South, Suite 202, Nashville, TN 37212 • (615) 327-2933 • FAX: (615) 327-3306

In addition, each of the other components in the oscillator circuit has its own temperature-related, value-change curves. Any one of these components changing value will cause the oscillator to drift. Basic approaches such as attempting to design so that the drift of one component cancels out the drift of another help somewhat. Pretty hokey but absolutely necessary. Even if you get these counteracting components right next to each other on the circuit board, or put them all together in an oven, other factors effect them: power supply stability, induced modulation and noise, interactive instabilities from proximity to another digital clocking circuit, and good old aging.

You might ask, "What can a person such as myself do about this?" Actually, there's a lot that you can do. Don't even think of using a piece of digital gear until an hour after you have turned it on. And if you plan on using an A/D or D/A converter, don't think of it until three to five hours after power up. Really. Don't put stuff that gets hot under your digital gear, and make sure that your AC line is as clean as possible. Run serious line conditioners. Be nice to animals.

2) IN LIKE FLINT?

A lot of people think that once you have converted to digital, you're in; your data is immune to the horrors of our uncertain, unstable analog world. You wish. The reality is that we merely *trade* certain problems for new ones, for the privilege of seriously improved power in the digital domain. In fact, in some ways interconnectivity is a little *worse* with the current state of digital than it is with analog. For example, you know that analog audio cables suffer from the effects of line capacitance.

All real-world conductive materials have internal resistance, so when you add capacitance, you create a filter. Real, live passive analog EQ, with all the infamous side effects. Phase shift, HF rolloff and transient destruction are all applied to your poor little signal. Termination decoupling caps add LF rolloff, and hum and buzz leak in through real-world, nonideal shielding. High-current line drivers add noise and distortion of their own. Bad copper alloys and unknown metal junction pollutants in the actual soldered connections can all add noise and even semiconductive nonlinearities. Ground loops cause hum. I am not even going to open discussions on line *inductance*. Go digital and these curses go away, but even as our industry is celebrating its newfound freedom from these horrors, new troubles appear.

Run a line from one piece of digital gear to another, and you are subject to the following curses.

DIGITALIS INTERRUPTUS

Oh, wait. We're out of space. Next month, I will tell you exactly how you can minimize these problems for little if any money, so it should be worth the wait. ■

Stephen St.Croix is converting one room of his home to a totally digital environment. He has removed all soft, rounded furniture and wears only sharply tailored clothing while there. As no round objects are allowed, no CDs are present, so he has not yet heard music there. He says, "When done properly, science can be frustrating."

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.

Mics like the U 47, U 67, U 87, and the TLM 170 are legends in the industry. Now, with the TLM 193, you can have Neumann performance in the classic tradition for less than $1300 us!

Make your next recording a classic. Use Neumann... the choice of those who can hear the difference.

Introducing the TLM 193
Large-Diaphragm Condenser Microphone

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Neumann|Canada

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Tel: 514.426.3013 • FAX: 514.426.2979

USE READER SERVICE CARD FOR MORE INFO

by Russ Berger

The new SSL Scenaria room at Russ Berger-designed Video Post & Transfer, Dallas

IT'S YOUR FACILITY

THE FIRST STEPS OF STUDIO DESIGN

I am having a tough day. I've spent the entire morning on the phone with studio owners who are a little confused about how to go about designing a facility.

One client wants construction plans by the end of the month. She just can't decide whether her new facility will have three or seven studios, which of course depends on whether she decides to produce radio jingles or go into film scoring.

Another guy wants to know how much foam to use for a room of 1,600 cubic feet (kind of like phoning a brain surgeon out of the Yellow Pages and asking what size scalpel is best).

Then there's the studio owner-to-be who's just signed a lease on a former S&L building, has some equipment coming in on a truck tomorrow and wants to know where on the walls to put the acoustics so they can be ready for their first session week after next.

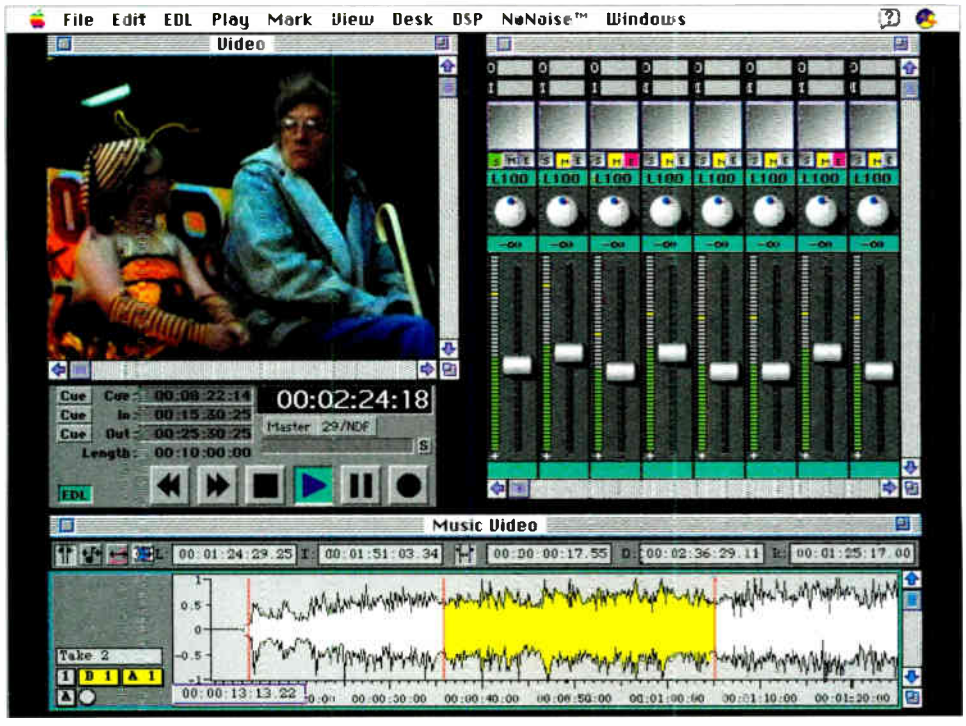
Okay, okay, so maybe I'm just feeling a little beat up right now, but we take a personal interest in our clients' projects, and it's hard to help some of them see where they're going. Just as it's true that you don't get an instruction manual when you become a parent, there's really nothing that prepares a studio owner for building a facility.

It's no wonder that a lot of clients are pretty bewildered when they first call us. The hardest part—the part that charts the course for the entire project—is getting started. What we need is a guidebook for taking the first steps in the design process so that you end up with a successful, working facility.

WHERE TO START

We periodically help teach a seminar on facility planning and design. It gives us a chance to step back from specific project crises and take a more abstract look at the design process. More often than not, the people in these workshops want to know, "What do I do first?" The front end of a facility project is probably the most important yet misunder-

How to Become a Power User



Load, edit, and dump simultaneously.
No other digital audio workstation offers the multi-tasking capabilities of the Sonic System. You can load and unload to the hard disk(s) in the background while you edit in the foreground. And while you're working, you've got plenty of playback capability — even the most basic Sonic System can play 12 or more channels simultaneously from a single hard drive! With NoNOISE®, you can now run *two* jobs simultaneously in the background and keep working in the foreground.

Create radio spots, edit and master a CD, cut sound for film or video, and restore sound with NoNOISE.
The Sonic System is the power platform for a wide variety of applications. Our product line is entirely modular and can be easily expanded or customized to your line(s) of work.

Share soundfiles with the engineer(s) next door.
With MediaNet™, you can share soundfiles, edit decision lists, and processing resources among Sonic systems. MediaNet is the true Power Users' network — it supports playback of 80 or more channels simultaneously, and multiple users can access the same hard disks (even the same soundfiles!) without introducing a drag on the host system.

Cut to picture with SonicVideo™
Our built-in digital video gives you fast access to picture so you never have to wait for a tape machine to shuttle. SonicVideo plays back smoothly without any interruptions — even when listening to 24 channels of digital audio!

Write audio CDs and CD-ROMs in double speed.
Sonic Solutions was the first to integrate a workstation with a CD recorder. You can create high-precision CDs which can be used for direct glass mastering, archives, or reference copies. And soon, you will be able to create the new CD-DVs (CD-Digital Video) on a Sonic System!

Invest in a Sonic System.
No other system offers the breadth or flexibility of the Sonic System. And no other system can match the performance for the price — an entry level system, including Macintosh and hard disk, is under $10,000 (slightly higher outside the US).

For more information on why Power Users prefer Sonic, please call your local dealer or our product hot line at (415) 485-4790.

Headquarters
1891 East Francisca Blvd., San Rafael, CA 94901 USA
Tel. 415 485.4800 Fax 415 485.4877

Sonic Europe
Brugwachter 19, 3034 KD Rotterdam, The Netherlands
Tel. 31.10.414.7354 Fax 31.10.414.7365

SONIC SOLUTIONS

stood part of the design process. What can you do to make your project a success?

Establish reasonable goals, find a good site and select a competent design team. The rest of the project will usually take care of itself. This requires a lot of concentrated effort early on in the planning, but it will pay off in the long run. Good decisions at the beginning of a project act like a fulcrum, increasing your leverage to control the budget, quality and schedule later on.

Look at it this way: Many of you have been involved with sessions that were not rehearsed, where the bass player brought his brother and girlfriend in to produce or the band came into the studio with a few half-baked ideas but expected to cut six songs in 45 minutes.

On the other hand, if you recall a session that went smoothly and created exactly the results that everyone envisioned, I'll bet that the reasons are pretty clear: planning, leadership, an understanding of the process, willingness to give and take direction, open communication. Well, the same things apply to designing a studio.

GETTING WITH THE PROGRAM

Most clients are keenly aware of the effect that the designer, the budget or the building will have on the outcome of their project. But sometimes they overlook the fact that their own input, actions and leadership have at least as much impact on the results.

Before you can create your dream facility, it's important to set clear project goals that reflect your operations, finances, technical performance and target market. As you bring other people in to assist with the project, these goals help keep everyone on the same page. In architectural terms, as these ideas and expectations are fleshed out and refined, they become the *facility program*, a document that spells out what the facility is supposed to be and do; it serves as a reference guide for the design team.

The more information you can provide to the designers you select, the more likely you will get what you want. They need to understand who you are and what your operation is about before they can help you plan your project effectively.

Write it down. If you find that you can't explain what you want to do in black and white, you might not actually know what it is yet. Include as much supporting information as possible—photos, equipment lists and sketches—anything that will help define where you're headed.

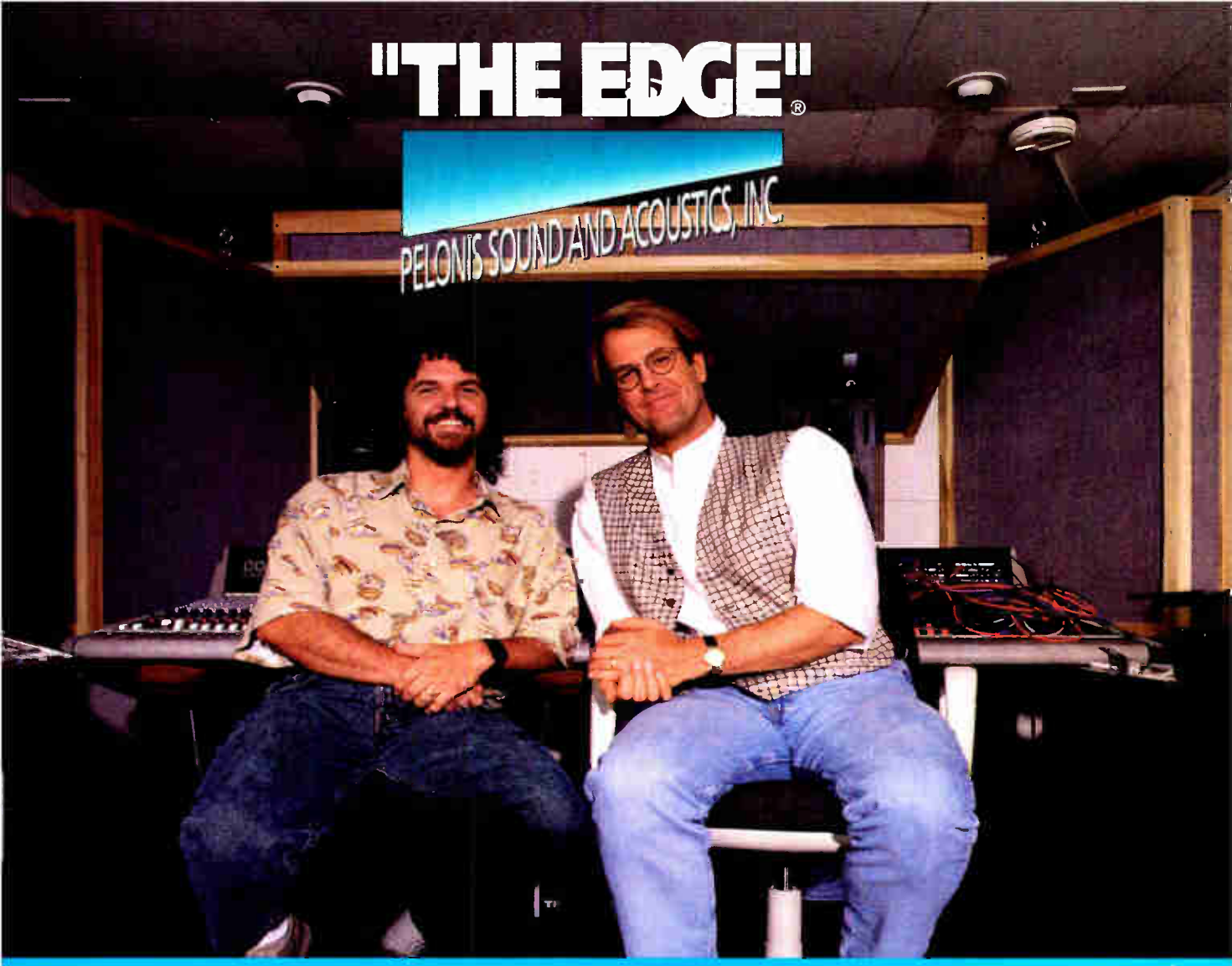
However, don't make new technology the driving force behind the design. Figure out how you want your rooms to function, then relate available equipment types to those functions. Remember, even when equipment changes, many other facility needs—acoustics, ergonomics, traffic flow, lighting, noise control—remain.

PICKING THE DESIGN TEAM

Pick a design team that you can trust. Remember that these individuals or firms are on your side. This is not an adversarial relationship; design professionals aren't used car salesmen. In fact, if they have something to sell or prove, run (do not walk) to someone who has your best interests at heart.

Different studios have different needs. Every project is unique, and you should be wary of anyone who

"THE EDGE"®



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seems to have a "cookie cutter" approach to design or implies that they know exactly what you need before you've shown them around the place.

This is your facility. Your design team is working for you, not the other way around. Their job is to provide you with ideas, recommendations, guidance and alternatives based on their experience and expertise, but always directed by *your* desires and goals.

Design consultants are part of a service industry, but occasionally we hear other designers talk about clients as if they were the enemy, complaining that they get in the way of good design. That's a pretty good sign that it's time for the designer to start looking for another line of work. A design professional should thrive on challenging projects. The charge of your design team is to find creative ways to meet your needs, enthusiastically attack the problems at hand, find cost-effective solutions, make appropriate compromises and, as much as possible, make the process fun.

Through all this, try to keep your role in perspective. As the director and focal point of the design team, your talents are wasted if you can't keep a fairly global overview of the process. If you want to dabble in details because it's fun or because you're particularly good at it, great! But don't lose the forest for the pine needles. The selection of rack-mount screws should not interfere with your review of the room sizes or the technical power systems or some other larger, less forgiving issue.

The design team can't (or at least shouldn't) tell you your business. No one knows your market better than you. The reason to seek out qualified designers is to help flesh out your ideas, figure out how best to get what you need and find new ways to address old problems.

Effective communication is the lubricant that keeps a project moving. Miscommunication is responsible for more failed projects (and relationships) than any other factor. If you establish the form, frequency and distribution of project information among the design team early on, the rest of the process will be much easier (and maybe even possible).

I see the design of a studio facility increasingly as a holistic process. It's not about good acoustics vs. the budget, or good acoustics vs. aesthetics, or good acoustics vs. anything else. For a successful project, acoustics must work in concert with the architecture, the electronic systems, the structure and everything else about the building. It is meaningless to champion "perfect" acoustics, because there is no such thing. There is only appropriate acoustics, and that has to do with a host of other issues besides the narrow concerns that most people associate with design.

Of course, there's much more about the first steps in the design process that is important to the success of a project, but you get the idea. Just remember that the more you do to make well-thought-out, careful, rational decisions early on, the easier it will be for everyone else to help you get what you want out of your new facility.

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Russ Berger is a TEC Award-winning studio designer based in Dallas, Texas.

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by Mr. Bonzai

TOM PETTY

HISTORY IN THE HITS

"I guess people usually put out a hits collection before 18 years go by," Tom Petty admits modestly, "but I just never thought about it before."

The Tom Petty musical saga started back in his hometown of Gainesville, Fla., when he teamed up with guitarist Mike Campbell and keyboardist Benmont Tench to form a band called Mudcrutch. The band got a record deal, moved to Los Angeles in 1974, their first single flopped, and the group disbanded. Two years later they were joined by fellow Floridians Stan Lynch on drums and Ron Blair on bass, and Tom Petty & The Heartbreakers were born. Luck was with them this time around. The big break for The Heartbreakers was a radio-friendly song called "American Girl," which was described as "Byrds-like" at the time and even recorded by Roger McGuinn. "Breakdown," also from their first Shelter Records album, was their first to crack the Top 40. The band toured unceasingly in the late '70s, successfully bridging the gap between the burgeoning new wave and the pop mainstream. It was melodic rock, but with some attitude.

In 1979, The Heartbreakers, with Blair replaced by Howie Epstein on bass, began work wih producer Jimmy Iovine and ace engineer Shelly Yakus and scored big hits with "Don't Do Me Like That" and "Refugee." "We started to get a much bigger sound on the records," Petty says. "It was certainly a turning point productionwise."

In 1982, the band recorded "You Got Lucky" and made a landmark music video, known as a "promo clip" at the time. Shot in the desert with a futuristic Western motif, it was released just as MTV was being born—indeed, The Heartbreakers were one of the earliest bands to benefit from heavy MTV play. In 1985, Dave Stewart of Eurythmics entered the picture as co-producer of "Don't Come Around Here No More." Petty describes it as one of his favorite singles, "with all sorts of strange sounds, and a pretty wild arrangement—a first sign of breaking ground and finding new things musically."

Working with Mike Campbell, Petty's solo album *Full Moon Fever* hit in 1989, produced by Jeff Lynne (a fellow Traveling Wilbury along with Bob Dylan, George Harrison, and Roy Orbison). From The Heartbreakers' most recent album, *Into the Great Wide Open*, the hits package includes the title track and the enchanting "Learning to Fly." Of the two bonus tracks produced by Rick

ROBERT SEBREE

Rubin, Petty says, "He brought us back to a sense of freedom—nothing is too outrageous, we can try anything, and it's evaluated for what it is."

Our conversation took place just as the *Greatest Hits* album was completed and as Petty was in the final stages of preparing a Disney Channel rockumentary of his career, directed by Jon Bendis.

Bonzai: Any surprises for you in going over the old film footage?
Petty: I was surprised that the music held up as well as it did—performances that I thought might not be my favorites, in retrospect, seeing them 18 years later, they're pretty damn good. It was kind of fun watching it, actually.
Bonzai: How have your songs changed over the years thematically?
Petty: Well, I think the songs have certainly grown in a lot of ways. Lyrically, I've certainly gotten better. I think I've gotten better musically overall, although I still do enjoy that wild rock 'n' roll stuff. In a way, I think that's where I'm headed again.
Bonzai: How have the changes in recording technology affected your work over the years?
Petty: Well, to my knowledge, the changes in recording technology have really screwed up music for the most part. I spend an inordinate amount of money to stay away from any sort of technology.
Bonzai: I'm not sure I understand—you spend the money to stay away from it?
Petty: Yes, because it's getting more and more expensive to buy this old '60s gear. We won't allow any computer of any kind in the room at any stage of the game, or any sampling, synthesizer, or anything. I really like the sounds that you get through cheaper equipment. Actually, last week we were mixing, and I went to three studios and ended up going back to Mike Campbell's house and mixing on his Soundcraft desk because I didn't like any of the multimillion dollar desks I was working on. They just put too much gear in there, too much stuff that you don't need that really colors your sound. I've got the sound I want on the tape—I don't really want another sound coming up through the board.
Bonzai: You've known Mike Campbell since you were teenagers?
Petty: Yes, we met in 1970.
Bonzai: How do a friendship and an

—CONTINUED ON PAGE 209

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SOUND FOR PICTURE

SPRING 1994

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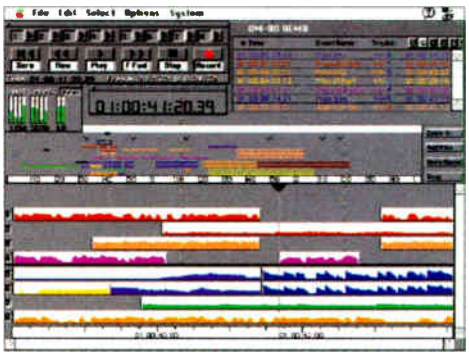

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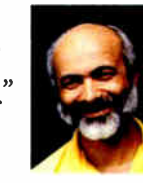

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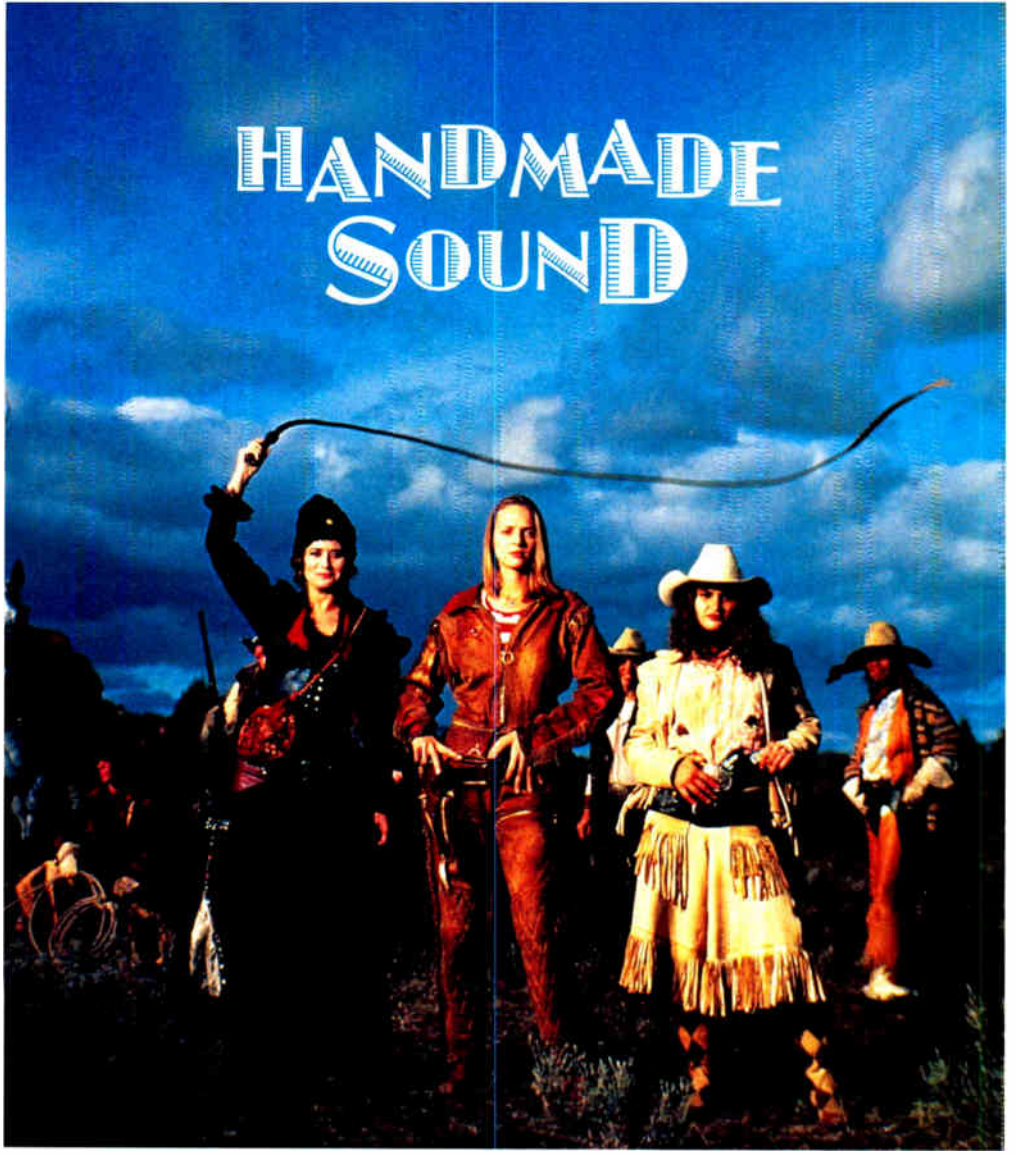


PHOTO: TIMOTHY WHITE

Delores Del Ruby (Lorraine Bracco), Sissy Hankshaw (Uma Thurman) and Bonanza Jellybean (Rain Phoenix) with cowgirls in* Even Cowgirls Get the Blues, *directed by Gus Van Sant

Audio Post-Production For

EVEN COWGIRLS GET THE BLUES

[Even Cowgirls Get the Blues *was originally scheduled for a November 1993 release. At the last minute, director Gus Van Sant, in conjunction with FineLine, pulled the film from distribution for a re-edit. According to reports, Van Sant was to have a new cut completed by the first of the year, and the film was to be released this month. The interviews for this story were conducted in August 1993 at the Saul Zaentz Film Center in Berkeley, Calif., during the final days of the final mix.*]

It's the end of reel 9, beginning of reel 10, and we're coming down from the climactic gunbattle on the Rubber Rose ranch. The last flock of whooping cranes in North America has flown off on a delayed migration. And Bonanza Jellybean, de facto head of the Rubber Rose, has been shot dead by the FBI.

The cowgirls of director Gus Van Sant's *Even Cowgirls Get the Blues* sit heavily in the bunkhouse. The camera moves around the semicircle of long faces and weary shoulders as Debbie (Victoria Williams) strums and sings "Happy Trails to You," then pans slowly past Williams to Sissy Hankshaw (Uma Thurman), laid up

BY TOM KENNY

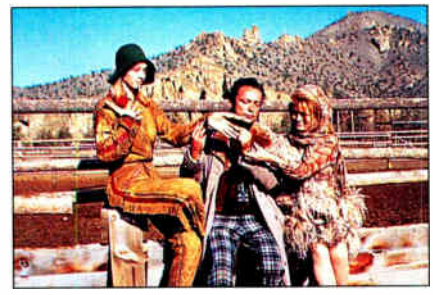
in a bunk, forlorn at the loss of her lover and friend.

This music, the only piece in the film—score or song—that does not come from k.d. lang and Ben Mink, has been left dry. On second pass, re-recording mixer Leslie Shatz adds echo from a Lexicon 480 (sort of a dreamy reverb) to the final measures, so that when the song tapers off, it swirls around cavernously, as if we have entered Sissy's head.

As Shatz (sound designer and mixer for *Bram Stoker's Dracula*) and re-recording mixer David Parker move through the rest of the reel, they delete some of the ranch sounds ("too many horse whinnies"), take out the steady-state wind in favor of whooshy wind, remove the sound of a brown paper bag rustle, bring up the crackle of burning love letters and bring out individual lines in the voice-over.

Van Sant returns from lunch to listen to playback on reel 10. "Can we shorten the intro by a measure," he suggests, "to get the sense of time passing more quickly? And can we move the echo a little later, so that it comes in as the camera moves to her face?" Done.

Later, a score cue is shifted a few frames to come in as the character known as The Chink (Pat Morita), lying in his recovery bed, looks at a photograph. And in reel 11, the song "Sweet Little Cherokee" is repositioned over the credits so that it ends as the first set of main credits winds up. By chance, it turns out that the song now begins—with a k.d. lang howl—just as the film ends and the screen goes blank. Shatz calls such moments, and there were plenty, "inspired accidents."



PHOTOS: ABIGAYLE TARSCHES

Sissy Hankshaw (Uma Thurman) with the Film Director (Udo Kier) and Miss Adrian (Angie Dickinson)

Even Cowgirls Get the Blues, a Fourth Vision production distributed domestically by FineLine Features, is Gus Van Sant's third commercial feature film (the other two are *Drugstore Cowboy* and *My Own Private Idaho*). Based on the best-selling novel by Tom Robbins, who also provides the voice-over for the film, *Cowgirls* is a playful cross between cult and camp. It is the story of Sissy Hankshaw, born with enormous thumbs, who becomes the world's foremost hitchhiker and the cover girl for Yoni-Yum feminine hygiene products. She ends up with a renegade group of cowgirls on the Rubber Rose ranch, and together they fight for the rights of the last flock of whooping cranes in North America. The Chink moves in and out, imparting wisdom and manning the Clockworks, the focus of a Native American religion based on notions of time.

Cameos abound, with appearances by Roseanne Arnold, William Burroughs, Ken Kesey, the late River Phoenix, Buck Henry and many others. Stars Uma Thurman and John Hurt (The Countess, the owner of Yoni-Yum) are outstanding. And a haunting, eerie, countryish score by k.d. lang flows through the 90-minute picture. The songs and score are the unseen actor.

"If there was a music editor on the film [Van Sant has a credit as music supervisor], I wouldn't have been doing any of that moving and rearranging of music in the final," Shatz explains. "It gets back to this handmade feel that Gus wanted. I was willing to fly by the seat of my pants and experiment, and I felt like I could take a chance, take a risk. If it was awful, we'd try something else. And that spirit kept building.

"Maybe Gus didn't know what he wanted until the final moment," Shatz continues. "I like to say that the mix is the final performance of the movie. It's a standout score, but part of what makes it great is the way that Gus reinterpreted it for the movie. Not very many of the cues are where they were originally intended to be, or in their original form. We did a lot of manipulation. I think this must be difficult for k.d. lang, because when you write for record or CD or radio, the composer puts his or her stamp on it, and that's the way it goes out. But in film, the music is just another element in the palette for the filmmaker. The music doesn't reign supreme."

The five k.d. lang songs in the

Dialog editor David Cohen at the DAWN workstation at Teknifilm Labs, Portland, Ore.

PHOTO: PETER APPLETON

Supervising sound editor Kelley Baker (L) and editor Peter Appleton at the Kem, Square One Productions Portland, Ore.

PHOTO: PETER APPLETON

film, as well as the score, were recorded by Marc Ramaer at a home studio in Vancouver and Skip Saylor Recording in L.A. They form part of lang's latest album. "k.d. approached Gus about acting in *The Mayor of Castro Street* [based on the life of Harvey Milk, the assassinated gay San Francisco politician] while Gus was still working on it," explains producer Laurie Parker, who also produced *My Own Private Idaho* and Michael Tolkin's acclaimed *The Rapture*. "They had lunch, and all Gus could talk about was *Cowgirls*. By the end of lunch, she wanted to do the score. And she was great. She had an outstanding vision of the music. Ben [Mink, lang's collaborator] is a master instrumentalist, and they are such fun together. She's a powerhouse. He's a powerhouse. And she's a wonderful guitar player."

Shifting a composer's music in the final is not unique to *Cowgirls*, by any means, and it certainly made it easier having the k.d. 24-tracks on the stage. The unique part was the interplay that took place in the Saul Zaentz Film Center, Mix Stage 2, in Berkeley, Calif., between director/writer Van Sant, producer Parker and her 18-month-old son Kaj, mixers Shatz and Parker, and sound designer Kelley Baker. The mood was relaxed, and the energy was experimental.

"As you saw, we're not afraid to do things on the stage," says Baker, owner of Square One Productions in Portland, Ore., and sound designer on *My Own Private Idaho*. "That's one of the things about working with Gus—it's all part of the process. Do we need an effect on stage? Great. It's not like, 'Oh, God, get an editor in here, we gotta stop everything.' If somebody gets an idea on the stage, we do it.

"The big thing with Gus' films specifically is that they have this handmade feel to them," Baker continues, echoing what seems to be a theme. "And I like making the soundtrack feel a little on the handmade side. For example, we went in and replaced an airplane because the original airplane, which was cut wonderfully, sounded too nice. Gus said that he liked the one we had in the temp mix. So I called the sound house where the picture editor got it, and the guy said, 'He liked that? Well, it's on a record, but it's not particularly clean.' But that is what Gus wanted, and I like it—that funky old airplane sound.

"The big thing with Gus' films specifically is that they have this handmade feel to them," Baker says, echoing what seems to be a theme. "And I like making the soundtrack feel a little on the handmade side."

"Over the last 20 years, we've lost a lot of great sounds—the telephone bell rings, typewriters, V-8s. But we needed all those effects for the show because it's a period piece."

EFFECTS AND BACKGROUNDS

About 25% to 30% of the effects in *Cowgirls* are original recordings from Baker and his team up in Portland. The rest come from his extensive, often quirky library, which includes effects gathered from ten years of animation work. Peter Appleton and Mary Bauer were the effects editors, and though it's Baker's name in the credit roll, he attributes much of the sound design to collaboration with Appleton, Richard Moore and Bauer.

Van Sant films are not typically effects-heavy, Baker says. But besides Van Sant's outstanding musical sense, the director seems to have an ear for backgrounds and subtlety, and so does Baker. Whenever we see Bonanza Jellybean in the film, for instance, we hear jangling spurs. After her death, we hear the spurs on Sissy.

"I don't know if anyone will ever catch this," Baker says, "but when Sissy and The Chink are down below in the cave, you hear a bunch of crickets. But when we go to the Clockworks, where they are walking along, we put in just a single cricket. We referred to it as the Sissy cricket, because there are a bunch of scenes where she is by herself, or what we considered a little more vulnerable. When she and Jelly are in the sleeping bag near the end, and all the cowgirls are whooping it up over by the campfire with lots of crickets, out in the sleeping bag there is just one. It's little stuff that probably no one will ever hear, but we use it to work on the unconscious. If the backgrounds are a little different, I think the audience registers that on some level."

The New York scenes, by contrast, are busy with sound, and that was the intention. The party scene in Julian's apartment is loaded with urban noise. "We wanted overkill," Baker explains. "On my first visit to New York, I was walking around, and I had to go back to the hotel at four in the afternoon. There was just *too much noise*, and it was getting to me. I also remember waking up at four in the morning, and there was noise, seven floors up. New York just doesn't stop. So Gus and I talked about it, and that was his impression, too, so he said, 'Absolutely. Kill us. Push it.'"

Yet much of *Cowgirls* takes place outdoors, either on the ranch, up on The Chink's ridge, in the cave or on the road. Because the environments changed so much, even within the context of the ranch setting, backgrounds often set the tone. Most were assembled in the Doremi Labs DAWN system, as was all of the dialog, by dialog editor David Cohen.

"Birds were really important in this film," Baker explains, "so we designed specific backgrounds for specific parts of the ranch. Everywhere you go, there is something different. We researched the types of birds from the prairie, what kinds of birds would be up with The Chink in the high mountains—obviously, we knew the hawk would be there. But here we are in the middle of eastern Oregon, so I'm looking for things that people might not necessarily hear but are indigenous to whatever area we're in.

"There are tons of winds," Baker continues. "I love winds because wind adds a texture that you rarely

ever hear when you're outside doing something—you feel it. In the movies, we have the chance to let you hear it, to try to create what you would be feeling. Wind, to me, is always there. The other big thing—and people never talk about this—is that winds hide a lot of problems in the dialog."

Wind sounds can be heard throughout Van Sant films, and they fit nicely with the time-lapse images of directors of photography Eric Alan Edwards and John Campbell, as well as the open prairie scenes. The connection of the visual and aural elements is obviously crucial to the whole suspension of disbelief when viewing a film. That point is driven home when we first meet the whooping cranes in *Cowgirls*.

Van Sant uses stock photography for the whooping crane scenes, and he doesn't try to hide it. Baker called all over the country to find an authentic whooping crane call and ended up with a 15-second DAT from the Cornell Ornithological Library. That was loaded into the DAWN, broken up and shifted around so that the same loop didn't play over and over. After a while, Baker says, he feels like he's hearing the same thing, though he sprinkled in sandhill cranes and some other birds.

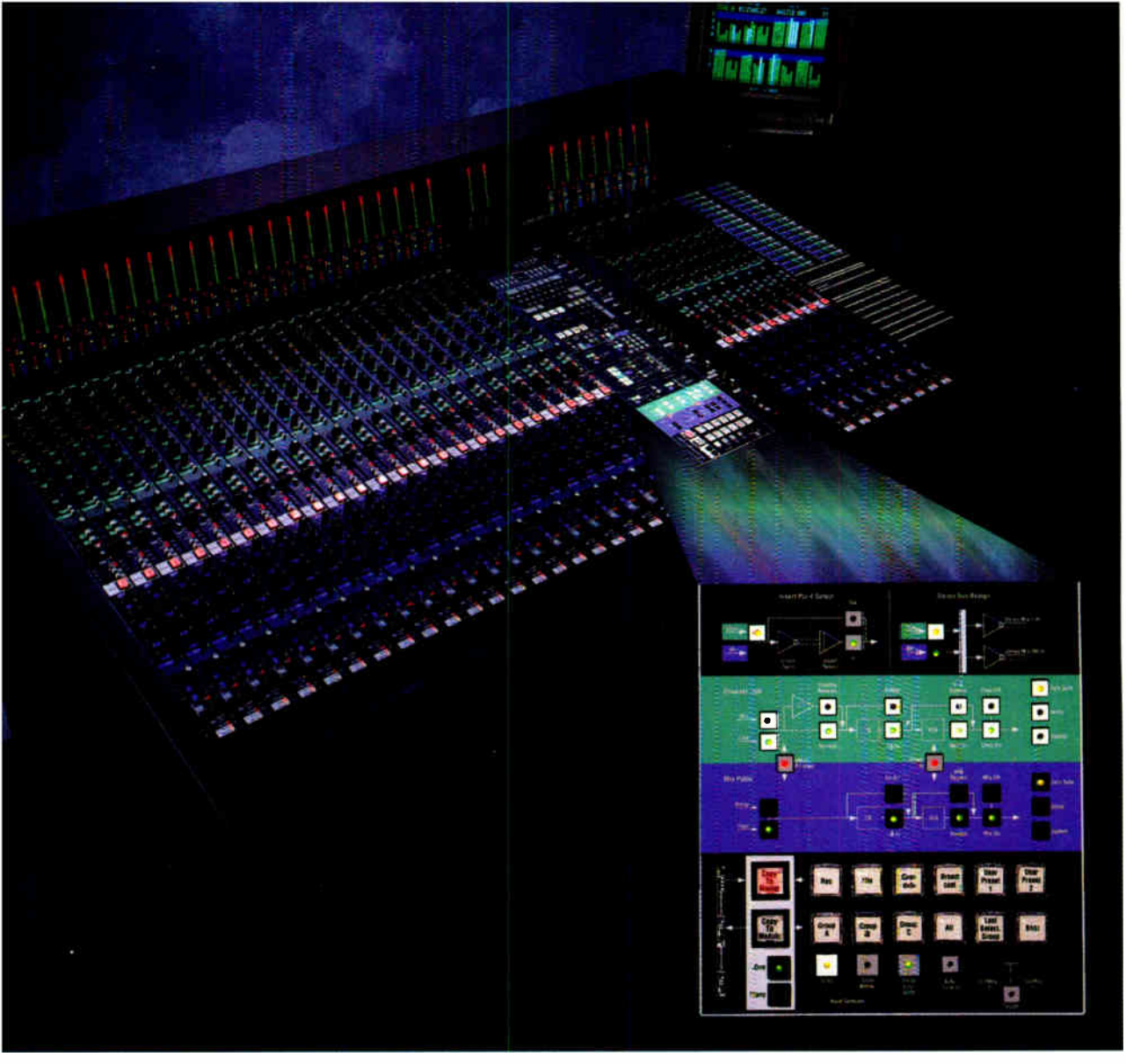
Shatz, on the other hand, thought it worked perfectly. "To me," he says, "the sound is a stock sound. And it's absolutely perfect that a stock shot would have a stock sound. Why should we try to hide it? It would seem more out of character to have these stock shots with some incredibly well-recorded piece. The whole idea of the cranes in the film is that they were this ideal, this icon. When they appear, they are an icon. You cut away, and it's a closely framed shot with no background. The sound is obviously repetitive—it's an icon, and it stands out. I don't feel it was necessary to hide the repetitive nature. To me, it was another one of those divine accidents."

Incidentally, the crane wing flaps were all done in Foley at the Saul Zaentz studios by Foley walkers Jennifer Meyers and Margie O'Malley, recorded by Eric Thompson and Jim Pasque. In the climactic scene, those are three channels of wing flaps that were transferred twice and cut at different intervals, eventually ending up with 12 channels of wing flaps. As Baker said, "We wanted it to work."

THE CLOCKWORKS

Not everything in this film is subtle, and not everything happened by accident. The shining moment of the film's sound design actually takes up nearly an entire reel: reel 6, inside the cave, when we are introduced to The Chink's Clockworks, a ragtag collection of found junk, assembled into a primitive, timekeeping version of the classic, Rube Goldberg-esque "ball rolls down ramp, hits string, trips crossbow, which fires into a bulls-eye, which triggers flashing light and rings the bell kind of thing." It was the one reel that Baker actually edited as well.

Baker first viewed the film in January 1993 and started working on it in March. His first thought was the Clockworks. "I started thinking, 'Okay, what is this thing all about? What is the main theme behind the Clockworks? What do we want the Clockworks to say?' And I kept



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going back to the opening reel when they talk about the Earth being alive. So I wanted to try to use organic sounds as much as possible. I started thinking about animal sounds and odd things that people wouldn't associate.

"I knew I would need some machines," he continues, "but you hear an elk in there—that high-pitched eeeeeeee! is an elk—and obviously, I took my ten-speed bicycle and spun the chain backward. There's some clanking and clunking and squeaks from a loose board in the kitchen of an apartment I used to live in. One of the main sounds of the Clockworks—one of my favorites, and it took us awhile to find—was a wooden metronome. Everybody has those damn plastic ones, but the old wooden ones sound really nice.

"You're also hearing a roulette wheel, a pinball machine, which is the only electronic thing in there, an old cash register, fire, a tree falling, bowling pins being knocked down, bowling ball down an alley. There's a ton of stuff in there, and we didn't drop a single track in the mix. Gus would ask to cut back a little on the thunder—I like low end—when The Chink starts talking, for example, but it's all still there."

Baker worked with Richard Moore on the Clockworks, assembling and building all the sounds in a CyberFrame. Each of the elements was then stripped out and onto 35mm. A rough mix of each Clockworks scene was done in mono, so that Baker could spread them out and put them in different places in the theater. That way, once he came down to Zaentz and heard the dialog and music against the effects, he could cut down on the interference without losing elements.

All of the effects were cut on Moviolas, shipped up from Christy's in L.A. for the project. To run the Clockworks itself required 14 or 15 tracks, and each track contained anywhere from three to five sounds.

"The Clockworks basically takes up most of reel six, onscreen and offscreen" Baker says, "and we didn't want people to get bored and tired of hearing it. So when we premixed, we decided to inject some randomness into it. Sometimes David Parker and I would push two tracks up a little hotter and hold them for ten or 15 seconds, then pull them down and bring something else up. Because it's organic and such a bizarre contraption, it should have a random feel."

"I originally thought this was going to be the part of the film where we went inch by inch," adds Shatz, who was not present for the premix because of a commitment to *The Secret Garden*. "But when I first heard it, I turned to Kelley and said, 'That is great.' I was delighted by it. Again, it's handmade and not overly sound-designed. There's something about all the sounds chosen that was sort of like a garage sale of sounds—this potpourri that was really appealing and appealingly in sync with the odd character of the clock itself. One element that I thought stood out was a sliding pick over a guitar string, which had this human quality. I think Kelley did a superb job, and I told him that I'm glad to know there is someone further north of Hollywood than I am," he adds with a laugh.

DIALOG

David Cohen edited all ten reels of dialog on the DAWN system over a six-week period at Teknifilm Labs in Portland. His 8-channel setup included a Macintosh Quadra 700, a

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1.3-gigabyte Seagate hard drive and a Ricoh magneto-optical drive, which was used mostly for storage and transfer of sounds. Everything was backed up to analog 8-track.

Three-quarters of the production dailies had time code, the other quarter came in with a 60Hz tone. The workprint and cut track were delivered to Teknifilm, and a transfer was made to ¾-inch videotape with two window burns. Time code in and out points were marked in on the TimeLine MicroLynx, which calculated the offset and sent the takes to the DAWN. For the last quarter of the movie, the Nagra was resolved directly.

"My main asset is my ability to concentrate on my job," says Cohen, who recently won an Emmy for his work on *Law and Order*. "I am listening strictly to the quality of the sound itself, in order to provide them with an edited production track that doesn't require finessing in the mix. The DAWN allowed me to go into a bunch of alternate takes and build every cut in as seamless a manner as possible."

Ironically, Cohen's most difficult scene for dialog was one of the scenes that made use of some unusual ADR—unusual by nature and unusual because Van Sant does not like to loop. "It's the hotel lobby scene," Cohen says, "and the cutting was very tough to begin with: an extremely reverberant space with a lot of noise and movement going on. A lot of time was spent in the DAWN pasting in proper backgrounds to make it work. And then Julian [Keanu Reeves] has his asthma attack."

"The asthma scene is only half Keanu," Baker adds. "The other half is me. The first time I heard the track, I thought he was having a heart attack. I'm an asthmatic, and asthmatics have a ring in their lungs that nobody else has and no actor can duplicate. So I didn't take my medication when I should have—and when my wife found out what I had done, she was ready to kill me—and I went into a recording studio. It sounds worse than it is. It was living in L.A. that gave me asthma; my years in L.A. caused a hormonal change in my body.

"But David has a great ear for dialog," Baker continues. "He would cut a reel, and then we would sit down in the small mix room at Teknifilm and listen to it on the big

speakers—a wonderful luxury to have. We then transferred straight out of the DAWN onto 3-track, bringing down about eight channels of dialog per reel, roughly. We then spent about four-and-a-half days on the dialog premix once we got to Zaentz."

When listening to playback in the Zaentz screening room, the dialog comes through incredibly clean and intelligible, without being overly sanitized, as Shatz points out: "The dialog is intelligible because it was recorded well, prepared well and because of choices Gus made in the mix. He had the sound organized so that it fit around the dialog. As far as the technique of mixing goes, I think this is the one steadfast rule that you can say is absolute: If you bury the dialog, you've done a bad job, even if the dialog is expendable, even if it's off-camera, throwaway lines. If people don't understand what is being said on the screen, you break the spell, you break the flow, and they're out of the movie."

Even Cowgirls Get the Blues is not *Terminator 2*, and it's not *The Fugitive*. It's not meant to be. The Hollywood trade press panned it long before its release. But then again, the trades weren't too excited about *Drugstore Cowboy* or *My Own Private Idaho*, both excellent pictures.

This is a fun film, with a playful feel that comes across in the almost comic performances of Uma Thurman, John Hurt, Buck Henry, Lorraine Bracco, Angie Dickinson, Pat Morita and many others. After viewing the film foot by foot, hundreds of times, Baker says he still gets a charge out of Morita and Hurt, especially.

"I believe that the whole act of Gus giving it a handmade feel is what endears his films to people," Shatz says. "His point of view is present, and he doesn't try to eradicate his presence. That's very unique and very difficult to achieve, because you really have to be in tune with your own intuition, and you have to trust your own judgment. Gus trusts his judgment, which means he's not afraid to go in there and say, 'Make it rough around the edges.' And people who go see the film will know they just saw a Gus Van Sant film. This film was made by a person with a point of view, not cranked out by some machinery." ■

Tom Kenny is a Mix *associate editor.*

BY TOM KENNY

POST·SCRIPT

SCORING FOR "SEINFELD"

by Tom Kenny

Signature opening themes are a hallmark of prime time television series. Think back to *M*A*S*H*, *Welcome Back Kotter*, *Hawaii Five-0*—you could tell from the first note what show it was, even if you were in the kitchen finishing up the dishes. The best themes fit the mood of the drama or sitcom and can be played repeatedly without annoying the audience. Hell, some even made it to radio.

The music for *Seinfeld*, composed by Jonathan Wolff, is as signature as signature gets. It's quirky, jumpy, rhythmic and fluid, all the while maintaining a sense of humor—just like the wildly popular Thursday night sitcom. The opening shaker rhythm introduces comedian Jerry Seinfeld on stage, doing his stand-up routine in a comedy club setting. From there, the bass line weaves in and out of the star's voice, then reappears throughout the 22 minutes in transitional cues, before wrapping up with a closing monologue.

PHOTO CARIN A. BAER

Comedian Jerry Seinfeld onstage delivering the opening monologue. Below: Composer Jonathan Wolff at the Pro Tools station at Music Consultants Group, Burbank, Calif.

PHOTO HARRISON FUNK

"I watched a lot of Jerry's comedy material," says Wolff of his initiation to the show, "and I noticed that he has a unique, quirky rhythm to the way he delivers—in the pacing of his words and phrases and inflections. And he has kind of a musical quality. So I based the rhythm of 'Seinfeld, The Theme' on rhythms of his speech patterns. I said, 'Okay, he seems to be talking about at this tempo,' and Jerry's voice became the melody of the theme. I built the rest of the music around him. Instead of using drums and percussion, which might not blend too well with his voice, I used digital samples of finger snaps and lip smacks and noises to accompany him. The way I first designed it, and it seems to be working, is as if they are part of his speech. I guess if there is a musical melody to it, it would be the bass line, but it's in an audio range that doesn't compete with Jerry."

The finger snaps and lip smacks are all sampled Wolff, stored on a hard drive and performed along with the other musical instruments on the sequencer. Because Seinfeld's opening and closing monologues change each week, so must the music. Each Wednesday night, the show arrives on two ¾-inch videotapes, and while an assistant takes one away to spot the transitional cues, Wolff takes the other and spends the next couple of hours working up the two monologues.

"I architected this theme in a manner to be easily manipulated modularly," Wolff explains. "If you've got a long joke, you wait for him, and when he hits the punch line, you start in with the next phrase. You fit it around, scooch it around, and that's where Auricle comes in.

"Auricle is a PC-based time processor, and time code is where I get my information. For instance, he'll say a line, and I'll get

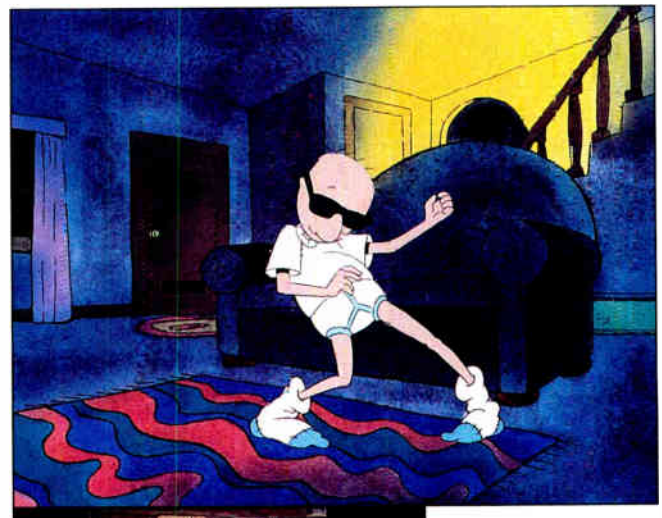
—CONTINUED ON PAGE 16

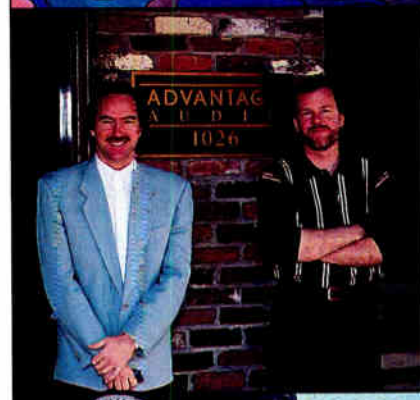
BOING! CRASH! SPLAT! SATURDAY MORNING SOUND

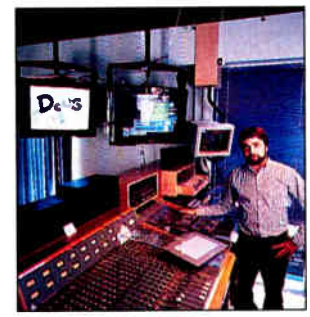
by Tom Kenny

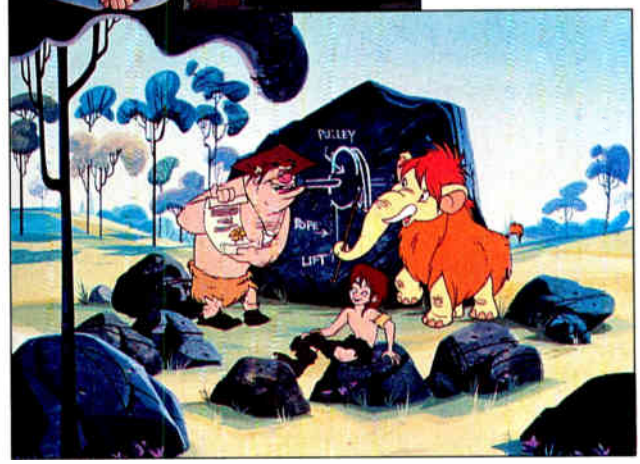
Audio rules break down when you work in sound for animation. A body falling off a cliff may land Boink! rather than Thud! Footsteps may sound rubbery on pavement rather than click-clock. And when eyes bulge out, any number of whoops, whishes or squirts may fill the track.

PHOTOS COURTESY OF U.A.C. AND ADVANTAGE AUDIO









Above right: Doug doing his best Tom Cruise imitation, posted at Pomann Sound. Middle, l-to-r: Jim Hodson and Bill Koepnick of Advantage Audio, Burbank; Robert Pomann of Pomann Sound Design and Production, New York City; the new Pink Panther, posted at Advantage. Bottom right: Cro, from Children's Television Workshop, posted at Advantage.

Essentially, sound for animation is wide open. The sound designer's job is not so much to support the action as it is to exaggerate it, or augment it in an unusual and freshly emotional way. Many sound designers in feature films will tell you that they've done a good job if they are not heard. In cartoon sound, if you're not heard, the animation, no matter how well it is drawn, will often have no life.

"Watch *Terminator 2* without the sound and it's nothing but a bunch of pretty pictures," says Bill Koepnick, co-owner of Advantage Audio in Burbank, where the specialty—make that the only work—is sound for animation. "You listen to the sound on that, and that's what makes the picture exciting. We get to do that on a smaller scale and do it all the time. Cartoons without sound are kind of boring. When you put in the sound, the sound makes it work in a very dramatic way.

"When we're done building a show," Koepnick continues, "if you mute the dialog and mute the music and turn off the projector and just listen to the effects, it sounds like you're listening to a movie soundtrack, with this incredible activity happening. You can visualize what's going on because we put all this detail into it. I think depth and detail are what we're looking for."

SOUND EFFECTS AND FOLEY

Depth and detail. Robert Pomann, owner of Pomann Sound Design and Production in New York City, refers to it as "weight." Whatever you call it, it's what separates good sound from mediocre sound, whether in live action television/film or cartoons. If you have kids, and if slide whistles, gong clangs and countless boings have become your background weekend soundtrack, you already know that much of what appears on the air comes from CD effects libraries. And often the same sounds are on different shows.

Pomann owns most of the standard effects libraries. However, while designing the sounds for the animated Nickelodeon children's series *Doug*, he combines the CD sound effects with organic mouth and percussion sounds.

Fred Newman, host of the Disney Channel's *Mickey Mouse Club*, is a master of vocalization—odd sounds, effects and whinnies that date back to the golden age of Looney

—CONTINUED ON PAGE 18

PHOTO: PETER APPLETON

FACILITY SPOTLIGHT:

NORTHWEST VIDEOWORKS

Four years ago, in an article about the Chicago post community, *Mix* pointed out a trend that actually had been going on for some time: video houses putting in high-end audio rooms. Some audio facilities perceived it as a threat then; others saw it as emblematic of an increased awareness of the importance of audio in the commercial community. Some said that audio would always be the poor stepchild in a video facility, and others applauded the merging of the two industries.

We all know that good rooms don't guarantee good audio. But we also know that good rooms go a long way toward keeping

—CONTINUED ON PAGE 20

—FROM PAGE 14, SCORING FOR SEINFELD

the exact frame that those lines end and the exact frame where the next one starts. And if he makes a hand signal, I get that frame. I enter all that information into Auricle, and I tell Auricle what tempo we are—Seinfeld usually hovers around 110—and Auricle tells me where each of these events occurs musically. If I need to do a little speed-up or slow-down, Auricle does the math."

Once Wolff finishes with the monologues, he begins previewing the transitional cues that one of his three assistants (Jack Diamond, Paul Buckley, Rich Goward) has selected, accessed through a ClarisWorks database. Although they now have an extensive, perfectly usable *Seinfeld* library after four seasons, many times Wolff will come up with new variations. "I like to keep the library fresh," he says. The infamous Chinese restaurant episode was unusual in that it had no transitions—just one long scene of waiting for a table. But according to Wolff, *Seinfeld* typically has three or four story lines going, resulting in anywhere from 30 to 40 pieces of music for a half-hour show—a lot for a sitcom.

Certainly technology has made much of this weekly original music possible. Wolff's Music Consultants Group in Burbank is a two-room facility running dual 8-channel Pro Tools systems on Macintosh Quadra 950s; session files are transferred between the rooms on Ethernet. Backup/archiving takes place in the background and is sent to Grey Matter Response's Mezzo dataDAT system.

The main console is a 40-input, 16-bus Trident—"a good, clean workhorse board, with great-sounding EQ," Wolff says. He built a large control room to accommodate keyboards when he bought the building in 1987. But now that synths have gone rack-mount, he's opted for a Roland JD-800 controller to fire his wide range of sounds. He works primarily with Opcode Studio Vision.

All recording and editing is done directly to Pro Tools, and mixing takes place internally, either to Pro Tools or Sound Designer II. The music is then delivered on a zero-offset time code DAT to Compact Video for an 8 o'clock, Thursday morning prelay. Wolff scores five other network shows, and for some, depending on the post house involved, he delivers on a removable magneto-optical disk.

"For now, the standard seems to be time code DAT," he says, "which is an improvement over last year, which was ½-inch, 4-track. DAT's limitation, however, is that it's only stereo, and often for music, a third or fourth track is desirable for isolating vocals or featuring instruments on the same delivery medium. To me it seems that one of the ADAT formats with the extra tracks might be a more flexible linear digital alternative for the post houses."

Wolff is a first-call television composer, with current credits that include *Seinfeld*, *Dave's World*, *Saved by the Bell: The College Years*, *Good Advice*, *Married With Children* and *The Good Life*. He used to do *Who's the Boss*, and he's done spot music for shows ranging from *Falcon Crest* to *Max Headroom* to *21 Jump Street*. After the producers of *Seinfeld* had tried out a few composers for the pilot (which was then called *The Seinfeld Chronicles*), apparently Jerry himself called Wolff.

Those types of calls don't normally come out of the blue in Hollywood. Despite his youth, Wolff has paid his dues. After working around L.A. in the late '70s as a session musician, playing on a "zillion records, jingles and film scores," he took an interest in TV music from a player's perspective. He started out as an orchestrator, and like a Here-Comes-My-Big-Break script from one of his shows, got the chance to create an original score on a lark.

"It was 1980 or '81," Wolff remembers. "I was hired to be the orchestrator for a show called *Square Pegs*—the series that introduced to us for the first time Sarah Jessica Parker, Jamie Gertz, Tracy Nelson and me. The composer in New York either forgot about it or didn't come up with it on time, so they turned to me the day before the session. I had been hired to orchestrate and conduct the orchestra, so I had already booked the musicians. It was a school show, where every kid had a new song—production numbers.

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3	NEW ▶		BIG "O" / BRAND NEW D4	DOUBLE HEAD KICK w/VERB
4	5	52	RIM SHOT ROOM / SR-16	BRASS PICCOLO w/VERB
5	10	156	BIG FOOT / HR-16:B	SINGLE HEAD 26" MAPLE
6	NEW ▶		SLAM / BRAND NEW D4	POWER TOM w/VERB
7	23	156	COMBO SNARE / HR-16:B	PICCOLO PLUS WOOD
8	NEW ▶		BIG BALLAO / BRAND NEW D4	WOOD SNARE w/BIG VERB
9	NEW ▶		FAT CITY / BRAND NEW D4	SUPER FAT SNARE
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305	327	52	RIM 2 CENTER / SR-16	ARTIC
306	123	208	DOUBLE HEAD	DOUBLE HEAD KI
307	223	156		
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TIME CODE: WATCH OUT!

by Larry Blake

The coming of digital audio to film and TV sound has been "around the corner" for the past ten years. Well, in the past two years the future has finally arrived on all ends of the sound food chain: Time code DAT is in widespread use, workstations are better and cheaper, and digital sound in movie theaters is spreading as fast as the theater owners will allow.

Since there aren't any—and we hope never will be—35mm sprocketed digital recorders, time code has been with digital

—CONTINUED ON PAGE 22

PHOTO ILLUSTRATION TIM GLEASON

When the composer didn't come through with the music, they turned to me and said, 'What about you? Are you a composer?' And I said, 'I am now.'

"I did it overnight," he continues. "This was before computers, so they kept the music-copying department at Universal open all night and kept couriers running back and forth from my house to get the parts copied. It seems kind of archaic now, because today we just have the computer spit 'em out. But I was ready for the session at 10 o'clock. I still didn't realize that I was going to get the series; I thought I was just saving somebody's butt. At the end of the session, the producer said, 'Hey, you're now the composer for *Square Pegs*.' It was kind of fun."

At the time, Wolff was working out of his house. When the work continued coming and he outgrew his house, he bought a bigger house. But he soon realized that no matter how good you are, some commercial clients just won't pay the big bucks for someone working at home. And since his studio now dominated his living space, he decided to move the business to Burbank. In 1987, he invested everything he had into the building that now holds Music Consultants Group. And the hits keep coming.

In the broadest definition of the term, Music Consultants Group could be considered a project studio. It's Wolff's operation, and the projects that come through do so because of him. "The purpose of building Music Consultants Group was to make this wild dream of mine into reality," he says, "to allow me to create music under the absolute most favorable circumstances, using only the best equipment. It's something everyone dreams of, and I figured I might as well try and do it. It's the kind of place I always wanted to work, and since nobody was offering me a position, I created it for myself." ■

—FROM PAGE 15, SATURDAY SOUND

Toons. When you hear footsteps in *Doug*—including the black-screen, off-camera intro—that's Newman. When you hear cars roaring off or lawnmowers, that's Newman. Fred Newman sounds are libraried on the SSL ScreenSound and stored on a magneto-optical drive.

Pomann manipulates the basic Newman effects within the ScreenSound and adds splashes from an extensive in-house library and a three-hour Foley session each week. "The organic, natural nature of the effects he creates works as a subconscious element on the viewer," Pomann notes. "And it adds a human quality to the animated characters."

The human feel is important to *Doug* because it is treated, from production through post, more as a sitcom than a cartoon. It is one of the few cartoons produced and posted in New York, and it is story-driven, with a moral to each episode—kind of like an animated *Wonder Years*, Pomann says.

Individual cartoon series usually generate their own libraries—those signature effects for characters, certain screams and the like. According to Pomann and Koepnick, sometimes it's just plain faster and simpler to jump on the Foley stage for prop Foley—paper rustles, glass clinks etc. Koepnick says that the amount of customizing for any series depends on what the producer wants, and in that sense, cartoon sounds resemble commercial spots more than feature films.

"In *Schnookums and Meat*," Koepnick says, "characters often scream, and the producers wanted 'girl screams,' like out of horror movies. Someone's going to get run over and their mouth opens wide and their eyes bug out, so instead of having them go 'Aaaaggghhh!' we put in these girl screams. It's really funky, and even though I would love to do it on other shows, it's reserved exclusively for *Schnookums*.

"These producers also want outrageous sounds," Koepnick adds. "There's a fair amount of zipping and boinging in it, but all of them are highly processed. Everything gets a twist. So let's say a character does a double-take, and his eyes pop out. I'll take some sort of sheet-metal thing that has a real clang to it, then I'll pitch-envelope it so it goes *Boiiiinngghh!* with a real grating quality. Instead of using the typical Jew's harp kind of sound, I'm getting the same effect but with more impact. You take this metal clang and stretch it real fast."

The trick to staying fresh and avoiding repitition—and let's face it, a lot of Saturday morning sounds alike—seems to be taking stock sounds and manipulating them, or adding a touch of realism. Slide whistles and boinks will only go so far.

On *Bonkers*, a show built on the *Roger Rabbit* premise, Koepnick and friends must deal with "live" (albeit animated) characters and Toons.

"The 'real' characters have real shoes and walk on real surfaces, and when they fall down they go *thud*!" Koepnick says. "Then there are Toons working with the real people, but when the Toons walk, they don't make any noise, and when they fall down, they go *honk!* or *boink!* Our directive on the show is to play up the difference as much as possible.

"Then we work on a series called *Cro*," Koepnick adds, referring to the Children's Television Workshop and Film Roman production based on the best-selling book *The Way Things Work*. "The producers on *Cro* wanted everything heavily Foleyed—all footsteps, including the woolly mammoth from the Stone Age. Actually, the mammoths were recorded on the Foley stage, but we manipulated them to give them size and weight. So I play those back on an [E-mu] EIII to picture, but all the other characters get footsteps everywhere, on all surfaces. There are no real cartoon noises on *Cro*."

DIALOG AND MUSIC

Producing an animated series is a long process. In order to get the storyboards underway, dialog is often recorded six months to a year in advance of the air date, at a studio that specializes in voice recording. Usually it's not the post house, although Pomann Sound Design & Production handles the voice recordings for Doug by recording directly into the ScreenSound. When there is an emotional, group scene, the ensemble reads together, much like we've all heard about on *The Simpsons*.

The process differs according to the production, but it generally begins on DAT. At Advantage Audio, they take the DAT, along with a recording script, and dump lines into a Sound Designer file within Pro Tools. Then an editor goes through the show and does a "normal pausing," where individual lines are separated by an eight-frame gap.

The normal pausing is sent on DAT to the client for approval, then to somebody who does a "timing" in preparation for the storyboard artist. The storyboards are sent back to Advantage, and the editor builds a "slugged" dialog track, which is essentially the dialog of the show in approximate time. For example, if there is 60 feet of a car chase between lines, 60 feet of silence is inserted in the Pro Tools session.

The slugged dialog is sent to a track reader, who does all the tome-based phonetics—hard and soft consonants, vowels and such—for the animators.

Once animation is returned, generally on D-2 these days, Advantage transfers it into a 16-channel Digidesign PostView system with scratch dialog that may be sixth- or seventh-generation at this point. (Advantage has long been an alpha tester of Digidesign products.) The editor then goes back to the original slugged dialog session and matches up the waveform with the scratch track, often not even looking at picture. It's almost a mechanical process, Koepnick says, adding that two of the nice things about PostView are that you can rock picture and sound together, and you can play things at half-speed to make double-sure the consonants are hitting where they are supposed to. The finished dialog tracks are then dumped onto the master 24-track, along with Foley, effects and music.

At Pomann Sound, the process is somewhat different. They handle all the recording in a six- to eight-hour session, then spend another ten to 15 hours editing. And it's all done in ScreenSound. The normal-paused track is transferred to DAT, then transferred to mag. The mag track is edited by the director and sound editor, then sent to Korea for animation. When the picture track comes back from Korea, the digital audio is conformed to the mag track.

"The ScreenSound makes it possible for five people to do the work that it used to take a dozen to do," Pomann says. "It's really changed my life."

Music usually comes in on DAT from the composer right before the final mix, either as library or score. Time code isn't necessary for the way either Pomann or Koepnick works, as the computer's word clock does the transfer for Koepnick, and Pomann uses a two-beep cue. Koepnick eventually moves the score over to multitrack for the final. Pomann keeps it in ScreenSound.

Often, a composer will score only the first season or two for a cartoon series, and after that, it's up to the music editor to "arrange" individual episodes. On the new *Pink Panther* series, for example, the first 15 11-minute episodes were scored, and

the rest were edited together by Mark Fromme at Advantage in PostView. Additional cues would come in if the show was thematic, say, with an Egyptian or a Western tinge.

"Cartoon scoring is tough," Koepnick says. "There are a lot of hit points and action that is carried by the score—much more so than in live action. People really want that classic cartoon music that supports every little zip and motion. Everything is really broad and exaggerated. And you have to have humor in it or play up the action. I think the humorous stuff is harder. Action is action, and you can get away with a lot of hard-driving stuff. But the comic shows tend to have a lot of subtlety. It must be hard to play some of this stuff, the way it's written—time changes left and right. Some of it is mind-boggling. But when it's well-done, it's a wonderful thing to behold."

Composer Doug Sawyer, in Los Angeles, creates original music for each episode of *Doug*. "*Doug* is scored more like a prime time series than a cartoon," Pomann says. Voice impresario Fred Newman co-created the *Doug* theme and most of the musical beds, along with Dan Sawyer, and many of Newman's vocalizations are incorporated into the pseudo-African-style score. The score works especially well for the moments when the hero slips into his fantasy world—sometimes sounding like a sitar-based Beatles cut, other times sounding like guitar-driven rock 'n' roll.

Sound for animation, if not exactly sneered at, carries some negative connotations. The truth is that it can be every bit as complex, and even more so, than sound for live action. These people are not in the business of re-creating reality, although when the producers call for it, that's what they get. The design process is wide open. As Koepnick says, Saturday morning provides an opportunity to be outrageous. ■

—FROM PAGE 16, NORTHWEST VIDEOWORKS

commercial clients in the building once they've wrapped up the video post portion of a project. Northwest Videoworks in Portland, Ore., has had an audio sweetening room for the past six of its ten years in business, and they've turned out consistently good work. But as chief engineer Richard Moore says, until August of this year, the room itself looked like an afterthought.

"The first thing I dealt with when I got here was the equipment package," says Moore, who arrived at Northwest Videoworks four years ago. "I said it was time to go to digital sweetening, and I leaned on them until they bought the WaveFrame [400]. Once I got that cooking and had all our library systems in place, it was a real good place to sweeten, but it didn't look like it. The previous control room was small and funky. Now it looks like the legitimate department it's always been."

The new control room was designed for audio sweetening and client comfort, Moore says. It's a standard splayed-wall space, measuring 33 feet wide by 23 feet deep, with 12-foot ceilings. A vocal booth and studio, complete with Foley pits, are off to the left, and a machine room is on the right. A producer's desk is centered in the back of the room.

The console is a 36-input Soundcraft TS12 with FAME automation, but the centerpiece of the room is the 8-channel WaveFrame 400, which Moore says "locks real keen to picture." A Korg O/1W keyboard essentially gives the mixers a second "workstation," as the bulk of the effects and music work falls into the category of what Moore calls "embellished library."

Television commercials make up about 40% of the work that comes through Northwest Videoworks, with the balance being about 40% corporate industrials and 20% radio spots, music videos, and odds and ends. Moore pulls daily from music libraries from DeWolfe ("a good, solid basis"), FirstComm, APM, Network, Manhattan Production Music and Omni. For effects, he says nothing beats Hollywood Edge.

"My reputation in this market, if I may deign to characterize myself, is probably the guy who knows the libraries that he has, and knows how to edit them and embellish them," Moore says. "I use the Korg, and it triggers a sampler as well as the stuff that's in the keyboard. It's set up to the sequencer if we really need to go into that. There's just so much music recorded in so many different styles, and some of it sounds really good. And I've always been able to manipulate prerecorded stuff to make it fit the need."

Although a small part of the motive for expansion was to try to entice Hollywood producers and the film community in general to look at Portland (for *Hear No Evil*, a Martin Sheen film shot in Oregon, Northwest Videoworks handled the loop lines for local actors; L.A. sent up a ¾-inch rough-cut, and Moore sent back a DAT), the driving force was the simple fact that a lot of video is produced in town.

"I don't know what other markets are like, but there's an awful lot of video generated in this city," Moore says. "Nike is based here; Weiden & Kennedy is based here. Not that they do all their production work in Portland, but it certainly has its repercussions in this market. For example, Weiden & Kennedy will come over and book a couple of days just to kick around an idea—a spec idea for a new client. They've got the dough, so they lock the place out. Now a lot of their finished production does end up in bigger markets like Chicago or L.A. But they play here because it's close and convenient.

"We're involved in a lot of sales presentations for Nike—big trade show stuff for when they go to Europe and things like that. Plus, there's just a lot of video production companies in town, and they're constantly cranking out spots for the local and regional market. This place has been very busy."

Now that the new room is online and cranking daily, Moore is looking toward expanding once again. In terms of equipment, he says the next purchase probably will be one or more of the ADAT-format digital multitracks, and they're looking into Avid's AudioVision recording/editing system—to go with their Avid video editing suite across the hall.

In terms of expanding nationwide and reaching into the big-market talent pools, Northwest Videoworks is looking at the phone-line transmission hookups now available from EDnet, IDB and others. Who knows? Voice talent in L.A., musicians in New York, online effects from Chicago, mixed live in Portland. Why not? ■

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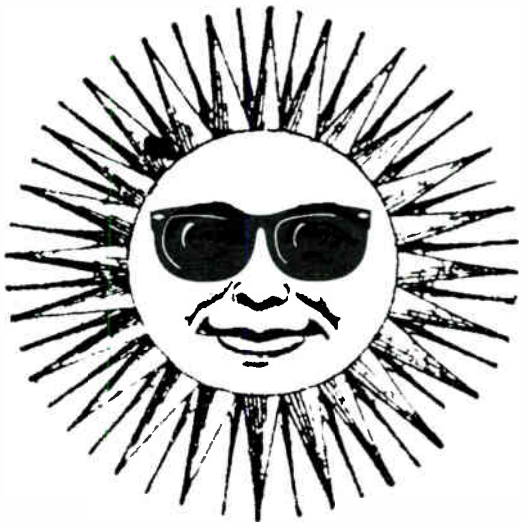

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—FROM PAGE 18, TIME CODE: WATCH OUT!

audio almost every step of the way. (Digital mag would be the film sound equivalent of "word processor" typewriters, which make high technology—in this case computers—soft and cuddly to technophobes, while omitting virtually all of the benefits.) To no one's surprise, time code is the lingua franca enabling all sorts of disparate devices—hard disks, DAT machines, video decks and, yes, analog tape machines—to walk hand-in-hand like multicultural kids in a Billy Jack movie.

This almost-mystical, it-shouldn't-work power of time code can be pretty intimidating, because virtually everything is happening "in the dark," which makes problem-solving all the more frustrating. The good news is that most time code screw-ups can be traced to pilot error; more often than not, the equipment can kick back and say that it was only doing what it was told to do. No, really, this is good news, because what I'm saying is that preventing time code screw-ups doesn't require you to be able to "look under the hood" of your synchronizer. Just do your homework.

In passing on recommendations, one usually lists them as "do's and don'ts." Well, sitting here thinking about time code problems gets me in a pretty pissy mood, so I will restrict my advice to the don'ts.

DON'T #1: *Don't Use Drop-Frame Time Code.* Okay, let me start off by excepting television shows that need to follow the clock on the wall with regard to the formatting of commercials, etc. But if the issue is simply one of knowing absolute program length, as in video mastering of a feature film, then there's no reason to use drop frame. You can easily make drop-frame distribution copies of non-drop masters; the catch is that drop frame should be taken out of the production loop whenever possible.

Non-drop (or, as some insist on calling it, full-frame) time code has a constant relationship to video frames and film footages and is therefore the only flavor of 30-frame time code that you should ever use when working on a feature film. The only count of program length that is of any meaning with a film is the sum total of LFOP (Last Frame of Picture) footages (minus the 12-foot leaders on each reel, of course). Accept no substitutes.

DON'T #2: *Don't Take Just Any Telecine Transfer That's Handed to You.* When you are cutting sound for a feature film using a videotape dub, it is very important that you let the producer and the picture-editing department know in writing that you have very specific telecine requirements. Let them know as soon in the process as possible, but let them know. Note that while some of the telecine suggestions are not time code-related, per se, they do relate to better integrating video into the world of film.

You can easily make drop-frame distribution copies of non-drop masters; the catch is that drop frame should be taken out of the production loop whenever possible.

First, if the majority of the sound editorial work will be done to these videotape copies, and not on mag film, ask that the film go to telecine in doubled-up "big" (2,000-foot) projection reels and not as standard 10-minute editorial reels. Reducing the number of reels you'll have to deal with means fewer changeovers and greater speed in editing and mixing, not to mention giving you a better flow by dealing with larger stretches.

Make sure that your start marks bear a consistent and specific relationship to time code. It's not enough to tell the telecine facility that the "Picture Start" is on the hour start (i.e., 01:00:00:00 for reel 1, 02:00:00:00 for reel 2, etc.); you have to tell them that the first field in which the "Picture Start" frame is visible should be the hour start. If the start is off even one field, bounce the transfer back at them and point to your written spec.

Proper start marks allow you to cut your sync pops at six seconds past the hour, knowing that they will always maintain the proper 35mm three-feet/two-second relationship (16 frames per foot) to the first frame of picture at eight seconds past the hour. The same should hold true for the visible film footage window on your videotapes: They should roll over from 9999+15 to 0000+00 on the first "Picture Start" frame.

Unless you are very careful with these start marks, you could find yourself in confusing and embarrassing situations where what you cut looks in-sync to the videotape but will be out-of-sync when the resulting track is placed in sync relative to the head pop.

Make sure the audio track that goes to telecine is composed of the production track only; with more films being cut on nonlinear systems such as the Avid and Lightworks, you have more picture editors getting creative with putting music and effects in. This is fine if you want to do a temp dub but is not so good when you are trying to phase your replaced dialog with what should have been the work-track.

Don't accept a transfer made with a prism device that blurs the distinction between frames. The last thing you need to be doing, when figuring out exactly where a scene change occurs, is guessing which of three frames is really the first frame of the next scene. Again, simply put this in your telecine spec and bounce it right back if it isn't right.

DON'T #3: *Don't Take Machine-to-Machine Compatibility for Granted.* I am primarily talking about ¼-inch decks with center-track time code. Perhaps this could be restated as "manufacturer-to-manufacturer." For example, on several occasions I have received ¼-inch tapes for playback with a Nagra that had dangerously low time code levels. As it turned out, these playback tapes had been made on studio decks that apparently didn't record the code as hot as the Nagra IV-S TC would have liked.

Similarly, I have been told (but have never done experiments myself) that there can be some problems with downward time code compatibility from Sony PCM-3348 digital multitracks with their PCM time code recording to standard PCM-3324s with linear time code. To sidestep any potential problem, I

make sure that my tapes are prestriped and blacked on a standard 3324, even if I plan to be using a 48, because you never know what machine will be called on to play it back one day.

DON'T #4: *Don't Stripe Your Multitrack Tapes by Reshaping Time Code from the Video Master.* There is absolutely no reason that I can think of to do this in normal operating practice, yet I know it's done all of the time. There is nothing unique or special about the non-drop code on the address track of the ¼-inch tape that you received, and if there is, you don't want to have anything to do with it. I can't count the number of times I've had to deal with a time code burp or dropout on a videotape.

By striping the multitrack tape directly from a high-quality generator, you are guaranteeing that you aren't passing on any errors that your videotape might possess. (With an analog multitrack, remember to take the machine off all external controls. In fact, in addition to switching the remote to "Ext," I play it safe and unplug the synchronizer interface from the machine.) Therefore, should you see the lock light on your synchronizer flash on all slave machines simultaneously, you are sure that the problem exists with the videotape and not with any of the slave tapes. You can then put the machines in a slow lock mode to ignore any momentary time code discrepancies and integrate them over a longer period of time. Otherwise, you will hear a wow on the recording when played back with a stable time base.

Better yet, you should check the integrity of each videotape (as soon as you get it) with a time code analyzer that will give you a printout of errors. This is the best way to go, since you find out as soon as possible.

There's enough to talk about in the world of time code and synchronization to write a book, and indeed that's just what I'm doing. Anyone with any sync questions or war stories can write me at P.O. Box 24609, New Orleans, LA 70184; or fax (504) 488-5139. ■

Larry Blake is a sound editor/rerecording mixer who lives in New Orleans because of reasons too numerous to mention, although an afternoon at the Jazz & Heritage Festival would give you a good start.

FACILITY SPOTLIGHT

The Post Group

Graham-Patten has been making audio mixers for the broadcast and post-production communities for about 14 years, and the 1991 introduction of the D/ESAM 800 (Digital Edit Suite Audio Mixers) systems was big news for the audio side of the video/broadcast industry. NBC ordered 24 for the broadcast of the Barcelona Olympics. CBS did the same for the Winter Games from Lillehammer.

The Post Group, which has been a fixture in Hollywood for 20 years and specializes in national commercial spots and prime time television shows (including *Law and Order* and *Sea Quest*), outfitted four of its nine editing bays with D/ESAM 800s. The facility also contains four audio sweetening rooms (one with an SSL Scenaria, the other three with Neve boards), two Harry rooms, a PaintBox suite and four telecine rooms.

Early in 1992, the Post Group embarked on an extensive upgrade and complete technical rebuild of the primary analog facility. It was decided at that time to make a departure from analog audio routing and distribution systems to full AES digital equivalents. The new distribution system and router are from NVision.

"AES audio distribution was a new technology at the time and provided a learning experience," says Andy Delle, VP of engineering. "I considered upgrading the facility to 4-channel analog routing but feared that would not be a wise move for a redesign with a life expectancy of seven to ten years. On the other hand, full AES routing and distribution was in its infancy, with the required equipment either unproven or unavailable. Also, the large scale of the router—160 stereo inputs by 192 stereo outputs—left limited practical options for patching and redundancy.

"The AES distribution was therefore installed without any patch bays," he adds. "We did, however, provide backup analog patching on a limited basis. The full AES distribution system also allowed us to take advantage of the D/ESAM 800. All audio entering or leaving the board is digital, with conversions to

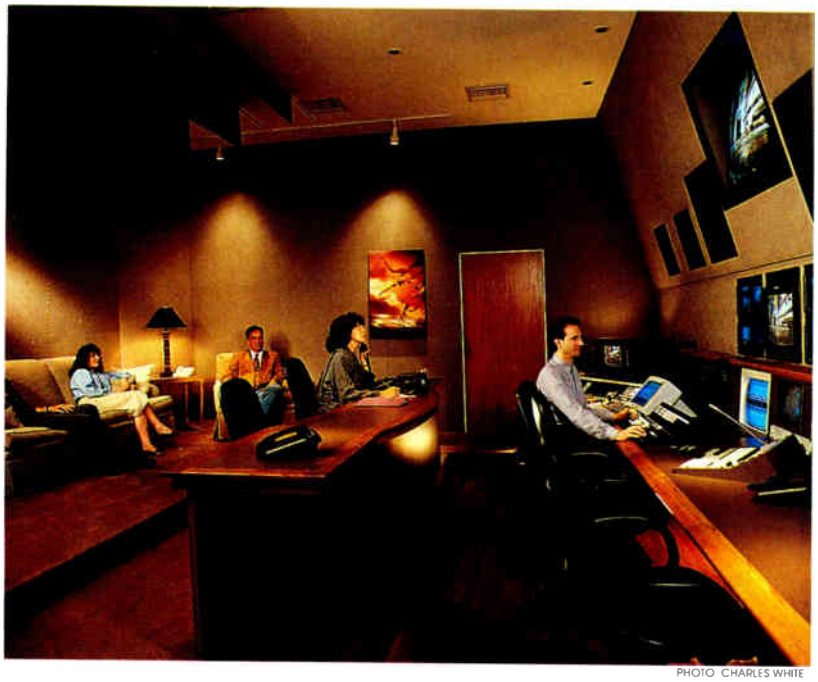

PHOTO CHARLES WHITE

Edit Bay One, The Post Group in Hollywood, featuring the Graham-Patten D/ESAM 800. Editor Brian Reid is at the controls.

and from analog required for 1-inch and Betacam machines done by the routing system."

"The 800s are very easy for our editors to get up and running on because they're used to the [analog Graham-Patten] 616s and 608s," says chief engineer Chris Genereaux. "The D/ESAMs work much like a switcher, so the setup is much like a 300 setup, with crosspoints, preview buses, program buses and things like that. The only thing our editors really had to learn was the internal routing—the D/ESAM internal routing is very powerful."

D/ESAM mixers were designed specifically to streamline the process of videotape editing. Each D/ESAM 800 mixer accepts up to 56 channels of digital and/or analog audio, routing via a Virtual Input Matrix to 16 full-function mixing channels and to four analog program, four digital program and four monitor outputs. Multiple VTRs and ATRs can be hooked up to a D/ESAM system, then assigned as necessary—dependent on the complexity of the session—to a physical control.

Besides the fact that the D/ESAM edit suite mixers maintain an all-digital signal path, video editors are able to control four channels on the videotape recorder through the edit system, using ESAM-compatible serial commands. In the age of D2, D3 and soon D5, the advantages of 56 inputs, 16-channel mixing and 4-channel monitoring are obvious. Programmable EQ, channel delay and digital processing are also available.

All level settings, machine assignments and crossfades can be stored as snapshots and recalled instantly. Level transitions and crossfades, plus I/O assignments, are fully controllable from an external editing system.

Although the D/ESAM 800 internal routing system is quite powerful, the Post Group desired even more flexibility. The facilitywide touchscreen-based routing control software written by Delle already provided sophisticated audio signal management. With feedback from the staff, a menu was created to provide a graphical user interface to delegate 2- and 4-channel sources to the D/ESAM. This simplifies the setup of the D/ESAM, according to Delle, and provides friendly signal management to freelance editors who may not be familiar with the D/ESAM. Further Post Group software enhancements have provided automatic video frame delay compensation through the router. These frame delays (33 ms each) accumulate through D1 equipment such as switchers, DVEs and, most importantly, composite D2 to component D1 transcoding.

"Most digital mixers, including the D/ESAM, have these delay lines as an option, but we decided to incorporate NVision modules directly into the router," says Delle. "That way, the control software can manage signal delay and remove this burden from the mixer. This also allows interformat dubs to be done without tying up an edit bay mixer.

"The future promises audio boards with unlimited logical channels based on workstation technology," he adds. "Some even think the conventional edit bay mixer will eventually become a software package that runs in a window along with a video switcher, DVE and 3-D graphics packages on a low-cost but powerful desktop computer. Whatever the future, our AES infrastructure will provide the conduit and compatibility to seamlessly interface these new technologies." ■

PHOTO AL LEMIRE

The Outpost opened at MultiMedia Studios in Culver City, Calif. Besides being a full-service video production and post-production facility, The Outpost has an audio room, with vocal booth, run by supervising sound editor Christopher Potter. The main audio component is an 8-channel Pro Tools 2.03 system on a Mac Quadra 950, with 20 megs of RAM and a 3.6-gigabyte hard drive. Pictured here are post-production supervisor Forrest Burgess (seated) and general manager Michael Bateman.

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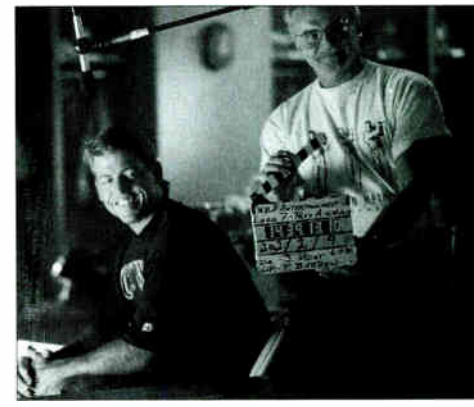
POSTNOTES

Solid State Logic News: **Avenue Edit** of Chicago expanded its audio post capabilities with the purchase of two Scenaria systems, and the facility is in line for the installation of Omni-Mix. **Big Shot Productions** (Baltimore) also took delivery of a Scenaria for work on regional spots and corporate projects. And **Snaptrax**, the new audio facility at Denham Film Studios in London, brought in two SSL Screen-Sounds and a SoundNet network system...Two post facilities recently installed Otari Concept 1 Consoles: **Valentine Productions at Omega**, a Denver facility, selected a 96-input, 48-frame version; and **Horta Editorial & Sound** in Burbank installed a 64-input model for work on episodic television...Media One Communications and Outside Broadcast have joined forces to form **Posters Production**, the first independent, full-service audio/video post facility in Calgary, Alberta. The audio suite is centered around Pro Tools and Sound Tools...**Paramount Pictures** (Hollywood) recently installed a 48-channel Euphonix CS2000 console for daily production of the TV shows *Entertainment Tonight* and *John & Leeza*...**Soundscape Productions** opened last fall in Sherman Oaks, CA. Owner Gregg Hall calls it a pocket-size audio facility, and he designed the two-room facility for multiple functions, catering to the TV, radio, video and multimedia industries...Lakeside Associates designed the new **Post Production Complex** for Cutters, Chicago. The complex, which opened in December, includes two mix-to-picture studios, a large recording area, a V/O booth, Foley recording area and machine room. Cutters also moved recently to the 25th floor of the AMA Building...**Trio Video**, also based in Chicago, is planning to bring its new 48-foot truck, named T48X, to NAB. T48X features a 40-input Soundcraft Europa console, three Sony 3100 1-inch machines and two BVW-75 Beta machines...It may be old news in L.A., but **Todd-AO** bought five Fairlight systems after working with them on *The Firm*...San Francisco-based Sonic Solutions, meanwhile, announced Sonic System purchases by **Sound One**, **C5** and **Todd AO East** in New York; **Zenith/IPA** in Chicago; and **Larson Sound Center** and Tom **Maydeck** in L.A....Project Notes: **Russian Hill Recording** of San Francisco was busy with ADR for some big-time Hollywood productions: They recorded Robin Williams for *Mrs. Doubtfire*, Macaulay Caulkin for *The Good Son*, Harvey Keitel, Wesley Snipes and Tia Carrera for *Rising Sun*, and character voices for *Tim Burton's The Nightmare Before Christmas*...Radio-Band (NYC) brought on composer/sound designer **Gene Moore** in the fall, and he went to work creating three spots, named "Red," "White" and "Blue," for the Army National Guard radio/TV campaign...Across the country in Santa Monica, Pacific Ocean Post landed commercial mixers **Jeff Payne** (formerly with Waves) and **Peter Rincon** (L.A. Studios) and picked up the audio post for Bochco Productions' acclaimed *NYPD Blue*...**Peter Buffett**, principal of Independent Sound (Milwaukee), produced and composed music for Logoathletic's TV spots featuring Troy Aikman of the Dallas Cowboys...The band Pray for Rain was in **Poolside Studios** (San Francisco) recording tracks for the Showtime film *Love, Cheat and Steal*; engineering by David Nelson...Video editor **Peter Shelton** was in National Video (NYC) putting together *Weird Nightmare: A Tribute to Charles Mingus*, directed by Ray Davies of The Kinks. Over at National Sound, **Peter Fish** built an original score, based on the "ticking clock," for the TV special *60 Minutes...25 Years*. Using the Synclavier/PostPro, Fish also performed on the tracks; Troy Krueger engineered...Transcontinental Link: **Machine Head** in Venice, CA, installed the Digital Patch System from Entertainment Digital Network (EDnet) into the offices of Tim Case & Associates in New York, allowing clients to stay back East while working on West Coast projects...The **THX Division of Lucasfilm Ltd.** (San Rafael, CA) offers consultation services for the building of theaters, screening rooms, home theaters, post facilities and other environments that show feature films. Also from Lucas: In a move to consolidate operations at Skywalker Sound North and South, **Katherine Morris** has been named vice president and general manager of Skywalker Sound. Morris is based in the Lantana facility in Santa Monica...Kodak opened a European version of its L.A. Cinesite facility. **Cinesite Europe**, based in London's SoHo district, will house a high-resolution Cineon CCD film scanner, Cineon gas laser film recorder and several high-performance, image-computing workstations. Colin Brown was appointed managing director...Dolby reorganization: Bill Mead is now vice president, film marketing. David Watts will handle Mead's former duties as vice president, technical marketing. David Gray, manager of Dolby's L.A. facility, is now vice president, Hollywood film production, and Michael Di Cosimo has been promoted to vice president, East Coast division...**AdVenture**, an editorial house with facilities in Hollywood and Santa Monica, recently opened AdVenture Music in the Santa Monica location. The hook was hiring composers/arrangers Gregory Kuhn and Mark Henderson...After 11 years at General Television Network in Oak Park, MI, **Doug Cheek** was named president of the company...Principals Bob Hemenway, David Hutton, Stewart Randall and Greg Vincent formed **Communications Design Associates** (Norwood, MA) to provide total system management. Services include digital and analog audio/video systems design, budgetary planning, facility documentation services and RF and LAN system designs for the broadcast, teleproduction and presentation markets...Finally, DuArt Film and Video (NYC) hired **Steve Syarto** as audio layback engineer. ■



Troy Aikman, quarterback for the Dallas Cowboys, and Ron Fergusan, the production assistant for NBA Entertainment

A GUIDE TO CLEANING, MAINTAINING AND (EVENTUALLY) REPLACING YOUR DAT RECORDER

Take a moment to think about analog 2-track recorders. For the most part, they have open and forgiving personalities. When tape path parts are dirty, they show them—right out in the open! They don't hide their heads when they start to wear out. And, when serious trouble is brewing, they often give ample advance warning.

Your DAT is different. It's the secretive sort. It holds everything inside. Dirty stuff stays hidden where you can't see it. Dangerously worn heads are buried deeper than Jimmy Hoffa's concrete galoshes. A DAT can become erratic with surprising suddenness. You can't count on it to show signs when it's starting to unravel—often until it up and quits.

For engineers accustomed to maintaining analog recorders, the DAT personality can be challenging. On the one hand, there's the temptation to ignore maintenance, run it until it dies and get a new one. On the other hand, there's the danger of diving inside willy-nilly, taking out dozens of tiny parts, only to have a couple of critical ones disappear forever into your studio's luxuriant deep-pile carpeting.

Fortunately, there is a happy medium. With a little basic attention and some advance planning, you can keep DATs perking along reliably for years to come.

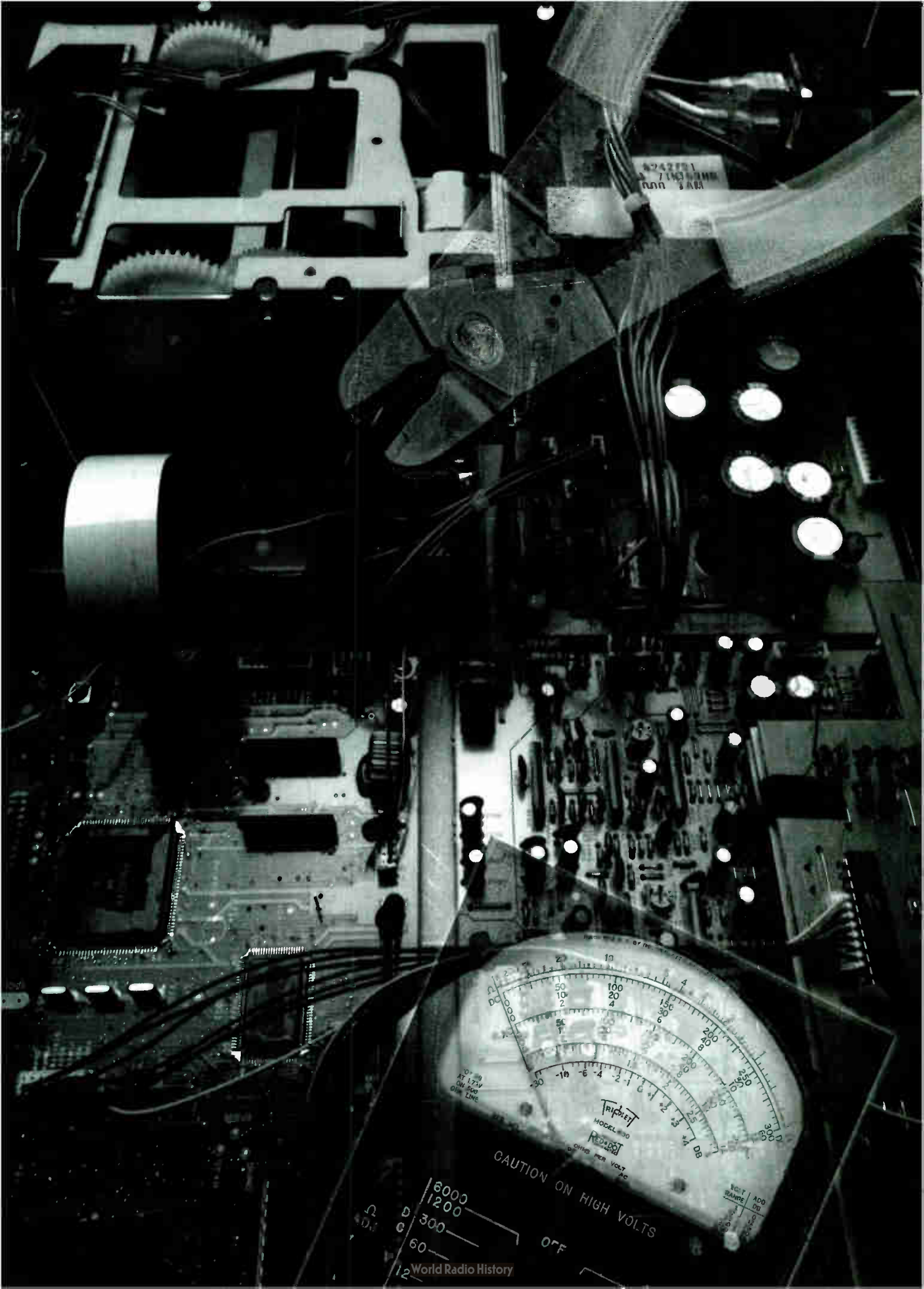
Whenever technology touches humanity, technology takes on a personality.

KEEP IT CLEAN

Cleanliness remains the first rule of maintenance. All DAT manufacturers recommend periodic cleaning of

by Dennis Charney and John R. French

LARGE DAT PHOTO: BILL SCHWOB / TOOL OVERLAYS, TIM GLEASON



the head drum and tape path components. Fortunately, this is easily achieved—for the most part—by using cleaning tapes made specifically for DAT recorders.

Have no fears about using them. The tapes inside are not the abrasive type used in some past VCR cleaners. These are gentle on the heads, and they do a good job of picking up small, loose particles in the tape path that could eventually cause problems. Running a cleaning tape for five or ten seconds after every 15 or 20 hours of use will go a long way toward keeping your DAT happy.

However, cleaning tapes usually will not remove grit and grime that has stuck firmly to nooks and crannies inside your DAT. If you believe in tip-top preventive maintenance, or if you're getting high error rates even after using a cleaning tape, you may wish to venture inside for a thorough cleaning. Most owner's manuals do not recommend this, so proceed only if you are technically adept and have proper facilities: a clean bench, lots of light and good eyesight!

First, you will have to remove the tape elevator assembly to gain access to the tape path and heads. On some models this is a royal pain, but on others it pops out with removal of only(!) about ten screws. On the average, the whole procedure takes a good tech about 20 minutes, of which about five is spent cleaning. The rest is spent taking it apart and putting it back together.

NEVER use a Q-tip, tissue or cotton cloth inside your DAT. That will clog up the works. Use a chamois, lint-free lens-cleaning cloth or foam-tipped cleaner dipped in commercial VCR-cleaning solvent. Performing this kind of thorough cleaning every week or two, depending on intensity of use, will help keep your DAT happy in the rack.

If you believe in tip-top preventive maintenance, or if you're getting high error rates even after using a cleaning tape, you may wish to venture inside for a thorough cleaning.

WHEN HOME REMEDIES FAIL

No matter how well you clean and pamper your DAT, eventually critical components will wear to the point where professional intervention is necessary. Ills you will encounter fall into two basic groups: tape path problems and head problems.

The basic design of the DAT transport keeps the tape path hidden from view. In most cases, disassembly of some elevator components is necessary just to get a glimpse of the transport and head drum. The tape path is small, and the numerous components are in close proximity to the head drum. Obviously, any small failure or discrepancy in the tape path will affect tape-to-head contact. A problem with any of the small gears or levers can render the DAT unusable, often with little or no warning.

Typical symptoms of a transport in need of overhaul include:

- Loading/eject problems
- Physical tape damage
- Intermittent transport functions
- Elevated error rates from poor tape-to-head contact.

Should you experience such problems, it's time to call the "DAT doctor." Your transport needs a good cleaning, proper lubrication, realignment and, quite likely, replacement of some tape path parts that are subject to wear.

As with transport ills, head problems have a tendency to appear suddenly. High error rates associated with a dirty head can be remedied quickly by cleaning, and cleaning will usually extend head life. But, eventually, the head will wear out.

When a head-drum tip wears through or the gap fails, a sudden high error rate results. By the time any audible dropouts can be detected, the error rate will be above the correctable threshold. The machine will exhibit an obnoxious digital chatter that you cannot work around or correct for. It's off to the DAT doctor for a new head!

EVADING MURPHY'S LAW

And when that head finally fails, don't you just know it will happen at 1:02 a.m. in the middle of a critical session with your most important client. The best way to prevent such untimely disasters is to take your high-hour DAT in for a preventive overhaul.

But, how do you know if you have a "high hour" machine? That can be tricky. Many earlier machines have no internal indication at all. You'll have to make your best guess from experience and any studio logs. (Another good reason to write things down!) Some earlier pro machines, such as the Panasonic 3700, have a little fuse-type indicator that shows how long power has been on in a rough gauge between 0 and 5,000 hours. Many new pro DATs, thankfully, now include software-based counters that accurately indicate actual transport running hours.

At NXT Generation, we break our periodic maintenance services into two categories: At intervals of roughly 1,500 hours, we recommend thorough cleaning, inspection, lubrication and alignment, plus possible replacement of critical tape path parts and, if advisable, the head drum. At 6,000 hours, we recommend all of the 1,500-hour services, plus replacement of capstan and spooling motors as needed.

Costs for the basic preventive services start in the $150 to $200 range, with major overhauls running in the $400 to $700 range. In most cases, you can expect to pay $200 to $400 to get an aging DAT back up to factory-new performance specifications.

WHERE THE CURVE CROSSES THE LINE

When we used $8,000 to $10,000 analog 2-tracks for mastering, we never flinched at spending a few hundred bucks every couple of years on maintenance. But as we only paid $1,800 for our DAT to begin with—well, a different psychology seems to apply.

So, at what point does the favorable price/performance curve of new DAT machines cross the line of what we're willing to pay for repair or overhaul of our current machines?

If you're still using one of the very first machines available, you may have crossed the line already. Chances are that you are already hungering for capabilities that your ancient seven-year-old deck doesn't offer. And while common wear parts are likely still available, other parts such as PC boards and structural parts may not be. Yes, your worn machine may be restorable to factory spec today, but if you drop it or spill coffee into it next week, that could be all she wrote.

However, in most other cases, a good professional DAT machine is worth restoring to new spec. And some popular decks recently discontinued have spun off newer "sister" models incorporating essentially identical transports, so parts will continue to be available long into the future.

In other words, if your present DAT has given you two or three years of reliable service, and it still does everything you want it to do, then it doesn't make sense to junk it just because the overhaul price might be 20% to 30% of new equipment cost—rather than the 5% to 10% you experienced with your analog deck. By extending the life of two DATs in your studio, you can save enough to buy a third new machine.

SHOPPING TIME?

On the other hand, if severe damage or wear pushes overhaul costs above 50%, or if newer models provide capabilities of real value to your work, it's time to go DAT shopping. But remember, your new DAT will be no different than your old one when it comes to maintenance. Keep it clean, service and overhaul it at recommended intervals, and it will give you reliable service into the next century.

The authors would like to thank Bruce Borgerson of Tech/Write Communications for his assistance in preparing this article. ■

Dennis Charney and John R. French operate NXT Generation (a division of JRF Magnetic Sciences), a DAT repair and overhaul facility in Greendell, N.J.

DAT on Location

The Progress and the Problems

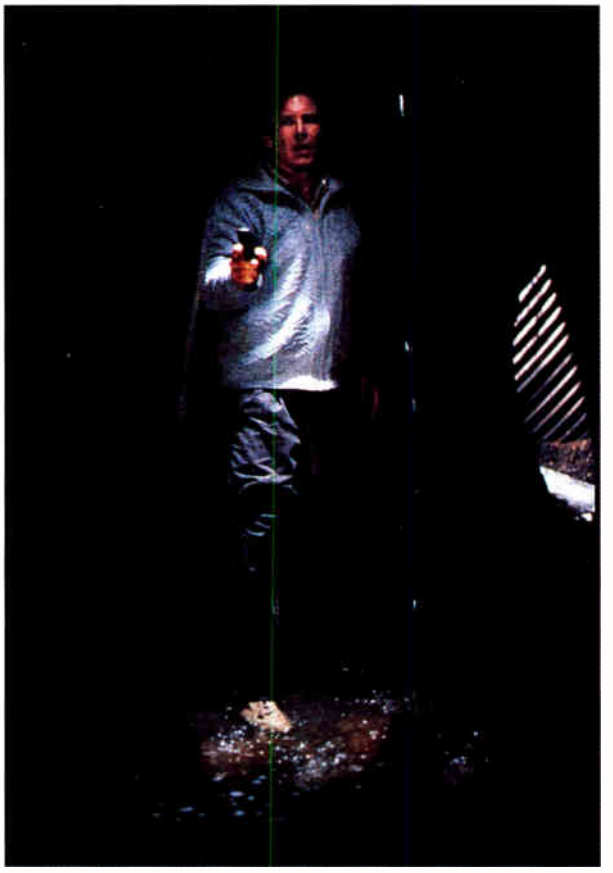
An Interview With Scott Smith

by Blair Jackson

Professional audio types are an interesting bunch, at once always looking for new, better ways to do their jobs but also somewhat set in their ways—when they find a method or product they like, they tend to stick with it. So it's not surprising that when high-quality portable DAT recorders, with their promises of ultraclean audio, portability and ease of operation, came onto the scene several years ago, they were viewed with a certain amount of circumspection by the location film sound community. After all, the Nagra recorder was the location recordist's best friend—sturdy and dependable—so why change? Well, there was that golden buzz word looming out there...*digital.*

Scott Smith, owner/president of Chicago Audio Works and a leading production sound mixer on major Hollywood films, was one of the first people to experiment extensively with digital recorders for location sound work, initially trying the F1 format, then moving on to DAT with the Gene Hackman thriller *The Package* in 1989. His other film credits include *Under Seige* (which was nominated for a Best Sound Oscar), *Risky Business, Vice Versa, In Country, Mad Dog and Glory, Above the Law* and last year's megahit *The Fugitive,* among many others. Smith is an interest-

On the set of* The Package, *sound mixer Scott Smith (right) holds 12 cans of magnetic film, or the equivalent of the amount of audio that would fit on one DAT cassette, displayed (at left) by boom operator Dale Janus. Technician Daniel Richter (center) holds a DAT recorder.



Harrison Ford in a scene in* The Fugitive *partially recorded on location with DAT

ing case because he has spent a lot of time working with DAT and examining the recorders inside and out, and he still has many questions about the medium. Indeed, for a number of reasons, he elected to do most of his work on *The Fugitive* using analog recorders. Recently, we talked to Smith about the pros and cons of using DAT in his job as a production sound mixer.

I gather The Package *is recognized as, perhaps, the first major feature film to have used DAT recorders for all the production dialog.*

Right. That was about four years ago. Prior to that film, we had done some experimenting with the Sony F1 format and a couple of other semi-proprietary digital formats. Our reason for undertaking *The Package* in DAT was really primarily to see what kind of problems we were going to run into, both in production and post-production.

Did you use a Nagra backup?

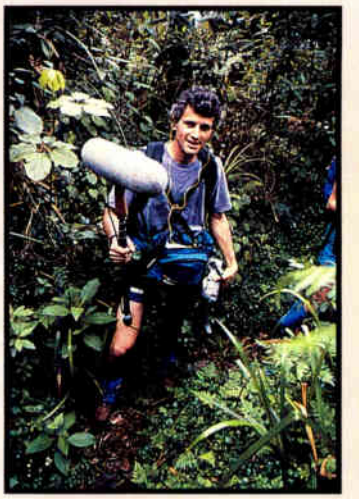
Yes we did. I wasn't ready to commit professional suicide yet. [Laughs] I had a very difficult time with the studio on that film—Orion—trying to convince them it was okay to try the DATs. But I took it upon myself, and with the approval of the director, Andy Davis, to go ahead with it, knowing we'd have the Nagra tapes as a backup if the DAT broke down or we ran into problems. I thought that film would be a good test because we were in a lot of cold-weather situations, with a lot of moving around—it wasn't a nice, easy studio picture where you're living on the lot for three months, which is where we'd done our earlier digital tests with the other formats.

Interestingly enough, they ended up using all of the digital in post-production, which was handled out at Weddington Productions [in L.A.], and they were very enthusiastic about it. We

DAT on Kilimanjaro For Rockport

As a senior producer for the Needham, Mass.-based video and post-production company Multivision, Tim Mangini has a lot of interesting work come through his door. But one of the most fascinating projects the veteran sound

Tim Mangini and his rig on Mt. Kilimanjaro



editor and recordist (*Gremlins, 2010*) has been associated with required that he leave the comforts of the Boston area...and hike up 19,500-foot Mt. Kilimanjaro in Tanzania!

The client was shoe manufacturer Rockport International, which hired Mangini to be videographer and sound recordist on an expedition in which two Rockport customers—who'd won an essay contest about Rockport shoes—and a handful of other people from within and outside the company, scaled the famous mountain wearing Rockport XCS and Discovery hiking shoes. The 12-day expedition took the group from 90-degree rainforests to the snowy peak of the mountain,

—CONTINUED ON PAGE 37

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thought we might run into some problems because so many different people are involved in the post-production of a film—the dialog editors, the sound effects editors and so on—but everyone was quite excited about it.

Did they have to bump it to some analog format to work on it, because there weren't many digital workstations around at that point?
They did all the cutting of the dialog on traditional 35 mag. The edited dialog track is usually done non-Dolby because most dialog editors like to do a lot of manipulation of the oxide—cutting, wiping and such—and Dolby SR in particular isn't very kind when it comes to manipulating the mag like that, so the generation prior to the dialog predub is usually a 35 work copy, and then the dialog predub is traditionally done Dolby, usually a nonspliced complete reel that they lay up as another element for the final dub.

Is this still the most common way of working?
For the most part. Obviously, some places do it differently. When we did *The Fugitive*, we did it that way. Even though in that case a lot of picture assembly work was done on the Avid, due to time constraints all of the final cutting was done on 35 mag again, and the final mix was done in Dolby SR with an SR·D release print.

So were any of your fears about working digitally borne out?
My initial trepidation, which has made me very unpopular with manufacturers when I've stated this in public, is that we're dealing with something [DAT] that I think was designed as a consumer format. To my mind, it was not really designed for professional use. They didn't address a lot of the things you would normally address for a professional format when they put together the specifications for it. Like being able to record analog time code; the ease of monitoring with a confidence head. I think they backed us into a corner with the bit rate, which, in my experience, has typically been that with most 16-bit formats, if you

DAT on Location at NPR

DAT recorders' portability, long recording time and the very fact that they're digital make them ideal for gathering radio news stories in the field, says Michael Schweppe, general production technical director at National Public Radio in Washington, D.C.

On a recent three-week trip to Alaska to gather sounds and interviews for a story on the Bering Sea fisheries industry, Schweppe and reporter John Nielson took along two Sony D10 R-DATs and 15 two-hour tapes, a relatively light load compared to what is normally used—the 25-pound Nagra IV-S and accompanying suitcase full of ¼-inch reels.

Schweppe says the main disadvantages of working with DATs in this price range are poor-quality mic preamps and lack of phantom power for condenser mics. To solve these problems for the Alaska jaunt, he packed a Sonosax XS-M2, which is an external mic preamp and phantom power supply. "It's a little cumbersome to use an external mic preamp, but if you do, you get two hours of glorious audio instead of two hours of sometimes hissy and junky audio," he says. They record in stereo, the SMPTE time code having been striped on the tapes before they left the studio.

Michael Schweppe aboard the Pacific Glacier in the Bering Sea. He is employing the M-5 stereo recording technique, using a Sennheiser MKH 40 mid mic and an MKH 30 bidirectional mic in a Rycote Zeppelin.

The reporting team returned to the NPR studios with 30 hours of clear recordings, which they cataloged to locate the interviews and sounds for use in the story. Cataloging DAT tapes is more time-consuming than with conventional reels, because DATs can't run at double speed, which is one reason many deadline-conscious producers still prefer working with analog tape—they can hear and choose the sounds in less time than it takes on DAT.

For Schweppe's Bering Sea report, the distilled sounds and interviews (called actualities) were loaded onto a Sonic Solutions workstation, where they were edited and mixed to create the final 23-minute piece. "The Sonic Solutions workstation is very powerful," Schweppe says. "You can manipulate sound like you would not believe: You can move a sound one word [⅓ of a second] or do fades that are not humanly possible. Creating a radio story is like painting a picture, where the background is a wash of sounds, the ambience around the event, then a mid-ground where you add specific sounds for interesting detail. Last, the foreground is laid—an interviewee or a reporter speaking."

The final piece is then loaded onto a DAT cassette, taken to a DAT player in the studio, put through the analog mixing console and then out to the airwaves via the satellite uplink. "The fantastic thing about this is that, from the gathering of the story to the final mix, the audio has never left the digital domain," Schweppe says. "The piece, with its multiple layers of sound, remains much cleaner than if it were recorded and mixed analog."

Schweppe notes that the primary limitation is that, at this point, NPR owns only one digital audio workstation, so most DAT recordings taken in the field have to be dubbed to and then mixed in an analog format. However, he says that NPR is due to purchase another workstation soon.

—Georgia George

get 14 bits, in reality you're pretty lucky. With a lot of careful tweaking and good, hard work, you can get an actual 16 bits out of it, but I've seen very few systems that, on a run-of-the-mill basis, are really capable of that. I would also like to have seen the manufacturers come up with a tape format that is a little more robust, like an 8-millimeter metal tape or something like that—something that isn't so flimsy.

My main fear was, and is, that you've got a tape in a shell, and if you run into problems with jamming, you could easily end up with two hours of material that could be the equivalent of a $150,000 shooting day that is completely unusable, whereas at least with analog, usually you can fudge things a little bit. With digital, it's either all there or nothing's there at all.

Has that actually happened to you?

I've never had that problem with a tape we've recorded. I have had problems with tapes recorded on what I think of as substandard digital audio cassettes that we've received in the studio, jamming in our machines. Typically, in the studio we're using mostly Panasonic 3700s and the Sony 7000 Series with time code. The initial recording we did on *The Package* was prior to the release of any time code decks, such as the Fostex PD-2, but it wasn't an issue, because all we had to do was maintain sync, and we were able to come up with a little black box device that essentially took the sample rate clock from the playback deck in our transfer suite and locked the sprocketed machine to it. So we were in dead sync with the sample rate clock, and then we tweaked the sample clock on the location deck so they'd be as close to 48k as we could get.

I know there are some who wonder about the necessity of buying time code DATs because there are ways around it.

Well, for video it certainly makes sense, and if you're shooting time code film and you want to be able to slave something in the edit suite, then it's great because you've got to generate it somewhere along the way. You can either record it on location or restripe time code later and offset the numbers and look for the clapstick or something to get sync. In a lot of situations, it certainly makes it easier to record on the production tape to begin with. The other good thing is it gives you a locater point to work to, which is a big help in post.

One of the big problems we've encountered operationally with all the decks we've used is the fact that, for the most part, the only thing that is transferable as a reference point from one manufacturer to the other is the PNO number, and even that seems to come up at a different start point on different manufacturers' decks—it could be off a second or so. The problem we've encountered on location with trying to use the PNO numbers as a starting reference for a take is that frequently we preslate a take. A lot of times we have false starts and things like that, and the nature of writing a PNO is it requires nine seconds for a valid number, so it was very difficult to figure out how to deal with that. For example, typically, our pre-slates are only two or three seconds or so, and if we have a false start, we have to either let the tape roll and record it as being a skipped-over I.D. number, or try to figure out some way to back the system up. Unfortunately, on any system that uses an incrementing PNO counting mechanism, there's no way you can go back and reset that number. All the software dealing with those functions is embedded in the chip set, and it seems that there are only two chip sets that are manufactured for the system control operations, and for the most part, at least from a user point of view, they both work the same. They deal with a lot of the deck functions themselves—the actual servo mechanism of the deck, the reading and writing of the digital data on the tape. It's very frustrating because there's a set of instructions written in [the software], and there's nothing you can do to change them.

One problem that we've received a lot of calls from various post houses about is they get tapes from recordists who don't think enough about what they're doing, so they've got either nonvalid PNOs, or the numbers are wrong, and they end up having to spend a huge amount of time searching through tapes to find out where a take really is. I'd say that, operationally, from the set to post-production, that's been one of our biggest problems. Some peo-

ple might want to use counter numbers, but different decks read differently. In fact, when we were using two or three different decks during the shooting of *The Package*, we had little stamps made up, and we'd stamp the log "Sony counter," "Panasonic counter," "Aiwa counter." The guys in post must have loved it!

Even with the recent decks, we still occasionally encounter some compatibility problems, particularly when it comes to time code. There is a standard, but it seems that different manufacturers are interpreting the standard somewhat differently. With the time code-format DATs, it's important to make sure that everyone is clear on exactly what the time code format is that's being used so sync will be correct from recording to reproduction. Because of the fact that the time code is recorded as subcode data and not an actual time code track, per se, as in the normal SMPTE format, you could easily get a situation where the recordist might record code as being a 60Hz signal or field rate, and in post-production, they may decide it was 59.94, and then you're out of sync. But that's a problem in ¼-inch, too, and it's mainly a problem of not properly marking material or just not knowing what the hell they're doing.

By the time you got to The Fugitive. *had you stopped using the Nagra backup?*

Actually, we did most of *The Fugitive* on traditional ¼-inch analog with Dolby A. I elected to go analog be-

—FROM PAGE 33, KILIMANJARO

and it was all captured on video for in-house promotion and for point-of-purchase displays in Rockport stores. For Mangini, this meant recording everything from the sound of bushbabies in the jungle to the songs of Chaga tribespeople in a mountain cave to interviews with the hikers. And lots of hiking footsteps, of course.

The rigors of the trip demanded that Mangini's rig be light, so he borrowed a Casio DA-R100 portable DAT recorder from another friend in the sound biz (Multivision's house DATs, used mainly for mastering and backup, are all Sonys) and acquired several special, 15-hour lithium expedition batteries made by Automated Media Systems of nearby Allston, Mass. (In the end, he only needed one battery.) He carried several mics—a Sennheiser ME80 shotgun, a Sony ECM-MS5 stereo mic and a pair of lavaliers—which he fed through a Shure FP-32 portable stereo mixer. Mangini's tape of choice was Sony's Pro DAT Plus 120, which he says "held up flawlessly." In addition, Mangini toted a pair of Sony TR81 Hi8 camcorders, noted for their top-quality, hi-fi audio tracks.

To carry his audio rig, "I had a Portabrace pack that housed the DAT player and its battery, and out of the case came two cables: one for the input from the mixer; the other was a combination remote control and headphone jack," he says. "The Casio had this little remote control, about the size of two quarters, that could control all its functions, which allowed me to remotely start and stop the recorder. So I had the battery and recorder inside the Portabrace, which was placed inside a beltpack, and then I could set my levels and close everything up so the equipment wasn't exposed most of the time. I also carried some Ziplocs [plastic bags] that had moisture munchers in them, so if I had a problem with humidity, I could take a mic, or even the recorder, throw it in the bag of moisture munchers, and within 15 or 20 minutes, they were dried-out."

Mangini returned from the trek with a wealth of great sound material, only a fraction of which found its way into Rockport's videos—where, naturally, his work had to compete with dramatic music (twas ever thus!). Still, it was the trip of a lifetime for Mangini, and it served as an instructive torture test for the portable sound equipment—and for himself.

—Blair Jackson

cause it was a very rushed production—the studio had decided on a release date before the film even went into production. At that early stage, they didn't know where they were going to post it, and I still wasn't entirely happy with how things were going with some of the DAT decks, so I didn't want to add one more unknown to the project.

Still, there were a lot of effects that I did on DAT—like in the scene at the dam—as well as some production sound: notably, the St. Patrick's Day parade sequence, which was recorded with two different DAT machines. I chased the Steadicam with a small M-S mic rig and a DAT, and then we had another DAT machine operated by one of my other crew that was recording a more traditional left-right pair perspective. We were moving around a lot chasing the Steadicam, and John Leveque, the sound editor, did a really good job piecing together something cohesive out of what we gave them.

You wonder when you see a busy, noisy scene like that whether it really makes any difference recording it digitally.

Well, my only reason for doing that scene digital was I wanted the lightest rig I could get because we were moving around so much. It was cold, we had a lot of clothes on, and I didn't want to have to deal with carrying around a Nagra while I was chasing a Steadicam and weaving in and out of the parade. Plus, the tape was cheap enough, and we didn't have to worry about reloads and such, so I could just kind of let things roll to give [the editors] all the head and tail pieces to make the editing easier. In terms of the actual quality of the sound, though, nobody would ever notice if it was digital or Dolby analog in that kind of sequence.

As far as the digital tape format goes, I think there is a place for using DAT on location, and with some of the newer decks that are becoming available now—the Fostex and Stellavox and such—I think it will become a more acceptable format to work with. Especially as people get more used to dealing with it in post-production, they might not have the same trepidations they've had in the past.

My main concern, as I said, is even on a deck with a confidence head, I'm concerned you have X number of minutes of material. Typically, we use only one-hour cassettes because I don't feel good enough about putting almost a full day's worth of shooting on one cassette—and if you have a tape jam or a shell problem, you could easily end up with something that is worthless. So what I've done on some occasions is run two DAT machines, using one as a backup.

There are some other things that are annoying, too. The battery life on all these machines is too short, at least if you're used to the fact that you can usually run a full day on a set of batteries, or a battery box, with analog equipment. Though we built battery boxes for all the location [DAT] decks we used, even that was kind of frustrating because none of the decks were really set up to efficiently use an external battery. We ended up wasting a lot of battery juice and regulation and such due to DC-DC converter design.

In general, though, the quality of the decks has been getting better, and certainly for use in the area of sound effects recording and situations where additional background material needs to be recorded, DAT is really a great format. They're small, they record long lengths and, of course, they sound good. It's relatively easy to put one in a small space and just turn it on and leave it going. Which brings up another problem—something we frequently need in film work is the ability to easily control a deck with a remote, and that's another thing the manufacturers haven't addressed, with the possible exception of the Fostex. With the other decks, you have to go through some sort of serial datastream conversion before you can get into the control bus of the deck itself.

So there are issues like that that frustrate recordists who want to use the machines the traditional way we might use a Nagra. But hopefully some of these things are changing. Until they do, though, I'm going to be reluctant to jump into [using DAT] as my only format. ■

Mix *managing editor Blair Jackson's first tape recorder was an Aiwa reel-to-reel. It was cool.*

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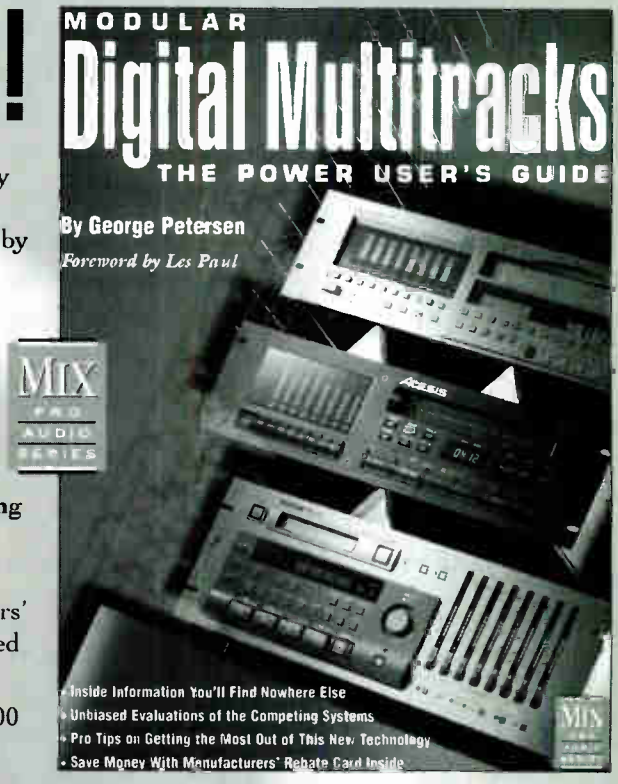

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by Paul Potyen

DIGIDESIGN PRO TOOLS 2.03

Major changes have taken place since *Mix* reviewed Digidesign's Pro Tools multitrack digital audio production system in April 1992. Although the original version of this innovative, Macintosh-based, random-access system redefined the term "affordable DAW" to a whole new set of audio professionals, it was not without its problems.

Several factors contributed to make the original Pro Tools system unacceptably slow for many professionals. The challenge of handling many tracks of CD-quality digital audio while updating the computer screen's waveforms and software-based faders made for a sluggish performance on all but the fastest NuBus Macs. Four channels were marginally possible without a separate processor, and Digidesign created a System Accelerator NuBus card for those who needed configurations that could handle up to 16 channels of audio.

Also, Version 1 of Pro Tools consisted of two separate applications. For recording and mixing, there was Pro Deck; and Pro Edit was the environment for editing your tracks. Switching between these two complex applications could take 30 seconds or more, depending on your CPU.

Well, Digidesign appears to have listened closely to its customers' suggestions, and the result is an entirely new software package for recording, editing and mixing. It's been optimized for faster performance and includes a long list of additional features and improvements. As a result, Pro Tools has been embraced by a wide range of professionals, from project studios like Thomas Dolby's to edit suites in

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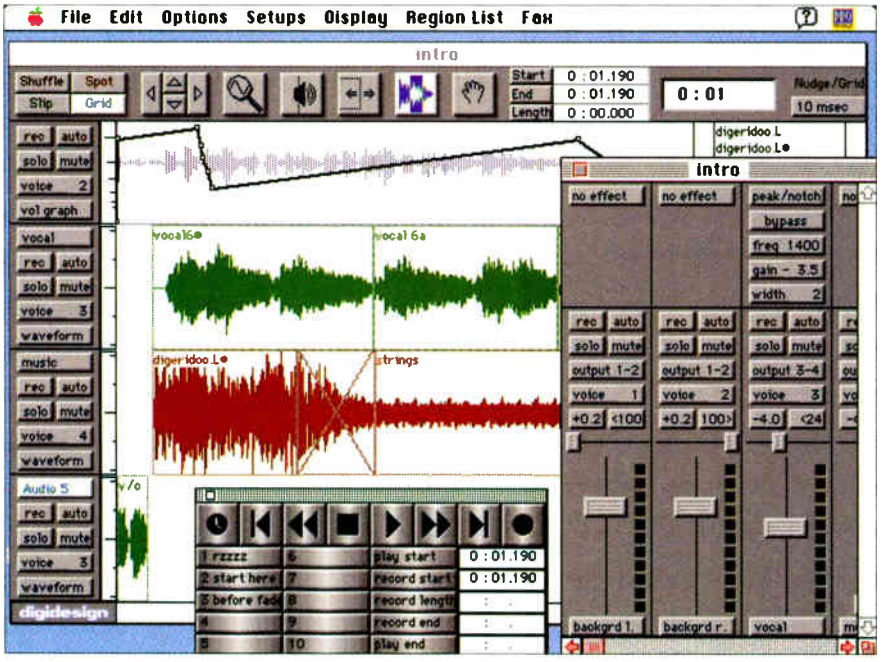

Figure 1: The new Pro Tools software interface features a Transport window (at bottom), Mix window (at right) and Edit window (background).

Pro Tools PostView Sneak Preview

I had a chance to use a prerelease version of PostView, Digidesign's software option for the Pro Tools system. PostView integrates frame-accurate digital video within Pro Tools sessions, making it a promising product for anyone involved in audio post-production for video and film. And I came away impressed.

A basic PostView setup includes a 4-, 8-, 12- or 16-channel Pro Tools system. In addition, since digital video is extremely data-intensive, a 25MHz, 68040 Macintosh equipped with at least 16 MB of RAM is recommended. For the same reason, a System Accelerator is strongly recommended even for 4-channel systems. (Audio is managed by the Accelerator card, which must be connected to its own hard drive, while video is handled by the main CPU and stored on a separate SCSI drive.)

Additional hardware and software are required to capture and view the video. Digidesign recommends the following video capture hardware solutions, all of which can record at 30 fps: Radius VideoVision Studio, RasterOps MediaTime and MoviePak, and SuperMac Digital Film. And Adobe Premiere 3.0 is the software of choice for configuring the movie size and frame rate. The video uses Apple's QuickTime architecture, and so the QuickTime 1.6.1 extension also must be installed in your system. And finally, you'd be crazy to try this without a second high-resolution color monitor.

The idea behind PostView is to take advantage of the random access offered by integrating digital audio and video in a single environment. Once work is completed, or you need a client or producer to view the project at maximum resolution, the same audio tracks that you have built up in the digital video environment can be synched to the original video material in a video deck, using another new feature of PostView: VTR Control. This lets you control any VTR that supports Sony 9-pin or Videomedia V-LAN protocol directly from the program. In fact, many users may want PostView for this feature alone, even if they have no intention of using integrated digital video.

We used the same system for this preview of PostView as was used for the Pro Tools test. A high-capacity Mezzo hard drive from Grey Matter Response (Santa Cruz, Calif.) was connected to the System Accelerator. (Grey Matter is also the designer and supplier of the Accelerator.) In addition, a Radius VideoVision Studio was installed onto the Mac, and a second 13-inch Apple color monitor was connected to the Radius card for viewing the digital video.

One of the most challenging aspects of any complex software/hardware system is the setup, and this was no exception. Each type of video capture hardware uses its own plug-in modules for compatibility with Adobe's Premiere software. Improper installation or selection of these modules in setting up your Premiere software results in anything from unacceptably slow frame rates and poor resolution to Premiere application lockups.

However, once all hardware and software setup issues were resolved, we were able to record a three-minute, 30 fps movie (which occupied about 40 MB on the hard drive) from a VHS deck into Premiere at a screen size of 320x240 pixels. (We followed Digidesign's recommendation that only video—not audio—be captured using Premiere, as inclusion of high-resolution audio in the video stream will only degrade the video quality.) I found the video quality and screen size to be acceptable for purposes of spotting audio cues.

Having saved the movie to hard disk, we opened PostView and created a session. The software interface is identical to that of Pro Tools, with a few important additions. You must first select the time code type and start time for your session. Then, choosing Import Movie from the File menu causes that movie to be linked to your session. And before spotting any audio cues, you must use the Offset Movie feature to tell PostView where your movie should start relative to the session. A Control Status window lets you designate whether you want the session or the movie to be the master. When the Movie is slaved to the Session, the two move in unison when you play, scroll or otherwise navigate around the timeline.

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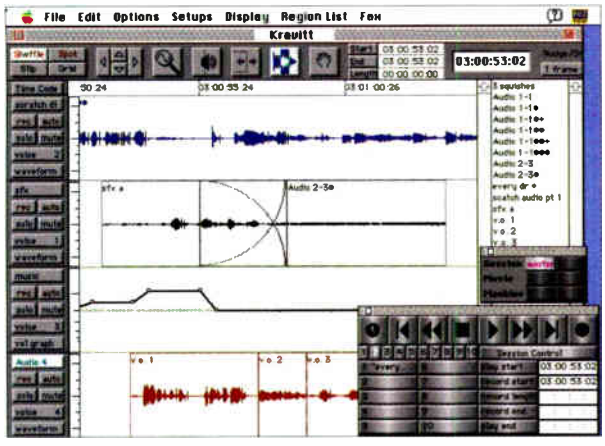
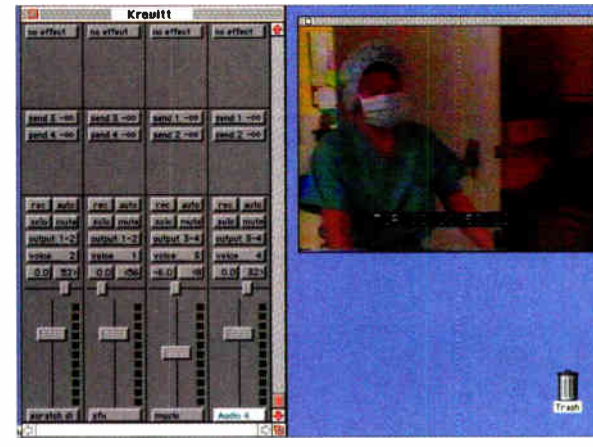




Two monitors are highly recommended for working with Pro Tools PostView.

—FROM PAGE 40, PRO TOOLS 2.03
high-profile facilities such as Record Plant in Los Angeles and Skywalker Sound in Marin County.

REQUIREMENTS AND SETUP

We looked at Pro Tools software Version 2.03, with a single 4-channel Pro Tools Audio Card and an Audio Interface, running on a Mac Quadra 650 with 16 MB of RAM. Digidesign recommends at least a NuBus-equipped Mac running System 7.0 or higher, with 32-bit addressing enabled and 8MB RAM or more. Also recommended are a 12-inch or larger color or grayscale monitor and a hard drive with an 18ms access time and 800kB/sec throughput. We used a 1-gigabyte Maxtor Panther hard drive to store audio for the main part of this test.

Pro Tools is available in 4-channel increments up to 16 channels. The 4-channel version does not require a System Accelerator card; however, the company reports that some of its 4-channel users have chosen to install the card for improved CPU performance. For this test, we used the 4-channel system with and without the Accelerator Card, which *is* required for the 8-, 12- and 16-channel configurations. Also, each additional four channels require another Audio Card and Audio Interface. (In Quadra 800s, 650s and other Macs that come with only three NuBus slots, a NuBus Expansion Chassis is needed for systems that use more than three cards.)

Setup of the Pro Tools hardware and software was straightforward—a separate hardware installation manual is provided, as is a well-produced videotape. Each Audio Interface contains four balanced +4 XLR analog ins and outs. In addition, S/PDIF (RCA) and AES/EBU (XLR) digital ins and outs are available. Incidentally, the Audio Interface is essentially unchanged from the original version and is responsible for this system's consistently clean, high-quality audio. (Inputs 1 and 2 are software-selectable to be analog or digital.) A cable is provided to tie the 50-pin connector to the corresponding Audio Card. The Slave Clock In/Out BNC jacks are designed for synchronizing multiple Audio Interfaces and for slaving the Audio Interface(s) to Digidesign's SMPTE Slave Driver or Video Slave Driver.

The Pro Tools software comes on six 800k floppy disks, two of which contain a demo session. Installation is about as easy and time-consuming as installing System 7 on your Macintosh. (Windows users, eat your hearts out.) The installation procedure automatically places the necessary extensions into the proper locations of your System folder. Before launching Pro Tools, it's recommended that you check the calibration of your Audio Interface(s), which is easily done by using the Calibration Tool software copied to the Digidesign folder that is created during the installation process. Calibration is essentially the same as with an analog multitrack, except that the Audio Interface is much more stable; Digidesign recommends calibration every six months.

THE SOFTWARE

Users of Sound Designer software will be happy to know that Digidesign uses many of the same menu configurations, conventions and key commands in Pro Tools. Every Pro Tools session is organized as a session file, with associated audio files and fade files, all within a session folder that Pro Tools automatically creates when you begin your session. Fig. 1 shows the software inter-

face for a typical session. The Edit window is shown in the background, with the Transport window in the lower left and the Mix window at the lower right. For those who don't have large monitors, a Reduced Track Size mode is provided that allows you to view more information in an abbreviated form.

Pro Tools' Transport window always remains in the foreground unless you choose to hide it. It works in much the same way as its analog counterpart. From here, you can operate Pro Tools as an independent recording device or as a slave to external devices, using Digidesign's SMPTE Slave Driver or Video Slave Driver modules. In addition, Pro Tools can operate as a master by using the SMPTE Slave Driver. It is also here that you can define and name up to ten autolocate points in your session.

You can record audio directly from within the application, and you can import audio files. The software allows for a maximum of 64 virtual audio tracks, but you can only hear as many simultaneous tracks as you have channels. Stereo Sound Designer files can be imported into Pro Tools and used as linked or unlinked mono files only after an extra step that creates two additional mono files from that stereo pair. Voice prioritization is determined by two factors: relative position in the Edit window and the voice number, which is selected at the left of the waveform in the Edit window or above the fader in the Mix window. You can view tracks in the Edit window as region blocks, waveforms (shown for voices 3 and 4), volume graphs (voice 2) or pan graphs. The latter two are among the most valuable of the new features incorporated into Version 2, allowing you to quickly and intuitively draw nondestructive fades and pans for each track in your mix. Fades and their corresponding controllers in the Mix window sounded and looked as smooth as any we've experienced.

Pro Tools is also capable of recording up to 64 MIDI tracks. However, the MIDI editing tools are limited. If you use MIDI for anything but triggering effects, you'll probably want to create them using a full-featured sequencer, after which you can import the MIDI file into Pro Tools. Limited MIDI editing features, such as quantize and transpose, are present in the program. MIDI files also can be imported (along with associated tempo maps) and exported.

THE TOOLS

Audio files and regions that have been recorded or imported into Pro Tools appear as regions at the right of the Edit window. Placing a region into a track is as simple as dragging from the region list to the desired track. At the top left of the Edit window are four buttons, marked Shuffle, Spot, Slip and Grid. These buttons are important in that they determine how your audio will "land" on your track and, once there, how they behave when you want to move, cut or paste them.

The three biggest reasons that any original Pro Tools user might wish to upgrade are speed, speed and speed.

If Shuffle mode is selected, each region you place in a track will snap to the far left of the timeline. If audio already exists in that track, it will butt up to the end of the previous audio. Any regions occurring after the insert point will "shuffle" back by an amount equal to the length of the inserted region. Slip mode lets you place and move regions freely in a track, even overlapping other regions. Spot mode lets you place a region in a track at a specific SMPTE time code location, an especially helpful feature in audio-for-video applications. And Grid mode is similar to Slip mode, except that you can specify a "quantization" grid for the region to snap to. You adjust the "fineness" of quantization at the top right of the Edit window, to the nearest .001, .01, 0.1 or 1.0 second.

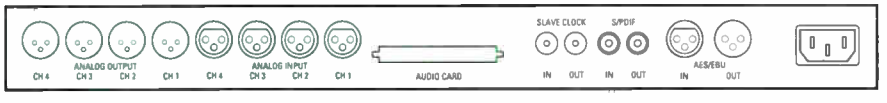
To the right of the mode buttons are the familiar arrow icons that let you zoom in and out on your tracks. Next to those are five tools: The first is the Zoomer tool, represented as a magnifying glass icon. Use this tool to zoom quickly in or out on a selected area of a track by clicking and dragging over that area. Next is the Scrubber tool, familiar to anyone who has worked with random-access digital audio. I used my trackball with this tool and found it to behave somewhat differently from Sound Designer. It was easy to use for small regions (up to one second) but seemed to "stall out" when I tried to extend further. Increasing the amount of application RAM had no effect on performance.

The nondestructive nature of the audio in Pro Tools allows you to use the Trimmer tool to extend and trim the head or tail of any region in a track. The last two tools are the Selector and the Grabber. The Selector is used when you want to edit or play a particular section of a track; with the Grabber activated, you can select a whole track and then move it, remove it or copy it.

All tools follow the conventions for Mac software and take advantage of many extra tricks, such as the use of the Esc key to tab between the tools. Mac-savvy users will get used to Pro Tools quickly, figuring out their own favorite short cuts to make sessions more efficient.

The Edit window takes up some major desktop real estate. Add to this the Mix window—Pro Tools' customizable audio and MIDI mixing environment—and you'll find yourself wanting a large monitor or a second one. In fact, we found that switching from the Mix window to the Edit window on a single 13-inch monitor was slightly irritating because the Mix window would become hidden.

Here are two tips for those who choose not to go with additional monitor space: (1) pull the bottom of the Edit window up about ¼ inch, and then drag the bottom of the Mix window to the lowest point on your screen; clicking on the appropriate window quickly activates that window; or (2) get WindowShade, a freeware control panel device from Rob Johnston, Interactive Technologies Inc. of Stuart, Fla., that rolls windows up by clicking on the title bar of a window. In any event, do *not* attempt to maximize space by dragging the Transport window to the



Pro Tools Audio Interface back panel

bottom of the desktop; doing so causes Pro Tools to crash. Digidesign assures me that by the time you read this, an update will be available that corrects this problem.

The Mix window is flexible and easily customizable, and it can display much of the same information as the Edit window. For example, each track has two bands of digital EQ and two effects sends. You can choose to display all, some or none of this information, either in the Mix window, Edit window or both. Incidentally, Pro Tools offers a lot of flexibility in terms of signal routing: It can be used as a multitrack recorder, and you can use the mixing environment to set up and automate effects sends/returns as well.

Pro Tools offers a choice of five types of high-quality, nondestructive parametric equalization for each band: high-shelf, low-shelf, peak/notch, highpass and lowpass. And, yes, you can adjust frequency and bandwidth while listening to the track.

OPERATION

The three biggest reasons that any original Pro Tools user might wish to upgrade to Pro Tools 2.0 are speed, speed and speed. Combining the recording, editing and mixing functions into a single program makes much more sense and minimizes waiting time. In addition, the new interface seems to respond much more quickly: Waveforms were drawn almost instantly upon completion of recording a new track, the VU meters respond accurately to incoming audio signals, and faders move smoothly in response to automation.

Speaking of speed, with the System Accelerator installed, redraw took less than a second after a 15-second, 4-track record. Intense volume and pan automation on four tracks caused only slightly grainy fader movement, and a 15-second, 4-track-to-mono bounce took about ten seconds with the System Accelerator. Without the System Accelerator, recording a similar 4-track sequence resulted in no significant difference in redraw time, and all four tracks were recorded faithfully. However, the same 4-track-to-mono bounce took about 15 seconds, and the same highly automated file showed significant degradation in redraw performance.

In addition, after playing this heavily automated playback section several times in Loop mode, I received an error message telling me that "it is likely that your disk is either too slow or too fragmented to complete this request." Quite possible, since by this time our disk was more than 75% full of many audio files. Also, this version of Pro Tools software did not support waveform scrolling during playback, but this feature is promised in the near future.

Additional Pro Tools 2.03 features include flexible crossfading between two overlapping regions in a track (see Fig. 1, voice 4); strip silence on selected regions with variable threshold and hold times; compacting (automatically removing unused audio from the session and the hard drive, freeing up disk space); and the ability to automatically export a region into Sound Designer for sample-accurate editing.

By itself, Pro Tools can slave to an external SMPTE LTC signal using SMPTE Trigger mode with a SMPTE-to-MTC converter. For improved performance, Digidesign's optional SMPTE Slave Driver and Video Slave Driver also allow you to slave Pro Tools to external devices via LTC, or via black burst or word clock, respectively. And using the SMPTE Slave Driver, Pro Tools also can act as a SMPTE master source.

Digidesign continues to push the envelope of the current DAW technology with Pro Tools 2.0. If you already use a Macintosh, this is an excellent way to enter the digital audio workstation environment without spending a fortune (and in some cases, getting a lot less for your money). Even if you don't own a Mac, you might consider the benefits of assembling a Pro Tools system that can be upgraded as your needs expand, as opposed to going with a turnkey system. The cost is favorable compared to other products of similar power; the Mac user interface offers distinct advantages over other platforms; and the Mac seems to be the current platform of choice for digital media production in general.

List price for Pro Tools 2.03 is $5,995, including a basic 4-channel system and software. The System Accelerator is priced at $2,000 and is required for anything above four channels. Each 4-channel expansion kit (which includes an Audio Card and an Audio Interface) is an additional $4,000. For systems that require additional NuBus slots, the 12-slot Digidesign Expansion Chassis is available for $1,995.

Digidesign Inc., 1360 Willow Rd. #101, Menlo Park, CA 94025; (415) 688-0600. ■

—FROM PAGE 41, PRO TOOLS POSTVIEW

When the Movie is the master, navigating the timeline does not affect the current position of the Movie.

Another subtle but important change is in the Transport window. Whereas Pro Tools 2.0 allows you to set up to ten autolocate points, PostView allows 100 points arranged in ten banks of ten—a feature that will undoubtedly be appreciated by anyone doing dialog editing and sound effects on long-form video. (This feature will soon be available in a forthcoming update of Pro Tools.)

PostView offers the same flexibility in editing that exists in Pro Tools. In fact, there are so *many* options that we found the process a bit confusing at first, given all the editing modes, master/slave configurations and cursor insertion chase modes.

Needless to say, spotting video is faster when it's digital: There's no waiting for videotape rewind or sync lock. You're at the top and you want to go 15 minutes into the program? No problem; click and you're there. One obvious dilemma that PostView does not solve by itself, and where other (more expensive) systems can offer an advantage, is the familiar scenario where you're told that, say, five seconds have been cut from the middle of a 20-minute video. Wouldn't it be great (as they say in the beer commercial) if you could do a simple ripple cut out of that video in the PostView environment and then adjust the audio accordingly?

In any event, Pro Tools PostView offers professionals excellent random-access audio post-production tools for random-access video at an unprecedented price point of $1,495. (A special introductory offer of $995 may be expiring around the time this review hits the streets on February 28; check with a Pro Tools dealer to see if it's still valid.) It does require a core Pro Tools system, and if you want to use integrated PostView Movies, you will also need a System Accelerator. PostView will also be compatible with Digidesign's TDM Bus system, which was scheduled for February release.

It looks like a winner to me.

—Paul Potyen

New Products For Film/Video Sound

LEXICON OPUS VERSION 4.0
Lexicon (Waltham, MA) is shipping Version 4.0 software for its Opus workstation, which expands the recording capabilities of the system to 16 tracks and adds a faster 486-based processor. Other enhancements include a single button push for accessing a second set of channels on the mixer, Automix® console automation, time compression/expansion, sample rate conversion, CMX list autoconforming, direct interface to a CD sound effects jukebox and dual hard drive operation for up to 28 track-hours of storage.
Circle #190 on Reader Service Card

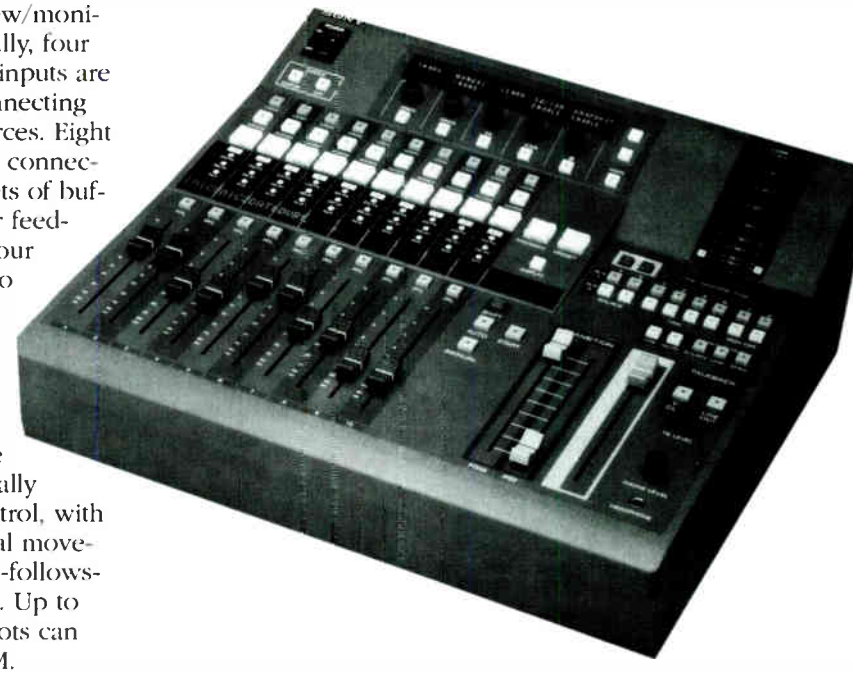
ALLEN & HEATH GS3V SMPTE MODULE
Allen & Heath (dist. by DOD Electronics, Sandy, UT) debuts a $399 optional module that allows the MIDI-based automation and control system in its GS3V console to sync to all time code sources. In addition to performing the SMPTE-to-MIDI conversions, the module functions as a SMPTE reader/generator. The expandable GS3V is available in 16- or 24-channel configurations, offering up to 72 inputs in remix.
Circle #193 on Reader Service Card

OTARI PRO-MD
New from Otari (Foster City, CA) is Pro-MD, a professional broadcast playback/storage system based on the Sony MiniDisc format. Available in recorder and playback-only models, the Pro-MD features electronically balanced +4dBu XLR connections, memory start, single/repeat play functions, lighted front panel controls, hard-wired remote controller, Otari 37-pin parallel remote interface and S/PDIF digital I/O on the recorder model. Options include transformer-balanced I/O and RS-422/RS-232C serial interfaces.
Circle #191 on Reader Service Card

SONY DMX-E2000 DIGITAL MIXER
Designed for post-production in the digital edit suite is the DMX-E2000 from Sony Business and Professional Products (Park Ridge, NJ). Equipped with both serial and parallel remote interfaces, the DMX-E2000 features ten stereo inputs, two mix buses and 2-channel preview/monitoring. Additionally, four channels of aux inputs are provided for connecting other digital sources. Eight AES/EBU output connectors offer four sets of buffered outputs for feeding as many as four digital VTRs. Two channel digital aux sends are provided for external outboard gear, and the board can be controlled manually or via editor control, with storage of manual movements and audio-follows-video crossfades. Up to 99 mixer snapshots can be stored in RAM.

ESE ES-2940
ESE (El Segundo, CA) debuts the ES-2940, which combines a dual 1x4 video distribution amplifier and a 5-output blackburst generator in a single-rackspace chassis. Retail is $900.
Circle #192 on Reader Service Card

SPECTRAL NOVA
Spectral Synthesis (Woodinville, WA) has announced Nova, a nonlinear, disk-based video accessory for use with its Windows-based digital audio workstations. The new add-on allows video to instantly track to follow the random-access audio tracks.
Circle #194 on Reader Service Card



SOUNDMASTER DA-88 INTERFACE

Soundmaster of Etobicoke, Canada (near Toronto), a manufacturer of high-performance transport synchronizers for the film and video industries, unveiled a DA-88 interface for its Integrated Operations Nucleus system. The ION interface puts the DA-88 under the serial control of the Soundmaster SYNCRO synchronizer, allowing DA-88 operations to be remotely controlled via a PC host computer, and scheduled to occur at precise SMPTE time code locations. Recently used with the DA-88 on the production of the *Unsolved Mysteries* TV series, the system also provides full synchronization control of the DA-88 and any number of other audio, video or film transports.

Circle #195 on Reader Service Card

D/ESAM DEMO

Graham-Patten Systems (Grass Valley, CA) has released a videotape demonstrating its D/ESAM digital edit suite mixers, available in modular versions with up to 56 input channels. For a free copy of the tape, call (916) 273-8412.

ASC VIRTUAL RECORDER

From ASC Audio Video Corp. (Burbank, CA) comes the Virtual Recorder, a PC system that brings random-access video to any audio application. The VR records and plays video and two channels of 8- or 16-bit audio, with linear SMPTE time code, so any audio system, recorder or workstation capable of interfacing with a professional VTR can take advantage of disk-based video via SMPTE or RS-422. Cueing time is under 250 ms, and the system uses Dyna-Q®/JPEG compression with a choice of three video resolutions (7.5, 16 or 22 minutes per gigabyte). A jog controller is optional.

Circle #196 on Reader Service Card

SDI TRACK-IT

Sprocket Development International (Burbank, CA) has released Track-It 2.0, which formats and prints film-style re-recording logs. Developed by a leading Hollywood sound editor, the $995 Macintosh program manages sound effects, music, Foley and dialog documentation throughout the production process and can import Pro Tools session files and several CMX EDL formats.

Circle #197 on Reader Service Card

SONIC SCIENCE'S SONIC SEARCH

Sonic Search® from Sonic Sciences (Toronto, Ontario) is a Mac-based software program designed for organizing large sound effects libraries. The program allows the user to create and search a database of various media—CDs, tapes, opticals, hard disks, etc.—and retrieve the effect from any online media, and edit decision lists for auto-uploading to workstations are supported.

Circle #198 on Reader Service Card

SENNHEISER EK-4015-UHF RECEIVER

The EK-4015-UHF from Sennheiser (Old Lyme, CT) is a pocket-sized diversity wireless microphone receiver built into a rugged, waterproof case. PLL technology provides a selection of 32 UHF frequencies and five front-panel LEDs,

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New, Faster, ScreenSound

by Dan Daley

THE INTERACTIVE PROJECT STUDIO

WELCOME TO YOUR FUTURE

If you've been keeping up with your decidedly uninteractive media lately, you're aware that we are on the brink of a huge change in the way information is disseminated. Forget the Clinton/Gore Information Highway concept—it'll languish forever as political interests fight over funding and access. Any real progress will come from the same sector it has traditionally come from in this country: business. And the real action at the moment is in the area of distribution, such as the Bell Atlantic/CellularVision merger and the fight over Paramount by QVC Network Inc. and other cash-laden suitors. All of this corporate wrangling will determine the way information is transmitted.

Although these struggles appear to be taking place in the stratospheric realm of high finance, the implications of all this for the project studio are tremendous. In fact, the nimbleness that comes with the project studio's scale could provide an advantage over larger facilities.

The big differences for project studios looking to move into interactive media are in knowledge and capitalization. "If you thought that your project studio audio equipment was a big, black money hole, wait until you get into interactive." So says David Biedny, whose interactive home studio serves as a template for those looking to take the next great leap forward.

Biedny, 31 years old, got his earliest exposure to music technology at age 11 when, while living with his family in Venezuela, he passed his spare time taking apart radios and helping local bands program their analog synthesizers. "I spoke English, so I could read the manuals," he explains. Then a friend of his got an Apple II computer in 1978 and intro-

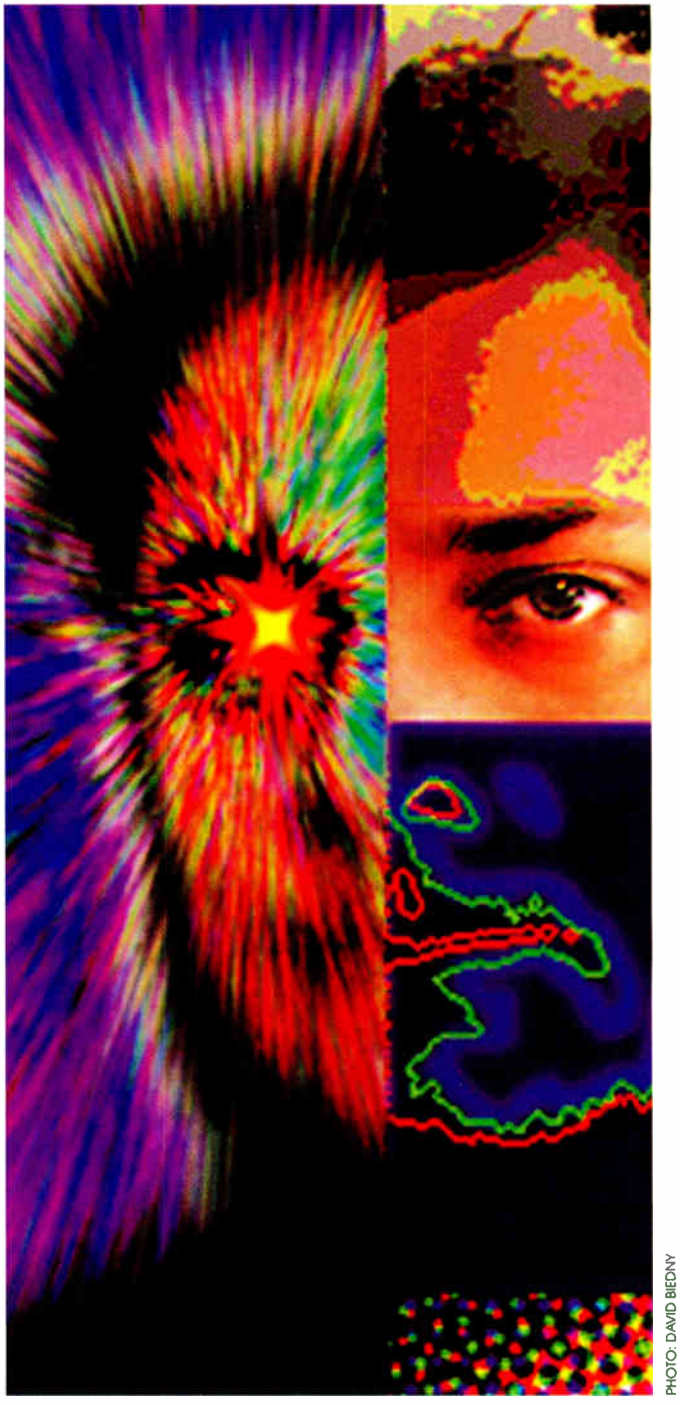

PHOTO: DAVID BIEDNY

duced him to that new platform.

Fifteen years later, with numerous CD-ROM interactive multimedia projects behind him and in front of him, Biedny sits in his San Rafael home in Northern California, surrounded by the equipment that could become the logical extension of the current project studio scenario. The music gear is there. It's more sophisticated than the ARP 2600 he cut his teeth on but not exactly cutting-edge, in keeping with his philosophy of using only proven technology. The digital synths are the workhorse Yamaha DX7 and Korg M1-R, as well as two Sequential Circuits analog synths, Oberheim and Ensoniq modules and sampler, Alesis signal processing, drum machine and 1622 mixer, and a Tascam PortaStudio II 4-track. Interacting with his seven computers are Digidesign's AudioMedia and MacProteus boards. Seven computers? Yes—including the Quadra 950, Mac IIfx (his favorite) and a Gateway 2000 PC/486 loaded with an internal CD-ROM drive, ATI Ultra and Media Vision Pro Audio Studio 16. Biedny is quick to point out that interactive work requires that a significant percentage of the computing power in a studio be dedicated to certain tasks: mainly graphics.

The computer is central to his work and his definition of multimedia. "Multimedia is what results from the ability to take all forms of communications and media and represent them in a single format—a digital format." It's a simplified definition that he says is actually more specific than some of the others that try to define this ground. That single digital format is the computer. Although project studios can take them or leave them as they see fit, audio and multimedia project studios have developed along parallel lines in that their existence and viability are utterly dependent upon affordable technology. It's the scale of investment that prompts Biedny's earlier statement about black money holes.

> If you thought that your project studio audio equipment was a big, black money hole, wait until you get into interactive.

Despite his musical background, Biedny stresses that those considering a transition from straight audio to multimedia need to accept the fact that audio is but a component of multimedia rather than a pivot from which to hang the other elements of video and graphics. It's a change in perspective that he says is critical to the success of such a transition. "That's because the depth of knowledge you're going to need will far exceed what you've relied upon up until now in audio," he explains. "Look, MIDI has been around for ten years as a way to exchange audio information among systems regardless of the vendor. We still don't have the equivalent of that in computers. Want to move a title from a Mac to a PC? Beep! How about going from QuickTime to a PC? Beep!" Ethernet has become the standard for net-

working among different platforms, but even that is still primitive compared to MIDI, he says. It all underscores the exponentially increased base of skills and knowledge needed for multimedia work, which in turn emphasizes his contention that multimedia project studios can at best be only partial subcontractors to any complete project.

"It's not a matter of one guy does it all," Biedny states. "That's not how it's done, or least done well. I'm using collaborators all over the world online because multimedia projects are larger in scope than what an audio project studio is designed to accomplish. I use the movie production model: A film has hundreds of people on a crew; they need writers, directors, editors, artists, graphics people. The same goes for multimedia. When you look at how much information—text, music, graphics, voice-overs, etc.—goes into a 650MB CD-ROM, you realize you're literally producing a movie. If you try to be all of these things, you're certain to fall short in a few areas. It's too rare for someone to have all the necessary skill sets."

Biedny lists his strong points as conceptualization, interface design and flow and graphics production. And music? "For me, the music is there for personal pleasure," he says. "I usually subcontract out the music. I don't really find that I'm good at writing music to spec."

Because the computer is the basis of the technology for Biedny, he reserves his most animated comments for it. He loves his Mac IIfx, and it forms the basis of his complex. He uses an Apple Quadra 950 for 3-D modeling. (He is less than thrilled at even the mention of a Quadra 800.) And though he prefers his technology to be proven and has no problem with used equipment, he is adamant about storage devices. "Buy it new, get the best and get a lot of it," he admonishes. "You're going to be amazed at the amount of space you're going to need if you're going to try interactive work."

His monitors are pairs of Bose Roommates and AR power Partner speakers. Nothing exotic, but his reasoning is that it's not unlike the environments in which interactive presentations are played back, from offices to board rooms to baseball parks. His MIDI sequences are either played to tape—analog, not DAT—and then

digitized into a Mac using a sound card, or else digitized directly from the sequencer to a Mac file. The same goes for voice-over takes. His apparent insouciance regarding audio fidelity stems from the limitations of that same environment, in which 22kHz sampling and 8-bit sound are the norm. "The basis for the playback is usually the Mac, and 22 kHz is the standard for multimedia in terms of sound," he says. "It's not often you use 16-bit audio on CD-ROM interactive presentations, and most people don't have the equipment to play anything better." It's all part of a lower-common-denominator approach he says is dictated by the playback equipment and environments; there's no compromise in aiming for that standard, because that's what's going to go over best, given the playback equipment's capabilities.

The economics of multimedia are where the greatest potential lies, despite the fact that the investment required is hefty and getting more expensive every day. Start with seven computers and move on from there. "But it can be extremely profitable if you're smart," he asserts. "If you have a decent portfolio, you can be working nonstop." Almost all the multimedia work out there is freelance since, as Biedny points out, larger companies seem to have trouble putting together in-house the team approach that works best to make a whole CD-ROM. "As a result, rarely do you find the content owner being the content producer," he points out.

Any business advice Biedny confers comes with the understanding that potential takers are already aware of the cost and education factors. After that, he says, would-be interactive entrepreneurs could start by contacting the local chapter of the International Interactive Communications Society (IICS), which has branches in most major cities. "It's the closest thing we have to a trade organization," he says. "For instance, they put out a newsletter in the Bay Area that has a classified section." Biedny also suggests logging on to some local user group BBS's, not only to look for work but to get a feel for the level of intensity of the interactive industry in a given area. Also, check in with some of the more high-tech personnel agencies, some of which are trying to promote

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new media workers.

"Despite the high costs and high knowledge level required, it's a great time to get in on this," says Biedny. "It's like television was in the 1940s."

Angela Dryden, chief engineer at Sutcliffe Music in Manhattan, has been working interactive media on the side with two other partners in a company called GeoSync that specializes in multimedia for financial services. She agrees with Biedny's assessments for the most part, but she sees some relief on the horizon to present high start-up costs, pointing to developing cross-platform technology that could limit the amount of dedicated hardware required. Dryden cites the new generation of computers from Apple, which include 16-bit audio, full-motion video and interactivity with the PC's Windows. "Things are becoming more integrated," says Dryden, who, like Biedny, uses a Mac IIfx. "Data is just data, and things like graphics are processor-intensive, so as the processor speeds increase, the reliance on multiple hardware will decrease, the same way it has with digital audio."

> Multimedia results from the ability to take all forms of communications and media and represent them in a single format—a digital format.

Dryden agrees with the movie production model espoused by Biedny, but she adds that it's more like doing audio-for-video—handling multiple elements—something that audio types have been doing for decades. "People can wear more than one hat well with multimedia," she says. "Sometimes you have no other choice. You simply have to adjust your thinking to a new medium but use many of the same disciplines from audio." ■

Dan Daley is Mix*'s East Coast editor. He is hyperactive.*

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by Paul Potyen

VIGNETTES FROM THE TRENCHES

PRODUCING SOUNDTRACKS FOR VIDEO GAMES, PART 2

Last month we heard from Mark Miller of Neuromantic Productions, soundtrack producer for some of the most popular of the new generation of video games on the Sega and Nintendo platforms. Miller described his view of the state of the art of video games, as well as the restrictions he faces and the rewards he derives from developing a successful game soundtrack. In this second installation, four other producers and composers discuss the unique issues they face in writing music and audio for some other platforms, such as PC, Mac CD-ROM, 3DO and CD-I.

INTERPLAY

(Irvine, Calif.) is a developer of games for Nintendo, Sega, PC, 3DO and CD-ROM for Sega, MPC and Mac. Its *Clayfighter* game was the first to use voice-over on SuperNintendo. The company released a number of new titles for the Christmas season, including *Out of This World* for 3DO, *Star Trek I* Sega CD-ROM, *Omar Sharif on Bridge* Sega CD-ROM, *Mario Teaches Typing* Sega CD-ROM and PC CD-ROM versions of *Sim City* and *Sim Ant*.

CHARLES DEENEN, music director: "When *Star Trek II* came out on floppy, they gave me 800k to do all the sound effects. We ended up doing 260 sound effects for this game—they're all between one and five seconds. We had to find ways to compress it, and even after that, it was about 3 megabytes. We used a utility called Sonarc, which was specifically designed to compress .WAV files on PC. The title ships compressed on about ten floppy disks and expands to about 22 megabytes on the hard disk—6 megabytes of that is audio.

"For the *Star Trek I* CD-ROM for Mac and PC, we added more than five hours of voice-over. It was the first time we used a title with that much speech—we started with 52 hours of raw material. We then transferred all the voice sound files from DAT to Sound Designer, edited them, normalized them and compressed them. The original *Star Trek* cast did the voice work, and some of them are getting on in years. We had to compensate for volume level changes and less-than-perfect diction, both

—CONTINUED ON PAGE 92

Interplay produced the soundtrack for Cinematic Multimedia's Star Trek CD-ROM.

CLAYTON ENGINEERING

(Daly City, Calif.) produces audio for video games.

GARY CLAYTON, owner; also staff engineer at Russian Hill Recorders in San Francisco:
"We just finished the final audio for a 3DO video game called *Twisted*. It's a take-off on a bizarre game show. My contribution was to supply music, sound design and also to edit together sequences. There are large sections of the game that don't require interactivity, where I'll do a complete mix, including music, dialog and sound effects. I also oversaw all audio production for the offscreen voice-over announcer. I worked with Ed Bogas on the music composition. In much of it, I was more of a producer and he was the composer.

"*Twisted* is full of different challenging situations. Each of the challenges presents a set of opportunities

—CONTINUED ON PAGE 92

Clayton Engineering designed sound for Electronic Arts' Twisted on the 3DO platform.

GTE IMAGITREK

(San Diego) is a developer of games for SegaGenesis, SegaCD, SuperNintendo, CD-I, Tandy VIS, 3DO, MPC and Macintosh. Among its published titles are a CD-I disc called *Project Pass* and a Tandy VIS disc called *Animals*. The company's first project was a laserdisc arcade game called *Hologram* for Sega.

DOMINIQUE WIDIEZ, audio director:
"It's important to work with digital audio at high resolution and then bring it down to the target platform. I tend to do all of the processing and editing in Sound Designer. As far as down-sampling and otherwise manipulating audio files, I find that Alchemy is good for sample-rate conversion and conversion of 16-bit to 8-bit on shorter files, but since it's RAM-based, there's a limit to how big the files can be. SoundHack [see sidebar, p. 93] is disk-based and is somewhat slower, but it's a better way to work with large files that need to end up as 8-bit. I've also had good results laying the prepared Sound Designer file back to a master tape and then going through an analog compressor back into the Quadra sound input, resampling at 8-bit using Sound-Edit Pro, Premiere or some other program; Apple's digitizing methods are optimized for 8-bit audio."

TERRY BARNUM, audio editor:
"It's still considered unwise to ignore cartridges because of the huge installed base of players. I edit picture on an Avid Media Composer. I use Sound Tools, Alchemy, SoundHack, Pro Tools PostView and other software for audio editing. Alchemy is pretty good for sample-rate conversion, and SoundHack is especially good for creating clean 8-bit files from 16-bit files. I also write code to do our own specific kinds of things.

"I also do orchestration and arrangement-types of things. We have composers who write tunes in a high-resolution format. I'll get a Standard MIDI File of the tune, bring it into Vision and map to patches that I cre-

—CONTINUED ON PAGE 93

TEAM FAT

(Austin, Texas) has produced music for more than 80 PC games, including *Seventh Guest*, *Wing Commander*, *Wing Commander II*, *Star Trek 25th Anniversary*, *Ultima Underworld*, *Castles*, *Masters of Orion* and *Seal Team*.

GEORGE SANGER, music producer:
"Before General MIDI, I just wrote for the Roland MT-32. These brilliant guys at Origin Systems made it sound good on the Sound Blaster. The same thing happened for *Loom* for LucasArts. So I thought, 'Hey, this is easy.' So I wrote some music for another company. Now when it's played through a Sound Blaster, the music literally sounds like farts and banging and clanking, and there's my name on the start-up screen: 'Music produced by The Fatman.' That was when I decided I had to start creating my own tones. At that time, I used my Mark of the Unicorn Performer plugged into an MT-32 module.

"The guy who brought me into this business, Dave Warhol at Real Time Associates, used to take my MT-32 arrangements and rewrite them himself for Nintendo and PC. I was really a hothouse flower for the first year I was doing this. I was taken care of by Dave and by the guys at Origin Systems and LucasArts. I soon discovered there weren't general tools out there to do this, and it wasn't easy. I found that in order to sell to anybody else, I had to provide some of the tools to make it sound good.

"That's what has gotten us into this 'Project Chaparral' card certification project. We are working with several hardware manufacturers to bring MIDI a step closer to being truly compatible. We're offering a service of certifying cards as compatible with the way we write music. We put a Team

—CONTINUED ON PAGE 94

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JUPITER SYSTEMS MULTIBAND DYNAMICS TOOL

Jupiter Systems (Applegate, CA) announces the Multiband Dynamics Tool, a DSP plug-in for the Macintosh that allows users to control the relationship between the input and output signals in digital audio material. The graphic interface allows configuration of compressors, limiters, expanders, downward expander/gates, soft-knee compressor/limiters, tube compressors or any combination of these by placing up to 20 breakpoints on the curve. Multiband modes allow adjustment of each spectral band in relation to the master gain curve. The MDT is plug-in-compatible with Digidesign's Sound Designer (V. 2.5 or greater) and OSC's Deck (V. 2.1 or greater); a TDM version is planned for early '94.

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NEW VIDEO EYEQ AV BOARD

New Video (Santa Monica, CA) introduced the first real-time (30 fps) video compression/processing board for the Macintosh Quadra 840AV and 660AV. Priced at $1,895, the EyeQ AV board interfaces directly with the Digital Audio Video (DAV) connector, giving access to 16-bit graphics over video and 16-bit stereo audio with sampling rates up to 48 kHz, plus support for displays up to 16 inches and the NTSC, PAL and SECAM video standards. The board has its own video processor and supports a variety of compression algorithms, including EyeQ Video, Indeo Video, RTV and PLV. Also included in the package are a QuickTime Player Utility; QuickTime codecs; Director XObject; QuickTime support for capture, compression, editing and playback of audio and video; and an EyeQ utility for the same features.

Circle #202 on Reader Service Card

OPCODE SYSTEMS VISION 2.0

Version 2.0 of Opcode's Vision sequencer for the Macintosh includes major new features such as music notation editing and printing, track overview and groove quantize, plus a variety of new commands and options, such as Controller names for each MIDI instrument, Markers in the Track Overview measure ruler, a Step Record mode in SMPTE lock and others. In addition, the onscreen controls and user-adjustable parameters are now said to be more consistent, intuitive and visually pleasing. Retail price is $495; upgrades are available for $99.95, including a new manual.

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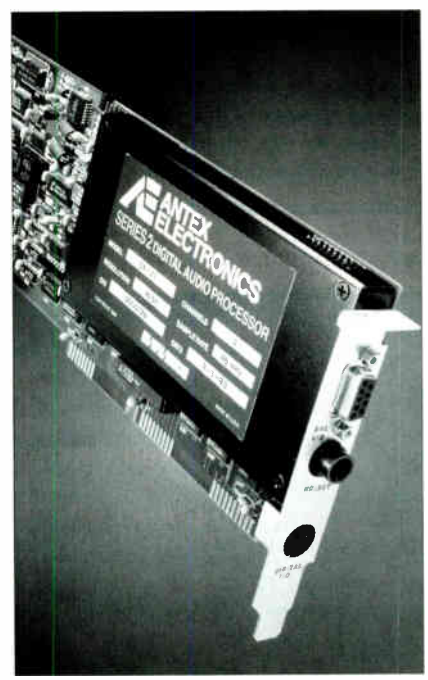
CYBER AUDIO/SRS 3-D SOUND CARD

SRS Labs Inc. (Newport Beach, CA) and Alpha Sound Labs Inc. (Irvine, CA) announced the first software-upgradable sound card with SRS 3-D sound: the Cyber Audio/SRS. The card allows a PC user to create, produce, edit and play back CD-quality sound, with integrated voice recognition (up to 125 words). The SRS system expands mono, stereo and encoded signals to provide a three-dimensional playback system with two speakers.



Antex SX-23

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APPLE HYPERCARD 2.2

Apple Computer (Cupertino, CA) introduced a new version of HyperCard that takes initial steps toward Apple's OpenDoc compound-document environment. Version 2.2 includes ColorTools, which allows developers to add color to stacks. It also supports Apple's QuickTime architecture, and the toolbox has several new objects, such as pop-up menus and list fields. HyperCard 2.2 is available for an introductory price of $139. Suggested retail price will be $249. Upgrades are $89.

Circle #205 on Reader Service Card

MICROSOFT VIDEO FOR WINDOWS UPGRADE

Microsoft Corporation's (Redmond, WA) Video for Windows Version 1.1 software offers improved image quality, more flexible architecture and additional cross-platform development support. Video for Windows files can now be played on the Macintosh, and QuickTime files can be converted to Video for Windows. Developers can order a Video for Windows developer's kit ($199) directly from Microsoft. End-users will have access to run-time software from a variety of sources, including the Microsoft forum on CompuServe, as well as from computer systems from vendors who pre-install the software with Windows.

Circle #206 on Reader Service Card

ANTEX SX-23 DIGITAL AUDIO BOARD

Now available from Antex Electronics Corp. (Gardena, CA) is a new PC add-on board, the Series 2 Model SX-23, which provides real-time, compressed, high-quality stereo sound. The board is the first to incorporate ISO/MPEG/MUSICAM Layer I/II compression, and it delivers compressed audio at 32, 44.1 and 48kHz sample rates. The SX-23 also offers variable bit-rate reduction schemes for varying levels of compression based on user needs, resulting in audio compression from 5:1 to 16:1. The company reports a frequency response of 20-22k Hz, ±3 dB, with a dynamic range of 92 dB and S/N of 90 dB minimum. List price is $2,495.

Circle #207 on Reader Service Card

"The Sega Genesis has one channel of 8-bit digital audio; the highest resolution is 10.4 kHz. The other audio part is based on a Yamaha FM chip that's roughly equivalent to an FB01—basic 4-operator FM stuff. While the digital audio is not that good, it's better in many respects than the FM chip for music. If you use a standard development package from Sega called GEMS, you can have 5-voice FM polyphony and a single digital audio channel. That runs on a PC with a card that plugs into the Genesis.

"The Sega CD is a Genesis plus the benefits of CD. The maximum sample rate is a little bit over 32 kHz. Theoretically, it can play 32 kHz along with the 10.4kHz digital audio stream. According to the game programmers, it's tricky to talk to the Genesis sound engine at the same time as the CD-ROM drive. The Sega CD has a little more memory for sampled sounds; you burn the sampled sounds into the ROM on the Sega Genesis.

"Sampled sounds are expensive on the Sega CD platform because of the limited space. Just a good snare drum sound can eat up a lot of memory. If we can trim ten bytes off a sound, we'll do it. Space is an issue on the Sega CD as well, since there's only 64k of RAM for audio. But you can page sound in off the CD.

"Typically, you use part of the RAM for constantly streaming background audio, and the remainder is available for sound effects. If you use half of the 64k for streaming, then you have 32k left for sound effects, which, at 12kHz resolution, is about three one-second effects.

"SuperNintendo uses only sampled sound. It uses a Sony chip to crunch a 16-bit sample down to 4-bit. It becomes a project in getting all the instruments that you want to use sampled in at the correct pitch. The technique would be similar to that of any sampler, where you take a set of samples, each of which are mapped across a usable range, to get an entire usable instrument range.

"I'm most familiar with the Genesis cartridge, although we're moving more and more into CD-based titles like the 3DO platform. I recently spent a day at a 3DO workshop playing around with the guys who are responsible for the audio portion of the operating system, and I heard some stuff that completely blows everything else out of the water. If you need to display different dynamic data types simultaneously, they recommend at least a couple-hundred kilobytes for streaming the audio, which can be the equivalent of Red Book audio. Twelve stereo pairs of 44.1kHz audio simultaneously will max out the DSP. There are a variety of sample rates to choose from. They have a modified delta compression. You can use AIFF 16-/8-bit mono/stereo, 8-bit delta 2:1 compressed. I heard a 22kHz, 16-bit, 2:1 compressed audio demo on a *Batman* title that sounded really great.

"Rules to live by: Try to get as much RAM for audio as you can. It's important to get the 'instructional' kinds of vocals to sound as clear as possible, so use whatever sample rate and processing you need to do that. Then the other elements will fall into place according to how much space is left. A guy at the 3DO workshop was in the habit of telling producers, 'Remember, if audio is considered last, it really is L.A.S.T. (Late Audio Sounds Terrible).' I think there's a lot of truth to that." ■

—FROM PAGE 94, TEAM FAT

Fat seal on the compatible cards, giving the consumer the confidence that the games we write will work on that card. [Other members of Team Fat are K. Weston Phelan, Dave Govett and Joe McDermitt.]

"People who are creating General MIDI cards need to go beyond the GM spec and look at the way composers are actually using GM. They need to make sure their card is suited for that composition method. I'm concerned about consumers buying games and not getting what they expected in terms of music and creating a General MIDI backlash. The cards that have the Team Fat seal will hopefully be able to weather that backlash.

"This area we're working in—music for multimedia—will very soon be just like working with music for traditional media, with the added factor of interactivity. We'll be competing head to head with everybody else who is doing music." ■

Paul Potyen is an associate editor at Mix.

AN AIR OF CONFIDENCE.

"I remember this Logic 2 was up and running the day it arrived... and I don't believe it's been idle since.

"Of course, the assignable processing makes any layout you may prefer very easy to set up. The real difference is Dynamic Automation of the digital signal path – it's fast and flexible and means I can be more creative with changes in the mix.

"The integration with the AudioFile's Event Based Automation allows you to make changes to the edits, with the console automation following suit.

"I think the speed of it... the flexibility, is a standard I've come to expect now. I can sail through time consuming tasks and get on with the real business – getting a true feel for the mix.

"The on-board EDL conform allows greater control over source audio – saving on On-Line time – the system relays the tracks from first generation material.

"The sound? I love it. An acute lack of distortion.

"Essentially, Logic 2 is reliable and it's fast...and anything that makes me look the same, I want a piece of..."

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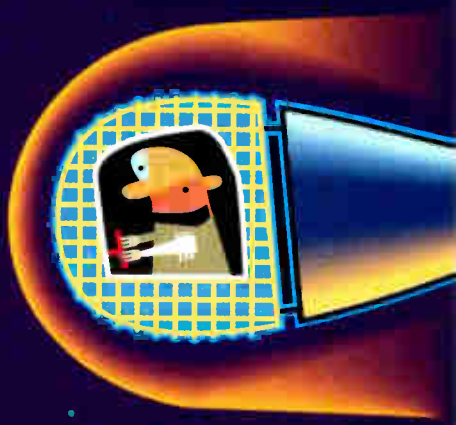
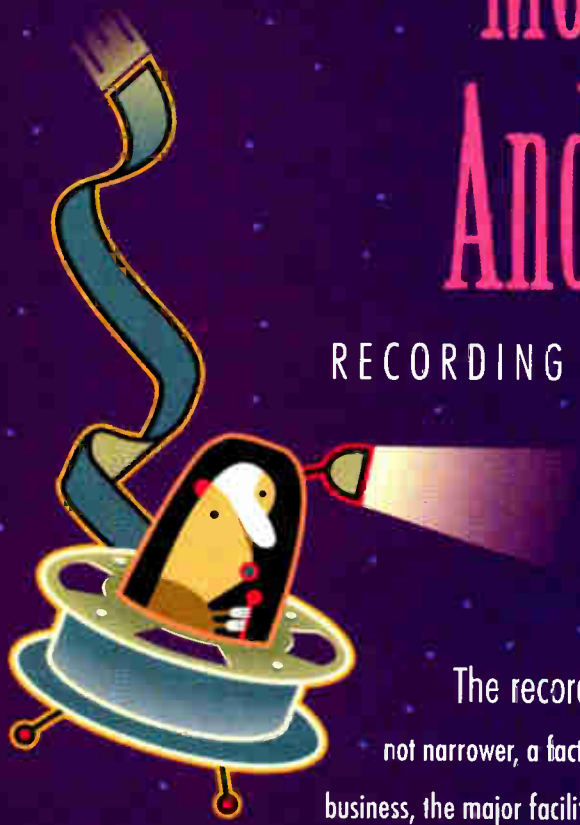
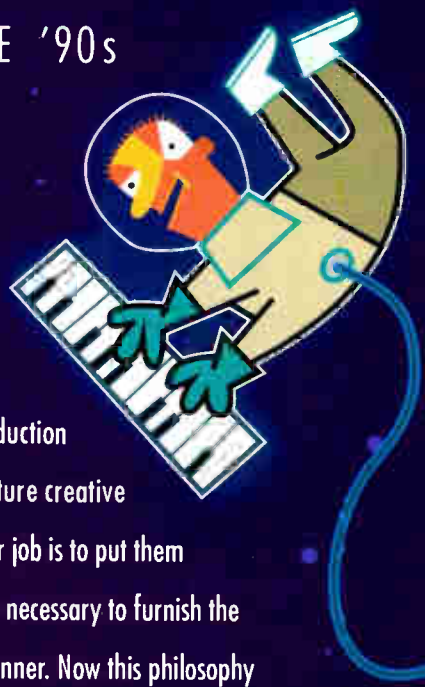


Motherships And Satellites

RECORDING EVERYTHING IN THE '90s

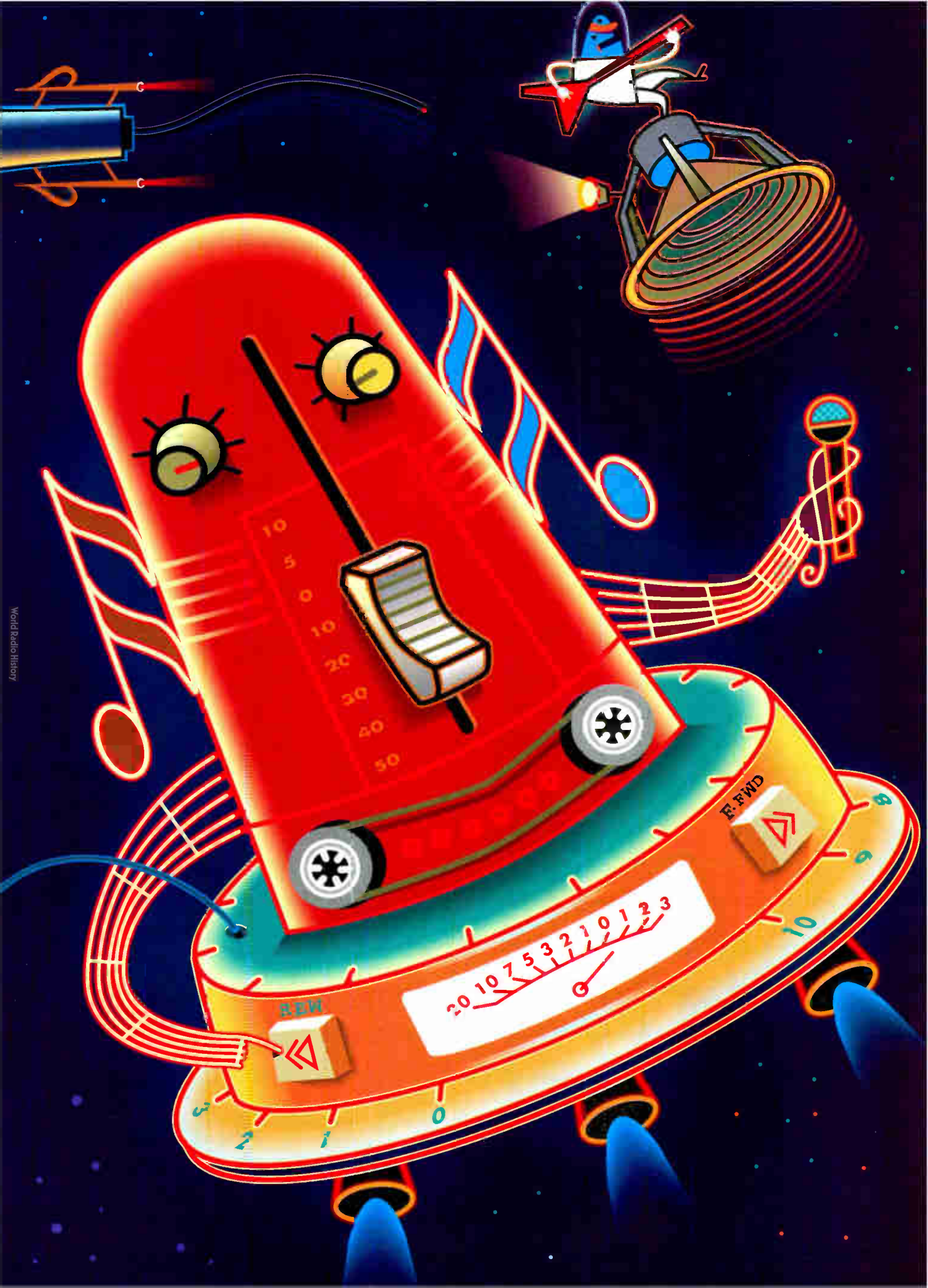
by Chris Stone





The recording industry is getting broader not narrower, a fact of life in the '90s. In the video post-production business, the major facilities have dealt with many sound-and-picture creative providers for years, whose materials they receive in various formats. Their job is to put them all together, make them all look and sound better and provide all of the services necessary to furnish the client with the best possible end-product in the most efficient and expeditious manner. Now this philosophy is becoming common within the music-recording business. With the proliferation of legal home studios, we are becoming an industry of specialists. These niche providers and the remaining full-service audio recording facilities are starting to work together more frequently. I believe this means we have already entered the world of Motherships and Satellites.

Illustration: Dave Ember



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A "Mothership" is a leading one-stop recording/post-production professional service company in any geographically defined market. These are the big guys, and we all know who they are. A "Satellite" is a law-abiding home or project studio whose professional owner performs some or many of the required recording/editing services for sound and/or picture, for themselves more than others. They then frequently bring the resulting product to a Mothership facility for additional services that they feel cannot be done as well at their own facility, or for services they are not qualified to perform.

Most of the time, the budget determines the degree of involvement of the Mothership. Sometimes, the party who holds the purse strings for the project (record label, ad agency, multimedia or film company, etc.) determines which sound/visual functions will be created at the Mothership and which can be provided by the Satellite. In either case, those portions of the project—pre-production, composing, arranging, overdubs, etc.—that do not require the use of expensive equipment or recording in large, acoustically treated spaces, are being done much more inexpensively at the Satellites.

To confirm this theory, we spoke to record labels, film companies, Motherships, Satellites, home studio owners and others who contribute to the project or are responsible for bringing it in on-budget. Most were in agreement that our theory is how it works today, and that there will always be a place for the Mothership. There was also general agreement that the mid-level, professional overdub-type room is the next dinosaur, and that home/project facilities (Satellites) will multiply. This last conclusion follows from the fact that the industry continues to develop inexpensive new hardware that is simple to operate and software technology that allows the individual specialist to produce professional-quality sound/picture product on a very cost-effective basis.

As the cost of new digital communications networks like EDnet, phone patch, T-1 telephone lines, fiber-optic networks and satellite communications become more affordable, it becomes easier for the Mothership and Satellites to communicate. Therefore, much like the quick acceptance of the fax machine, it is starting to be taken for granted that geographical distance between sound and/or picture creative facilities is no longer a sonic disadvantage. It will also soon be very cost-effective. The artist will literally "call in" his or her part of the project seamlessly between professionally qualified facilities in various parts of the world.

Former SPARS president David Porter of Music Annex in San Francisco says it well: "The project studio may only need these communication services once or twice a month and will not want to own them. If it were convenient for the Satellite studio to use them on an interactive, high-quality network provided by the Mothership, then high-end specialized services would be available not only to an in-studio customer, but to the Satellite as well. The exciting part is that the technology exists now. What we do with it remains to be heard."

In order for the full-service facility to become a Mothership and attract the major clients, it must attract the right satellites as its clients. To attract them, the Mothership must provide diversified services that are unique or more efficient than its competition. My first experience with

A Real-World Partnership in Action

River Sound of New York City is a state-of-the-art studio equipped with analog and digital multitrack formats and a Neve 8078 with 58 Flying Faders. It's co-owned by Gary Katz and Donald Fagen. Shaolin Temple of Soul is a Brooklyn project studio (co-owned by Danny Wyatt, of the band Repercussions, and Dan Millrood) equipped with three ADATs, an 8-track Pro Tools digital workstation, an Akai S3000 sampler and a variety of MIDI gear. The two studios have worked out a harmonious working relationship, as exemplified by this sketch of a project, provided to us by River Sound's studio manager Scott Barkham (who also plays keys in Repercussions).

Step 1: Demo starts at Shaolin with basic drum programming; focus on song structure, chords, melody, lyrics.

Step 2: Real drum tracks are recorded digitally at River Sound through the 8078 and then dumped to the ADAT format.

Step 3: Drum tracks are dumped digitally into Shaolin's Pro Tools 8-track editor, where they are edited before being returned digitally to the ADATs.

Step 4: Basic bass, guitar, keyboards and percussion are overdubbed to the edited drums on remaining ADAT tracks at Shaolin. Additional sampling is recorded on the S3000 and stored on a Syquest 105 removable hard drive.

Step 5: Live performance material is transported on the ADATs. MIDI info is transported as a standard MIDI file on a floppy. The S3000, like the ADATs, resides in a flight case at all times and is brought to River Sound; its samples are stored on 105MB removable cartridges.

Step 6: At River Sound, the ADAT information is once again digitally transferred to the 3M digital, or analog multitracks. All virtual tracks are also put to multitrack at this time.

Step 7: At River Sound, live performances are augmented and embellished, including replacing MIDI piano, organ, brass, strings with "the real thing."

Step 8: Having finished all tracking, the song is then mixed on River Sound's 8078 using the studio's collection of classic outboard gear.

this requirement was many years ago when Ronnie Wood, before joining the Rolling Stones, wanted to do his own album in a brand-new studio built in the basement of his London home by producer Ron Nevison. Woody even titled the record *I've Got My Own Album to Do*, because he had signed a solo artist deal in addition to his group commitments. He had built his studio because George Harrison had built himself one at his home at Friar Park outside of London and had recorded some great music there. Woody asked the Record Plant to oversee the tracking of the album, which included appearances by all his superstar buddies in London. He wanted to record the music in a party atmosphere where they would be most comfortable. He agreed to mix with us in L.A.

Sound familiar? The services provided by the Mothership are really anything the client with the home studio needs, whether it's technical or production assistance, audio engineering or whatever. The secret is, it's a partnership of services to make the project as good as it can be within the required budget and time restrictions.

We decided to speak first with the major record and film companies. We chose Larry Hamby, vice president of A&R at A&M Records, and Chris Carey, executive director of post-production services at Walt Disney Pictures and Television, to represent their respective industries. Both thought that any process that would make the end-product better within the given budget and time limitations was a good idea, and that certain parts of the project could be completed effectively in Satellites. Says Larry Hamby, "I don't care what kind of studio the budget is spent in, though I usually prefer that the mix be done in a Mothership, because you want to have the best of all possible worlds when you mix. I am interested in the final product being the best that the artist is capable of giving at that time. That's the most important thing. If he or she wants to get there with a variety of contributors, that's fine with me. I hire the people that the artist and I think are the right producer and the right engineer, and I hold them responsible for the quality of the music, bringing it in on time and on budget. I'm here to serve the artists, and I think that procedure serves them best."

Chris Carey puts it this way: "Managing a Mothership gives you an excellent benchmark to measure just how many different options are available to us today because of emerging technology. To continue to motivate the creative people in the film post-production community, we have to constantly evaluate all of the factors that go together to achieve the desired result in the end-product at the lowest cost. Change is inevitable, and your suggested concept is healthy for us. Motherships have an infrastructure—brains, management, technical expertise, standards, lots of advice, capital resources, facilities, etc.—that individual providers don't have and many times need. By going into business with them, we both benefit. In the future, the Mothership will manage, rather than provide certain components of the post-production process.

"As soon as digital communications networks are able to give us geographical mobility at a reasonable cost and acceptable quality," Carey continues, "we will be able to package more post-production services at a project price. Then we could consider using Satellites to provide those creative functions that are more profitable for us to subcontract than to do ourselves. We are not ready to do this yet, because some of the important components are not sufficiently developed or negotiated to allow us to do so. Still, services like transfers, ADR, Foley, sound editing, premixing and others need to be constantly explored and reviewed for this possibility. If certain components can be networked effectively so that the providers can create them in their own environment, we can make more movies in the same amount of space and become more cost-effective." If these two opinions are typical, then it appears that two different parts of our industry—records and film—are both aware of the options for horizontal and vertical integration that exist in the '90s.

Next, we went to see some of the L.A. music Motherships: Buddy Brundo of Conway, Allen Sides of Ocean-way/Record One and Rick Stevens of Record Plant. We also spoke with Miles Christensen of Post Logic, who started in the music end of the busi-

ness and now runs one of the Motherships of video post-production. We found a little more diversity in their opinions, probably because they are the big guys, but there was still a general agreement on our concept. All of these people cross over from music to picture, either directly or indirectly, during various parts of the production process, but each believes he has his special niche that keeps clients coming in the door.

Miles Christensen was very positive about the Mothership/Satellite relationship because he works with it every day and has for some time: "Our main source of revenue comes from the short-form commercial market. If the budget allows, those clients have a significant portion of the project done by sound designers and other specialists, who usually furnish it to us on various 2-track digital formats. We take all the bits and pieces, put them into some kind of an editor and then do a final sweetened mix. This has turned us into an editorial/execution house.

"We deal with curve balls, so there is no standard situation," he continues. "We have to be ready for anything. We do a lot of consultation with the specialists who provide us with the pieces, particularly those who have a lot of music savvy and want to make a relationship to picture. I wish more people would call post-production houses like us and ask us the best way to interface with a particular project. Otherwise, it can be a real nightmare for us trying to untie someone else's problems. We have to be prepared to seamlessly integrate any provider's format into our own, in order to provide our client with the best possible finished product. Our client expects us to be able to handle all formats of film, video and audio and be able to do anything with those media that they think is best for the project."

Allen Sides of Ocean Way/Record One in L.A. adds, "We build home studios for our clients. It's one of the things we have always done. Projects move freely from our facilities to these home studios and back. About 60 percent of our clients have some type of home studio to help them with their projects, and we go to great lengths to make sure everything is working properly for them. TV networks, as an example, provide all-in budgets for a composer, which really limits what he can afford to do with

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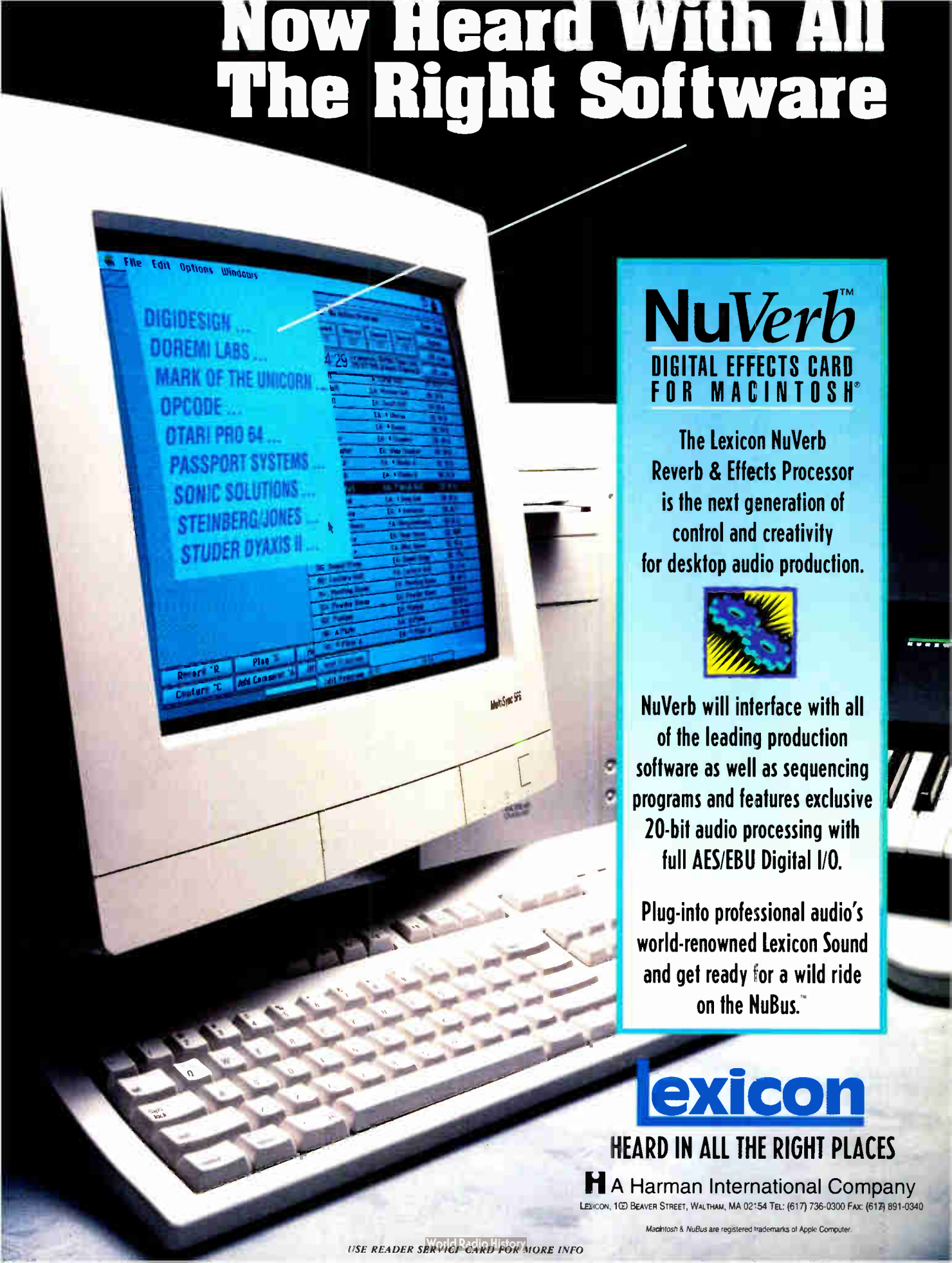

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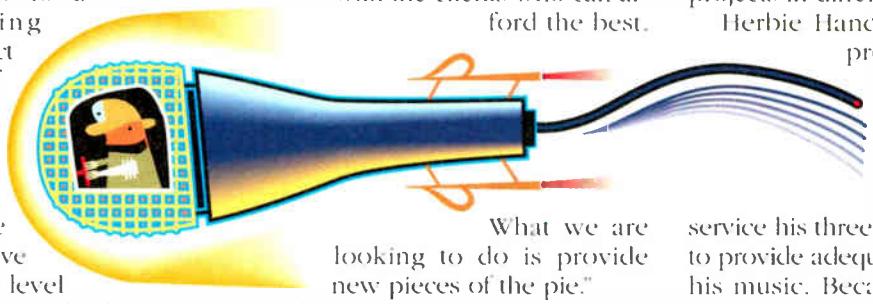
us. Most of it has to be done at home."

Rick Stevens of Record Plant agrees: "The reality is that a high level of recording can be done at home. Don't fight it. I look for business opportunities to enhance what my clients with home studios have created in their own spaces. You have to help those guys understand when it is time to bump up to a Mothership—bring their creative product to the next level of quality. Artists are attracted to technology, and it fuels great music. We have to accept the fact that we now have a two- or three-tier level of recording. We provide the umbrella of services that the home studios need once they have created the basic product. We need each other. Motherships will survive and compete only by their differences. Make yourself unique and you will survive."



Buddy Brundo of Conway sums it up: "You can't do business in this town the way you used to because the price pressure gets in your way. You have to diversify to succeed today. I am looking at several different new businesses right now, which will allow me to create my own Satellites, and at the same time work with the other providers who are out there for sound and picture. We still have a strong foundation of project business with the clients who can afford the best. What we are looking to do is provide new pieces of the pie."

Did I hear someone say "Diversify or Die"? I think these industry leaders will survive not only because they understand the challenges they must meet in the '90s, but because they are making positive efforts to move the demand for their services in a direction where they each excel.

How about the home studio owners...the Satellites? How are they stretching their budgets with their own facilities, and how do they use the Motherships? To answer those questions, we went to Herbie Hancock (artist, producer, composer), David Tickle (engineer, producer) and Richard Feldman (songwriter, producer). All have more than modest home studios and use the services of Motherships to enhance their projects in different ways.

Herbie Hancock, whose music, productions and film scoring I have followed for many years, says he has eight gigabytes of memory at home to service his three computers, in order to provide adequate systems to make his music. Because he has several projects going all the time, he needs access to his equipment 24 hours a day. Hancock explains, "Any time of the day I have any musical ideas for a project I may be working on, or if the inspiration hits me, I am immediately able to put something down. We record a lot of things to MIDI just through the computer, but when we do acoustic music, we always go to a commercial studio. But, to save

time and money, we lay the pre-production groundwork before we go over there. With nonlinear recording now a viable alternative to tape, and emerging technology providing us with more simplicity, smaller size and increased flexibility, there is no doubt in my mind that there is a huge trend toward people like me being able to make their own recordings. I don't feel this will cause the demise of normal commercial recording studios because there are still major projects, which have to be done in a much larger acoustic setting than is available to the artist in his home studio."

Richard Feldman, producer of Shakespeare's Sister, Wailing Souls and Belinda Carlisle, and writer of the Eric Clapton hit "Promises," uses his home studio to write his songs, develop new artists and do the pre-production for his record-producing duties. "I just want the creative freedom I need without having to watch the clock and to be able to give the artist a creative environment to prepare for the recording," he says. "Once I know the best way to present the artist I am working with, I often go to a commercial studio to record. There is an interaction that happens with live musicians in a large room that is lacking in a home environment. I think the home market will continue to grow, but there will always be a need for big recording spaces."

David Tickle has co-produced and mixed projects for Prince, U2 and, most recently, 4 Non Blondes. He says his home studio gives him the budget flexibility to try creative things that he could not do if he had to pay for studio time by the hour: "My next record is with Adam Ant, which I will track at Abbey Road in London. After about six weeks, since we both live here, we will come back and finish the record in my studio. That way, I can continue to make my record without being penalized. I can work on it until it is right and not worry about being over budget. The legal definition of what you are allowed to do at home is very clear. I do that. I don't want a commercial studio. I don't want to disturb the character of my neighborhood. I just want to make the best music I can with the budget I'm given. My home studio gives me the flexibility to do that."

Well, there you have it: a '90s philosophy for how to use all of the creative recording services available to assure the best end-product—the music and the picture. And don't forget the people who create it, without whom there would be no sounds and visuals. Miles Christensen of Post Logic says it best: "The bottom line is if you have a kick-ass mixer and a market to support these expensive services, you are going to get work. It is still a talent-driven business. If you don't have that, you are just another body sitting in front of a bunch of blinking lights." ■

Chris Stone is a former studio owner, a business consultant to the professional audio industry, and president of the World Studio Group.

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by Camran Afsari

STEVE ALBINI

NEMESIS OF CORPORATE ROCK

In the hype-fueled journals and airwaves of rock 'n' roll, the name Steve Albini has become almost ubiquitous. But few journalists or DJs would feel comfortable mentioning him as one of the hippest-of-the-hip indie producers if they heard him bluntly say, "I absolutely refuse to call myself a producer; I find that term offensive. For me to be called a producer has the same effect as being called a nigger, a faggot or something like that. It's an offensive term that does not describe me in any way."

At 31, Albini is a veteran recorder and generator of music. His band Big Black was an influential prototype in Chicago's early punk rock days. But tonight, the talkative and quite friendly engineer of many, including The Pixies, the Wedding Present, PJ Harvey, The Breeders and Nirvana (*In Utero*) refuses to be viewed as anything like the typical "industry producer."

He strongly resents the temptation of major labels, many indie labels, producers, engineers, A&R, managers, lawyers and others with tenuous links to the recording chain, who use artists to maximize personal revenues and liner note credits. In his experience, this exploitation by "industry types" often financially paralyzes the artists (who keep everyone working in the studio in the first place).

He flatters bands with his recording aesthetic—through both accurate sonic reproduction, and respect (non-interference) for their music and playing. Definitions vary from producer to producer regarding what "non-interference" is. On one extreme, a producer might fire a tenured member of a band and hire a session player to get his "signature sound." And on the other extreme, an engineer might prefer the band to be oblivious of him or her, let alone dream of touching an EQ pot, compressor or reverb. It doesn't take an engineer to figure out which side of the curve Albini operates on.

Albini's concern for the term "producer" is evident even in his writing. After earning a degree in journalism, he continued with Big Black and wrote for *Matter Magazine*, a Chicago fanzine. Some of his frustrations were later reproduced (he says without his permission) next to clips by Bob Dylan, Pete Townshend and Lou Reed in the *Penguin Book of Rock and Roll Writing*. Regarding an LP he did for British band The Membranes he says, "I did not produce this record, despite what it says on the jacket. I worked on a couple of songs in Chicago and helped them mix a few more songs in Leeds, but I no more 'produced' it than did I reach into my butt crack and discover it."

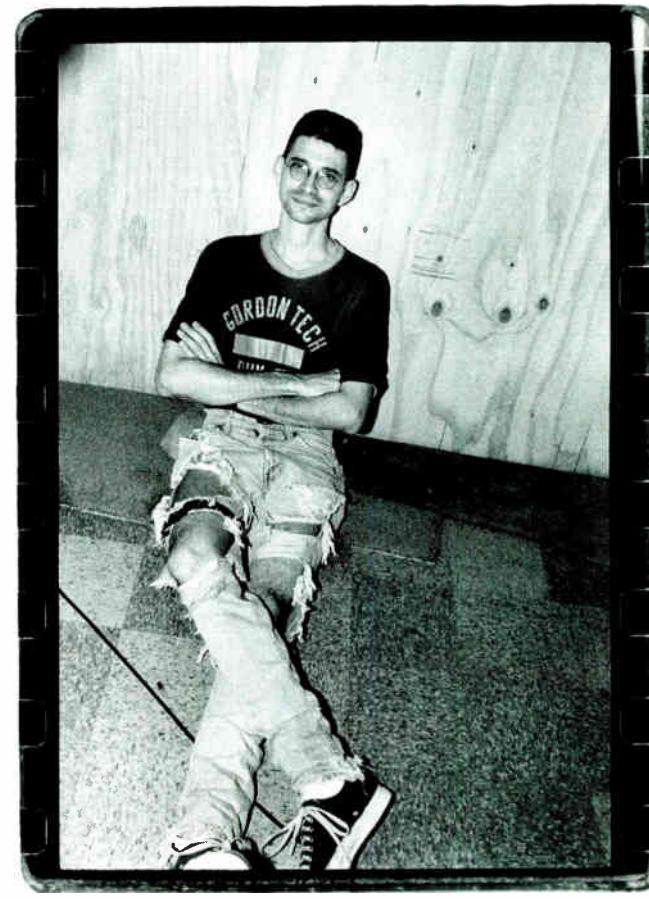

PHOTO: GAIL BUTENSKY

He displays a remarkable ability to skip between "alternative talk," like considering electronic bulletin boards as a forum for discussing genital piercing, and expressions like, "In some philosophical, yet diffuse theoretical sense, the recording should be the same as the sound being recorded."

After rendezvousing at Coast Recorders in San Francisco, right after a session with a band he enjoys called Oxbow, we went to a South of Market building a few blocks away, open windows overlooking the street. It was somehow appropriate when later we found ourselves competing with the piercing clatter and industrial sonic booms that only tough, metallic, uncompromising waste-disposal trucks can make.

Mix: You're more comfortable being referred to as an engineer, rather than a producer, right?

Albini: That's right, but even that bothers me a little, because I don't have a degree in electrical engineering like some engineers I admire have, and I never had any formal apprenticeship as an engineer.

Mix: It's true that degrees in electrical engineering are not very common among recording engineers.

Albini: Yes, and that's a big part of the problem. Recording engineering used to be a black art—you had to know everything involved in building a tape recorder, a loudspeaker, a mixing desk and so on before you could effectively operate them. Only since the '70s have electronics been user-friendly enough for people who don't know what they're doing to make records. These days, you have people being paid huge sums of money as "producers" who don't know how to align a tape machine; they couldn't find a burnt resistor on a circuit board or even tell if their monitors are out-of-phase. Get this—I walked into one of the biggest, most expensive, classy studios in Chicago to mix a tape recorded somewhere else, and their main monitors were 180° out-of-phase—they'd been living with them that way for weeks, and nobody noticed! That really blew my mind.

There are too many people in recording studios who don't have the perception to tell that something is wrong or the diagnostic skills to figure out how to find and solve the problem. There are people making records these days, calling themselves recording engineers, that to my way of thinking, are really nothing more than glorified button-pushers.

Mix: You seem to have really high standards for someone who is flattered to be called an engineer in the first place.

Albini: I'm not saying that good records can't be made under anything other than technically top-drawer conditions. But the possibility of excellence in any session is affected by the quality of the environment. And the quality of the environment in recording studios is at a very low ebb right now—I blame a lot of that on engineers not knowing any better. I'm uncomfortable calling myself an engineer for the same reason that I have trouble granting that a lot of the people out there making records are engineers. I know very little about vacuum tube electronics. I freely admit that I can't build a mic preamp from scratch and have it sound any good. But I can tell from experience in circuit design that 741 op amps in an audio stage are going to sound like crap. I can tell that power supply rails so close to the operating range of an amp circuit will eliminate any headroom in it. I know things

about audio, but I don't know everything about electronics, and that bothers me—I wish I did.

Mix: What is the decision-making process for you in terms of which band to work with?

Albini: I split it into three levels. First, a band that's desperate and has no money or options, one that's just starting or has been around for a while, but with no respect, record label, or a sugar-tit to suck on. I always try to make myself available to them, even if I perceive that their music sucks. I do this because when I was in a small-fry band and wanted to have a serious job done of recording, it was very hard to find somebody that would cooperate and do what we wanted in a way that we could afford. Ninety percent of the bands I work with are nobody's favorite, let alone an institution with a following.

The second level are bands with some kind of business interest, indie label or financial support. A manager might call me and say [he talks in a schmoozie sales-pitch voice] "Yeah, I've got this band, and I think they would be just perfect for you. We're shopping their demo around and we're trying to open the doors for them—so what'dya think?" Right away I know this band has aspirations toward commercial success; otherwise, they wouldn't bother with a schmoozing manager. People other than the band itself have a stake in the band being successful, and that's an uncomfortable arrangement for me, because I'm not in the slightest bit concerned with commercial success. I must want to work with the artist on some personal level before I could do it.

> Recording engineers and producers are nowhere near as important as the bands are.

The third level are artists on a major label, who are essentially supported by an entire industry and have access to ridiculous amounts of resources. Anyone who can afford to spend more than $5,000 making an album is pretty well-off. Most people in this business don't have any idea how cheaply things have to be done on the street level. I routinely make records for less than $2,000; that includes paying me, buying tape and a couple of pizzas during the session. The very bottom end of a major's budget for making an album is around $10,000, and with superstar acts, if they wanted to spend half a million or more in the studio, nobody would stop them. The majors don't exist to serve the bands, they exist to exploit them in whatever way to make money. That's capitalism, and I cannot begrudge any capitalist for behaving that way, but I choose not to live my life along those principles, unless it's for someone or some music that I feel very strongly about.

Mix: What's behind your conviction that major labels and the corporate wing of the music industry are so evil?

Albini: I think the way major labels do business is indefensible, the way

they treat the artists is unforgivable, and the position the artists end up being in, financially and politically, if they follow the record companies directions, will take them the rest of their careers to work their way out of, if it ever happens. And what will most likely happen is they will be destroyed in 18 months—which is the average life-span of a band on a major label—unless they've become a huge commercial success. I do not want to be a part of destroying a band that could otherwise have survived if not for the involvement of the big record industry.

Mix: How about contractual agreements between the parties—doesn't that protect them both?

Albini: The contracts are never honored. You can't presume that a band has the resources to bring an action against a record company that has a staff of lawyers. Contracts, by definition, favor the more powerful party. The band is fresh off the street, they do what they're told. There are many things about the way contracts are structured that if taken on their face value, are absolutely insupportable, but because it's standard practice, it's assumed by the artist that they have to go along with shit like this.

Paying points to a producer is a standard industry practice, and it's one of the many reasons why bands go broke. They have to give a lion's share of their income to other people in the music industry, and everybody ends up making money off them, except them. I think it's criminal for a producer to take a royalty on a record that he produces—especially before the band itself has been recouped. Royalties are for producers who say people are buying this album because *I* worked on it; it has *my* signature sound on it, and so *I* deserve a cut from every record that's sold. With the point system, the producer has a personal financial stake in making sure the record is commercially successful. The money he makes for himself and his family is more important than the band sounding like itself.

I think there's an attitude among a lot of engineers that *they* are somehow responsible for the records. They want to be credited and paid in the same way as the band, they want the record to be a part of their legacy. I think that's pretty arrogant. Recording engineers and producers are nowhere near as important as the bands are. It's the bands that matter. A recording engineer thinks that his technique is more important than the drummers playing—it's more important that he put his mic in the right place with appropriate isolation from another drum, than let the drummer play comfortably and naturally. A producer says that it's more important to him that the record have a super hyped-up, bigger-than-life sound, than the band sound like they do. The record company says the record has to be competitive, and so it needs a certain level of production for it to be worth their while, rather than let the band express itself in the way it wants to.

Bands who won't be huge commercial successes are encouraged by the record companies to spend wastefully in the studio; they will not accept a record that's done cheaply, they insist that the band use a producer with a name, the producer has to get paid with points, and all of this comes out of the band's royalties. After the recording, they need money for the start-up costs of a tour, but the band has no money because they've been

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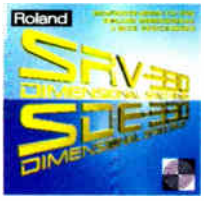

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in the studio, so they have to beg an advance from the label, and that comes out of their royalties as well. The income from the tour does not cover all the money they owe, and so the debt continues.

Mix: What about this recent commitment of major labels to open departments that are supposedly sensitive to the needs of alternative bands?

Albini: The people involved with that truly think they're changing the music industry into a kinder and gentler one. Right now, there's a frenzy of signing for "alternative" bands with some vague connection

> I like music that sounds like stuff I haven't heard before, whereas the point of most music is to sound like stuff that you've heard before.

to the independent music scene, and before that, punk rock. I've seen the most faceless, talentless, uninspiring bands with no reputation, fan base or track record get bidding wars started merely by pretending to be popular. Every record company in this signing frenzy has a point man used as an initial contact. These people are generally young and not from the music industry—like an ex-sound man from CBGB's or a fanzine writer from Boston. The majors have found a group of people with a patina of kinship to the bands they're trying to capitalize on. When the artist is ready to commit to the record company, after being hoodwinked by the point man, they are not committing to this person that befriended them, they are committing to the larger corporate structure that has a 30-, 40-, maybe 50-year history of screwing artists.

Mix: Many of your recordings have a coarse and enjoyable quality to them—what is your opinion or definition of "melody"?

Albini: I don't have an opinion of

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melody. I like music that surprises me. It's very rare for me to hear a song with conventional arrangements, production, instruments, technique and attitude that surprises me. Genre music that's designed to be inoffensive and is based on an archetype does not appeal to me.

I like music that sounds like stuff I haven't heard before, whereas the point of most music is to sound like stuff that you've heard before. My favorite recording of a rock band ever has a slow melodic feel to many parts of it—*Spiderland* by Slint, recorded live by Brian Paulson [for the Touch & Go label]. It's a textbook recording of how an engineer can capture a band without interfering with the way they sound. The quiet parts are really quiet, the loud parts are really loud, and every inch of that record is convincing, stark and natural.

Mix: What are the most important pieces of gear for you? What do you travel with and what kind of monitors do you prefer?

Albini: The microphones, preamps and tape machine are the most important because that's what I use on every record. I don't really like to use equipment too much, but I like using microphones. I travel around everywhere I work with two suitcases full of microphones. That way, I have old familiar friends to use at any studio and then make compensations in the control room so it sounds like the way it should. I like the George Massenberg Lab, ITI and Sontec equalizers. The John Hardy of Evanston preamps are excellent. I really like to use a dual trace oscilloscope because I can find bits of distortion or crackle easier than looking at VU meters. A dual trace in XY mode gives me a visual reference for the width of the stereo image I'm hearing and to answer questions about phase relationships of different signals.

I work almost exclusively on near-fields. I think listening to music on massive speakers with massive amplification hovering over your head is a totally alien way to listen to a record. Listening to music in the far-field with loudspeakers that have crappy frequency response is the norm. I prefer to use speakers that do not give an unrealistically flattering representation of what's going on. At my home studio, I have [Yamaha] NS-10s and [Tannoy] PBM 6.5s. I just got a pair of near-fields that were built for me by Linaeum in Oregon. The tweeter in these is outstanding—it's wide dispersion, flat and really smooth; not aggressive and piercing, like pins in your ears.

Mix: What kinds of dynamics control have you used on any of the bands you've worked with?

Albini: I hate compression. The only time I adjust dynamics is with specific problems. Sometimes I have a mic set up for "soft stuff." Like a vocalist that sings a few inches from the mic and puts out a dynamic range that the tape could never reproduce, especially over a raging rock band. If the singer is mumbling along at -20 dB and suddenly starts barking up to about 0 dB, then sometimes I use dynamics control to shorten the scale on the vocal. I use expanders once in a while. I seldom use hard gates, and I have very little use for compressors, compared to a pop music engineer. At some point in his mundane career, every engineer stumbles

—CONTINUED ON PAGE 213

New Products

EUPHONIX ES-108 CONSOLE DYNAMICS SYSTEM

Euphonix (Palo Alto, CA) introduces the ES-108, providing eight to 128 channels of high-quality dynamic range processing for the CS2000 and CSII consoles. Two of the ES-108's eight processors can be fitted per channel, with pre/post-EQ switching and external sidechain inputs for voice-over and other effects. They can also be inserted into the main stereo outs. The units plug into the Euphonix patch bay without modifications. A single VCA performs all gate, expand, compress and limit functions, for minimum signal path and maximum fidelity.

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WOHLER TECHNOLOGIES AMP-1A/DI

The AMP-1A/DI from Wohler Technologies (South San Francisco) allows simplified monitoring of AES/EBU and S/PDIF digital audio signals. The self-contained unit has three power amps and five speakers (two on each side for mids and HF, one for summed LF in the center). The digital input section synchronizes to any sampling frequency between 31 and 48 kHz and contains 18-bit, low-jitter converters and a digital output for passive loop-through. Wohler offers several digital input modules, plus optional analog line outputs for standard D/A functions.

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DYAXIS II CONTROLLER

MultiDesk is a new control surface from Studer Editech (Menlo Park, CA) for the Dyaxis II workstation. Based on MultiMix audio software, the system provides dynamic automation of level, pan, mutes and DSP, plus 100mm moving faders from Uptown Automation and a jog wheel. MultiDesk can control and automate up to six Dyaxis II processors for up to 24 channels of recording and playback, with a footprint of under five by two feet.

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ROLAND S-760 SAMPLER

Roland (Los Angeles) has packed the power of its S-Series samplers into a single-rackspace module with improved DACs. The upgradable operating system is compatible with all S-700 sample libraries and can convert S-550, W-30 and Akai S1000/1100 samples. A Quick Load feature loads only those sounds tagged for playback, and Load While Play enables samples in memory to continue playing while other information is loaded (a 600MB CD-ROM drive is included). EQ can be configured as four stereo or eight independent EQs. Also new from Roland are the first four discs of a ten-disc series of 150MB CD-ROMs with 16-bit instrumental samples in a wide variety of styles; the discs are compatible with S-770/750 digital samplers, the SP-700 sample player and the S-760.

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CONNECTRONICS TT PATCH BAY

New from Connectronics (Stratford, CT) is a Bantam/TT patch bay that is said to cut wiring time by 80%. The single-rackspace unit has a series of DIP switches to set each pair of connectors to Full-Normaled, Half-Normaled or Straight-Through configurations, allowing quick setup and reconfigurations. The JB9600 is available in a hard-wired version and a version terminated by cable assemblies with a 37-pin D-sub miniature connector, also available from Connectronics.

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TLA TUBE EQ

Distributed by Sascom Marketing Group (Pickering, Ontario), the TLA Dual Valve Equalizer is a 2-channel tube equalizer that features balanced inputs and outputs on XLR connectors, line and mic level inputs with switchable phantom power, and four overlapping bands of sweepable EQ per channel, with a fixed Q of 0.5. The two-rackspace unit retails for $1,295.

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APOGEE UV22 CD MASTERING

Apogee Electronics' (Santa Monica, CA) new UV22 CD mastering process has 24-bit data-handling capability, allowing information from beyond the 20-bit level to be encoded into standard 16-bit formats. Rather than lowering the noise floor at the expense of transparent operation, the floor is left at the theoretical 16-bit level, but undistorted detail as low as 30 dB into the noise can be heard.

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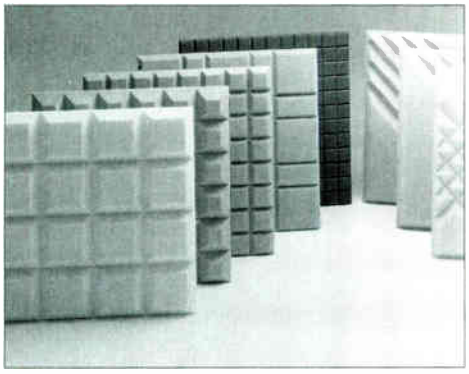

SONEX CLASSIX CEILING TILES

The newest addition to the Sonex line of acoustical treatments from Illbruck Inc. (St. Paul, MN) are Classix ceiling tiles, which snap into existing 2x2-foot suspension grids. The tiles are made of a fire-resistant, open-cell, melamine foam that meets Class 1 building requirements. Illbruck offers three color choices and five pattern/thickness combinations, as well as custom designs.

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HAFLER 9505 POWER AMP

The 9505 trans•*nova* balanced amplifier from Hafler (Tempe, AZ) is a true differential-input power amplifier. Each port of the input differential stage has been buffered with a high-impedance JFET buffer pair for direct signal access to the amplifier without conversion to an unbalanced signal; the balanced mode can be deactivated via a rear-panel switch. Another rear-panel switch allows mono bridging. Balanced inputs are on ¼-inch phone plugs and XLRs; unbalanced inputs are accessed via gold-plated RCAs. The 9505 is available in silver rack-mount ($2,200) and black 17-inch ($2,100) formats; rack ears for black units are $70.

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SVETLANA TUBES

Svetlana Electron Devices (Portola Valley, CA) has introduced a line of Russian-style power grid tubes that are plug-compatible replacements for Western products. The tubes are designed for power amplifier and intermediate power amplifier applications, especially in the broadcast field. A wide variety of radial-beam tetrodes and pentodes are available.

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SOUNDTRACS SOLITAIRE CONSOLE

Soundtracs (U.S. dist. by Samson, Hicksville, N.Y.) now offers the Solitaire, a 24-bus in-line production console with the latest ADP package, providing gates, compression, limiting, expansion, modulation and autopanning. Dual line inputs on each channel (24-, 32- and 40-channel models are available) provide up to 88 total inputs for mixdown, and VCA and moving fader options will be offered in the future.

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WENGER W.A.V.E.

Wenger Corp. (Owatonna, MN) now offers the Wenger Acoustic Virtual Environment, an 11x13-foot room that uses L.A.R.E.S. (Lexicon Acoustic Reinforcement & Enhancement System) to simulate the acoustical properties of 16 different environments (12 preset and 4 custom-defined). Available environments include a practice room, recital hall, intimate theater, recording studio, cathedral, concert hall, stadium and others.

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JL COOPER AUTOGRAPH AUTOMATION

JL Cooper (Los Angeles) announced the Autograph Universal Console Automation System, a hardware and software package supporting VCA Associates MTA-1537, Penny and Giles moving faders and a variety of other VCA and moving fader options. The feature set also includes support for Macintosh computers, with color display and intelligent cue-list offline editing.

Circle #238 on Reader Service Card

FIDELIPAC SR CONVERTER

Dynamax is a new sample rate converter from Fidelipac Corp. (Moorestown, NJ) receiving stereo digital audio signals in AES/EBU, IEC 958, S/PDIF and optical formats at any frequency and outputting either at a switchable sampling rate or synchronized to a second reference digital signal. The converter comes as a stand-alone or a rack unit with external power supply and connectors; list price is $1,290.

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DIGITECH DHP-33 PITCH SHIFTER

Called a "little brother" to the powerful DHP-55, the DHP-33 from DigiTech (Sandy, Utah) replaces the discontinued IPS-33B Intelligent Pitch Shifter. At a retail price of under $1,000, the DHP-33 processes three-part instrument harmony in three modes: chromatic (a fixed interval from the input note), scalar (moving up and down a scale with the input note) and chordal (always members of a specific chord type).

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ROSS RCS1402 CONSOLE

Priced at $599, the Ross Systems (Ft. Worth, TX) RCS1402 rack-mount console features six balanced mono line inputs, six studio-quality mic inputs with discrete preamps, four stereo line inputs, two stereo aux returns and a stereo tape in. Each channel offers two post-fader/EQ aux sends, 3-band EQ, pan and gain. Outputs include left and right balanced/unbalanced mains, left and right tape outputs and a stereo headphone out.

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HHB COMMUNICATIONS PORTADATS

HHB Communications (dist. by Independent Audio, Portland, ME) has developed two new portable DAT recorders with nickel metal hydride rechargeable batteries for approximately two hours of use. The PortaDAT PDR1000 ($4,375) uses a rugged 4-head, 4-motor transport and offers selectable sampling rates (32, 44.1 and 48 kHz), balanced XLR inputs, AES/EBU and S/PDIF digital I/O and 48-volt phantom power. The PDR1000TC ($6,995) adds the ability to jam sync, convert absolute time to time code, and record, generate and reference to time code in all international standards.

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HOT OFF THE SHELF

Audio Alchemy's **DAC-in-the-Box**, a $199 outboard D-A converter in a compact case, features S/PDIF optical and coaxial inputs and -10dB RCA analog outputs. Call (818) 707-8504...**Valentino** released its sound effects library on magneto-optical disks for the Synclavier and PostPro systems and on CD-ROM in Emulator III format; also available is a CD-ROM with production music and effects for Mac or IBM multimedia applications. Call (914) 347-7878 or (800) 223-6278...**ETA Lighting Systems** unveiled a new line of AC power conditioners for the pro audio market in UL-approved, single-rackspace chassis; all feature EMI/RFI filtering, spike and surge protection, and ten rear outlets. Sequenced turn-on of up to 60 amps is available. Call (216) 425-3388...ILIO Entertainments has licensed the **Synclavier Sound Library**, which will be available on CD-ROM for Digidesign SampleCell, Akai S1000 and CD3000, and Roland's S700 samplers; other platforms are planned. Call (818) 883-4546...The **Mixrak line of studio rack furniture** from Bullfrog, allows users to easily configure and assemble a custom system of racks and desks. Call (219) 233-4151 for info...**The Hollywood Edge** and producers Chris Lang and Eric Cunningham have released L.A. Riot 1 & 2, two sampling CDs for dance music production. Volume 1 has hundreds of DJ moves, scratches and loops; Volume 2 has custom drum beats, bass licks, guitar and keyboard riffs, and vocal hooks. Call (800) 292-3755 or (213) 466-6723...**Lumex Opto/Components** released a color, 60-page catalog with more than 2,500 LEDs. For a copy, call (708) 359-2790...**Manhattan Production Music** added two new CDs to its music library: "The Little People" has children's music; "The Hip Hop Jam" has ten pieces (60 cuts) of techno-pop music with full tunes and rhythm/drum loops for editing. Call (212) 333-5766 or (800) 227-1954...DSL Electronics is shipping its **ARMS-to-MIDI converter**, a single-rackspace device that converts tape-based console automation data (Harrison, Sound Workshop or MCI) to MIDI data for storage on any sequencer. Call (214) 869-1122 for info...**River City Sound** expanded its Specialty Series of buyout production music with "Country," a $59 volume of 12 country music themes. Call (901) 274-7277...**H. Wilson Company** now offers a line of adjustable ceiling- and wall-mount brackets for speakers or video monitors. Call (800) 245-7224...With the addition of "Post Scores" (music for post-production), "The Investigators" (TV tabloid-style themes) and "Kickin Flayvas" (Urban Grooves) **Aircraft Production Music** now offers 60 CDs. Call (800) 343-2514...A short-form catalog of **Bogen audio and telecommunications** products is now available. Call (201) 934-8500 for a free copy...**TRF Production Music Libraries**' releases include three CDs for The Bosworth Library (ethnic, positive and general assortment) and five discs for the BMG Production Music Library on the RCA label (travel, urban, Christmas, Latin jazz and science fiction). Call (914) 356-0800 or (800) 899-MUSIC for info. ■

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Andy Grassi
Sean "Puffy" Combs
Producers
Mark Morales
Mark C. Rooney
Dave "Jam" Hall
Sean "Puffy" Combs
Tony Dofat
Devante Swing
Artist
Mary J. Blige
Studios
Ed Germano/The Hit Factory
Marathon Recording
Greene Street Recording
Chung King House Of Metal

Doo Bop

Engineers
D'Anthony Johnson
Kirk Yano
Producers
Easy Moe Bee
Matt Pierson
Gordon Meltzer
Artist
Miles Davis
Studio
The Soundtrack Facility

Unplugged

Engineer
Steve Boyer
Producer
Russ Titelman
Artist
Eric Clapton
Studio
Power Station

Malcolm X Soundtrack

Engineers
James P. Nichols
Major Little
Sandy Palmer
Douglas T. McKean
Suzy Fink
Gene Curtis II
Producers
Terrence Blanchard
Spike Lee
Studio
BMG Studio A

Are You Gonna Go My Way

Engineer
Henry Hirsch
Producer
Lenny Kravitz
Artist
Lenny Kravitz
Studio
Waterfront Recording Studios

The Extremist

Engineer
Andy Johns
Producers
Andy Johns
Joe Satriani
John Cuniberti
Artist
Joe Satriani
Studio
Ocean Way Recording Studios

Timeless— The Classics

Engineers
Bill Schnee
Dave Reitzas
Al Schmitt
Mick Guzauski
Producers
David Foster
Michael Bolton
Walter Afanasieff
Artist
Michael Bolton
Studios
Ocean Way Recording Studios
Westlake Studios
Record Plant
The Enterprise
The Hit Factory

Get A Grip

Engineers
David Thoerner
Ken Lomas
Producer
Bruce Fairbairn
Artist
Aerosmith
Studios
A&M Recording Studios
Little Mountain Sound Studios
Can-Am Recorders, Inc.

Back To Broadway

Engineer
Humberto Gatica
Producer
David Foster
Artist
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by Mel Lambert

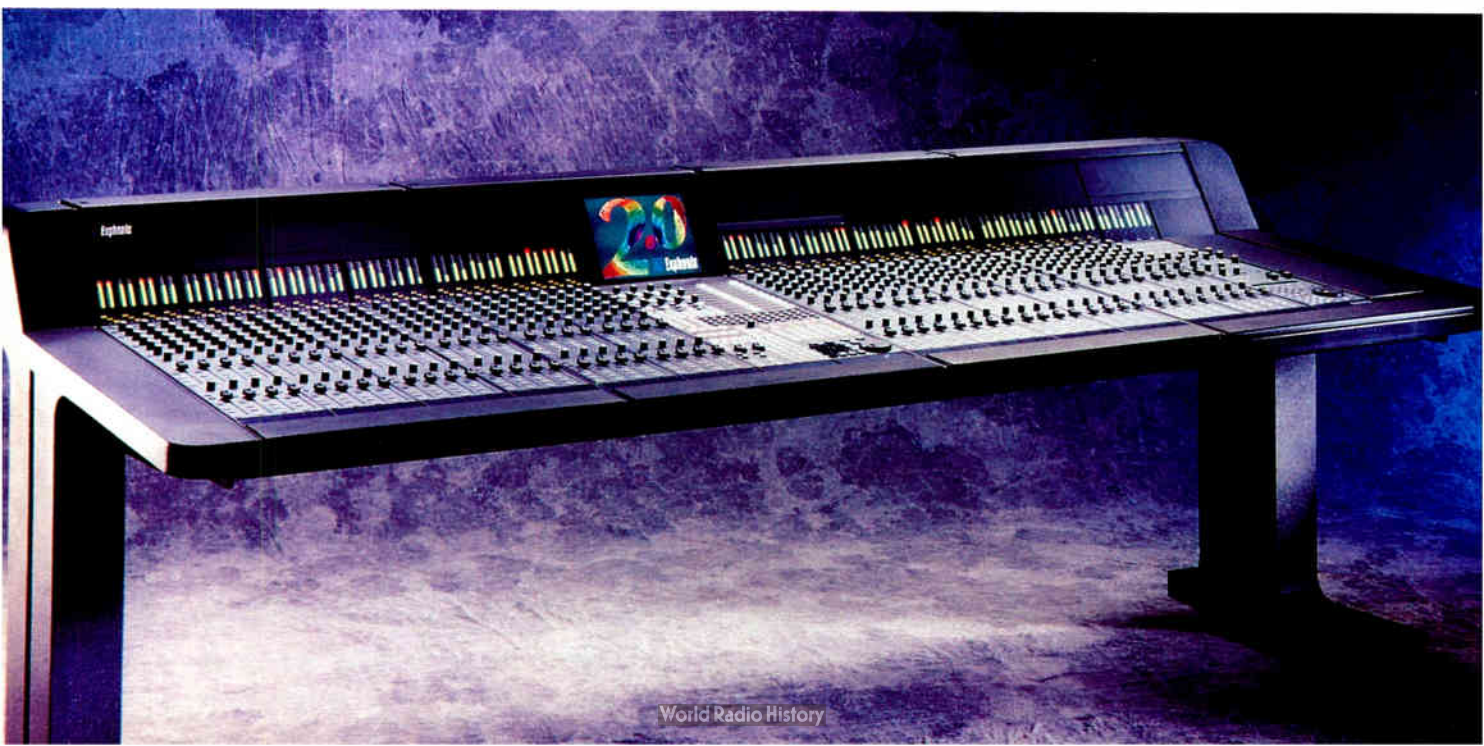
EUPHONIX CS2000

ASSIGNABLE PRODUCTION CONSOLE

With traditional mixing console designs, each knob, fader, button and switch has a predefined function; reach for it and that EQ, dynamics, gain trim, aux send/return, level-adjust or other task is instantly available. The advantages are obvious. Familiarity with a specific console topography means that we can instantly locate and then modify the required control device. But what of the disadvantages? Today's 72/96-input designs with 32-track assignment, multisection EQ and dynamics have reached gargantuan proportions, often requiring large control rooms and even multiple operators. And giant mixing consoles place additional burdens on monitoring systems that must now provide accurate images across a wide subtended angle.

The Euphonix CS2000 takes a different approach. A separate Audio Tower holds all of the various analog signal-processing circuitry and connects via a simple serial link to the Hardware Controller. Here, the various control elements are scanned by a companion microprocessor, and their settings passed to the tower, where the appropriate gain adjustments are made via precision, digitally controlled attenuators. Every console function is now computer-restorable—including the mic preamps, gain elements and switching crosspoints—to within 0.01 dB.

As a result, the tower, with its cooling fans and multichannel I/O connections, can be located outside the control room, close to the recording and playback hardware. The controller can now be remapped under software to a more centralized location, and a bank of assignable faders, buttons and other devices can be used to control more channels than are currently visible. Also, the



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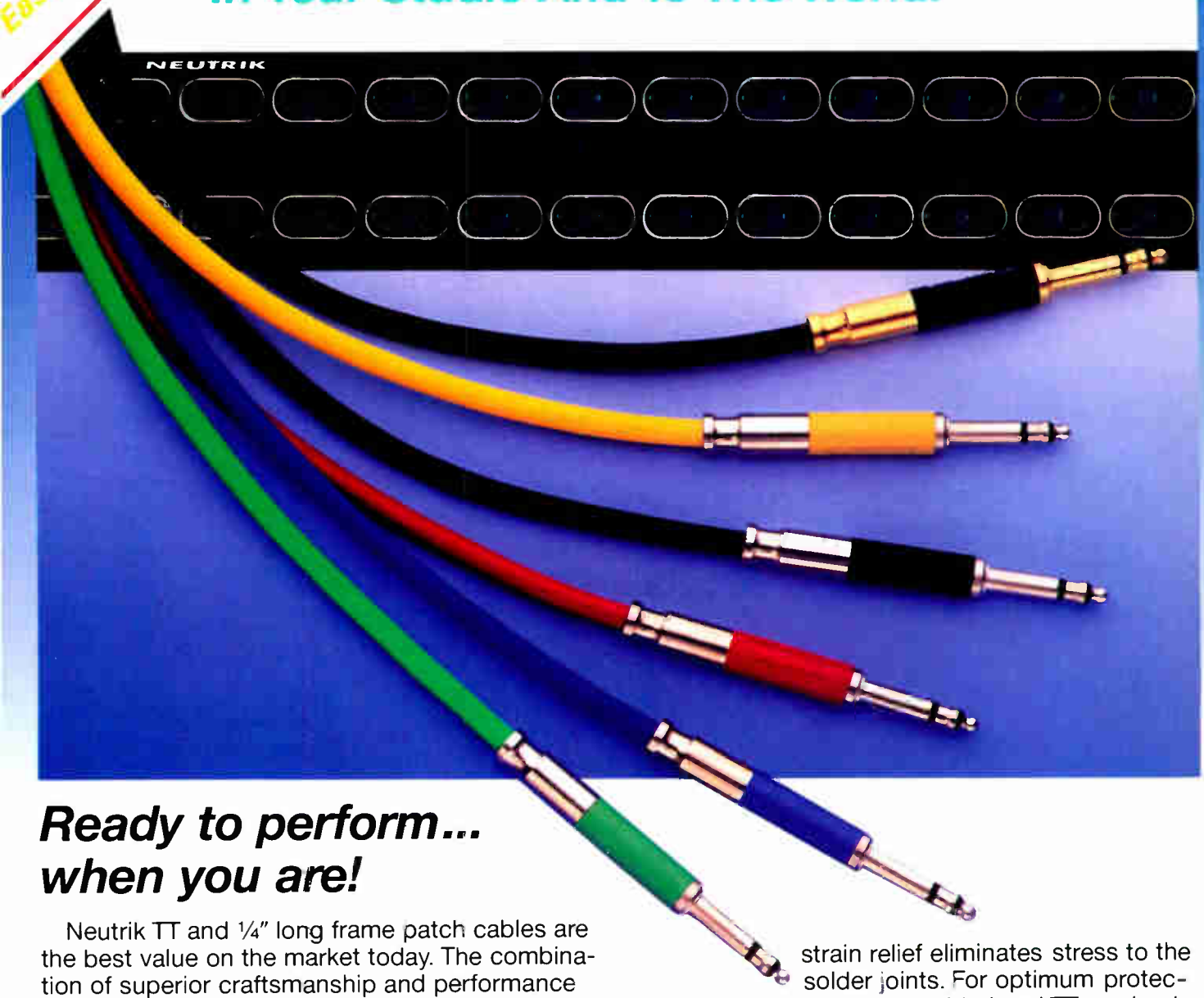

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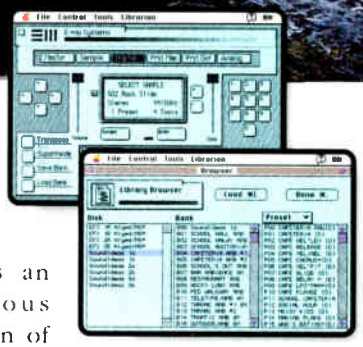

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Whether you're a professional musician or a sound designer for film or video post production, you don't have a minute to waste. You're on a continuous search for that perfect audio tool that will maximize your productivity. Well, look no further. Introducing audio tools from E-mu that combine high-end functionality with down-to-earth, time-saving ease of use—the EIIIx series of professional digital samplers.

As you would expect from the company that pioneered digital sampling, the EIIIx series features true 16-bit resolution for the purest audio quality possible. Proprietary DSP technology gives you pitch transposition capabilities over an incredible 10 octave range without aliasing, imaging or clock noise.

But incredible sound is only half of the story. The EIIIx series offers an impressive complement of features beginning with 32-voice polyphony, 32 digital resonant lowpass filters and 8 MB of RAM standard (expandable to 32 MB). And with AES/EBU digital I/O and eight balanced polyphonic outputs, the EIIIx series is ready for any mix environment. Dual SCSI connectors make it easy to link multiple EIIIx modules and to access a variety of mass storage devices. Add a long list of sample processing functions and you've got both power and versatility at your fingertips—all accessible through the industry's clearest user interface.

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All EIIIx series samplers are compatible with the ever-expanding EIII sound library. Over 16 gigabytes in size, the EIII library includes virtually every instrument on earth as well as an enormous selection of sound effects—all brought to you by E-mu and the industry's leading third-party sound developers.

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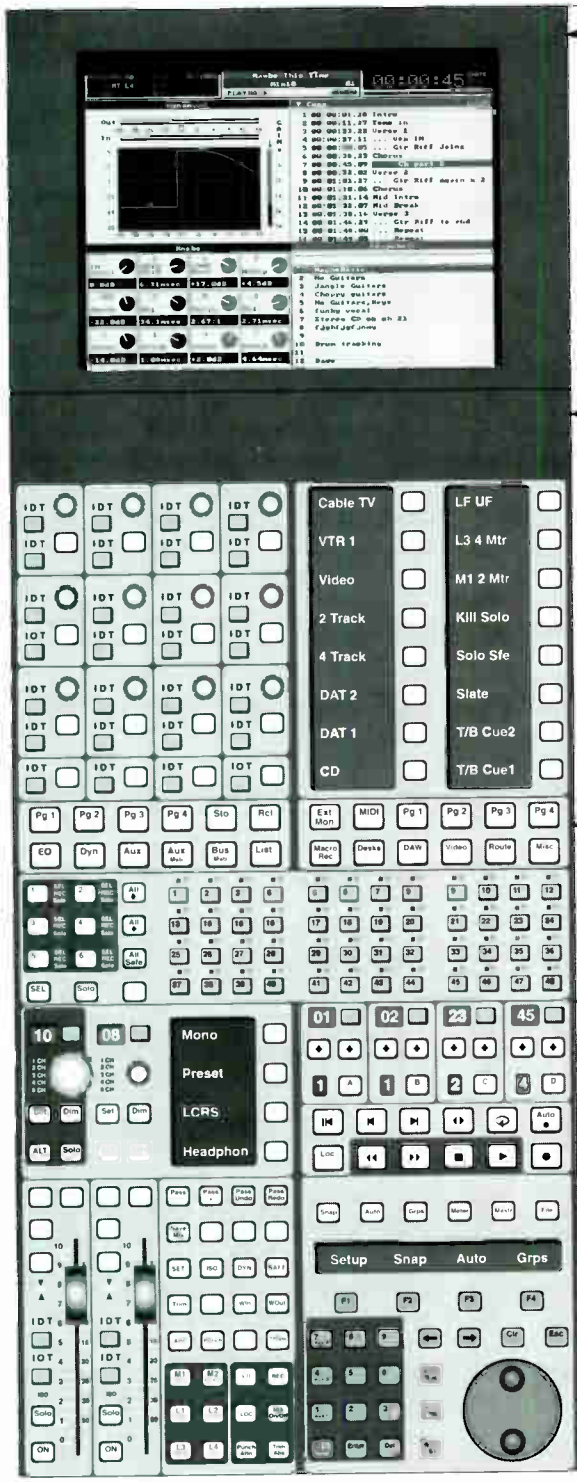
various settings can easily be copied from one channel section to another and their settings displayed graphically on a central VDU. The entire controller can even be totally redesigned or modified for specific audio applications. And, should the need arise, an assignable system can be expanded to accommodate, for example, additional compression limiting functions or aux sends or sends or to provide additional outputs. The possibilities are virtually limitless.

And consider the sonic advantages. The longest signal path from mic/line input to group, multitrack or monitor outputs within the Audio Tower and interconnect panel is no more than a couple of feet—including the comprehensive patch bay—

Euphonix DSC at a Glance



Color Graphics Display
A built-in active matrix TFT screen offers real-time display of incoming time code addresses and processing parameters, such as EQ curves, dynamics settings and automation data (snapshots, projects, mixes, etc.).

Assignable Controls
A bank of 12 rotary controls (each with illuminated switches) can be assigned to adjust EQ, dynamics, aux sends and bus masters. On the right, 16 user-definable macro keys can enable various console operations, with 8-character displays showing the function of each.

Machine Control
Includes MIDI/tape transport controls and track arming/bus routing functions.

Master Control
Control room monitoring selection, twin moving faders on master outputs, dedicated keys for routing and automation control, numeric keypad, rotary data entry wheel, and four programmable soft keys with alpha-numeric function display.

resulting in extremely low signal-to-noise and crosstalk, coupled with wide dynamic range and headroom performance.

Every gain and switch element throughout the CS2000's distributed intelligence can be reset within a single video frame, with all snapshot and dynamic automation data being stored within each channel module. The external PC or LCD simply provides a familiar graphics interface for the EQ display and system functions, plus permanent hard disk storage of mix data.

A potential downside in designs such as this—and one that is being addressed directly in the CS2000—is that assignable designs must be user-friendly to engineers and producers who are more familiar with conventional consoles. Euphonix designers have obviously decided to retain several functions that could have been mapped to a series of assignable controls but which might have made driving the CS2000 console less intuitive. New technologies are absorbed gradually by our industry; as one or two notable companies have already discovered, innovative designs introduced before their time can fail to spark our attention simply because we do not fully appreciate their advantages.

But, as I discovered, the original CSII (previously referred to as the Crescendo Series) has evolved into a more powerful and flexible incarnation, the CS2000, with revised V2.2 operating software. All in all, the CS2000 packs a great deal of mixing and processing power into a remarkably small amount of space and is a design that can be mastered in a stunningly short period of time.

BASIC SYSTEM COMPONENTS

Each Audio Tower can accommodate a maximum of 28 channel modules, plus a Master Audio Module; additional towers can be linked together to provide additional input capacity. Each audio channel comprises two totally independent signal paths, complete with dual EQ sections. In the current design, one audio module is assigned to a single channel strip on the Control Surface. The Master Audio Module houses the various stereo bus controls, monitor sections, talkback, auxiliary sends, reverb returns and other functions. Various CS2000 controller mainframe constructions can accommodate between 48 and 104 channel faders.

Primary differences between the CSII and CS2000 are related to the central Control Section and controller mainframe; both systems can accommodate the same input channel modules. The CSII is intended for smaller production and music-recording facilities and features a less flexible, lightweight mainframe design that can house up to 96 channel faders. The CSII also features a lower meter bridge—making it more appropriate for theater sound, mobile trucks and project studios, where near-field or ear-level monitoring might be encountered—as well as a somewhat limited control section.

The new CS2000, on the other hand, is intended for high-end installations and features a cast aluminum frame design that can accommodate more input channel strips and the new Digital Studio Control section. The frame design lets you install any type of module virtually anywhere, making possible, for example, integrated three-person CS2000 consoles intended to handle the exacting demands of film-style mixing.

AUTOMATED FUNCTIONS

In addition to the familiar SnapShot Recall automation—which allows every fader, switch and knob setting to be memorized in RAM and offloaded to disk—a newly developed Total Automation system enables most CS2000 settings to be tagged to time code locations, allowing EQ and fader settings to track video or film frame references for audio-follows-picture productions. The current software release handles time code automation of faders, mutes, pans, aux sends and master faders; subsequent versions will add routing and EQ automation. Absolute Write, Trim and Autotakeover are provided together with additional modes that allow levels to be written through a mix, to the front, or just to the end.

Most important, all control settings are saved with the mix data, even if they weren't selected for dynamic automation. When the mix is recalled, all controls instantly reset, including EQ, routing and levels. And, as soon as time code is received from a video source, controls that were recorded with dynamic moves will play back instantly. Up to 99 mixes can be saved per title, and each is time- and date-stamped.

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As if that weren't enough, the majority of console functions will soon be controllable via external MIDI-based sequencers and signal processors. Despite their functional differences, both the CSH and CS2000 use the same Version 2 software, allowing full interchange of mix and automation data.

AUDIO CHANNEL FUNCTIONS

Coming to grips with the control possibilities offered by the CS2000 is easy. From a glance down each channel strip, you can determine which input source has been assigned to the input of each fader channel and where the output has been assigned. You can choose between two microphone inputs, M1 and M2, with phase reverse, phantom power, gain trim and highpass filter; or four line-level sources, L1 thru L4. In addition, eight Auxiliary Sends per strip can be controlled via four knobs, and the output from each fader bank can be routed and panned between 24 internal multitrack buses or two independent stereo buses. (The internal multitrack buses can be cross-normalled at the patch bay for 48-track assignments.)

Two independent EQ sections are also provided per channel strip. They can be assigned internally as a stereo pair to the upper or lower fader block or used as two separate monitor sections in each bank. Control of the actual channel I/O assignments is achieved from the Master Module. You simply call up the function from the appropriate channel and use the central routing source/destination keypad to enter the required routing.

> The future of analog and digital console design lies in the realm of assignable gain, EQ, dynamics and signal processing.

In much the same way, equalization settings for each EQ section—center frequency, cut/boost and bandwidth—are adjusted from a central control section. Each four-band section features high shelving (1.32 kHz to 21.1 kHz); two mid-frequency parametric bands (659 Hz to 21.1 kHz and 41.2 Hz to 1.32 kHz); plus a low shelf (20.6 Hz to 330 Hz). Up to 15 dB of adjustment is available, with bandwidth on the two parametric sections adjustable between 0.32 and 11.6.

All in all, the equalization system provides a flexible set of parameters that prove to be musically useful. The degree of overlap is adequate and can be set easily by ear or by using the values displayed on the master section. For even easier adjustment, the gain/frequency plot is also displayed on the companion CRT display—useful for comparing EQ profiles between channels and for visually determining where a notch, for example, needs to be set to cure an odd resonance. And, of primary importance, all settings are made from the center of the console, at the acoustic focus of the monitoring system. Resolution adjustment for

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Suggested list price for Topaz 24-channel: $3,995; Topaz 32-channel: $4,995. Soundtracs is exclusively distributed in the U.S. by Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068. ©1994 SAMSON

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each four-band EQ section is within 0.25 dB.

FAST AND SIMPLE SYSTEM SETUPS

Setting up the CS2000 for a typical tracking, overdub or remix session is simplicity itself. A standard factory SnapShot, recallable from disk, sets the input source for each lower channel strip to M1 and selects EQ into each fader section. The upper stereo/mono fader now controls the level of the signal being routed to the selected multitrack buses for tracking purposes. The input to the lower fader block is now normalled to the corresponding multitrack return so that it controls monitor levels. Any fader channel can also be assigned to a DCA group master; to prevent confusion, the level meters display slave/master status for the appropriate channel strip(s).

In this way, different combinations and permutations of routings between channel input and output can be laid out across the CS2000 to handle different production chores. During live mixing, for example, the upper bank of faders can control input-level gain and then be switched to handle submixing, while the lower bank controls an entirely separate stereo mix, with different EQ. Alternatively, mic sources can be equalized and then sent directly to the multitrack bus outputs, leaving a full complement of dual-channel faders to handle a complex monitor mix. And for multichannel mixing, either via a Dolby Stereo Surround matrix or to create discrete submixes, the stereo buses can be complemented with a spare pair of Aux Sends or with the two independent stereo buses used for Left-Right and Center-Surround assignments.

The Master Module also houses a bank of macro keys that can be programmed to perform a series of functions, such as sending a cue source to a specific destination or toggling between playback formats. Other features include eight Auxiliary Send masters, a Monitor section, AFL/Solo controls, Talkback/Oscillator controls, and dual-channel faders for the two Master Stereo outputs. Every control element is labeled clearly and is easy to locate.

In just about every sense of the word, the CS2000 is more of a free-form "audio erector set" than a conventional, hard-wired console. And the bonus is that every input/output assignment, EQ and optional dynamics setting can be memorized in one video frame and recalled against time code. LEDs on each fader and rotary control allow the previous values to be nulled during update/auto-takeover modes while the VDU display concurrently shows previous EQ and dynamics settings.

DIGITAL STUDIO CONTROLLER

Realizing that a new generation of CSII users might need some additional functionality and centralized control, Euphonix recently unveiled the new Digital Studio Controller, which ships with every CS2000 console. The DSC more fully integrates various internal and external control duties, as well as adding two assignable, motorized faders. In addition, the DSC's built-in, active-matrix LCD screen eliminates the need for an external video monitor. The full-color screen can be used to display normal system functions or a graphic display of EQ, dynamics and auxiliary parameters. Macro keys feature eight-character alphanumeric displays.

A revised bank of assignable con-

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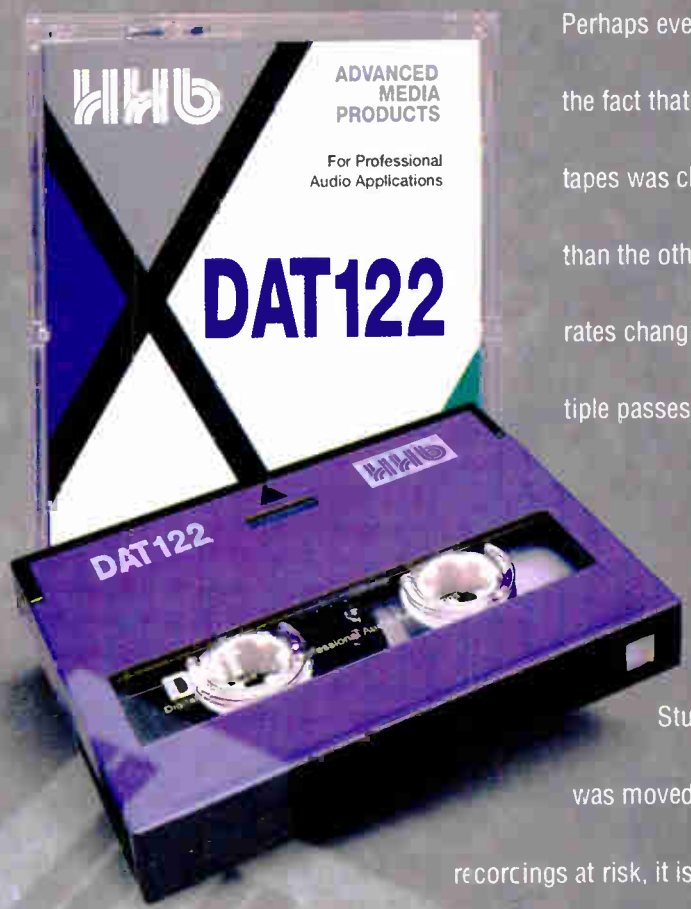
Ask Studio Sound, one of the world's most highly respected professional audio publications. They recently subjected eight leading DAT tape brands to an exhaustive series of tests and the results should be of interest to everyone serious about audio.



In the critical area of block errors, the tapes fell into two distinct categories of performance. Three exhibited similarly low error rates with the others presenting error levels considerably higher. HHB DAT Tape was one of the leading three.

Perhaps even more significant was the fact that one of these leading tapes was clearly more consistent than the others, with its low error rates changing very little over multiple passes. That tape was HHB.

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trols located below the LCD is mapped to onscreen knob icons that control the various cut/boost, frequency and bandwidth controls for the four-band EQ section; they also can be remapped to control corresponding sections of the optional dynamics section or to the auxiliary sends. In this way, the user is provided with instant visual feedback of the setting of each control—thus several controls can also be adjusted simultaneously, rather than via the single jog wheel provided on the original Master Module.

Also featured are 48 dedicated safe/ready controls for a remote multitrack or for operating other control-room hardware via MIDI. The transport arming buttons also can be assigned as groups via a second set of programmable buttons. A set of dedicated transport controls can be used to command up to six video or audio decks via standard 9-pin protocols or connected via a TimeLine Lynx Supervisor controller. The audio and video transport functions are currently implemented in hardware; the relevant controlling software is scheduled to be completed by mid-year.

SYSTEM OPTIONS: ADDITIONAL ROUTING AND DYNAMICS UNITS

Also available is an outboard audio processing rack that extends the CS2000's routing capabilities. Each rack adds up to 48 Aux Sends per channel; up to 48 Film Mix buses with multichannel pan; up to 48 Mix-Minus feeds; up to 48 multitrack buses from lower and upper faders; and an input routing switcher with a maximum capacity of up to 48 I/Os. Operation is completely integral to the CS2000 console; extra outputs/buses can also be added in increments of four.

The rack-mount dynamics unit features eight combination compressor/limiter/expander/gates that plug straight into the CS2000 patch bay to add up to two dynamics functions and a pair of digitally controlled filters per channel strip. Each unit is controlled directly from the console surface just like the EQ functions. For frequency-conscious compression and limiting, the digitally controlled filters can be inserted into the compressor sidechain.

Parameter settings are controlled from the assignable knobs and switches on the DSC. A companion display of input level vs. output level profiles is provided on the LCD screen.

I'm fully convinced that the future of analog and digital console design lies in the realm of assignable gain, EQ, dynamics and signal routing. Because of the enhanced functionality that this design philosophy offers, an increasing number of music recording, broadcast, audio-for-video and film production facilities will want to consider designs like the Euphonix CS2000. With respect to ease of use and its ability to reset every function almost instantly, the CS2000 will continue to attract a great deal of deserved attention. In terms of creative potential, integrated functionality, and enhanced sonic quality—as well as other innovative controller designs that are currently in the planning stage—the Euphonix CS2000 stands head and shoulders above the competition. ■

Mel Lambert heads up Media&Marketing, a consulting service for pro audio firms and facilities.

RD-8s for 16 tracks requires one cable; three machines (24 tracks) need two sync cables, and so on. Any D-sub 9-pin cable having pin-to-pin connections, male connectors on both ends and with the shield connected to the connector shell on both ends will work. This is a fairly standard computer item and can be found at Radio Shack (part #26-116) for $9.95.

The first deck in the chain is automatically designated as the master deck, and once cabled together, all other decks in the chain will follow with sample-accurate (±1/48,000 second) synchronization. This scheme does not require dedicating an audio track to recording SMPTE or other synchronization signals. When you lock up two RD-8s (or one RD-8 and an ADAT), you get 16 usable audio tracks.

The RD-8's front panel has the familiar transport, track arming, tape monitor and locator buttons found on the Alesis ADAT but adds additional controls for its track manipulation (delay and machine offset) features, as well as its extensive MIDI and SMPTE time code synchronization functions. As an adjunct to the large ten-digit LED readout of hours/minutes/seconds/frames/subframes are 35 colored LEDs that indicate operational status at a glance.

One important function that the RD-8 offers (and the Alesis ADAT lacks) is the ability to punch in or out of the recording process while recording continues on other track(s). For example, while music tracks are being laid down on tracks 1-5, you can punch in and add a short synth pad, guitar riff or horn stab to the tape, then punch out of record (on those tracks) while recording on the other tracks continues. This feature could be a real time saver in the post-production environment, where you might be laying back an edited music bed—say, from a workstation—and while everything is synched to picture, you could also punch in a couple of sound effects or narration cues.

Like the Alesis BRC controller, the Fostex RD-8 has a 2-line-by-18-character LCD window that shows multiple pages of software access for operational data (incoming/outgoing SMPTE rates, sync status, sampling and/or clock rates, etc.), as well as autodiagnostics and locator info. Data in the LCD window can include take numbers and other production information. Any information displayed in the LCD window, along with the machine's 100 locator memories and user-default settings for sync and operational parameters, can be stored in a table of contents section on the head of any ADAT tape. This information can be loaded back into the RD-8 at any future date. And as with many LCD readouts, the RD-8's display has a contrast control that optimizes viewing at any angle.

Unique to the RD-8 are "user bits"—specific pieces of information (memos of up to eight characters in length, date/time stamp, etc.)—which are imbedded with the time code track and displayed on the LCD screen within a page of the time code generator menu. These user bits are generated and read with the data on every frame of time code and are ideal for indicating take numbers and other production data.

BACK VIEW

The RD-8's rear panel contains the -10dBV analog audio inputs (on RCA phono jacks); +4dBu inputs and outputs on D25-sub multipin connectors; fiber-optic digital I/O (ADAT-format); MIDI in and out; BNC video

RD-8 MAIN MENU PAGES

PAGE	FUNCTION	FUNCTION
1	Sampling Rate	Pull Up/Pull Down
2	MIDI Data Dump	TOC Load/Save
3	Time Code Level	Time Code Frame Rate
4	TC Rewind	User Bits
5	Zone Start	Zone Length
6	Crossfade Time	MIDI Machine Control
7	Date Set	Time Set
8	T-120/-160 Select	LCD Contrast Adjust
9	Error Rate	Software Version

Figure 1

The new Kurzweil MicroPiano.™ $499 of pure inspiration.

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input (for locking to VITC time code, black-burst or composite video sync sources) with 75-ohm termination switch; time code input and output on balanced XLR jacks; 9-pin output to the Alesis RMB meter bridge; ¼-inch jack for the Model 8312 remote control; ¼-inch jack for optional punch-in/out footswitch; 9-pin sync jacks for interlocking other RD-8s or ADATs; and a 9-pin RS-422 interface. The latter is designed to emulate a Sony BVU-950 VTR and uses the Sony P2 serial communications protocol for controlling the RD-8's transport functions from a video editor.

The rear-panel fiber-optic in/out ports allow the cloning of safety copies, whether between two RD-8s or one RD-8 and one ADAT, and each RD-8 includes the necessary glass fiber cable. The optical transfer ports also provide access to the digital audio datastream for connecting peripheral devices, such as the Alesis AI-1 AES/EBU-to-ADAT digital interface or the latest version of Apogee Electronics' AD500E analog-to-digital converters, which now include an RD-8/ADAT-compatible optical output.

Included with the RD-8 is the Model 8312, a compact remote that duplicates the transport controls and adds buttons for input monitor select, locate mark in/out, locate zero, auto record and auto return/auto play. Except for the layout of the transport keys and the functions of several buttons, the 8312 is similar to the Alesis LRC remote and connects to the RD-8 via a two-conductor, ¼-inch cable. Unfortunately, when using the 8312, locator points 00-99 are inaccessible—you can only locate to zero, the mark-in or the mark-out points.

The RD-8 offers the ability to punch in or out of the recording process while recording continues on other track(s).

One look at the RD-8's crowded back panel and it's immediately obvious why Fostex used the D25-sub multipin connectors rather than a bank of 16 XLR jacks for the +4dBu analog inputs and outputs. There's not enough space! There are already over 30 connectors on the rear of the RD-8, and adding 16 more would have been impossible. So if you want to access the balanced +4dBu connections, you'll need two snakes with XLRs on one end and the D25-subs on the other. These are available through a number of third-party suppliers, such as Whirlwind or Clark Wire & Cable.

TRANSPORT AND ELECTRONICS

As with the Alesis ADAT and Tascam DA-88 recorders, tapes used in the Fostex RD-8 must be formatted before recording. Similar to the procedure of formatting floppy disks, the RD-8 tape formatting writes time address information on the videotape, along with a header ("DATA") section on the head of the tape. However, formatting takes place in real time (40-plus minutes per tape), so this can be done while setting up for a session or while running cassette dubs at the end of a session. If you have several decks available, you can format tapes on an unused trans-

Studio Notebook

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Photo: Skyline Studios NYC

Alex Haas has mixed for Eric Clapton, the Pat Metheny Group, the Kronos Quartet, the Blues Brothers, Chaka Khan and Michael McDonald, Garland Jeffreys, and many others.

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port while recording tracks on the other machine(s).

Tracks can also be recorded while formatting, although it's best to preformat tapes whenever possible. A unique feature on the RD-8 is a format search function, which automatically searches for the location on a partially formatted tape where the formatting ends, then automatically begins extending the formatting from that point.

Once the formatting process is complete, a tape is divided into three sections: leader, data and the recordable area. These are shown on an ADAT's LED time counter as "LEAD," "DATA" and as a minutes/seconds/frames display when you are in the recordable area. The LEAD section is a short length of leader at the beginning of the tape; the recordable section is self-explanatory, and the 2-minute, 15-second DATA section at the beginning of each tape allows the storage and names of locator points, which can be recalled and displayed on the RD-8's LCD screen.

The RD-8 sends out a noticeable audio "thump" whenever it's turned on. With this in mind, make sure that any MDMs in an audio system are turned on before you turn on the power amplifiers.

The record electronics on the RD-8 and Alesis ADAT are identical and provide a frequency response of 20 to 20k Hz, ±0.5 dB, although machines I've tested have exceeded this spec by a considerable margin, typically in the ±0.1 or ±0.2dB range. The recorders' THD+Noise spec at 1 kHz meets the published claims of 0.009%. Even in the worst case (at 10 kHz), THD+N measured below 0.02%, which is excellent. The digital-to-analog converter chips are Burr-Brown 1700s; the analog-to-digital converters are Crystal CS5336s, which are high-quality, reliable components.

The RD-8's audio quality is comparable to listening to a good-quality studio DAT machine; so if you're satisfied with the sound of a DAT deck, you'll be pleased with the RD-8's audio performance.

As is the case with the Alesis ADAT, the Fostex RD-8 requires approximately three seconds to go into "play" or "record" from "stop." If the heads are "engaged" (referring to a pause-style mode where the tape is lightly held against the head drum), then going into "play" occurs in a second. The tape can be shuttled forward or backward with the heads engaged, although long fast-forwards or rewinds should be avoided in this mode. You can disengage the heads with two presses on the "stop" button, or they disengage automatically when no transport activity occurs after four minutes. In the engaged mode, the rewind time for a 40-minute tape is about four-and-a-half minutes, as compared to the disengaged rewind time of under two minutes.

TAKING CONTROL OF THE RD-8

The Model 8312 remote included with the RD-8 is functional, although somewhat limited, lacking useful features such as track arming and a remote time display.

While the RD-8 is compatible with the Alesis BRC remote—a $1,995 unit that has all the required transport and track arming controls but also adds features such as MIDI and SMPTE synchronization, track delays and offsets—the BRC features are unnecessary with the Fostex recorder, as the standard RD-8 includes them.

If you require more flexibility than the 8312, then consider the JL Cooper CuePoint. This $799.95 autoloca-

tor/transport control unit uses MIDI Machine Control to control up to eight MMC-compatible tape recorders (such as the RD-8), MIDI sequencing programs and serial- or parallel-control protocol tape transports. CuePoint provides conventional transport controls, a shuttle wheel and track enable/track grouping functions for up to four 8-track MDM transports. Other features are auto-punch in/out, 99 locate points, SMPTE-MTC conversion and a SMPTE reader/generator with LED hours/minutes/seconds/frames readout, which is switchable to a bars/beats display. Options include a dataCARD for synching to an ADAT without losing a track (not required with an RD-8) and RS-422, RS-232, and Apple Desktop Bus communications modules.

RD-8 OPERATIONS

Operationally, the Fostex RD-8 can be set up to be as simple or as complex as is needed by the user. Rather than filling the front panel with dozens of dedicated buttons, the RD-8 provides a Main Menu for selecting specialized features. The parameters within the Main Menu page can be selected by pressing the Home and Next buttons, which reveals nine pages, with two functions on each page, as shown in Fig. 1.

Once the desired page is displayed, the user can manipulate the parameters in each by using the three "soft" function keys to select a desired parameter and the data up/down arrow keys to change the value.

The process is a lot easier to execute than describe. For example, if you want time code to be output during rewind and fast-forward operations, just call up menu #4. Choose either of the two selections on the menu page—TC Rewind or User Bits—by pressing the function key under the feature you want to enable. Toggle the function on or off using the up/down keys and you're done.

A similar procedure provides access to various menu pages that accompany most of the functions that have dedicated front panel buttons. Pressing the Data Edit button and any of the following controls will bring up a specific menu for that function:

Format: Format Search Page
Track 1-8: Track Delay Page
Gen Setup: TC Generator Setups
Chase On/Off: Chase Menu Pages
Vari Speed: Vari Speed Edit Page
Remote/Local: Remote Menu
Digital In: Channel Assign
Auto Rec: Auto Record Menu
Mark In: Mark In Edit Page
Mark Out: Mark Out Edit Page
Loc: Locator Functions Menu

So despite the apparent complexity of the RD-8, any function or parameter can be accessed or manipulated with a minimum of keystrokes, to suit any user needs. For example, varispeed (pitch control) is adjustable ±6% (in 0.1% increments) from either the 44.1 or 48kHz sampling rates. By entering the Vari Speed edit page, not only can you vary the amount of pitch shift, but the parameter value can also be changed from ±6% to +101/-107 cents.

Clicking onto the Track Delay page allows the user to individually delay the playback of any track by up to 170 milliseconds, in 1ms increments. Track Delay offers a variety of creative and practical uses, such as time-shifting certain instruments into and out of "the pocket," making phase

adjustments to compensate for variations in microphone techniques/distances, and fine-tuning (time slipping) elements—such as dialog and sound effects—in the video/film post-production environment.

Speaking of video/film post, the RD-8 offers a variety of features catering specifically to that market. The unit slaves to incoming SMPTE time code, at 24, 25, 29.97 or 30 frames per second, with the latter two selectable to standard or drop-frame varieties. The RD-8 can sync to longitudinal time code, VITC and Sony P2 9-pin (serial protocol) control. The software for enabling Sony serial control was not implemented in the deck we tested in January but was expected to be added as a simple chip swap by the time you read this. Word clock in/out ports are also provided, and the XLR SMPTE in and out ports can be varied to operate from -10 to +4 dB.

Additionally, the RD-8's sample rate can be adjusted by ±0.1% to compensate for the timing differences between film shot intentionally for video release at 30 fps (or 24 fps film transferred to video at 30 fps via telecine), when the U.S. standard (NTSC) TV frame rate is 29.97 fps. The RD-8's "pull up/pull down" feature makes the 0.1% change in the speed of the tape, while leaving the time code format/frame rate unchanged.

MIDI in and out ports on the rear panel can output MIDI Time Code for synching the recorder to a MIDI sequencer. MIDI Machine Control is also supported, allowing the RD-8's transport and record functions to be controlled from a sequencer that supports the MMC standard.

DIGITAL TRANSFER OPTIONS

The RD-8 offers extensive control of the Alesis Digital Bus, a proprietary fiber-optic chain that allows making perfect clone copies of important sessions, track-bouncing and assembly editing, the latter being one of the RD-8's most powerful features. It requires two RD-8s and combines the digital copying and offset features, thus providing nondestructive editing capability in the digital domain. Suffice it to say, the ability to create new versions of songs by copying (or deleting) verses or choruses offers a great deal of creativity to the producer. Best of all, the edits are done on a copy tape, so the original tracks are unaffected, and as the copying occurs in the digital domain, there is no audio degradation when using these methods, and users are free to create as many variations as they want.

While these assembly editing methods are intended for use in multitrack material, there's no reason they couldn't also be applied in editing 2-track material, such as DAT mixes. And a two-RD-8 system with an Alesis AI-1 digital interface could be the basis for a flexible system for editing and/or sequencing songs from DAT tapes.

At press time, Digidesign was slated to begin shipping a bidirectional 8-channel ADAT fiber-optic-to-Digidesign Session-8 or Pro Tools interface that transfers both digital audio and sync data. Meanwhile, Fostex has included an ADAT-format fiber-optic digital input and output on its Foundation 2000 workstation—an expandable 8- to 48-track disk-based system that combines recording, editing, mixing and signal processing functions.

Overall, I was pleased with the RD-8's performance. Typically, the deck would be used as a slave to an external SMPTE source—such as a VTR—and the RD-8 handled this task quickly and efficiently. The audio quality was quite good, and the multimenu system provided flexibility without confusion. The main drawback of the system is the lack of a comprehensive remote, but the Cooper CuePoint will suffice until Fostex comes out with its version of an MRC (medium remote controller).

The Fostex RD-8 retails at $4,795. It offers an impressive combination of features that are ideally suited for incorporating this recorder into the post-production suite, project room or MIDI studio. By adopting the ADAT standard, Fostex entered the modular digital multitrack world with a deck that's compatible with a large base of users, while adding useful functions such as time code chase and enhanced autolocation. And single-ADAT owners may find that expanding their system with an RD-8 (as the master deck) will add an extra measure of flexibility at an affordable price.

Fostex Corporation; 15431 Blackburn Avenue; Norwalk, CA 90650; (310) 921-1112. ■

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

by George Petersen

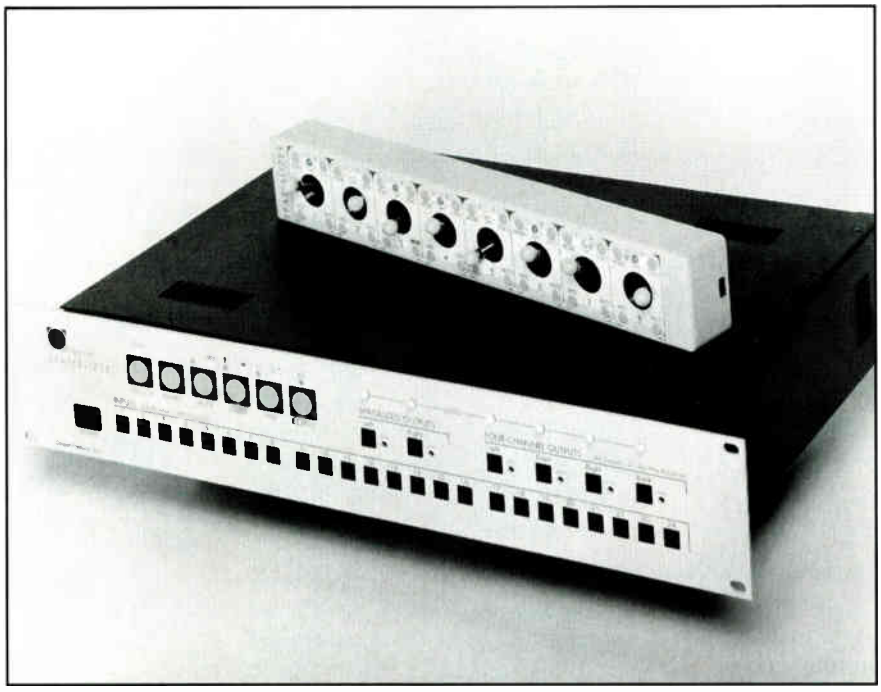
DESPER SPATIALIZER

Without a doubt, spatial audio manipulators are *the* signal processing frontier of the 1990s. Over the years, a number of systems—representing every conceivable variation of effectiveness and user-complexity—have been presented, ranging from PC-based headphone systems designed for NASA flight simulations to simple 2-channel devices for spreading out the stereo image. Systems have been available on a rental basis for several hundred dollars a day, or for a retail price tag of more than $20,000.

The newcomer in the field is Spatializer®, a real-time, three-dimensional processor that allows placement, movement and scaling of individual tracks in space from two loudspeakers. The key word here is *two* speakers, as Spatializer has the ability to encode a three-dimensional sound placement into stereo material intended for 2-channel playback systems. No decoder is required—the audience hears tracks right where they were placed (or moved) by the engineer. And all image manipulations occur in real time, as quickly as the operator can move the joystick controllers.

Spatializer is available in several versions. Spatializer-8 is an 8 "station" system (with eight joysticks, each controlling one audio channel, all routed to a stereo output pair) retailing for $5,995. The Pro Spatializer is a 16-channel system priced at $9,200 and expandable to 24 tracks.

Both versions now include MIDI control software, which translates the Spatializer moves into MIDI data for storage on sequencers or other peripherals. Although the system has no provision for SMPTE control, once the data is stored on a MIDI sequencer, it is a simple matter of slaving the sequencer to SMPTE time



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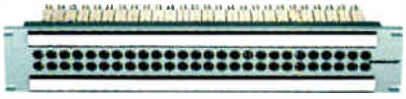

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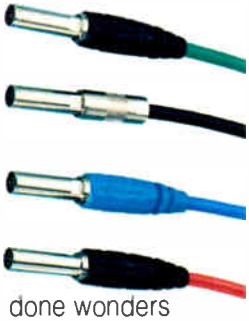

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code for automated control (and editing) of all joystick controls. Among the available options are Jensen transformer isolation on the outputs and rear panel Elco/Edac multipin or XLR connections, which are wired parallel to the TT jacks on the front panel.

The system consists of a rack-mount processor unit that contains all the audio processing and the 8-station joystick controller, each of which has an audio card that plugs into a slot on the motherboard of the main unit. A standard 6-conductor modular Telco cable connects the controller to the main processor. The controllers have a quality feel and a noticeable heft that should reduce the chance of them sliding off the console during a session.

In addition to a joystick, each of the eight stations on the controller has three tricolor status LEDs and switches for mute, solo, MIDI (for writing MIDI data) and mode. The latter gives the ability to shut that particular station off (to minimize noise generated by unused channels) or selects one of several Spatialization types: "D" (directional) is a function for use with mono sources, such as individual tracks in a multitrack mix or a channel source in sound reinforcement; Type "E" (expanded) is a mode for processing stereo sources, whether they are mixed program material, submixes or stereo sources such as synths/samplers.

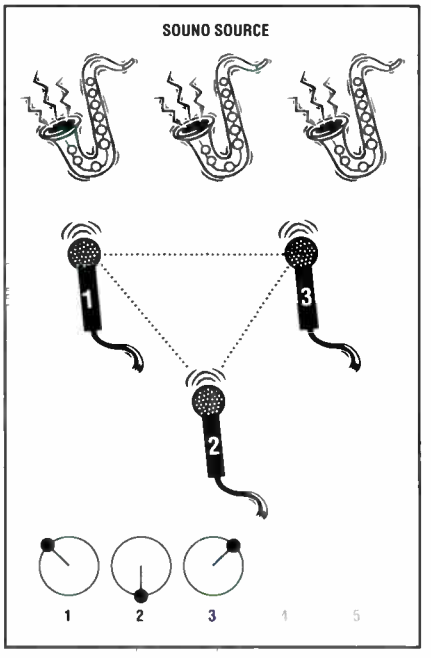

Figure 1

Within the E mode is a feature called E Boost, which increases the separation of a stereo sound source by approximately 10 dB. While useful on certain sounds that have an extremely narrow stereo image, some mono incompatibility may result when using the E Boost. However, if you are doing a project—such as live sound or theater—where mono compatibility is not an issue and you want the full effect, then the unbridled use of the E Boost is no problem.

A third mode, Type C (Corona), is used for a live recording of a single sound source, whether it is a choir, instrumental ensemble or drum set. Using at least three microphones placed from three to six feet apart, the user creates an array and routes the preamps of each mic into the Spatializer. Each is assigned a controller station, and the joysticks are set to correspond with the relative placement of the mics, as shown in Fig. 1. While the manual suggests

using C mode during the recording process, I also tried recording using various arrays of three or more mics and printing the raw (non-Spatialized) tracks to tape. Later (meaning, when I started running out of tracks), I could route the miked tape tracks into the Spatializer in C mode and tweak the mic array to perfection, bouncing them to a stereo submix on the multitrack.

This post-miking manipulation was a lot of fun, especially with background vocals and percussion—many variations are possible, and you can create all sorts of cool effects by changing the perspectives in real time as the tracks play. There is one caveat, however: C mode requires that each mic receives a *common* sound wave from a single source. If you try to use Type C processing with a conventional miking scheme, such as one close mic in front of each of three horn players in a section, the results would not be mono-compatible. The results are much better if you consider the mic array as you would a single (albeit large) spatial microphone and place it more than six feet from the source.

In addition to the TT and/or XLR inputs for the to-be-Spatialized sources, the two-rackspace processor has two Spatialized outputs (in a left/right stereo pair) and four outputs for use in LCRS mixing applications. These are discrete (non-Spatialized) outputs, and routing to these can be achieved by placing the joysticks to the 10:30 (left), 12:00 (center), 2:30 (right) and 6:00 (rear) positions. Of course, the movement of any joystick in intermediate positions will result in a blended output, and information can be panned to any of the four positions.

Above each of the front-panel output connectors are tricolor LEDs that indicate signal present, clipping and overload conditions. Internal jumpers on the mainframe board allow the selection of balanced or unbalanced operation and the setting of output polarity. Recessed trim pots are provided for attenuating individual output levels.

Spatializer has several clever touches that simplify operation. An "orient" switch on the processor changes the orientation of the eight joysticks so that they can be used with the controller placed in a hori-

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zontal or vertical alignment on the console. And the joysticks are spaced 1.5 inches apart, so they align with console module strips when placed horizontally along the board.

The mute and solo switches on each of the controller stations are an important addition and really speed things up when working with several Spatialized channels simultaneously. Both sets of switches operate noiselessly, and the solo function is in-place, so you know exactly where the source sound is being placed within the stereo soundstage.

The three status LEDs on each station, however, take some getting used to. In the center is a tricolor LED marked S/M, which refers to solo/mute, rather than sadomasochism. When solo is selected, it glows green; when mute is selected, it glows red; if that station is muted by solo being selected on another station, the red color blinks; and if both mute and solo are selected simultaneously, the LED turns yellow. The latter condition (mute and solo) is useful when writing mute status of a soloed station to MIDI.

Flanking the S/M light are two LEDs marked left and right. These indicate the operating mode: In C mode, both LEDs are yellow; in D mode, both are green; in E mode, both are red; and when writing to MIDI, the selected mode LEDs flash. While it's nice to have all of this information available, it can be a bit confusing until you get used to the display.

Fortunately, the system is easier to use than to describe, and the 50-plus-page manual that accompanies Spatializer is excellent. The documentation also includes a 20-page applications section with plenty of tips for the user. The setup and operation were easy in my studio, where I have ample counter space next to my 400-point TT patch bay (although this could be more difficult in some installations—requiring the use of the optional XLR or multipin interfaces).

Spatializer's construction and audio quality were first-rate throughout, and the unit I tested met its rated frequency response of 20 to 25k Hz (±0.1 dB, single-channel processed and front-panned) and 0.05% THD specs. Best of all, the system delivered wide, huge stereo effects and an ability to place mono sources anywhere within a 350-degree (not including the 10 degrees behind the engineer) sound field from two speakers. The net effect on many tracks was that of a thick sound field emanating out from beyond the two front speakers and surrounding the listener. And Spatializer's ability to place various instruments, vocals and other instruments—not only right and left, but also forward and backward in the soundstage—is a powerful tool for the creative recordist.

Mono compatibility was maintained in all but the most drastic examples, whether used on individual tracks, multiple tracks in a mix, or for processing mixed program material. The playback localization seemed to be better with point-source speakers (Tannoy) and other high-quality studio monitors (JBL, KRK and Meyer) but was evident on even the simplest of playback systems—auto stereos, boom boxes and cheap hi-fis. In cases where a picture (visual localization cue) accompanied the Spatialized tracks, with panning to follow the screen action, the effect was even more pronounced, but this is more of an extension of the eye tricking the brain into thinking what it wants to hear. In any case, it worked and worked well.

The main drawback to the system is that the user may be lulled into using more spatial manipulation than is required by the job at hand, but this is common with most other new studio toys, whether it be reverb, EQ or the latest mega-turbo-death-flanger. A little can be nice—too much can sometimes detract from the job at hand. At the same time, there are a lot of cool new effects and applications for spatial manipulation out there, waiting to be discovered, and it was sure fun checking this one out.

While the unit's $9,200 (16-channel) price may dissuade the casual consumer, the per-channel pricing is about $575, which seems reasonable. And future developments for Spatializer include a plug-in card option for the TDM bus in Digidesign's Pro Tools system, as well as a Sonic FX option for the Sonic Solutions Sonic System.

Manufactured by Desper Products Inc., distributed by Audio Intervisual Design, 1155 N. La Brea Ave., West Hollywood, CA 90038; (213) 845-1155. ■

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by Bob Ghent

Healthy Hearing

And Sound Reinforcement

Enjoyment of the artistic and economic fruits of live music, for anyone from artist to sound engineer to consumer, depends on being able to hear. One would think that those who use their ears to make a living would consider a basic understanding of hearing to be fundamental. Unfortunately, many people's knowledge of human audition goes no further than a sixth-grade science unit on sound. And a lot of engineers can recite the specs of their latest automated console but are at a loss to explain the fidelity of their own hearing.

Conversely, the field of audiology often fails to address the unique needs of music and sound industry professionals. Because audiology has its roots in speech communication, most audiologists stop at 8 kHz, encompassing only the frequencies used by speech.

My background is a little different. In 1974 I joined Tycobrahe Sound Company, and since then, my various jobs in sound, music and electronic engineering have helped prepare me for my current gig as an audiologist. With one foot in live music and the other in audiology, I want to start bridging the gap between the two professions.

PHYSIOLOGY OF THE HUMAN AUDITION SYSTEM

Let's begin with a tour of human hearing. Where appropriate, we'll supplement anatomical descriptions with analogies to audio equipment and signal flow.

The visible part of the outer ear (pinna or auricle) provides initial frequency conditioning. It has a resonant frequency of about 4.5 to 5 kHz. The ear canal has a resonant frequency of about 3 kHz. Together, these two structures alter the frequency response of incoming sound.

The middle ear, consisting of the ear drum (tympanum) and the middle ear bones (ossicles), form a sort of mechanical lever. The ratio of the lever arms is about 1.31 to 1, which represents a gain of about 2.3 dB. Additionally, the tympanum has about 17 times the area of the oval window. This area advantage represents a gain of almost 25 dB. The lever action of the ossicles and the area advantage of the tympanum allow the middle ear system to act as an impedance-matching amplifier between the low impedance of the air in the ear canal and the high impedance of the inner-ear fluids. The footplate of the middle ear bone, known as the "stirrup" (stapes), vibrates the fluid on the other side of the oval window

where the inner ear starts. This is also the start of the snail-shaped cochlea, which burrows in a spiral through the temporal bone of the skull. The cochlea is filled with two fluids: a thick, heavy one called endolymph and a thinner fluid called perilymph.

These fluids are in three ducts (endolymph is in the middle duct; perilymph is in the outer two), which are separated by thin membranes that keep the fluids from mixing. The interface created at the membrane by the thin and dense fluids is like the interface between air and water. When sound traveling through air hits the higher impedance of the water, the sound travels along the interface in surface waves. The same thing happens in the cochlea. However, the fluids in the cochlea are sealed, so any pressure creating a surface wave at the interface causes slight displacement of the membranes.

One membrane is called the basilar membrane. Resting upon the basilar membrane are the hair cells, which comprise the organ of corti. On top of the hair cells are the actual "hairs." The hairs, or cilia, bend due to a "shearing" action that is caused by displacement of the basilar membrane. This movement converts the hydrodynamic pressures of the inner ear fluids into neural impulses. (Over-excursion of the basilar membrane can cause the cilia to be broken or sheared off. This is the kind of damage caused by exposure to high SPLs.) The hair cells closest to the oval window respond to high frequencies, and those at the other end of the spiral respond to low frequencies.

Bending the cilia causes neural impulses from the hair cells to be sent along the auditory nerve. There are approximately 30,000 neurons in the auditory nerve, twisted together like a rope. They run from the cochlea to the brainstem, where they synapse with other neurons and ascend to the brain.

The outer, middle and inner ear are collectively known as the peripheral auditory system. The fourth part of the hearing system, often ignored, is the central auditory system. It includes the auditory pathways of the brainstem and auditory portions of the brain. Central auditory processing is what allows us to attach meaning to speech sounds, interpret the timbral and time-of-arrival nuances that we associate with room

acoustics and stereo imaging, and encode frequency and temporal patterns into what we enjoy as melody and rhythm. Ultimately, we "hear" with our brains, not our ears.

On each side of the brainstem are two distinct paths of auditory neurons. The two sides communicate with each other at various places on their way to the brain. Eventually, the nerve fibers branch out to the cortex of the brain.

The brainstem also contains neurons that send impulses back down to the cochleas. Most of these cross over from one side of the brainstem to the ear on the other side. Not everything is known about these descending neurons, but, among other things, they provide a kind of negative feedback to help fine-tune the frequency selectivity of the hair cells (kind of like active filtering) and reinforce time, amplitude and frequency differences between ears.

Also within the brainstem is a reflex arc from the auditory nerve to a branch of the facial nerve. This branch of the facial nerve connects with a small muscle (the stapedius) that is attached to the stapes in the middle ear. Our stapedius muscle contracts in response to high sound pressure levels (around 90 dB SPL and up) and causes the ossicular chain to become stiff. This action is called the acoustic reflex. Some think that the acoustic reflex acts like a hard limiter by trying to keep dangerous amounts of acoustic energy from being transmitted to the inner ear. In this way, the ear can protect itself, to a certain extent, from loud sounds.

Unlike an electronic limiter, however, there are serious limitations to the acoustic reflex's ability to perform this function. The reaction time is not fast enough to respond to sounds with steep wavefronts. This is because the reflex arc is set up like a limiter with the side chain connected to the output of the system rather than the input. Also, the stapedius is a wimpy muscle, so the reflex fatigues easily.

The outer ear is like a passive resonant filter with a center frequency around 4 kHz. The middle ear acts as an impedance-matching amplifier with a low-Z input, a high-Z output, about 27 dB of gain and a hard limiter at its output, with the side chain connected downstream. The inner ear can be thought of as a sort of 20,000-channel spectrum analyzer with very steep active filters (about 500 dB per octave) and a dynamic range of around 120 dB. The central auditory system is the computer that tries to make sense of it all.

HEARING TESTS

Most hearing losses occur gradually. Initially, the afflicted person may perform well in conversation, and if the victim happens to be a sound engineer, his or her mixes may still sound pretty good. However, when a person's hearing loss starts becoming severe, other people begin to sound like they are mumbling; a sound engineer may notice that the vocals in a mix have lost their "sparkle." To compensate, the engineer may add 4 to 5 dB at around 4 kHz but then find the mix irritating and generally unpleasant. Although earlier and ongoing hearing tests could have helped to monitor and ward off a hearing loss such as this, it is only at this point of severity that most people seek help.

If you were to come to me for a comprehensive clinical hearing evaluation, we would start with a thorough oral history of your occupational and recreational noise expo-

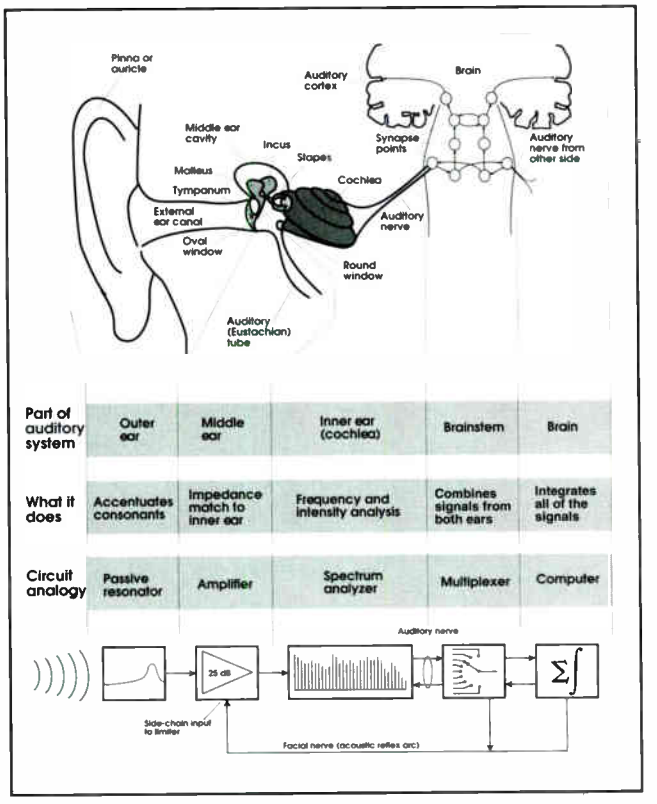


Figure 1: (The Peripheral Auditory System) The pinna and external ear canal make up the outer ear; the middle ear consists of the tympanum (ear drum) and the three middle ear bones; the cochlea is the inner ear.

sure, as well as past illnesses, surgeries and genetic factors. A peek into your ears with an otoscope determines if there is any ear wax or other object or condition that requires medical attention or precludes continued testing. Now, on to the sound booth.

The most basic hearing test is the pure tone test. An audiometer is used to deliver sine waves through headphones at octave frequencies (and sometimes interoctave frequencies) from 125 or 250 Hz to 8 kHz. The tones are *really* soft. You need to respond to the softest intensity you can detect so that a threshold can be determined. The range of test frequencies encompasses most of the energy produced by human speech. As mentioned before, most audiologists tend to be speech-centric in their approach. If you are interested in having your hearing tested above 8 kHz, ask the audiologist about high-frequency testing capabilities.

The threshold for each tone is plotted on the graph part of an audiogram like a frequency-response chart. The right ear is represented by circles and the left ear by Xs (Fig. 2). The vertical axis of the graph is marked in dB HL (hearing level). This scale is derived from the Fletcher-Munson (or Robinson-Dadson; take your pick) equal loudness curves and then corrected for varia-

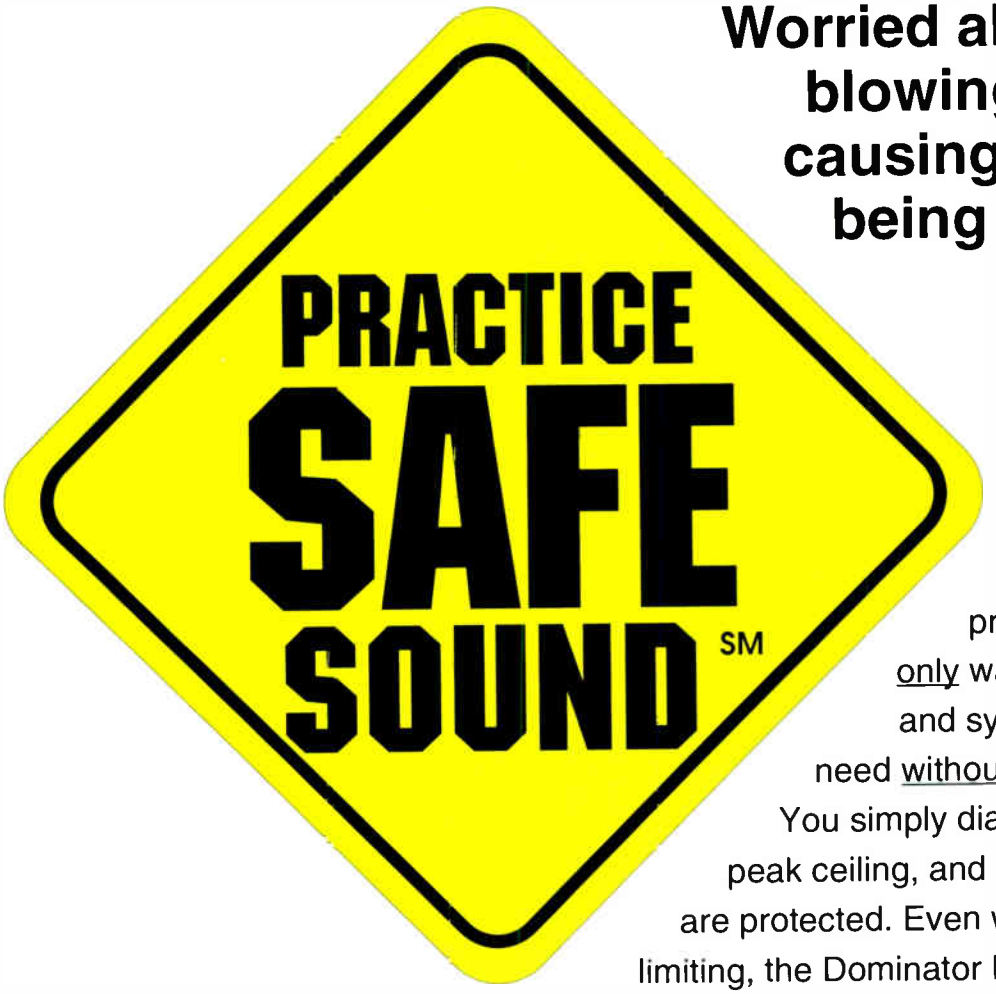
tions introduced by the transducers used in the test.

When troubleshooting, bypassing parts of a system can reveal the location of potential problems. Bone conduction testing is performed to "remove" the outer and middle ears from the circuit and stimulate the inner ears directly. This is done by placing an electromechanical transducer behind the test ear (on that little bump called the mastoid process) or on the forehead. A gap between headphone and bone conduction tests usually indicates a hearing loss arising in the middle ear, although a disparity of 15 dB or more usually is required to be considered clinically significant (Fig. 2a).

Vibrating the skull for bone conduction testing stimulates both inner ears simultaneously. When it is necessary to isolate the test ear, narrowband masking noise is introduced into the non-test ear to keep it busy listening to something else. Masking is also used with air conduction testing when a person's thresholds are so high that the test signal can cross over to the non-test ear. Through the audiometer, I'd perform several tests involving speech presented at various levels to assess your thresholds of detection and reception, and discrimination of speech sounds.

Immittance testing (from "impedance" and "admittance") completes the basic comprehensive battery. Immittance testing allows me to find out the physical volume of your ear canal (too big may indicate a hole in your ear drum), the compliance of your middle ear system and the air pressure of your middle ear cavity. If your ear drum won't move (low compliance), there may be fluid in the middle ear from a pending, past or present middle ear infection, or some other condition inhibiting movement. If the ear drum is too flaccid (high compliance), it may indicate a discontinuity of the middle ear ossicles. Another middle ear test makes use of the acoustic reflex to assess the nerves involved in the reflex arc, as well as other functions.

All immittance tests are performed by making an air-tight seal of the ear canal with the test probe. A tone is delivered into the ear canal and measured with a small microphone. The air pressure in the ear canal is then varied (don't let the pressure change alarm you). The ear drum is rigid at the pressure extremes, and most of



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the test tone energy is reflected back to the microphone. Somewhere between the high and low pressure extremes, the ear drum is most compliant. At this point, more of the test tone energy is transmitted on through the middle ear system to the cochlea, and less is reflected back to the microphone. The difference between the maximum and minimum SPLs reflected back to the mic indicates the compliance of your middle ear system.

HEARING DAMAGE

Damage to the hearing system can result from physical trauma, genetic influences, psychoses, drugs or disease, among other causes. But the most common causes of hearing impairment are advancing age and exposure to high SPLs.

Hearing loss accompanying advancing age is called presbycusis (Fig. 2b). It is probably an accumulation of the effects of living in an industrial society, in addition to the fact that we fall apart as we age.

Noise-induced hearing loss has a signature audiogram as well, distinct from most other impairments. Typi-

Hearing Specialists

There are three types of hearing professionals: physicians with a medical specialty in head and neck surgeries, audiologists and hearing aid dispensers. Physicians who specialize in the ear (otologists) and related parts of the anatomy (nose and throat) are trained in the treatment of disease and in surgery for medical intervention and reconstruction. Because their emphasis is on making the ear function and not necessarily measuring its performance, they probably will refer you to an audiologist for comprehensive hearing testing.

Audiology can be thought of as the study of sound once it gets to the ear; that is, how sound affects the auditory system and vice versa. Although an audiologist may hold a Ph.D. in audiology or a related field, he or she isn't a medical doctor and can't write prescriptions or *medically* diagnose and treat a hearing disorder. An audiologist is required to have at least a master's degree and a state license to practice, and most are clinically certified by the American Speech-Language-Hearing Association. Audiologists fit hearing aids and help rehabilitate people who have lost their hearing, in addition to performing diagnostic tests on hearing and balance. Audiologists also dispense hearing protection, including custom-molded types, and many are involved in hearing conservation and community noise abatement programs.

Hearing aid dealers make their living solely by selling hearing aids. Some also dispense hearing protection. Hearing aid dealers must refer a client to a physician for any medical treatment and to an audiologist for comprehensive hearing evaluations. Do not be confused by the label "hearing specialist" or "hearing professional." Although hearing aid dealers are technically hearing professionals, they are not audiologists or medical doctors and may not refer to themselves as such. Although there are no educational requirements to sell hearing aids, most states require that dealers be licensed. ■

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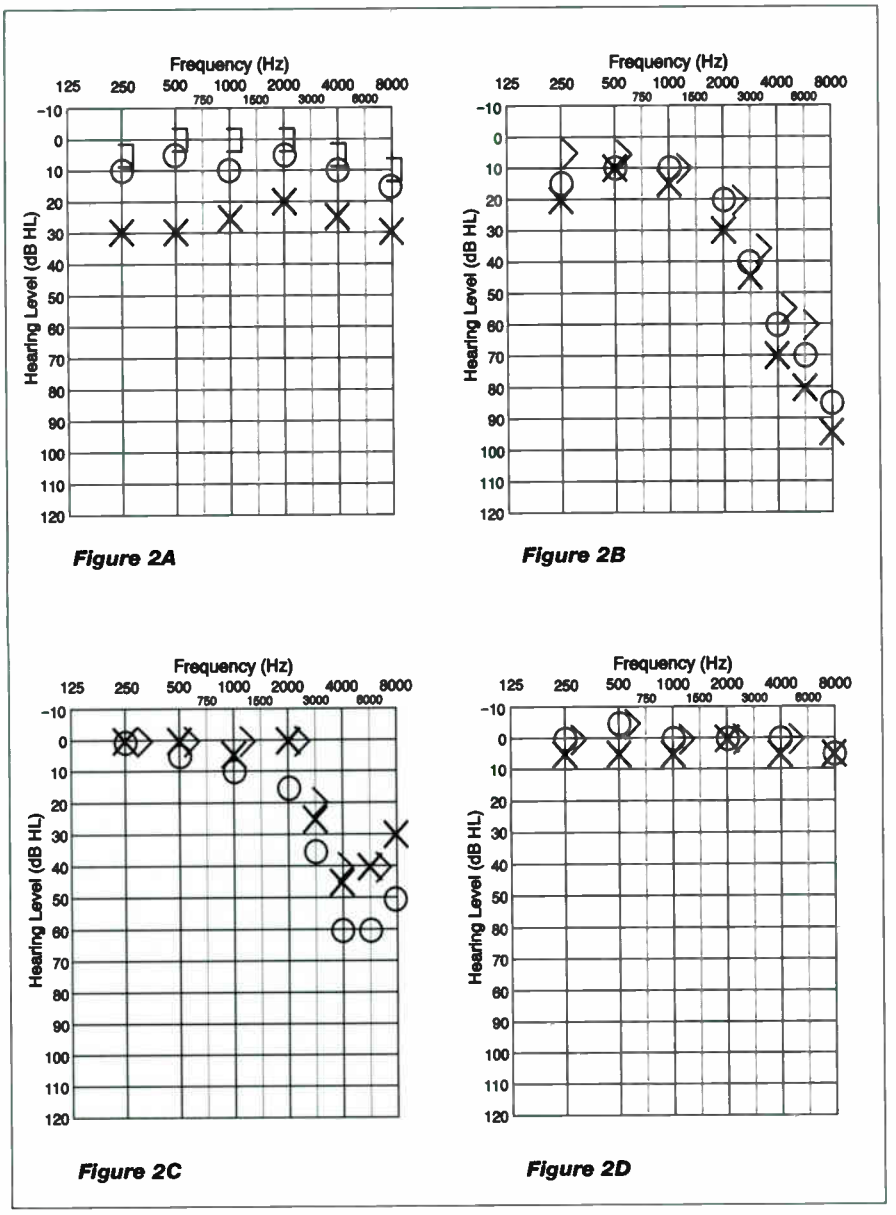

Figure 2A

Figure 2B

Figure 2C

Figure 2D

Figure 2A shows a conductive hearing loss signifying a problem in the middle ear. Notice the dB difference between air conduction (Xs) and masked bone conduction (brackets) thresholds. Figure 2B shows a high-frequency loss typically associated with aging. Figure 2C shows a noise-induced hearing loss. Note the 4kHz notch in both ears. Figure 2D is typical of normal hearing.

cally, there is a notch in the audiogram, centered at around 4 kHz, that begins to recover at around 8 kHz (Fig. 2c). The depth of the notch indicates the severity of the loss, and the rolloff can be on the order of 50 dB per octave. Over time, noise-induced and age-induced losses will affect the entire frequency spectrum.

A noise-induced impairment occurs when cilia are damaged or destroyed. Eventually, the hair cells and auditory nerve endings may atrophy and die. This is irreversible. Cochlear losses occurring in people with previously normal hearing are accompanied by a phenomenon called recruitment, which results in a restricted dynamic range. Recruitment is also referred to as an "abnormal growth in loudness," meaning that, as actual intensity increases, *perceived* loudness increases more rapidly. Sound that was barely tolerable at 120 dB SPL with normal hearing now causes extraordinary discomfort at 105 dB SPL. The combination of elevated threshold and recruitment compresses a normal dynamic range of 120 dB to 50 or 60 dB at the affected frequencies. Our hypothetical sound engineer experienced recruitment when 5 dB was added at 4 kHz to the already loud vocal mix.

Before high SPL exposure causes a permanent hearing loss (known as

a Noise-Induced Permanent Threshold Shift), it causes a Temporary Threshold Shift. TTS is indicated by the "stuffiness" you feel, the ringing you hear (called tinnitus) and the hearing loss you experience immediately following a loud event. With rest, most of your hearing will recover, but some permanent damage probably has occurred. Continued exposure with no rest period or repeated exposures that again result in TTS have a cumulative effect. TTS is your warning flag; heed it.

The threshold shift shown in Fig. 2c at 4 kHz is not due to exposure to noise only in the 4kHz range. It is caused by exposure to *all* frequencies at about 4 kHz and below. This has to do with the way the cochlea is designed. Acoustic stimulation results in waves traveling along the basilar membrane. High frequencies have shorter wavelengths and displace the basilar membrane only a short distance from the oval window. Low-frequency waves, having longer wavelengths, displace almost the entire basilar membrane. The part of the cochlea that responds to 4 kHz is the ears' most sensitive region, and this part of the basilar membrane is always in motion at this frequency and lower.

HEARING PROTECTION

Fundamental to hearing conservation are hearing Damage Risk Criteria tables based on a time-intensity trade. This means that one must reduce exposure intensity and/or exposure time to lessen the risk of hearing impairment. Intensities below 90 dBA (SPL), about where the acoustic reflex kicks in, are not considered dangerous, so the time-intensity relationship does not apply. Of course, time of exposure is a moot point at intensities above 140 dB SPL, where instantaneous and irreparable damage can occur (along with a bit of pain, most likely).

Exceeding the limits of DRC tables does not imply that hearing damage actually is occurring, only that there is an increased risk. Some people are more susceptible to hearing damage than others due to genetics, past noise exposure and other factors. Current DRC tables were developed by OSHA for for the protection of employees in a noisy workplace.

Music presents some unique challenges to existing guidelines. First of all, in live music, high SPLs are not

the by-product but the end product of a process. Second, in concert sound reinforcement, overall SPLs must be sufficient to provide adequate coverage. Following the inverse-square law, people in most seats in the house can experience the sound intensities that are integral to an aggressive live performance without risk. But those seated in the near field of the reinforcement system can be subjected to punishing levels.

The options here are to lower the overall house level, which would cheat those farther out in the arena; shorten the performance, which would cheat everyone; distribute optional hearing protection, which (if the inexpensive compressible foam plugs are used) would alter the fidelity of the mix considerably and might be cost-prohibitive; eliminate seating in the near field, which would reduce ticket revenues; or design reinforcement arrays so that there would be no near field *per se*, and all seats would be equidistant from the reinforcement system. But this would mean that all the venues on a tour would have to be able to accommodate the design.

Third, the slow-response, A-weighted sound level meters specified in existing standards are woefully inadequate for measuring average levels of amplified music at typical concert SPLs. Music is full of transient pressure waves, and these tend to be at the extremes of the frequency spectrum. Low-frequency sounds are attenuated by A-weighted filters, but these frequencies can devastate hearing when amplified to concert SPLs, because the ear becomes more sensitive to low frequencies as the level increases (compare the 100 dB phon line on the equal loudness curves to the 40 phon line). The AES is developing a standard targeted toward dealing with neighborhood music annoyance problems. This should also yield a more valid measurement procedure for amplified music levels and spectra.

I haven't addressed the stage mix specifically, but the same problems and principles apply. With the advent of personal in-the-ear monitoring systems, the problem of crowd noise obliterating the monitor mix is reduced. With luck, this will lead to lower monitoring volumes. Ideally, an audiologist should fit the wearer with a vented custom ear mold.

In the realm of personal hearing

protection, look for "musicians'" ear plugs like the Etymotic ER-15 and ER-25 and Pacific Coast Labs' Sound Waves II. These are supposed to provide flat attenuation, although field reports indicate a problem with extrahigh-frequency attenuation (the manufacturers' published data only goes to 8 kHz). The best hearing protectors are fitted into custom ear molds like in-the-ear monitors. There are mixed reactions, but the tendency is toward acceptance.

Improvements will continue. The future will see more audiologists who will cater to the music industry and will fit personal monitoring systems and hearing protection devices. There are also hearing aid-like devices being developed that can be tuned like compression limiters. Many current hearing aids incorporate compression circuits, so people with recruitment don't wince every time someone drops a fork onto a plate, but current technology is crude.

Again, the larger issue is the protection of the concertgoer. Although some individuals may benefit from use of personal hearing protection or from their seating in an arena, none of the foregoing options provides a single satisfactory solution. The industry and the consumer must take responsibility. The industry should look seriously into system designs and seating arrangements that offer the best compromise among the conflicting values of adequate sound coverage, revenues and reduced risk of hearing impairment. The industry also has a responsibility to educate the consumer and set an example. Consumers must take personal responsibility for their hearing protection.

Sound contractors, artists and promoters should support organizations such as HEAR (Hearing Education and Awareness for Rockers, San Francisco) and the House Ear Institute's Los Angeles HIP (Hearing Is Priceless) program. Distribution of literature, questionnaires ("Was it too loud tonight?" "Where did you sit?" etc.) and high SPL warnings and disclaimers at the door or with ticket sales can help get the message across while the industry works out solutions. ■

Bob Ghent holds a master's degree in audiology from Brigham Young University. He is a Utah-based musician, vocalist and engineer who runs an engineering consulting company and a MIDI studio.

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by Mark Frink

SOUNDCHECK

Electrotec Productions (Canoga Park, Calif.) recently provided sound for Rod Stewart at the Shoreline Amphitheatre in Mountain View, Calif. The sound system included Electrotec's proprietary Lab-Q speaker system comprising 80 cabinets, 16 Q-2 sub-bass speakers, Midas and Soundcraft consoles, AKG microphones and Future Sonics Ear Monitors.

PHOTO: STEVE JENNINGS

Greetings from sunny Seattle. My name is Mark Frink, and I have joined the *Mix* staff as the editor of the Live Sound department, replacing David (Rudy) Trubitt, who has moved on to other responsibilities.

First, a bit of background. I worked with Sun Sound Audio in Northampton, Mass., for ten of the past 20 years while living in New England. More recently I've been involved with an EAW KF-850 users group that I founded in 1989. After graduating from UMass in 1982 with a degree in economics, I worked as the sound engineer at Dartmouth College's Hopkins Center, and I have written for various publications.

I moved to Seattle in June with my wife, Pat, to enjoy the people, coffee and weather, as well as work with U.S. Sound. I recently worked with ProShow in Seattle and have been on the road with Tony Bennett while engineer Vance Anderson was "steppin' out."

We are sure to see and hear many interesting developments in this department in the near future, and I eagerly anticipate bringing you all the latest news and views of live sound production, installations, products and people. Next month, we'll report on the Live Sound Workshop and the Winter NAMM show in Anaheim.

LIVE MIX BBS

Beginning in April, there will be a Live Mix electronic bulletin board service at my Seattle office. The number is (206) 933-8478 (2400 baud, no parity, 8 data bits, 1 stop bit). The bulletin board will allow easier and faster transmission of press releases, letters, comments and contributions, as well as forums for file sharing, databases, classified ads, private mail and public message centers for live sound topics. Contact SYSOP MF for details, or just modem in and register.

CLUB OF THE MONTH

Also next month, you'll see a new section on club owners who have made a major investment in sound equipment—purchases and upgrades that have earned particular clubs the recognition of live sound engineers as a nice place to mix. Criteria for nominations and qualifications will follow in the next issue and on the Live Mix BBS.

Finally, "Live Mix QuickTip" will be a new section that gives readers a chance to interact and share some worthy bit of knowledge gained from on-the-road experience. You'll be recognized with a mention of your name, phone number and a *Mix* T-shirt. Topics could range from maintenance, packaging or stage production shortcuts to any other time-saving idea for the office, back-shop or gig. Got any QuickTips in 50 words or less? Write to the Mix offices (6400 Hollis St. #12, Emeryville, CA 94608) or modem to the Live Mix BBS in Seattle.

Otherwise, I can be reached at 4050 Admiral Way #305, West Seattle, WA 98116; phone (206) 933-8404; BBS (206) 933-8478. I look forward to working with you. ■

by Jeff Forlenza

Pearl Jam Live and Loud

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Berkeley Greek Theatre
October 31, 1993
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R.A.T. Sound
FOH ENGINEER
Brett Eliason
MONITOR ENGINEER
Karrie Keyes
FOH SYSTEM TECH
Dave Rat
MONITOR SYSTEM TECH
Mark "Smitty" Smith

Emotion. Unfiltered, gut-wrenching emotion is the bond between Eddie Vedder and the crowd. Rhythm guitarist Stone Gossard and lead guitarist Mike McCready bring back the '70s—Southern rock, heavy metal and Top 40 pop alike—while Jeff Ament's deep, slinky bass lines and Dave Abbruzzese's solid drumming anchor the wah-wah guitars and soulful wailing. The approving crowd is pogoing as the sun sets on the concrete columns of Berkeley's Greek Theatre on All Hallow's Eve.

Sure, they've sold a gazillion records, but the fact is Pearl Jam is a great *live* band. Like few groups in recent memory, Pearl Jam connects, commiserates and communicates with its audiences. To this end, the band likes to keep that small-venue, band-to-fan vibe that they grew up on in the Seattle club scene. Berkeley is the fourth stop on

—CONTINUED ON PAGE 169

R.A.T. crew from left: Mark Smith, Brett Eliason, Karrie Keyes and Dave Rat

PHOTOS: STEVE JENNINGS

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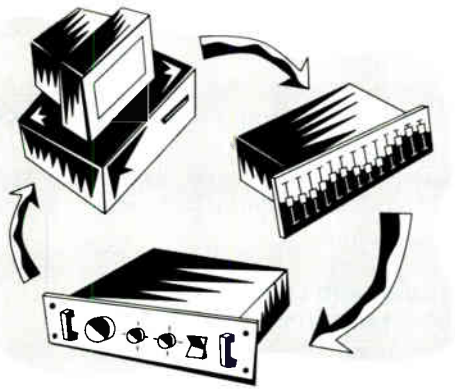
COMPUTER CONTROL CONCEPTS



by Bob Moses

SYNESTHETICS, THE 1993 SEATTLE ART & TECHNOLOGY FEST

A lot has been written in this column about the future of computer-controlled audio systems and the efforts of the Audio Engineering Society and a number of vendors to evolve this technology. But not an awful lot has been written about the aesthetic and human ramifications of handing control of media over to computers. This month I would like to report on a recent event in Seattle that implemented a variety of computer-control technologies in the effort to create a unique "interactive" experience for performers and participants. The event was the first to implement many of the concepts discussed in this column, and it provides a glimpse of what might be in store for live entertainment as computers take over more and more tasks.

First, a little geographical perspective. The Pacific Northwest is virtually buzzing with new businesses, research centers and artists active in multimedia and interactive arts. Nearly a dozen prominent professional audio and MIDI manufacturers are based in the region, along with Microsoft and a number of other innovative software companies. Add to this the University of Washington's Human Interface Technology Lab (renowned for its research in virtual reality), Vancouver's Centre for Image and Sound Research (directed by SC-10-2 committee chairman Jeff Berryman), and many other organizations on the cutting-edge of new media and information technologies.

The region is also home to a number of arts groups that are experimenting with new interactive multimedia aesthetics. One Seattle-based group, Northwest CyberArtists, was established in 1992 with the goal of bringing artists and technologists from diverse backgrounds together to "see what happens." The result was an event in October 1993 called Synesthetics (synergistic aesthetics), which featured a variety of artists active in music, theater, dance, video, computer graphics, kinetic sculpture and biofeedback, along with businesses specializing in virtual reality, professional audio, lighting and computer technologies. The system tying all these disparate media together was based on traditional and custom-engineered computer-control technologies. Space does not allow me to describe all the details, so I will focus on just a few of them.

MUSICAL INTERACTIVITY

A goal of Synesthetics was to give the audience creative input into the show. Three large "MIDI Trees" (created by artist Einar Ask using a PAVO MIDI-toolkit computer) laden with dozens of MIDI sensors were set up on the dance floor and fed onstage sound modules. While Ask's band (The Same) performed, members of the audience played along by manipulating the sensors hanging in the trees. Of course, many of the audience members

ILLUSTRATION: ANDREW FAULKNER

from a second-floor balcony into eager fans' arms—as well as the large San Jose State football field.

"With this tour, the venue sizes are so disparate," Rat says. "We'll go from 12,000 seats to 1,500 seats, and we've got to carry a rig to cover both. It's difficult to do that—to squeeze a fraction of the big rig into a small venue. We've got 48 boxes with us. We can split off 16 boxes—eight per side stereo—one-third of the rig for a quad setup or as a stereo/mono delay cluster. And we have some long-throw bins, which we run in the higher parts of the stack. We're carrying enough to do about 8,000 seats; we'll augment anything over that."

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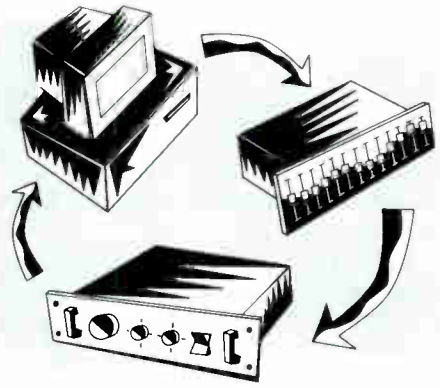

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ILLUSTRATION: ANDREW FAULKNER

were not musicians, so at times this interactive element created musical mayhem. But there were many periods when order arose from the chaos, and the audience and the band had an absolutely wonderful time playing together.

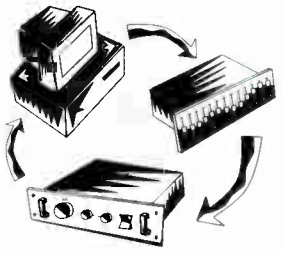
SOUND AND LIGHT INTERACTIVITY

A popular attraction was a VPL Data Glove configured to control the show's Intellabeam lights and MIDI mixing and signal processing gear. The Data Glove, a staple in the field of virtual reality, uses fiber optics to measure the bend angles of the joints in a person's hand and a six-dimensional spatial tracker to measure the location and orientation of the hand. Together with Brian Karr, a VR researcher at the University of Washington's HIT Lab, I created a custom hardware and software interface (using another PAVO MIDIToolkit) that allowed the Data Glove to send MIDI Show Control commands to the Intellabeam controller, and MIDI Control Change and Program Change commands to Mackie 1604 mixers equipped with OTTO MIDI automation and a Symetrix 601 MIDI-controllable vocal processor.

The Mackies fed eight mixes to a ring of eight loudspeakers encircling the audience. Sounds were spatialized by adjusting their level in each loudspeaker via OTTO. The Symetrix 601 provided signal processing effects. The Intellabeams projected four beams of light with varying colors, patterns and motions over the dance floor. Almost all MIDI-controllable parameters in these devices were accessible via the glove. A person wearing it could literally sculpt lights and sounds with their hands and cast them around the room. Lucinda Hughey, former principal dancer with the Pacific Northwest Ballet, wore the glove as she danced in a mesmerizing synergy of music, light and human motion. Members of the audience were also invited to wear the glove and control the lights and sound during performances.

COMPUTER-GENERATED MUSIC

Another artist, Bret Battey, experimented with computer-generated music based on chaos algorithms programmed into Opcode's MAX environment. Battey provided external stimulus to the algorithms via MIDI events and let the algorithms take over in a shower of notes and rhythms. Battey's various MIDI modules were networked to a "mind machine" device (implemented with a third PAVO MIDItoolkit), which flashes LEDs mounted on sunglasses with varying frequency, pulse width, phase and intensity via Lone Wolf MidiTaps and FiberLinks. People wearing the sunglasses experienced a psychedelic trip as their retinas were bombarded with kaleidoscopic light patterns in sync with Battey's music.



COMPUTER-CONTROLLED VIDEO AND ANIMATION

Two visual artists, Julius Brown and Steve Hawks, projected live video and computer graphics images on large screens adjacent to the main stage. Many of the projected images were generated on-the-fly by two computers and mixed with live video captured by a camcorder. An SPL meter was interfaced to the computers and used to synchronize the images to the live sound in the hall. Consequently, the images automatically adapted to the subtle mood changes in the live music performances. At times, the synchronization between sounds and images created a stunning effect.

COMPUTER-CONTROLLED HARD DISK RECORDING

The entire show was videotaped, and the audio was digitally recorded direct to hard disk—a Spectral Synthesis Audio Engine in an 8-track configuration with 9.6 gigabytes of storage space (over 20 mono hours of uncompressed 44.1kHz data). A black-burst signal was fed to a Spectral SynClock 6400 sync translator, which generated the audio sample rate. The Audio Engine was locked to SMPTE time code provided by the video system, keeping the audio recording accurate to within a tenth of a frame over the entire 2.5-hour show. In additon to the pristine quality of the digital recording and solid synchronization, the Audio Engine provided a number of flexible computer-controlled DSP functions. Gone are the days of taping a show on a mere cassette!

These were just some of the unique forms of computer control experimented with in the Synesthetics show. The technologies used were relatively simple—some of them using ten-year-old technology. As the AES-24 protocol migrates out of the SC-10 committee and manufacturers begin to offer a variety of computer-controllable tools, who knows what we'll be doing several years from now?

One thing is for sure: Connecting all the equipment (and people) in a performance hall via computer networks creates profound avenues for expression and social interaction. Indeed, many attendees of the show were overwhelmed by the multisensory experience and the opportunity to interact directly with each other and the performers. Computer control is not just an intellectual exercise for engineers—it offers a whole new world of aesthetics and art forms. All indications are that we are in for a great ride. ■

Bob Moses is a senior digital audio engineer for Rane Corp. and a member of the AES SC-10 subcommittee. He would like to thank everyone involved in the creation of Synesthetics.

—FROM PAGE 165, PEARL JAM

their nascent *Vs.* American tour.

Juggling the band's desire to keep their shows intimate with the requirements of sheds and larger venues is no small order for Dave Rat and R.A.T. Sound. R.A.T. has been doing live sound for Pearl Jam since they met when the band was opening for the Red Hot Chili Peppers in October 1991 and R.A.T. was doing the Peppers' sound. R.A.T. and Pearl Jam toured Europe, opening for Neil Young and U2, and then headlined around Canada in theaters and sundry hockey rinks. But headlining in the States poses its own problems.

"The biggest problem we're having now is they really prefer to play smaller venues and kind of get that real closed-in sound onstage," Rat explains. By the time they reached Berkeley, R.A.T. had already seen the small Catalyst Nightclub in Santa Cruz—a last-minute surprise show where Vedder stage-dove

from a second-floor balcony into eager fans' arms—as well as the large San Jose State football field.

"With this tour, the venue sizes are so disparate," Rat says. "We'll go from 12,000 seats to 1,500 seats, and we've got to carry a rig to cover both. It's difficult to do that—to squeeze a fraction of the big rig into a small venue. We've got 48 boxes with us. We can split off 16 boxes—eight per side stereo—one-third of the rig for a quad setup or as a stereo/mono delay cluster. And we have some long-throw bins, which we run in the higher parts of the stack. We're carrying enough to do about 8,000 seats; we'll augment anything over that."

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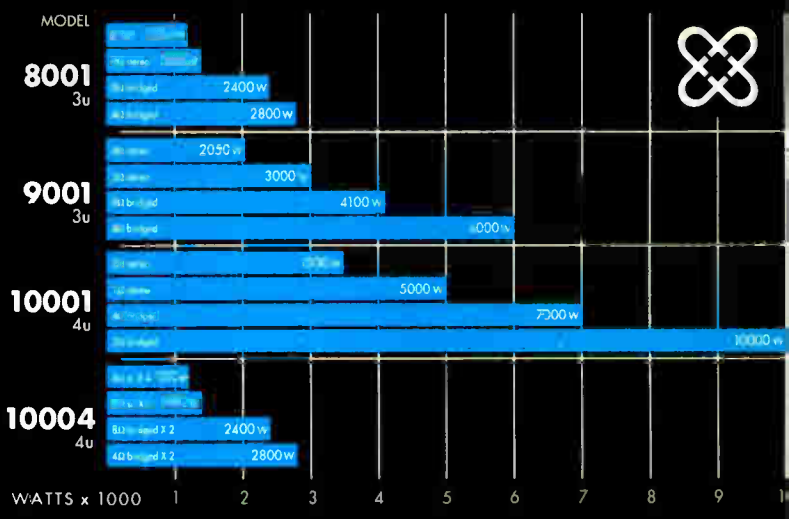

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the fines get fairly steep. At least the band stands up for me and says, 'Oh well, looks like we're spending some money today.' I usually run C-weighted right around 118 dB." (Eliason's mix position is usually 75 to 110 feet from the stage.)

"They're a tough band to do because their stage volume is really loud," Rat adds. "They opened for U2 and Neil Young, and the monitors that Pearl Jam run are considerably louder. They've tried to use other monitor rigs, and most of the other acts just don't run the stage volumes that Pearl Jam does."

Handling the heavy SPLs onstage are R.A.T. proprietary wedges. "They're the only things that we can use," monitor mixer Keyes explains. "We take four R.A.T. wedges wherever we go, and they won't play without 'em." The R.A.T. wedge is a double 15-, 10- and 2-inch tri-amped wedge. "And they're real flat, and they get amazingly loud," according to Dave Rat.

Mic choices include Audix OM-7s on all vocals; Shure SM98s on snare, toms and bass; EV RE20 on kick drum; AKG 460s on all cymbals; and a combination of Shure SM57s, Beyer M88s and Sennheiser 421s on guitars.

"Eddie really breaks mics," Rat says. "He goes through an average of three or four a week. The Audix is a really rugged mic, so he doesn't break 'em as often. One thing that's odd is we've been using an SM98 as a bass mic, which is kind of unusual. Bass rigs tend to be resonant, but the small-diaphragm SM98 doesn't have a lot of inherent resonance, and it's working real well."

Not only can they play loud but this band can really play. Each player brings a dynamic range of tones—and chops to match—to the overall Pearl Jam sound: Drummer Dave Abbruzzese tastefully adds subtle hi-hat stickings to the big bass-snare beat. Bassist Jeff Ament goes through four different preamps for four different basses (four-string, four-string fretless, eight-string and 12-string) to match bass sounds heard on studio albums. (His 12-string is heard chiming harmonics at the beginning of the megahit "Jeremy.") Each guitarist (Gossard and McCready) has a fairly convoluted chain of pedals and stompboxes that re-create everything from dirty, grunge rhythm to clean, searing lead sounds. And Eddie Vedder is a passionate singer who seems to pour his guts out each show.

"The guitarists have fairly complex guitar rigs," Rat explains. "They'll each have three or four different rigs. Stone [Gossard] has Pan pedals that'll mix between the rigs. The bass rig's got four different preamps and a switcher, and he'll actually use different preamps for different songs. The band does a lot of the sounds themselves."

Handling Ament's bass and the subbass portion of the show are 16 dual 18 R.A.T. subwoofers loaded with TAD and Electro-Voice speakers. "The double 18s are on an aux send, and they go through a graphic EQ, through the dbx 120, and then that hits the crossover, which has got a variable lowpass filter on it—so you can shape it any way you want," Eliason explains.

Altogether, Eliason handles 26 inputs coming off of the stage, with ten inputs for drums, from a 40-channel Ramsa WRS-852 console. Of the console, Eliason notes: "It's definitely a transparent board. I wouldn't want to use it with a rig that I felt I had to use a lot of EQ on. It's got good head room. The rig is very smooth, so I end up not having to use a lot of channel EQ."

The band is largely in control of their individual sound shaping and tone control, and often Eliason just amplifies and blends, without a lot of EQing. He does admit to using "the SPX-1000 and some [Eventide] H3500 on Eddie's vocals. Mostly, I'm just trying to use a lot of the effects that are on the record: simple delays and stuff. Eddie's got such a beautiful voice, there's really no reason to cover

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it up, plus the music's so straightforward. It's definitely not a heavily processed kind of band."

Pearl Jam's monitor mixing board for the Berkeley show is a 40-channel Yamaha PM-2800, of which monitor mixer Keyes says, "It's got pluses and minuses. Most of the time we use this board, but in Europe we were getting a lot of Ramsas. The vocals were great [on the Ramsa]—they were really easy to EQ—they sounded a lot clearer. I had a lot of problems with guitars on the Ramsa—getting the right tone. It's like the preamps and EQs were too clean for guitars. Coming back to the Yamaha, I'm having more problems with vocals, but the grungy guitar sounds are easy to get."

Other helpful gear on the tour included a TC Electronic 1128 digital EQ, which the R.A.T. crew used to EQ the varying venues they played; a BSS 960 Varicurve system used to EQ Vedder's monitors; four Alesis ADAT units, with which they documented each gig for a possible live release; Crest power amps; and a Klark-Teknik DN800 crossover.

Overall, the show was enthusiastically received, and the band seemed to enjoy themselves as well, with Vedder even donning a ghoulish mask for one of four long encores. The sound was quite good. The mix was strong, and yet each individual player was discernible—especially the intertwining sounds of the two guitarists. Above it all, Vedder's vocals were loud and clear.

When it was over, the sweaty, contented concert-goers filed out, and the R.A.T. crew began their ritual breakdown. Another day, another show. But nobody was dragging. "Everybody who tours with this band is a friend—it's like a big family," Dave Rat concludes. "Since everybody's happy, they do their gig well." ■

The New String Thing

Miking Live String Ensembles

The emergence of string ensembles in the '90s is more than a reawakening. The Kronos Quartet, Max Roach's Double Quartet, Turtle Island String Quartet and the Ron Carter Nonet are playing a wide variety of music, going where no one has tread before. And they present a new dimension in audio, as well. After all, chamber music is traditionally performed in a recital hall, "au naturel," which is to say without any sound reinforcement at all. Each of the previously mentioned ensembles uses audio technology to enhance their performance and to reach larger audiences.

by Mark Fitzgerald

There are many factors to consider when providing live sound for string ensembles: Ambient miking includes the room sound but is limited in terms of gain-before-feedback. Miniature condenser mics are useful in theory but must be mounted without harm to the instruments, some of which may be worth more than a 40-channel console. Pickup technology is getting better—it clearly gives the best gain before feedback, as well as the most freedom from leakage—but in spite of these advantages, mounted microphones seem to lack the realism achievable with the use of high-quality mics. The instruments are miked for a number of purposes, ranging from accurate reproduction to the extensive layering of special effects such as digitally generated harmonizing, chorus, doubling and reverb. Ask any number of people to mic these modern aberrations, and you're sure to get any number of answers.

CLASSICAL HENDRIX

The Kronos Quartet is the epitome of modern classical music. They have consistently expanded the scope of the traditional classical concert with the help of amplification and effects—both subtle and dramatic—stage sets and lighting. A Kronos concert sometimes includes prerecorded DAT tapes, sometimes a Jimi Hendrix cover as an encore.

Kronos plays a tremendously varied program and uses two sets of mics for the two basic precepts. The first is a set of highly directional AKG 747s set on the floor underneath each instrument to generate the more ambient "classical" sound. The second set of mics comprises four Countryman omnis affixed directly to the instruments. This second set of mics, combined with digital effects, is used for such pyrotechnical numbers as Hendrix's "Purple Haze" or "Foxy Lady." More commonly, the use of effects in the show is subtler, but those signals are also generated from the close mics and then mixed as needed with the ambient mics.

The Kronos Quartet often play with prepared, prerecorded compositions and only use monitors for purposes of hearing those tapes. Miniature headphones are used to hear synchronized cues. They employ two sound mixers for their grueling schedule: Jay Cloidt uses a PCM-70 and an Eventide Ultra-Harmonizer, and Scott Fraser uses a pair of rackless

MICHAEL LAVINE

Kronos Quartet

rails for transporting his Boss SE-50, SPX-900 and Roland DEP-5.

Both mixers like to work with the room. Fraser has developed a technique where he "impulses" the room by feeding the same impulse into his SPX-900 to create a program by ear that mimics the room—an effective way to create the illusion that several of the medium-level pieces are unamplified. Often Fraser uses the Roland for a lush, extended reverb and the Boss for the special effects. His impulses, which are generated by a metronome, provide a sound rich in harmonics. In order to fully optimize this technique, Fraser has transferred the click to DAT, separating the clicks in time to allow for more room decay, EQ'ing them to get even wider bandwidth from the impulse and gating the metronome's own woody acoustics. He completes the technical portion of each soundcheck by feeding a dry recording of the quartet into the system before rehearsal. Fraser's goal is to give everyone in the house the same auditory experience that one might have in the front rows of a traditional, unamplified

Uptown String Quartet

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JOHN ORAM "The father of British EQ"

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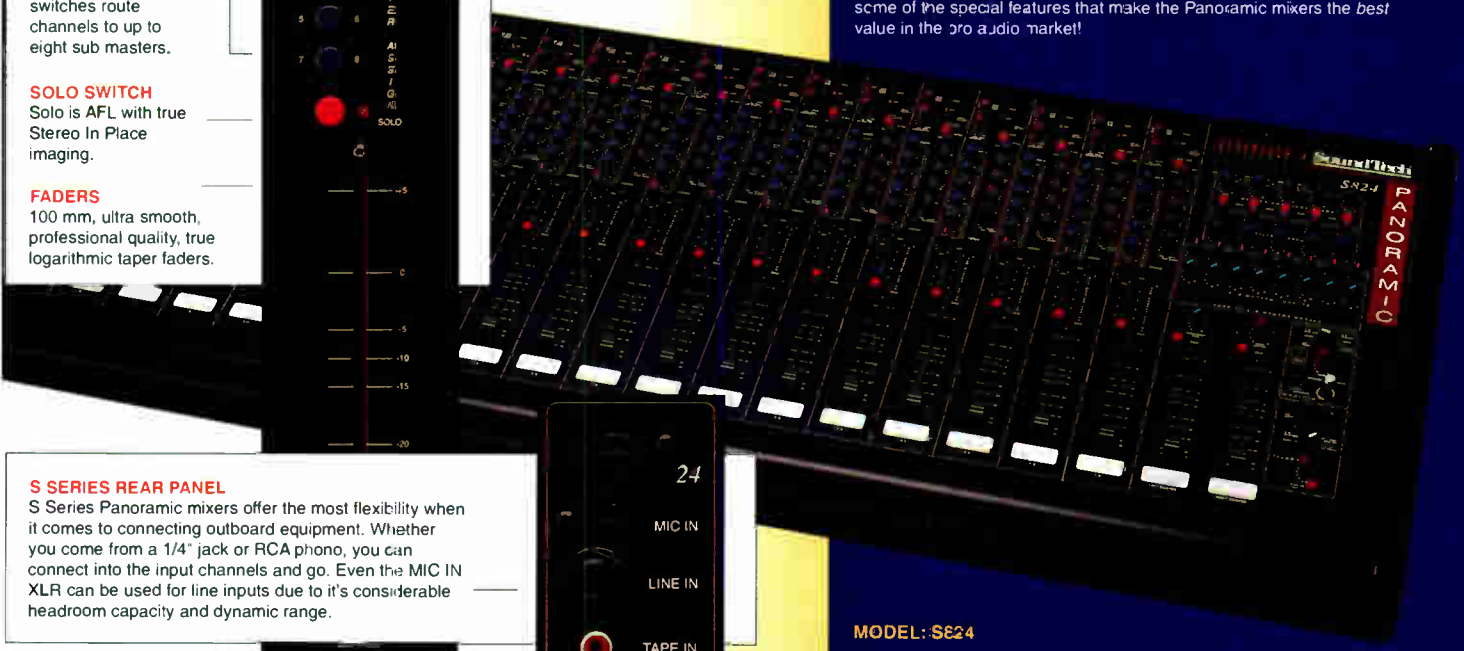

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chamber music presentation.

Cloidt is looking forward to auditioning new ambient mics, and he has plans to try hypercardioids from Neumann and Schoeps. Fraser used the Schoeps in Vienna and found a marked improvement in terms of warmth. Cloidt also uses double-sided, foam-filled tape to mount the miniature omnis. He feels it has contributed to the accuracy of reproduction and claims that it's the best way to eliminate what he describes as a "phony, woody resonance."

Both Kronos engineers aim for realism. Cloidt feels he has improved the perceived degree of realism by using a digital delay to "move" the speaker system back to the same acoustical plane as the quartet. The result is that the listener perceives the quartet to be actually louder than they are.

IRENE YOUNG

Turtle Island String Quartet

MAX ROACH'S DOUBLE QUARTET

Max Roach created the Uptown String Quartet to add strings to his own jazz quartet—standup bass, trumpet, sax and Max on drums—making it a Double Quartet. The Uptown String Quartet consists of Diane Monroe on violin, Lesa Terry on violin, Maxine Roach on viola and Eileen Folson on cello, and they play everything from jazz to blues to gospel.

Tim Casey, sound mixer for Max Roach, uses a staggering variety of techniques for the vast range of situations he encounters. For very large fests, with no time for an elaborate soundcheck, he uses Fishman pick-ups. Casey carries four Beyer M-201s for the lectures that Max gives in high schools because not every sound system in those circumstances can provide phantom power for his favorite mic, the AKG 460. Casey also has gotten great results with a set of Beyer 260s, a particularly smooth ribbon mic. For close-miking bass and cello, Casey recommends

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Sennheiser MKH-10s and Beyer MCE-6s—both lavaliers.

Casey likes to maintain a natural, European, classical room sound—of the type you might hear in an acoustical shell. In that environment, the players can hear each other without monitors. It also lends some early reflections to the overall ambience. One departure from a classical approach is a slightly greater emphasis on the cello, because the cello carries lines that might otherwise be heard from the bass.

TURTLE ISLAND

The Turtle Island String Quartet can improvise in any of several different styles. Their favorites are jazz and bluegrass, but they fluidly cross into almost any genre. Darol Anger, formerly of the David Grisman Quintet, has been playing a baritone violin, which is a standard instrument tuned in fifths, but Angor tunes his an octave low. This is only one of the ways the Turtle Islanders try to create new timbres.

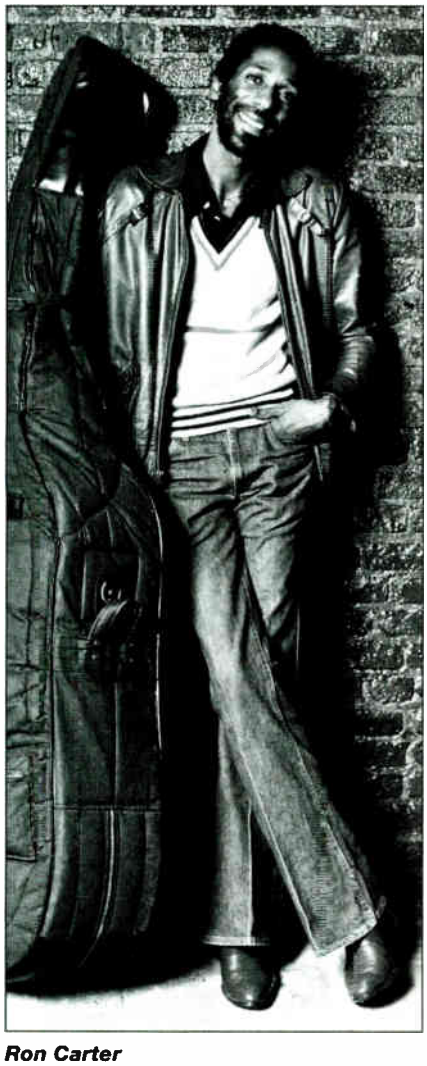
Engineer Brian Walker works with Turtle Island in the studio and on the road. Walker uses miniature Crown GLM-100s on all of the instruments, as well as an L.R. Baggs pickup on the cello as a second source. He equalizes the latter heavily with a Rane 15-band EQ. The Alesis Quadraverb is his standard effects box, but he often supplements it with an SPX-90 for varied special effects. Walker's use of stereo imagery in the concert hall is outstanding: Given a poor mix location, he often spends considerable time wearing headphones, yet all the while getting great room sound.

RON CARTER'S NONET

Ron Carter's Nonet explores the notion that you never can have too much bass. A quartet of cellos, a double bass, piano, percussion and drums create the lushest and warmest texture for the maestro to improvise over with his piccolo bass.

I miked Carter's cello quartet using four 421s, with a DI on his double bass player. The absence of drums and percussion in the bass feed was a tremendous advantage. For a perfectionist, the optimum method seems to be to mike *and* DI the larger, stringed instruments. Carter wants no mic near his bass, preferring a custom preamp placed one foot from a Barcus-Berry piezo-elec-

tric crystal embedded in the bridge of the bass, much like the way mother-of-pearl is inlaid in the neck of a guitar. Ambience and depth can be



Ron Carter

achieved from the mic, with punctuation or definition coming from the pickup. In this way, I usually can generate the most natural reproduction.

◆ ◆ ◆

So there you have it: four case studies of miking live string ensembles. But these are, by no means, the only ways to get the job done. In fact, if you ask any two engineers how to mic string ensembles, you just might start an argument, but rest assured that each person will have a valid viewpoint based on personal experience and production values. The new string thing breaks all the rules. ■

Mark Fitzgerald specializes in sound reinforcement for acoustic instruments with his company Rosewood Sound in Syracuse, N.Y.

SOUND REINFORCEMENT NEW PRODUCTS

BEYER HEADWORN MICS

New from beyerdynamic (Farmingdale, NY) are two headworn microphones with thin, flexible goosenecks. The HEM 190 (cardioid) and HEM 191 (omnidirectional) are miniature-electret condenser mics with frequency response of 20-20k Hz; output is via a 3-pin XLR, and phantom power of 8 to 52 volts is required.

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BAG END ELF-M2

Designed as a low-cost version of the popular ELF-1 extended LF integrator from Bag End (Barrington, IL), the single-rackspace ELF-M2 retails for $1,195. It features stereo highpass output with CVR limiters and dual integrated ELF output with Concealment. ELF cutoff frequency and highpass frequency are internally adjusted with plug-in resistors, and gain and protection thresholds are front-panel adjustable. An internal switch allows stereo two-way or mono three-way operation. A wide range of speakers and subwoofers are available for use with the controller.

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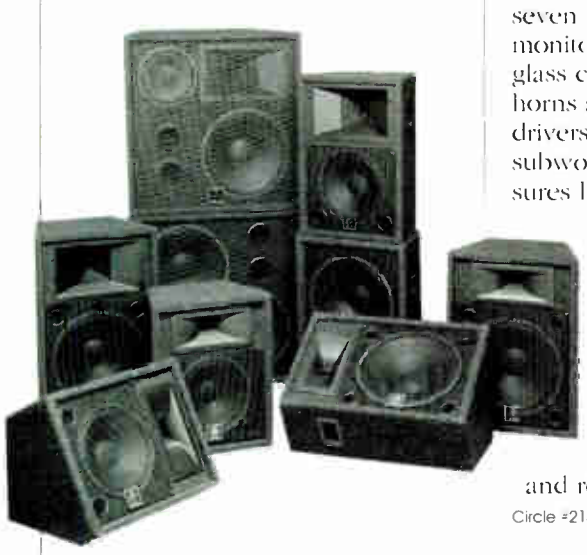

SAMSON INSTALL SERIES

The Install Series from Samson (Hicksville, NY) is a wireless system designed specifically for sound contractors. The unit offers Samson's Microprocessor True Diversity technology for dependable RF over long distances. Also included are a balanced output; remote-controllable, rear-mount antennae; terminal-strip connections on the rear panel; and dbx noise reduction. The HT-3 (handheld) and TX-3 (beltpack) transmitters include Power On/Off, Audio On/Off, Mute and Audio Sensitivity controls. Suggested retail is $579.99.

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BULLFROG TRAPEZOIDAL SPEAKERS

Bullfrog Inc. (South Bend, IN) introduced a new line of trapezoidal speakers, consisting of seven loudspeakers and two monitors. They provide fiberglass constant-directivity HF horns and titanium compression drivers, with the exception of the subwoofers. Driver support ensures horn and component protection, and the units offer high-level passive crossovers and two parallel, ¼-inch inputs. Other features include 16-gauge, polyester, powder-coated grilles, durable carpeting, internal stand mounts and recessed handles.

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ATL DIGITAL DELAY LINE

ATL Inc. (dist. by Tactile Technologies, Cerritos, CA) introduces the ADU-24, a professional digital delay line that can adjust delay times in increments as small as 20.83 microseconds, allowing digital audio signals to be resolved to just one digital word length (1/48,000 of a second). Delay ranges are 1.56 to 1,366.87 ms in 1-in, 4-out mode and 1.56 to 684.20 ms in 1-in, 2-out mode. The unit features 18-bit A/D and D/A conversion and true unity-gain structure, and can store up to 128 programs. Possible applications include time alignment in sound reinforcement systems and localization of sound images through the Haas effect.

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ELECTRO-VOICE ELAN CONSOLES

Electro-Voice (Buchanan, MI) announces a new line of mixing consoles for live sound applications, available in 8-, 12-, 16- and 24-channel formats. The 8-channel model has 60mm faders and fits a standard rack, while the other versions feature 100mm faders. Each channel offers line and 48-volt, phantom-powered mic inputs with insert jacks, PFL, 3-band semiparametric EQ and three aux sends, while the master section has -10dBv stereo tape sends and returns, left and right insert jacks, aux send and return, headphone jack, and low-impedance, balanced XLR outputs.

Circle #217 on Reader Service Card

by Philip De Lancie

TAPE & DISC NEWS

TESTING THE WATERS FOR NEW CD-ROM DISTRIBUTION CHANNELS

CD-ROMs so far have been available mostly at computer stores and through mail-order. But a concerted push to bring CD-based interactive media to new types of retail outlets has begun in selected North American markets. Recognizing that consumers are largely ignorant about the new formats, retailers and distributors are experimenting with ways to educate the public and expose the new technology.

In one such experiment, bookstores in New York, Denver, Southern California, Toronto and London, Ontario, will test the appetite of book buyers for CD-ROM titles under a program co-sponsored by Apple Computer and five electronic publishers: The Voyager Company, Creative Multimedia Corporation, Discis Knowledge Research, Macmillan New Media and Time Warner Interactive Group.

Each of the participating stores will receive a kiosk with demonstration computers, preview software and a large selection of titles. The Voyager Company, which publishes the Expanded Books series, will provide in-store personnel for training and demonstrations. The program also will include drawings for multimedia upgrade kits. According to Voyager, the market test will run at least through mid-1994 and possibly through the 1994 holiday season.

Meanwhile, video rental giant Blockbuster Entertainment has initiated a program at its stores in the San Francisco Bay Area that allows customers to get a taste of the technology before they commit their hard-earned cash. Interactive Experience kiosks in the stores feature the 3DO, CD-I and Sega CD consumer platforms, as well as Macs and IBM PCs running CD-ROM drives.

After trying the systems in the stores with the help of trained demonstrators, customers can rent any of the "set-top" systems for three nights ($14.95). Titles for any of the five platforms rent for $4 for three nights. The company also sells the hardware and software.

These test programs are just two in a growing number of tentative steps toward developing a broader market for CD-ROM software, which, along with the drives to play them, were reportedly hot items in computer stores this past Christmas. Based on the real-world experience of the booksellers, Blockbuster and

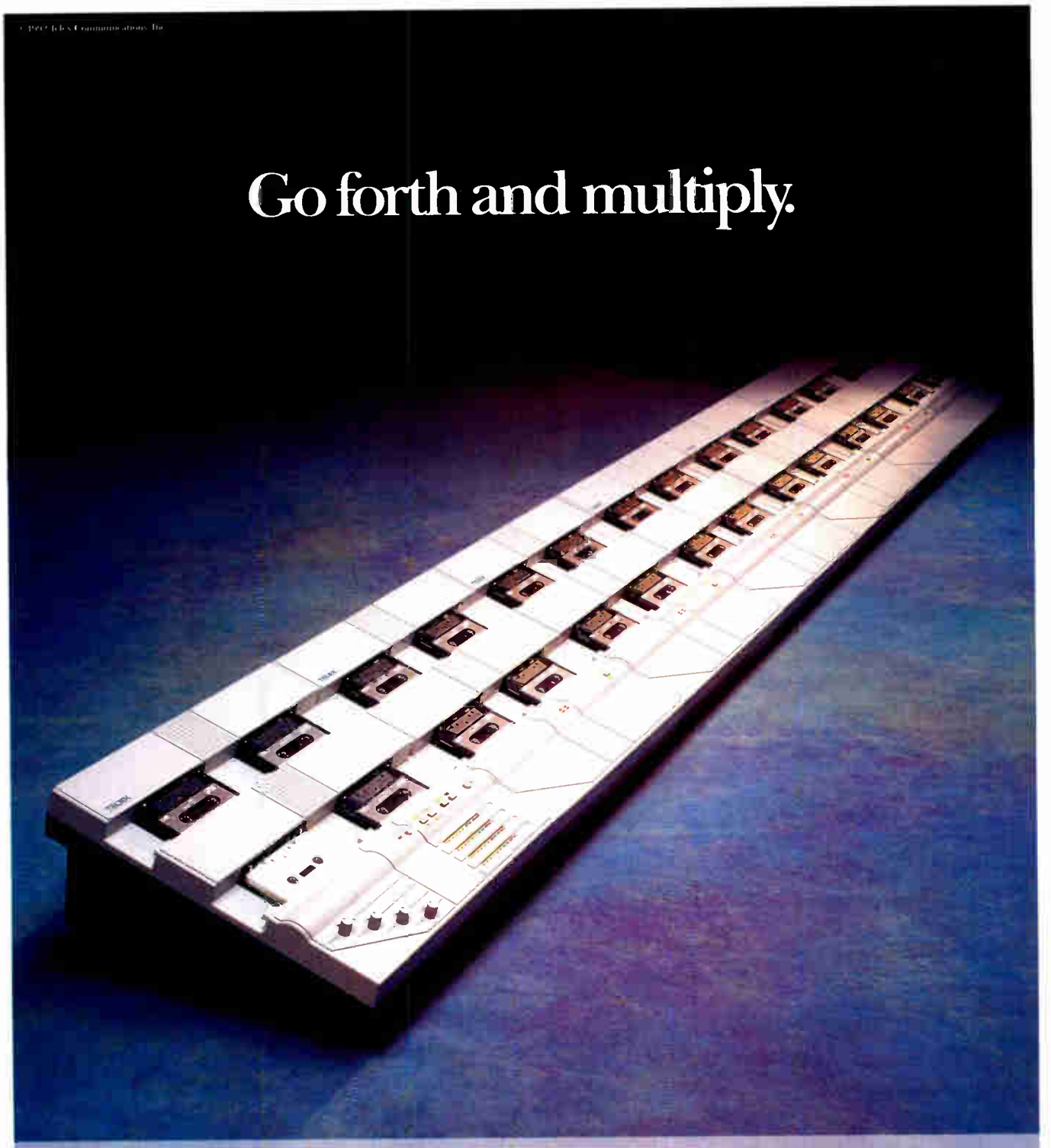
David Rubenstein, assistant to the chairman at Cinram Inc. (Richmond, IN), with the company's new Koch CDCS 4 Compact Disc QC system. Cinram's system comprises two banks of seven players each.

other early entrants like Tower, the multimedia industry should soon get a feeling for whether CD-ROM is destined to be a mass entertainment phenomenon or just a hula hoop for the techno-elite.

SPLICES

ITA president **Donald Winquist** of Magnox Inc. succeeded Stan Bauer of Fuji as ITA board chairman, while **Donald Rushin** of 3M became the trade group's new president. Each will serve a two-year term...**Tapematic** (Orlando, FL) announced a new video pancake loading system, the model 3003 Bit Video Loader. Modular in design, the 3003 can be purchased as an individual unit and subsequently built up into an integrated multistation machine with automation and conveyor feed. The single supply pancake loader is priced under $20,000...**Otari** (Foster City, CA) introduced the AL-631 (single pancake) and AL-632II (dual pancake) audio cassette loaders with rotary splicing and microprocessor-controlled diagnostics...**Sollas** (Morristown, NJ) debuted the Model 17 overwrapper, operable at rates of 20 to 75 units per minute and adaptable to a variety of in-feed and stacking systems...**EIT Instrumentation Products** (Sterling, VA) is now marketing the CD Quality Analyzer, which tests CDs for compliance with all Red Book (CD-Audio) and Yellow Book (CD-ROM) specifications. The device, built around a 486 PC, offers hard copy output and hard drive data archiving...**Studer Editech** (Woodland Hils, CA) is distributing the CDCS 4 compact disc QC system from **Koch Digitaldisc** (Elbigenalp, Austria). The hardware/software package controls up to seven test CD players. The companies also announced the sale of additional test units to **Cinram** (Richmond, IN), which brings the facility up to 14 test stations in two CDCS 4 systems...Audio and video duplicator **Precision Tapes** broke ground on a new 23,000-square-foot facility in downtown Minneapolis. Set to open in June with a staff of 38, the plant will combine production facilities for video and audio recording, including a Sonic System, with high-speed and real-time video and audio tape duplication...After 21 years with BASF Magnetic Products, **Peter Piotrowski** is joining SKMA (Sunkyong Magnetic America) in Long Beach, CA, as manager of technical services...Recent sessions at **Northeastern Digital Recording** (Southborough, MA) have been spanning the generations of popular music. The company has been mastering work by Arlo Guthrie and Pete Seeger, David Bowie and Morphine. NDR also offers Sonic Solutions' NoNoise system and is making inroads into premastering for PC and Macintosh CD-ROM with clients such as Lotus, Polaroid and Dr. T's... Mastering engineer **Carleton Batts**, formerly of Frankford Wayne, has joined the staff of New York's The Hit Factory...Also in Manhattan, **Gene Paul** of DB Plus has been mastering projects by Hugh Masekela, Javon Jackson and Mose Allison...Way out West, meanwhile, **Music Annex** of Menlo Park, CA, added a Sonic Solutions system for CD premastering and audio prep for interactive media. The company uses Apogee A/D converters and has GML and Focusrite analog processing available. ■

Go forth and multiply.



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COAST To

L.A. GRAPEVINE

by Maureen Droney

My name is Maureen Droney, and I'll be writing the "L.A. Grapevine" from my home in Woodland Hills. My past engineering credits include work with Santana, Kenny G., George Benson and En Vogue. Currently, I work as production manager for an artists' management firm. I look forward to working with fellow Angelenos in the coming months.

SPARS comes to Los Angeles: SSL's 1993 L.A. Christmas party was shut down early

—CONTINUED ON PAGE 190

Paul Schwartz and Sharon Tydell in Studio A of Hollywood's Studio 56 Productions, complete with Neve VR console.

NORTH BY NORTHWEST

by Jeff Forlenza

Pearl Jam, Nirvana, Soundgarden, Primus, 4 Non Blondes, Kenny G., Sir Mix-A-Lot. Sure, we've all heard about the Northwest acts selling records worldwide, but do you know where those acts tracked? Or which rooms recently opened in Seattle, Portland and the Bay Area? Here's the latest happenings from some of the recording facilities in the Pacific Northwest.

Up in Seattle, Scott Crane built Soundhouse Recording from the ground up with acoustic design by Chips Davis. Soundhouse is a 16-track facility equipped with a Tascam ATR-6016 recorder, Allen & Heath 36-input Saber console and KRK monitors. The studio is on the former site of American Motion Pictures' Seattle production facility.

Crane says the burgeoning alternative/grunge scene is a major client base for Soundhouse: "Most of the bands are washing dishes during the day and recording albums at night," he says, "and they can't afford the big 24-track studios here. Facilities like mine give them an option other than the basement 16-track studio." Some of those yet-to-break Seattle bands tracking at Soundhouse include The Spinanes (Sub Pop), Alcohol Funnycar (C/Z Records) and Zipgun (Empty Records).

PHOTO: TIM FINLEY

Robert Lang Studios recently opened in Seattle. Studio B, which features extensive stonework, is shown here.

Also in Seattle, Robert Lang built a recording facility in a lot adjacent to his house overlooking Puget Sound. He started designing the studio in a double cement garage nearly 20 years ago. Along the way, he had to excavate 1,000 dump trucks of sand and pour in 150 trucks of cement in order to build his studio 40 feet underground. Lang used a total of 25 tons of rock in his new facility, including marble and granite floors, and future plans include a 200-gallon saltwater reef in the control room. Rooms at Robert Lang

COAST

At Bad Animals/Seattle, the Neville Brothers recorded and shot a video clip for NFL Films in Studio X for an opening sequence of Monday Night Football: (L to R) Art, Cyril, Aaron and Charles Neville.

Studios include a seven-sided stone room (Studio B), a five-sided stone reverb chamber and four iso booths. Equipment includes Otari recorders and a modified 60-input API console with Otari DiskMix automation. Lang is finally seeing clients in his lavish facility, which boasts excellent acoustics from a 24-foot-high ceiling in the live room, with coral covering 30% of the walls. Some of Lang's first clients were Steve Berlin (Los Lobos), King Sunny Ade, Michael Shrieve, Sir Mix-A-Lot and Candlebox.

Spectrum Sound, which was Portland's largest recording facility until it closed in October 1991 due to bankruptcy, has risen again, Phoenix-like. Several new tenants now share the facility, including White Horse Studios, a music scoring and recording house that moved from its digs at Northwest Videoworks; Super Duper

—CONTINUED ON PAGE 191

NY METRO REPORT

by Dan Daley

Forgive the laundry list prose of this month's report, but the plethora of stuff indicates that things are popping more than they have been in New York.

Pilot Recording Studios officially opened January 1. The two-room facility has 24-, 32- and 48-track analog and digital. Consoles are a Trident Series 80C in the tracking room and a Mackie board in the second room, which is targeted at digital pre-production and editing. Design was by Frank Comentale. Owner Will Schillinger, who also owns studio design and installation company Wilbur Ltd., said

—CONTINUED ON PAGE 199

Philadelphia producer/engineer Jim Salamone recently signed an exclusive co-publishing agreement with Rufftunes Music, the publishing subsidiary of Ruffhouse Records/Sony Music. From left: Joe "The Butcher" Nicolo (Ruffhouse president), Clare Godholm (Rufftunes president), Chris Schwartz (Ruffhouse CEO), lawyer Frank McDonnell and Salamone (sitting).

—FROM PAGE 188, L.A. GRAPEVINE

when someone called the fire marshall to complain about overcrowding. People are still wondering who made the phone call. (Was it Neve? Or maybe SSL when too many of the free drinks got consumed?) But those at the inaugural meeting of the L.A. chapter of SPARS were calling their gathering the delayed second half of the party. Hosted by SSL at the Mondrian Hotel on January 13, about 100 studio representatives and equipment manufacturers gathered to meet, greet and view a video presentation put on by EDnet (Entertainment Digital Network), with the help of EDnet's Tom Kobayashi and producer Phil Ramone.

The groundbreaking EDnet system, which provides compact disc-quality sound over telephone lines, was used by Ramone to record parts of Frank Sinatra's *Duets* and Gloria Estefan's *Christmas Through Your Eyes*. The video featured Ramone at Capitol Studios in L.A. producing a Dave Koz sax solo being performed in New York City.

SPARS president Howard Schwartz flew in from New York to kick off the chapter, and he guarantees that the monthly meetings will be informative and fun. Get in touch with SPARS Executive Director Shirley Kaye at (800) 771-7727 or fax (407) 642-8263, for details about meetings and becoming a member.

Life in the midline studio trenches: Due to the proliferation of digital project studios and shrinking album budgets, many studios find themselves in the oft-discussed middle-class crunch. It's diversify or perish, and the trend is away from total reliance on record work and toward audio for film and video. Here's how two L.A. studios are evolving.

Hollywood's Studio 56 Productions, in business for seven years on the site of the historic Radio Recorders complex, with four studios, four pre-production rooms and several producers in residence, has been expanding with a focus on service to soundtrack producers. Although recently busy with recording sessions for Tony Toni Tone, Johnny Gill and Cece Peniston, there has been a natural transition to audio-for-picture. Studio owner Paul Schwartz says, "I'm really a creative type who has evolved into being a studio owner. I've worked in radio production, and my partner in 56 Entertainment, Gilles 'Frenchy' Gauthier, has a background in music videos. We do in-house projects here, and that gives us an edge in providing the kind of facility that outside producers require."

Recent Studio 56 scoring projects include *Columbo* and *Perry Mason* episodes arranged by Chris Page; and the Academy Award-nominated short titled *Contact*, scored by Mark Chait. Schwartz would also like to get the word out that Studio 56 is bringing back the time-honored studio tradition of offering night-shift rates—those with low budgets and nocturnal habits can get talented, "chops up" staff engineers and quality Neve consoles for bargain rates.

Over in Burbank, another studio has reversed the west side migratory trend of the last few years. Ground Control closed the doors of its Santa Monica complex and reopened in what was formerly Evergreen Studios in Burbank, with an emphasis on post-production for film and television. They handle spotting to final

dubs, all in-house. Studio manager Christie Cash says they have been busy around the clock working on four to six films a month, as well as various TV movies. Ground Control has six editing bays and four studios, including a THX dubbing theater with 35mm projection and a Neve VR console. Studio B has a 4060 SSL. They also have a large scoring stage and are equipped for ADR and Foley work. All studios have Mitsubishi 32-track digital and Studer 24-track analog machines.

Format Wars: Westlake Village-based DTS (Digital Theatre Systems) received a leg up in the battle for dominance currently being waged by digital sound on film soundtrack distribution systems. Director Steven Spielberg, along with Universal Studios, became a minority owner of the fledgling company. DTS also has received commitments from Universal and from Spielberg's Amblin Entertainment to release all their pictures in DTS, although creative-control-sensitive Spielberg states that the final decision to use DTS will be up to a film's director. The DTS system is the only CD-ROM-based format of the three currently available systems, and the only one to have the digital soundtrack physically separate from the film print.

In the other two nascent formats, Dolby's Stereo Digital and Sony's Dynamic Digital, the digitally encoded soundtrack is on the film print. DTS's campaign was launched last June with the release of *Jurassic Park* and its John Williams score. Other DTS releases include *Schindler's List, Gettysburg, Flesh and Bone* and *Carlito's Way*.

Fears that the separate system might not be fail-safe seem to be unfounded, and, just in case, the original analog soundtrack is preserved on the film strip for backup. DTS claims to be superior to its competitors because it requires less data compression than soundtracks digitally encoded on the film strip. Also, they believe that CD-ROM is more impervious to damage and more cost-effective to manufacture and distribute. According to the company, DTS planned to be in 2,000 theaters worldwide by January 1994.

Got L.A. news? Fax me at (310) 472-8223. ■

—FROM PAGE 189, NORTHWEST

duplication services; Icon Productions, a video production company; and HypeDreamz Studios, a music and commercial recording service. Each company operates autonomously, yet they all share communal space and are hoping to integrate further to make the complex a true one-stop shop.

The new White Horse contains an SSL 6056E console, Studer A820 24-track, Alesis ADAT and an assortment of monitors. Rooms at White Horse include an audio-sweetening room, a music-scoring suite and a Beta-to-D2 video suite. Along with the move, White Horse also expanded its staff: audio sweetening engineer Lance Limbocker, music recording/mixing engineer Bob Stark and composer Tim Ellis. Recent White Horse clients: alternative rockers Sweaty Nipples recording for Megaforce and Celtic jazzers Nightnoise tracking for Windham Hill.

The Plant, Sausalito, Calif., recently celebrated its 21st anniversary with a slew of changes: Arne Frager attained full ownership of The Plant when Bob Skye sold his interest late last year. A new production company and private label, Bay Blues Records, was established at The Plant featuring blues and blues rock music. T-Town Studios is the new digs for Marin County transplant Booker T. Jones. T-Town was designed so that producer and artist can both be in the control room, with synths and MIDI keyboards close to the console. "Keller & Cohen were using the room for ad music lock-to-picture," Frager explains, "and we reconfigured the room especially for Booker T., which he has a long-term lease on. Booker is using the big control room to compose and record in as well as produce Tuck & Patti for Epic. Booker T. & The MGs have a record coming out on Sony Music, which they mixed in Studio B."

Other Plant revamps include a new SSL in Mix 1 (previously Studio C). Recent sessions in Mix 1: The Breeders mixed their new album for 4AD; and Kenny G. and Aaron Neville tracked "Even if My Heart Would Break" for *The Bodyguard* soundtrack. Frager also points out that "What's Up," the worldwide hit

White Horse Productions is a music scoring and recording house in Portland, Ore.

single from 4 Non Blondes, was cut live in Studio B by engineer Mark Hensly.

Another studio goes digital: San Francisco's Pyramind recently remodeled and expanded its facility. The control room was completely redone to accommodate a 64-input Amek/Einstein console. 24 tracks of Alesis ADAT and a Digidesign Pro Tools hard disk editing system. Fred Williams Design handled the remodeling of Control Room A, which includes a floating hardwood floor and sunken cable runners. Studio B has been remodeled for pre-production and in-house production companies: the San Francisco Audio Network and Sonic Temple Productions. Studio B is based on a variety of digital and analog synthesizers and a Macintosh IIX to run sequencing and digital editing software.

Corrato Rusticci, the Italian producer of Zucchero and guitar player for Narada Michael Walden, recently built a studio with designer Brian Bell—who helped build Herbie Hancock's and Neil Young's home studios—into his California home. Located in the Berkeley Hills, Rusticci's room has a 32-channel Mackie mixer and 24 tracks of Alesis ADAT. The studio is ideal for overdubs and album pre-production, Rusticci says. The first project at the facility was

The Art of Ears recently relocated to Hayward, Calif. Designed by Andre Ernst, the new room features a Soundcraft Sapphyre console and 24 tracks of Tascam DA-88 digital recording.

Tesla drummer Troy Luckетta's new TML Studios in Hayward, Calif.

producing the single "Top of the World" for Jive Records artist Kenya Gruv with engineer Dale Everingham.

Other Northwest sessions...San Francisco's Poolside Studios had Peruvian musical group Markahausi in working with engineer David Nelson, and the Nicaraguan ensemble Los Ramblers mixing their Hemisfono Records CD *Filemon* with producer Greg Landau...At Triad Studios in Redmond, WA, Brazilian pianist Geisa Dutra recorded her debut CD for Yellow Tail Records with engineer Larz Nefzger...San Francisco's Hyde Street Studios had Oakland rapper Del The Funkee Homosapien tracking his new Elektra album *No Need for Alarm* with producer Kwame and engineer Matt Kelley...Up in Burnaby, British Columbia, Salvadore Dream were working on their Warner debut with engineer Drexel Moliere and assistant Dean Maher...Also in Canada, English producer John Leckie was working on a six-song EP from Ginger (formerly Grapes of Wrath) at Vancouver's Mushroom Studios. Ken Marshall assisted...Motown recording artists Boyz II Men were at Granny's Recording Studios in Reno, NV, completing vocal overdubs for their upcoming album with engineer Jiff Hinger and assistant Tom Gordon. ■

the tracking of his own album, which he then mixed at Berkeley's Fantasy Studios.

Up in Portland, City Lights Studio was scheduled to open March 1. Designed as a creative workspace, the facility stresses creature comforts for the artist like couches, tables and oriental carpets in the 30'x27'x18' live room. Equipmentwise, City Lights features an Amek Einstein console with Supertrue automation, Studer and Alesis recorders, and a host of MIDI gear.

In Hayward, Calif., The Art of Ears recently opened with a Soundcraft Sapphyre console and 24 tracks of Tascam DA-88. Owner Andre Ernst designed the facility, which consists of a large recording area, isolated rooms for drums and vocals and a MIDI pre-production room. Some of the first clients included Screeching Wheel for Lookout Records and The Bums for All City Productions/Priority Records.

Also in Hayward, Tesla drummer Troy Lucketta opened TML Studios. Managed by Jerry Merrill, Lucketta's facility features a Soundtracs Jade 48x24 console, 24 tracks of Alesis ADAT with BRC and four tracking rooms.

In Seattle, Sound Sound Studios took delivery of a vintage 1903 Steinway grand piano, which was completely refurbished by American Old Piano of Monroe, Wash. Sound Sound is now the only 24-track studio in Seattle with a Steinie.

In Berkeley, Calif., Live Oak Studios recently celebrated its tenth anniversary with the addition of a new Otari MTR-90 24-track recorder. Recent Live Oak sessions include Dwayne Wiggins of Tony Toni Tone

SESSIONS & STUDIO NEWS

by Jeff Forlenza

NORTHEAST

Saxophone Colossus Sonny Rollins tracked his new album, *Old Flames*, at Clinton Recording in New York City. Engineer Gene Curtis and assistant Robert Friedrich captured the jazz giant in Clinton's Studio A. Sonny and Lucille Rollins co-produced the Milestone/Fantasy release, which features Jack DeJohnette on drums along with a five-piece horn section...At New York's Giant Recording, hot producer S.I.D. was busy doing mixes and remixes for Queen Latifah, Jamiroquai and Nikki D...Producer Chieli Minucci (guitarist with Special EFX) was at BearTracks Recording (Suffern, NY) mixing an upcoming release by Rick Rhodes. Paul Wickliffe engineered the project for Japanese label Polystar Records with assistant Dave Cozzie... Boston's Sound Techniques had Avatar Blue in mixing funky tracks with producer Chris Phoenix...At Kajem Studios (Gladwyne, PA), guitarist Vinnie Moore recorded his latest instrumental album with producer/engineer Paul Hammingson and assistant Brian Stover...

SOUTHERN CALIFORNIA

Geffen artist Toni Childs mixed her latest CD, *The Woman's Boat*, at Skip Saylor Recording in L.A. David Bottrill and Childs shared production duties, while Bottrill engineered and Eric Flickinger assisted. Peter Gabriel made an appearance to add background vocals...At Hollywood's Conway Recording, harmonica legend Toots Thielemans was tracking with engineer Joel Moss and assistant Marnie Riley...Manic Eden were at Burbank's Ocean Studios tracking with engineer/co-producer Tom Fletcher...At Hollywood's Image Recording, producer Andy Byrd and engineer Chris Lord-Alge were mixing tracks for Victoria Shaw's upcoming Warner Bros. release...At Sound City Studios (Van Nuys) alternative rockers L7 were tracking their upcoming Slash Records release with producer GGGarth, engineer Joe Barresi and assistant Billy Bowers...

PHOTO: KIERAN CONNELLY

David Byrne recorded his latest Luaka Bop solo album at Clinton Recording Studios in New York City. From left, Byrne with engineer/co-producer Susan Rodgers and Gina, and producer Arto Lindsay. The project was captured by vintage tube microphones, a classic Neve 8078 console and a Studer A800 24-track.

SOUTHWEST

Cirque du Soleil brought their unusual musicians and tons of wild percussion instruments into Las Vegas' Oakdale Post Audio when they tracked a CD release of the soundtrack for *Mystere*, the live circus show they've been performing at the Treasure Island casino/hotel in Vegas. Rene Dupere composed the music, and Luc Gilbert produced the upcoming CD...

NORTH CENTRAL

At Pachyderm Studios in Cannon Falls, MN, producer David Z remixed the cut "Moanie" by PolyGram artist Bootsauce with Tommy Tucker Jr. as-

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ALESIS STUDIO ELECTRONICS

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PHOTO: JAY BLAKESBERG

At The Plant, in Sausalito, Calif., Chris Difford and Glenn Tilbrook of Squeeze, during an in-studio performance broadcast on San Francisco's KFOG 104.5 FM.

sisting. Former Husker Dü-er Grant Hart was at Pachyderm tracking his new band, Nova Mob, with producer Lance Sabin...At Chicago's Sparrow Sound Design, local sax great Fred Anderson recorded his new CD with Malachi Don Favors (Art Ensemble of Chicago) on bass. Joanie Pallatto recorded the jazz project direct-to-digital. Also at Sparrow, alternative rockers The Creepers tracked several songs for an upcoming CD with engineer Patrick Halliwell...

SOUTHEAST

The Indigo Girls checked in to Atlanta's Triclops Sound Studios with producer Peter Collins to mix their latest release for Epic Records, which they recorded in Nashville... Transmedia Studio in Atlanta had Arrested Development in tracking songs for their upcoming EMI CD. AD's Speech produced the follow-up to the critically acclaimed big-label debut from the Atlanta rappers, with Seth Cohen and David Norman engineering...Also in Hot'lanta, Doppler Studios had Sony artists Soulhat in tracking their brand of southern rock with hot producer Brendan O'Brien, engineer Nick Didia and assistant Steve Schwartzberg...

STUDIO NEWS

Nashville's Emerald Sound Studios reports some changes: Former general manager Andrew Kautz was promoted to vice president; Nashville native Milan Bogdan became the new GM, and John Griswold was brought onboard to head up the communication division. Also at Emerald, work is underway on a "budget-conscious overdub room," and a Pro Tools workstation was added to the production studio...Five Towns College (Dix Hills, NY) recently installed an SSL 4000 G Series console in Studio A of its teaching facility. Also at Five Towns, the music technology wing will soon be renamed the John Lennon Center for Music and Technology...In Your Ear Music & Recording in Richmond, VA, recently added a Euphonix CSII console to its Studio A. Early sessions on the new 56-fader console included original music from House of Freaks...Bay Records Recording Studios (Berkeley, CA) added Brian Walker to its engineering staff. Walker is considered one of the premier acoustic engineers in the Bay Area, most recently working live sound for the Turtle Island String Quartet. See "The New String Thing," on page 176, for more on Walker's work... Cincinnati's Sound Images added two engineers to its music production company: Dale Smith and Corey Liepelt.

Send nationwide sessions and studio news to Jeff Forlenza, c/o *Mix*, 6400 Hollis St. #12, Emeryville, CA 94608. ■

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—FROM PAGE 189, NY METRO

the studio will also be home of Tailwind Productions, a new production company he formed with Steve Holley, former Wings drummer.

Quad Recording opened a new MIDI-based room, a joint venture between owner Lou Gonzales and Artie Skye, who contributed much of the gear, including Sound Tools and ADATs. "Essentially, it's the movement of a home studio into here," said Gonzales, who added one of his Studer analog multitrack decks to the venture. After paying rent to Quad, the new room, dubbed Skyelab, is a 50-50 proposition between Skye and Gonzales. "It's good for me because it helps bring in additional work for overdubs, vocals and mixing," said Gonzales, whose own MIDI room was damaged in a fire three years ago and has since been rebuilt.

Rental company Audio Force opened a digital transfer/editing/mastering room at its Manhattan offices. Design was by Liam McGrath and Mark Richardson. The room offers a Sony 3000 digital editing system, Sony 1630, Harmonia Mundi sample rate converter and EQ; monitoring includes B&W 801s, Tannoys and Yamaha speakers. "The point was to provide a service for clients who are between formats," explained owner Ray Buccafusco, who added that the company had been getting calls for referrals for these services. "It also made sense because we have so much of the equipment in our inventory." One of the room's first projects was mastering and editing a ten-CD Billie Holiday set for Verve/PolyGram.

Right Track Recording installed a new Ultimation-equipped SSL G Plus console in January. The 84-input board, which replaced a 64-input SSL E/G, was configured around Studio B, which also received new Genelec 1034A monitors and a complete rewiring. According to studio owner Simon Andrews, "It was time for an upgrade, and we wanted the sonic enhancements that the newer SSLs offered."

Sync Sound installed an AMS Logic 2 console late last year, and more recently added an Avid audio workstation in January, according to studio manager Sherri Tantleff. The acquisition broadens Sync's base of workstation compatibility, according to Tantleff.

Greene Street Recording installed a new API desk late last year in its A room. The 32-input console was the first of a new series of all-discrete boards, according to studio manager David Harrington. The API replaces the Trident TSM in that room, which was also totally rewired. With the addition of several old Pultec and Lang outboard processors, Greene Street has jumped aboard the vintage ship due to a combination of client demand and personal taste. "It's a trend, but it's also our personal preference," Harrington said. "We wanted to create an ultimate tracking room here."

Sony Recording installed an SSL 8056 G Series for post-production, bringing the desk situation there to two Sony and two SSL boards, according to Nick Balsamo, director of technical operations and engineering. The studio also added a Screen-Sound for post editing.

Power Station Rochester recently opened in Rochester, NY, as a new music recording and production complex with ties to Power Station NYC. Tony Bongiovi and David Schumaker of the Dajhelon Entertainment Group formed the alliance in order to promote Rochester as a world-class production facility in the expanding

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MIX DIRECTORIES

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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

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* Equipment repair, maintenance and rental services
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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.

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· S H O W C A S E ·

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· SHOWCASE ·

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6313 Maltby Rd.; Woodinville, WA; 98072;
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White Horse Studios

1634 SW Alder St.; Portland, OR 97205
(503) 222-0116; Fax (503) 222-3658

Our Russ Berger-designed facility consists of a 24-track Studer/SSL recording studio, two digital-audio sweetening suites featuring Waveframe and Pro Tools systems, a Beta/D2 video-editing suite and a music-scoring suite. Recent projects include a CD for Epic/Sony Japan artist Mimori Yusa with Windham Hill artists Nightnoise, scoring the animated "peacock IDs" for NBC and sweetening and scoring a Revlon infomercial with Dolly Parton.

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Pajama Recording Studio

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(510) 832-JAMM

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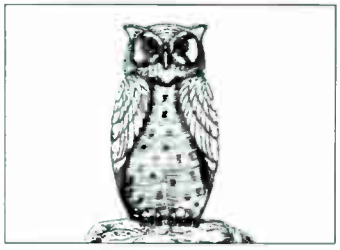
· SHOWCASE ·



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Bad Animals/ Seattle

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FEEDBACK

THE DAW DIFFERENCE

I read Larry Blake's article "One More Digital Nail in the Mag Editing Coffin" [January '94] in the latest issue of *Mix*. I don't usually write letters to the columnists of this trade, but your article struck several points that I consider close to my personal experience.

Since I am more involved in episodic television than film mixing at this time, I have to congratulate you on informing your readers why DAW technology has succeeded more so in episodic television than film. Storage *is* the key. Who wants to wait for the data to be loaded from the source material in reel two when you are finaling the predubs in reel six? Sure, the supervising sound editor knows the perfect element is in reel two, but who's got the money to pay for the time?

I had the privilege to work for a company (EFX Systems) in the late '80s that invested heavily in the latest technology money could buy at the time. While this company lost its fiscal ass in the process, I gained an education in New England Digital's Synclavier and Post Pro Systems that showed me every pitfall possible in digital post-production. Don't get me wrong—we consistently turned out quality product, and this company is still in business, churning out audio post for film and episodic television. The point is, while many people spent a lot of time, energy and money to develop methods to incorporate digital technology in a mag-dominated industry, it was an uphill battle—one that is finally being won. Buena Vista has invested in Pro Tools; Sony Columbia has an army of Waveframes. It took the successful independent editors' balls to open the studios' eyes.

For the most part, I agree that producers follow people and not technology. However, I do feel that the *almighty dollar* has guided a number of production companies toward post facilities offering newer technologies. This is a fact because the wiser of these newer post houses have been able to structure post-production editing and mixing packages that cost significantly less than traditional approaches.

The majority of these production companies are producing movies-of-the-week for network television, syndicated episodic shows for cable, and the straight-to-videocassette B movies. While these productions have serious restrictions in their post budgets, they also have to compete with the well-funded projects, as far as sound quality. So, they are experimenting with the fresh approaches and low-cost packages being offered by a number of new places.

I know of at least one facility in West L.A. that has over two dozen DAWN (Doremi Labs) workstations. After the materials are edited, the hard drive is taken to the machine room for the dub stage and connected to another DAWN whose audio output is patched directly into the console. The stage has multiple Mac terminals for the mixer to see what's been edited and to manipulate the elements as he desires. It is a very successful and highly competitive audio post house utilizing a drastically different approach. Ergo, the future of the young editors and mixers at this place is almost guaranteed to be golden.

I can see the day when editors will be at their homes, editing on their workstations and dumping

the finished data over the phone to a system at the post house for the mix. Of course, a few protocols will have to be worked out, but it's just a matter of time.

Rusty Smith
Northridge, CA

PARTS & SERVICES, THE SEQUEL

I enjoyed your article in the August 1993 issue on "Analog Multitrack Maintenance." You hit many good points that will help studios keep their equipment in better condition.

The one area I am disappointed in is the sidebar listing Parts Sources. Your list is good, but while showing several companies providing only a single service item, such as heads, you fail to mention some of the oldest existing suppliers of parts and service for professional recorders in studios and radio stations.

I strongly suggest that your list should include: Technical Services Inc. (708) 392-2958, supplier of parts for Ampex reel-to-reel recorders.

VIF International, (800) 848-4428, fax (408) 739-9740, supplier of parts for Ampex recorders and sole source for ITC reel-to-reel recorders.

And, of course, for all the owners of Scully and Metrotech recorders, at Sequoia, we have the largest, most complete stock of parts in the world. We also provide motor rebuilding, replacement tape heads and, if necessary, complete overhaul of Scully recorders.

Mel Crosby
Sequoia Electronics
San Jose, CA

Please address all correspondence to "Feedback, Mix magazine," 6400 Hollis Street, Suite 12, Emeryville, CA 94608; or fax (510) 653-5142.

AD INDEX & READER SERVICE PAGE

PAGE	READER SERVICE NUMBER	ADVERTISER
170	001	Abilene Research & Development
83	002	Acoustical Solutions
170	003	Acoustic Systems
196	004	Advance Recording Products
149	005	Akai
32	006	AKG (WMS 100)
197	007	AKG (Vintage TL)
IFC	008	Alesis (QuadraSynth)
6-7	009	Alesis (Monitor 1)
49	010	Alesis (D4)
195	011	Alesis (AI-2)
9	012	Ampex
95	-	AMS/NEVE
193	013	Anvil Cases
155	014	Aphex Systems
186	015	API Audio Products
113	-	Apogee Electronics
173	016	Apogee Sound
20	017	Ashly
13	018	AT & T
14-15	019	AT & T (DISQ)
63	020	Athan
86	021	AudioForce
68	022	Audio Services Corp. (ASC)
137	-	Audio-Technica
181	023	Balboa Capitol
157	024	BASF
178	025	Beach Boys Big Sur Studio
112	026	Russ Berger Design
74	027	Brainstorm
85	028	Bryston
109	029	Burlington Audio/Video Tapes
160	030	Caig Laboratories
206	031	David Carroll Electronics
125	032	Carver
191	033	CCS Printing
210	034	Century Music Systems
213	035	Clark Wire and Cable
192	036	Conservatory of Recording Arts & Sciences
128	037	JL Cooper Electronics
55	038	Cooper Sound Systems
171	039	Crest Audio
100-101	040	D & R USA
55	041	Dale Electronics
69	042	The DAT Store
154	043	Demeter Amplification
209	100	DGS Pro Audio
19	044	DIC Digital Supply
10-11	045	Digidesign
IBC	046	DigiTech
199	047	Disc Makers
196	048	Disques
31	049	Dolby
152	050	Drawmer
146	051	Dreamhire
161	052	dynaudio acoustics
44	053	EAR Professional Audio/Video
43	054	Eastside Film & Video
112	055	East West Communications
63	056	Eco-Charge
174	057	Electro-Voice (EV)
122	058	E-mu Systems (EIIIx)
21	059	Euphonix
123	060	Europadisk
130	061	Eventide
178	062	First Light Video Publishing
28	063	Focusrite
39	064	Fostex
134	065	Full Compass
53	066	Full Sail Center for the Recording Arts
151	067	Future Sonics
133	068	Genelec
139	069	Glyph Technologies
172	070	Gold Line
102	071	Goodman Music
183	072	Grey Matter Response
161	073	Groove Tubes
114	074	Hafler
92	075	Harris Institute for the Arts
129	076	HHB Communications Ltd.
51	077	The Hollywood Edge
182	078	I.D.T.
192	079	illbruck
175	080	Institute of Audio Research
BC	-	JBL Professional
68	081	Jensen Transformers
86	082	JRF/NXT Generation
212	083	Klarity Kassette
135	084	Kurzweil Music Systems
58	085	Klark Teknik
158	086	Lectrosonics
214	087	Leo's Professional Audio
103	088	Lexicon
151	089	Los Angeles Recording Workshop
102	090	MacBeat
98	091	Mackie
124	092	Manhattan Production Music
209	093	Markertek Video Supply
147	094	Maxell
94	095	Mediaworks International
194	096	Metro Music
168	097	The Microphone Company
145	098	Micro Technology Unlimited (MTU)
71, 224	099	Mix Bookshelf
214	101	National Sound (NSE)
200	102	Nat'l Sound & Comm. Assn.(NSCA)
23	103	Neumann/USA
121	104	Neutrik
131	105	Neutrik (XLR)
175	106	Night Technologies
110	107	Northeastern Digital (NDR)
40	108	N Vision
87	109	Oberheim
126	-	Optical Laser
115	110	Optical Media International
42	111	Optifile/Sascom Marketing
41	112	Otari (Concept 1)
66	113	Otari (DTR-90)
70	121	Pacific Innovative
84	114	Pacific Mobile Recorders
138	115	Peavey Electronics
27	116	Pelonis Sound & Acoustic
26	117	Philips Key Modules Group
212	118	PolyQuick
201	119	Premium Entertainment
93	120	Progressive Music
207	123	QCA
82	124	Quested
154	125	Quintessential Sound
177	126	Ramtek, Inc.
153	127	Rane
207	128	The Recording Workshop
162	129	Reelsound Recording
183	130	Rhythm City
84	131	Rich Music
160	132	Rock & Roll Music
141	133	Rocket Lab
34-35	134	Roland PAD (DM-80)
111	135	Roland
163	136	Rorke Data
22	137	Ross
146	138	Russian Hill Recording
180	139	Sabine Musical Manufacturing
213	140	Sam Ash Professional (Parts)
79	141	Sam Ash Professional
94	142	San Diego Audio
124	143	SAS Industries
162	144	Selco Products
45	145	Sennheiser
106	146	Shape
143	147	Shure
1, 80	-	Solid State Logic (SSL)
194	148	Sonic Science
25	149	Sonic Solutions
93	150	Sonocraft
17	-	Soundcraft
44	151	Sound Ideas
179	153	SoundTech
127	154	Soundtracs
3	155	Studer Editech
210	156	Studio Consultants
198	152	Studio Sound International
108	157	Studio Technologies
148	158	Summit Audio
159	159	Sweetwater Sound
144	160	Switchcraft/Raytheon Co.
156	161	Symetrix
2	162	Tannoy
90	163	Tascam
166	164	t.c. electronic
187	165	Telex
83	166	Thoroughbred Music
119	167	3M Corporation
29	168	Turtle Beach Systems
140	169	UCLA Extension
190	170	Uptown Automation
136	171	Valley Audio
177	172	Walters-Storyk Design Group
99	173	Westlake Audio
92	174	West L.A. Music
167	175	Whirlwind
191	176	Whisper Room
104-105	177	Yamaha
169	178	Yorkville

—FROM PAGE 31, TOM PETTY

artistic relationship last so long?

Petty: Well, I guess we just really hit it off. He's a brilliant player, and I think we shared a lot of the same interests. We were the same age and were interested in the same kinds of music. Ever since I was about 11 years old, I've never quite been with my own age group in what I liked musically. I was more hung up on the music of the '50s when I really shouldn't have been, but that was what really spoke to me—'50s rock 'n' roll. And Michael could understand that and really dug that. Then we both embraced the '60s at the same time, but our roots are deep in rockabilly and the music of the '50s and early '60s. We've tried to assimilate everything else that has come along, and we've just gotten along very well. I've known Ben [Tench] longer than I have Michael, and Stan [Lynch] I think I met the following year, 1971. So, it's a long time to be together. They're sort of like your brothers—you love 'em and you hate 'em. [Laughs]

Bonzai: Let's talk about the songs on this *Greatest Hits* album—"American Girl"?

Petty: It was our first single, 1976. We were quite surprised when it came out, when we started reading that it sounded like The Byrds. We were huge Byrds fans, but we had never dreamed that we would sound like them. But I guess it did sound like The Byrds because Roger thought it was him when he heard it. So, I was immediately summoned over to see Roger McGuinn, at the time, which made me very nervous because I wasn't sure what it was about. But he turned out to be a lovely guy, and he invited us to go on tour with him, which we did. Sometimes we would do two shows a night with both bands playing "American Girl," so it would get played four times in an evening.

Bonzai: "Breakdown"?

Petty: Well, that was in the same year, and I think it's still a very popular number. We don't play it any more in concerts, but they still yell for it all night. [Laughs]

Bonzai: "Listen to Her Heart"?

Petty: One of my favorites, from the next album. Again, it's very Byrds-like. It had the controversial cocaine line at the time. ["You think you're gonna take her away, with your money and your cocaine."] They didn't want me to say the word "cocaine"; they wanted me to say champagne. I thought that it wasn't fair, because there was such a huge difference in what I was talking about. It was inspired by a near-horrifying experience.

Bonzai: "I Need to Know," 1978.

Petty: A very fast one, inspired by Wilson Pickett's "Land of a Thousand Dances." He's one of my all time favorites—I love Wilson Pickett. I could play *his* greatest hits album all day long.

Bonzai: "Refugee," 1979.

Petty: That was one of the first things I did after meeting Jimmy Iovine and Shelly Yakus. They came out from New York, and it was one of the first things we cut.

Bonzai: Was that a turning point for you musically?

Petty: I don't know if it was a turning point musically. We learned more about recording at that point, and we started to take a lot more time in the studio than we'd had the luxury to do before.

Bonzai: "Don't Do Me Like That," 1979.

Petty: That was a song that almost didn't get on that album. It was one that we did in Muderutch, actually. We played it one day, and I was sort of tired of it, and I thought it wasn't right for what we were doing at the time. The assistant engineer, Tory Swinson, suggested at the very last minute that we please get that tape out and play it again because he thought it was great. So we played it again, liked it, and we put it on the album, and then it was a hit. So, you never know. It was an R&B kinda song, you know?

Bonzai: "Even the Losers"...get lucky sometimes.

Petty: That was one of my particular favorites from that album. Just lucky, really. I remember sort of writing it, and I think I actually finished it in the studio as we were cutting the track. I was still trying to fill in words, and it was a great feeling when they played it back and all the words were there. [Laughs]

Bonzai: Do you work well under pressure?

Petty: Well, I don't like to think so, but I probably do. I know that a lot of the songs were written in the studio. I wrote "Breakdown" while the band was playing cards in the other room, waiting on a song to cut. [Laughs] But I prefer not to do that if I can get around it. I'd much rather have the song all done before I come in.

Bonzai: "Here Comes My Girl"?
Petty: A lot of couples come up to me and tell me they got married to that song. They're always asking me to play that one. I think it's a popular song at weddings, or so I'm told.
Bonzai: "The Waiting"?
Petty: That was from the *Hard Promises* album—quite a good song, and we still play it every now and then on the tours. I hear it all the time on TV whenever there's a story about waiting on something.
Bonzai: Does that seem funny to you when one of your songs ends up being used in a totally different way than you could have imagined?
Petty: As long as it's not a commercial. I guess it's a compliment. You put 'em out there, and if they turn out to mean something to somebody, that's *really* a compliment.
Bonzai: "You Got Lucky"—you did a futuristic western video for this song, and I understand there was a lot of footage shot that didn't show up on television.
Petty: I saw some of that yesterday. We had a ball out there in the desert doing that. We shot it for 40 grand, which is very cheap for a video, but at the time, these weren't referred to as videos. They were called promo clips most of the time. We used to make a film clip so we wouldn't have to go on the *Merv Griffin Show*, or the more honky television shows, or the ones you couldn't get to in Europe. They'd have us lip sync the song and then send the film off to the different TV shows and they'd play 'em. They weren't intended to be played again and again and again. We had never seen MTV when we made "You Got Lucky," and it was shortly after that that it came on in L.A. We started to see it and we got a lot more visibly famous, we started to notice. Wherever we went, we were stopped.
Bonzai: "Don't Come Around Here No More," 1985—Dave Stewart comes into the picture...
Petty: Dave Stewart and I got friendly around 1984, around the time of his first Eurythmics album. He started to hang around my house, where I had a recording studio, and we made this song. It's really one of my favorite singles that we ever made, and a very interesting one to listen to.
Bonzai: And the final track was recorded at your home—anticipating

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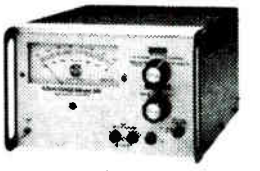
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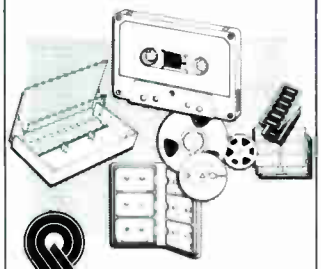

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—FROM PAGE 115, STEVE ALBINI

upon compression as a gimmick and thinks he invented it. Pounding everything with compression is so standard a trick now that records made without it sound distinctive. That's what keeps me in this business.

Mix: Your axiom is that a band should not have to change its sound or playing one iota just because they're in the studio. Does this mean that producers who force themselves in ways other than simply being a sonic documenter end up getting in the way?

Albini: Absolutely. Producers that take an active role in the making of a record usually do so to the detriment of the band. Let's say you've got a three-piece rock band—drums, bass, guitar and vocal—who cut their bones by playing live; that's how they formed their aesthetic and wrote their songs for five years before they could even get into the studio. And then the producer tells the drummer he has to play to a click track, and they'll overdub everything else! He makes each bandmember play segments of the music and splices together composite tracks, over which other things such as several layers of rhythm guitar, then lead guitar, and accent guitar and vocals are multitracked.

Mix: But many engineers or producers these days seem to be into recording the basics live.

Albini: That's what they say. If that was the case, then it would be inconceivable that bands would take more than one week to make the best record of their career. But albums that take many months and sometimes years are routinely made. I know of an album recently that took three months, and on some songs there are 50 guitar tracks! That's preposterous. It's chaos. That record bares no more relationship to the band than it does to a fig. [Laughs] Based on the evidence before us on the radio or MTV, no records are being released without overdubs. Every band gets into the studio and either they go through the "let's have more of me" ego battle, or their producer is encouraging them to do something *different*—that uses his signature sound. So many people are doing something different that nobody is doing anything ordinary—recording and playing a three-piece rock band like a three-piece rock band.

Mix: What about bands that may re-

ally need some guidance from a producer or whoever?

Albini: I think regardless of who the producer is, or what technique is used, or how much time and money is spent, a mediocre band can only be elevated to the upper echelons of mediocrity. You can never turn a sausage into a trout. You can take a sausage and make it into the best sausage it can be, but it will never grow fins and swim away. Some bands just do not have greatness in them, but there are some bands that will make great records regardless of how much production they're afflicted with.

Mix: How do you approach recording electric guitars and amps?

Albini: Most everyone that records electric guitar does it the same way: a dynamic mic that won't be hurt by the volume, a bit of EQ and compression and then, if that isn't good enough, they start multitracking it. The problem with guitar recordings, as far as I hear them, is dynamic mics just don't cut it—they don't have enough compliance to respond quickly and capture the detail in the treble and distortion coming out of the amp. With experimenting, I've found that the subtleties in guitar texture are better captured by ribbon mics. Ribbon mics, even when in a very high sound pressure situation, still have quite a bit of excursion, and if it's too loud, the mic bottoms out, and you can't miss the distortion if it chokes. The STC 4038 [now made by Coles ElectroAcoustics] is a British BBC-patented ribbon mic. I use this mic like I use my lungs—it's a masterpiece. If I owned one mic, this would be it.

Mix: On The Pixies' *Surfa Rosa* and The Breeders' *POD* albums, your drum sounds are amazingly real. How did you capture that?

Albini: The most important tool in making a good drum sound is an excellent drummer. I don't do anything to the drums or tell the drummer how to play or to pay attention to the equipment. If they have to worry about damaging mics, then they're not concentrating fully on playing their best. If you have a good drummer and a good-sounding kit tuned appropriately for the music, then you should not need to do much more than put mics up and get a drum sound that'll wet your pants. You just have to avoid the temptation to mess with things. If there's a nuisance frequency with a drum, then that's an acoustic problem to be solved acoustically—it's not an electronic problem. With drums, I think engineers and producers like to feel that they're responsible for the sound. When they mic the drum, it's only the starting point for the masterpiece they're going to sculpt with the limited tools of EQ and dynamics into a sound that is somehow more satisfying to them than the unaltered acoustic drum sound itself.

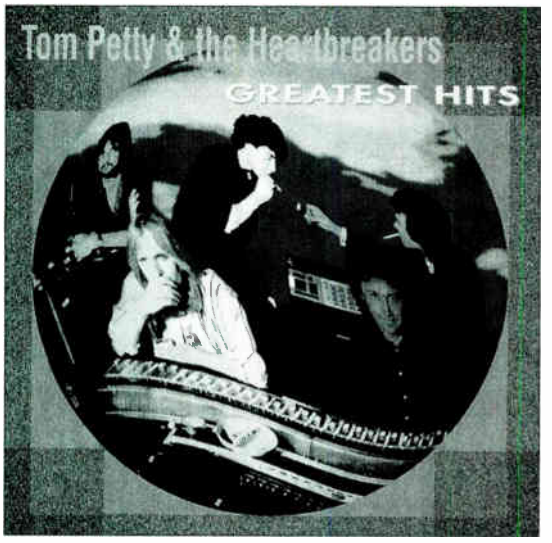
Every record I hear has banged up 57s on the snare, Sennheiser 421s on the toms and a D12 or D112 on the bass drum. Over time, these mics get trashed, studios continue to use them and then wonder why their recordings sound so crappy. It's about $100 or $200 to re-ribbon the most expensive mic I have if an amp or a drummer rips it. I may blow two in a year, but the rest of the time it's getting powerful guitar or drum sounds and doing a much better job than the rugged cheap mics which are "insured" against damage. Engineers are so concerned about damaging an expensive mic that they'll have the record sound like crap rather than put a 414 on a bass drum or floor tom. I think it's embarrassing how few working engineers own any microphones—they just go from studio to studio thinking that hands and ears will solve all the problems. The best advice I can give to any studio is give all your banged up mics to a recording school and buy some new ones.

Mix: Any final words for bands or engineers?

Albini: If the record company has signed you, that implies they have some faith in you—make them demonstrate that faith. Bands should not allow the label to govern their finances. Find a studio yourself, argue for the rate yourself, pick an engineer yourself, then all the decisions and money will stay under your control. Inform the record company what the total cost of the record will be and have them cut a check for that amount—not a penny more. I would encourage anyone that is making rock 'n' roll records for a living to go and see live bands play. If you're not out seeing bands do their thing at least a few times a month, then you're just kidding yourself. ■

Camran Afsari is a freelance writer and recordist.

the growth of home-style recording?
Petty: We've worked in home studios ever since, to tell you the truth, because they are so much better—they really are. Take it from somebody who A-B's them a lot. I just can't find a commercial studio that sounds as good as what we have at home. I have a theory that it's because there is so much less wire. We don't have a mile of cable between the control room and the studio. We might have 25 feet of cable, and we get a much bigger signal, bigger sound, and it's also a much nicer atmosphere to record in.



Bonzai: "I Won't Back Down," from *Full Moon Fever.*
Petty: It's such a stark, direct song that when I first heard it back it almost startled me. It made me a little nervous at the time, but now I am very proud of it when I hear it. I heard the whole *Greatest Hits* thing the other day, and I think that was my favorite of all the old stuff. I think it's such a well-made record, and I have to thank Jeff Lynne.
Bonzai: You can definitely hear the Lynne touch. In your mind, what does he bring to a project?
Petty: I think Jeff is probably one of the two greatest producers alive—and very underrated.
Bonzai: Who is the other one?
Petty: I would reckon George Martin, and I think there are a lot of good producers, don't get me wrong. If you take the word [producer] seriously—the guy who comes in and you're gonna leave with a record, and it's his responsibility—Jeff is really an unbelievable talent. He's a very good record-maker, and he's not at all interested in live performance. He's spent his life with a tape recorder, and I'm sure as an all-around player, he's the best musician I ever encountered. He can play almost anything really well, and he's a real master of harmonies. He taught me so much about harmony, I'm forever indebted to him. On this track we had quite a bit of harmony—we had myself, Jeff, Howie Epstein from The Heartbreakers and George Harrison. The four of us did those background vocals in Mike Campbell's garage.
Bonzai: Seems funny to think of George Harrison and you guys in a garage.
Petty: Oh, we spent a lot of time in that garage. [Laughs] We did a lot of songs there. We also did Roy Orbison's "You Got It" in that garage. And I mean a garage, not a plush one—you're next to the oilcans.
Bonzai: "Runnin' Down a Dream" has such a memorable instrumental hook. Is that your creation?
Petty: No, that was Campbell's creation. He actually came up with it for another piece of music and played it to me. I said, I don't really like this piece of music, but I love that lick. So, I took the lick and wrote another song to it. I may have only written one or two songs about cars, and I pictured it as a driving song. That was how it came to me—the feel of driving—and I'm very happy with it.
Bonzai: What does "Free Fallin'" bring to mind?
Petty: Mulholland Drive and Ventura Boulevard. I was living in Beverly Hills at the time, and I had to drive down Mulholland to Mike's house, which is on the other side in the [San Fernando] Valley. We would record at Mike's, so I think the song came to me as I was driving down Mulholland to Ventura.
Bonzai: "Learning to Fly?"
Petty: Another one of my favorites—I love that song so much.
Bonzai: "Into the Great Wide Open" wraps up the past work. What does that song mean to you?
Petty: Well, that song was a story-song. I was just having a little fun writing a fictitious story, like a screenplay of the classic story: kid comes from somewhere else, comes

to Hollywood and makes it big and then ain't big no more, back in the same place. I just wanted to see if I could pull it off in a song, and I really had a great deal of fun with that song. And I loved making the video, probably my most pleasant experience on a video.

Bonzai: Let's talk about the new songs on the collection—"Something in the Air" was a hit for Thunderclap Newman, back in the early '70s, produced by Pete Townshend. Why this song?

Petty: Well, we were playing it on tour, on the *Full Moon Fever* tour, every now and then. I love the song and [then we cut it] when we went in to do the two new tracks for the *Greatest Hits* with The Heartbreakers. Rick Rubin, who produced these tracks, wound up recording 30 tracks when we really only needed two. It's actually pretty different from the original one, which was written by Speedy Keene. Our version is very raucous. And I love working with Rick Rubin—a terrific producer.

Bonzai: What's he look like without his wig and sunglasses?

Petty: Same as me, I guess [Laughs]. Don't tell anyone, but I am Rick Rubin.

Bonzai: What does Mr. Rubin bring to the table?

Petty: Well, he's been producing this solo album that I've been working on for a year now and will finish one day, I hope. It's been quite a long project, and we're pretty close lately. Rick brings a lot of enthusiasm to the sessions, and he's a very positive guy. I think he's given me a really good kick in the ass, as far as rekindling my fascination with guitar. I really like him because he has very eclectic tastes. He appreciates all sorts of music, which I think is very important—not to get prejudiced in your musical tastes.

The other song we've done [on the *Greatest Hits* album] "Mary Jane's Last Dance," is one that I really like—came out great. This is with The Heartbreakers, so with Jeff I had gotten into more overdubs, where we worked more like a painting approach. I think Rick's approach is more like filming—where everybody plays at once. And everything is very live, right on the floor for the most part. For The Heartbreakers, it's very hard to make us rehearse and practice—we hate it. But Rick has sort of gotten us back into accepting that we may have to practice a while before we turn the tape on. I think it did us a world of good, really. I even got to play lead guitar on it, which thrilled me no end. We're just havin' a ball really—I love working with Rick.

Bonzai: What guitar do you play?

Petty: I play a lot of different ones. We have hundreds of them—our one remaining vice. One by one, the vices have fallen by the wayside, but Mike and I have such a weakness for vintage guitars. We won't play a guitar that was made after '69. We have hundreds of them, and we buy them anytime we see them. We just like the way they sound and the way they made them back then. It's our hobby and our joy in life. We actually use them, and I think I've hooked Rick on the habit as well. We have all kinds, and we love any instrument with strings. We even love old keyboards—harpsichords, harmoniums, organs. I love all that old stuff, and Rick came in and made the rule—we had never used a synth very much, but it's not allowed—and it really made us start working a lot harder on finding acoustic keyboards that would do the same thing. I'm really excited about this album I'm working on—it's turning into a very long album, a lot of songs. And the new songs for the *Greatest Hits* are nothing like the album that I'm making. I did that purposely, because I wanted The Heartbreakers tracks to be something from them more than where I was at the time. I actually had to stop the other album and spend two months writing just for this project. They're actually different, but in some ways similar, I guess. The band is very pleased with these new tracks.

Bonzai: Through your career in music, what's the most important thing that you've learned as a working musician? What keeps you good?

Petty: What'll keep you good is to enjoy what you're doing. You can't fool the audience—if you're not enjoying it, it really won't sound good. What I've learned is the most simple lesson—the real secret is to get in there and have a good time, and that somehow gets on the tape. I just enjoy music, and I only do it when I'm enjoying it. And that seems to have paid off for us, for a long time. ■

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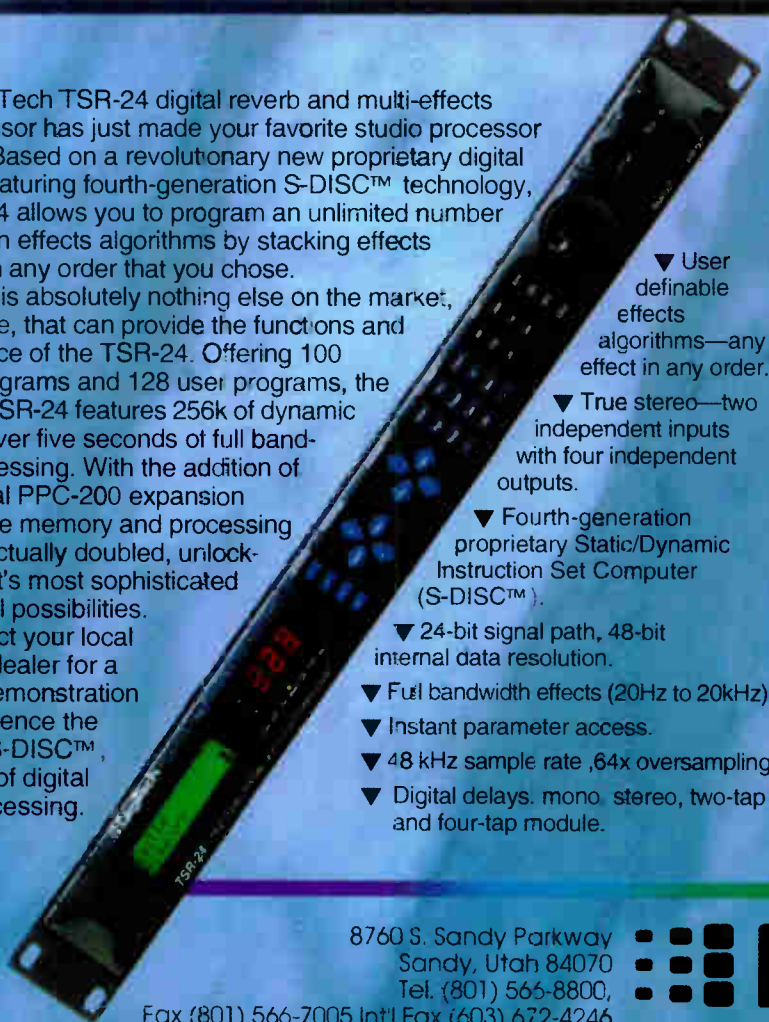

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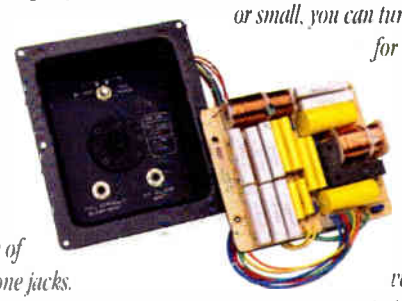

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