Sound for NYPD Blue' · Using QuickTime 2.0 · A Report From AES Europe

U.S. $4.95 CANADA $5.95 MAY 1995

MIX®

PROFESSIONAL RECORDING · SOUND AND MUSIC PRODUCTION

FOCUS ON UK:

- The State of British Recording
- UB40's Studio
- Recording The Stone Roses
- On Tour With Nick Lowe
- Producer/Engineer Flood

Bonzai Lunches With Elliot Scheiner

Sound Reinforcement Loudspeakers

Sound for Broadway's "Show Boat"

THE BIG PICTURE

The world's best studio monitors are like a picture window. If they perform with accuracy and transparency, you'll not only hear the mix, you'll see it. The new **Alesis Monitor Two™ Studio Reference Monitors** do just that.

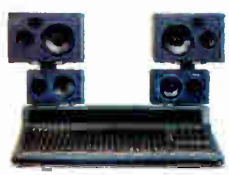
Their sonic character was modeled after our TEC Award-winning Monitor One™, so you can mix on either speaker, in any size room, and get the same results. The difference? The Monitor Twos create a larger sound field, the sweet spot is bigger, bass response is deeper, and power handling is greater.

MONITOR TWO®
STUDIO REFERENCE MONITOR

Our design team's 35 years of experience has produced a remarkable crossover design with super-low phase and amplitude distortion. This unique asymmetrical network combines 2nd and 3rd order filters with crossover points at 1.5kHz and 5kHz. And to top it off, a new silk-dome tweeter delivers sweet, natural sound without the harshness that produces ear fatigue. So you can do marathon mixes and still make decisions that translate.

Monitor Twos are perfect for near to mid field monitoring in project studios, mixing suites, and even large control rooms. Or put them in your personal studio to make it sound virtually cinematic. Their combination of civilized size and serious muscle is due to our exclusive SuperPort™ bass venting technology that delivers accurate low end transients equal to much larger, more expensive systems. In fact, the Monitor Twos cost less than some near field monitors. Which makes the case for owning them, sort of...full bandwidth.

Award winning design team, 40Hz - 18kHz frequency response, 200 watt peak power, mirror-image sets, fun to touch non-slip rubber laminate on the cabinet, and a lot more. For mixes you can see. The Monitor Two is at your Alesis dealer now.



ALESIS
STUDIO ELECTRONICS

For more information about the Monitor Two, see your Authorized Alesis Dealer or call 1-800-5-ALESIS.
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Alesis Corporation 3630 Holdrege Avenue Los Angeles CA 90016 1-800-5-ALESIS ALECO[illegible]@Alesis1.usa.com

USE READER SERVICE CARD FOR MORE INFO

OmniMix & Scenaria

The First Choice for Audio Post-Production

East Side Audio and Video, New York

"OmniMix has several great advantages, such as it's innovative combination of digital, audio and video storage. With instant access to sound and picture, there's no rewind time. This is particularly important in our business where several revisions of a project are common. When you are mixing with OmniMix, it's entirely in the digital domain – there's no comparison with conventional dubbing."

East Side Audio & Video, a 6-room facility specialising in audio post-production, recently took delivery of New York's first OmniMix digital surround sound audio/video system.

Projects include: Commercial spots for American Express, AT&T, IBM, MCI, Miller, Pepsi, Revlon, Volvo.

New Wave Entertainment, Burbank

"Scenaria lets us stay totally within the digital domain to final mix, which maintains sound quality. It's definitely a fast system to use, and the film-style user interface lets us assemble the sound elements to picture in a very intuitive way - our clients understand what we're doing and are more involved."

New Wave Entertainment handles audio and video production for theatrical trailers and TV commercials for Buena Vista Marketing, the promotional arm of the Disney Group. New Wave recently opened a new facility, with two Scenaria systems and SoundNet, designed to provide full editorial and mix-to-picture capabilities.

Projects include: trailers & commercials for Walt Disney, Touchstone, Hollywood, Caravan and Miramax Pictures

SSL DIGITAL

Solid State Logic

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TANNOY®

Get Real

For more than three-quarters of a century, Tannoy has been designing and producing loudspeaker systems and components to meet the demands of the world's most demanding user. A philosophy of constant research and investment in state of the art materials, technology and processes enables Tannoy to ensure that every monitoring system we produce will re-produce absolute fidelity to the source, true dynamic capability, and most importantly, real world accuracy. This is why Tannoy systems are used in more of the world's professional facilities than any other brand.

In the North American marketplace, Tannoy has been the number one monitor of choice for several years according to the Billboard's international recording and equipment statistics. This clearly illustrates why Tannoy enjoys its reputation as the world's leading manufacturer of reference loudspeakers. In fact, **leading the market is what Tannoy is all about.** While other multi-faceted manufacturers, not dedicated solely to the art of reference monitor loudspeakers, scurry to produce products to compete with Tannoy's original highly acclaimed and award-winning PBM series, **Tannoy moves on.**

The new PBM II series, once again, is setting new standards in the industry. Pioneering new technologies such as **variable thickness, injection molded cones with nitrile rubber surrounds** are but one fine example of our dedication to perfection. The new molded cones are stiffer than conventional cones producing more linear extended low frequency. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange. They are immaculately consistent and durable for years of faithful trouble free use. From the high power polypropylene capacitors to the hardwired minimilist crossover, every component has been carefully selected for the new breed of PBM II series. When leading edge technology is so affordable, Get Real Don't settle for second best.

TANNOY

HEAR BELIEVE

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USE READER SERVICE CARD FOR MORE INFO

Presenting

POST:TRIO

Editech's new POST:TRIO digital audio workstation delivers everything you need to build a world-class post production studio in your facility...

...Recording

...Mixing

...Editing

...at a fraction of the price of those expensive British systems.

Scalable architecture: *up to 24 disk channels – 48 assignable mixer strips – 72 inputs and outputs*

Complete digital mixer *with: parametric equalizer; compressor/limiter/expander; aux sends and returns; insert points; talkback & monitoring*

Multi-track recording and editing *on magnetic & magneto-optical media*

Dynamically automated mixing *with moving faders*

Non-linear video *option*

High speed network server *option*

Native OMF *operation*

POST:TRIO is designed to grow when your business grows – and it will! ...and since POST:TRIO is fully compatible with the Dyaxis II family, there is always a solution to meet your needs and budget.

To find out more about POST:TRIO or Dyaxis II, please call today.

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Atlanta	*404.257.8829*
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STUDER
PROFESSIONAL AUDIO EQUIPMENT

A Harman International Company

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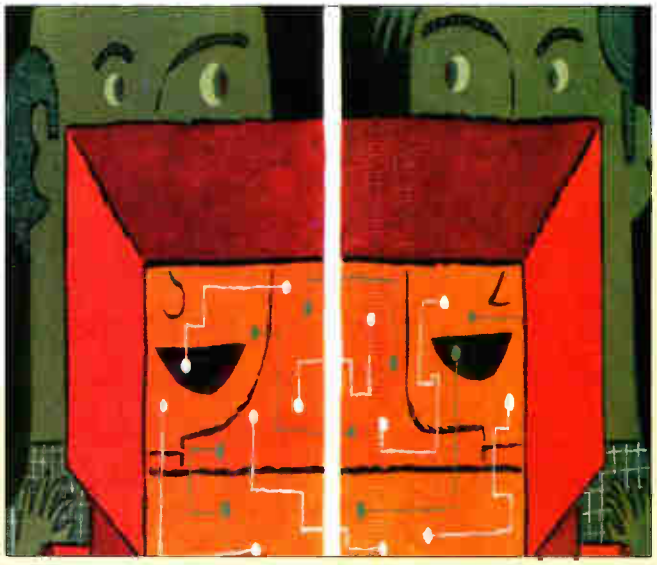
MIX®

PROFESSIONAL RECORDING · SOUND AND MUSIC PRODUCTION

MAY 1995, VOLUME 19, NUMBER 5

AUDIO



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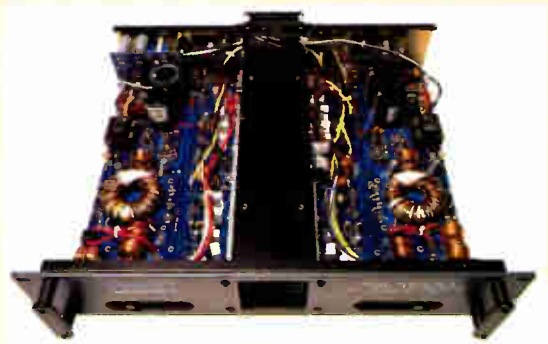
PRODUCTS



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AUDIO POST-PRODUCTION

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LIVE SOUND

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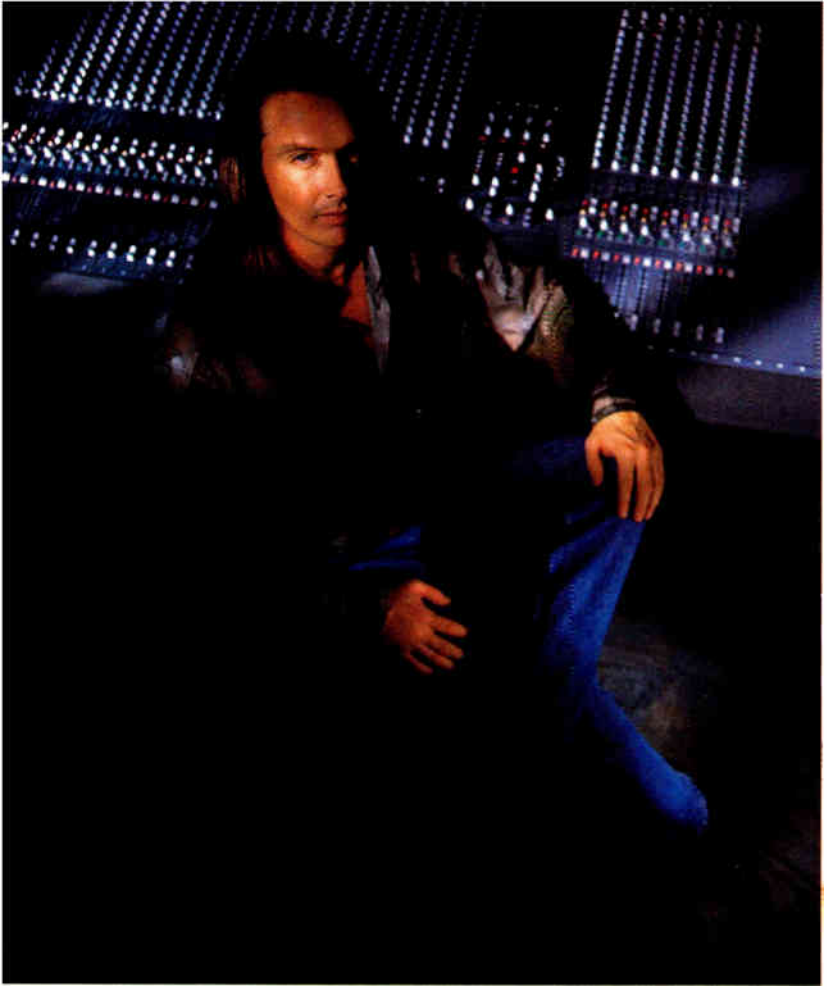
PHOTO HARALD SUND/IMAGE BANK

PAGE 38

DEPARTMENTS

Cover: Though The Town House has long been one of London's most respected facilities, the studio complex continues to grow and evolve. Studio One was upgraded last year with the addition of an SSL 4000 G Plus console with Ultimation and a second Sony 3348 digital multitrack. More recently, two new programming/pre-production rooms were completed, and three new mastering suites are under construction. **Photo:** Richard Davies. **Inset photo:** Mr. Bonzai.



When I finally found the perfect post production console...

"Speed matters when a network satellite feed deadline is looming. The console is fast. It just performs." *Derek Luff, president, Wild Woods Studios in Southern California — talking about business.* **"Three things matter to our clients: do it better, do it faster and do it for less."** *That's why Wild Woods chose the TASCAM M-5000 post-production console.* **"It's incredibly flexible, it sounds great and it's an outstanding value."** *Wild Woods is strictly post-production audio and sound design.* **"This is a 90's console — state-of-art integration with our digital gear."** *TASCAM incorporated superior quality components and innovative signal routing capabilities into the board.* **"It really saves time, allowing us to be more creative. And that means satisfied clients and higher profits."** *One M-5000 wasn't enough for Wild Woods state-of-the-art studio.* **"I was so impressed — I had to have two!"**

Derek Luff and Glenn Aulepp received absolutely no consideration for their appearance in this advertisement. In lieu of receiving studio rental fees for photography, a contribution to the National Wildlife Federation was made on behalf of Wild Wood Studios.

"I love it. It's set up for post-production." *Glenn Aulepp, chief engineer at Wild Woods — on why he chose the console.* **"The board is logically laid out and it's very easy to operate."** *The M-5000 is a 24 bus console with 32 I/O modules expandable to 40. Each channel has two independent signal paths with dual linear faders.* **"I can get things done extremely fast — the large faders are preset for my tape returns, but for tracking I can reverse them at a flip of the switch."** *Both signal paths have an extensive independent EQ, SOLO and CUT.* **"The three cut groups are a necessity."** *There are virtually unlimited grouping and sub grouping options.* **"I haven't run into any limitations for what we do."** *It features 8 AUX sends and has massive headroom.* **"The meter selector is convenient — transient peak hold is very important in a digital environment."** *Engineers like the subtle TASCAM design details.* **"The integrated patch bay is fantastic — very compact and extremely easy to change."** *There's PFL or In Place Solo on both channel and monitor paths.* **"I needed a flexible console so I can complete projects my way — freedom from any console constraints."** *Optional accessories include an I/O expansion kit, stereo modules and a VCA fader automation package.* **"When it comes to post-production, you gotta be good and you've gotta be fast. The M-5000 is perfect for us. There just isn't any other console that offers more value."**

I bought Two of 'em.

The TASCAM M-5000. For the business owner. For the engineer. For the post-production studio. **Perhaps you don't need two.** *But buying one M-5000 could be the best decision you ever made for your business.*

TASCAM®

Take advantage of our experience.

TASCAM FAX-BACK 1-800-827-2268

For information and specs via fax call 800-827-2268 and request document #6850.

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USE READER SERVICE CARD FOR MORE INFO

FROM THE EDITOR

Streetwise, Streetsmart

I received a disturbing letter today. Typically, the mail we get here at *Mix* ranges from technical tips and comments on topical issues to occasional barbs from those ever-vigilant readers who catch us when inaccuracies, typos or incorrect information slips through. But this letter was different.

A reader took the time to tell me the tragic story of David Loucks, the owner of Alternative Productions, a Seattle-based studio. Evidently, during the late hours of March 7, Loucks was murdered in his facility, with robbery the apparent motive, as thousands of dollars in audio gear was missing from the studio.

Loucks' death was a loss to everybody in the recording community, and our sympathy goes out to his family and friends. But perhaps some good can come out of this tragedy, if only to heighten the awareness of other studios about real-world dangers, especially when a single engineer works alone during late-night shifts. This incident reminds me of a similar occurrence years ago in a Southern California studio. Fortunately, in this particular case, the engineer was unharmed, but the M.O. was similar. The thieves, posing as clients, made a telephone booking for a midnight session, and on arrival, they handcuffed the engineer to the bathroom plumbing, backed a truck up to the front door and removed all the gear.

Although it's impossible to completely prepare for a criminal attack, some precautionary steps can help you avoid or decrease the danger. Now might be an excellent time to review facility security, whether it's improving lighting outside and in parking areas, upgrading the security system (perhaps with a couple strategically located "panic" buttons), taking inventory of your gear and recording serial numbers, or having a staff meeting to discuss crime awareness. The bottom line is: No matched set of U47s is worth your life. Streetwise is streetsmart.

• • •

As a salute to next month's APRS show in London (June 21-23), this issue takes an in-depth look at the British recording scene. Meanwhile, the National Systems Contractors Association meets in Indianapolis this month, from April 30 through May 5, and we'll provide complete coverage of all the latest sound reinforcement equipment.

See you there!

George Petersen
Editor

BPA INTERNATIONAL® Circulation independently audited and verified by Business Publications Audit of Circulation since 1985.

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Founded in 1977 by
David Schwartz and Penny Riker Jacob

Born Digital. Bred For Gold.

Ampex 489 ADAT, 488 Audio Hi8 and 467 R-DAT. Highest consistency, lowest error rates. No wonder more studios go gold on Ampex than on all other tapes combined.

You're on the cutting edge. You record in the newest generation studio. You need tapes that are designed specifically for digital audio applications.

So we consulted with the most demanding artists and engineers in digital recording and spent months in development back at the lab. The results are Ampex 489 S-VHS, 488 Audio Hi8, and 467 R-DAT, designed specifically for digital mastering.

They are simply the finest mastering tapes you can buy. In fact, more artists, engineers and studios go gold on Ampex than on all other tapes combined.

Thanks to our unique dual coating technology, Ampex 489 and 488 feature low dropouts, high output, and the most consistent quality tape after tape. Plus, low abrasivity to ensure long headlife. Which is why Alesis, the creator of the ADAT format, recommends Ampex 489 ADAT.

Ampex 489 is now available in our new 60 minute extended play configuration – for use on ADAT System 4 recorders or newer. Ampex 488 Audio Hi8, in 30, 60, and 113 minute configurations.

And for two track mastering tape, try Ampex 467 R-DAT. They're all easy to find, thanks to the industry's largest distribution network. And they're backed with the service and support that has long been the industry standard.

For more information, or the name of your nearest distributor, just call us at **800 227-8443.** Ampex 489, 488 and 467 audio mastering tapes. Born digital. Bred for gold.

AMPEX

Ampex Recording Media Corporation, 401 Broadway, M.S. 22-02, Redwood City, California 94063

USE READER SERVICE CARD FOR MORE INFO

WHY MACKIE IS YOUR BEST 8-BUS

Lately, several big pro audio companies have gone out of their way to "mention" us in their own 8-bus console ads. Many satisfied Mackie owners have urged us to shoot back with hardball comparisons of our own. But that's not our style.

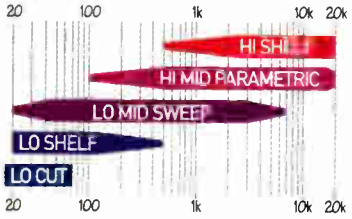
Greg believes that if a product is really good, it should speak for itself — without resorting to slagging the competition. First in a series, this ad details some of the features that we believe make our 8•Bus the best recording or PA console value available today for under $20,000.

Apparently we're not alone in our belief. In competition with many of the very consoles that keep "mentioning" us in their ads, we recently won the coveted *MIX* Magazine TEC Award for Small-Format Consoles. As well as *LIVE! Sound* magazine's Best Front of House Mixer Award.

To learn why, call us toll-free for our detailed, 24-page 8•Bus brochure.

Comprehensive equalization for creativity and problem-solving.

To quote Electronic Musician[1], *"It's no secret that the versatility and pristine sonics of the 8•Bus EQ have astonished jaded pros and home hobbyists alike. The 4-band EQ section includes two shelving controls fixed at 12kHz and 80Hz; parametric high-midrange EQ with a 500Hz to 18kHz sweep and a bandwidth that can be adjusted between three octaves and one semitone; and low midrange EQ with a 45Hz to 3kHz sweep. A full 15 dB of boost or cut is provided for each band. In addition, an 18 db/octave low-cut filter is set at 75 Hz. That's a heck of a lot of firepower!"*



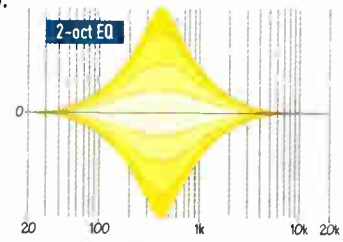
No kidding. But we also like that part about pristine sonics. One of the reasons that the 8•Bus Series took so long to ship was that Greg was determined not to compromise EQ sound quality. Cheap circuitry can create all sorts of sonic grunge that may add distinctive "character" to a console's EQ...but Greg's goal was clarity, not eccentricity.

To further quote Electronic Musician, *"In all applications, the 8•Bus EQ was extremely musical and transparent... One of the engineers summed it up best by saying, 'The 32•8 is so clean that you don't really hear the EQ; everything sounds deceptively natural, which is really great.'"*

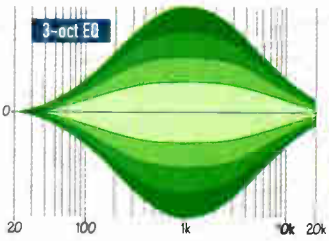
We wouldn't have it any other way.

What parametric EQ means to you.

The biggest gun in the 8•Bus' EQ arsenal is its true parametric high midrange EQ. Conventional sweepable midrange (like our 8•Bus' *low* mid), has a fixed bandwidth of about 2 octaves. No matter how high or low in frequency you sweep it (or how much you boost or cut it), 2-octave EQ's *contour* stays the same. While extremely useful, it's just one tonal "color." Having to rely on swept 2-octave midrange alone is like being asked to paint a picture with only a bucket of bright yellow paint.

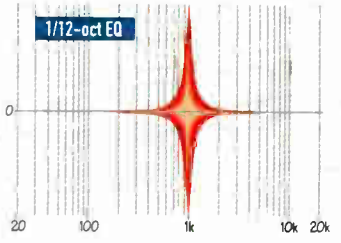


By letting you vary the bandwidth, parametric EQ gives you the equivalent of a full rainbow of tonal "colors" in your artistic pallet. Spreading high midrange EQ over three full octaves transforms it into an extremely subtle — yet extremely dramatic — effect[2]. Sweet and natural-sounding, it can unobtrusively change the character of a track without noticeable tonal intrusion. If you're used to conventional 2-octave swept midrange, you'll be surprised at how much 3-octave EQ you can add without things starting to sound obnoxious.



On the other hand, there are times when you want what can only be called surgical EQ. At its narrowest, our parametric Hi Mid is four times as precise as a 1/3rd-octave graphic equalizer. It's like having a delicate artist's brush and a magnifying glass for erasing or enhancing tiny details.

Between three octaves and 1/12-octave is a vast range of tonal colorations, nearly all possible only with parametric equalization. And, since our "HI" mid's sweep range extends from 18kHz all the way down to 500Hz, your creative palate extends over six octaves – to our knowledge the widest midrange sweep currently available[3].



Above Left to right: 32•8 console with MB•32 meter bridge, 24•E Expander with MB•E meter bridge, and The Sidecar.

[1] September 1994 issue, page 64, in a sidebar to an article on The British Invasion (of consoles). We urge you to read the whole thing so that we don't get in trouble for quoting stuff out of context.

[2] This is what we meant when we used the phrase *"Expensive British Console Sound"* in our first 8•Bus ads: Classic English desks were the first to offer extremely wideband (i.e. greater than 2 octaves wide) equalization. Obviously we didn't make ourselves clear on this point, because everyone from our competitors to at least one reviewer has taken us to task over this phrase. Okay, we apologize to all of you Anglophiles. We were merely trying to explain why we consider wide bandwidth EQ such a powerful tool and where we got our inspiration for including it...not attempting to rekindle the Revolutionary War.

CONSOLE CHOICE

An expandable console system.

If you can successfully foretell the future, you might as well play the commodity futures market, make a zillion bucks and buy a 128-channel SSL console.

However, because most of us are less clairvoyant

and a lot poorer, we've designed a system that can grow with your needs and budget. Start with our 24•8 or 32•8 console[4]. Then, when your tax refund comes back, add an optional meter bridge[5]. When you land that Really Big Project That Pays Actual Money, add more input channels (and tape returns) in groups of twenty-four with our 24•E Expander console[6].

You can keep right on growing your Mackie 8•Bus console system up to 128 channels or more.

And, beginning this spring, you can automate the whole shebang with our extremely affordable Universal MIDI Automation system. It consists of the OTTO-34 VCA gain cell unit, wicked-fast Ultramix™ Pro software and the innovative OTTOpilot™ control interface. Both the hardware and the software were debuted in final form at last Fall's AES Convention. They received rave reviews from seasoned pros who are used to working with "mega-console" automation systems.

3 . . .on a comparably-priced 8-bus console. Oops! We're starting to sound competitive.

4 $3,995 (24•8) and $4,995 (32•8) suggested retail. Slightly higher in Canada.

5 $795 (MB•24) and $895 (MB•32) suggested retail. Slightly higher in Canada

6 $2,995 suggested retail; MB•E meter bridge $695. . . Yadda yadda. Canada, etc. etc.

Very Low Impedance Circuitry (VLZ) for very low noise.

We like to say that the 8•Bus console's monster 220-Watt Power Supply was a product of typical, fanatical Mackie over-engineering. But one of our real motives lies at the other end of the power supply's multi-voltage connecting cable.

At room temperature, all electronic components create thermal noise. Cumulatively, this can become audible and objectionable. We design around thermal noise by making internal circuit impedances as low as possible in as many places as possible. For example, resistor values in our mix bus are 1/4 the value of those typically used — hence thermal noise is proportionally lower. Another advantage of VLZ is that low-impedance circuitry is far more immune to crosstalk problems.

VLZ

VLZ isn't easy to achieve. All circuitry must be thoroughly buffered. Plus, console current consumption goes way up, requiring a beefy power supply. Such as the massive, 31-pound, power supply we ship with each 8•Bus console.

Powersupplyus Humungoidus

+4dBu operation throughout.

This is a biggie in terms of overall noise and headroom. There are two current standards for console operating levels: –10dBV and +4dBu. Without knocking our competition, let's just say that +4dBu is the professional standard, used with all serious recording, sound reinforcement and video production components. This higher operating level effectively lowers the noise floor and increases dynamic range. Our 8•Bus consoles operate exclusively at +4dBu (although their tape outputs and returns can be switched to –10dBV to match other semi-pro/hobbyist gear you may still own).

Built like tanks.

Our 8•Bus Series consoles have been in the field long enough to gain an almost legendary reputation for durability. For example, a lot of them absorbed the impact of toppling monitor speakers during last year's Los Angeles earthquake with little more than a few broken knobs. Others have survived drops off loading docks, power surges that wiped out whole racks of outboard gear and beer baths, not to mention hundreds of thousands of air and semi trailer miles with major tours[7]. Read our 8•Bus tabloid/brochure to learn about the impact-absorbing knob/stand-off design, fiberglass circuit boards and steel monocoque chassis that make our consoles so rugged.

Bottom line: You simply can't buy a more dependable console. Maybe that's why *LIVE! Sound* magazine readers voted us their 1994 "Best Front of House Console."

7 Including the latest Rolling Stones, ZZ Top, and Moody Blues tours. (Footnote to the footnote: Mention in this ad denotes usage only, not official endorsement).

We could go on this way for pages.

If we got into the details of 8•Bus features like special RFI protection, triple tape bussing, in-place stereo solo, constant power pan pots, or the extra 15dB of gain available at the 8•Bus's aux sends and returns, this ad would have even teenier type than it already has.

For these and other facts, call us toll-free (8:30AM-5PM PT) and ask a real live person for our obsessively-detailed, 24-page 8•Bus brochure.

OUR 8•BUS CONSOLES REALLY WORK, THE UPDATE:

Ricky Peterson mixed ☮'s recent hit single, "*The Most Beautiful Girl in the World*" on his Paisley Park Studio 32•8 console.

Queensryche's new platinum album, *Promised Land*, was totally tracked on Mackie 8•Bus consoles (with help from OTTO-automated CR-1604s). A sonic (and musical) masterpiece, it has the tight bass, crisp highs and ear-boxing dynamic range that's becoming an 8•Bus console signature. Need more proof as to why pros prefer Mackie? Buy this superb CD.

MACKIE.

16620 Wood-Red Road • Woodinville • WA • 98072 800/898-3211 206/487-4337
mackie.com • Outside the US 206/487-4333• Represented in Canada by S.F. Mktg. 800/363-8855

CURRENT

TEC ANNOUNCES NEW AWARD, SCHOLARSHIP

The Mix Foundation for Excellence in Audio recently announced the creation of the TEC Award for Environmental Merit and the formation of the TEC Awards Scholarship Fund.

TEC Award for Environmental Merit: Recipients will be selected on the basis of, but not restricted to, the identification of a significant environmental issue generated by, or severely affecting, the audio industry and its family of vendors, services and customers; significant action taken by a nominee to address an environmental issue; and/or the advancement in technologies, processes or procedures resulting in significant environmental gains. Awards may also be made for activities that have yet to produce tangible results but show significant promise.

Nominations will be made by a nominating panel consisting of four selected members of the Recording Industry Environmental Task Force and two representatives of the Mix Foundation for Excellence in Audio. Nominations will also be solicited from all facets of the industry. The recipient will be selected by the panel and presented with the award at the Eleventh Annual TEC Awards ceremony in New York on October 6.

Any company, organization or individual interested in being considered for the TEC Award for Environmental Merit should send a letter explaining why they should be considered for this award. Submissions should be no longer than 750 words and include a contact name and phone number. The deadline for all submissions is Tuesday, August 1, 1995. Information should be sent to MFEA, 6400 Hollis Street #12, Emeryville, CA, 94608.

TEC Awards Scholarship Fund: Administered by the Mix Foundation for Excellence in Audio, The TEC Awards Scholarship Fund will award scholarships to deserving individuals pursuing careers in audio and currently enrolled in an audio education program. If you are interested in receiving an application, mail your name, address and phone number to the address above, or fax (510) 939-4022. No phone calls, please. Completed applications will be accepted until August 1, 1995.

KODAK DIGITAL SCIENCE

by George Petersen

On March 28, the Eastman Kodak Company made a sweeping series of announcements on the future of digital imaging. The debut of the Kodak Digital Science™ brand includes not only new alliances with industry giants such as IBM, Hewlett-Packard, Wang, Microsoft and Sprint, but also Kinko's copy centers, which will install Photo CD authoring workstations at 50 locations over the next year. Kodak has also opened access to the Photo CD format, transforming it into a cross-platform standard for interchange of digital images.

Much of KDS involves imaging-only technologies, such as medical images, digital document retrieval, security systems and new retail kiosks where consumers can instantly reprint, enlarge, crop, retouch or digitally enhance images. But there are a variety of implications for the audio industry. For instance, Sega's new Saturn game system supports Photo CD playback, which could lead to wider acceptance of this digital-audio-plus-picture format. Additionally, Kodak's new $399 portable Photo CD player (with video/audio outputs for connection to any TV set) is ideal for the presentation market.

The biggest audio news from these developments may be the way that audio producers can benefit from these alliances. If a local copy center has a one-off Photo CD authoring system, then enterprising engineers or producers could drop by with a hard disk of edited audio files and run off a couple of six-times real-time CD-Rs—with or without high-res color graphics and text. And Kodak's Disc Transporter system can create up to 75 CDs overnight—unattended—for short-run custom CDs.

An intriguing aspect of KDS involves new private and public image networks for downloading photos from stock libraries over the Internet, via Sprint lines. If this concept can be applied to pictures, why not production music or sound effects, where producers could download the latest cuts either to disk or writable CD?

AES CHANGES CONVENTION DATES

The AES has moved its fall convention back one day. The show is now slated for October 6-9. Call (212) 661-8528 for more information.

MOVES AT HARMAN

Philip Hart, president of the Harman Pro Group, announced that longtime Lexicon president Ron Noonan was appointed to a new position as president of the Harman Professional Group's Recording and Broadcast Alliance. Noonan is suc-

—CONTINUED ON PAGE 16

Creative control, superlative sound and uncompromising support — Lexicon's commitment to the audio professional.

STUDIO SERIES

The New 300L with LARC: The World Class Touch.

Introducing the ***Lexicon 300L****, the newest addition to Lexicon's world-class digital effects systems. It's a new version of the award-winning Model 300 — with* ***LARC*** *control. Offering analog/digital mixing, timecode automation, compression, unique mastering tools and a full complement of Lexicon's finest reverb and effects programs. And if you already own a* ***Lexicon 300****, you can upgrade.*

Lexicon Alphanumeric Remote Control
Bring your favorite effects processors under total control.

Lexicon

Heard In All The Right Places

If you own a ***300L****,* ***480L*** *or* ***224XL****, you can now have multi-machine LARC control via the* ***LR-4 FrameLink*** *— genuine examples of Lexicon's professional commitment. Few studio tools are as familiar as the LARC — putting you in touch with the sounds the competition imitates but never duplicates, without ever leaving the sweet spot. Call your Lexicon dealer for full details.*

Contact! 100 Beaver Street, Waltham, MA 02154 Tel 617/736-0300 Fax: 617 891-0340 E-Mail: 71333.434@compuserve.com

H A Harman International Company

How to Succeed with a Sonic

Edit and mix

Analog or digital in — Grammy out! It's no coincidence that the majority of the 300 plus recordings nominated for 1995 Grammys were edited on Sonic systems.

Record of the year All I Wanna Do by Sheryl Crow edited and mastered by Dave Collins, A&M Mastering

Create big sound for

Bullets Over Broadway, Hoop Dreams, Just Cause, Pret-a-Porter, The Jungle Book, Apollo 13 — what do they have in common? The Sonic System — of course! — because it delivers power and speed for dialog, music, and effects editing for film and video projects.

Blast out music

The biggest explosions, the clearest narration, the richest music — the Sonic brings life to audio for CD-ROMs.

Star Trek CD-ROM editing by Mark Waldrep, Pacific Coast Sound Works

Cut radio programs

"I haven't touched a reel to reel in months," says Bob Carlson from KCRW in L.A. That's because building radio programs with his Sonic System is fast, easy, and affordable. Stay tuned around the globe for promos and features prepared on the Sonic.

Beatles Live at the BBC editing, NoNOISE, and premastering by Peter Mew, Abbey Road

Restore priceless recordings

NoNOISE® is used around the world to tackle the problems of tape hiss and ambient noise, clicks and pops, and distortion and crackle. Engineers, artists, and producers wouldn't trust their masters with anything less.

Put the world's next best-seller

It was a dark and stormy night...the project deadline was approaching...the talent was restless. With my Sonic, I recorded readings directly to hard disk, edited alternate takes, layed up effects, and slapped down a multi-track music bed. "No sweat," I said handing over the finished tape. "My Sonic always delivers a happy ending."

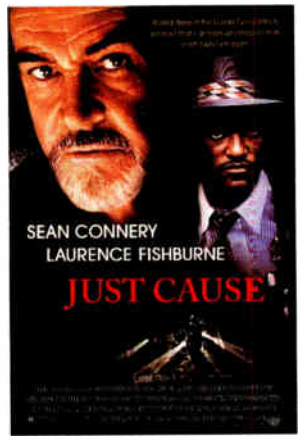
SONIC SOLUTIONS

a Grammy® winner

Our precision editing, high-resolution recording (all Sonic systems support 24-bit data), and superb sound quality yield stunning results and kudos all around.

the big screen

Our new UltraSonic Processor provides up to 16 channels with full DSP on a *single* board making multitrack work streamlined and affordable.



Just Cause. Sonic System dialog and background editing supervised by Michael Kirchberger; 20-bit music editing by Tom Drescher, Wonder Dog Music

and effects for multimedia

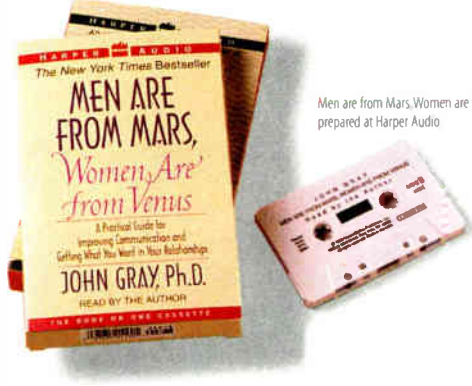
For multimedia pioneers, handling hundreds of soundfiles is all in a day's work for the Sonic. And with a native AIFF file format and OMFI compatibility, the Sonic is the CD-ROM producer's choice.

without a reel to reel

Tune in to ABC Racio, the BBC, the CBC, CBS, Danish Radio, Dutch Radio, KCRW, KIIS, NPR, Premiere Radio, WDR (Germany), WETA, WGBH, and dozens of others

for a platinum release

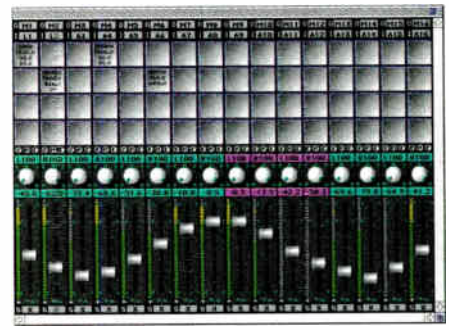
on tape



Men are from Mars, Women are from Venus prepared at Harper Audio

The Ultimate in Power: USP

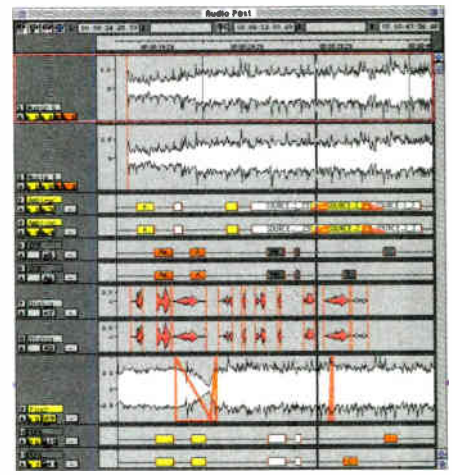
The USP (UltraSonic Processor) puts more digital signal processing power in the hands of audio professionals than any other Mac or PC-based audio workstation.



With a single USP card you get: up to 16 channels of digital I/O, up to 32 channels of playback from a single hard disk, 32 sections of real-time EQ, and elaborate aux/send return capabilities. No additional expansion chassis, kludged piggy-backed boards, or awkward internal cabling required.

The Ultimate in Affordability: SSP

With 2-4 channels of digital I/O, 8-12 channels of disk playback, and 16 sections of real-time EQ all available on one low-cost board, the SSP-3 is the clearest path toward platinum success. At $2995, the SSP-3 is the best DAW value around!



MediaNet: The Digital Media Workgroup's Data-Bahn

MediaNet, our high-speed FDDI/CDDI network, links Sonic systems (or any standard Macintosh or NFS application) in a seamless network. MediaNet is the only network that allows multiple users to share processing resources and hard disks (even the same soundfiles!) at the same time.

Sonic Solutions
1891 East Francisco Blvd. San Rafael, California 94901
Telephone 415.485.4800 Fax 415.485.4877
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INDUSTRY NOTES

Harman International Industries Inc. (Hertfordshire, UK) recently completed its acquisition of German company **D.A.V.I.D. GmbH** and is creating a new division in the Harman Pro Group to focus on network-based radio systems. **Gerhard Möller** will be responsible for combining Studer's and D.A.V.I.D.'s activities in Germany...**Korg USA** (Westbury, NY) combined its marketing and sales departments into one autonomous unit, promoting longtime sales VP **Joseph T. Bredau** to the position of vice president of marketing and sales ...**John Moyer** joined the *Mix* Northwest/North Central advertising team as advertising sales manager. Based out of the Los Angeles office, Moyer can be reached at (310) 207-8222. John Pledger remains associate advertising director for *Mix* and has also taken on the position of director of sales and marketing for the Cardinal Music and Entertainment Directories, including the *Recording Industry Sourcebook*, the *MixPlus Directories* and the *Mix Master Directory*...San Leandro, CA-based **Orban** promoted **Chris Holt** to the newly created position of product engineering specialist. In his new position, Holt will provide technical support for customers and for Orban's sales and marketing departments... **NVision** of Nevada City, CA, hired **Nigel Spratling** as vice president of marketing and **Marlene D. Young** as marketing operations manager...To meet the needs of a rapidly expanding German customer base, **AMS Neve** (London) is launching a new sales and service organization in Mainz, Germany, headed by **Claus Schellenberg** and supported by **Markus Ackerman** (senior customer support engineer) and **Kerstin Gutheil** (administrator)...**Twelve Tone Systems** of Boston promoted **Tom Cook** to company president and chief operations officer...**DigiTech** (Sandy, UT) recently selected **Eakins/Bernstein** as its rep of the year for 1994 ...British-based manufacturer of in-ear monitoring systems, **Garwood** established a U.S. subsidiary, **Garwood Communications Inc.**, in conjunction with its former U.S. distributor, **Bryan Olson** of Firehouse Productions. **Don Holloway** was hired as executive vice president for U.S. sales. Contact the new company at 176 Norman Ave., Brooklyn, NY 11222. Phone (718) 383-5606; fax (718) 383-8004...**Main Line Marketing** of Melbourne, FL, was presented with **Ramsa's** 1994 rep of the year award...**Klipsch Professional** developments: The company recently moved into a larger facility at 149 N. Industrial Park Rd., Hope, AR 71801. Phone (501) 777-0693; fax (501) 777-0593. It is now operating independently, seperate from the consumer division. The company promoted **Ian Thacker** to the position of general manager and appointed **Waypoint Marketing** as its newest rep firm, serving the territories of Southern California and Hawaii ...**dbx** (Sandy, UT) named the **J.B. Company** as its rep of the year for 1994...**Ross Josephson** joined marketing consulting firm **Chan & Associates** (Fullerton, CA) as account manager...**Steadi Systems** (Hollywood, CA) promoted **Michael Williams** to chief operations officer; **Mark Bianchi** to vice president of sales; **Brian Reilly** to manager of the Advanced Products Group; and **Patrick Birch** to director of marketing ...**Stage Accompany** moved to 6573 Wyndwatch Dr., Cincinnati, OH 45230. Phone (513) 624-9977; fax (513) 232-8709...**Pacific Microsonics Inc.** (Berkeley, CA) hired **Andy Johnson** as director of marketing...Multimedia market research firm **InfoTech Inc.** has a new address: P.O. Box 150, Skyline Dr., Woodstock, VT 05091-0150. Phone (802) 763-2097; fax (802) 763-2098... **615 Music Productions Inc.** (Nashville) hired **Eric Nordhoff** as account manager...**Roadworx Total Production Services** of Greensboro, NC, promoted **Tim D. Carter** to operations manager of the company's Nashville office...**Metro Music Productions Inc.** moved to 37 W. 20th St., Ste. 906, New York, NY 10011. Phone (212) 229-1700; fax (212) 229-9603. ■

—FROM PAGE 12, CURRENT

ceeded by former Lexicon executive vice president and chief financial officer Harvey Schein. The R&B Alliance in the U.S. includes the Lexicon, Orban, Studer and Studer/Editech brands.

On the other coast, JBL Professional president Ron Means has been named president of Harman's Sound Reinforcement Alliance, while Mark Terry steps up to the position of president of JBL Pro. The SR Alliance includes the Allen & Heath, AKG, dbx, DigiTech, DOD, JBL Pro, Soundcraft, Spirit and UREI lines.

CONFERENCE NEWS

The Music West '95 conference and exhibition will be held May 11-14 at Hotel Vancouver, Robson Square Conference Centre in Vancouver, B.C. Call (604) 684-9338 for more info.

The National Academy of Recording Arts & Sciences presents Music and Multimedia '95 at the Nob Hill Masonic Center in San Francisco on May 30. The event offers seminars and exhibits designed to help multimedia developers and the music community work together to explore interactive technologies. Call (415) 749-0779.

The New York section of the Audio Engineering Society presents DigiExpo, a daylong conference focusing on Digital Audio Workstations. Exhibitors include Digidesign, Spectral and Sonic Solutions. DigiExpo will be held on the fifth floor of NYC's Marriott Marquis Hotel on Saturday, June 3, from 9 a.m. to 7 p.m. For more info, call (212) 586-4200.

CORRECTIONS

The word "codec" was incorrectly defined in our April ISDN story as referring to compression/decompression. Coder/decoder is correct. Also in April, a "Coast to Coast" item entitled "New York Engineers Share Miking Tips," a quote was incorrectly attributed to Frank Filipetti. The quote, "We are victims of 'preamp du jour syndrome'..." was actually said by Sony Classical's David Smith. ■

FLYING THE EUPHONIX

5 MINUTES IN THE PILOT'S SEAT

Take a seat at the Euphonix CS2000. Seventy-two faders are in reach without stretching or moving your chair. The top knob on the channel strip is adjustable without bending your back. The surface is cool and comfortable and the large color flat screen casts a warm glow on your face.

Load the 'title' you started last week into the console from the removable cartridge disk. All those hours of meticulous work have been carefully preserved. Hit the console 'locate' button and select the top of the piece. Forty-eight tracks of digital tape are commanded to the cue. Press 'play' and the room instantly fills with the familiar mix - same EQ's, same dynamics, same reverbs and delays, same everything. Last week suddenly seems like a just few seconds ago. As you listen to your work you can't help thinking **"without a Euphonix, I'd still be twiddling console knobs and resetting my outboard gear!"**

Forget about SnapShot Recall and Total Automation for a minute and just listen to the sound. That's where the Euphonix really soars - that smooth, rich, high-resolution, analog sound. "How do they do it?" you ask yourself, **"Euphonix has built a high-end analog desk that has everything you thought you needed digital for."** You already know that Euphonix consoles are found in many of the world's finest studios and have earned a reputation for unbeatable sound quality.

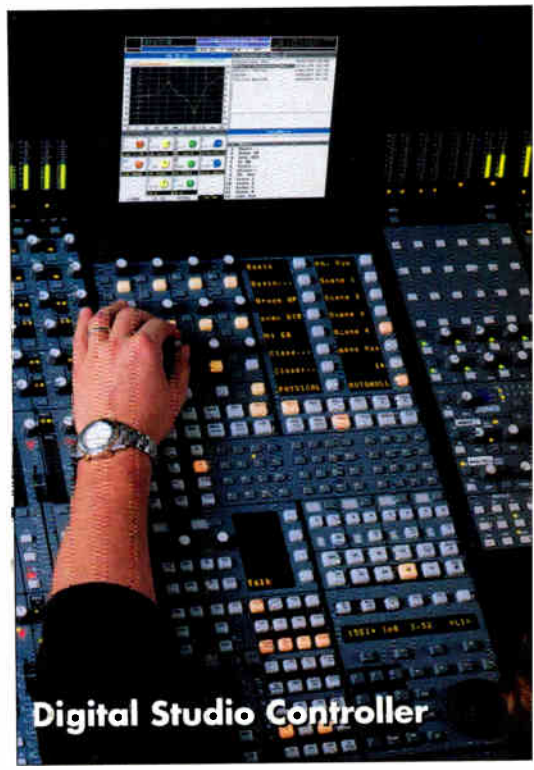
Back to work. You make some minor adjustments to the overall balance. **Faders, pans, mutes, and solos are all where you would expect them to be on the desk in front of you - no awkward paging or techno interfaces.** This console feels like most traditional consoles for basic mixing. But when you need to get a little deeper into individual tracks there's nothing like it.

Without moving an inch from the center mix position you reach over and solo a track. The track needs a little improvement in this passage so you set the tape machines to cycle with a couple of key presses. It sounds wrong, too aggressive. Glance at the screen and you'll notice a sharp peak in the track's EQ response curve. Grab the 'HM gain' knob and back off the boost a little. Then take the 'HM Q' down a little. It sounds much better and the curve doesn't look so radical anymore. Now the smoothness is there but it still sounds a little squashed. Hit the 'Dyn' button and back off the compression ratio knob a little. The GainBall on the screen isn't pumping so hard and now it sounds perfect. With automated SnapShots enabled, those EQ and dynamics adjustments are automatically saved just before the next cue. **No tricky key press sequences are required - no hassle.** As the tape rolls through the next cue, a new set of EQ's and Dynamics are instantly recalled. They sound just like they did last week - perfect. How did you ever manage without this feature?

Next challenge. A track needs editing and you need to do it on the workstation. **Since your favorite workstation is communicating with your console this is going to be easy.** Without moving from the center of the mix position you locate the track to the problem spot, route the audio over to the workstation input and hit record at the appropriate time. Roll your chair over to the workstation and make your edits. As you play back the track from the workstation, both tape and console instantly locate and play exactly as they did when the track was on tape. Move back to the center of the desk, assign the workstation track back to tape, locate the machines, and drop it back in. It's Fixed.

Now you realize the plate reverb effect at the next cue isn't quite right. Again, you cycle the tape through the cue. **While the piece is continuously cycling you hit the program change button for your favorite digital reverb right on the desk in front of you.** Step through a couple of algorithms until the right one fits. Finally it sounds perfect so you turn off the cycling and let the tape roll into the next cue. The reverb program change is automatically saved.

Your five minute session is nearly over and you still need to fix that automated ride on the voice track. The moves were perfect but the overall level isn't up enough in the mix. Hit the 'trim' and 'write through' buttons and then punch in on the voice fader. As you trim up the fader on the channel strip you notice the central assignable moving fader playing the same moves, just offset a little higher. The overall level is now exactly where you want it. Hit the 'stop' button and your trim is automatically saved as a new pass.

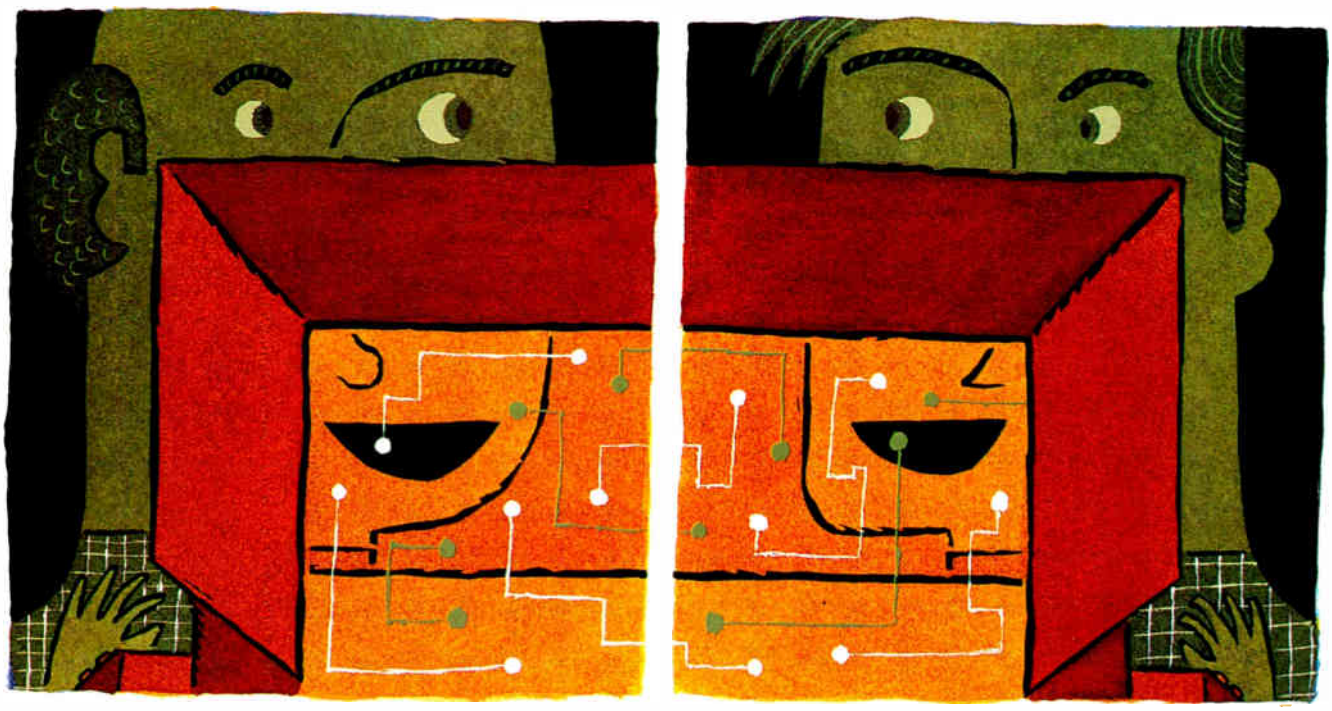


Your time is up. Press the 'save title' button and your work is neatly buttoned up and put back on the removable disk. Congratulations! You've landed safely after completing more work in five minutes than you ever thought possible. The studio is now free for the next quick-turn project and you're free to go to the beach.

by Paul Potyen

MULTIMEDIA FRONTIERS

AN ONLINE CHAT WITH SCOTT GERSHIN OF SOUNDELUX MEDIA LABS



The following is a Mix *experiment, where we asked two audio and multimedia professionals to talk online about issues affecting the emerging world of multimedia production. Paul Potyen is a former* Mix *editor now working full-time and overtime in CD-ROM and multimedia production at ESCAtech. Scott Gershin is an award-winning sound editor for feature films who is spearheading Soundelux's foray into audio for multimedia. Here, edited slightly for style and readability but not for spelling (no spellcheck on the Internet), is their late-night discussion.*

3/4/95 9:45:03 PM Opening "Chat Log 3/4/95" for recording.

Sonic G8: Tap Tap the mic Test 123
Potyen: okokok i got it
Sonic G8: can you see our chat? We're on LINE!!!
Potyen: yippee! Mix says we should talk about technology and creativity
Sonic G8: Ok how do you want to start?
Potyen: constraints on the creative process. does that bring up anything for you?
Sonic G8: Working with this medium is a combination of creativity & technology. Not only do you have to come up with great ideas, but you have to take the release medium into account
Potyen: how is that manifested in what you are doing?
Sonic G8: We are trying to take the same techniques we use in film to create audio illusions & apply them to the interactive industry
Potyen: specifically what kinds of ineractive things have you been doing?
Sonic G8: We did a title last year

ILLUSTRATION AD MCCAULEY

Hit Makers

Hit recordings are created through the artful combination of talent, experience and the right tools. Top studios, including The Hit Factory in New York City, know the value of these tools and settle for nothing less than the best. That's why they choose Neumann.

The TLM 170R is the ideal multi-purpose studio microphone. Its large diaphragm and transformerless circuitry offer superior performance and that famous "Neumann Sound."

Regardless of the the scope of your project or the size of your studio, you need the right tools. You need Neumann... the choice of those who can hear the difference.

The TLM 170R is the first and only microphone capable of remote polar pattern selection via standard microphone cable (with the optional N 48 R-2 power supply/controller.)

Call or write for detailed specifications on the TLM 170R and our informative field guide.

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called PITFALL released on SNES, SEGA, SEGA CD and soon to be released on PC. We combined movie style soundtrack with fx files to create a dense illusion of the jungle & the danger. Our job was to make it dangerous, exciting, mysterious & fast action. Creating a mood with sound.
Potyen: can you talk about the different challenges that the different platforms present?
Sonic G8: Each platform has its own challenges. Cartridge games have the limitations of memory both in RAM & on ROM. You're always balancing between the number of samples versus the audio file's sample/bit rate. The fewer individual audio files, the higher the sample/bit rate you can have. Then you have to decide which you would like to increase: the sampling rate or the bit rate. Example: 11khz @ 16 bit or 22khz @ 8 bit. Both take up the same amount of memory. This idealogy also pertains to CD ROMs. PCs & MACs can have a limited amount of voices (less than cartridge games), but they have the ability to play linear audio in addition to sound files. The limitations of the PC is the publisher's lowest denominator in CPUs & sound cards the game can be played on. Also, the amount of CPU activity (processing power) that the graphics take up. This information is only broadstrokes because each publisher/developer is trying to redefine the capabilities of the CPU & sound card's abilities. This creates a lot of customizing & proprietary software tools. Each project is trying to create a new graphic/audio experience on platforms that have sold the most...for example, 486-66. As the general populace buys faster CPUs, the publishers will be able to supply the users with faster, smoother, more defined, better quality, & hopefully something will be left for the audio track.
Potyen: my experience is that it's a constant tradeoff between bandwidth and emotionally engaging content. do you agree?
Sonic G8: Of course but the bandwidth (sampling bit rate) hasn't inhibited our soundtrack that much because we take into account the sample/bit rate allowed to us. We choose our sounds accordingly
Potyen: what res do you use? also, the authoring tools do not have ability to synchronize audio to visuals very well
Sonic G8: Our sample/bit rates are determined by the quantity of the graphic & how much action is occurring
Potyen: right. that's part of the tradeoff
Sonic G8: The graphics are first priority & then whatever is left over goes to sound. The sync issue is a proprietary format we use with our publishers
Potyen: proprietary, huh? can you tell me a teensy bit about it, and who are the publishers?
Sonic G8: Each publisher & developer we work with has a slightly different way of utilizing the technology
Potyen: care to give a general idea of the way you use the technology?

> Standards would be nice, but in an industry that is changing every six months that is not likely.
>
> —*Scott Gershin*

no need to give away secrets
Sonic G8: The interactive industry is a combination of intellectual property & the technology to achieve that project. It is very different from the other entertainment industries
Potyen: such as the film industry?
Sonic G8: Yes. Variety posts all the films going on. The interactive industry is more like the toy industry. The buyer will only buy so many basketball or tank games, etc...I use the term interactive entertainment instead of video games because video games are percieved to be shoot em up only. I find the interactive games & films similar. In both cases we're trying to tell a story & make the player/watcher feel the emotion of the game
Potyen: so you're involved in games a lot. we do more corporate stuff. i think our playing field is quite different from yours. we do a lot of complete projects where we control the bandwidth of each type of media. so far we have been using off the shelf authoring tools—so am i correct in assuming that you do only audio? what platform, what tools? what would you like to see improved in the area of tools?
Sonic G8: Many of the authoring tools we use are custom & proprietary...Everyone is trying to get thwe most out of the hardware. I love typing online — the speeling is terrible
Potyen: speeling, huh? i no what you meen. so am i correct in assuming that you do only audio—no graphics?
Sonic G8: We provide our clients with a soundtrack to their titles. This is a combination of FX, music, dialogue. we do not differentiate between the three. Al three are trying to create the mood & the illusion
Potyen: What kinds of audio tools do you use?
Sonic G8: We try to utilize the right tools for the specific project
Potyen: sounds like you don't want to give me specific details
Sonic G8: We have Waveframes, Protools, K2000s...
Potyen: aah, hardware...the manufacturers will love this!!
Sonic G8: Our facilty has the combined audio power of both of our divisions. From TC DAT players to Spatializer
Potyen: are you doing much spatialization/auralization?
Sonic G8: Definitely. Spatial processing has been a major interest of mine for many years. I think I've played with most of the toys out there
Potyen: are your interactive publishers into it yet?
Sonic G8: Yes, but sample/bit constraints make it challenging
Potyen: no kidding. what would you like to see improved in the area of tools?
Sonic G8: I feel that there's much improvement to be done in this field. Hey guys, how about 4 to 6 audio outs on the hardware
Potyen: have you tried protools III? I've been using it for a 6-channel audio project
Sonic G8: Yes, we just installed one recently, but the sound cards on PC wont support more than 2 channels.
Potyen: aah, right. But I think that is about to change. Hopefully this year...
Sonic G8: Oh? explain.
Potyen: I heard about some people who are developing it but they don't realize the applications for it yet. sorry, can't say more
Sonic G8: What CPU engine? How much RAM needed? Consumer?

2:00 a.m. The band just found the sound they've been looking for. Everyone's rockin'. Except you. **You're figuring out how to tell them the HIGH OUTPUT master you were using just "crapped out."**

Of course, you wouldn't be having this anxiety attack if you used new **BASF 900 *maxima*** High Output Mastering Tape. With 3 dB more output and 2 dB less noise than standard analogue mastering tapes, it is identical to the MOL and the signal-to-noise ratios of other high output masters. But it has the reel-to-reel reliability and consistency of BASF 911. Low rub off. Precision-manufactured. It's classic BASF. The kind of BASF tape studios have been relying on since 1934. As you turn to face the band (gulp), you make a vow. If you survive the next ten minutes, the first thing you'll do is contact BASF, 1-800-225-4350 (Fax:1-800-446-BASF); Canada 1-800-661-8273.

DEMAND IT.

BASF

USE READER SERVICE CARD FOR MORE INFO

Potyen: not sure. i just heard about this last week. potentially consumer. so are you gonna tell me what cool project you're working on or what?
Sonic G8: I just finished OUTBREAK & I am starting braveheart & congo then the games begin...This year we have approx 8 projects we're working on. Were doing a title with Activision called Mechwarrior. I feel the real industry will emerge with the advent of interactive entertainmet on the cable/air lines. Ahhhh!!!!! I cant type fast enough!!!
Potyen: that's okay. you're a great sound guy. you're not paid to type
Sonic G8: Mech warrior is a robot simulator It will be very COOOOL
Potyen: tell me more
Sonic G8: It is a VR/sim game that puts you in control of a very large robot that competes with other large robots. You are in the drivers seat like a jet sim
Potyen: a helmet-type vr game?
Sonic G8: How about those dodgers? Who knows?
Potyen: very good! who's publishing it?
Sonic G8: Activision
Potyen: sounds good. hope you're having fun and making a little dough. god i hope this got recorded.
Sonic G8: Please send me a copy of the outcome. What are you working on?
Potyen: we're doing stuff for corporate clients, such as apple, bose... altec...we do the whole ball o wax: scripting, design, graphics, with a specialty in sound—strictly Mac and/or Windows. right now i'm doing a stereoscopic video/multichannel sound thing and a couple of other cool things
Sonic G8: Oh I like it. what company, your own?
Potyen: i'm a partner. the founder is howard lieberman. he used to be in charge of sound at apple
Sonic G8: Power PC & Intel?
Potyen: scuse me?
Sonic G8: Stereoscopic release meduim?
Potyen: well, at this point it's linear, but the next step is interactive. I don't know how the hell we're going to do it, but we will.
Sonic G8: Can this be used over T1 lines?
Potyen: quite possibly. would you like to say something about the lack of standards in the mm industry from your perspective?
Sonic G8: Standards would be nice, but in an industry that is changing every six months that is not likely.
Potyen: so you think standards will emerge from the online commercialization
Sonic G8: yes, once these projects go online, there will have to be standards to work within those channels & the rate of change will slow down so as to have a return on the initial distribution investment. Ahh the business side...Then the industry will explode...The basics of platform choices are simple, the publishers want to support the CPU that has the most amount of users. As for now, we have deal with multiple platforms
Potyen: indeed. okay, i gotta get outa here. have you had enuf?
Sonic G8: How about those dodgers?

3/4/95 10:52:15 PM Closing Chat Log file. ■

Paul Potyen can be reached at potyen@aol.com.

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"Soundscape seems to be a remarkably stable system in that I didn't experience a single glitch, crash, or hiccup during the entire review period. It's a credit to the developers that every operation worked smoothly and as advertised. That is not something you can take for granted."
Dennis Miller. ***Electronic Musician Nov '94***

"Soundscape is one of the few digital recorders that permits recording while chase locking without an expensive hardware add on to control it's sampling rate. The SSHDR1 currently provides the most cost effective solution for this application."
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Dennis Miller. ***Electronic Musician Nov '94***

"Ever since the introduction of the DAT format, the world has looked for a replacement for the razorblade. Soundscape is a sharp, affordable replacement with extras."
Eddie Ciletti. ***EQ Feb '95***

"Everybody reported that their system had never crashed and that they had never found any bugs, not even on preliminary alpha or beta versions ..."
Paul Tingen. ***User review for Audio Media Dec '94***

"Soundscape does offer everything that you could want from a professional quality hard disk recording system ... it is cheaper, more powerful and more stable than many similar systems. But most of all it is so easy to use, allowing you to concentrate on the music."
Philip Moore. ***Australian Digital Mar '95***

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Nic Blinston. ***Business Video Mar '95***

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Bob Walder. ***Music Technology Jul '93***

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by Stephen St.Croix

NOW AND ZEN

THE ART OF CODING

You know, it just doesn't seem possible that computers are taking as long to compute things as they are. It is hard to believe that today's machines, which are capable of *20 million to 100 million instructions per second* are really spending 40 seconds to update a simple Excel spreadsheet, or 300 *days* to render a little 2-million-polygon, three-dimensional image. In fact, I don't believe it, and I have a theory as to what is really going on. As we all know, there are only two basic platform types in the personal computer market: Macs and everything else. Macs use the Power PC chip, and the new DOS/Windows machines use the Pentium.

So here is what I think is really going on. When you ask a Mac to do something, it stores the request, then spends all that time deciding, "Should I do it? Yeah, maybe so...No, I don't think so. Well, maybe I will; no, I won't. Wait, I guess I'll do it; no, I'll just crash; nah, I'll do it just this once and crash next time." And then, after several million of these decisions and decision reversals, totaling a few seconds, it performs the calculation and gives you the answer. The Pentium, on the other hand, immediately and obediently processes the request, does the computations and then spends the next several seconds figuring, "Okay, done. Now...wait; is that right? Yeah, that's right. No, wait a minute, that's not it...Yes it is, it's *close*, anyway. No, I have to do it again, that doesn't feel right."

Now, even with one of the above always going on—or perhaps *because* one of the above is always going on—as time-sensitive computer programs become more and more complicated (as we demand that more stuff happen in less time), a new challenge appears. Programs that deal with datastreams such as audio or video have some interesting time constraints. If you want something to happen to audio, let's say, and you want it in real time, you have to execute all the code, whatever it is, for each sample. Let me put it another way. If you just want to EQ a stereo track in real time, you have to completely run the EQ code for each

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sample, move the result out of the way, bump the next sample in, check the flag to see whether the EQ has been changed, and if it has, you have to load all the new code and then run *it* on the next sample, and so on and so on. This entire loop must be run for every sample, 44,100 times each second, over 88,000 times each second for stereo. Add to this the A/D and D/A converter overhead, along with a bunch of voodoo code like de-zippering, stack swapping, and so on, and you have quite a lot to do in a very short amount of time.

As we demand more and more real-time power, we are asking for more and more code to be run in the same 44.1k sample period. There are only two ways to do this: raw horsepower or clever code. Raw horsepower is pretty much self-explanatory. If you write a stupid program and run it on a slow machine, it looks like a stupid program. But if you run that same program on a wicked fast machine, it looks very impressive and powerful (unless, of course, it is *so* stupid that it only ends up looking like a really really fast stupid program). I have covered this in previous ramblings, but it's *still* true. Raw power can cover a multitude of sins

As we demand more and more real-time power, we are asking for more and more code to be run in the same 44.1k sample period. There are only two ways to do this: raw horsepower or clever code.

(as is demonstrated daily by large corporations and small governments alike). Unfortunately, many people are using raw power as an excuse to write sloppy, slow, stupid code. Today's computers can run programs written in BASIC faster than last decade's machines could run the same functions written in raw machine code (the fastest known way to run code).

Okay, now let's say that we took these same fast machines, fast DSP hardware and fast caching architecture and wrote really good, tight, intelligent code for them. Imagine what would happen. More bands of EQ, less noise and artifacts, more functions in general with less garbage in general, all from the very same hardware! Now wouldn't that be nice?

The problem is that there is little incentive for programmers to do this because newer, faster machines come out every Monday and get discontinued every Friday. But there *are* a few real artists out there who actually do it anyway, and their code is truly a joy to run. You can learn to sense the presence of a program running art for code; it feels slick, smooth, polished. It scares you a little for the first few days because things seem to happen slightly before you ask. Cur-

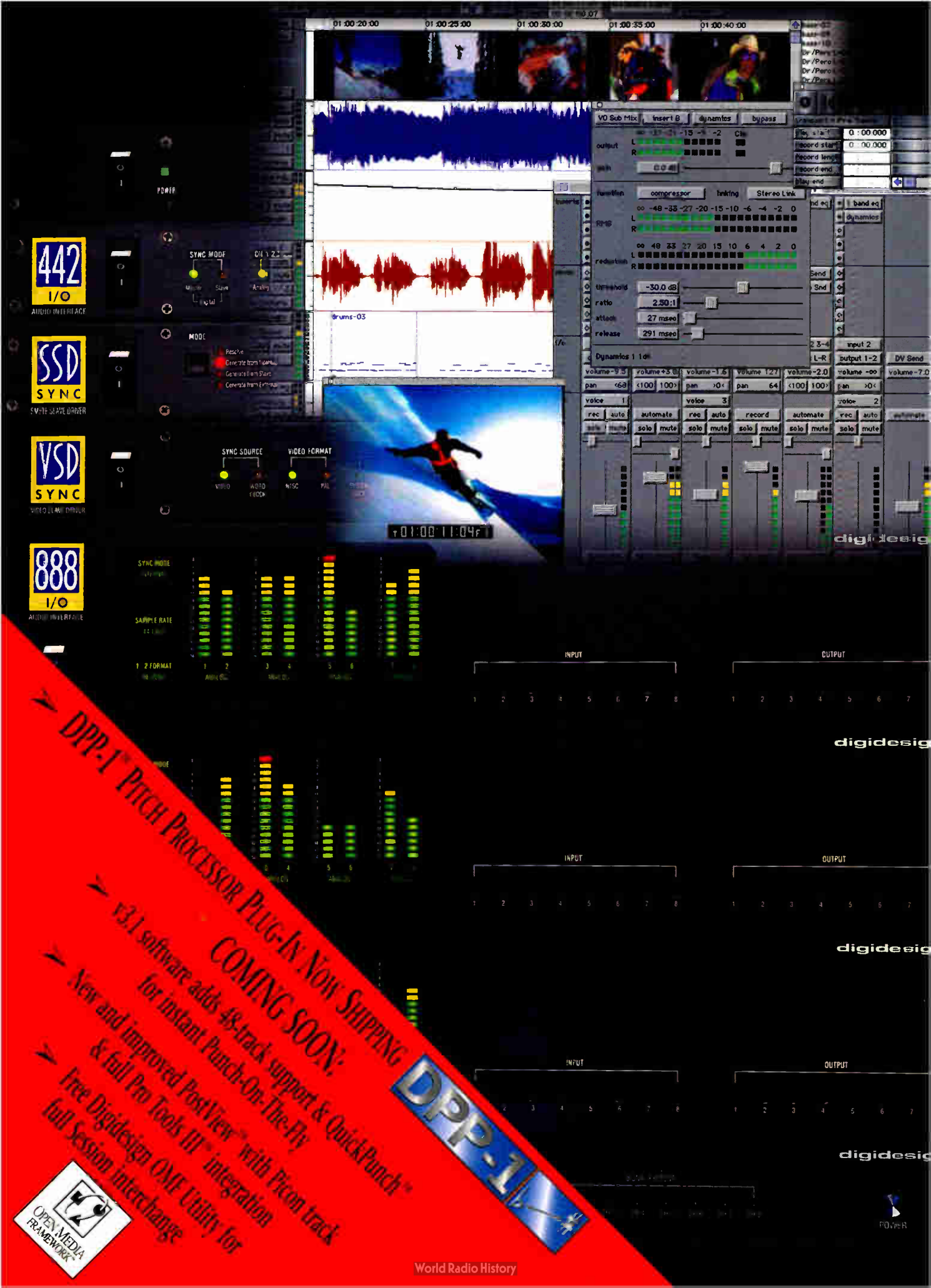
sors move without jerking, EQ sounds better, waveforms slip across the screen like heartbeats on a half-million-dollar hospital monitor. Screens pop instead of draw. The software actually seems to work *with* you instead of against you. You can tell.

Buy stuff that runs like this, and the people who write stuff that doesn't will not get paid. And they will have to learn to write art, too, and there will be even more to choose from. You have heard this theme from me before, applied to other subjects. I say it again because it still works. The amazing thing about capitalistic technology is that *you* are in control. You dictate exactly what products come out and at what price. You choose what features and what quality your equipment will have. You tell the designers and manufacturers what to make. If you buy garbage, then they know that they can get away with making it, and they will, because the profit is so high that they can't resist. If, on the other hand, you only buy good stuff, they will quickly get the idea, and the very core of technology itself will mutate and adapt to bring you what you demand at the price you are willing to pay.

This applies to software more than anything else because of the significantly smaller number of people in the loop, the smaller number of facilities involved, and so on. The smaller the group you have to force to change direction, the faster the response. It's like ships: the smaller the ship, the lower its mass, and the quicker it can turn. This is why small companies often appear with the newest technology first, and it is definitely the reason that smaller companies come out with software version 1.01 faster than the giants. Software can adapt quite rapidly if the customer demands it and the manufacturer is small enough to react rapidly.

They will do what you tell them, and they will do it for free. You just have to know how to tell them. And I just told you how. Show integrity in what you buy, and the manufacturers will show it in what they sell. If you buy $20 reverbs that sound like $10 reverbs, don't feel sorry for yourself when you get passed by Lamborghini Diablos with vanity tags that say: "BAD DSP," "YUBOTIT" or "DSPBUKZ." ■

Stephen St.Croix doesn't use vanity tags because it is easier for the cops to remember them.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by Mr. Bonzai

ELLIOT SCHEINER

KNOB BOSS

From *Moondance* to *The Nightfly*, *Songs In the Attic* to *Hell Freezes Over*, Elliot Scheiner has explored the art of recording with technical bravado and uncanny warmth. As a disciple of the Pope Of Pop, Phil Ramone, he is one of the few engineers whose body of work bridges that period of great live balancing to today's refined era of megatrack digital recombination.

Scheiner, a Grammy-winner for his skills in creating Steely Dan's historic *Aja* and *Gaucho* albums, is equally comfortable in the studio vacuum with artists such as Jimmy Buffett and Bruce Hornsby, or in the mobile hotseat for events such as last year's Woodstock '94 tour de force in live broadcast/recording.

Join us now at Cafe Bonzai for asparagus spears wrapped in smoked turkey and seaweed, green beans in handmade sesame soy paste, warm tofu laden with freshly ground garlic, and buckwheat soba noodles.

Bonzai: Did anything interesting happen in the creation of the new songs for The Eagles' *Hell Freezes Over*?
Scheiner: Well, most of that work was done outside of the studio, except for "Get Over It." The demos for the other three new songs were already finished when I came on board.

Timothy [Schmit, bassist] was in a band a few years ago when Irving [Azoff, manager] was trying to put together a supergroup with [Eagles guitarist] Don Felder, Timothy, Paul Carrack and Max Carl. "Love Will Keep Us Alive" was written by Paul, Jim Capaldi and Pete Vale. I think Timothy sang it on the demo and submitted it to Don [Henley] and Glenn [Frey] for this reunion album, and they loved the song. "Girl From Yesterday" was by Glenn and Jack Tempchin, and "Learn to Be Still" was written by Don and the [former] drummer from Petty's band, Stan Lynch. The only new collaboration was "Get Over It" by Don and Glenn, and I first heard it at some rehearsals, but that's about all I saw before we began the album.

MR. BONZAI

Bonzai: How far back do you go with The Eagles?
Scheiner: Not at all, but I go back with Glenn to about '83. The first record we did together was the theme from *Miami Vice*, "You Belong to the City." We had the same managers, and at the time he was on tour opening for Tina Turner, right after "What's Love Got to Do With

It." Glenn had recorded the theme out here at Hawk Wallensky's place. Hawk was the keyboard player with Rufus.

Anyway, Glenn went out on the road, and it never got mixed. They were in New York, and I ended up mixing the record. Then Glenn went off for his acting debut in a film with Gary Busey and Robert Duvall down in Mexico. Suddenly Glenn's record really took off, went right up the charts to Number Two. I guess he figured that since he hadn't had a solo record go so high, it must have had something to do with me. So we started working together.

Bonzai: On *Hell Freezes Over*, you are co-producer with Rob Jacobs and The Eagles. How did you make the transition from solo engineer to being both engineer and producer?

Scheiner: It took awhile. I don't know if it's because people don't want to give it up, or if they don't trust you. When I started out, they wouldn't give you producer credits, even if you were serving that function, or acting as a co-producer.

The first time I really got into it was on a Van Morrison record. Shelly Yakus, myself, and a bunch of other guys recorded *Moondance*, and I was going to mix the record. It was right before Christmas, and Van decided he didn't want to be there. He wanted me to mix it and send him copies, so that supported my view that I should be getting some sort of producer credit. So I mixed the record, with Gary Malabar, who was his drummer at the time and has been with Steve Miller for years now. We mixed the entire record, sent it to Van, and he never remixed anything, loved what we did—but he didn't give me any producer credits.

On the next record, *His Band & Street Choir*, Van wanted me to get involved early on, listen to the songs, and help in pre-production. I felt it was my shot, coming off *Moondance*, and maybe I would get to co-produce. I'd gone up to Woodstock a couple of times for meetings. He knew what he wanted to do, and we went into the studio with his new band, recorded the tracks, but things got a little tense. There must have been some trouble in his life, and finally we just had a blowout. I ended up not finishing that record. When it came out, my credit was production coordinator. I didn't know what that meant.

Bonzai: It doesn't sound quite as hefty as co-producer, does it?

Scheiner: No, and I figured it had something to do with the falling out. So, I moved on and ended up producing a lot of small things that never hit. At this time, in the early '70s, there were artists who would give you a shot, based on your engineering prowess, as the "staff producer" started to disappear. Record companies didn't trust the artists enough, especially new artists, to go in there and make a record by themselves. So engineers started to become more involved in production. But for a long time, none of my projects really hit. This was in the days when record companies would sign hundreds of acts each year, and work [promote] two. Your chances going in weren't very good that the record would be very successful.

> I like to hear things come out from side to side. When I mixed *Aja*, I hard-panned a lot of stuff, and I hard-panned reverbs.

Bonzai: You've told me before that you're very proud of your work with Jimmy Buffett. Why is that?

Scheiner: Well, making records with Jimmy is fun. There's no stress; whatever happens, happens. He's always been my idol, to some extent, because he lives like nobody else does. Life is fun, and he enjoys it to the max. He does things that everyone else wants to do. I don't know if it was because he knew the records would come out okay, or that whatever happened, his fans would buy the record under any circumstances. He was usually pretty happy with what came out of it.

It was always in some tropical climate, and the record I produced with him was done in a small studio he built in Key West, which he called Shrimpboat. It was a makeshift studio, but it was so great to be there in the middle of February when it was the dead of winter in New York: one of the best experiences.

Bonzai: How did you get involved with Steely Dan?

Scheiner: I used to make records with a group from the '60s called Jay & the Americans. Walter [Becker] and Donald [Fagen] were in that band as their sidemen, their roadband. On the last record we made, Donald and Walter did the arrangements and played on all the tracks. The producer Gary Katz was involved to some extent, but I don't remember exactly what he did. But he was always around, and he and Donald and Walter were very close. When Gary moved out here to L.A. around 1973, he took a job with ABC and hired Walter and Donald as staff writers. They moved out here and ended up as Steely Dan, working with Roger Nichols on *Countdown To Ecstasy*, *Katy Lied*, *Pretzel Logic* and *Can't Buy a Thrill*. They liked some records I had made and decided to bring me out to do some tracks for *Royal Scam*. But I didn't know anything about deals—I was basically a staff engineer until about a year before they called me. You got a weekly check from a studio, and life was all right.

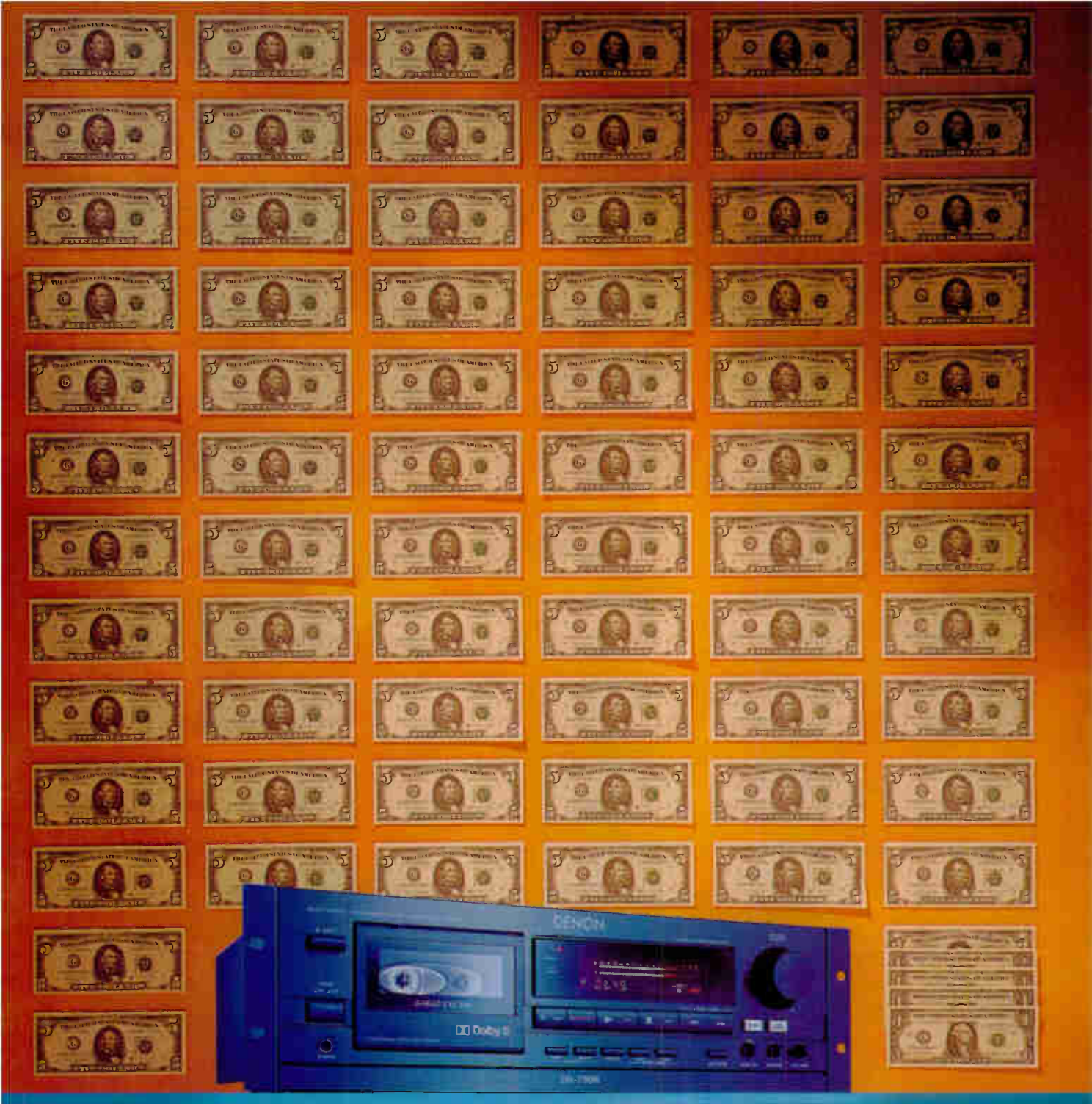
Bonzai: What studio was that?

Scheiner: A&R, Phil Ramone's place. Sometimes we were working on commissions, but I didn't know anything about making deals with bands and record companies. So, I agreed to what I thought was a good deal. They offered me what seemed like pretty good money to do this record, and Gary swore to me that it would take no more than 60 days. Then about six months later...

Bonzai: Still working?

Scheiner: Still cutting tracks! I was feeling so lonely and had been living in a hotel for so long. One morning I got a call from Gary, "Well, we're canceling today." And we had canceled three or four days out of the previous seven. I just packed my things and I left. I went back to New York and never got a call, never heard from them again. The record came out. I guess they must have known I had had it.

Bonzai: But you kept up the relationship?



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Scheiner: No. What happened is that they went on to do *Aja*. They called me up to mix, and I cut one track. I think the first song we mixed was "Deacon Blues," and after about two days of mixing, during a lull, I had stopped tape and I could hear a voice from across the room. It was Donald asking, "So, why'd you leave?" This was years later! I turned around and said, "Are you talkin' to me?" He says, "Yeah, why'd you leave?" I explained how I had felt and that was all that was ever said about it.

Bonzai: Donald Fagen's *Nightfly* seems to be the de facto listening standard. Wherever you go, if people want to check out a studio they pop that in. Why is that? I've even seen you do it!

Scheiner: I'll do it occasionally, because I am so familiar with it. I didn't used to do it, but I started when I'd go to live shows and I'd hear a guy tuning the room to *Nightfly*. It blew me away. People actually respected that record enough to do that. Most people liked the way it sounded, and I guess it just covered everything, in terms of frequency.

Bonzai: Is there something about it being recorded on the 3M digital machine? A lot of folks still feel its a great-sounding machine.

Scheiner: I felt like that for a long time, but not so much anymore. Gary still makes records with that machine. He and Donald own two 3Ms at River Sound in New York. I find it to be a little harsh-sounding to me now. I think digital has softened up a bit since the 3M came out, and I prefer a Sony now. The 3M is a good-sounding machine, but there is a lot of maintenance involved and it's hard to find parts. Gary and Donald have a guy on staff, on-call 24 hours a day, 'cause he's the only guy who knows what to do with it.

Bonzai: Digital vs. analog. When you're tracking now, which do you use?

Scheiner: Lately I've been tracking analog, but I tend to prefer digital. The Eagles were analog; Glenn was analog because he has analog machines at his studio in Colorado, Mad Dog Ranch. When we were building the studio, digital was a consideration, but it was still too cost-prohibitive. We ended up buying a pair of Studer A-820s.

Bonzai: Did you track all of Glenn's new tunes up at Mad Dog?

Scheiner: We did all the basics at his place and then came to L.A. and put live drums on, and horns, vocals.

Bonzai: What kind of console does he have?

Scheiner: Neve VR 48.

Bonzai: What is your console of choice?

Scheiner: I'm pretty partial to Neve. However, I'm intrigued with SSL's new digital console. I love the concept—to eliminate the tape machines and record directly to a hard drive.

Bonzai: You did Manhattan Transfer—what was your vocal mic setup?

Scheiner: I tracked about 80 percent of the *Vocalese* record with them, but I didn't do all the overdubs. With them, it varied, but I think we had them gathered around one mic, a U67.

> When I started working at A&R, it was a full-service studio. You got to learn how to master records, record, do film sound editing. We wanted to learn it all.

Bonzai: What did you use for Glenn's vocals on his new record?

Scheiner: A 67. You know, it depends on the singer, but I find the 67 to be pretty good. Depending on how dark somebody's voice is, I might use a C-12, or a 251. But the 67 can take a real beating and is a great-sounding mic.

Bonzai: How do you mike piano?

Scheiner: I usually use a pair of C-12s, and I'll keep one mic up by the high side of the hammers and the other one down the low side on the strings, to get some stereo imagery. If the piano is big, you can get wide imagery—amazing separation where you hear the low end on one side and the high end on the other. Sometimes it's disconcerting, and when I mix something like that, I will start panning it in, because it just feels so far apart that it doesn't sound like one instrument. Sometimes you luck out and there will be a nice even spread between the high and the low, and it will just come in a bit.

Bonzai: After scrutinizing a few of your mixes, it seemed at times that the weight shifts in the stereo image from left to right. It seems that most people go for definition, but they keep things pretty balanced. With you, my attention sometimes goes to either side.

Scheiner: Yeah, I would agree with that. And I would also agree that most people try and even it out and almost keep it mono-like. I know engineers who refuse to pan things out hard. They bring it in and they don't want anything sticking out to left or right.

When I started working for Phil Ramone, it was primarily 4-track. I was Phil's second engineer, and he was doing these Dionne Warwick records, with Burt Bacharach and Hal David. He had this one room at A&R that wasn't very big, but you could literally cram 40 guys in there and it would sound great. And he would do it all live-to-4-track. In some cases, the 4-track was just a backup, and he would do live stereo and mono.

With 4-track, he would have one track of all the rhythm instruments—drums, bass, guitars, keyboards. One track would be horns, and one track of strings. Sometimes when they'd do overdubs, they'd mix the strings and horns together, and do backgrounds on one track and lead on the other. But a lot of times, it would be horns split and strings split. So when he mixed the 4-track, he'd have center information of that whole rhythm track mixed together, then horns on one side and strings on the other. They were panned far and you heard stuff, it would jump out and stick out. It wasn't offensive. That was stereo to me.

I like to hear things come out from side to side. When I mixed *Aja*, I hard-panned a lot of stuff, and I hard-panned reverbs. If I had a keyboard, maybe a Fender Rhodes, I'd have its reverb dedicated only to that instrument, returned on the other side. So it was dry on one side, and the reverb return only on the other side. You'd hear it jump out a little. I like the fact that you can hear things pop out. I don't have any specific

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method of going to the right or the left—it just depends on what happens to be there.

Bonzai: Do you have any new tools?

Scheiner: Lately I've been working with Spatializer and trying to perfect it in my mixes. I'm striving for usage that will really make the sounds come out. As far as engineering, there's not much new that I'm crazed over. But as a producer, I spoke to Gerry Block, and I'm hoping that someone will design something that will recognize pitch, so that you could tune things, or see where it's out of tune and not guess. Sometimes I have to retune things with the Ultraharmonizer, trying to correct things that sound funny. I'd like something that you could feed a vocal into, or a horn part, and actually see where it's out of tune and in which direction. I've worked with people and they know that a vocal is out of tune, but a lot of times they are headed in the wrong direction. They think it's sharp when it's really flat. After pounding for hours in the studio it can be tough to tell. It would be great if you could take something off tape and put it into some software that would show it to you on screen, say five percent sharp. That would be a great tool.

Bonzai: What was the first music you recorded?

Scheiner: It was a Jimmy Smith record, in 1968. I was Phil's assistant, and it was the way many got started back at A&R. As an assistant, you set up the room for the engineer, miked everything. They really taught you mic technique. We knew how to mike stuff, we knew where these guys wanted it, and we knew what it would sound like. You got a chance to do rehearsals and stuff on weekends, or late at night.

We'd been working on this Jimmy Smith all week. There were daytime sessions, and then nighttime sessions. Jimmy Smith had the studio booked for a week or two at nights. So we'd have to break down the setup after we'd finished every night and set up again the next day. Phil walked in, everything was ready to go. About five minutes before the start, he said, "I got some stuff to do—you do it." I panicked, because it was the first time that it would mean anything. I was so scared and so nervous. I guess it came out okay,

but it was such a shock for him to walk down and say that. "You do it. I'll be up in my office."

Bonzai: Did you ever walk out of a session?

Scheiner: No, I never did. Oh, actually, I did, but it was drug-related, and I don't know that I should talk about it. I had a terrible cold, and I was trying to mix this record but I could barely breathe. Somebody gave me one of those Vicks inhalers and said, "Here, this'll help you." I took two big breaths, and it turned out that there was amyl nitrate in there, and it just made me crazy. They were laughing, and I just walked out, for that night anyway.

Bonzai: Is there anybody that you haven't worked with that you would like to work with?

Scheiner: Oh, yeah. I'd love to work with Peter Gabriel.

Bonzai: What's your advice for the next generation coming into the studio?

Scheiner: Boy, it's tough for these guys coming up. When I came up, you really moved—it was almost like an assembly line. When I started working at A&R, it was a full-service studio. You got to learn how to master records, record, do film sound editing. We wanted to learn it all. That doesn't exist anymore. In a period of a year, I went from knowing absolutely nothing to engineering. But there wasn't that much to learn. You had to know mic technique, and that was the primary thing. And you had to have ears to mix stuff; you had to be able to blend stuff on tape, because a lot of it was on 4- or 8-track, where you had to combine all the strings on one track, or all the horns on one track.

For the kids today it's tough, so technical. It's very seldom that a young person can go into a studio and actually learn how to mike strings, horns or drums. For a while, it seemed that there were no real drums—it seemed that everything was machines. An engineer who had made some incredible records came up to me awhile back, and he was almost in a panic. He was starting a record that had a real set of drums and he told me, "I've never miked drums. I have no idea how to do it."

Kids today come up as interns, maybe they move up to a second. It's a long, hard road now. And with the growth of home studios, it's even more difficult, because there is less studio work. You see it more back east, where most of the stuff is being done at home. I gave a seminar last year at Berklee, and the students asked what they could do after graduating. It's very limited. There are not many jobs available, and it's survival of the fittest.

Bonzai: So how did you end up becoming a recording engineer?

Scheiner: I was a musician, playing in bands all over New York. Did some road tours as a sideman, and I just didn't want to do it anymore. My uncle was a studio trombone player, guy named Chauncey Welsh. He was doing massive amounts of work at the time, and he introduced me to Phil Ramone. And that's how it all began. Shelly Yakus and I started the very same week at A&R—what a great bunch of guys. But even then, you had to know somebody to get in that front door. ■

Roving editor Mr. Bonzai got his start cleaning Walter Cronkite's pipe off-camera during broadcasts of The CBS Evening News.

AES Paris:

Les Hits du Show

by George Petersen

A week in Paris to check out new audio toys at AES? All expenses paid? This was one tough assignment, but it's proof positive that I will endure any sacrifice to keep *Mix* readers informed on the latest in audio technology.

But lest you foolishly envision this trip as evening strolls down the Champs-Elysées or sidewalk cafes along the Left Bank, be forewarned: February ain't summer, and the weather was cold (by Parisian standards), mostly in the 30°F to 40°F range, and it rained every day, save for a brief period of snow flurries.

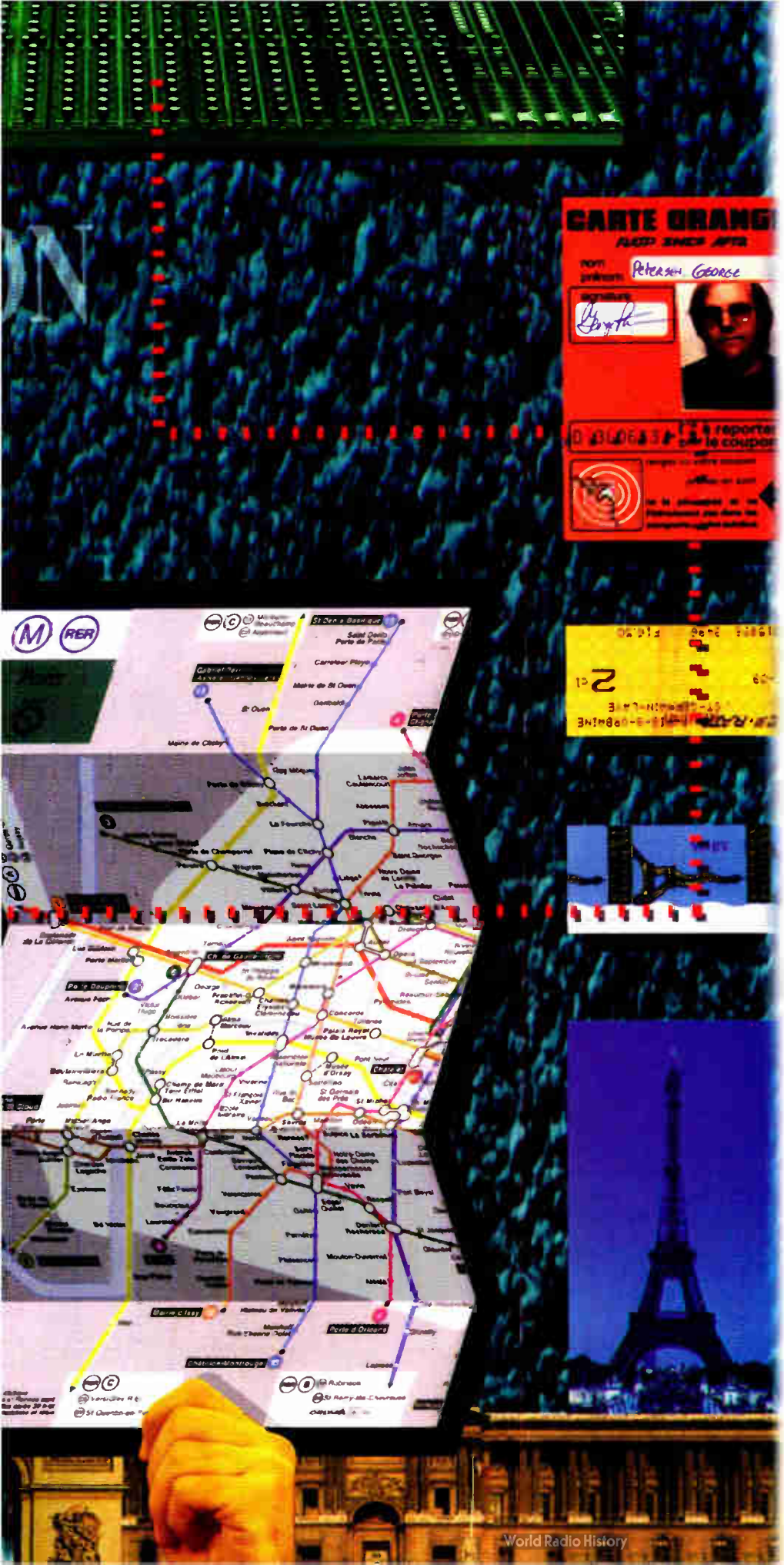


Illustration: Gordon Studer

Held from February 25-28, this 98th AES convention was just as successful as its first appearance at the Palais des Congres convention center in 1988. Yet the Palais remains among the most unusual convention facilities I've ever visited. On the plus side, it's in a nice part of town (a ten-minute walk from the Arc de Triomphe), with ample—albeit pricey—hotels and restaurants nearby. To avoid inclement weather, both railroad (RER) and subway (Metro) stations are conveniently located in the basement. The lower levels of the Palais are home to stores, fast food shops, a post office, three cinemas and a recording studio. The latter, the Studio de la Grande Armee, has four SSL-equipped rooms with a choice of Sony, Mitsubishi or Otari multitracks. During the show, a couple of enterprising companies booked the studios to demo new monitor designs (including the ultracompact, ultracool Dynaudio BM5s) for AES visitors. I must be getting strange in my old age: After years of enduring demos in bad hotel suites, it seemed odd to hear speakers at a show demo in a comfortable control room.

Stage Tec Cantus digital console

Upstairs, the AES staff was helpful in untangling the inevitable registration snarls that accompany any large event, and the only long lines I ever saw were attendees checking their wet raincoats at the front door. The only drawback of AES Paris stemmed from the fact that the Palais is not really a convention center at all, but a multistory performing arts theatre surrounded by several levels of lobbies, hallways and meeting rooms—all converted into booth space. AES

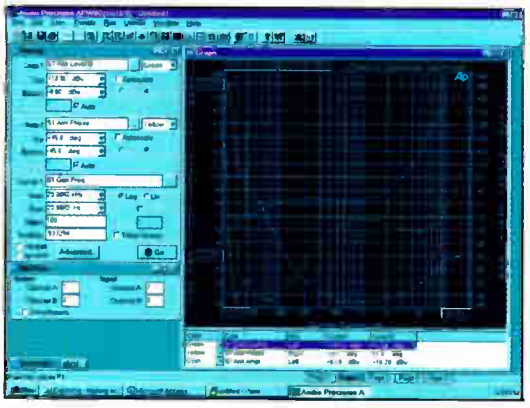
Midas XL4 console

Tektronix 764 digital audio monitor

featured more than 300 exhibitors, scattered over three floors of the Palais, and knowing where you were (or needed to be) required some knowledge of Parisian geography, as booth numbers were divided into four quadrants, depending on which district the outside of the building faced. Fortunately, AES Paris continued the elegant and civilized European show tradition of placing a well-stocked bar in every booth, so even if you got lost, you were never far from a cocktail.

Once I was on the floor (show floor, *not* the carpet), I started looking for interesting new products. Europeans take their audio conventions *very* seriously, so I was not too surprised to discover that the biggest buzz at the show was test gear.

Audio Precision celebrated its tenth anniversary with two significant introductions. Scheduled for release this July is System Two, the second generation of its now-industry-standard System One test gear. As with its predecessor, System Two combines software and an outboard interface box with a standard PC for all control and monitoring functions, so any improvements in PC speed or resolution could be incorporated into the system merely by upgrading the PC; a laptop control package is also available. Among the new system's features are true dual-domain (analog/digital) measurement capacity, so signals are never sent through converters during testing, and the ability to test all AES3 parameters (with margins sufficient for full 20-bit). Additionally, the unit can lock to virtually any house sync signal, including NTSC, PAL and SECAM video. Analog specs include -110dB (0.0003%) residual THD+N and FFT following the notch filter down to -140 dB; digital is said to be pure down to -130 dBFS.



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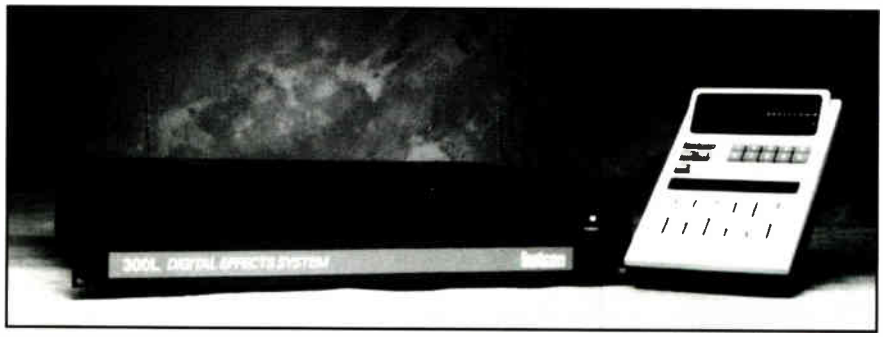
Standard with System Two and optionally available with System One (which will *not* be discontinued) is APWIN, a Windows-based control program that allows the user to create a "virtual audio test bench" so test instrument panels, bar graphs, and X/Y graphs of up to six parameters can be viewed simultaneously. System Two pricing is expected to be approximately 10% to 15% higher than comparably equipped System Ones.

Not to be outdone, Tektronix unveiled its Model 764 Digital Audio Monitor, a stand-alone (no computer required) half-rack box that combines the features of a level and phase meter with that of a digital monitor. Standard are LTC and VITC timecode inputs, headphone jack, four digital inputs (ideal for digital video applications), with loopthrough capability, so the unit can be left in a transfer chain without degrading the signal. Also included is a VGA output for remotely monitoring the unit's hires CRT display. In addition to the phase and onscreen (selectable ballistic) metering, the 764 has a "Session Screen" that detects and logs channel activity on all four channels, including highest true peak, number of clips and mutes, invalid samples, parity errors, active bits, sample rate, DC offset, frame/channel sync errors and more. Once a data transfer is complete, a hard copy of the report is generated by connecting a serial printer to the rear panel port. Best of all, the report time stamps the errors and status data to timecode or real time, so the offending section can be easily identified. Anyone who has ever critically listened to a cloned tape or safety copy (usually at 3:00 a.m.!) to make sure it sounds okay is going to love the Tektronix 764. And its $4,500 retail tag is a small price to pay for all those extra hours of sleep.

On a totally different front, Nagra created a stir with its ARES-C, a compact portable deck that records on solid-state PCMCIA cards. Designed for field recording, this no-moving-parts unit uses G722 compression to provide 7kHz speech-quality bandwidth and up to two hours on a 64MB PCMCIA (or 40 minutes on the more common 20MB PCMCIAs). A software upgrade later in the year will add MPEG Layer II compression, but meanwhile the ARES-C offers graphical editing capability, automatic EDL creation while recording, built-in ISDN hardware with telco output, AES/EBU digital output, onboard mic preamps with phantom powering and rugged aluminum construction. No word on deliveries or pricing as of press time.



Lexicon 300L

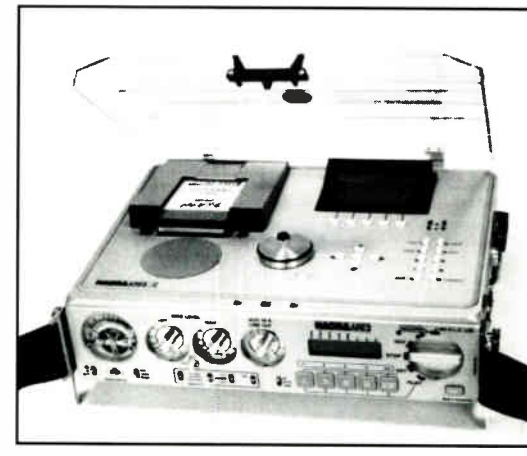
Even with all this solid-state stuff, tape recorders are here to stay. Sony's new PCM-2600 studio DAT deck is a rugged, four-motor (non-timecode) studio beast, with +4dBm XLR analog connections, AES/EBU digital I/O and switchable, onboard SBM (Super Bit Mapping) processing. It should be out this month at a U.S. price of $1,795.

Don't ask me when this next one will ship, but Otari was demonstrating an early prototype version of its Radar-GUI, the PC-based graphical user interface for its Radar workstation. Radar-GUI provides intelligent display of tracks. functions and session data, and while I'm sure Otari will let the world know when it's ready, I thought I'd let you know it's in the works.

Lexicon debuted a new version of its popular Model 300 processor: The new Model 300L supports the Lexicon LARC controller, just like the 480L and 224XL. But the BIG news is the LR4 FrameLink, allowing one LARC remote to control up to four LARC-compatible devices, which should end the LARC "console clutter" that besets many multi-Lexicon studios. Nominally priced upgrades (300 to 300L, and the LR4) are available now—call Lexicon for details.

Due for release this summer is Rembrandt by Amek, a mid-priced ($60 to $70k U.S.) multitrack recording console designed for music or video post applications. Based on the successful Einstein console, the board features an in-line, dual-input path design with 40- or 56-channel frames providing 80 or 112 inputs (all with 4-band EQ) and up to 16 aux sends. Amek's Supertrue Version 3 automation (a timecode-based system with six switches per module plus level control) is standard, and moving faders are optional. Supertrue also includes Virtual Dynamics processing on each channel with full parameter reset and Amek Recall for manual reset of all non-automated switches and rotary controls.

It's been talked about for months, but the Midas XL4 is now closer to reality. The XL448 is a 45-bus (16 mono aux, 16 subs, 4 stereo aux, main stereo out, stereo AFL and mono PFL) featuring 112 XLR inputs, including 48 dual inputs (line plus mic) and 16 aux returns; 77 20-LED peak program meters; 12 motorized faders on the VCA masters (10 subs/2 mains); eight automute groups; XLR outputs that include 48 direct channel outs, 24 aux outs and 16 group outs; internal 18x8 matrix; 158-point TT patchbay; and 99-scene automation storage of the 2,539 automated switch functions on virtually every console function. Already road-tested with Rod Stewart, the Midas XL4 is an absolutely stunning development: An upscale, high-performance sound reinforcement console that should make waves



Nagra ARES-C solid-state location recorder

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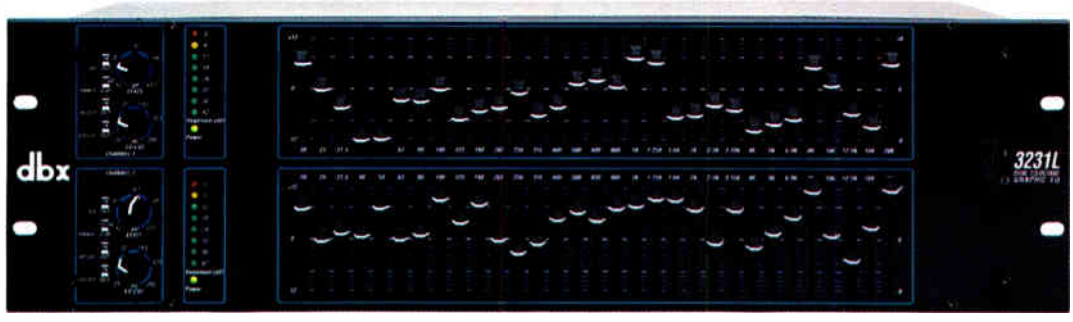

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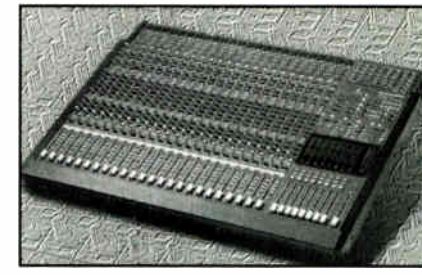
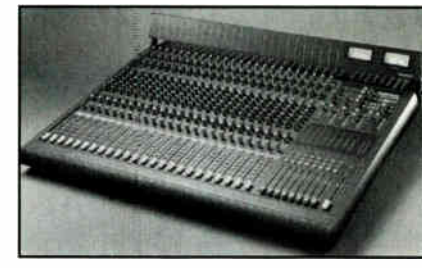
in the touring business for years to come.

The winner in the new, big digital console category is Stage Tec's (of Berlin) Cantus, which consists of a central controller that communicates to its remote audio electronics via fiber optics. The standard package is 64 inputs with an ultracompact three-rackspace DSP unit; 64 summing buses can be delegated as main outputs, groups or auxes. Also standard are screen-based, instantaneous channel routing of any input to any channel, extensive alphanumeric labeling throughout the console, onboard dynamics, moving faders, resettable rotary encoders, and SMPTE- or MIDI-based automation.

My "Design by Proxy" award goes to Behringer, which displayed its Eurodesk® MX 8000, a budget 8-bus console that—other than a minor EQ routing change—bears a more-than-coincidental resemblance to the Mackie 8•Bus.® Check out the photos...You make the call.



Behringer Eurodesk MX 8000 mixing console



Mackie 8•Bus (with optional meter bridge)

By anyone's standards, the 98th AES was a rousing success, and even if you were confused by the booth numbers, you could always find a great meal to help you forget about such trivialities. Number 99 comes to New York October 5-8, 1995, and the next EuroAES (the 100th Convention) goes to Copenhagen, May 11-14, 1996: In spring! My Danish soul-brothers (who always know where the good AES parties are) say it'll be great. And I believe them. We Danes gotta stick together. ■

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by Zenon Schoepe

Clockwise from left: Metropolis' Studio A, with its Neve VR60 console and Genelec monitors; Mike Stock and Matt Aitken in the control room of Stock's personal studio near London Bridge; Malcolm Toft, who designed the new MTA 990 Series console for his firm's new A2D mobile recording facility.

BRITISH STUDIOS

LIGHT AT THE END OF THE TUNNEL

The UK studio business has endured one of the most concentrated assaults upon its very substance that it has ever known, but it is beginning to come out on the other side. As studio operators in the U.S. know, the effects of the recession have been global, and the established recording

studio sector in Great Britain has responded with changes in attitude and variations in the number and type of players.

Studio closures have resulted from owners' inability in the belt-tightening '90s to support inflated property

rents that were fixed in the 1980s. This phenomenon has been compounded by rate-cutting, bad business sense and poor investments, or any combination of the three. Indeed, it is a demonstration of the maturity and built-in resilience of the

—CONTINUED ON PAGE 48

FACILITY SPOTLIGHT

DEP International Studios

UB40's Production Home in Birmingham, England

Abbatoir means slaughterhouse in French. It was also the name of techno-reggae band UB40's project studio when it opened ten years ago in a former cattle butchery in an industrial area of Birmingham, England. But the place has gone through a few changes since then: It is now a commercial two-room facility called DEP International Studios. "They changed the name, thank God," says DEP technical manager Ron Pender. "It's been prettied up, as well. They've changed the entrance to a different part of the building, and they've cleaned it up and painted it and made it look relatively smart. At the second-floor level, there is a conservatory overlooking Birmingham City Center. It's wonderful, but it does seem a little incongruous in the area." Most recently, DEP's Studio 1 underwent an extensive redesign.

DEP International's redesigned Studio 1

"The studio was originally built as a basement studio for the band to produce their own records in," explains the studio's chief engineer, Mike Exeter. "It was just a single room with the original Amek Angela console. I think they realized very early on that it would be better to have their own facility; the way they work, they like to write in the studio. Three or four years ago, they decided that the original Angela room had more than paid for itself, and they deserved a new studio. A new room was built, and the Angela room became Studio 2. It was finished two years ago."

After the rebuild was completed, and shortly after the band embarked on an international tour in support of their multi-Platinum *Promises and Lies* album, studio manager Nick Phipps hired Exeter, whose background includes a degree from Full Sail Center for the Recording Arts and freelance work for DEP. At the same time, studio veteran Pender, whose career began at Abbey Road 30 years ago, was brought in, and the team began turning DEP into a commercial studio.

Discussions between the band and their new staff about how the facility needed to operate yielded the impression that "not much thought had been put into the facility as a whole and the needs of the band," recalls Exeter. "With eight people in the band, they need a big control room and consistent monitoring between both control rooms, so we engaged a company called Recording Architecture [Greenwich, London]. They've done many studios over here, and they've done some stuff for LucasFilm up at the Skywalker Ranch in California." Exeter and Pender worked with RA's Roger D'Arcy and acoustician Nick Whittaker on a new design, with the bandmembers offering feedback by phone, as their tour was well under way.

"We came to the conclusion that it would be better to take the new rooms and actually turn their function around, so that what was the control room is now a slightly smaller overdub area, and the studio is now a control room. The original basement studio had gone through sort of a minor refurbishment last spring; we really brought that back up into life, too. Now, it's got a lovely live tracking room in it that is more than big enough to take the entire band in there for rehearsals, which was one of their own criteria."

Studio 1 is equipped with a DDA AMR24 console with Optifile automation. "It's sort of geared to tracking, but because of the amount of inputs—it's got like 68—it's okay for mixing," Exeter says. "And the band's production is oriented very much to sequenced music, so they have banks of sam-

plers permanently installed. Depending on who's in there, we have either three S1100 Akais or three S3000s, and they're generally fully loaded up to 32 meg, because they tend to record vocals directly, and so they need lots of memory." Other gear includes two Otari MTR-90II tape machines with 48 channels of Dolby SR, Amek 9098 mic-pre EQs, Focusrite Red 2 and Red 3, Tube Tech and Drawmer 1960 compressors, AMS digital delays and Lexicon 480L and 224XL. The main monitoring is through ATC SCM300s paired via ATC's custom crossover with three Crown Macro Reference amps. "ATC provided for a center monitor as part of the design," Exeter says, "so if you get into film or surround mixing, it's not an add-on monitor; it's actually built into the front wall."

Studio 2 remains much as it was before Exeter and Pender arrived, but its Amek Angela has been upgraded with Optifile Tetra automation. It has an Otari MTR-90 with 24 channels of SR. "And we've put in some of what I call my favorite vintage rack," says Exeter, "some vintage Neve mic pre/EQs, the Drawmer 1960 tube mic pre/compressor, a unit that's made in England called a Tony Larkin TLA dual-valve mic pre EQ and a couple of old EARs, which are very similar to the Pultecs, some old ancillary bits like the old AMS delays and reverbs and, of course, a Lex

Technical manager Ron Pender and chief engineer Mike Exeter

224XL. The main monitoring down there is ATC SCM 150s, and then both rooms share various close-field monitors like Tannoy PBM-6.5s and [Yamaha] NS10s." Exeter says that this room is "very much geared toward tracking but will also hold its own in a mixing environment. It's a 36-input console, which is 72 on mix. It's a great little console."

Elsewhere in the building is the office of the band's own record label, also called DEP. So far, it handles UB40 releases only, but the band has used its name and its studio to encourage local artists. "We ran a competition in conjunction with a local magazine called *Brumbeat*," says Exeter. "Brum is the nickname for Birmingham—sort of a play on words. Four bands were given the opportunity to record a song each in three days. We put together a CD to tout around, see if we can get them any further on in their careers. That was a nice project." Other recent sessions at DEP International have included UB40's lead singer, Ali Campbell, working on his first solo album, and Sony artists General Public.

"We got a studio that was built and completed two years ago, and we've gutted it and turned it 'round again," says Pender. "It's the kind of thing you'd have to laugh unless you'd cry. But it's been worthwhile. With some real thought to the requirements of the band, a look at the facility as a whole, and the coming together of a great team, led by Nick, we think we've created a really tremendous facility both for the band and for the commercial environment."

—Barbara Schultz

—FROM PAGE 46, BRITISH STUDIOS

UK industry that it has survived the cull as well as it has.

"Few would deny that the past three years in the UK have been among the most difficult for our industry, with the worst recession I have seen in my lifetime," says Adrian Kerridge, newly appointed chairman of the Association of Professional Recording Services.

"But there is a positive upturn, and I think most studios are now more upbeat than they were maybe 18 months ago," he continues. "I'm bullish about the future, and I hope that studios will begin to widen their margins so they can reinvest in equipment with our manufacturers. It all started here in the UK years ago, and we're still world leaders," he says.

Some will quietly admit that the shakeout of the past three years has separated the wheat from the chaff—that it was inevitable, even long overdue—but few would argue that what remains is an inherently stronger and healthier studio market.

David Harries is technical director at Air Lyndhurst studios, which remains the most ambitious UK studio development of recent years and which set an unusual precedent in combining traditional studio facilities with TV post-production and a large orchestral room ideal for film scoring. He says it is now up to the record companies to fuel the future.

"Throughout the recessionary period, the record companies battened down the hatches and relied on safe acts and reissued material. No one can blame them for that," says Harries. "If the record companies and studios are going to go forward together and maintain the industry, it's the record companies who must lead and start investing their profits back into new material and acts."

The international reputation of British studios also depends on this, according to Harries. "If you have a recording industry like the British one has been in the past, where just about every chart in the world has British artists in it, they've mainly been recorded in British studios. One would hope that our international reputation is based on what we've done with British artists," he says. "It's not a matter of any individual studio getting that reputation; it's based on what the international sales of records that have been made at British studios are.

"Everybody wants to go where the hit records are produced. If the record companies deliver the goods, British studios can match anything in terms of facilities and quality."

Perhaps some of the most exciting developments in the UK have centered around its previously ailing film industry. Shepperton Studios has been purchased by director Ridley Scott (of *Blade Runner* fame) and his brother, Tony. Meanwhile, it looks like the local council will force owner Brent Walker to sell the much-maligned Elstree Studios, which many associate with the birth of the British film industry, for not honoring his commitment to continue film and TV production at the site. While the film in-

Input Section

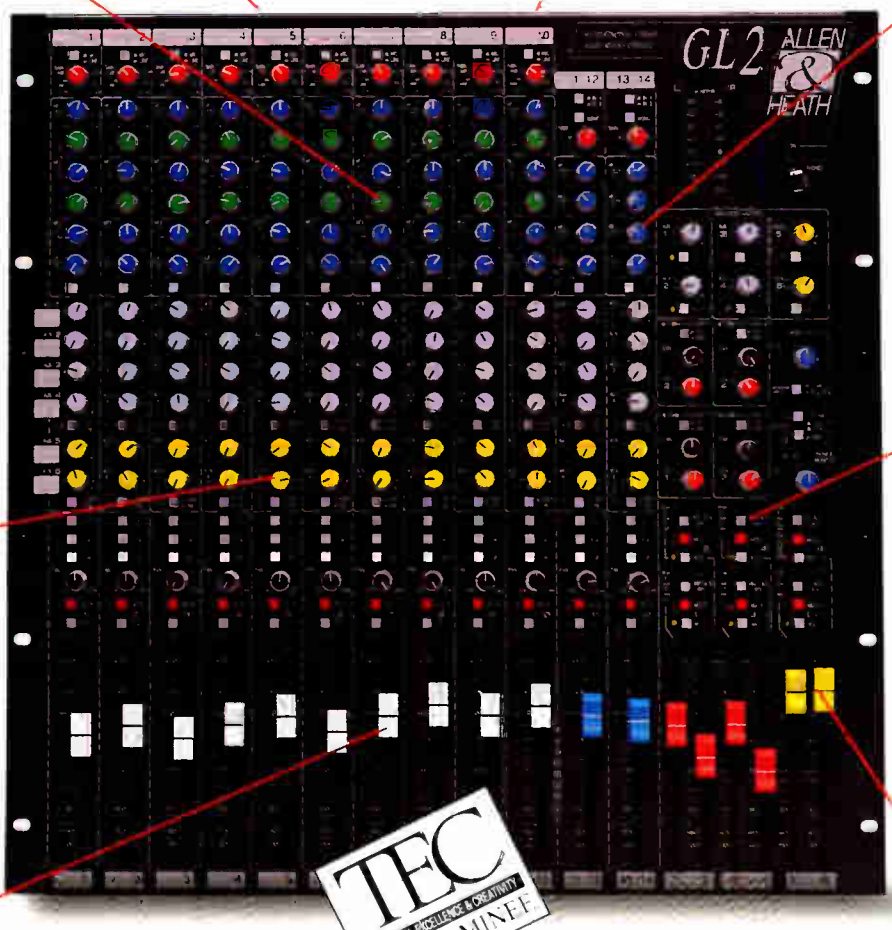
All inputs feature professional standard connectors, TRS balanced line inputs and individual 48 v phantom power switch (avoid unstan ing pops and ully power your hotter power hungry microphones) Our mic/line switch works as a 20 db pad on the XLR connector allowing you to plug into balanced XLR mic level inputs when you need to

Output Section

All four discrete subgroup outputs, Left Right and Mono outputs feature balanced XLR connectors and TRS insert points for external insertion of your favorite signal processors.

EQ Section

A warm, pristine, musical, British sounding EQ because it is British. The four band EQ (with in out switch) features fixed point shelving high and low frequencies with center points of 12 khz and 70 Hz respectively. The peak/dip upper mid band sweep is continuously variable from 500 Hz to 5 khz, lower mid band from 35 Hz to 5 khz. All bands feature 14 db boost and cut at 18db per Octave



Stereo Inputs

Stereo inputs featuring more EQ than most consoles have on their *mono* inputs. With two sets of inputs per channel and an A/B switch, you have the flexibility to select between 4 stereo sources (keyboards, CD etc.) For multitrack recording, used in conjunction with the 4 AUX/tape returns, you can bring in 8 tracks of tape while still tracking all of the other 10 inputs and getting a full function studio monitor feeds as well!

AUX Reverse Routing

Full function stage monitor console, ***it's that simple!*** Routing switches via our unique source reverse switch allows the console to be converted from a recording Front-of-House sound reinforcement board to an expandable 18 6 stage monitor console with a fully selectable engineer's cue mix.

Auxiliary Section

6 discrete auxiliary sends selectable pre fader/EQ (for monitor or studio headphone sends) or post fader (for effects sends). Routing and flexibility not found on mixers costing hundreds, even thousands more!

Faders

As is the standard on all professional mixers of its class, the GL2 boasts all throw 100 mm Alps™ faders for thousands of hours of smooth seamless operation

Master Section

Four discrete subgroups, left and right outputs, and the AUX reverse section allow the GL2 to adapt in ways impossible on other compact mixers

Tools, not toys.

See us at NSCA
Booth #313

Under the Hood

Careful attention to detail, as in individual circuit boards for each channel, fastidious component selection, and the best of British engineering all combine to establish the highest standard of performance... performance that is daily tested and confirmed anew.

The GL2 is the worlds first multi-function mixer perfectly suited for Front-of-House, Monitor, and Multitrack recording. ■ The ultimate in flexibility, this compact, rackmount unit reveals a world of new opportunity — the ability to adapt. ■ In basic format, the **GL2** is a 16 by 4 by 2 by 1 system for quality Front-of-House mixing, but at the touch of a button it's instantly configured as a 16 by 6 plus 1 Stage Monitor mixer. Another button and you're set up for digital Multitrack recording. No fuss — no compromise — no limitations for the future. Our unique SYS-LINK™ system gives the **GL2** the means to grow as you do. Designed and built by engineers that have been bringing you audio tools with the superb specifications and quality you expect from Allen & Heath. ■ Audition the latest tool for the working professional at your nearest Allen & Heath dealer or call us for more information.

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TANNOY

System 6 NFM II

A 6.5 inch Dual Concentric with Tulip HF wave guide forms the heart of the System 6 NFM II providing a reference single point source monitor in a more compact enclosure than ever before. Every aspect of design fully complements the drive unit's capability. The rigid cabinet with carefully contoured baffle and trim minimizes diffraction and the high quality minimalist DMT crossover and gold-plated Bi-Wire terminal panel optimize the signal path. Pin-point stereo accuracy with wide frequency response, good power handling and sensitivity make this an ideal nearfield monitor.

PBM Series II
Reference Monitors

The PBM II Series is the industry standard for reference monitors. They feature advanced technologies such as variable thickness, injection molded cones with nitrite rubber surrounds and the highest quality components including polypropylene capacitors and carefully selected indicators. With a Tannoy monitor system you are assured of absolute fidelity to the source, true dynamic capability and most important, real world accuracy.

PBM 5 II

- Custom 5" injection-molded bass driver with a nitrite rubber surround for extended linearity and accurate low frequency reproduction. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange.
- Woofer blends seamlessly with the ¾" polymide soft dome ferro-fluid cooled tweeter providing extended bandwidth for extremely precise sonically-balanced monitoring.
- Designed for nearfield use, the PBM 5 II cabinets are produced from high density medite for minimal resonance and features an anti-diffraction radiused front baffle design.

PBM 6.5 II

- Transportable and extremely powerful, the PBM 6 5 II is the ideal monitor for almost any project production environment.
- 6.5" lowfrequency driver and 3/4" tweeter are fed by a completely redesigned hardwired hand selected crossover providing uncompromised detail, precise spectral resolution and flat response.
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

PBM 8 II

- High tech 1" soft dome tweeter with unmatched pattern control and enormous dynamic capability. 8" driver is capable of powerful bass extension under extreme SPL demands.
- Hard wired crossover features true bi-wire capability and utilizes the finest high power polypropylene capacitors and components available.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.

Stewart

PA1000/1400/1800
Power Amplifiers

- High frequency switch mode power supply fully charges 120,000 times per second (1000 times faster than conventional power supplies) requiring far less capacitance for filtering and storage.
- High speed recharging also reduces power supply "sagging" that afflicts other designs.
- Incredibly efficient, 5 PA-1000 or PA-1400's (4 PA-1800's) can be run on one standard 20 amp circuit. There is no need for staggered turn-on configurations or other preventive measures when using multiple amp set-ups as current drown during turn-on is only 6 amps per unit.
- They produce smooth and uncolored sound, while offering very full detailed low end response and tons of horsepower.
- They each carry a 5 year warranty on parts and labor.

PA-1000 weighs 9 lbs, is 15" deep and occupies one standard rack space. Delivers 1000 watts into 4Ω when bridged to mono.
PA-1400 weighs 16 lbs, is 15" deep and takes 2 standard rack spaces. Delivers 1400 watts into 4Ω when bridged to mono.
PA-1800 weighs 17 lbs, is 17" deep and takes two rack spaces. Delivers 1800 watts into 4Ω when bridged to mono.

TASCAM

M-2600 Series
16/24/32 Channel Eight Channel Mixers

LOW NOISE CIRCUITRY

- Combining completely redesigned, low noise circuitry with Absolute Sound Transparency™ the M-2600 delivers high-quality extremely clean sound. No matter how many times your signal goes through the M-2600, it won;t be colored or altered. The signal remains as close to the original as possible. The only coloring you hear is what you add with creative EQ and your outboard signal processing gear.
- Double reinforced grounding system eliminates any hum. World-class power supply provides higher voltage output for better headroom and higher S/N ratio.

PREMIUM QUALITY MIC PRE-AMPS

- The M-2600's mic pre-amps yield an extremely low noise floor, enormous headroom and an extremely flat frequency response. This lowers distortion and widens dynamic range. It also increases gain control to an amazing 51dB. Plus, you get phantom power on each channel.
- The M-2600 accepts balanced or unbalanced 1/4" inputs, and low-impedance XLR jacks. Better still, the TRIM controls operate over a 51dB input range. For the hottest incoming signals, all it takes is a press of the -20 dB PAD button atop each channel strip to bring any signal down to manageable levels. Plug anything into it – keyboards, guitars, basses, active or passive microphones, samplers and more. No matter what you put into it, you can be confident that signal can be placed at optimum levels without a lot of fuss.

THE BEST AUX SECTION IN THE BUSINESS

The most versatile AUX section in its class: rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.

FLEXIBLE EQ SECTION

You'll find both shelving and split-EQ sections on some mid-level consoles. But that's where the similarities with the M-2600 end. The M-2600's bi-directional split EQ means you can use either or both EQ sections in the Monitor or Channel path...or defeat the effect altogether with one bypass button. Most other comparably-pricedmixers will lock the shelving mix into the Monitor path only, limiting your EQ application.

ADVANCED SIGNAL ROUTING OPTIONS

Direct channel input switching. Assign to one of eight busses, or direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can select either without repatching. You won't find this kind of speed or flexibility in a "one-size-fits-all" board.

ERGONOMIC DESIGN

The M-2600 has a big studio feel. All buttons are tightly spring loaded, lock into place with confidence and are large enough to accomodate even the biggest fingers. The faders and knobs have a tight, smooth "expensive" feel and are easy to see, easy to reach and a pleasure to manipulate. Center detents assure zero positions for EQ and PAN knobs. Smooth long throw 100mm faders glide nicely yet still confidently allow you to position them securely without fear of accidentally slipping to another position.

MACKIE

MICRO SERIES 1202
12-Channel Ultra-Compact Mic/Line Mixer

Usually the performance and durability of smaller mixers drops in direct proportion to their price. Fortunately, Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202, an affordable small mixer with studio specifications and rugged construction. The 1202 is a no-compromise, professional quality ultra-compact mixer designed for professional duty in broadcast studios, permanent PA applications and editing suites where nothing must ever go wrong.

BIG CONSOLE FEATURES

- Working S/N ratio of 90dB, distortion below 0.025% across the entire audio spectrum, switchable +48 volt phantom power and +28 dBu balanced line drivers.
- Real switchable phantom-powered mic inputs with discrete, balanced mic preamps as good as those found in big consoles.
- Has 4 mono channels, each with discrete front end mic pre-amp/line input and four stereo channels, each with separate left and right line inputs.
- Every input channel has a gain control with unity at the center detent for easy setup. Also a pan pot, low frequency EQ at 80Hz, high frequency EQ at 12.5 KHz, and two aux sends with up to 20dB available gain.
- Main outputs operate either balanced/unbalanced, as required.
- Switchable three-way 12-LED peak meter displays.
- Master section includes two stereo aux returns, a separate headphone level control, metering and two stereo aux returns.
- Line inputs and outputs are designed to work with any line level, from instrument level, to semi-pro -10dB, to professional +4dB.

HEAVY DUTY CONSTRUCTION

- Designed for non-stop, 24-hour-a-day professional duty in permanent PA applications, TV and radio station, etc.
- Sealed rotary controls instead of open frame phenolic potentiometers that suffer from dust and contamination.
- Has steel chassis, rugged fiberglass circuit boards and a built-in power supply. Also has exceptional RF protection.

MULTIPLE APPLICATIONS

- Ideal "entry level" mixer for those just starting a MIDI suite.
- Ideal as headphone or cue mixer, level matching pro audio "tool kit", drum or effects sends submixer, 8-track monitor mixer.

CR-1604 16-Channel Mic-LineMixer

The hands-down choice for major touring groups and studio session players, as well as for broadcast, sound contracting and recording studio users, the Mackie CR-1604 is the industry standard for compact 16-channel mixers. The CR-1604 offers features, specs, and day-in-day-out reliability that rival far larger boards. It features 24 usable line inputs with special headroom/ultra-low noise Unityplus circuitry: seven AUX sends, 3-band equalization, constant power pan controls, 10-segment LED output metering, discrete front end phantom-powered mic inputs and much more.

LOWEST NOISE, HIGHEST HEADROOM

- With the CR-1604, having the lowest noise and highest headroom (90 dB working S/N and 108 dB dynamic range) at the same time are not mutually exclusive. It is free of commonly encountered headroom restrictions, and is able to handle the occasional pegged input with ease. In fact, many drummers consider it the only mixer capable of handling the attack and transients of acoustic and electronic drums.

CONSTANT POWER PAN POTS

- Only with constant power pan pots will a source panned hard left or hard right have the same loudness as when it is sitting dead center. While most small mixers pass simple balance controls for pan pots, the CR-1604 s carefully optimized constant power pan circuitry make it a professional tool with the kind of performance necessary for CD mastering, video posting and other critical audio production.

IN-PLACE STEREO SOLO

- Stereo "in place" solo allows not only the monitoring of level and EQ, but also stereo perspective. Usually found in very expensive mixers, stereo solo allows you to critically scrutinize and carefully build a mix using all the channels with their respective sends and AUX returns.

UNITYPLUS GAIN STRUCTURE

- Proper gain settings are facilitated by proper gain labeling, along with center-click detents on the faders, clearly understandable input trim controls and output meters that read channel levels in solo mode. With properly set levels you achieve very high headroom and low noise at the same time.

EFFECTS SEND WITH GAIN

- Unusual circuit design that provides two different "zones" that reflect real world use: send from each channel can vary in level from off to unity gain, which is the normal range of effects sends in other mixers. Since you also get another whole zone from the center detent to +15 dB of gain, the channel fader can be pulled down and the effects send can be boosted above unity when more effect is needed.

INTELLIGENT EQ POINTS

- Low frequency EQ is at 80 Hz where it has more depth and less hollow midbass "bonk". Midrange is centered at 2.5 KHz, providing for more control of vocal and instrumental harmonics. A specially-shaped HF curve that shelves at 12 KHz creates more sizzle and less aural fatigue.

REAL MIC PREAMPS

- The CR-1604 has genuine studio-grade phantom powered, balanced input mic preamps on channels 1 through 6. All CR-1604 (and XLR10) discrete input mic preamp stages incorporate four conjugate-pair, large-emitter geometry transistors just like the big mixers use. So, when recording nature sound effects to heavy metal or miking flutes or kick drums, you get the quietest, cleanest results possible.

BUILT TO LAST

- The CR-1604 is designed for non-stop, 24-hours-a-day professional duty – even for tours that log 100,000 miles in three months. It has sealed rotary potentiometers that are resistant to airborne contamination like dust, smoke, liquids, and even the oxidizing effects of air itself.

Optional Accessories

OTTO-1604

Add sophisticated computer controlled automation to your CR-1604. When connected to the MIDI port of your computer (PC, Mac, Amiga or Atari), each one of the 16 input channels can be programmed to change gain or to mute, just as you would program a sequencer. Master levels can be programmed as well, along with all buss channels.

XLR10

While the standard CR-1604 comes with 6 high performance mic inputs, there are times when you need more. Enter the XLR10. This simple-to-install accessory adds 10 more (for a total of 16) mic inputs, with the same quality, performance and features as those in the CR-1604.

DEMETER
INNOVATIVE AUDIO SYSTEMS

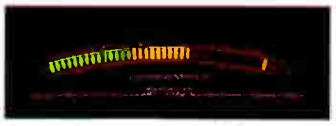
VTMP-2b
Tube Microphone Pre-Amp

The VTMP-2b Tube Microphone Pre-Amp makes any ordinary microphone sound like a rare, vintage tube mic. A two-channel unit, the VTMP-2b is completely tube-based for a distinctively warm but clean and quiet sound. It is designed to provide the recording studio the unsurpassed sound of tube amplification in a package that is easy to operate and interfaces with modern consoles and tape recorders. The VTMP-2b is typically used to bypass the mixing console pre-amps to provide the shortest possible signal path from mic to tape. This delivers a tremendous increase in fidelity in applications ranging from digital multi-track to professional and home recording studios.

Features:

- Each independent channel has a variable gain switch (40 to 60dB), phase switch, low cut switch, 20dB microphone pad, rotary faders for level matching and LED peak indicators.
- Each channel also has switchable 48v phantom powering, eliminating power supplies for condenser microphones.
- Equipped with 1/4" phone plug inputs and front panel switches so that it can be used as a DI box with electric or acoustic line level instruments as well.
- Uses classic tube design supported by the finest in modern components such as Jensen JT-13K6C input transformers, polypropylene capacitors and metal film resistors.
- The power supply features full regulation of the B+ voltage (250v) and the filament voltage (12.6v) for low noise and quick response.

dorrough



With today's audio systems stretching the limits of program dynamics it's become critical for engineers to obtain maximum loudness with the minimum of distortion components, to fully utilize the dynamic range available. It is of equal importance that they have a method of monitoring and establishing the maximum safe level at which a system can operate.
That's why every Dorrough Audio Level Meter simultaneously shows three dimensions of program material content; Peak, Average Power and Compression are displayed on a color-coded 40-segment LED scale. The meters are easily viewed while providing high precision indications of program energy content.

Loudness Meter Model 40-A

The model 40-A has a scale allowing 14dB of headroom in 1dB steps. A stand-alone unit, it measures 8¾" x 2¼" x 6¾" and has an internal power supply. Model 40-AP has a peak-hold option as well.

Loudness Meter Model 40-B

The Model 40-B provides metering of relative loudness to peak modulation. The 40-B is a scale differentiation of the 40-A and is calibrated in percent (%) modulation, with the lower scale in dB from +3 dB to -3 dB. Model 40-BP has a peak-hold option as well.

BEHRINGER

— COMPRESSORS —

MDX2000 Composer
Interactive Dynamics Processor

- Powerful and versatile signal processing tool provides 4 most commonly dynamic control sections: fully automatic compressor, manually controlled compressor, expander and peak limiter.
- Innovative IKA (Interactive Knee Adaptation) circuit combines the "musicality" of the "soft knee" function with the precision of the "hard knee" characteristics. Provides subtle and "inaudible" compression of the sound allows creative dynamics processing.
- Auto processor provides fully automatic control of attack and release times. There is also manual control.
- Interactive Ratio Control (IRC) expander eliminates "chatter" on or around the threshold point.
- Interactive Gain Control (IGC) Peak Limiter combines a clipper and program limiter. This allows for "zero" attack, distortion-free limitation of signal peaks.
- IGC is invaluable in live applications. Servobalanced inputs and outputs. Operating level switchable from -10dB to +4dB.

AUTOCOM MDX1000
Automatic Compressor/Limiter

- Autoprocessor for intelligent program direction
- Manually adjustable attack and release times
- Switchable "Hard Knee/Soft Knee" circuitry
- Program dependent attack/release times

— EQUALIZERS —

STUDIO PARAMETRIC - PEQ305
The Musical Equalizer

- Single channel State variable filter
- 5 independent fully parametric bands
- Minimal phase shift circuitry
- No interaction between the parameters of frequency, bandwidth and amplitude (Constant Q)

ULTRA-CURVE - DEQ8000
31-Band Graphic Equalizer/Analyzer

- Digital 31 band graphic fully programmable equalizer
- 3 parametric notch filter
- Programmable RTA with white/pink noise generators
- 20 bit A/D and D/A converters (Burr Brown)

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SENNHEISER

RF CONDENSER MICROPHONES

Unlike traditional condenser mics, the capacitive transducer in Sennheiser condenser mics is part of a tuned RF-discriminator circuit. Its output is a relatively low impedance audio signal which allows further processing by conventional bi-polar low noise solid state circuits. They achieve a balanced floating output without the need for audio transformers, and ensure a fast, distortion-free response to audio transients over an extended frequency range.

MKH 20 P48U3 Omnidirectional

Low distortion push-pull element, transformerless RF condenser, flat frequency response, diffuse/near-field response switch (6 dB boost at 10 KHz), switchable 10 dB pad to prevent overmodulation. Handles 142 dB SPL. High output level. Ideal for concert, Mid-Side (M-S), acoustic strings, brass and wind instrument recording.

MKH 40 P48U3 Cardioid

Highly versatile, low distortion push-pull element, transformerless RF condenser, high output level, transparent response, switchable proximity equalization (-4 dB at 50 Hz) and pre-attenuation of 10 dB to prevent overmodulation. In vocal applications excellent results have been achieved with the use of a pop screen. Recommended for most situations, including digital recording, overdubbing vocals, percussive sound, acoustic guitars, piano, brass and string instruments, Mid-Side (M-S) stereo, and conventional X-Y stereo.

MKH 60 P48U3 Short Shotgun

Short interference tube RF condenser, lightweight metal alloy, transformerless, low noise, symmetrical capsule design, smooth off-axis frequency response, switchable low cut filter (-5 dB at 100 Hz), high frequency boost (+5 dB at 10 KHz) and 10 dB attenuation. Handles extremely high SPL (135 dB), ideal for broadcasting, film, video, sports recording, interviewing in crowded or noisy environments. Excellent for studio voiceovers.

MKH 70 P48U3 Shotgun

Extremely lightweight RF condenser, rugged, long shotgun, low distortion push-pull element, transformerless, low noise, switchable presence (+5 dB at 10 KHz), low cut filter (-5 dB at 50 Hz), and 10 dB preattenuation. Handles 133 dB SPL with excellent sensitivity and high output level. Ideal for video/film studios, theater, sporting events, and nature recordings.

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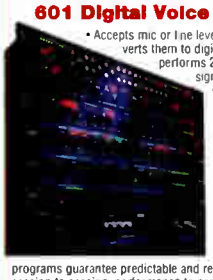
Signal Processing Products

601 Digital Voice Processor



- Accepts mic or line level analog signals, converts them to digital (18 bits) and then performs 24-bit digital domain signal processing.
- Processing includes fully parametric EQ, shelving EQ, notch filtering, dynamic filtering (noise reduction) de-essing, delay, chorusing, gating, expansion, compression, AGC and DC removal.
- Combination of 128 factory presets and 128 non-volatile user programs guarantee predictable and repeatable effects from session to session, performance to performance.
- Has XLR-balanced (analog) monaural mic and line inputs and XLR-balanced stereo output. XLR-balanced and S/PDIF (RCA) inputs and outputs. MIDI input/output supports connection to virtually any type of MIDI control device for programming or controlling the 601 in real time.
- Ideal for a variety of recording, broadcast, live sound, and post production applications.

488 Dyna-Squeeze

8-Channel Compressor/Interface

- Can easily increase average recording levels on your digital or analog tape recorder by 10dB with no side effects.
- Tracks processed by Dyna-Sqeeze have presence and increased articulation. Subtle sounds become more up front.
- Many professional mixing consoles have output levels that are much hotter than digital recorder inputs. The 488 matches any console to most any digital recorder.

We are a full stocking dealer for the entire Symetrix line

TASCAM

DA-88 Digital Multi-Track Recorder

The first thing you notice about the eight channel DA-88 is the size of the cassette - it's a small Hi-8mm video cassette. You'll also notice the recording time - up to 120 minutes. These are just two of the advantages of the DA-88's innovative use of 8mm technology.

- The ATF system ensures that there will be no tracking errors or loss of synchronization. The DA-88 doesn't even have (or need) a tracking adjustment. All eight tracks of audio are perfectly synchronized. What's more, this system guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks - whether you have one deck or sixteen (up to 128 tracks!).
- Incoming audio is digitized by the on-board 16-bit D/A at either 44.1 or 48KHz (user selectable). The frequency response is flat from 20Hz to 20KHz while the dynamic range exceeds 92dB. As you would expect from a CD-quality recorder, the wow and flutter is unmeasurable.
- One of the best features of the DA-88 is the ability to execute seamless Punch-ins and Punch-outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks, whether you want to generate special effects or compensate for poor timing. All of this can be performed easily on a deck that is simple and intuitive to use.

FOSTEX RD-8 Multi-Track Recorder

Fostex has long been a leader in synchronization, and the RD-8 redefines that commitment. With its built-in SMPTE / EBU reader/generator, the RD-8 can stripe, read and jam sync time code - even convert to MIDI time code. In a sync environment the RD-8 can be either Master or Slave. In a MIDI environment it will integrate seamlessly into the most complex project studio, allowing you complete transport control from within your MMC (MIDI Machine Control) compatible sequencer.

- Full transport control is available via the unit's industry-standard RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48KHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Slip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- All of this contributes to the superb sound quality of the RD-8. The audio itself is processed by 16-bit digital-to-analog (D/A's) converters at either 44.1 or 48KHz (user selectable) sampling rates, with 64X oversampling. Playback is accomplished with 18 bit analog-to-digital (A/D's) and 64X oversampling, thus delivering CD-quality audio.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. Eight tracks on S-VHS tape allow much wider track widths than is possible on other digital tape recording formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-fade time is fully controllable in machine to machine editing. Table of Contents data can be recorded on tape. When the next session begins, whether on your RD-8 or another, you just load the set up information from your tape and begin working. Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT controllers. Your tapes will also be playable on any other ADAT deck.

Panasonic

SV-3700/SV-4100

Professional DAT Player/Recorders

Panasonic's SV-3700 and SV-4100 are designed for professional applications. They have highly accurate and reliable transport systems with search speeds up to 400 times normal play speed. They also feature advanced, high-quality analog-to-digital (A-D) and digital-to-analog (D-A) converters and input/output circuitry designed to interface with the widest variety of devices.

SV-3700 Features:

- When recording via the analog inputs, a front panel switch permits selection of the sampling rate (44.1kHz or 48kHz). This avoids the need for a conversion of the sampling frequency in CD mastering applications. When recording through the digital inputs, it automatically clocks to incoming frequencies of 32kHz, 44.1kHz or 48kHz.
- Ramped record mute and unmute with three seconds fade-in and five seconds fade-out provides automatic level changes at the start and end of a recording.
- High speed transport enables searching up to 250x normal speed. High-speed search up to 400x normal speed is possible once the tape has been scanned in Play, Fast-Forward or Reverse mode. This ensures access to any point on a two-hour DAT in approximately 27 seconds.
- Built-in shuttle wheel has two variable speed ranges: 3 to 15x normal speed in Play mode and 1/2 to 3x normal speed in Pause mode – an ideal way to find tape locations.
- Comprehensive display includes program numbers, absolute time, program time, remaining time and Table of Contents which displays total recorded time and total PNO count for commercial prerecorded DAT tapes.
- Has XLR-balanced and unbalanced (phono) digital inputs and outputs. They provide direct interfacing with compact disc player, digital audio workstations and other components in a recording studio or production facility. Also has XLR-balanced analog stereo inputs and outputs. Output level is selectable between +4dB and -10db. The input level is +4db.

SV-4100 Has All the Features of the SV-3700 PLUS:

Offers enhanced performance required for professional production, broadcast and live-sound systems. Features such as instant start, external sync capability, enhanced system diagnostics, additional digital interfaces and exceptional 20-bit audio make the SV-4100 the DAT quality standard.

QUICK START WITH TRIM AND REHEARSAL

- With 8MB of memory holding five seconds of audio data, the Quick Start function provides sound almost instantly after a play command is executed. Other DAT recorders lag about .7 second, making them unsuitable for professional applications.
- Easily adjust the Quick Start position and specify it by A-Time, Start ID or PND. Recording via Quick Start is also possible, allowing two SV-4100s to be used for frame-accurate punch-in/punch-out and assemble editing.
- You can adjust the Quick Start position with I-Frame resolution over a range of ±50 frames. Using the shuttle dial and Skip key for adjustment. Frame number is preceded by + or - sign. A-Time, subcodes and peak level are displayed, to provide a general guide to positioning.
- Without playing the tape, you can monitor the level of stored data to check your Quick Start position. This preview capability is handy before actual editing or on-air play. Repeated play is also possible, using about 1.5 seconds of the data to create a kind of sampler effect.

FRAME ACCURATE INDEXING AND EDITING

- Using the trim and rehearsal functions, you can accurately determine points to write, start and skip IDs. These IDs can be written, rewritten or erased at any point in the recording and automatically renumbered.
- With two SV-4100s connected via the 8-pin parallel remote terminal, synchronized frame-accurate editing can be performed. Continuity of edit points can be checked by rehearsal playback. By entering and editing end position in one of the Locate buttons, you can determine a punch-out point as well.

FLEXIBLE SEARCH

- Easily and accurately access your A-Time. You can specify hour, minute, second and frame.
- In most modes, the currently displayed A-Time can be assigned to one of the Locate buttons. Then from Stop, Pause or Play you can rapidly cue to any of these four addresses by pressing its Locate key. In addition, Locate Last takes you to the most recent Quick Start A-Time position.
- Search is also possible by Start ID or program number.

5-MODE EXTERNAL SYNC

Has 5 external sync modes. External sync is essential for applications such as video postproduction and stereo submix recording. It assures uniformity of timing between different equipment so the audio data consistently matches up with the target media.

- Select from 3 video external sync modes (25, 29.97 and 30 frames per second) or use the word sync or Digital Data modes (which lock to the input sampling frequency).

ENHANCED SOUND

The SV-4100 satisfies the highest professional expectations both in terms of sound and functionality. It features new 20-bit (equivalent resolution) digital-to-analog converters.

MULTIPLE DIGITAL INTERFACES

- Has XLR-balanced digital input and output plus unbalanced digital coaxial and optical inputs and outputs. Analog inputs/outputs are XLR-balanced and output level is switchable between +4dB and -10dB, providing compatibility with other equipment.

3-WAY REMOTE CONTROL

- GPI input allows simple triggering of Quick-Start Play. 8-pin parallel remote terminal connects to another DAT deck, computer or wired remote. Includes wireless remote control.

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Portable DAT Recorder

- With rotary two head design and two direct drive motors the DA-P1 offers one of the best transport in its class.
- XLR-balanced mic/line inputs (with phantom power) accept a broad range of signal levels from -60dB to +4dB.
- Analog line inputs and outputs (unbalanced) plus S/PDIF (RCA) digital inputs and outputs enables direct digital transfers.
- Uses next generation A/D and D/A converters to deliver amazing sound quality.
- Supports multiple sample rates (48, 44.1 and 32 kHz) and SCMS-free recording.
- Included in its design is a MIC limiter and 20dB pad to achieve the best possible sound without outside disturbances.
- To monitor your sound there is a TRS jack and level control for use with any headphones.
- Built tough, the DA-P1 is housed in a solid, well-constructed hard case. The DA-P1 includes a shoulder belt, AC adapter and one battery.

SONY

TCD-D7

DAT Walkman Player/Recorder

- High-quality Standard Play (SP) mode provides up to two hours recording of 16-bit digital audio on a DT-120 DAT cassette. The SP mode is ideal for recording live music.
- Long Play (LP) mode allows up to 4 hours of record/playback of 12-bit audio on a single DAT cassette. The LP mode is ideal for meetings, conferences or other voice recordings.
- Equipped with digital coaxial and optical input connector. Maintains the highest signal purity for recording and playback of digital sources with all information retained in the digital domain.
- Also has analog Mic and Line inputs for recording from analog sources without external adapters.
- High-speed Automatic Music Sensor (AMS) search function finds and plays tracks, skips forward or back up to 99 tracks, all at 100x normal speed.
- Has a Digital Volume Limiter System (DVLS) that increases listening comfort and sound quality by automatically adjusting for sudden level changes of the recording. It also helps prevent sound leaks through headphones.
- Two-speed cue-review lets you hear sound while player is in fast-wind modes, up to 3x or 25x normal speed.
- Compact and portable, it has an anti-shock mechanism that permits accurate recording and playback even while in motion.
- LCD display with backlit windows clearly shows recording level, track number, operating status and 4-segment battery indicator, even in low ambient light conditions.
- Optional RM-D3K System Adapter Kit for complete digital interface. The kit is equipped with the input/output connectors for both the optical cable and the coaxial cable. Therefore you can use it as a relay between the TCD-D7 and other digital equipment. Also includes a wireless remote control.

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DTC-A7

Economical Studio DAT Recorder

The DTC-A7 is a high-quality two-channel DAT recorder that provides professional features at an affordable price. It incorporates advanced analog-to-digital and digital-to-analog converters for minimal sound distortion, a reliable transport system and a rich variety of subcode information. It also supports all major sampling frequencies, records Absolute Time Code and has coaxial as well as optical digital inputs and outputs. With its competitive pricing and advanced sound technology, the DTC-A7 is particularly well-suited for the home studio.

Features:

- Recording and playback can be done with three sampling frequencies (48kHz, 44.1kHz and 32kHz). For analog and digital input signals in standard mode (48kHz) for compact disc and pre-recorded DAT tape (44.1kHz), for analog and digital input signals in long-play mode (32kHz).
- Coaxial (IEC-958 Type II) and optical (EIAJ) digital inputs and outputs. Also, unbalanced (RCA) analog inputs and outputs.
- Records A-Time (Absolute Time) Code. With A-Time Code you can check elapsed time from the beginning of the tape. Tape recorded with A-Time can also be used for editing on Sony's 7000 series DAT recorders, since they translate A-Time to SMPTE/EBU time code.
- Date function automatically records the year, month, day, day of the week, hour, minute and second in the subcode area. During playback you can display data to check when the tape was recorded. Especially useful when recording live performances.
- The DTC-A7 can operate in long-play mode. Analog input signals can be recorded or played back for up to four consecutive hours with a single DT-120 tape.
- Three motor transport system provides stable and precise transport. Also significantly reduces cassette loading time.
- Includes a wireless remote control and necessary hardware for mounting in a standard 19" rack.

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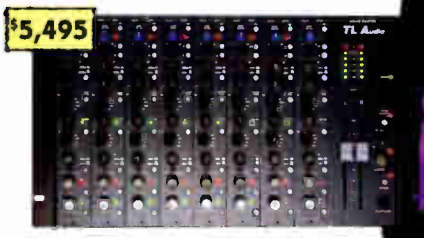

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dustry is not, on the face of it, directly related to traditional studio activities, a healthy film industry spawns spinoff work for support studios, from scoring through post-production.

The number of truly new studio arrivals has been few. Most notably, producer Mike Stock, of Stock Aitken and Waterman, bought an SSL 4000 G Plus for his £3-million, two-room, Andy Munro-designed complex near London Bridge. This facility will be used entirely for Stock's own writing and recording projects.

The creation of A2D by former head of Advision Studios Doug Hopkins has injected activity into the mobile sector. "The whole mobile business, in terms of the number of people operating in it, has contracted," says Hopkins, who is hoping to rekindle interest in location recording while going back to his roots.

One of the most interesting features of the twin Otari MX80-equipped truck is the presence of an all-new MTA console, called the 990 Series, designed specifically for the facility by Malcolm Toft, the man who started Trident all those years ago.

"Malcolm has a great reputation in the music business and was prepared to build what we wanted, even though it was a departure for him in that it is his first foray into in-lines," Hopkins says. "We've taken the best features of in-line and what we liked about the old Helios desk days and took it one step further."

Predictably, in the current financial climate, refurbishments have been more widespread than grand openings. The Town House installed a 72-channel SSL 4000 G Plus last year (the manufacturer's 1,000th desk)—a fitting move, given that the studio was one of the very first to commit to SSL's initial attempts at desk design. Three new Sam Toyashima-designed mastering rooms have been kitted out to replace the 15-year Eastlake builds, and the original mastering room has been rejuvenated for all-digital work, based around a Sonic Solutions system. PMC BB5 monitors have also been installed. "They're British and significantly cheaper than the Genelec 1035As that we usually use," says technical manager Ian Davidson.

Still in West London, production company Respect Productions has installed a 48-channel SSL 4000 G Plus

into its newly opened Westpoint Studios. Designed by Recording Architecture with ATC monitoring and Sony 3348 and 24-track Otari recorders, the studio has been used predominantly for the solo projects of Simply Red member Gota Yashiki, including production and arrangement for Japanese and European artists.

CTS Studios, the first studio in the world to go digital with the Neve DSP console in 1984, has ordered an AMS-Neve Capricorn desk for installation in Studio 2 or 3 (precisely which is still to be decided), both of which are tielined to its 130-musician capacity Studio 1 live area. Both rooms are set up for Dolby Surround and SR•D and will be assessed for suitability for the 48-fader, 160-path desk.

Air Lyndhurst's Studio 1 went fully operational last year with its famous and now fully refurbished Montserrat Neve/Focusrite console from Air Oxford Circus Studio 1, with which the new studio shares similar size and acoustic performance.

A trend that emerged through the troubled times was that one of the most saleable commodities of UK studios became the producers and engineers—the art and craft—as well as the facilities. Given the increasingly international nature of recording, it's a skill area for which the British are recognized.

Phil Manzanera, former guitarist with Roxy Music, has carved a niche as a producer with Spanish-speaking acts out of his Euphonix CS2000-equipped Gallery Studios. "What people desperately want is English and American expertise, but a lot of countries look to England more than to America," he says. "In Mexico, Brazil and Argentina, their tradition is focused a lot on Europe, and many of the bands want an English tradition, be it the Stones or The Beatles."

Similarly, acts like to work where the famous have worked, as Metropolis Studios has found with its success in attracting Japanese artists. "We've consistently had a lot of Japanese acts here from day dot," says sales and marketing director Karen Goodman. "They come here because it is cheaper to work in the UK than in Japan, even with the flights and hotels. The Japanese love to work where other very well-known people have worked, because they want to get British sounds, they like using British musicians, producers and engineers, and they're used to good service."

She adds that the business of selling studio time has changed and is no longer just a matter of waiting for the phone to ring. "You have to initiate things, you have to be proactive," she states. Metropolis' entry into the mastering trade with the opening, in the past two years, of a dedicated mastering wing (profiled in the December 1993 *Mix*) has broadened the complex's portfolio and drawn even more European work to its door.

Criticisms leveled at the APRS in the past regarding exclusivity have now largely been neutralized through the diversification of the association to better represent the interests of its constituent member groups. Thus, we now have divisions within it for studios, suppliers, pressers and duplicators, and producers and engineers. Re-Pro, the UK guild of recording producers, directors and engineers (see December 1994 *Mix*), is taking its message into Europe for its first meeting (at the AES convention in Paris) with counterpart organizations from the Netherlands, Germany, Austria and France. The aim is to draw attention to inconsistencies in the treatment of studio producers in different countries, despite "harmonizing" European Union legislation. Some type of alliance between the organizations would seem sensible, if not inevitable.

Perhaps the most significant recent development within APRS is the inclusion of the project studio within its membership categories—a move that has been long-awaited and has proved a bugbear for many national studio associations.

Chairman Kerridge sees no conflict with the interests of other studio membership. "It's an enhancement to the industry," he says. "Project studios that don't have large recording spaces and are doing multimedia projects such as music for TV will need to come to our member studios to record their overdubs. So why not embrace them? We need to bring them in, we need their assistance and input."

British studios may have been more numerous in the past, but there can be no doubt that the industry is currently in better shape to take on the challenges of the next decade than it has been for many years. ■

Zenon Schoepe is a UK-based writer.

UK BITS AND PIECES

The Wool Hall (Beckington, Somerset) suffered what manager Carole Davies calls a "small but quite damaging fire in the control room" in January. At press time, the facility was still being rebuilt, with hopes of reopening this spring...Location recording/coordination facility **Soundfield Studios** recently went to France to record Lenny Kravitz's new CD. The project was recorded in a 16th-century chateau near Paris. Soundfield coordinated the equipment hire, sales and installation, and provided much of the personnel, including two carpenters, two maintenance engineers, a studio assistant, an eight-person removal crew, a vegetarian cook and 24-hour bilingual troubleshooting. Henry Hirsch was the project engineer...**Soundtracs PLC** moved into a new 30,000-square-foot office in Epsom, Surrey. The new facility contains the company's headquarters for sales, marketing, customer service, accounts, purchasing and R&D. The new address is Unit 21-D, Blenheim Rd., Longmead Industrial Estate, Epsom, Surrey KT19 9XN England; phone (44)181-388-5000...The score for ITV's courtroom drama series *Kavanagh QC* was composed and produced by **Roger** and **Anne Dudley** using a Soundtracs Jade production console...Recording/mastering facility **Whitfield Studios** (London) installed TC Electronic M5000s in its three main audio post suites. The new reverbs have already been used on projects for Killing Joke, Rozalla and the Manic Street Preachers ...Singer/songwriter/film score composer John Parr recently upgraded his home studio in Yorkshire with an Optifile Tetra automation system. The facility, **The Doghouse**, is equipped with a 40-track Amek 2500 console. Parr's credits include writing music for movies such as *Three Men and a Baby* and *St. Elmo's Fire* , as well as songs for Meatloaf, Roger Daltrey and Tom Jones...**Garwood Communications Ltd.** (London), manufacturers of the Radio Station in-ear monitoring system, purchased its European distributor, PRS Ltd., and hired Andrew Frengley as managing director. Frengley, who comes to the firm from PRS, has years of experience as a touring monitor engineer for artists such as David Bowie, Frank Sinatra and The Stranglers. ■

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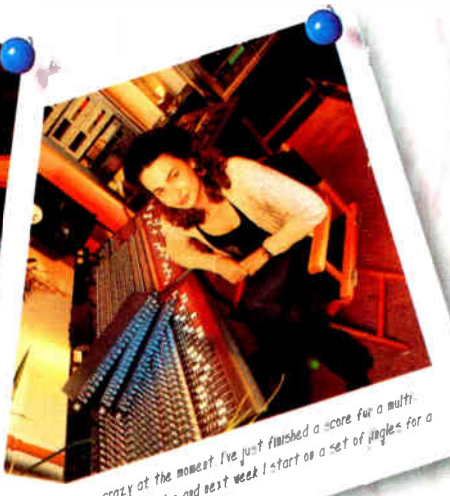

"Things are crazy at the moment. I've just finished a score for a multi national's corporate video and next week I start on a set of jingles for a national radio station."

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by Adam Beyda

FLOOD RISING

Having worked on a mind-boggling array of dream projects with the likes of U2 (*Achtung Baby*, *Zooropa*), Depeche Mode (*Violator*, *Songs of Faith & Devotion*) and Nine Inch Nails (*The Downward Spiral*), UK-based producer Flood (née Mark Ellis) is continuing his hot streak this year: He produced the oblique, striking new PJ Harvey album, *To Bring You My Love*, and recently signed on to produce the next Smashing Pumpkins effort. Quite a load of success, yet Flood is far from the glib, backstabbing mover and shaker you might expect. Defying the odds, he is in fact a genuine, down-to-earth fellow who has made his way with integrity and good spirits.

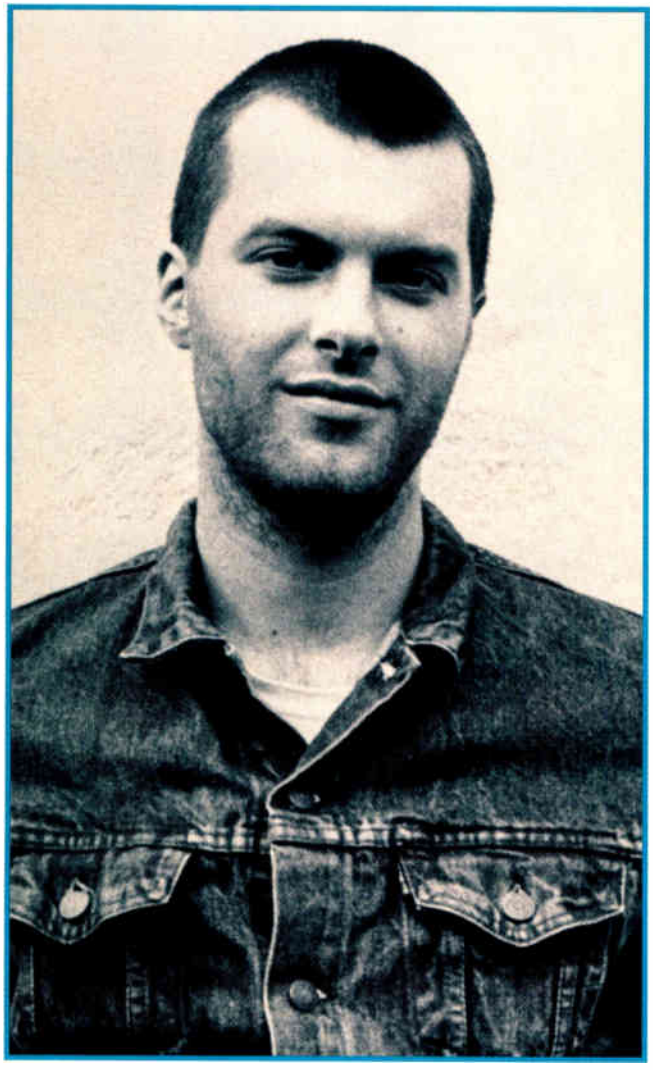

PHOTO: ROS ELLIS

Starting at the bottom in the late '70s, Flood worked his way up England's engineering ranks, eventually making the leap to producer. He has demonstrated equal dexterity with both organic and synthetic music, recording artists ranging from Nick Cave to Erasure. "I'm sort of a Jekyll-and-Hyde character," he admits, but his ability to work both sides of the techno/guitar fence isn't surprising given his approach to recording.

He comes into a session with few preconceptions, treating each situation as unique. Rather than adhering to any particular methods, he relies on an amalgam of experience and open-mindedness to guide him. Very much the artist's advocate, Flood sees his role as that of facilitator, helping to direct and augment the creative process.

And his nickname? Well, when London's Morgan Studios gave Flood his first studio gig in 1978, part of his job involved pouring tea. Apparently he was somewhat overzealous in his duties.

So you began learning your engineering chops at Morgan Studios?
Yeah, the first four years or so of my career were very important. Morgan was a four-studio complex, and the first week I was there, they had The Cure doing their first single in one studio, Jack Bruce doing a solo project in another studio, Thin Lizzy doing heavy metal in another, and an orchestral session for some jingle in another. So from that point of view, the influx of different influences and different people was a really good basic grounding in just the pure technicality of things, seeing how different people work, from a rock 'n' roll session to how to record an orchestra with two mics.

In some respects, I think that

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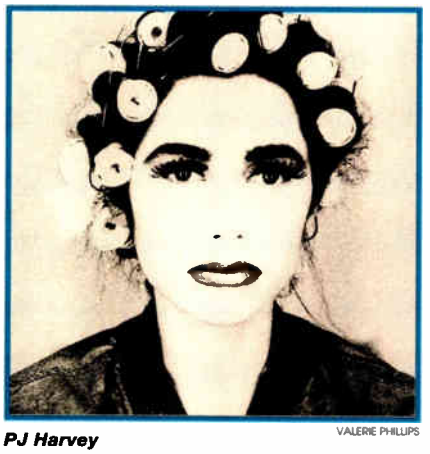
what a lot of people are suffering from, certainly over in this country, is a lack of grounding in learning a craft. From when I first started to when I first went freelance was almost six years, and I think that a lot of the time people don't really have that luxury anymore, to get that experience in different situations. If you're working as a house engineer in a studio, you're quite often given all the dodgy projects to do right through the night. You can afford to make mistakes there and try out things and ideas, then next day you go, hmm, why didn't that work? I'll ask somebody. Whereas now it's like from assistant—bang, six months of engineering and then you're good for freelancing, so off you go. Put people



PJ Harvey VALERIE PHILLIPS

in different situations now and quite often they won't rise to the challenge, because they haven't really been in that situation.

I can remember one week as a freelance engineer, I worked five different projects in the week, and each one was a different studio with a different desk and a different tape machine. You've got to be able to cut it. It's a little bit easier now because things are a little bit more standardized, but even so, experience should give you the confidence to try out different things because you know what you can use as your safety net. Why not record the drums with one mic and listen to it like that? And if everybody's excited, great. But you also know to make sure you've got a couple of close mics lurking just in case.

Given your background, do you in fact engineer when you're producing?

It's about 50/50. I tend to engineer more for "real" bands than I do for the synth ones, perhaps because over the years, I've gotten pretty adept at programming, and I've got a pretty extensive collection of analog synths that I tend to use or encourage people to use. So for some reason, I tend to find it easier to step back in those situations. Also, maybe a lot of the time because you're generating stuff from computers and/or synths, as an engineer it's like, well there's the sound, record it, rather than, okay well I need to place a mic in a certain place to do this and try that on that. So probably my instincts are to get in where the sound is coming from in the first place, hence with synths and samplers, that's where the sound is coming from, so I don't worry about where the mic is.

How specific are you in your equipment preferences and choices?

No hard-and-fast rules. You sort of judge it on the situation as it merits. For instance, if it's a sort of synth band, they often have their own gear there. And you might suggest, let's use a load of amps to pipe stuff out through, and it would be those types of suggestions. There's nothing I would stand and die by. If anything, I would say that I'm still a very big fan of analog. If there was one thing I was to hold out for, it would be analog, 15 ips with Dolby SR. Where possible, not 48-track.

What is it about 15 ips?

Bottom end. It's not that it's more correct—if you're pushing the tape, it doesn't come back exactly as you put it down—but the way that it comes back generally sounds better to me. You can have it so that you can record all your kit and bass and rhythm section and then park it, then dump a few cue tracks down to digital and do all the rest of your stuff on digital if you so desire. But if you've got a flappy bass guitar and you push the level, nine times out of ten, it'll come back sounding really throbby and warm and punchy.

Do you cut tape much?

Oh yeah, all the time. I'll work analog when I'm cutting tracks and overdubbing, because in some respects, I can control the specifics of the sound far better. But after that, nowadays I tend to end up mixing possibly to 15 ips SR, and then transferring it to DAT, and then I'll edit on Pro Tools and Sound Tools for compilations or 12-inches. That's a good way—you can spend a day in the studio doing a bazillion different passes and then take it home.

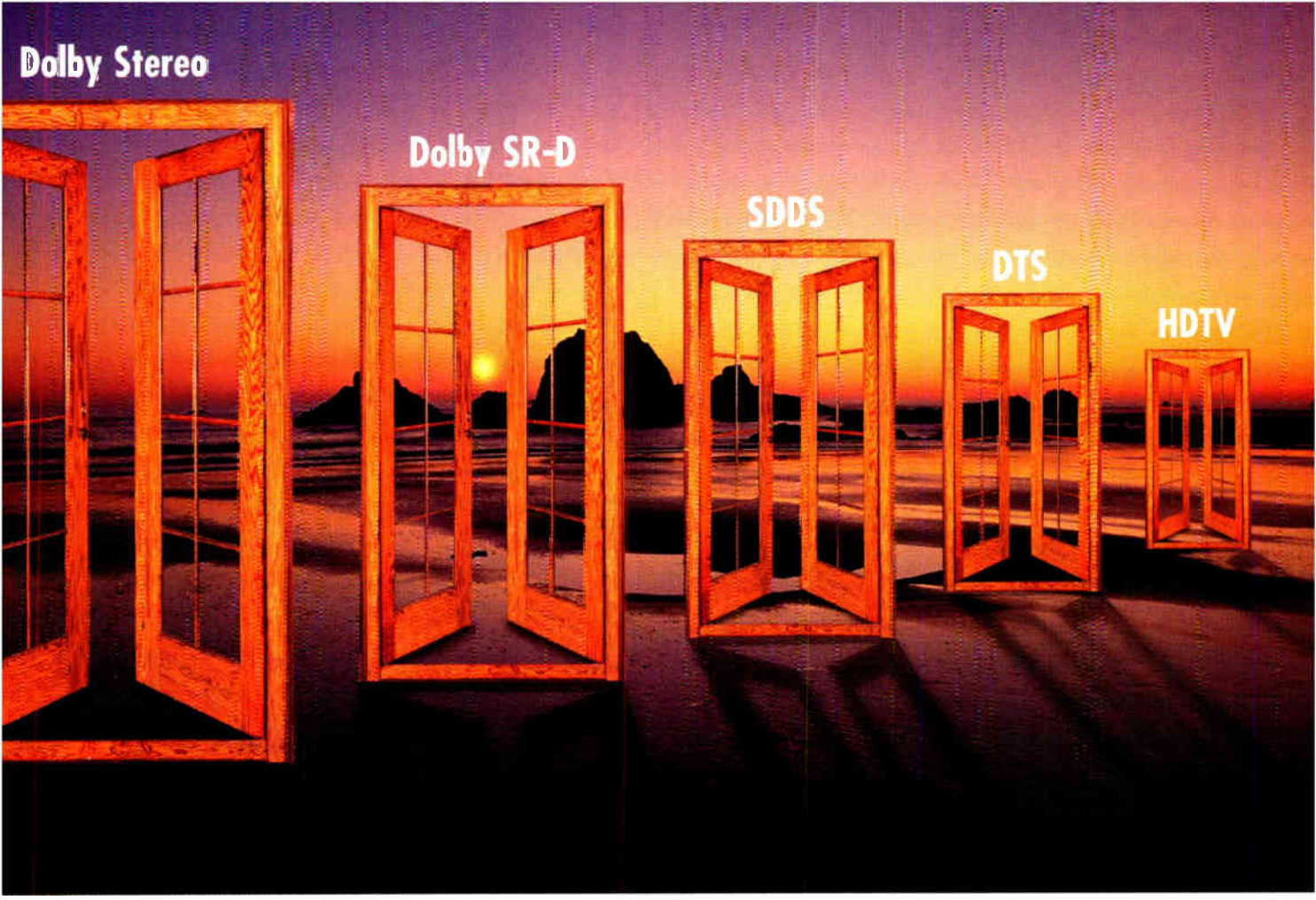
Also, I've been using Pro Tools a lot with MIDI sequencers (I happen to use Cubase Audio, but I've used StudioVision, Digital Performer and the Notator system). For instance I'll take a rough mix of the song, so we can continually cycle around one verse. It continually loops around, and you can play as the guitar player for an hour. Then after 58 minutes you can go: Stop, those two bars are brilliant, right, chop, click, bang it down through the verse, fine let's listen back, that sounds great, I think it sounds great as is, no I think you should replay it, no it's a bad idea, let's go back and do it again.

Also I've done situations where a drum part sounds good first chorus, but the second chorus is crap. Okay, load it in, copy the first chorus, bang it over, done. It probably takes more time to load it in and load it out than it does to actually do what you want. But I think if you start getting into snipping every other bass drum beat out, then you start to tread on dangerous ground. But as a sort of writing tool in that situation for 8-tracks, I think it's really useful. Because then again, having done that, you can say, all right, well let's dump it down to tape, and off you go, you're getting the best of both worlds. You have something that's helped somebody write something, which might turn out slightly different from how you would have expected it if you weren't in that situation, and then shove it on analog afterwards.

With things like Pro Tools and Sound Tools, the ability to edit between mixes in a creative way is really useful. Oh, that mix was done a bit later, it sounds basically the same but it's a bit louder, "click," pull the faders down, unclick, lift them back, that sounds great, off you go. I mean I think if you're comparing it with editing on tape with just a hard and fast cut, it's probably just as simple to do it on tape, but I think that's not using the system at it's fullest. But it's important not to be caught by the millions of options: I can EQ it, I can add compression, noise-reduce it—uh oh, what am I doing. It wasn't that bad when I started, but oh look at all these candies in the sweet shop.

What about the other end of the recording process—do you tend to like to do much pre-production?

It varies from project to project, depending on what it needs and on



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how the people I'm working with feel about it. Somebody like Depeche Mode had worked on so many albums and fitted themselves into such a strong pattern—usually the songs were written, then they were demo'd, then they went into pre-production, then finally they went into the studio—that after a while, it became blindingly obvious to me that they were caught in a rut by doing that. So one of the first things I suggested was, well next batch of recording, let's dump all of the pre-production. Just make sure we've got the keys of the song right in the first place, but barring that, let's forget it, let's go in and almost experiment in the studio. So it opened their eyes to doing things in a different way. But you know, other people you need to sit in a rehearsal room for maybe a month. Each project is its own boss. If somebody wants to record in a house in the middle of Nevada by Lake Tahoe because they feel that's going to do the best thing for the record, and I agree with them, then let's do it. But obviously one man's meat is another man's snare drum.

So when it's time to go into the studio, given your druthers, what kind of studio situation or vibe do you prefer?

It depends on the band. Usually, I think the most important criteria is flexibility, because something that's flexible means that there's more creative stimuli for the people you're working with. So that if you're in a creative impasse, you can say, all right, it's not happening with these sounds, let's move the band into the back room. It may take half a day, but just by doing that, it will make people hear things in a different way, whereas if you're sort of stuck with one type of area, then you might not be able to have that luxury.

But by the same token, I'm not that keen on places that have absolutely everything you could ever possibly want, because sometimes that makes you a bit lazy. If you haven't got the double overhead triple whammy bar reverb, you might actually try doing it in a different way, which may be a lot better. It's about working in a positive way to one's limitations. By the same token, you don't necessarily want to be sitting there with one compressor and one 910 Harmonizer. But I have been in situations where there hasn't been that much stuff, and then you do start to think of things in a different way—it makes your mind work in a different way. You have to use your experience to judge when something has moved on and is improving the music or when something's just a whacky effect for the sake of it. It's always hard, because sometimes if you're searching for something, the sound can govern how things are played. So if everybody's in a lull, and suddenly you pull x, y or z out of the bag, then that can really spur people on.

What sort of things do you do to elicit a great performance?

I think it's basically down to the confidence of the person doing it. It's trying to work with the person or the people so that you have mutual respect, and then working out what might be holding the person back from giving their best performance. For instance, with vocals—a lot of the time, people might be singing in the studio with a nice expensive valve mic, headphones, and they're just not delivering the goods. And then you go, okay, enough of all this. Come into the control room, let's

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crank the monitors to 11, here's a 58, go. Because so many vocalists are used to working that way live, it will suddenly change the way they're feeling about it. That doesn't work for everybody, but it works for a lot of people. And it's approaching those situations in different ways for different types of people.

A lot of the time, overdoing something is just a waste of time. It's much better to try something quickly, and if it doesn't work, come back to it later, and then you might find that what was essentially a guide is perfect. You might try and improve on it, and you never get it any better. Really, the adage should be that you're always in Record, because particularly with technology nowadays, if something's in the wrong place or a bit out of tune, you can fix so many things. But that sort of human spark—quite often after the first time you go for it—you never get again. You have to use your experience to judge if finessing a part improves it or not. But again, it's very simple—keep the first one then go on another track and finesse it to your heart's content, and if it doesn't sound any better than the original, fine, so be it. It's so important to keep the Record light on so that people don't get intimidated by it. It's ongoing. It should be: I've got an idea—okay, great, let's try it out. Not, oh my God, this is the recording of it.

U2

You have to be ready to capture the element of spontaneity. I've always cited, as a good example of this, working with U2, on *Achtung Baby*, the track "You're So Cruel." What happened was we were in the studio working on another song, and they were coming up to have a listen to a take, and somebody suggested we should have a listen to an earlier take, which was on a different reel. I said, okay, give me 30 seconds and I'll find it. Whilst that was going on, somebody started strumming an acoustic guitar, and somebody else said, oh that's quite good, and started playing along with some bongos. All of a sudden, almost in the time it had taken for me to wind off the reel and wind the next reel on, it was quite obvious that there was a song about to pop out, and if I wasn't suddenly taking the reel off and getting a new piece of tape on, and changing from monitoring a backing track downstairs to everybody's in the control room wanting to record now, it would never have happened. I mean, as it was, it obviously takes a period of time to refine the initial idea, but you need that inception of,

fine, I'm ready, let's go, and then you work from there.

You can change anything to your heart's content afterwards. And even if you've got the world's greatest part and the sound is totally crap, you can probably add something to it to add definition, uniqueness, whatever. You've always got to try to look on the positive side of things. But at the same time, you can't just ride—you've got to make sure that, by experience, you know that even if you haven't heard the person open their mouth, that your mic level and your compressor level and your EQ is going to be okay so that it's not going to distort as soon as they start kicking in the first note they sing.

You've collaborated with Brian Eno on albums for U2—did you pick up a lot of production knowledge from him?

Yes, very much so. After having pursued a certain course, stylewise, with engineering, working on the *The Joshua Tree* completely shattered every myth and creatively pushed me to places that I didn't think were possible to go. For me, that was probably the largest turning point just in the way of approaching things, and that's probably more leading onto production. That was the first thing where I saw the big picture.

Eno introduced me to the sort of lateral stance—he calls it oblique strategies. Effectively, you're going along one avenue, and you think,

> So much of what one does has to be based on instinct. From there you use your experience to refine, hone, change and question your original instinct.

well maybe it should go down here, but they're never going to see it. We're never going to get there if we just squeak, little bit by little bit, toward where I see it. So let's do something radical, and that will make everybody hear it in a different way.

I learned a lot from his point of view, his using things in a different way, like effects. For instance, I saw him string together an acoustic guitar through a delay that then was going through a reverb that was put into a gate that was on an incredibly long trigger, all put through a Harmonizer. So, from one basic acoustic guitar strumming he'd made this sort of ambient wash that was in a different key with a different rhythm.

So he was using things in ways they weren't intended to be used.

Yeah, and this was 1986. And the people I'd been exposed to until then weren't thinking like that. Another example would be Eno's use of Sound Tools and Pro Tools. He said, "Look, I've discovered this. What's so brillant about it is you can edit different mixes together that you shouldn't be able to, but you can make them work." There's one track on *Achtung Baby* that, through that logic, is actually composed of nine mixes from over a period of about

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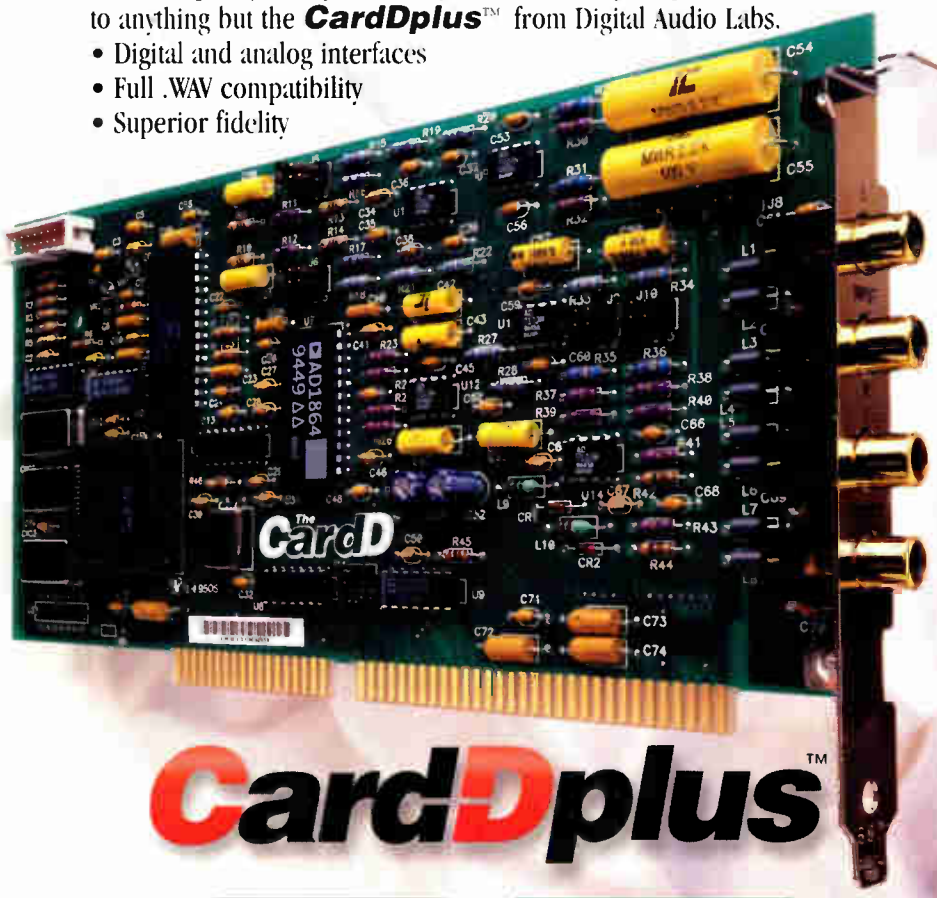

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six months, but you wouldn't know.

Was Eno also influential in terms of learning how to work with people?

His psychological approach is something that very much influenced me—the way that people can be encouraged, and how to judge a situation and discover what's happening, why it's happening and what its possible outcomes could be.

It seems like you're hip to coloration emanating from any point in the chain.

Yeah. For instance, a weird ring off the bottom of a snare drum coupled with a click off the bottom of the hi-hat just because of the way the guy's hitting the pedal—if you happen to have a funny mic with a lot of compression lurking underneath the snare, it might give you a whole new outlook on the way the rhythm sounds. On [the new PJ Harvey track] "Working for the Man," we spent ages getting a drum sound that ended up exactly like that. There's this weird sort of almost a tune that comes off the drums, and it really adds. It means you can just approach it from a different point of view, the drums can stand up and you listen to them in a different way. It's not very obvious, but in a couple of places it comes through and adds a different level to it.

So coloration can come from any angle at all. Your choice of mic—a few ambient mics parked in another room can sound brilliant for a certain thing, just as somebody accidentally scraping the strings in a certain rhythm at the beginning of the song. All it it does is spur your mind on to think creatively in a different way. So if you can capture that and then later be allowed to consider it, then that's what you should be doing.

So your role as a producer is about creating the space for things to happen or to keep the creativity happening in whatever way.

Yeah, keep the creativity happening, most definitely, which some days can mean just sitting there and saying, sounds great, carry on. Then other days, it's constructing a situation that you hope will spur people on. It might be a really bad idea, but if it gets the ball rolling, then it's a good idea.

Also by the nature of the people I've worked with, most people are quite willing and eager to try out different things. So, for instance, U2—classic situation is that the band can be set up in a little room downstairs, and then next minute, they're all recording in the control room next to you. Then three weeks later, you're in a completely different environment. So just by the nature of that, you're always doing something different, and then it's down to you as much as anything to say, well what's the consistent factor amongst all this, because obviously you don't want to go the other way, which is like too much, too loose.

Is that a factor in who you choose to work with—their openness and willingness to experiment?

Yeah, to a certain extent. The primary criteria is always whether the songs move me.

So you need to hear demos?

Yeah, or I have to know the back catalog very well and meet the people, and then the criteria is, are they moving me and do I get on with them, and also are they prepared to experiment and try something different? Also, by the same token, what

can I offer them?

What do you look to offer?

Enhancement by never resting on one's laurels. You can sit there and go, okay, well here we go, well, we did this before yeah fine we'll do this, and I just get bored by that.

Across your different recordings, you don't seem to create a particular, identifiable sound.

Not at all. You could stick half a dozen records together that I've worked on—like the Charlatans, Cabaret Voltaire, The Silencers, Nick Cave, Erasure—and go, hmm, well there isn't actually anything that's running between them, except for I like the records, and that's the way I think it should be. I like it if people look back at an artist's catalog and say, well that album stands out as being really good, I don't know why, rather than going, oh, that was the record that Flood did.

So if your approach is so flexible, how do you orient yourself when you walk into a particular situation?

A lot of it is intuitive, which is very hard to actually categorize and be objective about. So much of what one does has to be based on instinct, because that allows your own personality to come through. From there you use your experience to refine, hone, change and question your original instinct.

The main criteria is here's the song, what do I feel aurally is going to be the best way to make the song even better? It can be anything from I think the drums should be recorded in a closet to I think there should be only kazoo on the track. It's important to be able to say things like, let's record the drums really close, and then two days later go, hmm, big mistake, doesn't work, we'll do something different, and it's no big hang-up, no big deal, rather than setting up the drum sound and saying, off we go, this will be it for the whole record.

A good song can be recorded in a shoe box, and it's still a good song, but a good song recorded in a really innovative and at the same time conducive manner will make it into a great song, I feel. I'm sure there would be a lot of other people who would argue differently, but that's what makes it all fun. ■

Adam Beyda is a Mix *assistant editor.*

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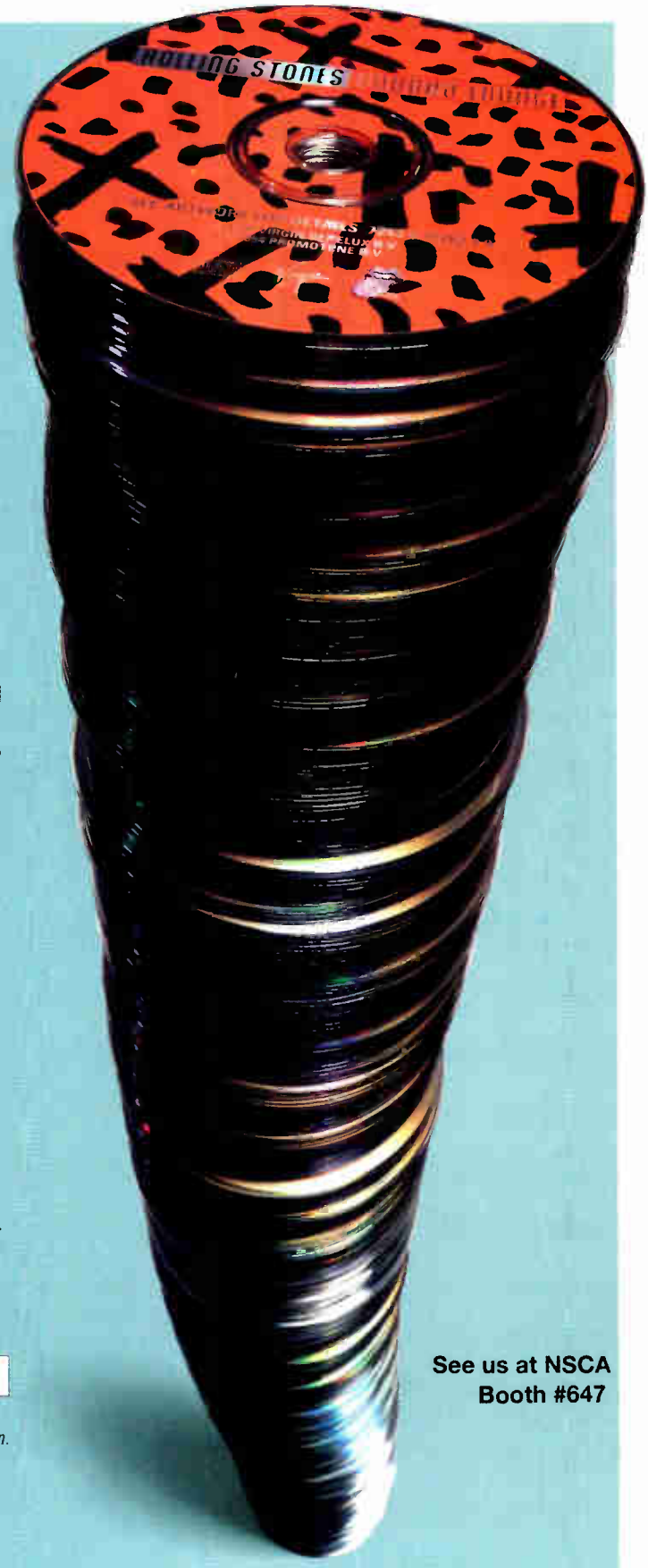

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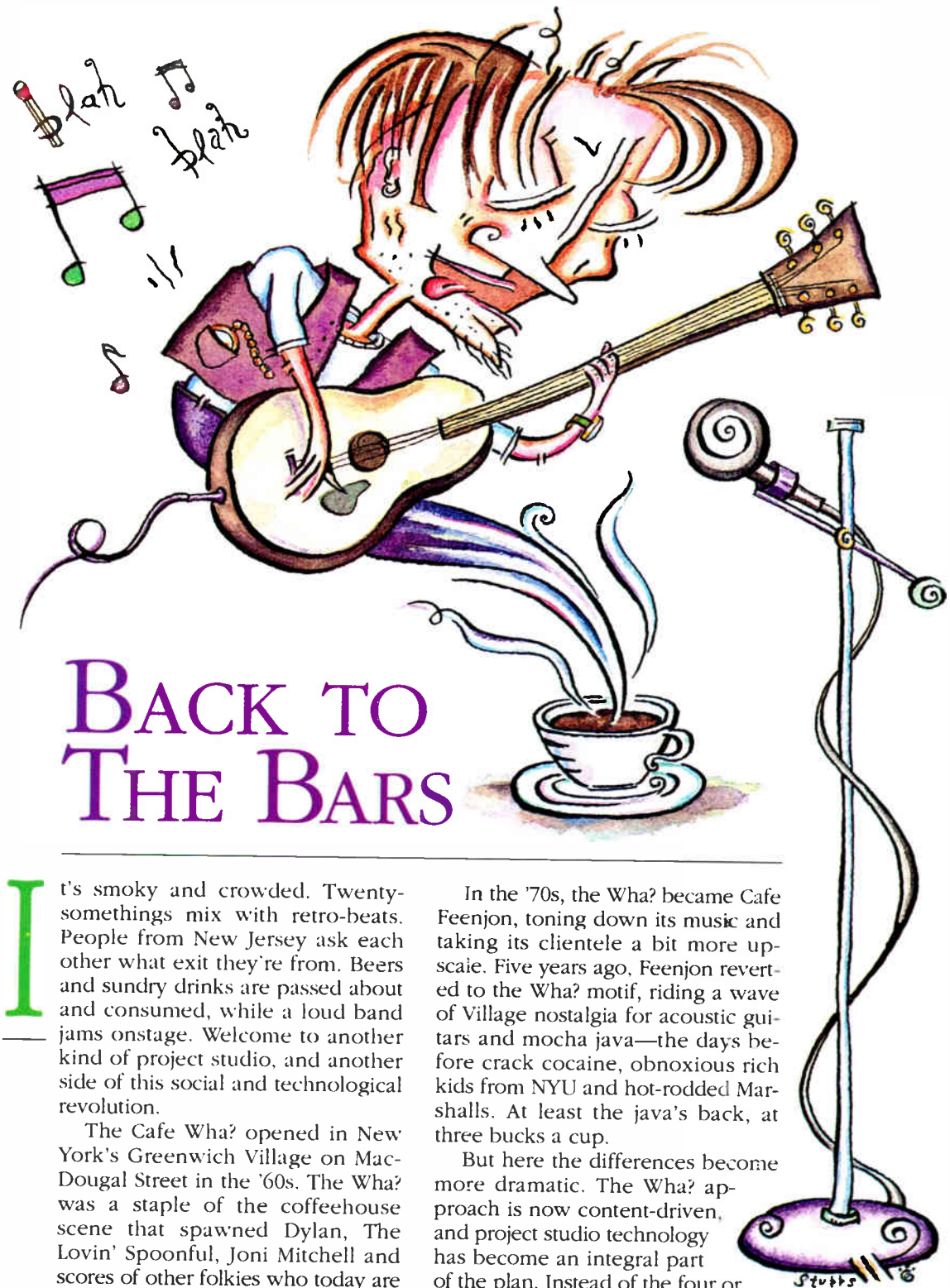

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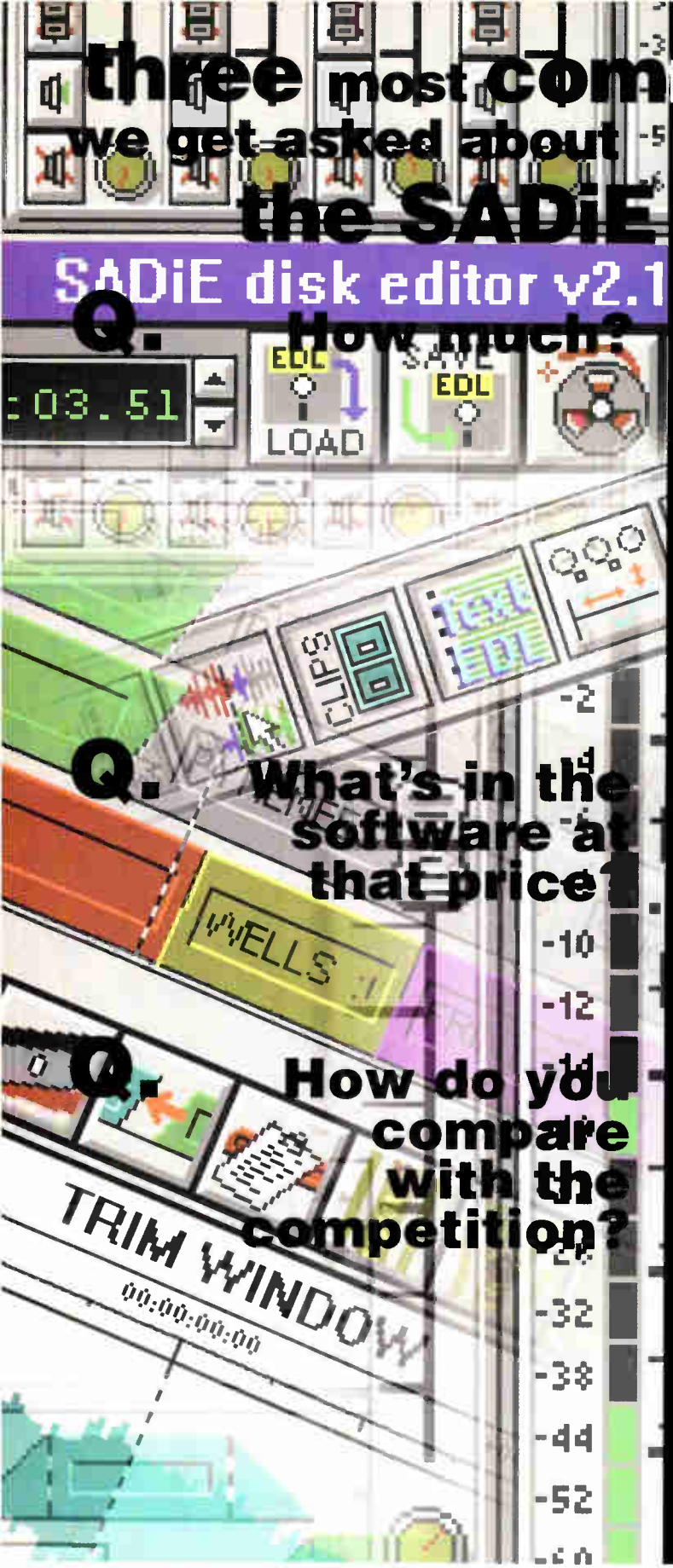

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opted to book just two house bands a week, and they are under contract to the Wha?'s record label and management company. The bands are recorded onto three Tascam DA-88s, two of which are usually installed in the club's main room near the Tascam 2516 8-bus console. The third DA-88 is ensconced in an office/studio arrangement in the adjacent building. The two multitracks from the club are brought up there for overdubs and mixing through a Soundtracs 32-input console. The studio and club are in the process of being wired together.

> The one thing that project studios don't have is the one thing that most clubs do: a large recording space.

Typical project studio gear fills up the studio and club outboard racks: dbx 163 and Aphex Quad compressors, along with assorted, inexpensive digital reverbs like the Alesis Microverb and Lexicon LXP-15. There is also a small videotape system that uses three Panasonic WV-5100 cameras and two Panasonic AD7750 VHS decks, along with a Video Toaster 2000 and 4000. The microphones are Shure Betas and SM58s, which actually are the perfect compromise for the club sound reinforcement and recording applications.

The intent is purely project-driven, as well: Club/studio manager and chief engineer—even his myriad titles reflect project characteristics—Michael Greer says that virtually all of the recording done in the Wha? is for in-house projects, mainly demos and records for release and distribution by the Wha? label. The concept came about when the club's ownership looked back and saw what kind of talent the club had hosted over the years; as grimy as the Village has become, it's a historically fecund ground for signings. While that's cooled off a bit and the New York music scene has headed further downtown to Spring Street or across to the Loisiada, signings do occur: R&B artist Mike Davis got his deal on Jive Records and a charted hit five years ago after gigging at the Wha?.

NOT WITHOUT ITS PROBLEMS

"We do the recordings during live shows and use the club as a recording space during the day," explains Greer, 26, who started his showbiz career as a song-and-dance man (really) aboard cruise ships. Combining that terpsichorean flair with computer chops and a thorough reading of the Yamaha SR handbook, Greer has grown into the position of live-recording engineer. Not that the merging of club and studio has been without some problems—Greer is also the chief tech. The antique wiring that pervades many buildings in the Village would make Edison cringe. Greer says it took months to isolate and eliminate various ground loops: "It was taking forever until it dawned on me that one leg of the incoming main electrical circuit was an old breaker from the 1960s," he says.

The SR wiring harness from console to stage uses a splitter to feed

the DA-88 decks. Greer has isolated the individual points of the stage as much as possible—every guitar amp is tight-miked, and a Plexiglas gobo surrounds the drums. "That gives us a little bit of talkback reflection from the close-in drum microphones," he explains. "But, hey, it's a club." Greer has set up three SM58s to capture room ambience and, in a truly retro manner, has them bused to a single track of the decks.

MEANWHILE, IN LOS ANGELES...

Out in L.A., Zack Zalon, manager of the historic Troubadour Club, founded in 1957, is poring over catalogs and making his final technology choices for a pending—though not completely resolved—decision to add multitrack recording capability to the club. Should the club's ownership agree, Zalon would likely put in a 24-track ADAT system with either an Alesis or Mackie console inside a soundproofed control room at the side of the stage. "It's the next logical choice for us and for any club that wants to support the local music scene," Zalon says. "There's a real hole in the Los Angeles club scene, and I think the ability to have bands make top-notch demos and records in the same places that they regularly perform would be perfect for them, and for us."

Zalon—who has worked for a number of music retailers in the L.A. area, including Guitar Guitar and Goodman's Music—considered subcontracting a multitrack installation to a project studio, but the catalogs have changed his mind. He acknowledges that he's been slightly behind the times technologically but says he's been reading "everything I can get my hands on. I understand the technology, but I've been out of the loop for a while managing a club. But what I see available and affordable now is amazing. All I have to do is run a split feed from my sound system into a control room."

The Troub's house SR is respectable: a Soundcraft Venue II 36-channel main board, Yamaha MC2410M monitor board, an FOH array including 12 large truss-flown EAW cabinets with bi-amped Crest amplifiers, and an eight-way EAW monitor rig with Crest and Crown power. The outboard rack includes an Eventide H3000S and Klark-Teknik EQ. Zalon

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is also consulting with Mick Zane, former Malice guitarist, who as a studio carpenter recently built producer Max Norman's (Megadeth) studio.

"Look," Zalon says, "on one hand, I don't want to just give some kids a 24-track recording studio, but on the other hand, Lisa Loeb had a Number One single with 'Stay' that was done on an ADAT." Zalon, sounding as if he has undergone a technological epiphany, also plans to allow artists to use the club as a studio during the day and on off nights. And that is as attractive a proposition as offering it to them during shows, because the one thing that project studios don't have is the one thing that most clubs do: a large recording space.

The recent trend toward vintage sound is not lost on Zalon. "A lot of studios are designing themselves around stages, with risers for the drums and concrete abutments in walls," he says. "We already have that." Zalon and Greer are also aware that by implementing multitrack recording capability, they are putting themselves into a different niche, one already occupied by mid-sized recording studios that cater to emerging artist demos and records. "With technology like this at these prices, we could wipe out mid-sized studios," Zalon crows.

Adds Greer, "The microtechnology of project studios made perfect sense for doing this: Why book a studio when we can record the acts right where we develop them?" While the idea of clubs putting in recording equipment is not new—Manhattan's CBGB's has had multitrack capability for some years—the new generation of inexpensive gear puts project studio owners that much further into the commercial studio realm.

The irony is that project studios, which virtually eliminated the demo component of commercial studio revenues in New York and L.A. by the mid-'80s, could find themselves at a disadvantage in the Age of Content. Instead of going out to clubs to find talent to develop in their home studios, project producers are now finding themselves competing with those very same clubs. So, you have a project studio; now, do you want to invest in a nightclub? ■

Dan Daley is Mix's East Coast editor. He is also available for lounge bookings.

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by Philip De Lancie

QUICKTIME AUDIO

IS ADPCM A SOUND SOLUTION?

With the release of QuickTime 2.0 for both Macintosh and Windows, Apple Computer has reaffirmed its leading role in the development of desktop multimedia technology. The program features a number of important enhancements over the previous version (1.6), notably in its ability to handle video playback more efficiently, meaning that for a given data rate the new QuickTime is able to deliver to the computer screen images that are larger and/or less jerky than before (see "QuickTime 2.0" in *Mix*, July 1994).

While its desktop video component attracts the most attention, QuickTime is much more than that; it provides a track-based framework for the playback of multiple media types (video, audio, still images, animation) in a manner that is synchronized, "scaleable" (adapts to a range of computers with differing playback capabilities) and cross-platform (plays on Macintosh, Windows, Fujitsu's FM Towns, etc.). These attributes alone make QuickTime worth considering for the delivery of sound even when no video is present. Further, QuickTime offers the ability to play audio direct from a file on a CD-ROM (without preloading into RAM) and—depending on the QuickTime support built into your multimedia authoring environment—allows much more flexible control over parameters such as volume, start location and stop location than possible with standard audio file formats. Of course, QuickTime uses some overhead on playback, which could be a negative on machines with limited RAM.

In Version 2.0, Apple has added two major features to QuickTime's sound capabilities. The ability to create music tracks based on General MIDI files has received the most notice; in a subsequent article we will take a hands-on look at this feature. This month, we focus on the new IMA 4:1 audio compression scheme that has been added as an audio-track format option, assessing its merits in terms of both listenability and practicality compared to linear PCM.

The "IMA" in QuickTime's new audio format stands for the Interactive Multimedia Association, a trade association representing hardware, software and user interests, especially big computer manufacturers such as Compaq, Apple and IBM. In 1991, the IMA set up some audio working groups, which eventually came up with a set

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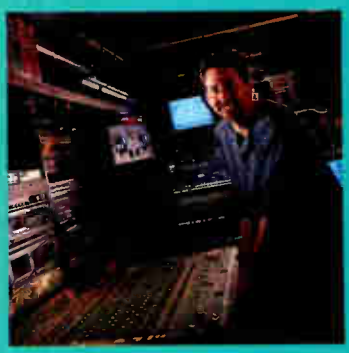

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of "Recommended Practices for Enhancing Digital Audio Capability in Multimedia Systems" (see "Sound for Multimedia" in the May, 1993 *Mix* for a fuller discussion of that document). The 4:1 compression scheme is among the formats that computers must support in order to be compliant with those recommendations.

Given the problems inherent in delivering good-quality linear PCM (see sidebar, *Why Data Compression?*, page 84) in a variety of playback settings, it is easy to see why the IMA wanted to include an alternative. IMA 4:1 is based on an Adaptive Differential Pulse Code Modulation scheme developed by Intel for audio playback within the DVI video compression standard. ADPCM is a hybrid approach which, according to Ken Pohlman's *Principles of Digital Audio*, "combines the adaptive difference signal of adaptive delta modulation (ADM) with the binary code of PCM." By storing the difference between successive samples, ADPCM achieves significant bit rate efficiency over linear PCM, which stores each sample in full.

For any given bit rate, ADPCM can yield better fidelity than PCM. CD-I's 8-bit ADPCM audio format, for instance, sounds much better than 8-bit linear. But the 4-bit algorithm adopted by the IMA allows only 16 values with which to quantify changes from one sample to the next, meaning that fairly gross quantization errors are introduced whenever a program has rapid dynamic variations such as transients. These show up as an unpleasant graininess on the attack of notes, which are hard for ADPCM to track.

COMPARING THE SOUND

To find the strengths and weaknesses of the IMA's ADPCM implementation compared to linear PCM, I conducted a few listening tests. Many factors, sometimes hidden or inexplicable, can influence the way an individual computer performs even such a seemingly simple task as playing back a sound file. But I varied the playback conditions enough to feel comfortable drawing some conclusions. Unfortunately, the experience reinforced the fact that available tools continue to be wholly inadequate when it comes to efficiently working with multimedia-grade audio, damning the user to a process that is tortured and convoluted where it should be easy and straightforward. Hopefully, by the time you read this new tools promised by Digidesign and others will be on the market to make this less of a pain.

My test piece was a 43-second segment derived from the first 1:30 of Bruce Hornsby's "Harbor Lights." The segment had three basic dynamic areas: It starts with solo piano, kicks into a full band vamp, then drops a bit as the vocals come in for the first verse. After preparing several audio test movies (see sidebar, *Prepping the Test Movies*), I opened them in Apple's MoviePlayer 2.0, provided on the QuickTime 2.0 SDK

PREPPING THE TEST MOVIES

AN AUDIO ODYSSEY

I began preparing my listening test movies in Sound Designer II (see Fig. 1), where I recorded the "Harbor Lights" excerpt at 16-bit/44.1 kHz. After editing, I normalized the file and saved it in AIFF format (file size: 7,380 KBytes). I then applied some fairly heavy dynamic compression to the normalized file. Everybody has their own approach to this step; mine is to try to maintain some semblance of original dynamic relationships but squeezed into the narrower range available in 8-bit playback. A number of good SDII plug-ins are available for this purpose. Many people swear by Waves' L1, while I find Jupiter Systems' MDT to be particularly easy to set up for the results I want. In this case, I tried out Waves' new C1, a beautifully sophisticated piece of software featuring look-ahead processing, but lacking a line on its graphic display showing the combined effect of the compression and expansion settings (see Fig. 2). I saved the C1-ed file to a new AIFF file. Then I downsampled the C1-ed file to 22kHz and saved it as a third AIFF file (3,695KB).

The next stop on my audio software tour was the shareware program SoundHack (available from Tom Erbe at California Institute for the Arts in Valencia, CA; tom@mills.edu). SoundHack is generally regarded as offering the cleanest (though not the fastest) bit resolution conversion. I used it to create an 8-bit version of my 16-bit 22k file (1,850KB).

Next up was Apple's SoundConverter (see Fig. 3). Apple doesn't sell this software to the general public; it is found on the QuickTime 2.0 SDK CD, available from APDA ([800] 282-2732), Apple's developer support people. SoundConverter is a simple utility for changing one kind of audio file into another. It reads and writes QuickTime, AIFF, AIFC and .snd files (sorry, no SDII or .WAV support), and can change sample rates and bit resolution in the process. As far as I know, it is the only available means of applying IMA 4:1 compression to QuickTime files. I used it to convert my AIFF files to QuickTime movies, including two IMA 4:1 movies (1,967KB each) from the 16/44 files (one with C1, one without). Just out of curiosi-

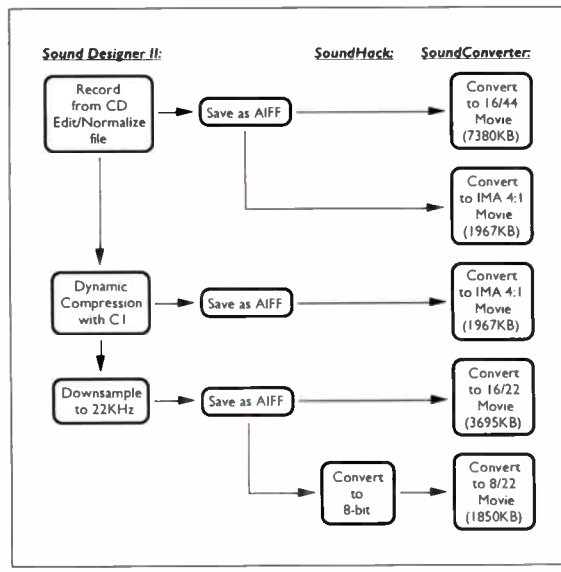

Figure 1: How the QuickTime audio movies were prepared for comparative listening

—CONTINUED ON PAGE 80

(software development kit) CD recently released by Apple.

For my first listening setup I used the 8-bit/22kHz stereo audio output built into my Centris 650 to feed a pair of modest self-powered monitors (Sony APM-007AV). I compared two IMA movies (one with dynamic compression, one without) to my control (a normalized 16-bit/44.1kHz file without dynamic compression) and two 22kHz movies (one at 16-bit, one at 8-bit) dynamically compressed with Waves' C1.

The first thing I noticed was that when I had several movies open, but paused in the background, the control movie played back with chirps and dropouts not present when the movie was open by itself. I do not know if this problem would also arise when using a Red Book movie in other playback environments such as Macromedia Director or Apple Media Tool.

As for fidelity (or lack thereof), my initial reaction was that all the PCM movies sounded pretty bad on the piano introduction. There was a lot of hiss, and whenever the level began to taper off, such as on the decay of held notes, a grainy hash began. The dynamically compressed files were better in this regard, of course, but they also had more hiss and much more noticeable pedal noise from the piano. Once the band got going, the PCM files were more acceptable, with the C1-ed files sounding, not surprisingly, much more punchy than the control.

When I started listening to the IMA movies, particularly the one that had been prepared with dynamic compression, I was surprised. The sound was still somewhat hissy in the intro, but far less grainy than the linear files. During the full band section, this movie was fuller and had more punch and presence than the linear files. To my ears, the combination of dynamic compression and IMA ADPCM yielded the best overall sound for 8-bit playback, particularly in the piano intro.

Unfortunately, my enthusiasm for

—FROM PAGE 79, TEST MOVIES

ty, I also created an alternate 16/22 movie, once again downsampling from my C1-ed file but this time using SoundConverter instead of SDII.

During the listening tests, it was obvious that the two 16/22 movies, which were theoretically the same, sounded very different from one another. Presumably due to a difference in filtering techniques, the file downsampled in SDII sounded much cleaner, but had less highs. This was especially noticeable where the whole band was playing; the cymbals were largely gone. Apple's SoundConverter left more highs but seemed to add much more distortion and grainy artifacts. Intrigued, I tried downsampling the same material in Adobe Premiere 4.0.1, once with the new Enhanced Rate Conversion option selected in the audio preferences dialog, once without. The results both times were similar to SoundConverter.

I mention all this to underscore how carefully you have to check out all the options before settling on any one process of preparing your audio files, because results will vary widely even where one might expect little difference. I should also point out that the highest-fidelity 22kHz files are usually those that are initially sampled at that rate rather than captured at 44.1 and downsampled. The problem with this approach is that when you try to process the files with plug-ins, you find that your 22kHz files play back at 44.1 (double speed), making it a little tough to set up your processing parameters. This results from a limitation of the Digidesign hardware rather than the plug-ins themselves.

Waves' plug-ins that do not require Digidesign hardware on 16-bit Macs are starting to become available for Premiere, which may be one way around the double-speed problem. But be aware that despite the fact that the Version 4.0 upgrade to Premiere is touted as taking full advantage of QuickTime 2.0, there is no mention of IMA 4:1 in either the program's manual or the audio settings portion of the movie output dialog box. IMA 4:1 movies can be imported into Premiere, but they play back with horrid distortion (not properly decompressed). Apparently, the IMA algorithm (like text tracks and MIDI music tracks) is a feature of QuickTime that Adobe has chosen not to support.

—Philip De Lancie

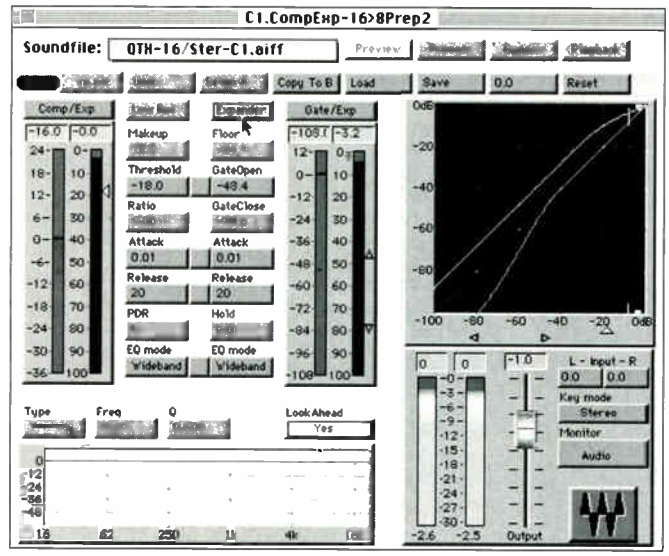

Figure 2: A compression/expansion setup in Waves' C1

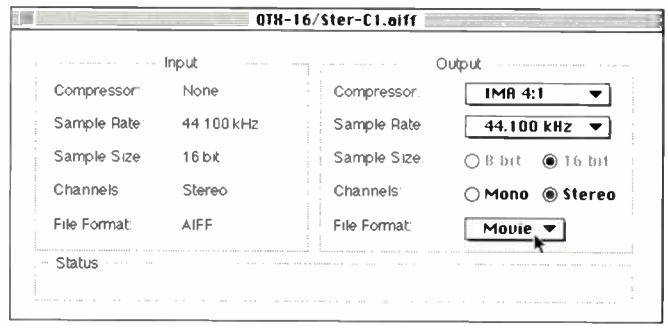

Figure 3: Making an IMA 4:1 audio movie with Apple's SoundConverter utility

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IMA 4:1 faded rapidly when I repeated the comparisons listening to the 16-bit/44.1 output of my Audiomedia II card. I monitored both through an SAE 2200 power amp with Boston Acoustics A40 bookshelf speakers (two-way with 6-inch woofer) and AKG K240DF headphones. Under these conditions, you could really hear what the ADPCM was doing to the sound, and it wasn't pretty. In the piano intro, both the dynamically compressed and uncompressed IMA movies exhibited harsh, grainy noise on the attacks of all the notes. The noise got better when the full band entered, but the overall character of the sound was still somewhat edgy.

Just to be sure that the unpleasant artifacts were not caused by some quirk in the way the Audiomedia II card was handling ADPCM, I repeated the comparisons on a Quadra 840AV—which comes with built-in 16-bit outputs—through Labtec LCS-800 self-powered monitors. The quantization noise on attacks was still very evident.

As for the linear PCM files, the 8/22 movie was very hissy during the intro but decent once the band came in. The 16/22 movie was much cleaner in the intro than either the 8/22 or the IMA movies, almost as good as the control (which barely played on the Quadra 840AV due to dropouts). Both 22kHz movies were moderately duller on the high end than the IMA movies.

WHAT'S A DEVELOPER TO DO?

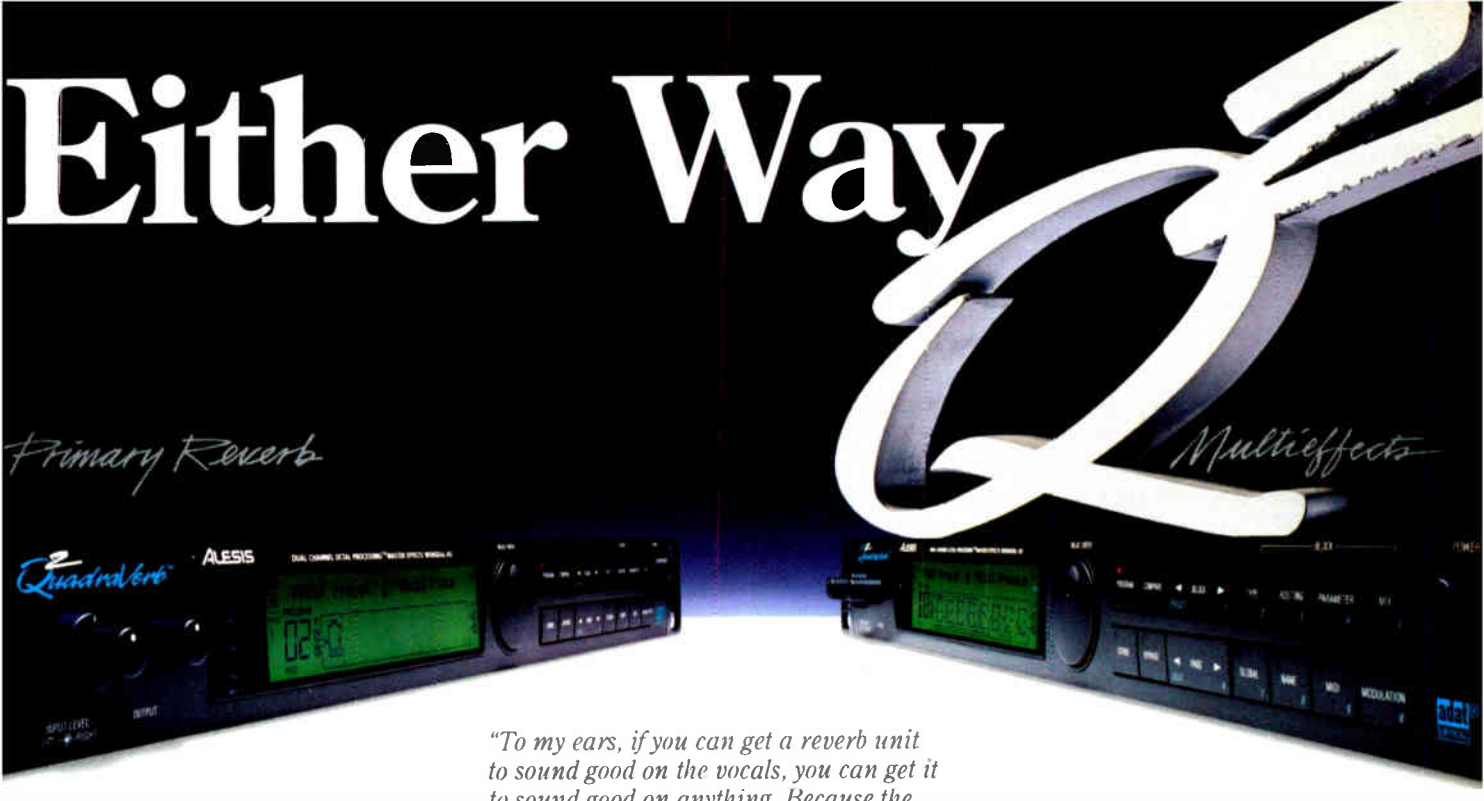
So what does all this mean in practical terms? If you want the best quality for audio-only playback, and you are prepared to make compromises in other areas (see the *Why Data Compression* sidebar), consider designing a mixed-mode CD-ROM. This will allow you to deliver Red Book directly from the audio outs of the CD-ROM drive, avoiding the possibility that some users will hear your 16-bit/44.1 sound degraded by their 8-bit/22K internal audio capability. If your authoring environment does not adequately support control over the playback of CD-Audio tracks from within your multimedia presentation, you and all your friends should write, fax, call and e-mail the product's vendor to let them know that we on the music side of multimedia need this capability.

If (as is most likely) you need to deliver internal audio for playback on both 16- and 8-bit systems, your simplest solution—if you have enough space on your delivery media—is probably to use dynamic compression as if you were preparing 8-bit files, but to deliver at 16-bit/22K. True, IMA 4:1 sounds better than 16/22 on 8-bit systems (I'm still not sure why you don't hear as much of the noise on attacks). But at 16-bit playback, the artifacts introduced by IMA whenever the audio has any dynamics make it sound far worse during such passages than 16/22, even though it better preserves frequency response and cuts file size.

If you are really pressed for space, 16/22 is out of the question, leaving a choice between 8/22 and IMA (which appears to use about 6% more disk space). You be the judge: Would your 16-bit listeners prefer loud hiss in quiet passages and grainy decays, or noise on the attack of every note? If your music does not have much dynamics, IMA probably yields better overall bang for the byte.

For the true fanatic (with lots of time) there is one other option, one which illustrates another potential advantage of using QuickTime for audio delivery. With dynamic compression/limiting, you can minimize transients and get away with IMA 4:1 for all the passages that have full, steady

Either Way



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- Francis Buckley, Independent Engineer: Album, Film and Television

"It's nice to see a company interested in the user's input before they release a product. They developed a reverb that really works. It's easy to make these kind of programs run if you've got tons of hardware. How they did it with such a small box at such an affordable cost is really impressive. It was worth the wait."

- Charlie Brewer, Chief Engineer, Village Recorders

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- Jay Graydon, 2 Time Grammy Winner, Engineer, Producer

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audio. For the occasional passage where IMA's weaknesses are exposed, however, you can replace part of the IMA track with 16/22.

Here's how I did it on my Horns-by test file: In Sound Designer, I split my edited, dynamically compressed 16-bit/44.1 file into two parts, one file for the intro and one for the rest. After sample-rate converting the intro file to 22kHz, I used SoundConverter to save it as a movie, and then con-

WHY DATA COMPRESSION?

THE CURRENT STATE OF MULTIMEDIA AUDIO

To understand why the IMA included a data-compressed format among its audio recommendations, it might be helpful to review the current state of audio delivery in multimedia. Naturally, Red Book audio (16-bit/44.1kHz linear PCM) is the preferred audio delivery format from the standpoint of fidelity, and it is also found in the IMA recommendations. But Red Book's usefulness (whether routed through the computer itself or taken directly from the line outs of a CD-ROM drive) is limited by its high requirements for storage space (10.5 MBytes/minute) and data rate (1.4 Mbits/second). That rate takes the entire available data bandwidth of a single-speed CD-ROM drive, meaning that if a Red Book audio segment is playing from CD-ROM, the use of graphics, animation or other media elements is limited to whatever can be done with files that have already been preloaded from the CD into the computer's RAM.

Data rate requirements become even more of a problem when the audio is the soundtrack for video that you are trying to play at the same time. Adobe, for example, recommends in the manual for Premiere 4.0 (the leading desktop video-editing software) that QuickTime movies made for playback from a single-speed drive use an 8-bit/11kHz soundtrack. The point is that most projects, including CD-ROM titles, will involve situations where Red Book is simply not a viable option. That being the case, the question becomes not whether to compromise the audio but how.

Using mono instead of stereo is the most obvious way to halve data rate, especially for narration. I won't dwell on how this option affects music, as most readers are presumably already familiar with how mono sounds. Of greater interest here are the reductions in bit resolution and sample rate commonly used for audio-only files, usually either 16-bit/22kHz, which cuts the data rate in half, or 8-bit/22kHz, which reduces it to one quarter.

Cutting the sample rate to 22kHz isn't great for your high end, but 16/22 is a pretty palatable compromise, all things considered. The problem is, unless you control the playback platform, such as in a kiosk situation, you can be sure that your 16-bit file will often be played back at 8-bits. On Intel-based machines, 16-bit sound cards are now the best-sellers, but there are still a lot of 8-bit cards out there. On the Mac, Apple has only been building-in 16-bit playback for the last couple of years, and until recently it was only available on high-end machines, so 8-bit is still most common (16-bit files will play on 8-bit Macs, but with an 8-bit dynamic range).

With a maximum theoretical dynamic range of 48 dB, 8-bit playback is obviously far from ideal. Liberal use of dynamic compression is needed to keep the audio level well above the lower limit of the dynamics, where quantization error adds grainy hash to the sound. Unfortunately, that compression can also bring out hiss and other noises that had been safely buried in the program, and these unwanted side effects are especially noticeable when the file is played on a 16-bit system. The challenge is to please those who care enough about sound to spring for 16-bit output, while still making the playback as good as possible at 8-bits. Based on the audio I've heard on a lot of CD-ROM titles, few developers have been able to master this balancing act.

—Philip De Lancie

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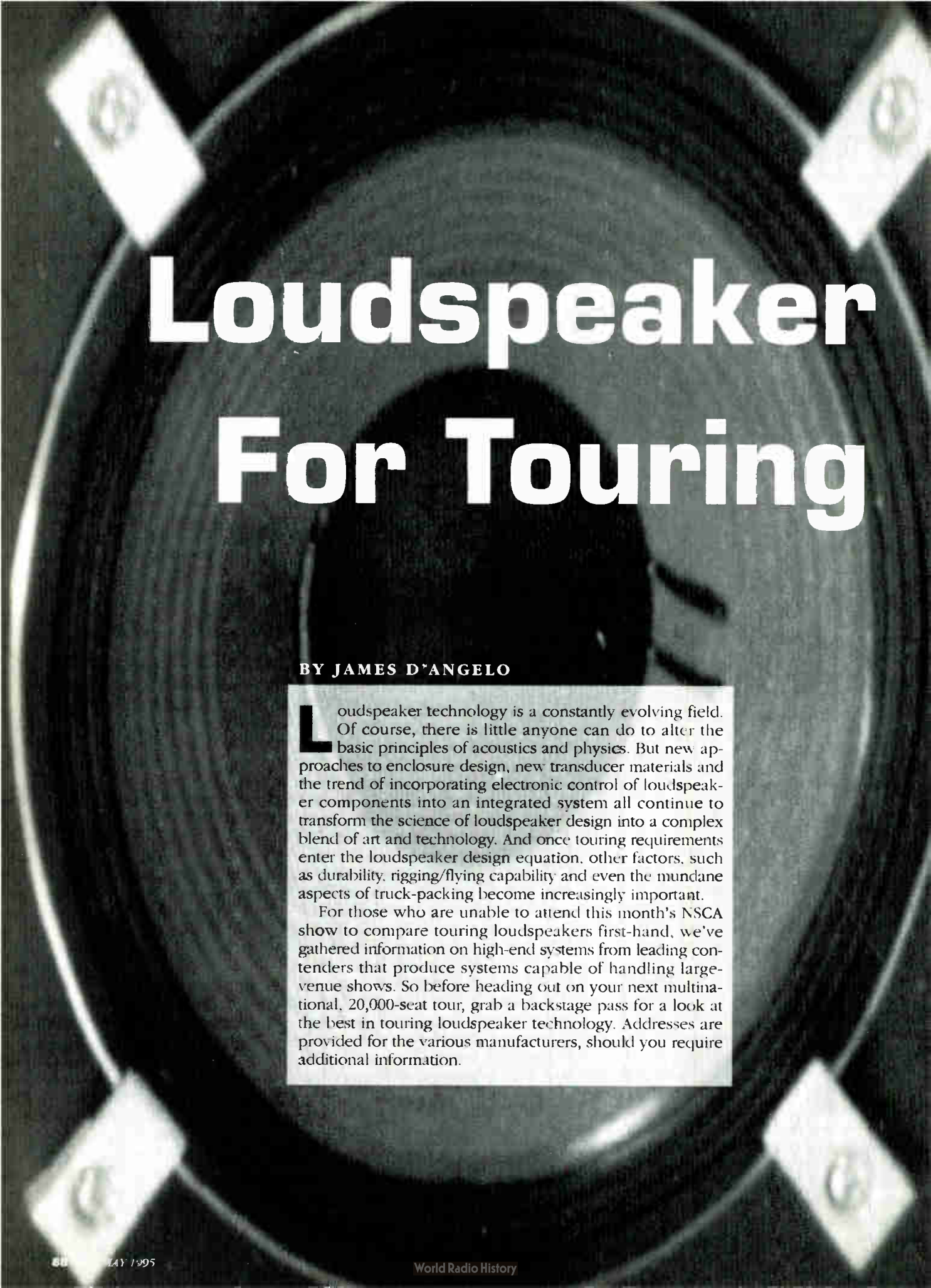
verted/saved the other file to an IMA 4:1 movie. In MoviePlayer, I opened the IMA movie and copied it to the clipboard. Then I opened the intro movie, went to the end, and chose Add, which appears on the edit menu when the option key is down. When I saved with the "self-contained" option, I had a movie that plays a 16/22 track for the intro and then switches to an IMA track for the rest. The file size is greater than the pure IMA, but less than the pure 16/22.

Needless to say, most developers won't find the above approach too practical. What is really needed are better-sounding ways to data-compress audio. The IMA concedes that fidelity accounted for only about 30% of the scoring that led to its choice of Intel's ADPCM over competing algorithms. Back in 1992, it seemed more important that decompression of the files (without dedicated hardware) require no more than 25% of the processing power of a 386/33 MHz PC. In a world increasingly populated by Pentiums and PowerPCs, however, it's time to re-open the process and begin work on a new generation of higher fidelity compressed-audio recommendations.

The IMA's Brian Marquart told me that even though the audio group is no longer active, the association ([410] 626-1380) "wants to leave the door open if someone sees a problem with the audio." At the same time, the recently formed IAIAC (see "The Audio for Multimedia Message" in *Mix*, October 1994; e-mail 71042.1410@compuserve.com) may be able to exert some influence toward improved standards. The important thing is for everyone who cares to get involved. Reporting on the draft IMA recommendations in early 1993, I wrote: "The recording industry and entertainment companies appear content to let the computer industry define the fidelity with which their creations will be heard by consumers...In the absence of their involvement, considerations of fidelity appear to be taking a back seat." That seems to be one of the few things in multimedia that hasn't changed rapidly over the past two years. ■

Philip De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.



Loudspeaker For Touring

BY JAMES D'ANGELO

Loudspeaker technology is a constantly evolving field. Of course, there is little anyone can do to alter the basic principles of acoustics and physics. But new approaches to enclosure design, new transducer materials and the trend of incorporating electronic control of loudspeaker components into an integrated system all continue to transform the science of loudspeaker design into a complex blend of art and technology. And once touring requirements enter the loudspeaker design equation, other factors, such as durability, rigging/flying capability and even the mundane aspects of truck-packing become increasingly important.

For those who are unable to attend this month's NSCA show to compare touring loudspeakers first-hand, we've gathered information on high-end systems from leading contenders that produce systems capable of handling large-venue shows. So before heading out on your next multinational, 20,000-seat tour, grab a backstage pass for a look at the best in touring loudspeaker technology. Addresses are provided for the various manufacturers, should you require additional information.

Systems Applications

Adamson (Ajax, Ontario) has introduced a new multibox, four-way concert loudspeaker system that features a new array geometry designed to reduce lobing error in the horizontal plane. As its name suggests, the Hi Q Arrayable Concert Speaker System is intended to be flown in large arrays and features a new rigging and handling system that's said to be fast, efficient and safe.

The Hi Q system comprises four enclosures: a bass enclosure and three three-ways (high-mid-midbass). One of the upper enclosures aims straight outward, and one aims downward at approximately 20 degrees; the third aims down at approximately 45 degrees.

The three upper-system enclosures may be combined, depending on vertical coverage requirements, to produce uniform vertical coverage over wide angles.

The Hi Q's precise time aligning is controlled by the Adamson DX4000 Digital Signal Processors. Additional control features such as equalization, limiting, crossover frequencies and filtering are also provided by the DSP box.

The rigging is configured for a dead hang with zero space

between enclosures, both vertically and horizontally. The system also is equipped with standard Aeroquip fly track, sides and back, for simple three-point hanging. A steel panel with welded steel loops on the back side of the enclosure allows for the use of a 2.5-inch ratchet strap for curving or tilting a daisy-chain hang.

Adamson Systems Engineering, 332 Fairall Street, Ajax, Ont. Canada L1S 1R6;(905) 683-2230.

Apogee Sound (Petaluma, Calif.) manufactures the Apogee AE-5 loudspeaker and corresponding P-5 processor for state-of-the-art sound reinforcement in theaters, concert halls,

Apogee AE-5 loudspeaker and P-5 processor

clubs and churches. Offering very low distortion, clear midrange and a smooth high end, the portable, bi-amped AE-5 is capable of high power output (125 dB continuous at 1 meter) and wide-range response (53 to 17k Hz) in a fully arrayable, trapezoid enclosure.

The AE-5 is Apogee's best-selling model. Constructed for demanding use, the unit employs a 12-inch, high-power, high-efficiency cone driver treated for resistance to moisture (ensuring long-term, cone-mass stability) and a proprietary 1-inch throat composite-diaphragm compression driver. It's ferrofluid-cooled and coupled to a highly damped, molded uralite horn. Engineered to function both as a stand-alone unit and as a building block to create large systems, multiple AE-5s combine into acoustically correct, easily flown arrays.

The most versatile member of Apogee's loudspeaker family, the AE-5 is crafted from 100% Finland birch ply and is equipped with steel rigging hardware. It is finished with durable epoxy paint and protected with a plastisol-damped steel grille.

Apogee Sound Inc., 1150 Industrial Drive, Petaluma, CA 94952; (707) 778-8887.

Clair Bros. Audio Systems' (Lititz, Pa.) R-4T is a culmination of 25 years of concert sound experience. The variable-array, trapezoidal system uses the same technology employed in the company's S-4 Series II, a popular loudspeaker system for concert sound reinforcement.

The design of the R-4T allows the choice of components, distribution patterns and cluster shapes, which can be oriented vertically and horizontally. Designed for nightclubs, arenas, stadiums, churches and auditoriums, the R-4T features proprietary infrastructure rigging to accommodate virtually any installation application.

Available in either three-way or four-way versions, the R-4T features a high-powered 18-inch driver for low frequencies, a 12-inch midrange speaker and a 2-inch high-frequency driver coupled to a 60°x40° constant-directivity horn.

The variable-array system can be set up with the bottom or top pair coupled and amplified to cover a desired area with maximum speaker efficiency. Lobing and phase problems are minimized with the proprietary horn and cone transducer technology.

The three-way active bass, mid-

Clair Bros.' R-4T

range and high-frequency system features three drivers. The bass and midrange sections have one 18-inch and one 12-inch driver, respectively, capable of handling 300 watts of pink-noise with a 6dB crest. The high-frequency section has a single 2-inch, high-compression driver coupled to a constant-directivity horn.

Clair Bros. Audio, PO Box 396, Lititz, PA 17543; (717) 665-4000.

Community Professional Loudspeakers (Chester, Pa.) has introduced the next generation of its popular trapezoidal RS loudspeaker systems. "We recently developed a totally new compression driver design, which produces a measurable increase in high-frequency response over the standard 1-inch that we used previously," said VP John Wiggins. "We first introduced this new driver, the VHF100, in the RS880 and have now incorporated it into all of the RS systems."

The RS880 is a high-output, high-sensitivity, horn-loaded, three-way, full-range loudspeaker system of

Community Professional's RS880 and VHF100

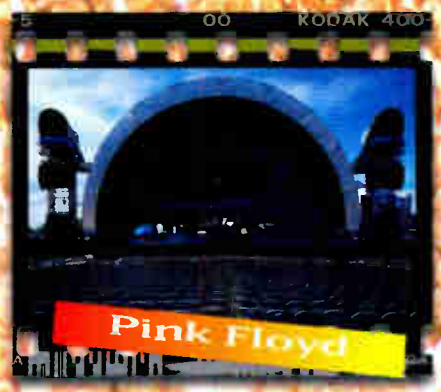
wavefront-coherent design. Components are matched for seamless full-range performance. The low-frequency section uses two 15-inch, triple-spider, low-frequency drivers on a dual-throated, expansion bass horn. The midrange section consists of an M200 2-inch exit compression driver mounted on a midrange Pattern Control horn. The low- and mid-frequency horns are molded in one piece and comprise the fiberglass faceplate of the trapezoidal cabinet. The RS880's high-frequency section, which is mounted co-axially to the upper LF driver, uses a single ferrofluid-cooled, VHF100 1-inch compression driver coupled to a fiberglass high-frequency Pattern Control horn.

The RS880 enclosure is made of extensively braced, birch-faced, multicore plywood with integral steel edging connected to internal steel bracing for suspension of the system.

Community Professional Sound Systems, 333 E. 5th Street, Chester, PA 19013-4511; (215) 876-3400.

Expanding its manufacturing and engineering facilities for the third straight year, **Eastern Acoustic Works** of Whitinsville, Mass., has become a major professional loudspeaker manufacturer. Its 850 Stadium Array Series, one of the hottest SR systems in today's concert sound industry, continues to expand with the addition of the KF853 Ultra-Long Throw Stadium Array System. The KF853f maintains the same frontal area as the earlier models, but this system is designed to project midrange and high-frequency energy over long distances.

The KF850 and the more modular KF852E (mid/high) and BH852 (low-



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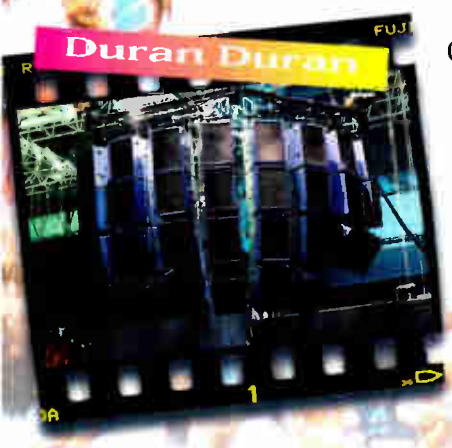

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frequency) combination feature EAW's Virtual Array technology, which integrates speaker systems to balance drivers, horn flares, enclosure geometry and processing electronics to produce a multicabinet system that eliminates lobing and comb-filtering problems. It also helps reduce design and installation expenses in permanent installations.

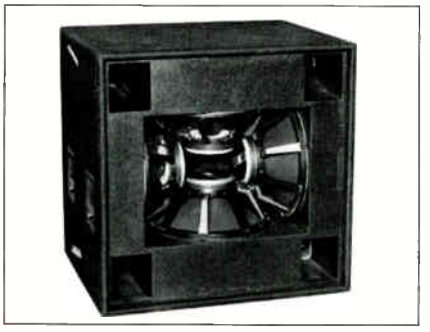
The 850 is a popular one-box system (optional subwoofers) that has constant 55° coverage over the 200 to 20k Hz band, with true horn loading for better pattern control and lower distortion at high sound pressure levels. The KF852E includes EAW's new low-distortion, ferrofluid-damped CD5002 2-inch compression driver. The midrange subsystem includes a pair of 10-inch mid/bass cones loaded on Kenton G. Forsythe's unique, foam-reinforced, wood-veneer horn and displacement plug.

Eastern Acoustic Works Stadium Array

Eastern Acoustic Works Inc., One Main Street, Whitinsville, MA 01588; (508) 234-6158.

Making use of proprietary Manifold Technology (MT), **Electro-Voice's** systems provide exceptionally high acoustic output and low distortion from a small enclosure.

The MTL-4B low-frequency loudspeaker system is a manifold-vented box, low-frequency system with a rectangular enclosure, using four high-power, 18-inch woofers. The system comes in four configurations: carpeted finish with flying hardware, carpeted finish without flying hardware, painted finish with flying hardware and painted finish without flying hardware. The manifolding technique results in increased acoustic loading, yielding increased low-frequency efficiency and reduced distortion over conventional direct-radiating designs in a small enclosure.



The Electro-Voice MTL-B system

The MTL-4B can be complemented by the MTH-4/64B or MTH-4/42B mid-bass/mid-frequency/high-frequency SR systems. Differing mostly in directivity patterns, the two are active, three-way, horn-loaded systems with rectangular enclosures. They cover 150 to 20k Hz. The 4/64 has a 60°x40° constant-directivity pattern, and the 4/42B has a 40°x20° constant-directivity pattern.

A staple of the concert touring industry, the MT systems are used extensively by top touring companies such as dB Sound, SSE Hire in the U.K., Sound Services and others.

Electro-Voice, 600 Cecil Street, Buchanan, MI 49107; (616) 695-6831.

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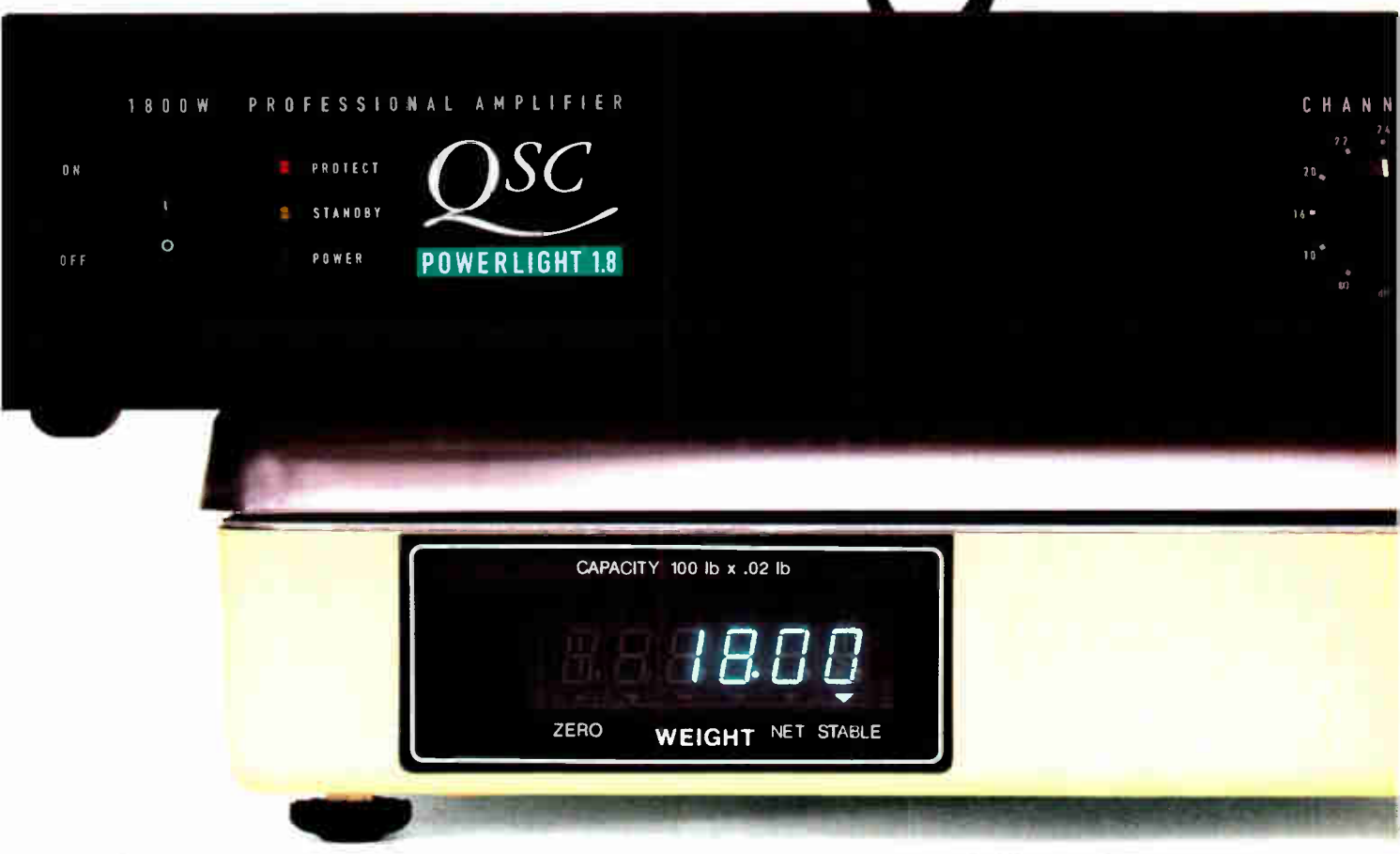

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JBL's Array Series

The Martin America Wavefront 8

Inside the 45° trapezoidal wedge enclosure, the Array Series has four internal steel braces that are ready to accept optional bolt-on truss modules. Ultimate break strength of this method exceeds 6,000 pounds. Outside, rigid ¾-inch, 13-ply hardwood, a textured black-paint finish, and a perforated 16-gauge steel grille form a durable package.

The ES52000 Digital Controlier offers system control with digital domain precision. Zero phase shift crossovers with 50 to 90 dB per octave slopes, 22 µs alignment resolution, adaptive filter equalization and protection limiting provide high-level sound quality.

JBL Professional, 8500 Balboa Boulevard, Northridge, CA 91329; (818) 909-4500.

The Wavefront 8 by **Martin** is a high-efficiency, three-way touring sound reinforcement system that achieves full-frequency performance down to 80 Hz. Its 55° horizontal by 30° vertical-dispersion pattern and trapezoid footprint allow it to be arrayed to suit a variety of medium- and large-scale theater and live sound applications.

Each Wavefront 8 enclosure houses a vertically splayed, dual-12-inch driver low-mid horn to cover the frequency band from 80 Hz to 850 Hz. The high-mid band between 850 Hz and 3.5 kHz is produced by a 6.5-inch treated cone driver loaded by a phase plug and horn, maintaining constant 55° horizontal dispersion over the entire operating range. High frequencies are generated by a 1-inch exit compression driver on a constant-Q HF horn with dispersion characteristics engineered to match the high-mid.

Use of twin 12-inch drivers for the low-mids allows the Wavefront 8 to operate down to 80 Hz, which makes it a very flexible system, capable of full-range performance on its own and making additional low-frequency enclosures a performance-enhancing option rather than a necessity.

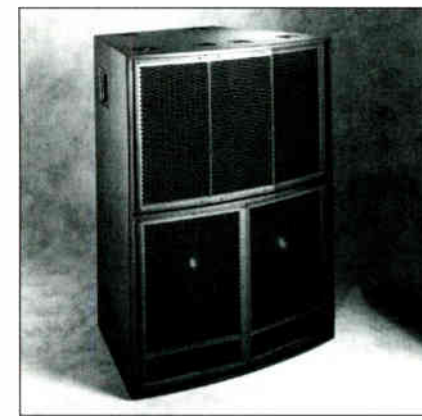
Martin America, 22930 Miller Road, Chicago Heights, IL 60411; (708) 758-0652.

The MSL-5 cabinet from **Meyer Sound Laboratories** in Berkeley, Calif., is a high-power, high-definition, arrayable loudspeaker for large-scale music reinforcement and public address applications. The company, which introduced its first product in 1979, has won many awards for loudspeaker design, including a TEC Award. Used recently for the "Three Tenors" concert at Dodger Stadium, the MSL-5 comprises an all-horn, integral loudspeaker cabinet constructed as a 30° arrayable section, with two 12-inch-cone, low-frequency drivers in a vented, horn-loaded enclosure and three 2-inch throat (4-inch diaphragm) high-frequency horn drivers with vertical 70° horns.

The cabinet is fitted with handles and rigging lift rings having a 1,500-pound, maximum safe working load capacity—bolted directly to an internal steel frame.

The MSL-5 bi-amped loudspeaker operates as a system with the M-5 Control Electronics Unit (one per channel). Optimized for the MSL-5 and aligned at the factory, the M-5 contains frequency and phase-response-alignment circuitry, as well as driver protection circuitry. A single-channel device operating at line level, the M-5 is intended to be the final component in the signal chain before the power amplifier.

The MSL-5 effectively covers the vocal range and may be used alone for paging applications. In music reinforcement situations, the DS-2 Mid-Bass Loudspeaker is recommended to supplement the low-frequency performance of the system.



Meyer Sound Labs' MSL-5

Meyer Sound Laboratories Inc., 2832 San Pablo Avenue, Berkeley, CA 94702; (510) 486-1166.

Professional Audio Systems' RS-2C

The RS-2C is a member of the Time Offset Correction System-2 family from **Professional Audio Sys-**

tems (P.A.S.). It features specially designed and matched components in a rugged, ready-to-fly trapezoidal cabinet with a front surface area barely larger than the loudspeakers it contains. Components are a 2-inch JBL HF compression driver mounted coaxially to a P.A.S. CXL-2580C 15-inch LF driver, with additional bass output provided by a P.A.S. 15-inch HL-2580C extended-low-range driver.

The enclosure is constructed from 11-ply Baltic birch with reinforced corners, a perforated steel grille, and top-and-bottom steel-plate-reinforced Air Cargo #20050 fasteners, with an additional #20050 on the rear under

The Renkus Heinz CE-3T

the terminal plate. The front of the cabinet measures only 35.25 inches high by 17.25 wide. The RS-2C is ideal for large-venue sound reinforcement applications.

The RS-2C uses P.A.S.'s proprietary Time Offset Correction circuitry to achieve strong phase response from 100 to 10k Hz, producing a point-source radiation pattern with great transient response, solid array coherence, low distortion and less tendency to feed back. Each channel of an RS-2C system achieves this performance through the use of carefully matched active electronics contained in an outboard RS-2C Electronics Unit, which provides four-pole, linear-phase dividing filters, special Time Offset Correction circuitry, equalization and overdrive protection for the compression drivers.

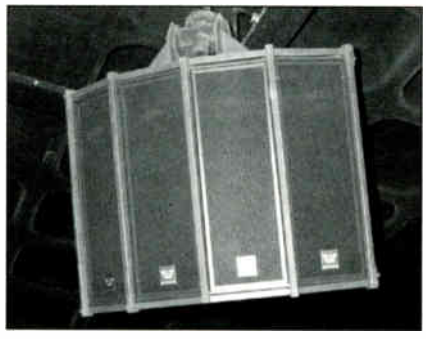
Professional Audio Systems, 660 N. Twin Oaks Valley Road, Ste. 10, San Marcos, CA 92069; (619) 591-0360.

The **Renkus-Heinz** CE-3T MH loudspeaker system was developed for use in large systems where its long-throw characteristics are needed. Its tight 60°x25° pattern and high-output SPL enable it to "lay down" 95 dB at 600 feet. The CE-3T MH features CoEntrant Waveguide Technology, a Renkus-Heinz design that provides true point-source performance, along with natural signal alignment and tightly controlled dispersion. The result is sound clarity and crystal imaging, even at high SPL levels. The CE-3T MH is packaged in a 20° trapezoidal enclosure that is easy to array and offers smooth coverage in both small and large arrays. Side-mounted Aeroquip tracks offer metal-to-metal reliability for inter-speaker rigging. Recessed top- and bottom-mounted fly points are also available.

The CoEntrant design ensures proper signal alignment and constant directivity and Q through crossover. This enables the CE-3T MH to provide tonal balance and resolution. Six 6.5-inch, carbon-fiber, midrange drivers and six extended-range, high-frequency drivers mounted in a close-coupled CoEntrant array feed a single large-format horn. This adds virtually distortion-free performance from 250 to 18k Hz.

The matching CE-3T LO low-frequency loudspeaker features four heavy-duty, 12-inch woofers in a horn-loaded, bandpass design that has the same acoustic origin as the CE-3T MH, assuring proper signal alignment. It provides excellent directional control and solid bass down to 60 Hz. A matching horn-loaded, dual-15-inch subwoofer, the C-3 SUB, is available for applications that need even more low-frequency energy.

Renkus-Heinz Inc., 17191 Armstrong Avenue, Irvine, CA 92714; (714) 250-0166.

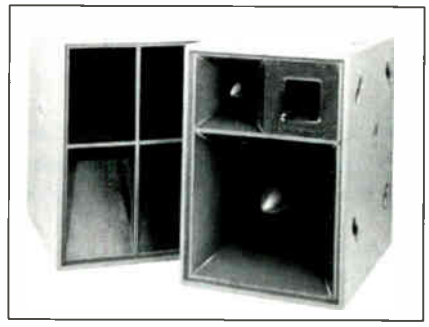


Stage Accompany's Performer Series

Stage Accompany (which recently moved to 6573 Wyndwatch Drive, Cincinnati) is just breaking into the U.S. market with its Performer Series loudspeakers. A standout feature of the Performer Series is the standard high-frequency ribbon driver in all its loudspeakers. Another standout feature of Stage Accompany is the Compact Drivers. By using powerful neodymium magnets, the SA 8535 Compact Driver has an output capability comparable to a 2-inch compression driver. This, combined with the sound of a ribbon-type driver, gives Stage Accompany unique, high-performance sound.

The complete Performer Series consists of six types of cabinets, including "high power" mid-high cabinets with minimal dimensions, augmented with newly designed bass cabinets for the lower registers. The power for the system is supplied by PPA 1200s, equipped with crossovers and extensive microprocessor-controlled protection circuitry.

Stage Accompany, 6573 Wyndwatch Drive, Cincinnati, OH 45230; (513) 624-9977.



Turbosound Flashlight

Formed in the late 1970s, **Turbosound** was one of the largest sound reinforcement companies in Europe before selling its live sound division in 1985. Turbosound has worldwide patents for its methods of horn-loading cone loudspeakers, which result in increased efficiency and a natural sound quality. Its Flashlight loudspeaker system is a long-throw (20° conical dispersion) sound reinforcement system for use in stadiums and large arenas. Additionally, it is the only complete premanufactured system, ready to go on delivery, with all necessary cabling, flying hardware, rigging trunks, amp racks, etc.

Proven during the Pink Floyd tour —the largest tour in history to use a premanufactured sound system— Flashlight is essentially a four-way, quad-amped loudspeaker system. The control system comprises a 24dB-per-octave crossover with factory-preset limiters, full digital time alignment and transformer-balanced outputs. A key to the Flashlight sound

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lies in the fact that the system uses all cone drivers (out to 8 kHz) for low distortion, with compression drivers taking over from that point out to 20 kHz.

The loudspeakers are divided into two uniformly sized enclosures; the TFS-780L and the TFS-780H. Where the TFS-780L covers the low frequencies in the range 30 to 150 Hz and contains a 21-inch loudspeaker with a 6-inch voice coil, the TFS-780H covers the frequencies in the 150 to 20k Hz range. The enclosure consists of two specially developed long-throw TurboMid devices and a compression driver on a waveguide horn. The larger TurboMid device is driven by a powerful 12-inch loudspeaker and covers the frequency range between 150 to 1.3k Hz. The smaller TurboMid device is fitted with a 6.5-inch cone loudspeaker covering the 1.3 to 8kHz frequency range.

Turbosound, distributed in the U.S. by Audio Independence Ltd., 9288 Gorst Road, Mazomanie, WI 53560; (608) 767-3333.

The **Woodworx** MAX Series of loudspeakers is based on the widely successful proprietary designs created by Roadworx for their own concert and installation activities. With an updated horn design, standardized cabinet, and Neutrik connectors, the MAX Series is ready for the consumer.

The Woodworx MAX Series

The MAX 3.5A High Density Concert Array is a professional, full-range loudspeaker system designed for extreme high-SPL concert performance applications. Designed to be used in multiples, the MAX 3.5A can be stacked or hung for smooth, wide-pattern coverage. Its phase coherency and flat spectral response satisfy the most critical high-SPL long- and/or medium-throw applications. The 13-ply Baltic birch contoured enclosure provides rigidity, freedom from weather effects, and tour-tested ruggedness. Rigging capabilities include Aeroquip L-track hardware set flush to the top, bottom and side panels, allowing for the creation of numerous high-load, compact array configurations.

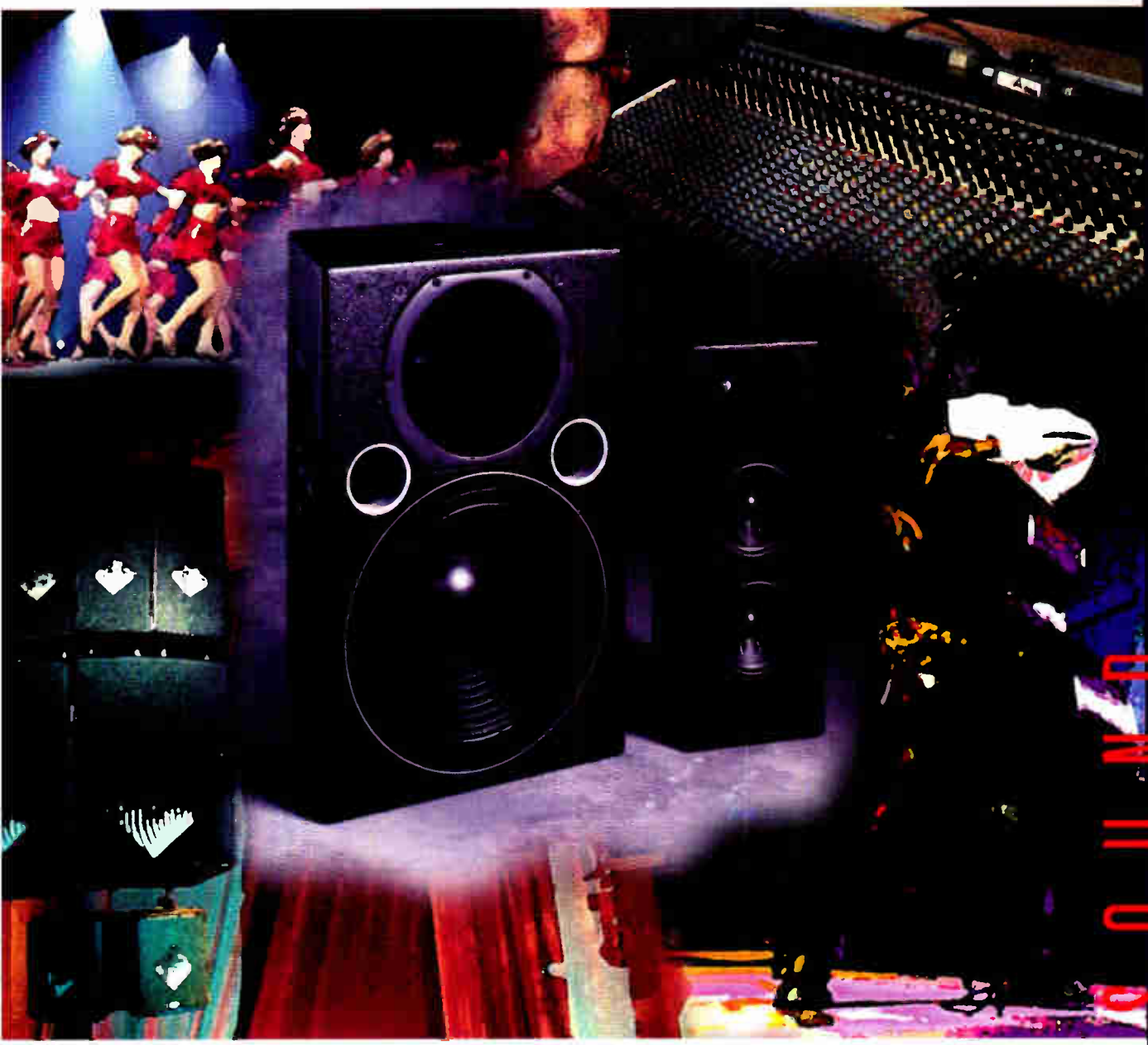
Components consist of two 12-inch 600W high-excursion woofers, two 10-inch, high-power, mid-frequency drivers, and one 3-inch diaphragm, 150-watt, large-format, compression device, all manufactured by major component suppliers to Woodworx's design specifications. High-frequency directivity is provided by a CAD-created, controlled-pattern waveguide, offering the highest level of seamless, multibox waveform integration and high-SPL projection when configured in an array.

Combined with the optional MXC-24 2-channel, four-way Active System Controller (a crossover and performance linearizer with output level controls, switchable high-frequency CD waveguide compensation and subwoofer output), the MAX 3.5A exhibits extremely coherent phase and frequency response.

Woodworx Audio Systems, 3714 Alliance Drive, Ste. 303, Greensboro, NC 27407; (919) 855-5600. ■

James D'Angelo is technical editor of Mix.

UPA-2C & UPM-2 Reinforcement Loudspeakers



Meyer Sound announces two new precision tools for creative sound: the UPA-2C and UPM-2 High-Q Reinforcement Loudspeaker Systems.

Building on proven, classic Meyer Sound designs, these new systems incorporate unique aspherical high-frequency waveguides with unprecedented directional control. Coupled with a high-power compression driver in the UPA-2C, and with a patented low-distortion titanium dome in the UPM-2, these waveguides enable precise management of high-frequency energy. Unwanted reflections are minimized to achieve a new level of clarity. Arraying performance is seamless.

At the intersection of science and art, Meyer Sound has consistently delivered the tools of choice for the most demanding sound professionals. These new systems continue and extend that tradition.

For more information on the UPA-2C and UPM-2, contact your local dealer or Meyer Sound.

Meyer Sound

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MEYER SOUND

SOUNDCHECK

Patrick Baltzell mixed FOH from a Cadac Live console at L.A.'s Shrine Auditorium

Grammy Sound '95

by Mark Frink

The Grammys were presented in L.A.'s Shrine Auditorium, with sound reinforcement services again provided by Burns Audio. One amazing moment, which did not go to air, was watching Seal's five-piece band get set up during a 150-second commercial break. Hats off to the stagehands! I was on hand to watch Tony Bennett win the first Album of the Year for a live recording.

Grammy veteran Patrick Baltzell mixed the inputs from the musical performances, except for the vocals, on the new Cadac "Live" console, which allowed for precise resetability from one act to the next. Processing on this console included a PCM70, an H-4000, two REV5s and two SPX-90s. Inserts were dbx 903/904 combinations on the drum mics, and 903s on the bass and key inputs, with a half dozen 166s for the remaining channels. Microphones used included a standard complement of SM98s or MD-421s on toms; 414s, 451s and SM81s for condensers; SM57s on snare, and Countryman DIs. Baltzell's band-minus-vocals mix was fed into the main console, a 56-input Gamble EX, on which Mark King mixed the vocals from each of the performances using dbx 903/902 combinations as inserts on lead vocals and on the background group. Vocal effects were simply a REV7 and an SPX-1000. Wireless mics were Cetec Vegas, and the hard-wired mics used by Springsteen, Etheridge, Raitt and Rollins were Audix OM-7 mics. Evan Andelman mixed dialog from podium mics and pre-recorded audio program material on the right side of the EX console.

Eight matrix outputs fed 13 speaker zones, while an aux send fed subwoofers. All speakers were equalized by Ken DeLoria using 15

—CONTINUED ON PAGE 119

Sound System Equalization

by Dave Revel

Have you ever tried equalizing a problem frequency, only to find that you have a band or two of your graphic EQ cut all the way, and you are still having problems at that frequency? Perhaps you have taken the time to run pink noise through your sound system and measure the room using an RTA—Real Time Analyzer—only to find the results disappointing. Some sound engineers attempt to achieve "flat response" using EQ alone. Some walk into a room and immediately begin adjusting faders on the graphic to "EQ the room," often employing an RTA and attempting to adjust the equalizer until the display reads flat. All experienced live sound engineers have found themselves in frustrating situations where all the EQ in the world can't make the room sound right.

Each engineer has his or her own routine for setting up and equalizing a sound system. One method is using an RTA to achieve a rough balance of the crossover bands, followed by music and voice sources to fine-tune the EQ, while others prefer to use only their voice and selected music. Some prefer the intuitive interface of a graphic equalizer, while others prefer the accuracy of using parametric filters. In order to achieve consistent results, all agree that it is important to have an established routine that correctly addresses

—CONTINUED ON PAGE 103

TOUR PROFILE

Nick Lowe & The Impossible Birds

From the Pub to the Clubs

STEVE JENNINGS

by Barbara Schultz

You could say that Nick Lowe's *Impossible Bird* tour began long before the CD was released last November, and long before Lowe and his band began a tour of U.S. and Canadian clubs last January. You could say the tour really started in the back room of a pub called The Turk's Head in Twickenham, England. Many of the songs from the artist's latest collection were rehearsed and recorded live there, first by Lowe alone and then by the entire band that appears on the album, which is arguably Lowe's most charming and heartfelt to date.

The "Impossible Birds," on the record and on tour, include Paul Riley (bass), Bill Kirchen (electric guitar and trombone), Robert Trehern (drums) and Garaint Watkins (keyboards and accordion). Lowe plays rhythm guitar and some bass on the record, in addition to singing, of course. He co-produced with Neil Brockbank, who also did the mixing and made up half of the band's two-man crew (with tour manager Brian Carson) when they took the act on the road. Lowe, the band and Brockbank took a refreshing DIY attitude toward the project as a whole, keeping their budget minimal and their contact with fans immediate.

"When I met up with Nick," Brockbank recalls, "He was going to be doing what would have been his second album for Warner's, and he started making noises like, 'Can we do it live? Do we have to do overdubs?' and it rang a huge bell with me. I thought, here's an artist who I really want to work with." As it happens, Lowe did not stay with Warner Bros.; *The Impossible Bird* is his first album for Rounder Records' Upstart label. "We cut the first songs for Nick's record a very long time ago, actually, beginning '93," Brockbank says, "because Nick had quite a heavy schedule at that time. He wanted to have a few ready and cut them and then go away and rehearse them up himself. And, at the same time, he was contributing to *Brutal Youth* by Elvis Costello, and he and Bobby [Trehern] were contributing to Mark Knopfler's solo album, which has yet to be released. All in all, though Nick's album was very fast to record, it was over a long period of time."

Brockbank, whose background includes engineering releases by Curiosity Killed the Cat and Alison Moyet's soulful *Hoodoo*, recorded all of the tracks live, on ADAT. "It allowed us to edit like mad," he says. "We could record a few takes and, because the vocal was live, I'd pick the takes on the basis of the vocals, because the guys were

—CONTINUED ON PAGE 112

STEVE JENNINGS

Lowe's engineer, Neil Brockbank (left), with Slim's production manager, engineer Jason Brodsky

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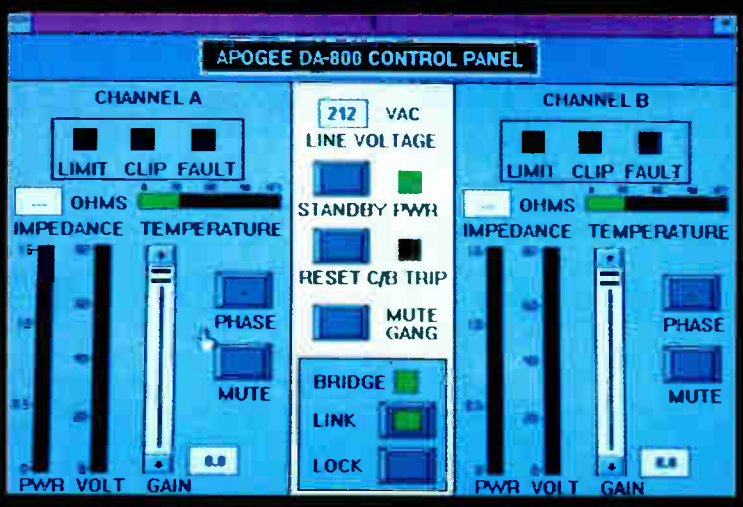

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APOGEE SOUND INC.

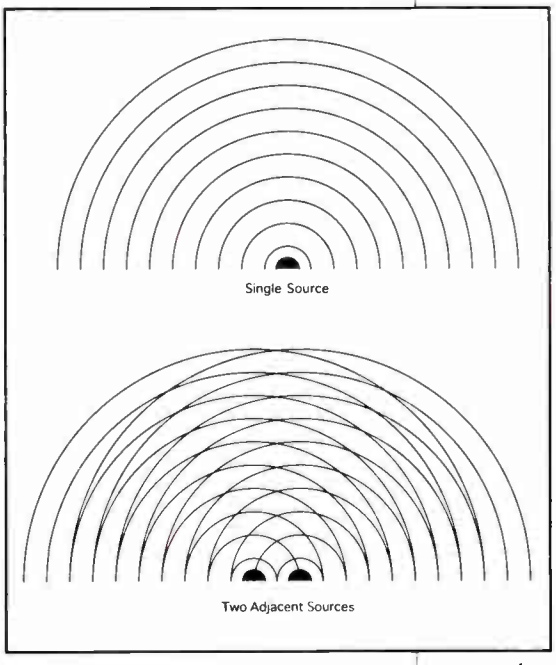
—FROM PAGE 100, SOUND SYSTEM EQ
all acoustic and electronic factors in the right order.

How can we achieve the flat, or neutral response, characteristic we are looking for? Don Davis, co-author of the classic text, *Sound System Engineering*, has been quoted as saying, "The room cannot be equalized, only the direct sound of the speaker can be equalized." Some problems are not solvable with equalization, requiring solutions that address the acoustic properties of the room and speaker system placement. Much of the work involved in balancing the response of the speaker system can and should take place in the shop, before even loading in to the gig.

TRANSFER FUNCTION

Consider the four major stages of your sound system for a moment. First, electro-mechanical transducers (the microphones) translate the physical energy of moving air into electrical impulses. Second, these impulses are fed into a console where they are amplified, possibly passed through various auxiliary components (equalizers, compressors, gates, etc.) and mixed together with other sources. Third, the output of the mixer is fed—via some combination of delay, equalizer, crossover, processor and system controller—to a power amp. Finally, the amplified signal is passed through another set of electro-mechanical transducers, the speaker system, which then translates the (now larger) electrical impulses back into air movement. The system's electronic components can be categorized as either "effects" (EQ, compression, and other signal modifications, which are applied prior to the output of the mixing console) or as "drive" (master EQ and crossover/speaker controller). Effects, which help create the sounds that you hear on the record, appear at the output of the mixer.

The drive system is the post-mixer processing that serves to correct nonlinearities, or flaws, that occur after the mixer—matching the sound in the listening area, coming out of the speakers, to the sound coming out of the mixer. A change that occurs between the input and output of a system is known as a "transfer function." Ideally, our sound system should provide us with an output from the speakers that matches the signal coming from the mixer, except louder. The transfer function of the drive electronics generally attempts to match the time and frequency response of the speaker components to the audience, in reference to the sound at the console's output. If you have any experience "baby-sitting" artists' house engineers as a system tech, you know that the speakers can sound as though they have been poorly "tuned" if there is a similar EQ cut or boost on all of the input channels (or if someone has a hearing problem at that frequency).



Wave interference from adjacent sources results in "comb filtering."

In simple P.A. systems with limited channel EQ, the engineer uses the main graphic to match the transfer function from the speakers clear back to the vocal mic's response characteristic, rather than only to the mixer's output. In this case, pre-recorded program material probably won't sound right without further EQ, depending on the microphones being used. Many engineers started their careers using limited systems and continue to EQ more powerful systems in the same fashion: grabbing a vocal mic, and "voicing" the system by talking into the mic and EQing. Sophisticated consoles offer channel EQ, which allows the engineer to correct microphone response without resorting to system EQ. With larger systems, it is important to use the system EQ to match the speakers to the console, rather than the vocal mic, as it will make it easier to adjust the different zones and listening areas, and the board tapes will sound better as well.

If the result of the transfer function is a non-flat speaker system, we may be at a disadvantage right off the bat. Various special effects may be introduced at this stage in the signal path, such as "reggae bass boost" or speech intelligibility curves, but it is essential to first be able to achieve a neutral response, adding any desired effects afterward.

COMB FILTERING

Consider a very simple system consisting of a single 12-inch speaker. Adjusting an equalizer might provide acceptable results, but unfortunately, a single 12-inch speaker will not provide the gain or frequency range needed for most modern productions. For example, a second speaker may be added in order to increase the available gain. The diagram above shows the results of using two sound sources. In some areas, the sound waves coming from these two devices will cancel each other out, while in other areas they will combine constructively to increase the

sound pressure level. This results in what is called "comb filtering," which is not always detectable using a ⅓-octave RTA. To compound this, the spacing of these nulls and peaks will vary with frequency and change with the spacing of the speakers. As a result, the system will exhibit different response characteristics in different parts of the room. It is important to listen in more than one spot to avoid being fooled by these varying levels. For the same reasons, the response of the system displayed on an RTA is highly dependent on the placement of the measuring microphone in multiple-cabinet arrays with overlapping coverage patterns.

A simple system can turn out to be much more complex than it seems on the surface. In the real world, full-range modular speaker enclosures use several components, each specialized for a specific frequency range. A simple configuration is a two-way enclosure with a 12-inch low-frequency driver and a compression driver for higher frequencies. At the crossover point, where both components are reproducing the same frequencies, they interact much like our two 12-inch speakers in the previous example. There will be cancellations (nulls) in the frequency response of the entire system, directly related to the difference in distance between the ear (or measuring microphone) and the acoustical centers of the two drivers.

The result of this misalignment (or "path length difference") is a notch in the response, which cannot be corrected with equalization. By adjusting the path lengths so that the signal from both drivers arrive simultaneously, the notch can be reduced. To achieve this result, the drivers can be moved physically in the cabinet, or electronically by adjusting the time delay of one of the components. With the advent of digital crossovers, controllers and processors, it is much simpler to delay any bandpass output. By adjusting the time delay, you can "move" the component of a loudspeaker system backward in time to align it with the other components in the speaker enclosure. The optimum delay time between components can be calculated by dividing the physical offset distance of the individual devices by the speed of sound. In modular, full-range speaker designs where the components' acoustical centers are different distances from the front of the cabinet, small delays to the closer devices can significantly improve the response in the crossover region. No amount of EQ can correct destructive interference in crossover regions. In non-aligned systems, perceived sound quality may even improve by reducing these frequencies.

Once the components in a speaker system are properly time-aligned, you can then use parametric equalization to precisely adjust for nonlinearities in the components themselves. One or two filters per device are often enough to smooth out the response of the individual components. Many modern digital speaker controllers allow you to make these adjustments within the controller itself and store them along with the other parameters, so that they may be recalled as needed for different cabinets and configurations.

ARRAYING THE SYSTEM

Once we have a drive and speaker system that is properly aligned and tuned, we can set up our speaker arrays in the room or hall, and know that outside of tonal "sweetening," any further corrections will only be necessary to allow for interactions between cabinets within the array, and between the array and the room itself.

Within the speaker array, the interaction of overlapping coverage patterns in one bandpass produces anomalies as discussed above. "Coupling" refers to the phenomenon that occurs at longer wavelengths (lower frequencies) when the output of the system (at these frequencies) is greater than the sum of its components. Coupling occurs when the acoustical centers of aligned devices are less than a wavelength apart. It can be either beneficial or detrimental to the sound. In the low bass range (<120 Hz), coupling allows you to get a little more "oomph" out of your system, while in the mid-bass

QUICKTIPS

If you travel by air frequently, you already know how difficult it is to find good, cheap luggage that will hold up over hundreds of trips. The Oyster™ from Samsonite comes in two sizes, 20x9x26 inches and 22x10x29. Made of polypropylene with a piano-style hinge across the back and a gasket to seal it, these pieces are the Tupperware™ of luggage. Available at discount luggage stores for $79 and $89, they are more expensive at retail outlets. The only warning you need to know about is duct-taping the latches so that they don't catch on sharp edges as they get kicked through baggage handling. These pieces also make good cases for drum hardware, if not overloaded. If padded correctly with foam or inserts, they can be used for small production cases, electronics, processing or microphones that you might normally have to pay overweight charges for if you put them in flight cases. They have a handle on one end and wheels on the other, so that they don't always have to be carried. All in all, they're a poor man's Haliburton™ that doesn't scream "steal me from the luggage carousel." This tip comes from Vance Anderson, who has been everywhere and toured with Pat Metheny and David Byrne, among others. ■

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(120-350 Hz) it can cause muddiness. The trick is to remember that where there are peaks, there are also nulls. With lower frequencies, there is more coupling and larger peak and null areas ("lobes") as you move across the front of the array. With large, horizontal line-arrays of subwoofers (front-of-stage), one solution is to use small delay times from one box to the next, to "steer" the response in the room.

There is a trade-off with large-scale P.A. systems, between producing even coverage and providing sufficient power. To minimize interactions between speakers, cabinet placement must minimize the overlap in the coverage patterns. For speech and acoustic music, it is much easier to design a system that comes much closer to the ideal of even coverage, while providing sufficient power. However, to provide increased volume, systems must use an array in which there is significant overlap in coverage at all frequencies. One driver per zone just isn't enough for most pop music. At lower frequencies, most designs have significant loss of directivity. Horn-loaded woofers provide an advantage, limited to the increased acoustical gain of their design, which allows for more gain from fewer devices with better pattern control.

TUNING THE ROOM

Adjustments to the room acoustics can be made in the form of physical changes to the room itself, such as the shape, the materials used and the contents (full or empty, humid or dry). Bruce Jackson, sound engineer for Barbra Streisand, laid carpet throughout the performance arenas to increase sound absorption. By treating the room in this manner, he achieved beneficial results that would not be possible using EQ alone. This allowed the empty room at soundcheck to more closely resemble the response of the room when full. Unfortunately, not many of us in the world of live sound reinforcement have the opportunity or budget to make wholesale changes in room acoustics. However, we can help ourselves by remembering to separate the nonlinearity of speaker response from the effects of the listening environment when using sound systems.

Working with the production company to provide a 20-foot-high velour drape at the back of the venue to cover the rear wall will help more than using equalization for getting rid of "slap back." Fabric draped around the stage area minimizes the initial bounce off the ceiling and side wall. Clubs with the dreaded mirrored stage walls can be modified with packing blankets or a large banner. In theaters, making sure that all of the theatrical curtains and legs are in place before balancing the P.A. system is essential. Trying to balance the sound system before adjusting all possible acoustic elements makes it more difficult to achieve predictable results at showtime. Particularly difficult are non-theatrical rooms with hard seats or benches, or even no seats at all. In these situations, the effect of the audience in the venue can radically alter the sound. Adjusting the system in these venues when empty can be not only frustrating and futile, but even detrimental to the desired system response when the patrons are in place. Extreme examples are those famous in-the-round seasonal tents, hockey rinks and gymnasiums, where it is best to make sure all speakers are pointed into the audience area, and hope for a good walk-up.

Some problems are not solvable with equalization, requiring solutions that address the acoustic properties of the room and speaker system placement.

MEASURING THE RESULTS

How do you balance and equalize your sound system to achieve reliable, repeatable results? You want to be able to bring your system into different performance spaces and know that you will be able to get the most out of it. Using measurement tools without understanding the acoustics of the measurement can be misleading. What kind of tools can you use, and what measurement methods? How can you adjust for the changes that occur in the room acoustics throughout the day, and between soundcheck and showtime? Use of computer measurement tools is becoming more widespread as their prices drop. Sophisticated systems are relatively affordable compared to 20 years ago. These tools allow you to make precision adjustments to your speaker systems by eliminating much of the guesswork involved.

It is important to remember the resolution of your test equipment and how this affects your ability to make effective measurements. For example, it is difficult to see a 1/10-octave notch in response, caused by driver misalignment using an RTA, which measures in 1/3-octave bands. When measuring, remember the interaction between components in the speaker system, as well as the interaction between the speaker and the environment. Using absorptive materials to dampen reflections off the floor, and judicious placement of the measuring microphone are two ways to minimize misleading measurements. If your speaker enclosure has two 12-inch midrange speakers, the measurement microphone must be equidistant from both of these components. If there is a path length difference of 6 inches, then cancellation will occur at a wavelength of 12 inches (1,000 Hz), which could prove misleading.

One way to minimize the negative effects of reflections on the measurement process is to use a large flat surface (a con-

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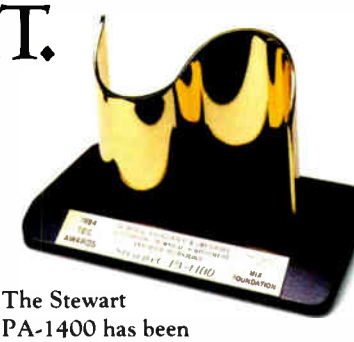

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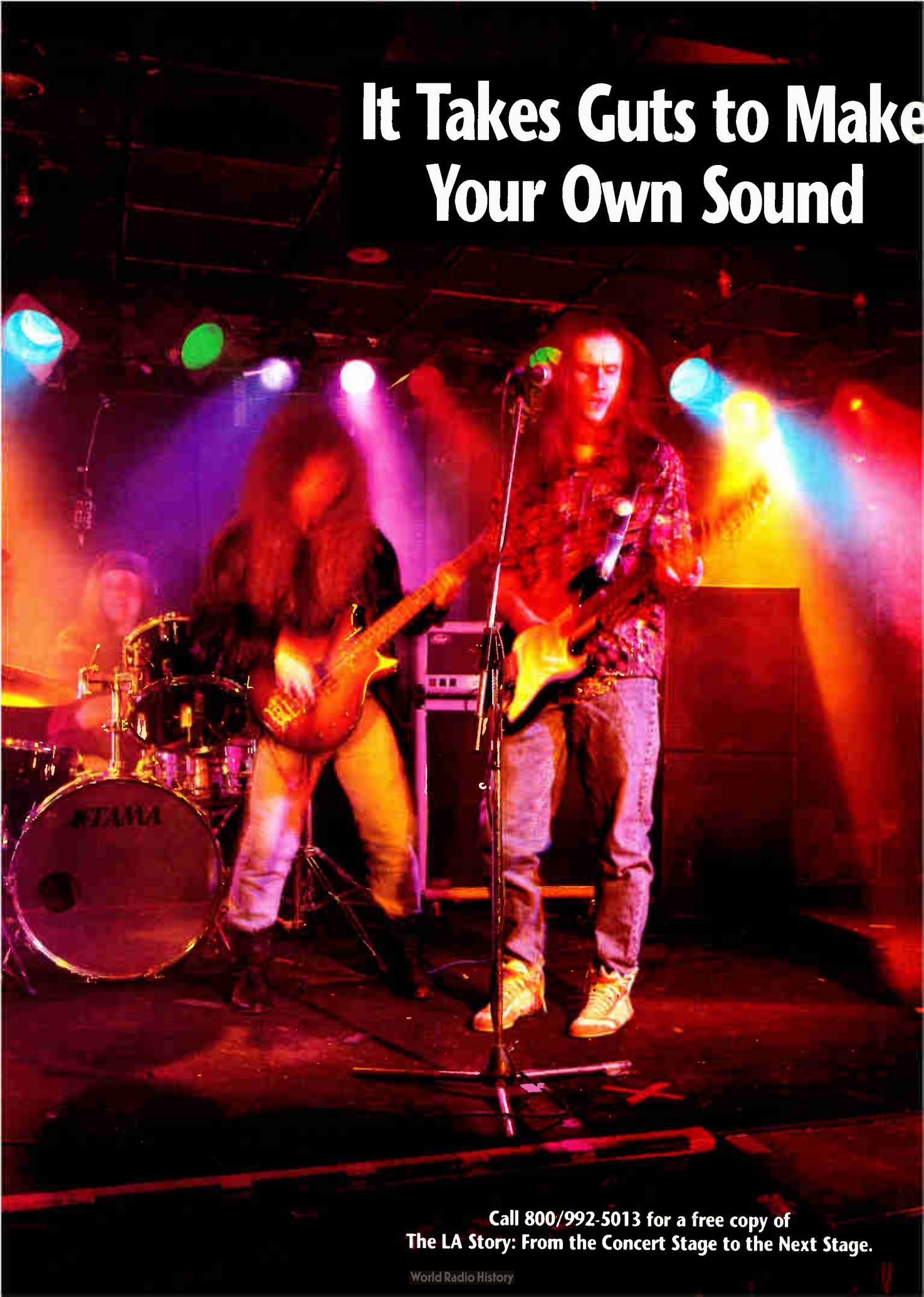

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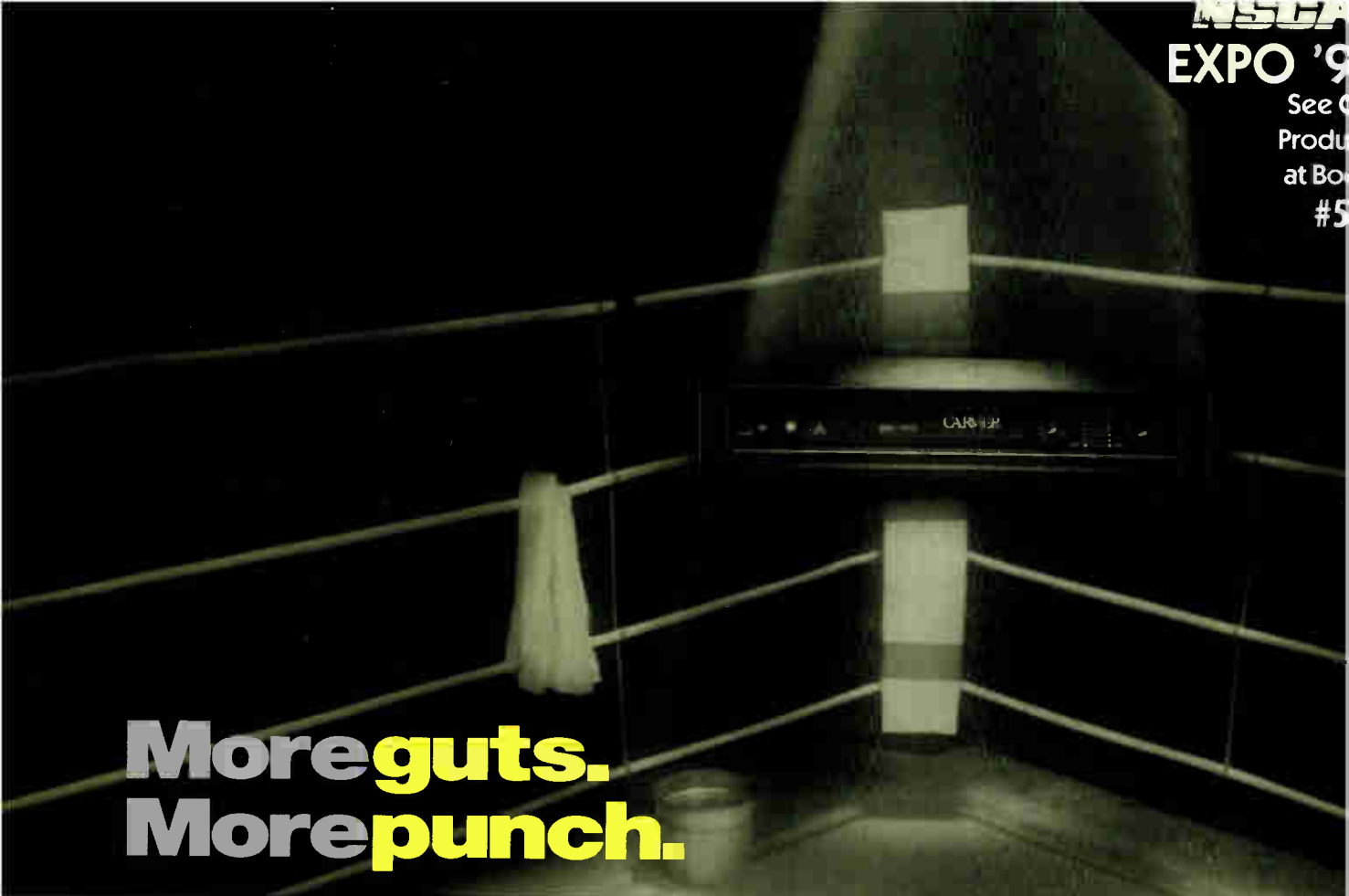

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sole case lid works well) to create a pressure zone surface with the measuring microphone. The microphone is placed as close as possible to this surface so that the only reflections that it "sees" are those from the surface that arrive very close in time to the original sound source. This eliminates cancellations, much like the design of a PZM or plate microphone.

THE REAL WORLD OF SOUND REINFORCEMENT

Hopefully, the P.A. rental company has had the opportunity to calibrate your system components as described above, prior to installing them for the show. It pays to take the time to measure a single cabinet, and make the appropriate component-level, time-alignment and EQ adjustments ahead of time. Once this has been done, you have a good foundation to go forward and balance the P.A. as a whole.

The first task is to roughly balance the levels of the various frequency bands in the speaker system. Whether using a measuring device or your ears, adjust the volume of each bandpass until they are even. Begin by adjusting the gain of the lowest bandpass to provide adequate headroom, and attenuate the remaining bands until levels are even throughout the entire range of the speaker system. This adjustment can be made either at the crossover's output-level controls, or at the amplifiers' inputs. To maintain a high signal-to-noise ratio, make rough adjustments at the amplifiers and then fine-tune the balance using the crossover-output controls. Equalization can then be used to make final tonal adjustments. You may be surprised at how little EQ it takes once you have made the adjustments described above.

In distributed systems, all speaker zones are referenced to the acoustical point of the original sound that is being reinforced. Even with simple stereo rigs, delaying the mains a few dozen milliseconds to match the backline on stage can clean up destructive interference from stage "wash," treating the sound sources onstage as if they were additional components in your system. Many modern digital processors have this capability.

As you adjust your sound system, remember that different areas in the room will respond differently. It is important to walk around and average out these variations. By taking the acoustics of the room and sound system into account when you set up, you will find that you can use less EQ and generally achieve more consistent results from system to system, room to room, and night after night. ■

Dave Revel is a freelance engineer based in San Diego. He works with a wide variety of clientele ranging from rock and jazz festivals to classical music, theatrical and multimedia presentations.

—FROM PAGE 101, NICK LOWE LIVE

playing great all the time anyway. But Nick wouldn't let them know how the songs went. He's so fabulous. What he does is he makes sure that his thing is absolutely water-tight. In other words, he would *rehearse*. This is very unlike [other] singers I've worked with. They tend to wait till the track's finished and then figure out what they're going to do, whereas he would go away and rehearse on his own with his acoustic guitar, and he'd go to this pub, which had a back room near where he lived rather than doing it in his bedroom. He'd go out to work, and he'd just sing his songs until he was happy with them.

"Then we'd get all the gear together," Brockbank continues, "and we'd actually take it down to where he was singing. We'd take the ADATs and we'd use a lot of outboard like Massenburg and Focusrite preamps, some valve [tube] mics, and we'd call the band, and they'd come in, and that would be the first they'd heard the song. Of course, Nick was absolutely together on it, so it sounded fabulous from the moment they started. 'Lover Don't Go' is take 2, and take 1 was the first time they'd ever played it. This was Nick's idea, and he used me to put it into practice. He picked up that I was somebody who didn't mind flying on the seat of my pants. I'd say after take 2, well, there's no need to do anymore, Nick. You sang that beautifully.

"Now, using ADAT, that's a fabulous routine, because unlike analog, instead of making a cut where you put your razorblade through the tape and everything on one side of the tape is take 3 and everything on the other side of the tape is take 4, with ADAT, you can make a cut that's edited in a different place for each instrument, so when you're going to take 3 at the beginning of the chorus, say, you can pick up the drums a bar early to make sure you get that fill. You can pick up the bass a bar late because he did something wrong on the take. It's miles more powerful than analog, which I'm used to.

"The editing is cumbersome," Brockbank explains, "in as much as if you're 24-track, you have to have six machines there: three record and three playback. And you assemble on the Record machines, pretty much like a video edit, as much material as you need for the masters. It takes a lot of time to listen to all that stuff, but I did it on my own, because I was my own engineer. I did it in [Attractions' drummer] Pete Thomas' studio, actually." He says that the "Bonaparte Rooms" credited on the CD as the mixing location actually refer to Thomas' home studio. "I've thought it sounded sort of like a City building," reveals Brockbank, "like some sort of conference center. Once the editing was finished, we just did some backing vocals. We didn't do very much at all in terms of overdubs.

"Mixingwise, it was all transferred to two-inch Dolby SR, and I mixed it in a really great mixing room on an SSL conventionally [at RAK Studios and The Townhouse], which I think was a good move because it got me off the ADAT format and got me onto a nice, smelly analog tape, and then I mixed on the half-inch 15 ips Dolby SR, and then I edited that to get it to the running order for the album and then transferred directly to CD. And a lot of people have said, especially over here, how *analog* the record sounds, which is great because a lot of people turn their nose up at ADAT. Excuse me, you know?"

In January, the same team that had made what is fundamentally a live record took *The Impossible Bird* to North America and rode a bus from club to club. The tour started in Toronto, traveled down through the eastern U.S. and headed back into Canada, to Vancouver, via the Midwest and West Coast. The load they carried around North America was light; the load they brought from England

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was even lighter. "We have to be fairly pragmatic," says Brockbank. "The production we're carrying [from England] consists of one Electro-Voice N-DYM 857B microphone—very kindly supplied by Electro-Voice to us—which was actually the same mic we recorded the record with. That's an interesting thing, because normally on a record, you'd want to use a condenser or an old tube mic or something, but we couldn't do that because we were in a situation where Nick was singing live with the band, so we had to use a P.A. mic. It's not like a 58 where you can scream into it and it never gives up. It will give up if you scream into it, but for an artist like Nick, who is a little more grown-up, it's the perfect microphone. It's got a lot more manly kind of low end, low mid."

Upon their arrival in Canada, it was Brockbank's task to acquire some additional gear. "It's a big problem for shows like this, coming from England—how much equipment do you take? How much do you source in North America? Obviously, you bring your guitars, and obviously you bring your drums, and we brought Nick's amp, and we brought keyboards. Bill Kirchen is American anyway, so he was covered, but that left us with no bass gear at all and no keyboard amplification.

"I said to Jake [Riviera], Nick's manager, we can rent them, and he said that's going to cost a lot of money, and he said maybe what you should do is buy some stuff in Toronto and then sell it again in Vancouver. You actually lose less money than if you rent. So in Toronto, I went 'round all the shops and there was nothing second-hand that really fitted the bill, and the new stuff was like, we were looking at losing thousands of dollars. Then I went to this last shop. It was called Long & McQuade, and they were running a sort of retail rental department. It wasn't like you were renting a system, it was like you'd take one of those, one of those and one of those. I looked at the prices, and they just seemed the cheapest. We rented a Gallien-Krueger bass stack, the keyboard speakers and power amp, and we rented a P.A. effects front of house. And not only that but it was one-way to Vancouver. They had a shop in Vancouver! To start and finish your tour in Canada, if you're British, is actually a fabulous thing, just if you take advantage of Long & McQuade."

Otherwise, the tour was pretty much at the mercy of whatever gear the clubs offered, which of course, varied greatly night to night. "In hindsight, I would have carried Nick's monitors," Brockbank says, "because I found that generally speaking, with some very, very notable exceptions, overall the standard of monitors is pretty poor. Now, we haven't been playing really glitzy venues. We've been playing clubs, and a lot of those people, because of the recession, haven't been able to re-equip. And you get a lot of bands going through and sort of screaming their heads off, and a lot of the club managers are saying, 'Why should I replace all these wedge monitors when all people do is pour beer into them?' A fair comment."

A lot of club managers are saying, 'Why should I replace all these wedge monitors when all people do is pour beer into them?' A fair comment.
—Neil Brockbank

The show *Mix* caught was March 1 at San Francisco's Slim's, the South of Market club partly owned by Boz Scaggs. After six weeks on the road, the bandmembers were a little the worse for wear. Drummer Robert Trehern had a cold and an ear infection so was unable to make the soundcheck. But Brockbank arrived with the rest of the band early enough to work with Slim's front of house engineer, Jason Brodsky, to "shuffle through a couple of songs" and make mic selections from the Slim's arsenal.

They used Shure SM81s for the two overheads on the ride and crash cymbals. The rack and floor toms were miked with Shure 57s, though Brockbank notes that he prefers to use Electro-Voice RE20s when they're available, because he feels they have a more open sound. "A lot of the mics that are offered up sound like they're gated already," says Brockbank, "which I don't particularly go for. I like to hear the rattle and hum, as U2 would say."

The kick drum was miked with an AKG D-112, the bass with a Sennheiser 421. For Bill Kirchen's Telecaster and Lowe's Gibson Chet Atkins (played through a Fender custom reissue Vibraverb), Sennheiser 409s were used. Slim's was "one of the few clubs we've had that actually had those mics," Brockbank says. "It's a good choice. The organ and piano are both DIs. They come separately out of our internal mixer. We have a little keyboard mixer, and we can get organ and piano separately out of that. Accordion, and this is quite an interesting thing—he has two AKG mics inside the thing. Little tiny tie-clip mics, and they come out via a little power box and then from there, we've got a Mesa/Boogie guitar tube preamp, which is really great. It's designed for guitar, but we find that if you put the accordion through it, you get a little more of a bluesier sound."

Brockbank also employed all of the effects the venue had on hand. "I just used a rock 'n' roll echo, like a rockabilly echo for Nick, which varies in time, depending on the song. At its shortest, it's around 130, and at its longest, it's around 170 milliseconds, and then I use another echo for the slow songs, which is a bit longer. It's around 222, with a lot more feedback. That's the type of echo you hear on 'Lover Don't Go' and '14 Days.'

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It's pretty much the same as on the record."

The installed gear at Slim's is centered around a 40-channel Soundcraft Vienna console. The speakers are eight Meyer UPA cabinets, two Meyer DS2s and four Meyer 650 subwoofers. The monitors used were the club's Yamaha 3210s; they have eight mixes and all are passive wedges except for the drum fill.

Lowe and the Impossible Birds opened with rousing, true-to-the-CD versions of two of the new songs: "12-step Program (To Quit You Babe)" and a glowing rendition of the Owens/Frazier classic "True Love Travels on a Gravel Road." But soundwise, the show got off to a slightly rocky start; Lowe's vocals were buzzing and crackling in and out. Brockbank explains what happened and how he solved it: "[Opening act, singer/songwriter] Jim Lauderdale's soundman, Doug Dawson, had just taken delivery of a couple of real great mic preamps. They were really great-sounding things—sort of Neve copies—so we had those plugged in. We had one of them plugged in for Nick and the other one plugged in for Jim Lauderdale's set. Nick came onstage, and that interference was pretty evident from the off, and I was looking for a moment to rewire it. At the appropriate moment, we matched up the settings and went straight to the other preamp. I had them sort of hot-wire it to the other one. Right? One two three go! And they did that, and it was still the same.

"Then I thought it was a problem with the fader, so I had them move it to another channel, again in a little gap. I know the material, so I kind of went, one two three, change to the other channel! And that still didn't cure it, so I had to believe by that time that the problem was with the cabling to the preamp, and at that point, I had them dump the preamps altogether and come straight back to the channel on the main board and, after we did that, we were fine, and I just worked like that for the rest of the set. I'm pretty sure the problem was the cabling, and it was solved, and I don't think it really affected people's enjoyment too much. I think they'd forgotten about that by the time two or three songs went by."

True enough. Lowe and his band treated a raucous, sold-out house to a generous set of new and older material, and to his trademark wit: "I know how it is. You go to see a band that have a new record, and it's new tune after new tune after new tune, perplexing new guitar riff after confusing chorus, and you're thinking, 'Nick, play something I know or I'm going home.'" The rest of the gig came off without a hitch, and the place was packed through the last song of the band's second three-song encore: "(What's So Funny About) Peace, Love and Understanding?"

On a tour like this, Brockbank says, "The goal is to make the

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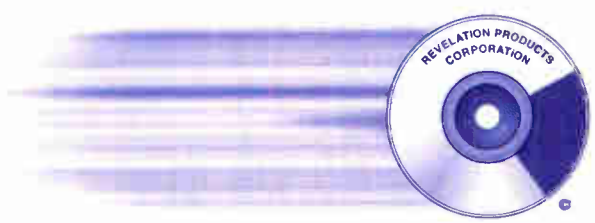

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live stuff as simple as possible, and that turns out to be the same as the way we made the record. When you're not carrying production and you're in a different place every night, if you try to do something complicated, you haven't got a snowball's chance in hell. But if you can be simple, you've got a chance." ■

Mix *copy editor Barbara Schultz is a lucky dog.*

—FROM PAGE 100, GRAMMY SOUND '95
channels of CRQ-12 equalizers and Apogee's CORREQT system running on an HP 35665 computer. The center cluster consisted of three of the large Apogee 3x3s, with three smaller, two-way AE-5 NC speakers hung underneath. The left and right arrays were each a column of four of the new V-DOSC cabinets from French speaker designer Christian Heil (see article on page 142). For the balcony there was a line-array of eight V-DOSC cabinets at the center, with three AE-5s hung underneath. Left and right balcony clusters were two rows of two 3x3s with two AE-5s below. At the rear of the balcony, a 30-foot truss held six evenly spaced AE-5s. A single AE-5 was in the box-boom position to fill in the extreme sides of the balcony. On the floor, a single 3x3 was at each side of the stage. Three groups of three AE-5s were used as front-of-stage fills, and there were also six AE-2 speakers used as under-balcony fills. Finally, 40 Galaxy Hot Spots were placed on the floor, behind the first four rows of seats in the center, where the center cluster couldn't reach, and it was used for dialog only.

Mix *sound reinforcement editor Mark Frink can be reached at 4050 Admiral Way, #305, West Seattle, WA 98116; BBS (206) 933-8478.* ■

New Sound Reinforcement Products

EAW LA SERIES

Eastern Acoustic Works (Whitinsville, MA) offers the LA Series of full-range loudspeaker systems. The LA325 Linear Activation System was engineered for near-field applications such as band P.A. and keyboard, drum and sidefill monitoring. The trapezoidal enclosure/three-way design incorporates two 15-inch low-frequency cone drivers, dual 6.5-inch midrange cones and a 2-inch compression driver mounted to a waveguide. A rear switch configures the unit for biamp or full-range passive operation via a computer-optimized crossover network with fourth-order filters, parametric equalization and driver protection.

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CROWN MICRO-TECH 2400

Crown International (Elkhart, IN) has released the Micro-Tech 2400 2-channel power amp for touring sound and fixed installation applications. A two-rackspace unit, it features three power supplies and provides 1,605 watts at 2 ohms in parallel-mono mode; 800 watts per channel at 4 ohms in stereo mode; and 2,070 watts at 4 ohms bridged mono. Priced at $1,699, the unit has a three-year "no-fault" warranty.

Circle 213 on Reader Service Card

GARWOOD PRSII IN-EAR MONITORS

New from Garwood Communications (Brooklyn, NY) is the PRSII In-Ear Monitoring System, a half-rackspace transmitter unit and beltpack receiver at an affordable price. The unit offers full stereo transmission on a single UHF transmission frequency. The front panel displays input level control and indication. The beltpack receiver includes molded ear pieces, low-battery indicator, flexible whip antenna and monitor output volume control. Retail is $2,499.

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ELECTRO-VOICE DX 34

Electro-Voice (Buchanan, MI) introduces the Dx 34 digital controller for use with active multiway loudspeaker systems. It includes a crossover with 70 different highpass and lowpass filters, tunable low-cut filters, parametric equalizers, low and high shelving equalizers, limiters and delays in a single-rackspace package. It includes a selection of factory presets for various loudspeakers. Edit mode allows storage of user settings into 16 presets. The unit features 18-bit A/D/A conversion.

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YORKVILLE ELITE EX-601

Yorkville Sound (Niagara Falls, NY) debuts the élite EX-601, a compact, full-range cabinet speaker system. The vertical format system combined with the élite P-601EX processor is optimized for use with the élite SW-1000 or SW-800 subwoofer systems. With a new horn and driver combination, the arrayable, 600-watt élite EX-601 has a maximum SPL of 129 dB and is equipped with ATM Fly-Ware. It is constructed of ¾-inch Canadian poplar ply and has a two-year warranty. Retail is $999.

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TEF RTA V2.0

Designed to provide audio professionals with the power to perform real-time analysis functions, the Sound Lab RTA Version 2.0 software from TEF Products (Elkhart, IN) expands the working role of the latest generation of TEF 20 analyzers. Measurements can be made at 1, ½, ⅓, ⅙ and 1/12-octave bands, while data can be viewed in 3, 6 or 12dB-per-division increments. A dual-channel mode provides the ability to difference two input signals, so even a program source can be used as a test signal. The software retails at $400; upgrades are from $100.

Circle 217 on Reader Service Card

SOUNDTRACS MEGAS 2 MONITOR CONSOLE

The new Megas 2 Monitor console from Soundtracs (dist. by Samson Technologies, Hicksville, NY) has been released to complement the Megas 2 Stage FOH desk. Available in 24-, 32-, 40-, and 48-channel frame sizes, the monitor console provides ten monitor mixes plus stereo fills, 5-band equalizers on every channel and dual-band, variable-Q notch filters on the monitor outputs. The units also feature locking XLRs, high-output headphone amps and metering on each output.

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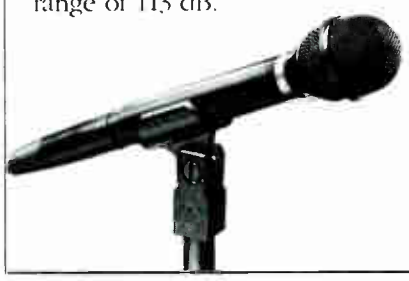
AUDIO-TECHNICA AT873R

The AT873R from Audio-Technica (Stow, Ohio) is a hypercardioid condenser mic designed for hand-held vocal applications. It features an internal shockmount and low-mass condenser technology to reduce moving mass by one-third. Interchangeable elements are available to provide a variety of pickup patterns, ranging from cardioid and subcardioid to omnidirectional. The AT873R has a frequency response of 70 Hz to 20k Hz and a dynamic range of 113 dB.



SHURE WIRELESS BOOKLET

Shure Brothers (Evanston, IL) offers "Introduction to Wireless Systems," a booklet providing a basic working knowledge of wireless microphones. Call (800) 25-SHURE for a free copy.

SABINE FBX-SOLO

Sabine (Gainesville, FL) releases the FBX-Solo Feedback Exterminator, a miniature model designed for use on individual microphones. Based on the FBX-901, the FBX-Solo provides more gain before feedback, increased sound clarity, and automatic feedback control on a per-channel basis. The six-filter Solo is available in two versions: the SL-610 for line-level insert points on a mixer's inputs, and the SM-610, with mic-level input/line-level output for use with mixers lacking insert points. Six FBX-Solos can be mounted in a single-rack-space tray. Retail is under $300.

Circle 219 on Reader Service Card

AUDIX IMPROVES OM3-XB

Audix Corporation (Lake Forest, CA) announces lower pricing and improved performance for its OM3-xb microphone. Revamped to provide 3 dB more output, the unit also has been restyled to resemble the OM5 and OM7 ball-grille style. The retail price has dropped from $279 to $199.

Circle 220 on Reader Service Card

YAMAHA CLUB SERIES III

The Club Series III speakers by Yamaha (Buena Park, CA) feature the reconstruction of the SW118III into a more powerful and efficient 18-inch subwoofer to produce high-capacity, low-frequency reinforcement. For satelliting the main speaker, a pole socket is supplied. This model now comes in oak and is ready to fly right out of the box with the pre-installed ATM FlyWare Internal Brace System. Input jacks with loop-through connectors and carrying handles are standard.

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AUDIO CENTRON LVS

The LVS Speaker Systems by Audio Centron (St. Louis, MO) has dual 12-inch woofers, an 8-inch midrange and HF horn in a narrow, trapezoidal cabinet; it handles up to 600 watts at 4 ohms. The CE-34 delivers 45 to 19k Hz with 96dB sensitivity and 127dB maximum SPL. The CE-36S subwoofer delivers 27 to 500 Hz with 96dB sensitivity and 127dB maximum SPL.

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GALAXY AUDIO 200-WATT HOT SPOT

Galaxy Audio (Wichita, KS) has introduced a 200-watt rated version of its Hot Spot Series of compact personal monitor speakers. New ferrofluid cooling in the 5-inch speaker boosts the power handling to 100 watts in each of the two speakers in the enclosure.

Circle 223 on Reader Service Card

BAG END ELF "I" SERIES

Bag End Loudspeaker Systems (Barrington, IL) has introduced the "I" (installation) Series of subwoofers, designed to complement its Extended Low Frequency integrators. Enclosures are constructed of ¾-inch, seven-ply poplar (unfinished or black textured paint) and include single- and double-woofer systems with 10-, 12- or 18-inch drivers.

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GOLD LINE FEEDBACK DETECTOR

The Model FD-23 from Gold Line (West Redding, CT) is a handheld instrument combining a built-in microphone with 23 LED indicators calibrated to display the frequency at which feedback occurs. During ring-out or setup, the engineer simply increases system gain until feedback occurs and then uses a standard equalizer to notch out the offending frequency. The FD-23 can also act as a feedback monitor during performance, allowing quick correction of any feedback problem. The unit retails at $259.95 and is powered by AA batteries or a 12V supply.

Circle 225 on Reader Service Card

FURMAN ACD-100

The ACD-100 by Furman Sound (Greenbrae, CA) is a compact, rackmount AC power distribution system designed for touring P.A., bands, mobile recording facilities, etc. It can handle an input of up to 100 amps, distributing it to five 20-amp circuits, each with a status indicator and 20-amp duplex outlet. The ACD-100 can be wired by the user for 120V, 240V or 208V three-phase power. Retail is $499.

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ROLLIN' DOWN THE RIVER

A LOOK BEHIND THE PRODUCTION OF BROADWAY'S SHOW BOAT

BY JIM VAN BERGEN

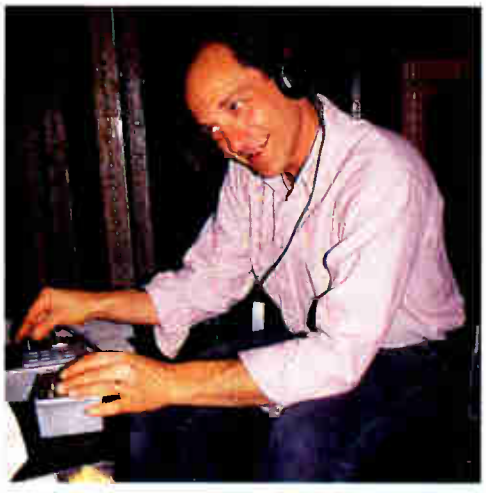
At one time, American popular music was dominated by Broadway show tunes.

Though that trend has faded away, many of the songs once immortalized in classic shows are still commonplace in vocal artists' "pop" repertoires. One example is *Show Boat*, the 1927 Jerome Kern and Oscar Hammerstein II musical, which was recently revived at the Gershwin Theater on Broadway to rave reviews and tremendous popular acclaim.

With timeless songs like "Ol' Man River," "Make Believe," "Bill," "You Are Love," "Life Upon the Wicked Stage" and "Can't Help Lovin' Dat Man," *Show Boat* relies on sweeping music and stellar vocal performances. Showcasing those musical performances in the theater is the responsibility of sound designer Martin Levan, production sound engineer Ron Sinko and a hard-working deck audio crew comprising Don McKennan (the show's A2), Les Ginsberg and Nichole LeBrun. Eight shows a week, the production plays for sold-out houses and audiences of all ages.

Production sound engineer Ron Sinko

Sinko provided me with a full tour of the Gershwin, offering a glimpse into the inner workings of the production, from the extensive pre-show mic check to the show's design and mix philosophy. From even the most basic gearhead perspective, *Show Boat* has more to offer than most productions. With sound equipment supplied by ProMix Inc. (of Mt. Vernon, N.Y.), the central showpiece of the state-of-the-art



Top: scenes from* Show Boat *at the Gershwin Theater; above left: the computer setup for the production; above right: crew member Les Ginsberg

system is a custom-built Cadac J-type mixing desk featuring computerized automation for mixing, sound effects playback and routing.

The console consists of 75 inputs spread over a main desk and sidecar unit, and it has 14 VCA subgroups and a 24-bus matrix. Using Yamaha digital mixing processors—the DMP9 and DMP11, respectively—the design uses premixes to allow the multiple foot mics, shotguns and CD playback sound effects to save precious space on the main console; at the same time, it takes advantage of the automation available on the Yamahas.

The *Show Boat* revival has an enormous cast of 80 onstage performers and the most wireless mics ever heard by Broadway audiences. The show requires most of the transmitters to be used with multiple mic elements

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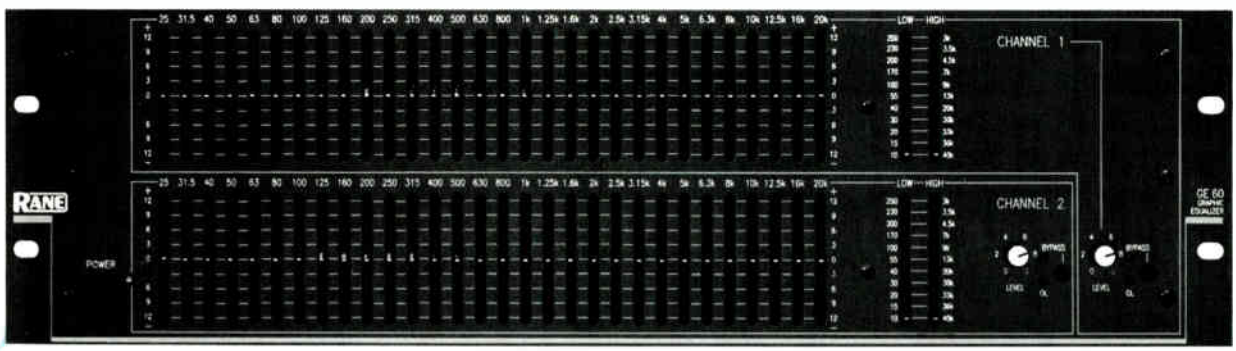

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throughout a single performance—48 of the new Sennheiser 1046 systems with SK50 transmitters—since the production requires a total of 81 lavalier elements to adequately cover the solo and lead lines, depending on the costuming requirements of the scene. Sinko is pleased with the new wireless system, especially the transmitter's connector, which has been redesigned and suits Broadway's rigorous mic demands better. "Whereas the older connectors could stretch at the contacts over time, the new SK50 transmitter has a Lemo-type connector that keeps the contacts tight and has kept us from having problems," he explains.

To receive the UHF signals, the wireless antennae array uses a custom ProMix ground plane system, built into the stage floor at the Gershwin. The receiver station is located just offstage and includes all the receivers, two visual signal monitors and an unusual splitting system. For added support in maintaining the wireless mics and transmitters, ProMix created three remote monitoring stations that allow any of the audio crew to select and monitor any channel of mic transmitter as if the operator were at the wireless rack.

"It's basically a relay switching box, and it allows you to listen to any mic channel at any station," Sinko says. "Each unit has headphone monitoring and a keyboard selection with digital readout so you can punch in the channel and immediately monitor the signal. You can also scroll up and down the channels quickly. It's quite simple: There are just one data and one audio line, and they're split off the back of the rack."

Below stage level, the orchestra pit is as cramped with bodies as the stage. The 31 musicians (*no* electronic instruments are used in this show) are miked with quality condensers such as Neumann, Schoeps and Sennheiser. Using mostly area-miking as opposed to per-instrument—close-proximity techniques often found on Broadway—Levan used the new multipattern MKH80 from Sennheiser for most of the string and wind players. Spot mics include four Neumann U87s and two KM140s, and a Schoeps CMC541U/MK4 cardioid on banjo. Sinko says, "We're very impressed by the sound of the [MKH80]. The U87 has a little more warmth and is being used to that end, which is why it's become the predominant spot mic in the pit."

> **The challenge is to try to keep the focus onstage at all times. That's a very difficult thing to do when you have a lot of reinforcement, because the image starts to come from the speakers instead of the stage.**
>
> **— Ron Sinko**

The speaker components used in the sound system include enclosures from Apogee (two AE3 S2s), Bose (24 Acoustimass drivers, two 101s and three 302 subs), Meyer (five UPA-1Cs and two USWs), JBL (52 Control 1s and four 2402H bullet tweeters) and Tannoy (12 System 6 NFMs). Also from Tannoy is one of Levan's trademark speaker models: five nonenclosed 3836 speaker chassis drivers in an open framework. These drivers are used in conjunction with White 4700-BL EQs, which have custom EQ curves designed to optimize the drivers. Though an unusual idea, the combination works well in the venue. "Some years back," Sinko notes, "Martin took one of these drivers to an anechoic chamber up in Sheffield and determined the curve that works with the open-framed chassis."

Sinko explains the zone layout in the Gershwin: "The front plane of the stage is the cluster. It's our ground zero. From there we go to the delay zones: cross left and right zones [which helps cover the orchestra and balcony seating], one set of under-balcony delays and one set of balcony delays [the tiny Acoustimass drivers], and front fills across the stage floor, just below floor level [JBLs]. Two subs per side. Originally, we had mid-side positions put in both the balcony and under-balcony, but we didn't need them."

At this point in our conversation, the house begins filling with audience members and the orchestra starts warming up. As the houselights dim and the overture begins, 2,000 patrons and I are whisked away into the past, up the gangplank and onto the mighty river. During the show, Sinko's adept fingers flash with lightning speed on the VCA groups, enabling cues on the Cadac, as his foot pounds (on a well-placed, absorptive carpet square undoubtedly designed for that purpose) in time to the orchestra, which sounds surprisingly like a real orchestra, unlike most shows with their heavily scored synth patches.

Having mixed many of these songs for revues, benefits and cabaret singers, I know first-hand how bad arrangements and poor singing can ruin these classics. This production is far superior to anything I had dreamed possible. From my vantage point, the music and voices have an extraordinary body and depth compared to most shows, and they create the illusion that the show is not reinforced, as the actors' vocal transients appear to come solely from their own bodies. The effect is stunning—so aesthetically pleasing that I get lost in the pleasure of the mix, and the three-hour performance is over in what seems like seconds.

Finally, the house empties and Sinko and I settle down to discuss the design concept and his subtle, transparent mix of the show. Sinko's intention is to make the reinforcement as natural as possible. "I remember discussing this show with

—CONTINUED ON PAGE 215

NEW PRODUCTS

BASF STUDIO MASTER 900
The BASF Professional Products Group (Bedford, MA) has released Studio Master 900 maxima tape, a new analog studio mastering tape that extends dynamic range by 5 dB and yields 3 dB higher MOL, while achieving 2 dB lower noise than standard analog mastering tapes. SM 900 maxima is available in ¼-inch, ½-inch, 1-inch and 2-inch reels and hubs.
Circle 226 on Reader Service Card

WAVES STEREO IMAGER
Waves (Knoxville, TN) releases the S1, an Apple Macintosh software plug-in for stereo-imaging manipulation on Digidesign Sound Designer II and TDM systems. The S1 remasters stereo mixes by enhancing and altering the stereo effect. The S1 consists of four tools (Rotation, Asymmetry, Width and Stereo Shuffler) to create both subtle enhancements and drastic modifications of stereo level-balance of a mix.
Circle 227 on Reader Service Card

SOUNDSCAPE V. 1.16
Soundscape (Westlake Village, CA) has released Version 1.16 of its SSH-DR1, an expandable 4- to 64-output multitrack hard disk recording system for the PC. The new release features audio scrubbing, a digital noise gate, fade-in/fade-out curves, volume contouring, 999 "nameable" markers, strip silence and de-frag disk functions, a new take directory list, and a new user manual with index. Updates are offered free to current users.
Circle 228 on Reader Service Card

SELCO TRIO
Selco Products Company (Buena Park, CA) debuts the Trio range of three-shot knobs. Molded in high-quality nylon, the Trio range has a matte finish body and contrasting gloss pointer. There are two 11mm diameter versions, and shaft diameters up to 6mm can be accommodated.
Circle 229 on Reader Service Card

PASSPORT ALCHEMY 3.0
Passport Designs (Half Moon Bay, CA) has released Alchemy 3.0, an upgrade to its popular digital sound design software. Version 3.0, a 16-bit stereo sample editor for the Macintosh, features multitap digital delay, direct recording from any sound source using Apple's Sound Manager, support for OMS, support for 8-bit and 16-bit .WAV files, faster sample transfers, pitch shifting, time scaling, FFT harmonic spectrum display and an improved user interface. Retail is $595 or $149 for upgrades.
Circle 230 on Reader Service Card

DB TECHNOLOGIES AD122
dB Technologies (dist. by Audio Intervisual Design, Hollywood, CA) announces the AD122 Analog-to-Digital Converter. Offering 22-bit performance, the unit features a -122dB RMS noise floor, 0.00009% total harmonic distortion plus noise, built-in acoustic bit correction for re-dithering to 16/20-bit formats, a precision reference meter bridge, switchable digital soft-knee limiter to simulate analog tape saturation and multiconverter synchronization.
Circle 232 on Reader Service Card

DENON PRO CASSETTE DECK
Denon Electronics (Parsippany, NJ) debuts a three-head cassette deck with Dolby S noise reduction. Designed for studio applications, the DN790R features manual bias adjustment capability, a real-time counter and Dolby B, C, and HX Pro noise reduction. Record/play frequency response is 20 to 20k Hz, ±3dB with metal tape.
Circle 231 on Reader Service Card

24-TRACK OSC DECK II
OSC (San Francisco) announced that its Deck II software can now play back 24 tracks of CD-quality audio on a Power Macintosh 8100 without the use of a sound card. The software also supports full automation, synchronous MIDI playback and QuickTime video playback for film and video sound editing. The software runs native on the Power Macintosh line. Retail is $399.
Circle 233 on Reader Service Card

REVELATION ZIP-CD
Revelation Products (Valley Forge, PA) offers Zip-CD, a plug-and-play CD-recording package for use with PC, Mac or Unix computers. Systems begin at $3,295 and include an internal or external Yamaha quad-speed CD-recorder, premastering software, SCSI adapter/cable, CD caddy and ten blank CD-R disks.
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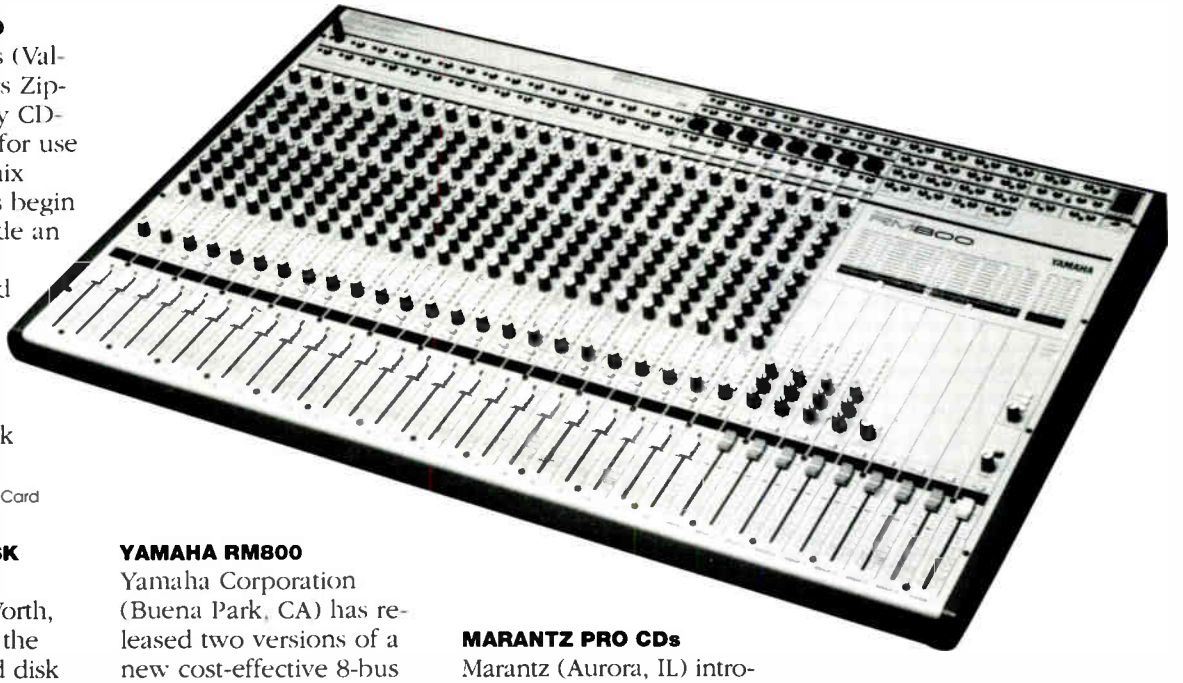

AKAI DR8 HARD DISK RECORDER
Akai Digital (Fort Worth, TX) has introduced the DR8 multitrack hard disk recorder. A continuation of the DR4d 4-track recorder, the DR8 features 8-track recording to a single disk, a built-in 16-channel mixer, and it is a self-contained recording and editing station that requires no host computer for its operation. The standard 1GB internal hard disk provides up to three hours and 17 minutes of recording time, while external drives may be connected via SCSI. The DR8's digital I/O interface allows data to be backed up to DAT. The unit features 18-bit, 64x oversampling A/D converters and 1-bit, dual 20-bit D/A conversion. Retail is $4,995.
Circle 235 on Reader Service Card

YAMAHA RM800
Yamaha Corporation (Buena Park, CA) has released two versions of a new cost-effective 8-bus recording board, the RM800. Available in 16- and 24-input configurations, the RM800-16 provides eight subgroups, six aux buses, four stereo effects returns, 3-band EQ, 100mm faders, direct outputs, true tape returns and a total of 40 inputs during mixdown. The RM800-24 contains the same features with a total of 56 inputs during mixdown.
Circle 236 on Reader Service Card

MARANTZ PRO CDs
Marantz (Aurora, IL) introduces two new professional CD players. The PMD320 features a coaxial S/PDIF digital output, fader start, ±10% pitch control and 1-bit oversampled D/A converters, all in a two-rackspace body. Retail is $399. The PMD321 includes all of the same features, as well as +4dBu balanced XLR outputs and a cue-to-audio feature for DJ and broadcast use. Retail is $499.
Circle 237 on Reader Service Card

JBL 6208 MONITORS
New from JBL Professional (Northridge, CA) is the 6208 Biamplified Reference Monitor. Incorporating an 8-inch high-excursion woofer and a 1-inch, titanium-dome tweeter, with each transducer driven separately by a dedicated power amplifier module with discrete circuitry, the unit features an internal active crossover and a rear-panel switch for selecting either -10 or +4 input levels. The transducers are internally aligned for coincident arrival of low- and high-frequency information, and the frequency response shows deviations of less than 2 dB from 60 Hz to 20 kHz. Retail is $499 each.
Circle 238 on Reader Service Card

ALESIS MONITOR TWO
Alesis Corporation (Los Angeles) introduces the Monitor Two Studio Reference Monitor. Offering higher SPLs and greater bass response than its Monitor One, the Monitor Two is recommended for use in mid-field listening applications. A 10-inch, three-way design delivers a larger sound field, clear mid-frequency detail and a broad frequency response. It features 200-watt peak power handling and a 40Hz-to-18kHz bandwidth.
Circle 239 on Reader Service Card

FOCUSRITE BLUE 330
Focusrite (dist. by Group One Ltd., Farmingdale, NY) debuts the Blue 330, a stereo mastering compressor and limiter. Designed to complement the Blue 315 mastering equalizer, the Blue 330 features completely separate compressor and limiter functions that operate through one VCA in the signal path per channel. The panel features two analog PPM meters with switchable scales and rotary controls for all adjustments. The three-rackspace unit has transformer-balanced I/O as standard.
Circle 240 on Reader Service Card

TC ELECTRONIC ATAC
A new hardware option from TC Electronic (dist. by Virtual Designs, Westlake Village, CA), ATAC is an advanced remote control for the M5000 Digital Audio Mainframe. ATAC offers M5000 users the ability to program parameters for up to ten M5000 mainframe units. Weighing just 2.4 pounds and featuring a 240x60 backlit LCD, the unit has eight assignable soft keys for quick patch changes, parameter changes or data nudging. The ATAC also has a PCMCIA card slot, a MIDI data merge port and the ability to update its software via the M5000 in Flash EPROM.
Circle 241 on Reader Service Card

DOLBY MODEL DP523
Dolby Laboratories (San Francisco) has released Model DP523, a 2-channel digital audio encoder. Designed for systems requiring both high audio quality and low, spectrum-efficient data rates, the DP523 supports Dolby AC-2 and AC-3 algorithms at as many as four data rates, ranging from 56 to 640 kbits/second. The unit supports analog (18-bit converters) and digital (S/PDIF or AES/EBU) audio formats; auxiliary RS-232 data can also be accommodated.
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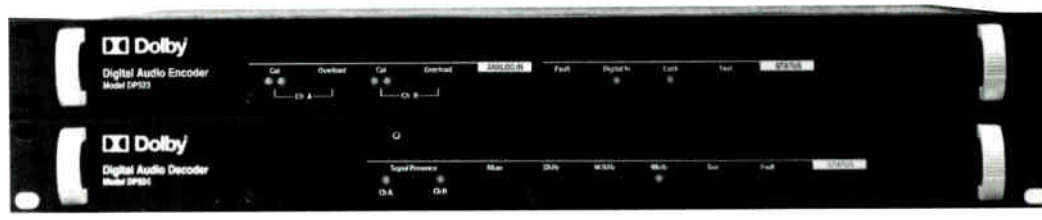
HOT OFF THE SHELF

This month's Hot Product Pick is **Q-up Arts' Steve Gadd DrumScores**, a collection of loops, fills, licks and samples by this legendary drummer, on audio or CD-ROM sampler formats. (408) 688-9524...**JRF Magnetic Sciences** has Flux Magnetics ½-inch replacement heads for Studer A80 tape machines; heads and conversion kits are also available for many Ampex decks. (201) 579-5773...**Howard W. Sams' 1995 Annual Index** is a catalog of service documentation for radios, televisions and other consumer electronics. (800) 428-7267...The **DOD 285 Gray Box** is a 4x12 and 2x12 cabinet emulator that lets guitars be connected directly to a P.A. or recording mixer. At your dealer now...DGS has introduced **Gotham GAC-2 V1**, a high-performance mic cable with advanced shielding for EMI/RFI protection to 50 kHz. (800) 292-2834...Now out: Version 6.13 computer automation and machine control system for the **Soundcraft DC2000** recording console. (818) 894-8850...**Greytsounds** announces The Cardas Lost Chords, a line of golden-section, stranding audio cables. (800) 266-3475 or (503) 347-4700...**Clark Wire & Cable** has released a catalog with its entire line of cable and cable-related products. (708) 272-9889 or (800) 222-5348...**Tripp Lite's Omnipro** is a series of line-interactive UPS systems ranging in size from 280 to 1400 VA. (312) 755-5400...**Tektronix 1995 Measurement Products Catalog** lists more than 80 new products. Call (800) 426-2200 (when prompted, press 3 and ask for program 372)...**Music Quest's MIDIEngine 8Port/SE** ($499) is a rack-mount, pro MIDI interface for IBM-compatible computers, offering SMPTE sync, 8x8 MIDI routing and more. (800) 876-1376...The **DAS Model 1194** has a new multi-input headphone system with four headphone amps in a single-rackspace unit. (818) 769-5654...End studio mishaps with **The Music Holder and Drink Holder**, two clip-on mic stand accessories from Middle Atlantic Products. (201) 839-1011...**MIDI Solutions Quadra Thru** ($59) is a 1-in, 4-out MIDI Thru box in a cigarette pack-sized package. (604) 794-3013...Available in 8-pin SIP and surface-mount packages, **That Corp.'s 2180** family of VCA chips reduce distortion, eliminate trimming and deliver discrete performance at IC prices. (508) 229-2500.■



Spectrum™ Organ contains 128 presets including classic rock, jazz, gospel and pipe organ sounds. Each preset includes individual vibrato, distortion, reverb,key click and release click settings. These settings can be globally altered from the front panel, or using MIDI controller messages. In addition, each preset contains four drawbar waves which can be accessed in real time using the PC™-1600 MIDI Controller.

- *1 Mb 16-bit Classic Organ Sample Wavetable*
- *128 Presets*
- *32 Oscillators*
- *32 Voice Polyphonic*
- *4 Part Multi-timbral*
- *Voice Pedal Input*
- *Leslie Speed Pedal Input*
- *Stereo Audio Outputs*

$399.99*

Spectrum™ Synth contains 256 (64RAM/192ROM) classic synthesizer presets including analog, digital and hybrid sounds. With 24 dynamic resonant filters, hard sync and pulse width modulation, the Spectrum Synth emulates classic analog synthesizers better than any other digital instrument. Presets can be edited and saved to RAM locations using the PC-1600 MIDI Controller.

- *2 Mb 16-bit Classic Synthesizer Sample Wavetable*
- *256 Presets (64 RAM /192 ROM)*
- *24 Oscillators*
- *12 Voice Polyphonic*
- *12 Dynamic Resonant Filters and 24 LFO's*
- *Poly and Legato Receive Modes*
- *Hard Sync and Pulse Width Modulation*
- *Stereo Audio Outputs*

$299.99*

Spectrum™ Bass contains 200 presets including classic analog and digital synthesized basses, as well as electric, acoustic, fretless and slapped sounds. The Spectrum Bass includes sustained and legato versions of most presets sounds. Up to 4 presets can be layered on separate MIDI channels to create incredibly fat combination sounds. Individual presets can be edited using the PC-1600 MIDI controller.

- *1 Mb 16-bit Classic Bass Sample Wavetable*
- *200 Presets*
- *8 Oscillators*
- *8 Voice Polyphonic*
- *8 Dynamic Resonant Filters and LFO's*
- *4 Part Multi-timbral*
- *Poly and Legato Receive Modes*
- *Stereo Audio Outputs*

$449.99*

Spectrum™ Analog Filter is a true programmable analog filter system which can be used to process any sound. It offers a 3-channel input mixer followed by a classic voltage controlled resonant 4-pole filter and voltage controlled amplifier. The filter circuit includes an ADSR envelope, velocity and key track amounts, and is MIDI controllable. The amplifier circuit also offers an ADSR envelope and master volume. 100 program locations allow settings to be stored in memory.

- *Classic Analog 4-Pole Filter Circuit*
- *100 Programmable Locations*
- *3 Audio Inputs*
- *MIDI Note Triggering*
- *Audio Trigger and Envelope Follower*
- *Filter Frequency Velocity and Key Tracking*
- *MIDI Controllable*
- *Mono Audio Output*

$349.99*

PC™ 1600 MIDI Controller This general purpose MIDI controller offers 16 sliders and 16 buttons that can be programmed to send system common or system exclusive MIDI messages. In addition, 2 CV pedals and the data wheel can be used as alternate controllers. The PC-1600 has many uses including programming and controlling any of the Spectrum series sound modules. The PC-1600 comes with 50 presets offering a variety of synth editors, sequence controllers, lighting system controllers, etc. All presets are fully programmable, so as other needs develop, they can be programmed by the user very easily.

- *16 Programmable 60mm Sliders*
- *16 Programmable Buttons*
- *2 Programmable CV Pedal Inputs*
- *Multi-function Data Wheel*
- *50 Programmable Memory Locations*
- *100 "Scene" Memory Locations*
- *Setup String Send on Patch Recall*
- *MIDI Dump/Load Capability*

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Stewart PA-1400/1800 Amps

by Mark Frink

The 1994 TEC Award for amplifier technology went to a little-known company called Stewart Electronics for its PA-1400 amp. Rated at 700 watts/channel (at 2 ohms), this 16-pound, two-rackspace unit breaks the dollar-per-watt barrier at $1,399 retail. Stewart's PA-1800 ($1,699) goes one better, spec'd at 900 watts/channel in a package weighing only a pound more. Lightweight amps are nothing new, so what's different about these?

In any amp, the power supply converts the 120 VAC/60Hz current into DC voltage to drive banks of output power transistors. Traditional supplies use a transformer working at the same 60Hz line frequency supplied by the power company, and the transformer steps the AC down to a more usable voltage. A "full-wave" rectifier on the transformer output converts the 60Hz AC into DC pulsing at 120 times per second. A pair of large storage capacitors charge for 2 milliseconds at those peaks and then wait 6 ms for their next charge. These caps store electrical energy in an electrostatic field and provide the positive and negative DC "rails" drawn on by the output devices.

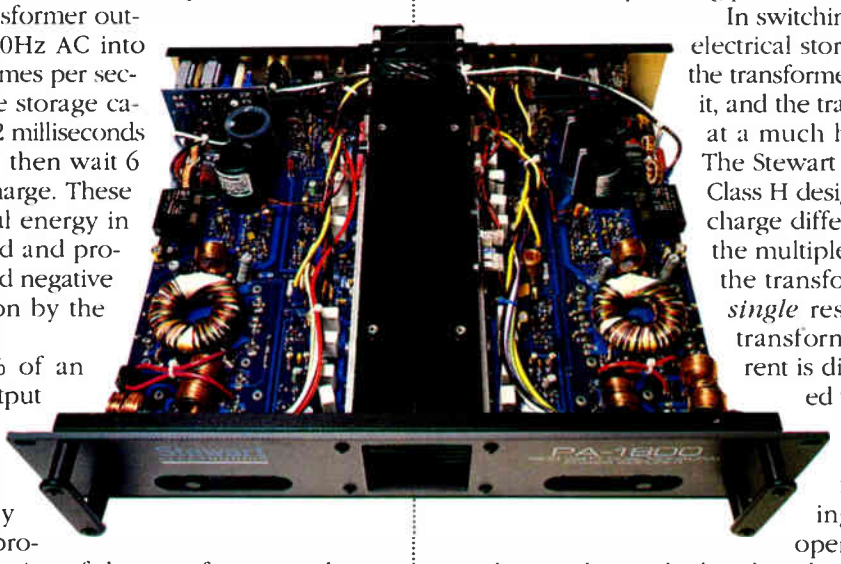

PHOTO: BOB ROSS

As little as 10% of an amplifier's rated output is needed for average program material, with full power required only occasionally for reproducing peaks. The size of the transformer and caps needed to have the power reserves necessary for the peaks is wasteful. A Class H power supply has a low-voltage pair of positive and negative DC power supplies, and one or two higher-voltage rails used according to the demands made on the amp. In an amp with a traditional power supply, a transformer (with several voltage taps) charges two or three different pairs of storage caps to create these DC supplies, and peak power is supplied by the higher-voltage rails only when needed. The amp draws on the lower voltage for the quieter passages, creating less heat and wasted energy. When a louder passage requires more power, the amp shifts to the higher rails—something like an automatic transmission in a car. This design approach achieves moderate power-to-weight savings and is now common in many professional, high-power amplifier designs.

The Stewart amps use a power supply that is truly radical. Although relatively new to pro audio, switch-mode (switching) power supplies have been around for some time in personal computers and telecommunications equipment. Chances are there is one on your desk right now. The Stewart design draws less power from the wall, has superior low- and upper-midrange frequency response, and in a portable system, its light weight is a further advantage. The Stewart amp employs a switching power supply but uses a Class H design and the same Toshiba 230-volt output devices—the 2SA1553 and 2SC4029—found in many leading professional amplifiers.

In switching power supplies, electrical storage occurs before the transformer, rather than after it, and the transformer operates at a much higher frequency. The Stewart amplifier uses the Class H design, but rather than charge different reservoirs for the multiple supply rails after the transformer, there is the *single* reservoir *before* the transformer, and the current is distributed as needed to the different DC rails through a high-speed transformer. The switching power supply operates at a frequency a thousand times higher than the 60 Hz coming out of the wall.

Using a transformer at a frequency of 60 Hz, voltage is applied over a relatively long time, and it is necessary to build up a magnetic field without overloading its core. For this reason, power transformers must have large cores of magnetic material to support the transfer of energy at this slow rate. At 60,000 Hz, little time is spent building up a magnetic field, so the core mass can be drastically reduced.

In the Stewart switching supply, the 120 VAC is rectified first, charging a single, large-storage capacitor to the 170-volt peak of the AC line. This produces a puls-

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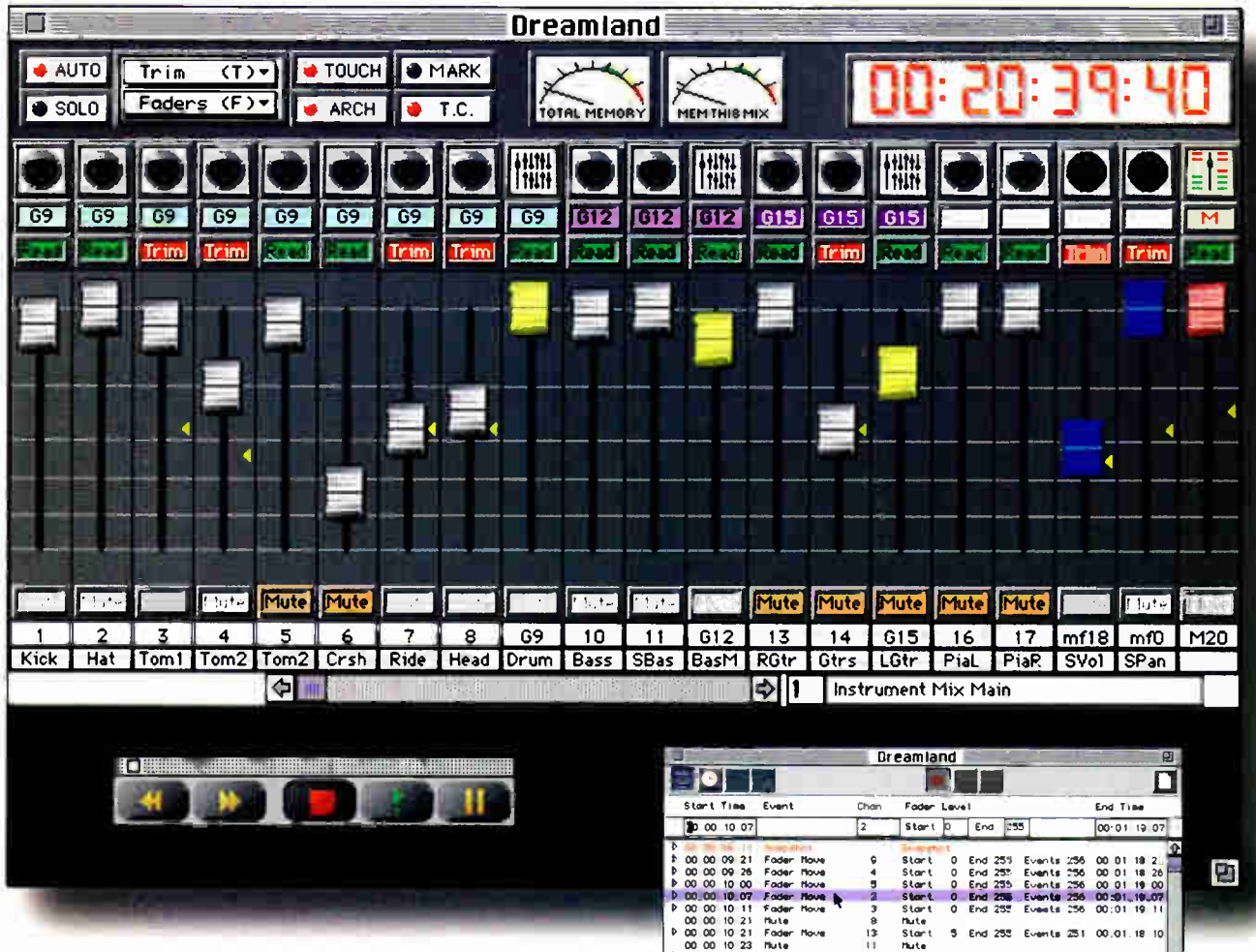

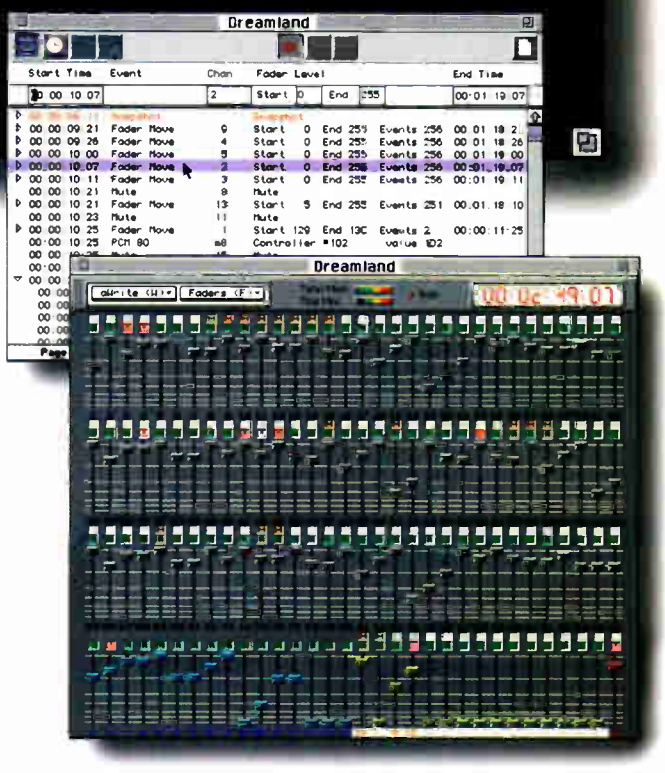

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ing, high-voltage DC supply, whose ability to deliver current is not limited by the impedance of a large power transformer between it and the wall. This voltage is then connected to the center tap primary of a high-frequency transformer. The two ends of the transformer's primary winding are alternatively switched on and off by a square-wave oscillator running at 60,000 Hz, creating a 340-volt peak-to-peak high-frequency AC supply. Because it is running at a high frequency, this transformer is small. The secondary windings on this transformer step the voltage down to two sets of rectifiers and filter caps, creating the positive and negative pairs of 40- and 100-volt DC rails that the amplifier's output devices operate on.

The design of the switching power supply uses a single storage capacitor that is a fraction of the size of the traditional capacitor pairs.

The design of the switching power supply uses a much smaller, lighter transformer and a single storage capacitor that is a fraction of the size of the traditional capacitor pairs. In the switching supply, one capacitor is delivering current to the load all the time, compared to the traditional designs, where one or more pairs of storage capacitors are delivering current part of the time, one at a time. Why wasn't this done long ago? Until recently, the switching MOSFETs and the core material used in the high-speed transformer were rather expensive. Widespread use of these materials in other industries has dramatically reduced the cost.

Something interesting occurred in the process of auditioning this amplifier. Naturally, the first A/B test was to contrast the Stewart to the previously mentioned lightweight "magnetic field" amplifier. Using a BSS FDS-310 crossover and a two-way, JBL-loaded floor monitor (2225 woofer and 2426 HF driver on a 2370 horn), the output of the crossover was split between the two amps. A single biamp enclosure was alternately plugged into each of the amplifier's outputs. The Stewart amp sounded more open and natural—"closer to your face," in the words of one experienced bystander. It also sounded as if the frequency response of the Stewart amp was exaggerated below 100 Hz and in the 2kHz to 5kHz region.

Using an LMS measurement system, identical components and substituting one amp for the other, a 20 to 20k Hz sweep was performed without moving either the measurement microphone or the speaker. The LMS plots showed identical frequency response. Next, sweeps of the two amps in isolation were done, showing both devices to have ruler-flat frequency response. These comparisons were also done with a popular "Brand C" amplifier having similar power ratings to produce the same results. Yet the Stewart amp exhibited more "apparent" lows and upper midrange, with no change in amplitude to account for it.

Second- and third-order harmonic distortion occurs in all amplifiers and is usually phase-shifted one way or the other. Any shift occurring in these components relative to the musical signal destructively reinforces the fundamental signal, producing brittle or harsh-sounding highs and a muffled low end. If these harmonics occur near the zero-crossing of their fundamental, they are quite noticeable. The harmonic shift correction employed in Stewart amplifiers accounts for this by adjusting the peaks of the second- and third-order harmonic distortion so that they occur in-phase with the peaks of the fundamental: It not only masks them, but also reinforces them. This reduces the audible distortion and is most noticeable in the upper midrange and extreme bass. The result of these corrections is an enhancement of the low bass and upper mids. Stewart Electronics was reluctant to explain exactly how this is done, but the effect is surprising, and it is easy to imagine that both end-users and other manufacturers will be taking a closer look at these products in the coming year.

Stewart Electronics, 11460 Sunrise Gold Circle; Rancho Cordova, CA 95742; (916) 635-3011; fax (916) 635-1787. ■

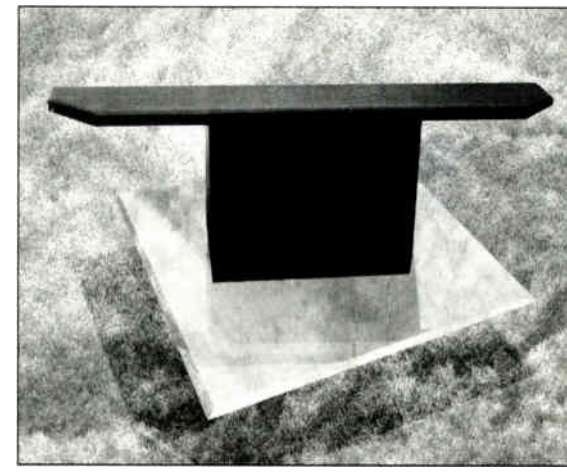
by Ty Ford

CLEARVIEW MONITOR LIFT

When I first saw this product, it was hiding behind a Euphonix console at an AES show. The Euphonix was getting lots of attention on its own, but every once in a while the speakers behind the board would raise straight up into the air, and a crowd would immediately form. Still, the monitor lift was so invisible, the crowd thought the speaker trick was a part of the console's functions. Only after investigating did I find a stack of brochures describing the Clearview Monitor Lift. I was later approached to do a review of the Clearview Monitor Lift, but I thought, "What is there to review?" "It goes up, it goes down." However, the manufacturer assured me that the *effect* of the lift on the sound field was worth a listen. I decided to give the unit a test run at The Studio, a facility in Hollywood, Calif.

Built by Vision Audio Inc., the Clearview Monitor Lift is an electronic lift system designed to—with a push of a button—remove near-field speakers and/or video monitors from the acoustic path of the main monitors and then return them to their exact position again when needed. The Clearview Monitor Lift comes in two boxes containing the base assembly and the tabletop. The latter is 7 feet long by 19 inches deep and covered with black short-pile carpeting. The base is 39 inches long by 18 inches deep by 25 inches high and is surrounded by a black, ABS, plastic, telescoping cover.

Assembly couldn't be easier: Unpack the units, plug in the power, run the lift to full height, and drop the tabletop in place. Four bolts from the table fall into four holes in the base, and four nuts hold it all together. The base legs are extendable for custom-fitting to various console configurations and have tabs in the feet for securing the unit to the floor. The standard configuration sets the upper height at 42 inches and the lower height at 17 inches. Once assembled, the unit is slid into place as close behind the console as possible and loaded with gear. It will hold up to 200 pounds of equipment. I recommend tying the various cables together in the middle of the table, but just make sure you have enough length to reach the full height of the Lift!



The Studio's control room A is equipped with a Euphonix console. This console's meter bridge is too small to hold speakers and, thus, needs some kind of table in any case. In position behind the console, the Lift is nearly invisible since it is all black and stretches the length of the 96-input Euphonix. The Clearview Monitor Lift has one function but two controls—a hard-wired switch (usually mounted in a blank panel or under the arm rest) and an infrared remote switch. I mounted the remote sensor on top of the meter bridge of the console with a Velcro pad.

We put a pair of Meyer HD-1 monitors, a pair of NS-10s, a pair of Auratones and a 19-inch Sony video

monitor on the Lift. As promised, the Lift went up, and the Lift went down. All of the gear on top went up and down with it, as well. No surprises there. The Lift travels about one inch per second, so it took eight to ten seconds to change the monitor height so that the NS-10s were at ear level and the Meyers were lowered behind the console. In order to lower the entire assembly (including the 19-inch video monitor) out of the sound field took just over 20 seconds.

I started out listening to a recently recorded jazz track that had a clean top end and real stereo mics on the drums and piano. The Meyers sounded true enough. (I had mixed the track on Meyers.) The Yamahas sounded like Yamahas, but I noticed that it was nice to be able to optimize the vertical position of each set of monitors to my ear height. Same thing with the Auratones. This monitor juggling was quick and easy. I then switched to the main monitors with the near-fields in the up position. This is the way everyone listens to their main monitors nowadays, with the clutter on the meter bridge. The Studio has an excellent main system, but it sounded like many big systems I have listened to—slightly hollow with soft imaging compared to the near-fields. That is, until I pressed the remote button and lowered the near-fields out of the audio path. What a difference! The top end sprang to life, and imaging became rock-solid—high-fidelity top to bottom—the effect was clear, and so were the monitors. The Studio's control room A is equipped with a large projection screen mounted between the main monitors. With the near-field system lowered, I got a clear view at the "big picture."

The $2,695 list price reflects the Clearview Monitor Lift's heavy-duty steel construction: This is no toy keyboard stand. Some control rooms are too small to use the Clearview Monitor Lift, but if your control room has a main monitor system and near-field speakers on the meter bridge, you should check it out.

Vision Audio Inc., 611 Anchor Drive, Joppa, MD 21085; (410) 679-1605. ■

Ty Ford is a Baltimore-based engineer/producer whose book Advanced Audio Production Techniques *is available through Mix Bookshelf.*

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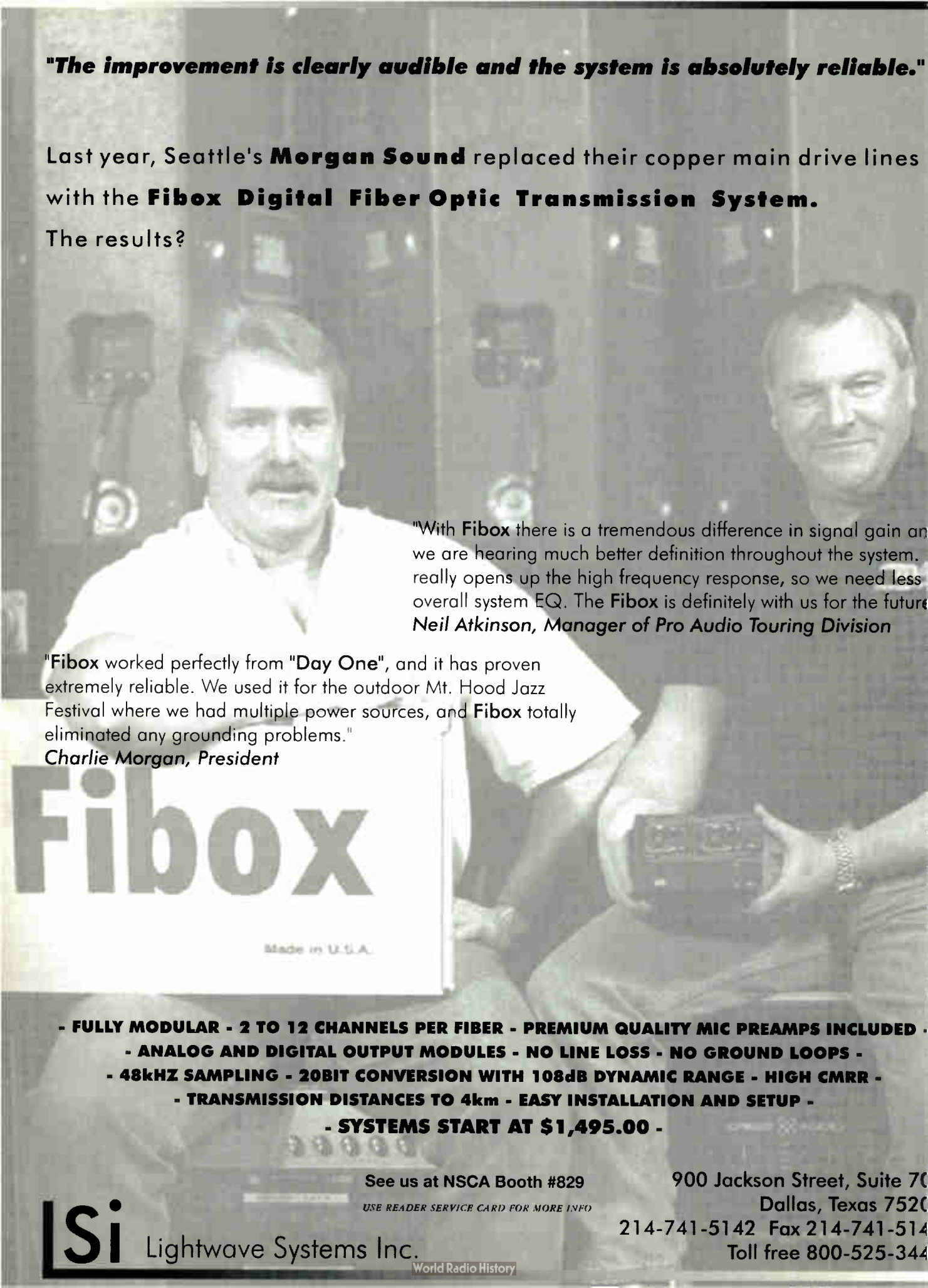

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by George Petersen

KRK K-RoK MONITORS

Over the past couple of years, KRK has emerged from relative obscurity to become a serious manufacturer of quality monitoring systems for the studio, broadcast, video and post-production environments. At last year's AES convention in San Francisco, KRK unveiled the K-RoKs, a low-end system designed for project studio users and priced at $449 a pair. I was impressed with the demo at the show and wanted to investigate further. Are the K-RoKs merely KRK's attempt to cash in on its name with a "good enough for rock 'n' roll" product, or are these really a studio tool that deserve to be called KRK? I had to find out.

The K-RoKs are a two-way system with a 7-inch, butyl surround, long-throw woofer combined with a 1-inch, silk-dome tweeter, housed in a gray speckle-tone cabinet. Five-way, gold-plated binding posts (in a recessed cup on the rear panel) connect to the passive, internal 2.5kHz crossover.

The enclosure is a front-ported box with trapezoidal front and rear baffles. The unique shape reduces the number of parallel surfaces and was designed to optimize linearity and maximize low-end punch. A few of the early K-RoK units combined wood front and rear panels with sidewalls of shaped fiber tubing, but KRK has since switched to an all-wood enclosure. As with other KRK designs, grille covers are neither included nor optional.

The outside of the K-RoKs is nicely finished and solid, but on the inside I expected to find a flimsy, punched-metal frame on the woofer. Instead, it's sturdy and has a cast-aluminum frame and large magnet structure. Ditto for the tweeter: no scrimping in the component area. The crossover —a simple, second-order (-12dB/octave) network—has hand-wound inductors and polypropylene capacitors. It's nothing exotic, but it does the job. When manufacturers come out with low-priced, "entry-level" products, cutting a few corners on quality seems to be an inevitable part of the process. However, the K-ROKs seem to be an exception.

Over the course of several months, I used the K-RoKs as near-field speakers on a variety of studio projects: jazz, rock and pop music, as well as broadcast production. The speakers have a forward character that seems to reach out to the listener. This stems from a couple of factors: The K-RoKs are relatively flat (57 to 19k Hz, ±3dB), with a very slight bump in the lower midrange,

which adds to its forward sound. The monitors have a 1-watt/1-meter sensitivity specification of 92 dB, slightly higher than most near-fields, which usually hover in the 90dB range. Higher sensitivity is certainly not a negative attribute, although unsophisticated listeners may perceive a hotter-output speaker as "better" when doing quick A/B comparisons in the retail environment.

The LF response is tight, well-damped and goes below its -3dB down-point of 57 Hz. I've always been a fan of front-ported designs. The response of rear-ported speakers can be influenced by their proximity to nearby wall surfaces. In a large, traditional control room, this is less of a problem, but in the small confines of a project studio, remote truck or edit suite, front-ported designs tend to be more predictable. In any event, the K-RoK's bass reproduction is well-defined, punchy and accurate.

At the other end, the performance of the tweeter was natural and crisp, without hype or excessive coloration. Although the crossover point falls at a critical frequency of 2.5 kHz, the blend of the two drivers at the crossover was smooth. And while not as tight as KRK's higher-end 7000B and 9000B models, the K-RoK's imaging was quite good, providing above-average re-creation of the stereo soundstage. Most importantly, mixes made on the K-RoKs translated well to other systems.

The K-RoKs do not incorporate internal magnetic shielding, and KRK offers a special shielded version, priced at $599/pair. As a test, I placed the standard version alongside numerous computer and video displays without creating any picture distortion, so this unshielded version will probably work fine in most studios.

At a retail price of $449/pair, the K-RoKs are an excellent buy for the budget-conscious facility. However, I have a sneaking suspicion that these are also going to show up in a lot of big-money pro studios as secondary reference speakers or main monitors in edit suites or MIDI rooms. Either way, anyone looking for a nice little monitor should give these a listen.

KRK Monitoring Systems, distributed by Group One Ltd., 80 Sea Lane, Farmingdale, NY 11735; (516) 249-1399. ■

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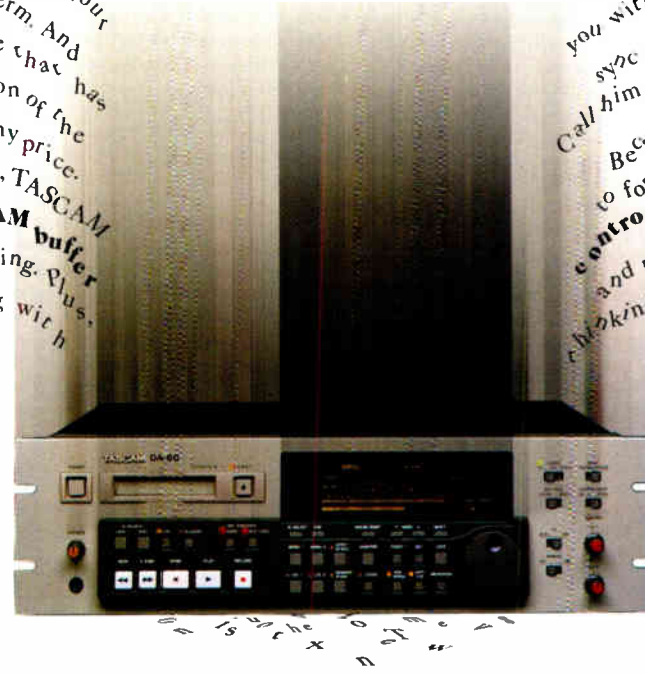

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L-Acoustic V-DOSC

LINE ARRAY SPEAKERS

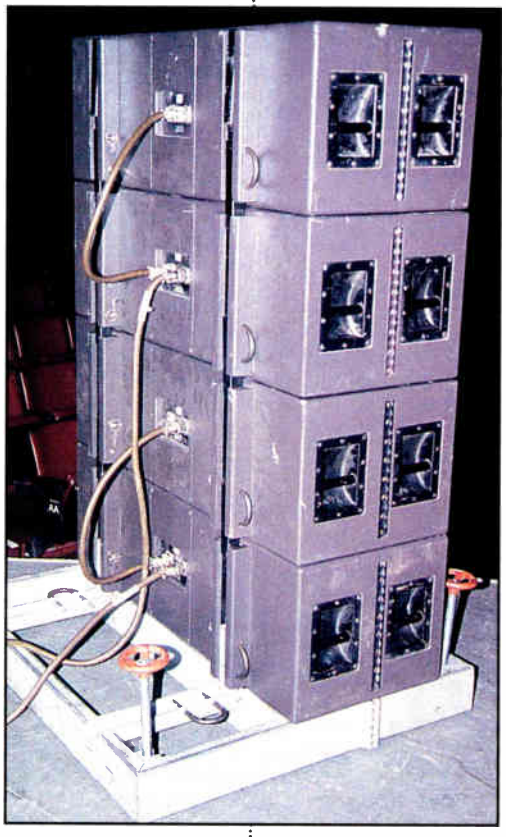
by Mark Frink

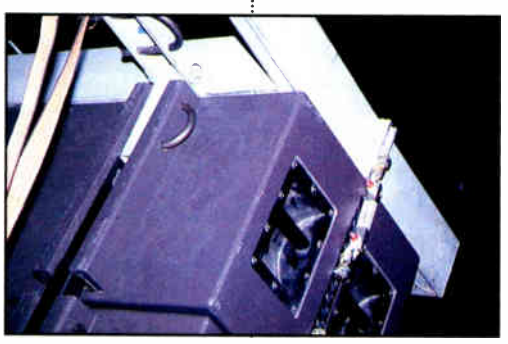
Proven on the road in Europe over the past two years, the L-Acoustic V-DOSC loudspeaker technology may be coming to a venue near you. In fact, if you attended this year's Academy Awards, Grammy Awards, Soul Train Awards or Billboard Music Awards, you've already heard these boxes in action.

The V-DOSC speaker system is radically different from any modern speaker array. Its name comes from the V-shaped acoustic loading of the mid- and high-frequency transducers (Diffuseur d'Ondes Sonores Cylindriques), which are designed to facilitate the concept of stacking.

Similar to tradition, each V-DOSC box is a modular, three-way "one box" system. Contrary to tradition, the system stacks like pancakes (in a single vertical column) where long slabs of drivers are placed one on top of another in attempt to minimize combing, beaming and lobing effects. The goal is to have the high-end drivers of each box stack next to the high-end drivers of the next box while still having the woofers of the first box sit close to the next box's woofers, etc. With this approach, two or more V-DOSC loudspeakers can be used to cover the same area better. A second box reinforces the first, a third reinforces the second and so on. This compares to traditional systems where individual boxes are angled away from each other in an array to avoid jumbled high-end information.

With V-DOSC, sound propagation is described as a "cylindrical-section" wavefront (shaped like a wedge of cake or cheese) with full-bandwidth pattern control, and it seems to ignore the inverse square law we are familiar with. Because it is a line array, the sound waves expand primarily in the horizontal plane and the coverage pattern is 90 degrees horizontal. A minimum stack of four enclosures is required to create this cylindrical wavefront. A stack of four is less than 6 feet high, with a footprint of 51 inches wide by 20 inches deep. Within that space there are eight 15-inch, 16 7-inch and eight 2-inch drivers.





The concept of "coplanar symmetry" is incorporated in the design. The drivers are oriented symmetrically around the vertical axis of each cabinet—the highs are in the middle, the midrange on each side, and the lows on each side of the mids. Each cabinet, or horizontal "slice" of the array, contains two 15-inch, direct-radiating cone drivers, one at each end of the cabinet, separated by less than a wavelength of the frequencies they reproduce. The two 2-inch compression drivers in the center each have a 7-inch kevlar, cone driver angled in on each side of them, four total per enclosure. Broadband coupling is achieved by this geometry, as the cabinets are arranged in a vertical column. Behaving as a single, tall, narrow sound transducer, a V-DOSC system generates "cylindrical" waves from the columns of devices.

All this compares to traditional speaker systems that create a "spherical wave front." The sound waves move outward, expanding *both* horizontally and vertically as a section of a sphere. Arranging multiple cabinets in a large array involves overlapping cardioid-shaped sound-lobes,

Top: the stacked V-DOSC array. Below: V-DOSC rigging detail.

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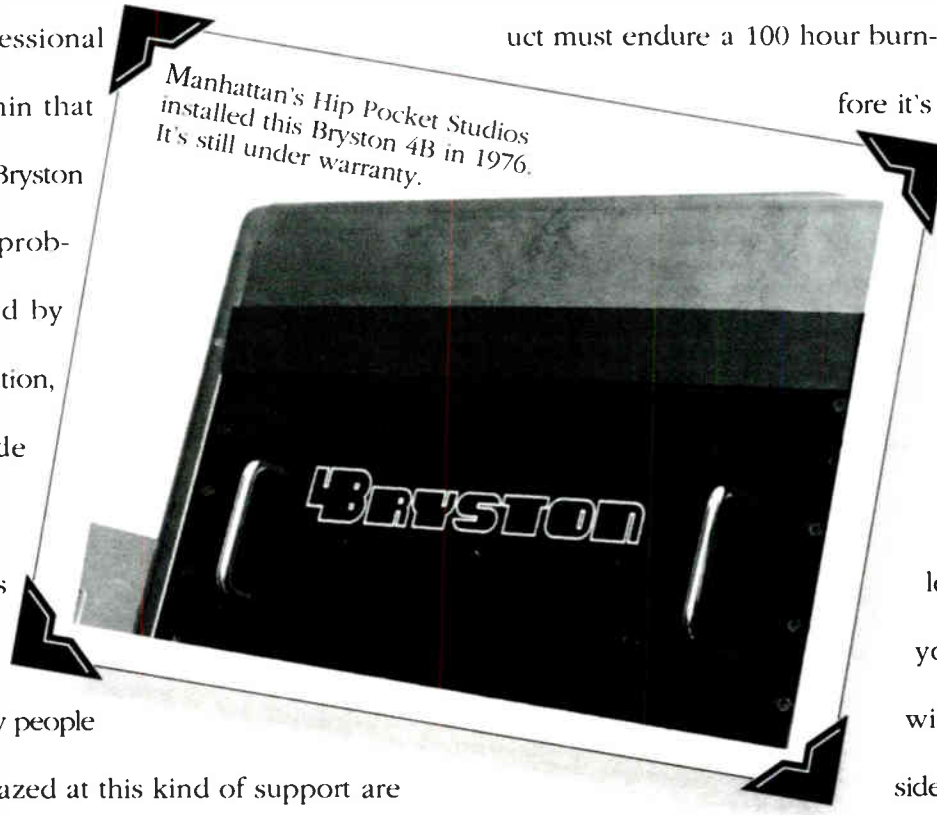

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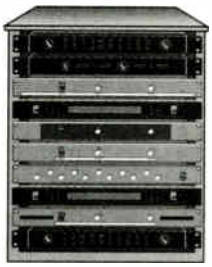

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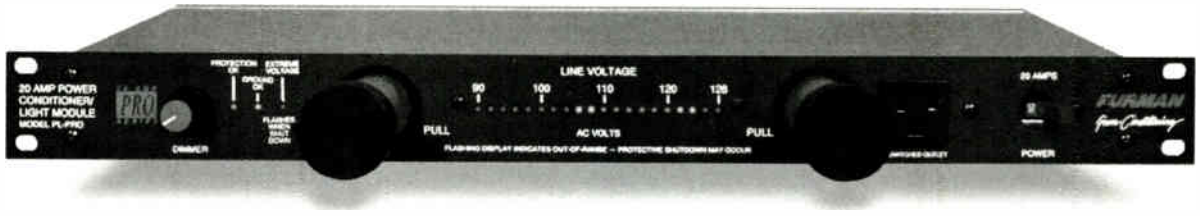

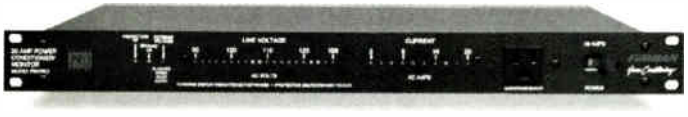

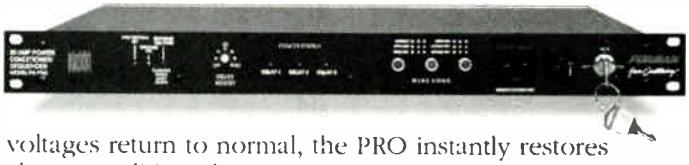

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which narrow at higher frequencies in the band of each component and at lower frequencies where horn mouth size loses its ability to control the coverage pattern. Optimization of these overlapping areas of coverage still allows destructive interference, particularly at the frequencies of widest dispersion. If a modular point-source array was able to provide even pattern control over its entire bandwidth, there would still be interference in the overlapping of zones, because coverage does not simply drop off sharply at the edges of its dispersion pattern. The contemporary approach has been to couple modular full-range enclosures in fan-shaped arrays, following the average angle of horizontal directivity of each enclosure, to minimize the overlapping zones. The maximum power available in one coverage zone can only be provided by one enclosure, or else by the addition of components in the same direction, which adds interference above frequencies where adjacent devices no longer couple.

In an array of sound sources, there is a limit frequency above which the devices no longer act as a coherent source and the individual sources no longer couple. At higher frequencies, where wavelengths are smaller than a mathematical function of the distance of their acoustical centers, sound propagation is no longer coherent, and the level decreases dramatically above certain frequencies. Below this limit frequency, the array acts as one continuous sound source having the shape of the entire array. Full-range coupling of sound in traditional modular systems is limited by their physical packaging, whether they are direct radiating or horn-loaded. While some coupling of lows and mids can occur, full-range coupling of all devices in a traditional array is not possible, resulting in comb-filtering at higher frequencies.

At the heart of the cylindrical wave front phenomenon is the correct coupling of individual components to act as a single, larger transducer. But to obtain this cylindrical wave front, two conditions must be satisfied. The first is that wavelengths must be larger than the distance between the acoustic centers of the devices. With V-DOSC, the distance between the acoustic centers is 18 inches for the 15s and nine inches for the 7-inch midrange drivers. Because of the V-DOSC design, the coupling of the lows is perfect for all frequencies below 730 Hz, and the coupling for the mids is perfect for all frequencies below 1,460 Hz. Crossover frequencies are 200 Hz and 1,300 Hz to ensure complete coupling of these devices.

Since the crucial distance between the high-frequency drivers is about 1-inch, it was necessary to design a new form of driver. In V-DOSC, the high-frequency drivers are mounted on a unique, patented wave guide, which transforms the output of individual compression drivers into sections of a very tall, thin, vertical high-frequency source down the center of the line array. This way, when stacked, the distance between them is small, and they couple as a single sound source. Still, at angles, the high frequencies couple, but they do so only up to a certain frequency. Above this frequency, the highs begin to beam, as with traditional arrays. With a 5-degree angle, this limit frequency occurs at 12,000 Hz.

The second condition for device

coupling requires that the total area of the radiating sources be at least equal to 80% of the total radiating area being coupled. The coupling of the high frequencies is achieved by the vertical alignment, edge to edge, of the rectangular mouths of the patented wave guides, providing a ribbon-shaped, flat wave front. The mouths of these wave guides are about 8 inches tall, by 1.5 inches wide, and they are definitely not horns in the traditional sense. The mid-drivers at each side of the high-frequency openings are angled in to semi-load them and also couple them at the crossover frequency.

The beauty of a cylindrical-section wavefront is that the speaker systems produce different near-field and far-field sound propagation characteristics. This is very cool. The geometry of a well-coupled line array extends near-field sound far out into the audience area. Within this area, the sound wave propagation is shaped like a section of a cylinder rather than a section of a sphere. A traditional point source generates a sound field in which the SPL decreases as the *square* of the distance, and the intensity is not dependent on the frequency at a given distance. A coherent line-array source generates a sound field with two different behaviors. In the near-field zone, the intensity decreases proportionally to the frequency, *and* proportionally to the distance, due to the nature of the propagation of the cylindrical wave front. Usually the near-field zone is only relevant for direct-radiating units and, because it is so small, does not even reach the audience. With V-DOSC, that zone is extended to a large portion of the audience area.

By the extension of this "near-field" zone into the audience area, SPL attenuates at a different rate from that of traditional arrays. Comparing two different systems that produce an SPL of 120 dB at 20 feet as an example, the V-DOSC produces 110 dB at 200 feet, while a traditional system may produce only 100 dB. "Obtaining a desired sound pressure level at extreme distances requires less gain from the V-DOSC system than with a traditional system," comments Dr. Christian Heil, founder of L-Acoustics. "The coherence of the wave front obtained with the V-DOSC system also prevents loss of energy due to comb filtering effects, as well as absorption caused by air and non-reflective surfaces."

Structurally, each rectangular enclosure is 51 inches wide, by 17 inches high, by 20 inches deep. The 220-pound enclosures roll in face down on a front dolly plate. When flown (in a venue), cabinets are joined, each to the next, in a column, in this face-down position with steel brackets on the back. Aeroquip fittings on the sides attach the boxes at the desired angle of vertical spread, if any. A reversible, dual-purpose bumper affords setup in two configurations: When the system is flown, the bumper is connected to the top enclosure and simply lifted by motor; when the system is stacked, the bumper is inverted, connected to the bottom enclosure, and acts as an adjustable base with four screw jacks, providing stability and the ability to tilt the stack.

The most subjective evaluation made of any audio system involves its sound. A coherent sound field has a decidedly different attenuation rate. Stereo imaging throughout the listening area is good, not just in the center of the house. The sound pressure level is high with respect to the size of the system. The coverage area is well-defined and predictable. The system is unusually flat, both in the vertical and horizontal coverage axis.

"The horizontal angle of coverage is 90 degrees, and in this plane, the behavior of the V-DOSC is defined as the sole source of sound," Heil states. "Matching it to an audience can be predicted with accuracy." Vertically, the sound field maintains a constant height over a large distance. When the enclosures are stacked at a 0-degree splay, vertical dispersion is very tight, about 5 degrees. The rejection at the sides is also great. This minimizes reflections and spill in reverberant rooms and would be an advantage in outdoor situations where the adjacent neighborhoods have SPL concerns. In "sheds" where sound levels are measured at the perimeters, this offers advantages beside the sound quality. With well-defined horizontal and vertical coverage, there are reduced reflections from metal roofs and side walls, and the P.A. doesn't need to be as loud to throw to the back of the venue.

V-DOSC is available on a rental or lease basis in North America through Cox Audio Engineering, (213) 344-8587, fax (213) 344-0043. ■

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A SONIC WEEK IN THE LIFE OF

NYPD BLUE

BY MAUREEN DRONEY

NEW YORK STREETS ON AN L.A. LOT

Boomboxes screech out the latest hip hop beat. Taxis, jackhammers and New York attitude—you can almost taste the pizza and bagels. But guess what, Dorothy, you're not in Manhattan anymore, and the truth is, you never were. You're on a set at Universal Studios in Los Angeles, where New York street life is re-created weekly for the hit Stephen Bochco-produced ABC-TV series *NYPD Blue*.

The production demands of *NYPD Blue* lie somewhere between feature film and regular television, marked by an attention to detail that's much higher than in most series. If a typical one-hour drama, according to the *Wall Street Journal*, costs more than $1 million an episode to produce, an educated guess puts *NYPD Blue* at about $1.5 million a week. A fair-sized chunk of that budget goes to sound, to create the feel and atmosphere that make the series so intense and emotional. At the end of February, the crew was rewarded with a Cinema Audio Society Award for Best TV Sound, for actor Jimmy Smits' debut episode called "Simone Says." Curious to find out how an episode's soundtrack is put together, I spent some time with the audio post-production team, and here's the result—a week in the life.

We won't deal with production sound here;

PHOTO: MAUREEN DRONEY

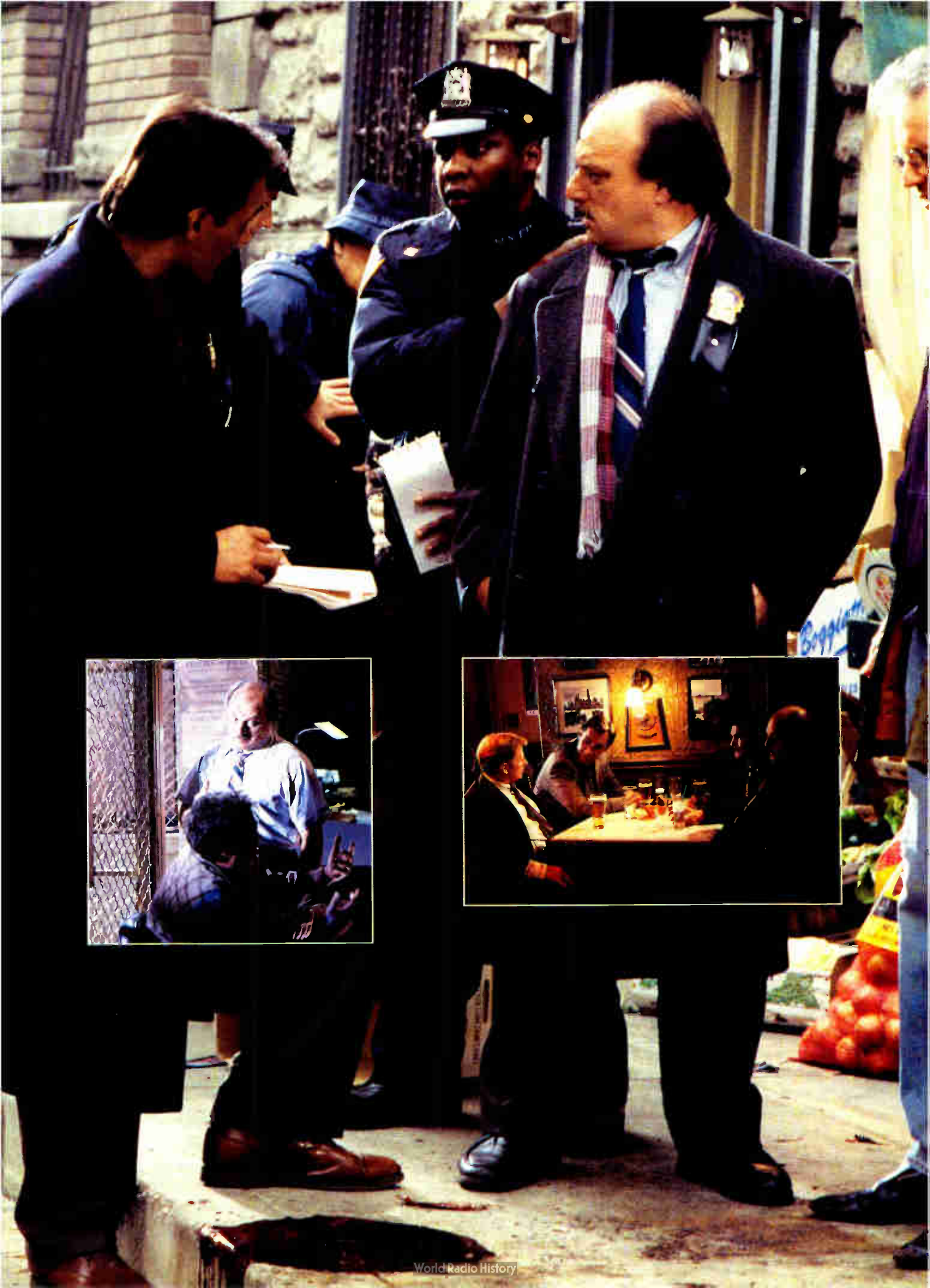
Re-recording mixers Robert Appere and Ken Burton

that's another story. For our purposes, all we need to know is that Joe Kenworthy records to a Nagra with timecode, and that mixing production sound for a Stephen Bochco show can be very tough. Supervising sound editor Dave Weathers, who has worked on previous Bochco shows such as *Cop Rock* and *Civil Wars*, says, "A show like this is tricky. Because there is so much movement in the way they shoot it, the production mixer can't always get as close as he'd like to." In addition to the traveling hand-held cameras, the pro-

Supervising sound editor Dave Weathers and sound effects designer John Edwards-Younger

PHOTO: MAUREEN DRONEY

LARGE PHOTO (LEFT): FRANK CARROLL, RESTAURANT & INTERROGATION PHOTOS BY BONNIE CODZINE



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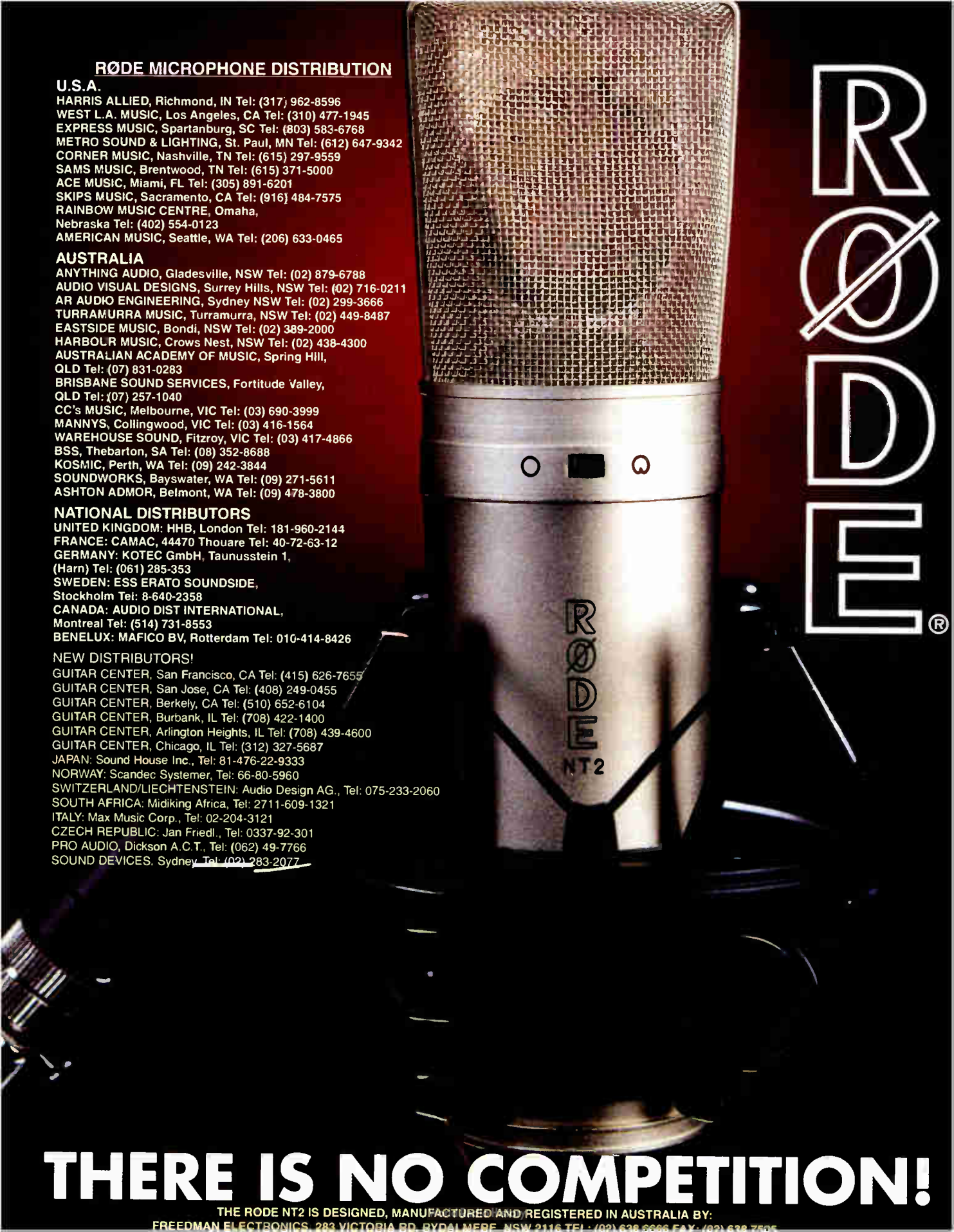

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ducers go for a lot of coverage, so a scene may be shot from five or six angles, with ten to 12 takes of each angle. That means 50 to 72 takes of production sound! Adding to the sound crew's headaches are body mics and a lot of offstage dialog, where the mixer can't see who's speaking.

DAYS 1 & 2

The film footage has been edited down to the actual 48 minutes of program for broadcast. Spotting sessions (scheduled early, sometimes 6 or 7 a.m.) are held with music composer Mike Post and Weathers. They screen the show with (or in the case of Post, who has worked with the Bochco team since *Hill Street Blues* back in the early '80s, without) the producers, to decide where music and sound effects are needed and what dialog should be replaced or added. Once those decisions have been made, Post and Weathers each head off with a videocassette of the episode to start building tracks.

Weathers works out of West L.A.'s Acme Soundworks, where step one in the process is to make his laydown tapes: six VHS copies, two ¾-inch videotapes and eight 2-inch audio tapes, all with matching timecode.

On Day 2, the editors go back to the ¼-inch sound dailies for dialog and start transferring and assembling, working from an edit decision list. While they are putting that together, Weathers goes through the show, checking for spots to record ADR (Automatic Dialog Replacement). Following the script, he listens to the ¼-inch tapes for alternates to each line that must be replaced, or he programs the line to be recorded on the ADR stage. Each line that must be replaced is logged, with timecode addresses.

"When we call in, say, Jimmy Smits, we'll know that his character, Simone, has 23 lines to do, and here's where they are," Weathers explains. "We can go 'bang, bang, let's get them.'" ADR is recorded to one of the 2-inch analog audio reels with Dolby SR, locked to a ¾-inch video so that the actors can see themselves on the screen. The original takes are also available for reference so that the actors can hear cadence and sync. In addition to the replacement lines, new dialog is often added.

Down the hall at Acme, dialog editors Duncan Burns and David Grecu are cutting on TimeLine StudioFrame systems. After loading the proper takes along with alternate choices, they add handles of room sound to the front and back of the lines, clean up bumps and noises, and generally, as Burns says, "perform microsurgery." Again, because of the style of camera work on the show (lots of quick cuts and hand-held-type moving cameras), it's difficult to get pristine production dialog, and there is plenty of cleanup necessary.

Along with banishing the baubles and bumps, the editors make sure that levels match, and they try to get rid of overlaps. This may mean moving a line to its own track to save the mixer from excessive gain riding, or searching for an alternate take. The editors also remove production sound effects (PFX) and fill that space with room sound that can be mixed with the new effects. This takes approximately four days and is finished just in time for the mix. The completed tracks are dumped to 24-track analog, Dolby SR.

In another editing suite at Acme, John Edwards-Younger is working on sound effects design. After he and Weathers spot the show, he starts cutting on his Pro Tools system.

Weathers explains, "John knows the show pretty well now, so, if we're in Simone's house, we've got set effects that we'll play, as well as sweetening with an occasional train-by, siren, fire truck or pile driver, just to give a little more flavor of the city. There's a lot of that because the producers of this show like to have buttons on the ends of scenes, not silence. It's gotten to the point that when John goes home, it's too quiet for him. He has to put on a CD of a jackhammer so he feels like he's living in the *NYPD Blue* world."

Usually Edwards-Younger is working with 21 to 22 tracks. The backgrounds are stereo, the hard effects in mono. He says, "We replace everything. We may use something from production, because even though we try to split everything off, sometimes you can't because there is dialog tied to it. Then the effects become especially important, because we also do a foreign version. And once the dialog is dumped out, if there was a door-close over a voice, it's gone. So it's important that we cover everything on this end. I pretend that it's a silent film, and I just create the audio universe. I do listen to the dialog tracks while I'm working, but mostly as a guide as to where to put effects rather than relying on that work track to supply sounds.

"I basically start from scratch each week," he adds. "I have a palette of sounds that I've built over the course of the season. Every scene has a walla [background noise] track of some kind: a street walla, or an interior-presence walla, a restaurant/bar walla. Something to enhance what the ADR is going to do with their group.

Music by (and for) Post

The *NYPD Blue* music production team follows its own weekly timeline. Mike Post composes the old-fashioned way—on paper—and there are three engineer/composers who input and interpret the information from Post's charts. Danny Lux, who has worked on the show since the pilot, says, "He faxes me the score, and I input it at my studio. We record everything on ADAT; we use three ADATs, Mackie boards and Roland 700 Series samplers for 90 percent of the sounds. The people who work with Mike know him real well, so he can kind of put his ideas down knowing that they'll know what it sounds like and can finish it. For instance, he'll write the bass line, the organ, the trumpet, with the feel left up for interpretation. This works for the play-ons [return from commercial] and the scene transitions with rhythm. The melodic stuff he writes out. He may write out 50 percent of the rhythm stuff, with 50 percent left for interpretation. But for the melodic stuff, there's only about 10 percent interpretation."

Mike Post

Mixing is done at Post's studio, generally to ½-inch, 4-track that then gets re-recorded onto a 24-track, which it shares with the Foley tracks on the final: Foley on tracks 1-7, music on 8-22, with format, main title, bumpers, end credits, and Bochco and Fox logos locked to picture. Things can be moved on the dubbing stage if needed, but mainly they are put in their proper place on the 24-track so that the mixers on the stage don't have to worry about it.

Regarding *NYPD Blue*, Post says, "It's different from anything else I do, and it's very satisfying. I think the theme really sets a tone in the opening that also works well with the camera work and the transitions. The middle part of the main theme is based on Irish music. I started out back East, where there's no police band or orchestra, just the pipers. So if there is a musical ethnicity in the show, it's Irish. But even more, I tried for the camaraderie of it— whether the cops are black, brown or white—because those pipes are the sound that you hear at cops' funerals.

"I'm luckier than most in that I work mainly with three of my best friends: Stephen Bochco, Stephen Cannell and Dick Wolf," he adds. "But that doesn't mean I have free rein. I have two prerequisites for my music. I have to like it, and the guy whose name is on the top of the building, the guy in charge, has to love it. I want them to walk out after they've heard it for the first time, look at each other and say, 'It couldn't have been any better no matter who had done it!'

"I like doing television. I like the immediacy of it. I'd be bored just doing one show. And in television, unlike film, which is a director's medium, no one changes my music just because they can. In television we don't have the time to pander to runaway egos."

Patty McGettigan is the music coordinator, the liaison between Post, the producers and the mixers. She says, "Because we have so many unusual elements in the music, when we first started to do the show, people would say, 'What was that? Is that a mistake? Did somebody drop something?' Since the composer can't be there, I'm there. I've been with the music from its inception, and I know what it's supposed to sound like. Also, because of the amount of effects used, they need to know where the music is going to be, so that only the most vital sound effects are mixed into it. There are so many different ways to mix a show, and it's a fine line between hearing every little sound that you would hear if you were there, and the art of it—the combination. It really all happens on the dubbing stage, tying all the elements together in a way that is artful and realistic at the same time."

—Maureen Droney

Every scene has traffic, whether it's interior or exterior. In a quiet apartment, you still want to hear the street outside; inside a busy office, you hear the interior presence of that office. In the summertime, I'll stick in fans, things like that.

"Then for offscreen specifics," he continues. "I've got cars and buses, trucks, fire sirens, jackhammers, subways, that I paint in. I have a wide selection, and I try not to use, say, a particular siren more than once in an episode. So there are backgrounds, which are the steady presences; ongoing traffic or 'air'; then onscreen specifics: door slams, things that go with picture. Offscreen specifics are not visible but are spotted to enhance holes in the dialog—things like sirens and helicopters. Sometimes I need direction because there are specific needs that take place offscreen that I am not aware of. One example is the 'Donna' character, the receptionist. Oftentimes, she's taking phone calls, and what I see is her saying, 'Detective, there's so and so on line two for you.' I need to know when the phone rang and the length of time for the dialog answering the call, so that I can then spot the phone ring, the phone pickup, and the phone hangup. It takes me about a day to do the backgrounds, and that leaves me time to deal with the hard effects, which are really the most time-consuming."

DAYS 3 & 4: FOLEY AND ADR

Normally, Weathers cues up the Foley effects that will be cut at Pacific Ocean Post Studios on Days 4 and 5, and also shoots ADR at Fox Studios. For principal ADR, the series actors are scheduled. There is also group ADR to be shot: incidentals, restaurant walla, street and precinct walla, whatever will be needed for that particular episode. For the walla, sometimes called loop group, *NYPD Blue* uses a group of actors called SuperLoopers. Says Weathers, "They're really great. They'll look at the show and help us decide what we want to play in certain scenes. Say we have an armored car heist—they'll be the background cops running, yelling out codes, adding to the flavor of the scene."

On Day 4, while ADR continues at Fox in West L.A., Foley begins at Pacific Ocean Post in Santa Monica, usually to be completed the following day. For those who may wonder, the difference between which

sounds are scheduled for Foley and which are covered by effects is that Foley generally covers the non-vocal sounds that are created by a person—footsteps, cup-downs, handpats, sitdowns; anything generated by a human as opposed to a mechanical sound.

"Of course there are gray areas," Weathers says. "Like, I don't do clicks and switches in Foley because they are standard; a tape recorder sounds like a tape recorder when you click it off. But what I may do in Foley is the tape recorder movement; someone's holding it so it's kind of shifting around a bit and there's a little clinking to it. A leather jacket makes a certain sound to it when you move. You can't go to a library and say give me 'leather jacket movement' that fits with the picture. But it's different for everyone. Some people Foley door-opens, I don't. I Foley somebody grabbing the door knob, because there's a sound to that, but the actual clicks and things, I have effects for. When you get in the feature [film] world, they have so much more time to Foley everything. We spend two days on Foley, where a feature will spend six or eight weeks. So we have to be very selective, yet cover what the producers want. You have to strike a balance there."

DAYS 5, 6 & 7: THE MIX

The final mix takes place at Stage 12 on the Sony Pictures lot during the last three days of the process. The team mixes two acts a day, leaving a third day for fixes, or as the crew calls them, "creative changes." While most productions use three re-recording engineers, *NYPD Blue* has two at the board. Robert Appere covers dialog and music, while Emmy Award-winning Ken Burton rides herd on effects.

Both mixers are enthusiastic about the console, a Harrison MPC (Motion Picture Console) that is one of five at the Sony facility, the only five in the U.S. Designed by Harrison in conjunction with Sony Pictures, the MPC is in use only at Sony Pictures and in five studios in Germany. It was created for feature film work, with a switching router of 256 ins and outs that also biases the tape machines. A digital controller of analog audio, the board runs 48-track and mag tape machines and is completely automated, including EQ and 8-track panning on each channel. The team finds the desk especially useful for changing setups, as just recalling one file will switch tracks to different machines, switch the monitoring so that the tracks are going to the correct speakers, change which buses are assigned to which tracks, and even which tracks the guys in the machine room are monitoring. "Nobody knows about it!" laughs Appere. "This board is great! It has total automation, and it never breaks down."

Appere is a longtime member of the Bochco team, and his background includes production or engineering on over a hundred records, including ones for James Taylor, Earth Wind & Fire and Neil Sedaka, as well as a stint mixing for the *NBC Nightly News*. He says that mixing the music for *NYPD Blue* is relatively simple. "The people who write and record it know how to make something sound good out of a little speaker, which is the art form," Appere explains. "It's almost as important as what somebody writes!" It's the dialog and ambiences that take up most of his time. As with the background sound effects, there is dialog ambience for each room and camera perspective. Appere creates these with multiple reverbs. "It's constant riding," he says. "More 'verb if an actor is yelling, less if they are whis-

pering. All that has to be ridden on every line, so that you get a sense of the room. I'm working with eight tracks of dialog as well as ten to 12 tracks of ADR going all the time. Four of those ADR tracks may be specific people saying specific things that we have to hear, and the rest of those tracks are, well, walla."

Appere listens exclusively on small speakers, and the show is mixed in surround. "When you put music through the [Dolby] DS4, a certain amount of the out-of-phase material, which there is always a lot of in music, will go to the surround," he explains. "Then I put two different delays on the music. I have a stereo pair, which is left-right for the music, then I have another stereo pair, which I use for center surround. And I manipulate those. We mix on Yamaha NS-10s and Auratones in surround, and we play it back in stereo through the TV. Producer Mike Robin wanted to do the show in surround, and the Bochco people always want to be on the front end, whatever it is. They push everybody to do the best work that can be done in the medium. They also encourage people. If I wasn't involved with these people, I don't think I'd be doing television. The rest of television is your worst nightmare: 'Hurry up, what reel are we on?' The Bochco people are the only people in the television business who operate this way. Any pressure on the mixers is based on a high level of analysis and taste."

Burton, who edited effects for *The Player* and *Look Who's Talking*, among other films, provides other insights. Often, it's necessary to add additional effects during mixdown, so he keeps a stock of offscreen specifics available, he says. Multiple reverbs allow him to use some of the same sounds, like sirens or helicopters, more than once in each episode, drawing from Edwards-Younger's elements to fill any holes discovered at the mix. "I may use the same effects over but wash them with different reverbs so they'll sound like they're 20 blocks away, for instance," he says. Those effects may be taken off of CDs to a 4-track, with timecode synched to the main tracks, or they may be recorded in Foley. He laughs, recalling the time the Sipowicz character (Dennis Franz) rubbed his finger on camera and proper Foley was lacking. Burton then licked his finger, rubbed it on the floor and miked it. "Sometimes it's just quicker to fly it in with a mic than to search a library," he says.

Sitting in on the dubbing session it was obvious that everybody involved in the show was tuned in to the tiny nuances of sound. And there are *a lot* of tiny nuances. Says supervisor Weathers, "When you think about it, we've got 60 tracks of stuff—24 tracks of effects, usually 17 tracks of dialog and ADR, another eight channels of Foley, and eight or nine channels of music. It's funny. When my friends ask, 'What do you do?' I say, 'Well we add things, sweeten things,' and they say, 'Isn't that stuff already there when you shoot?' So I'll have them come over and I show them a cassette of a show beforehand, and then I show them after we're done, and they go, 'Wow! You really do something for a living!'" ■

Mix Los Angeles editor Maureen Droney prefers her pizza without extraneous California toppings.

BY TOM KENNY

POST·SCRIPT

SOUND FOR FILM

Balancing Film Sound on The Cutting Edge

PART 4

by Larry Blake

This is part four of a four-part column discussing ways in which recent music recording innovations such as modular digital multitracks and high-quality, low-cost consoles can be used in film and TV post-production.

It's quite astonishing to me that the current standard practice of recording separate stereo dialog, music and sound effects stems during the final mix was not standard in Hollywood until the 1980s. Before this, everything went together to a composite 4- or 6-track 35mm magnetic film master. In the case of 70mm Todd-AO films, the 6-track final mix master would be copied straight across to a 70mm mag print by lining up the tones, i.e., with no further adjustment in level or EQ.

Among the many procedures introduced with Dolby Stereo in the mid-'70s was print mastering. As initially practiced, this entailed using the composite final mix to make masters for the two Dolby release formats: 2-track, Lt-Rt (Left total-Right total) matrixed print master for transfer to a stereo optical negative, and a 6-track print master for transfer to 70mm prints, with low-frequency information only on speaker channels 2 and 4, primarily to extend the low-end response of the then-standard Altec Voice of the Theater speakers.

This was a sensible process for many reasons. Overall corrections could be made to the final mix when making the print masters, usually consisting of putting the pedal to the metal on the 6-tracks and pumping the brakes when making the matrixed stereo optical mix. Furthermore, use of the precious final mix elements was limited to the re-recording studio, and one could make as many print masters as necessary, which came in handy in the glory days of the '80s when upward of 300 Dolby 70mm prints would be struck for a big film. The very minor downside of print mastering is the addition of one more tape generation of the format used during the final mix; an additional generation was needed anyway in the old 6-track roadshow days to make both the mono mix and the 4-track mix for 35mm CinemaScope mag prints.

It soon became obvious that the benefits of the two-step final mix/print master process could be further explored by splitting up dialog, music and effects into individual "stems" at the final mix. Not only could they each be individually tailored during print mastering, but

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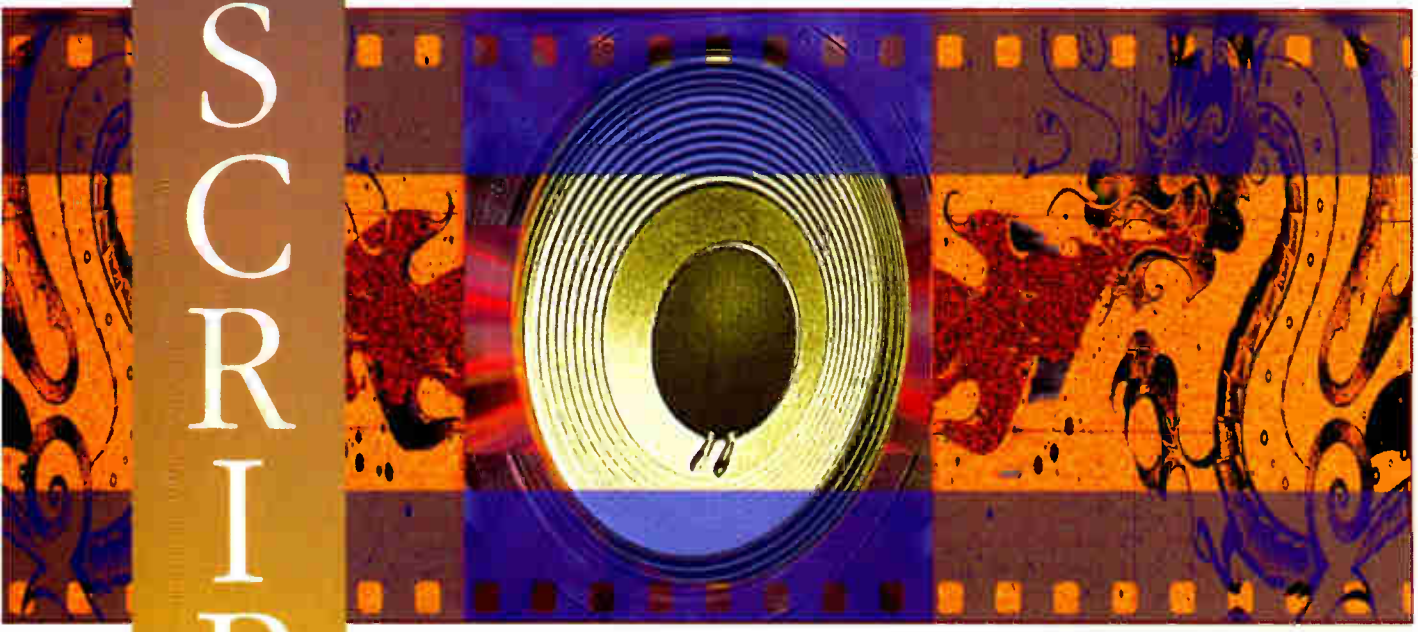

PHOTO COLLAGE TIM GLEASON

20-Bit Recording For "Just Cause"

by Thomas Drescher

Now that digital audio has reached local movie theaters and digital audio workstations have found their way into post-production facilities across the country, those of us working in feature film music production are finally beginning to see some of the advantages that our colleagues in the record industry have been enjoying for years. Digital audio has been around in one form or another since I began working as a music editor in 1982, but not until very recently has there been a reliable method of working digitally that neither put undue limits on the number of tracks you could play back at once, nor forced the level of audio quality down below the standards set by Dolby SR analog. All you need is a workstation that can handle multitrack playback at 20-bit resolution.

A little over a year ago, I found a system from Sonic Solutions. Though far from the cheapest

—CONTINUED ON PAGE 160

ABOVE PHOTOS: JON FARMER/COURTESY WARNER BROS.

Above and right: Sean Connery and Laurence Fishburne; right: Tom Drescher, music editor on Just Cause

PHOTO: ANDREA C. BROWN

Animal Meets Machine: Sound for "The Langoliers"

by Gary Eskow

Stephen King described it as being reminiscent of Rice Krispies. Executive producer Richard Rubenstein was adamant that it should not evoke the thought of machines. And director Tom Holland had an idea: The sound of the imaginary creatures that buzz around *The Langoliers* should sound like...animals!

From his seven-year stint as sound editor at New York audio post facility Sync Sound, Ray

—CONTINUED ON PAGE 162

Right: Ray Palagy at the Pro Tools station at Sync Sound; far right: a scene from The Langoliers

PHOTO: MICHAEL ANTON

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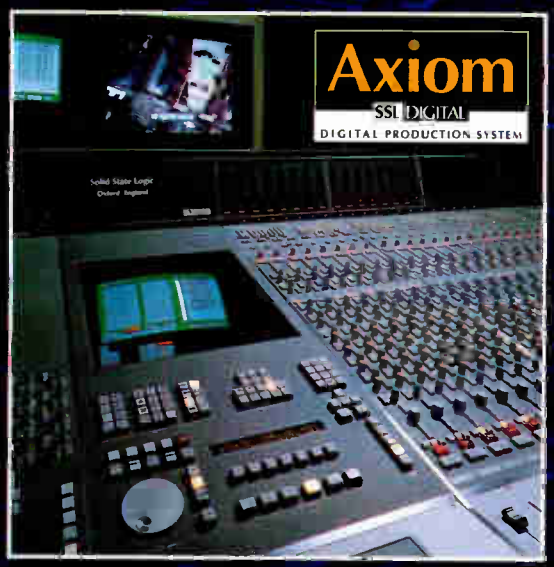

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—FROM PAGE 156, SOUND FOR FILM

the music and effects mixes were greatly simplified. (More on M&Es later.) Also, and perhaps most important, having separate stems made the final mix go much smoother. As practiced in Southern California, if the effects mixer nailed a complicated scene but the music mixer screwed up because he didn't put down his RV magazine in time to make the fade, the magazine could be handed over to the FX mixer so that the music mixer could punch in on his stem and correct it separately. Everybody didn't have to match at the same time.

Looking back in time just a little further, it's scary to think that less than 25 years ago, in the heyday of 70mm 6-track mixes, people weren't even punching in—a ten-minute reel was done in one pass. Today, what with punch-in recording, separate stems, and moving-fader automation...well, we have no excuses.

Now that we're hopefully clear on how print mastering came to be what it is, how will you do it in our mythical MDM/8-bus studio? First, you might need to abandon the notion that print mastering is the same as recording to 35mm mag film. It just ain't so. There is no reason why you can't do all the required mixes with MDMs. Doing the mixes is one thing, but delivering them to the studio is another.

Every feature film or television distribution agreement (signed by the producer who hired you) includes a list of delivery requirements, primary among them are the cut elements, premixes, final mix stems, 2-track print master, 4-track stereo M&E and a 3-track mono, with dialog, music and sound effects separate. Almost all of these boilerplated contracts specify delivery on 35mm mag film simply because that is what the studios are used to. (The only exceptions are TV shows that don't also have a conformed film negative.) So what do you do?

Unless you're working on an ultra-low-budget theatrical project, your film will probably be licensed by Dolby or DTS, and you will be making your 2-track print master via one of their encoders. The Dolby A-Type or SR noise reduction encoding should be done at this point, so you will have a noise-reduction encoded signal on your MDM. A Dolby-encoded digital recording might appear to be an oxymoron, but I feel that it's crucial that the noise reduction encoding be done during print mastering and not during transfer to optical, thus leaving no doubt as to what the correct 0 VU level is both with regard to eventual noise reduction decoding in the theater and the proper playback level. This 2-track print master can be transferred "stretched" to the optical track negative by locking an MDM to the AC line reference that drives virtually all optical cameras.

The flow chart to a 6-track digital theatrical print master (if you will be doing one) is slightly more convoluted, and you should consult with Dolby, DTS or SDDS regarding your options. Regardless of what system you use and their mastering medium (i.e., to magneto-optical in the case of Dolby Stereo Digital), you should also simultaneously record on MDM, giving you an archival master that you can play anywhere, anytime.

Next up is the stereo M&E mix, which is a crucial delivery item although most of us who make them never get a chance to use them. This 4-track LCRS mix—I think you should forego subwoofers and stereo surrounds while you are getting this room up and running—should be ready for the addition of foreign languages and should be completely filled with respect to room tone and production sound effects. Finally, fold down the stems to mono, which is primarily used in the production of trailers and radio spots.

At this point, you might end up with two sets of print master tapes (A set: tracks 1-6, theatrical digital print master, 7-8 theatrical NR-encoded Lt-Rt; B set: tracks 1-4, stereo M&E, 6-8 mono DME). For delivery purposes, each of these four mixes is copied to 35mm Dolby SR-encoded mag. The only exception is the theatrical print master, which should be copied "stretched" from the A-Type or SR-encoded signal on tracks 7-8 of the A tapes to tracks 1-2 of 3-track mag. Also, the M&E should be copied to 6-track mag, with track 6 of the mag being the original dialog track for guide in foreign-language dubbing. I'm assuming that you don't have a mag recorder at your disposal and will have to take your MDM tapes to a friendly competitor for a resolved transfer.

I also recommend copying your stems to 16 tracks of a 2-inch Dolby

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SR-encoded 24-track tape. This is truly the lingua franca of formats and can be handled by any major film or television studio. While you're at it, you can also copy across your M&E and your 2-track print master onto this tape for good measure.

Clearly, what I have outlined here is contrary to most delivery requirements. However, I have found that as long as you deliver the important stuff such as the 2-track print master and the stereo M&E on mag, and give them an X-copy of the stems on multitrack analog, they won't mind your giving them everything else (i.e., cut elements and premixes) on a digital format only. (I should note that I primarily use the ½-inch, 24-track DASH format and not MDMs.)

I don't want to open up a can of digital sync worms, but I recommend that if you are mixing for TV, you do all of your recording at the 48kHz sampling rate when referenced to NTSC color video. This is to allow you to make a D-to-D transfer of 2-track print masters for home video use (i.e., not a Dolby NR-encoded theatrical print master) to digital videotape with no need for sample rate conversion. It also helps to provide an Lt-Rt M&E, although this should be in addition to, and not in lieu of, a 4-track LCRS version.

When I am doing a theatrical film, and have the time, I try to make a separate, restricted dynamic range Lt-Rt that is designed to be played back at a lower level—optimal for videocassette and cable release. The standard practice of compressing a theatrical print master can't work as well by definition, because by dealing with a composite mix, you are unable to adjust internal balances (for example, raising a low-level background while leaving everything else alone). Make sure that whoever is in charge of video mastering knows of the existence of this mix.

After all of the above is done, I recommend (no, insist) that you make a protection clone of your stems, print masters, etc. The MDM formats offer great sound at a real low price, but there's no predicting (a) whether the tapes will hold up in the archival sense and be playable in 15 years, and (b) whether any of the machines themselves will be extant in 15 years. The tape cost of making clones of everything is so ridiculously small—about $150—that I'm not even going to waste my breath any further on this subject. Give the master MDM tapes to the producer as part of the delivery requirements and store the clones yourself where you keep other precious tapes—low, constant temperature and humidity, right?

In closing, I have to say that I'm aware that much of what I have talked about—both with regard to print mastering and in the three previous columns—is beyond the financial grasp of low-budget films; it's up to you to adjust my recommendations to your financial abilities. These four articles have been written in the spirit of doing the best possible work with these new technologies. It's your job to push it to the limit, which will always be set more by your creative skills as a sound editor and as a re-recording mixer than by the money at hand.

I am also aware that I have totally avoided any discussion in these articles regarding the monitoring system, including home theater systems. Tune in next month for that fun topic.

As always, please contact me directly at PO Box 24609, New Orleans, LA 70184; fax (504) 488-5139; or via the Internet: swelltone@aol.com. ■

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans for reasons too numerous to mention, although being able to see your natural disasters coming at you on a hurricane tracking map, thus being able to throw a party in their anticipated honor, is definitely one of them.

—FROM PAGE 157, "JUST CAUSE"

DAW on the market, Sonic had much to recommend it besides its 20-bit capability. Sonic's customer support is impressive, and it was becoming a standard in New York, where I frequently work. But most important, the Sonic System gets high marks from music-recording engineers, who generally know of the company's product from Sonic's years in the CD-mastering market. Even at 16 bits, the Sonic workstation has a reputation for simply sounding better than its competitors. We finally got the opportunity to explore its 20-bit capability last December with composer James Newton Howard on the Warner Bros.

film *Just Cause*.

The 20-bit package was put together at the Todd-AO scoring stage in Los Angeles under the guidance of recording engineer Shawn Murphy, with the help of David Smith at Sony Classical Productions in New York and support from Sonic Solutions. In scoring *Just Cause*, Howard combined a large orchestra with a variety of synthesized instruments, a compositional approach he used with notable success in last year's *The Fugitive*. Synth sweeteners and click tracks were laid down first at the composer's home studio on 24-track analog Dolby SR, which was then brought to the scoring stage as a guide. Murphy mixed the orchestra live to a second 2-inch machine, adding minimal reverb, while a (never used) digital multitrack rolled simultaneously as a backup. In order to provide sufficient separation for the final film dub, the mixdown was made onto 16 tracks of a third SR-encoded 2-inch machine with five orchestral tracks (left, center, right, plus a live surround pair for the SR•D release), three separate LCR groupings for synth pads, percussion and solos, and a pair of electronically generated synth surrounds, giving us a total of 11 synth tracks.

Using Sonic's timecode-stamping feature, which subsequently automates the music prelay, the SR mixes were then dumped to disk at 48 kHz using 16 Sony AD 4001 20-bit converters. These converters employ the Ultra Analog ADC 20048A chip set and are the same ones Sony Classical uses for its all-digital opera recordings. On the D-to-A side, we had 16 Sony DA 4002 cards fitted with the Burr Brown PCM 63 chip set and an NPC 5842, 8-times oversampling filter. Back in New York at the final dub, the score was laid down on an SR-encoded mag stem so that the music remained either SR-encoded or at 20-bit resolution all the way from its original recording right up to the creation of the final SR•D magneto-optical print master.

In addition to on-site technical support in L.A. and New York, Sonic Solutions lent us half of the required 16-channel playback system, a pair of 8-channel Z-Systems TOSLINK-to-AES optical converters, and most of the 28 (count 'em!) gigabytes of hard drive space to hold all the sound files. Drive-schlepping was accomplished with a $20 log carrier from the L.L. Bean catalog. Once assembled, we pushed the workstation past its published throughput limits by building four independent, 4-channel SCSI chains without networking the DSP cards and carefully managing which channels were recorded onto which hard drives. By so doing, we were able to make full 16-channel-to-16-channel cuts and crossfades without channels dropping out. Like the split-bit method of recording 20-bit information across a pair of 16-bit tape tracks, Sonic requires twice as much throughput in the 20-bit mode as in the 16-bit, so that error-free 16-channel crossfades demand the equivalent of playing 64 16-bit channels simultaneously.

And what did all this rocket-science get us? Well, if you think 16-bit audio sounds good, wait till you hear the world at 20 bits! When the program is loud and the frequency spread wide, the 20-bit copy is indistinguishable from SR—a huge stereo image with gobs of headroom to spare. If there's any room for improvement, it's at low frequencies, and especially at low levels where fewer than the full complement of 20 bits are holding most of the significant digital information. A quiet string bass passage, for instance, seems to change

color slightly, and there is a distinct but acceptable decrease in the apparent depth of the sound image, though the stereo width feels about the same. At 16-bit resolution, these minor color and spatial defects are much more pronounced and objectionable, especially to a recording engineer like Shawn Murphy, who uses very little equalization and a minimal mic technique to achieve an orchestral mix with complex reverb characteristics. Surprisingly, recording directly to hard disk, even at 20 bits, worsens these problems, which makes an SR "filter" somewhere in the re-recording chain a plus in most situations.

But why bother at all with high-end hoo-ha when it can't be reproduced in a movie theater? None of the existing theatrical digital formats support 20-bit playback, while all of them, even at 16-bits, must still shoehorn the bitstream with compression routines. The simple answer is the same as in the classical universe—the better your original recording, the better your chance of it sounding good even through tin cans and a piece of string. True, the cutting edge is never cheap, but as hard drive prices drop and high-end converters become more common, the economic arguments against 20-bit technology will fade. So why accept the status quo? Pave the way and let the rest of the world catch up. ■

Thomas Drescher, music editor on Just Cause *and the principal of Wonder Dog Music, maintains a presence on both coasts, though New York is considered home.*

—FROM PAGE 157, "THE LANGOLIERS"

Palagy knows that part of the job description involves people skills. So when he got the call to cut effects for the animated creatures featured in the ABC-TV special (to be aired this month) based on a Stephen King novella, he knew that he'd have to take input from a variety of sources—and satisfy them all.

"Meeting everyone's expectations is a big challenge," Palagy says, "especially on a project that's going to be quite visible." Featuring *thirtysomething* star Patricia Wittig and Bronson Pinchot, *The Langoliers* is a science fiction thriller/drama in the tradition of King's *The Stand* and *Golden Years*.

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"We actually spent an entire day recording cereal sounds—dry cereal, wet, mushy; in a box, in a bowl, in a tub..." At this point, Palagy pauses, realizing that his words are starting to resemble Dr. Seuss copy. "We took all of these sounds and made processed versions of all of them. Then we took, say, a flanged version of the wet cereal sound and combined it with other sounds to create a library of effects that went from a literal representation of what Stephen King had described in his book to a series of interpretations of his text."

During his work on *The Langoliers*, Palagy relied heavily on Sync Sound's Pro Tools 2.5/SampleCell setup, which is tielined into a central house effects library at Sync Sound. "Obviously, the fact that SampleCell and Pro Tools share the Sound Designer II file format is a big help," Palagy says.

Palagy is also a big fan of OSC's Poke in the Ear With a Sharp Stick CD libraries. "I'd take sounds from Poke III and load up both SampleCell cards to the max," he says. "I'd keep the sample as it came off the CD in a few voices, then open up Sound Designer and radically change EQ, or play with time compression and expansion effects, and make these effects changes a permanent part of the sound as played by a few other voices." Palagy used his Roland JD-800 synth to help create "non-realistic" sounds of the Langoliers, creatures whose sonic characters are combinations of grinding, screeching, scraping and crunching metal and earth. Because they were based on no equivalent in the real world, they had to sound unique. Palagy combined Poke in the Ear CD-ROM or library effects such as Velcro, car doors, subway screeches and lion growls with various JD-800 noise waveforms to yield "signature" sounds that are hard to categorize as animal or machine. He then laid down those sounds to DAT and loaded them into Pro Tools. The sounds would be layered within SampleCell to create as vivid a palette as possible.

SampleCell eventually ran out of voices. When it did, Palagy performed his composite sound (made up of many SampleCell voices and some MIDI tracks) to picture and recorded his performance onto a single Pro Tools track. This process freed up SampleCell, but it had a major pitfall: "People were coming to check out my work at various times—the director, the producers and so on," Palagy says. "If I had created a multivoice 'performance patch' and recorded it onto a Pro Tools track, and the director wanted, say, a groaning sound that was part of the performance to come in a little earlier, I had to explain that I needed to go back and re-create the parameters that went into the sound's creation. That's when note-taking comes in handy.

"The dedicated keyboard commands also make things go very quickly," he adds. "For instance, control dragging will constrain an event in time but let you move it from one track to another. Say you laid dozens of sounds onto a single track, but for mixing purposes decided to split out that track so that you moved all close-perspective sounds to another track or all sounds that needed reverb to a third track, etc. All you have to do is control-shift-click the regions and with one drag move them all to a new track while keeping their relative position locked. Another feature I really like about 2.53 is that you now have 100 location points at your

—CONTINUED ON PAGE 197

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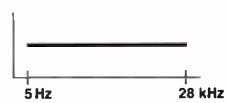

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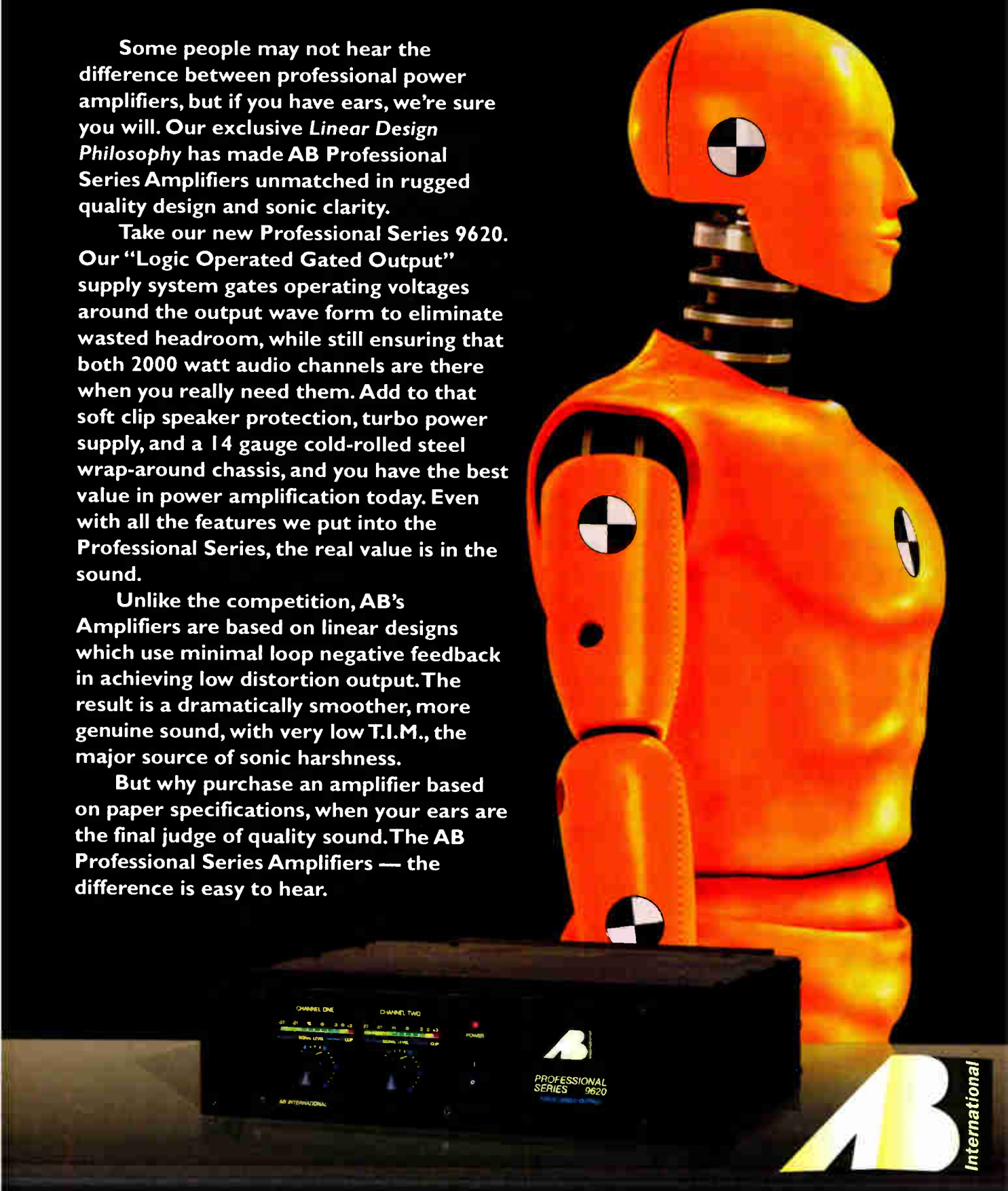

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New Products For Film/Video Sound

TIMELINE LYNX-2 SOFTWARE
TimeLine's (Vista, CA) Lynx V700-10 software program, provides advanced machine control and synchronization for the Lynx-2 system. Offering more than 60 new enhancements, the software includes RS-422 intelligence for synchronization of tape transports. Other features include support for the Tascam DA-88 and Alesis ADAT MDMs, locking of serial transports to serial timecode, an Auto Serial Transport Setting function, park-to-the-perf film transport control, sample rate selection for digital tape transports, and the ability to generate LTC from the serial timecode input.
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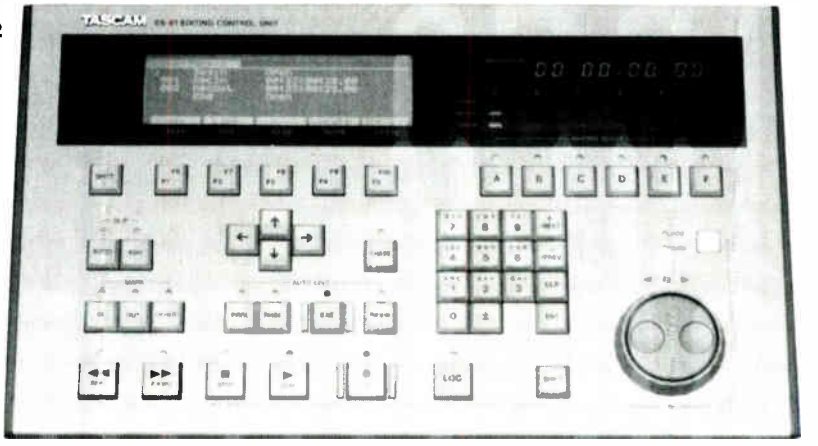

EV RE50N/D
Designed for location and studio broadcast applications, the RE50N/D from Electro-Voice (Buchanan, MI) is a dynamic omnidirectional mic. EV's neodymium (N/DYM) magnet structure is said to offer an even pickup pattern with extended frequency response and increased sensitivity. The mic also features an Acoustifoam filter and a DynaDamp shockmount for greater ruggedness.
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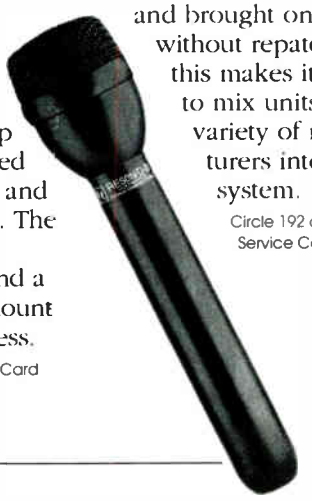

TASCAM ES-61 AUDIO EDIT CONTROLLER
Tascam's (Montebello, CA) ES-61 Edit Control Unit expands synchronizer/controller capabilities, providing editing functions and control over devices that don't have active sync capabilities or standard communication ports. The ES-61 controls via a universal communications protocol and connects directly (via P2, MMC, RS-422 or simple interfaces) without requiring external synchronizers. The unit simultaneously controls up to six individual machines, and 128 machines can be connected and brought online without repatching. All this makes it possible to mix units from a variety of manufacturers into one system.
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APOGEE S-2 MPTS SUBWOOFER
Apogee Sound (Petalama, CA) has released its new S-2 subwoofer. It is designed to integrate into the MPTS-1 Motion Picture Theater System, a THX-licensed monitor system for post facilities, dubbing stages, film/video screening rooms and small cinemas. The S-2 has two 18-inch drivers to accommodate larger facilities requiring extended low-frequency information. The unit is rated at 400 watts per driver (8 ohms), weighs 204 lbs. and has a sensitivity of 96 dB (1W/1m).
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SONIC SCIENCE SONIC SEARCH V.2.0
Designed to help post facilities get the most out of their current equipment, Sonic Science (Toronto, Ontario) released Version 2.0 of Sonic Search, enabling multiple users to share single or grouped CD autoloaders. In addition to networking, the software features improved sound effects management and support of AES/EBU digital/analog routers; creates EDLs, custom libraries of sounds and project tag lists; and provides translators for many database and PQ file formats.
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AMP BRUSH/SLIP RING ASSEMBLIES
AMP Services (West Palm Beach, FL) offers brush and slip ring assemblies for Sony BVH-1100 and BVH-2000 scanner motors. Manufactured using the same material as the originals, the AMP parts are guaranteed to perform as well and for the same duration.
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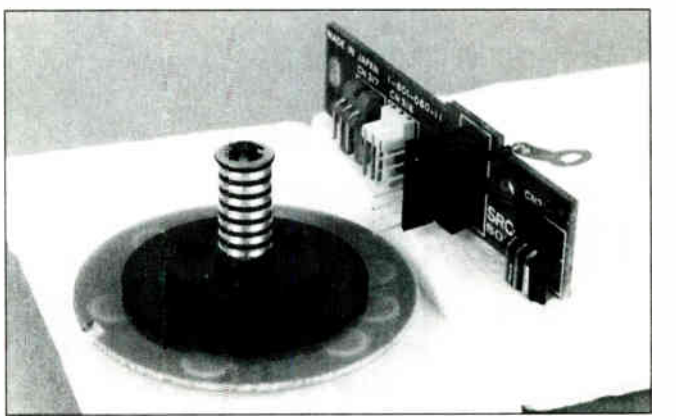

VIDEO FOR AUDIO

PART II: Synchronization Issues In Digital Production

BY PAUL McGOLDRICK

[We continue our series on what audio engineers need to know about the video-editing process. Last month Paul McGoldrick addressed the video signal. This month: sync issues in digital production.—Eds.]

Despite the many advances in recording media in recent years, it remains an inviolate truth that audio has been the second thought to the video-recording process. The manufacturers of videotape recorders would heartily deny it, of course, but until the advent of digital formats on tape (and storage on other media), densities were increasing, with narrower tapes and tracks and with the tape moving slower—all indicators of lower quality, or tighter engineering tolerances to achieve the same quality. With the additional limitation of having to use the same head for audio record and playback—to maintain lip-sync—crosstalk is inevitable, particularly from the timecode track; flutter is also present because of the use of rotary heads. The tape itself is also optimized for video recording rather than audio. The overall result is not something to regard as the classiest act in audio recording.

Video, on the other hand, belongs on a videotape recorder. It is effective both as a source and as the final store of pictures. That should not be true for audio unless the programming is basically a news format. For any quality programming, we would expect the audio to be manipulated on another medium—tape or otherwise—and only brought to the VTR as a convenience for a single-source presentation or transmission system.

With the digital format machines, things are somewhat better. The audio (normally four, but eight tracks is in the works and on all the HDTV machines) is embedded into part of the datastream and is treated identically to the video. With time-base correction and suitable error-correction techniques,

questions of crosstalk, flutter and generational loss are no longer relevant. The overhead of the audio in a DVTR is so small that it is almost an immaterial add-on to the recording process. In practice, the error correction of digital audio is better on D-1, D-5 and Digital Betacam than it is on D-2 and D-3 machines. This is because the location of the audio on the latter machines suffers larger tracking errors. Overall, however, the audio on a D-3 machine is the most reliable in its repeatable performance under the worst operating conditions.

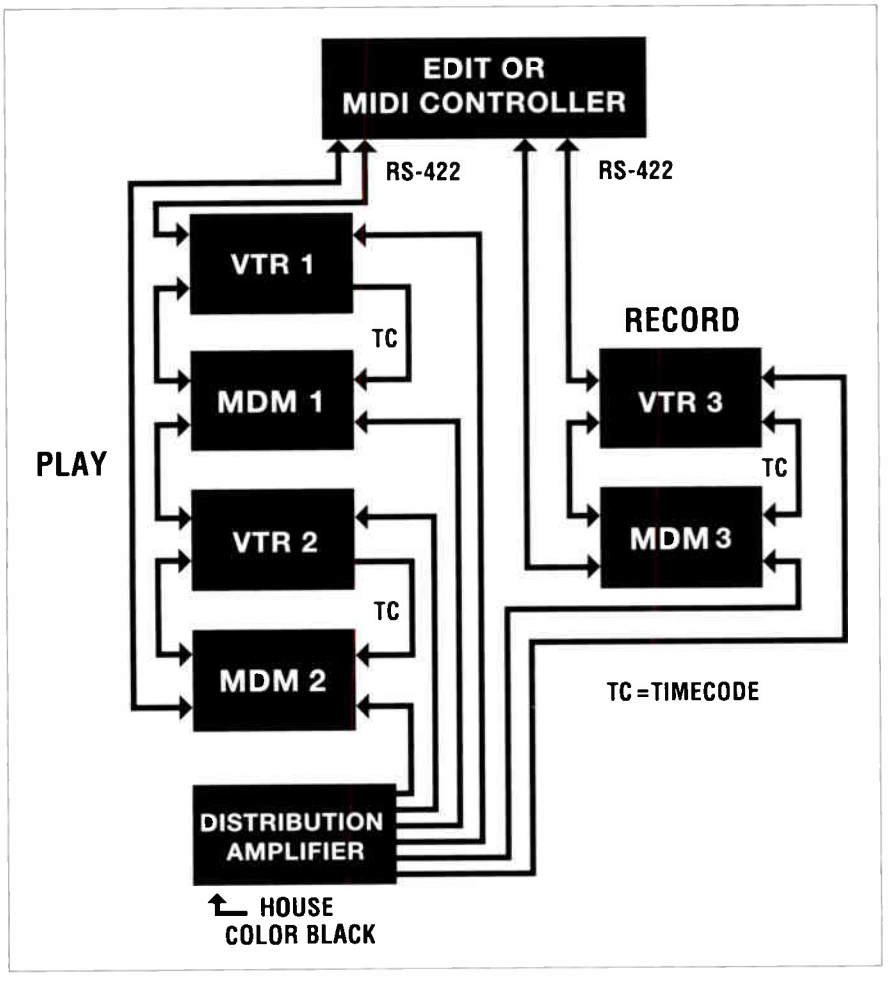

Figure 1: Preferred lock-up and positional control with modular digital multitrack recorders (video and digital audio interconnects not shown)

SAMPLE RATES

In order to imbed the audio in this way, the audio and video data rates must be locked to one another, but DVTRs only offer a 48kHz sample rate. This can cause interface problems with the need to change data rates on some inputs. Because NTSC's field rate is actually 59.94 Hz and not the generally touted 60 Hz, there is a mathematical problem in getting a complete and equal number of samples per field at 48 kHz. Instead, there is a five-field sequence for NTSC, with fields having samples of 801, 801, 801, 801 and 800. Some of the editing considerations in the digital VTR will be discussed here a little later.

Film audio has been very different from the video scenario. With recordings on a separate media—such as sprocketed mag film—the full resources of the audio environment in terms of sources, consoles and sweetening could mirror an audio-only facility. "Rock 'n' roll" dubbing was, additionally, one of the first examples of nonlinear editing.

The modular digital multitrack revolution is bringing the video scenario closer to that experienced in film post-production. MDMs such as the S-VHS-based ADAT format (adopted by Alesis and Fostex) and the Hi-8mm-based DTRS format (Tascam and Sony) provide eight audio tracks, with the option of adding additional 8-track modules for up to 128 tracks. Where DVTRs are not yet in use, or where the four or eight tracks are insufficient for a mix, MDMs offer economical solutions. These recorders can be controlled on the same protocol as the video recorders with the machines all locked on a timecode basis.

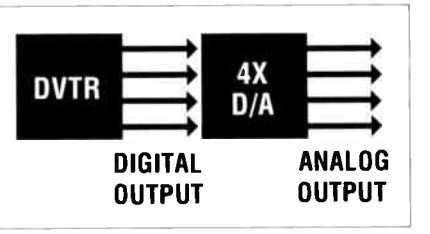

Figure 2: Use outboard digital-to-analog converters to maintain audio quality.

However, when this lock method is employed, things will go haywire if the VTR does not output correct timecode in shuttle, fast forward or reverse situations. The only way of bulletproofing such systems is to have the VTRs and MDMs controlled using RS-422 (or, in some cases, MIDI machine) control protocol from a suitable edit controller or digital audio workstation. Timecode can be used as a "position" setting tool, but it cannot be used as a lock. It is too coarse for the digital clock lockup in the units; for that, all the units must be locked to station or house color black (syncs plus color burst), which should be available in the facility.

CORRECTING LIP SYNC PROBLEMS

One of the most confrontational areas in the video-editing suite involves lip-sync problems. It is always the "other guy's" fault. The fact is that video-to-audio delay can be an insidious, creeping problem. Any video processor, or circuit, that involves video storage technology can create a video delay. Even the innocent time-base corrector will introduce delays. With memory so low in cost, it is of no significant benefit to the manufacturer to limit the correction window to a few lines of video—as it was once—and there is always at least a field (half-frame) of delay. This field (16.7 ms of audio) is not a significant delay, but if compounded by multiple generations in an editing situation, it will become a problem.

Most people can detect a video-to-audio delay of about 50 milliseconds (approximately 1.5 frames),

but, strangely, the majority of people cannot tell at that marginal point whether it is the video or audio leading, which is useful when the delay is being adjusted out. Other situations can create complex delays such as field/frame stores on satellite or remote feeds and, somewhat frustratingly, the delays through standards converters in the conversion from one of the world's TV standards to another. It used to be simple (again, when memory was expensive!), with the converter doing its magic line interpolation over a couple of fields. Then it was four fields, now it can be more. How much more? Well, with some motion-compensated converters, the question is almost open-ended; there is an absolute delay through these units plus a variable delay that is dependent on the content of the video material. More than eight fields is typical.

To correct for these delays, which may need to be changed as the source material changes, an appropriate delay needs to be introduced into the audio channel(s). The delay units available on the market, analog and digital, will cope with all the delays necessary. However, there is a noticeable absence of units that will accept digital audio inputs at multiple sampling frequencies. This is a major quality problem. Coping with the variable delay of a motion-compensated standards converter requires a delay setting that is a compromise above the absolute delay and tends to take up an average position. It is unfortunate, and maybe a little irresponsible, that the manufacturers of these units have not seen fit to incorporate audio delay units triggered by the information that they have available within their own equipment—another case of audio being treated as the second-class citizen.

It is important in a multisource/multitape programming situation that any video delays are compensated for individually at the source before any attempt is made at a composite mix. Otherwise, the combination becomes a mess, with different lip-sync problems on different segments. Adjusting delays is easiest when the source can be slowed and an identifiable audio source—such as a mouth opening—can be tied on the video monitor to the corresponding audio track emanation. Adjusting the delay to tie these together should obviously be sufficient, but if the piece is more than a few seconds long, check the sync in another position as well. It is obviously perfectly acceptable to sync up a separate audio source in a retarded position such that lip-sync is returned. But be careful that any repeat take is done in the same way; some locking systems will always return to the "correct" position rather than the retarded one.

Matching audio and video in the editing suite is still way up there in skill requirements. The degree to which "sweetening" of the audio, and balance and color correction of the video can be taken is a matter of taste in the initial flow of material. It becomes very obvious to the viewer/listener when things go wrong. However sophisticated the facility, it is inevitable that a crisis/last-minute change will be made with a direct audio edit on the DVTR itself.

Editing audio on a DVTR is one of the weakest areas of the machines. The D-1 machine, which represents the absolute benchmark in video quality today, uses a double-location technique for audio. This results in two separate copies of the audio so that the second can be used in cases where reading of the first has had too many errors. During an edit, however, the new material is loaded into one location and the second is updated later. A smooth transition can be made between the two locations in the form of a crossfade. Great, provided that an error does not occur at or near that point in time. If it does, the results can be "interesting," with old and new material being swapped about. The later D-2 machines used a similar double-recording technique, but the material in both copy locations was always identical. Instead of crossfading, the machine fades out one track and fades in the new. This can be acceptable on a lot of material, but by no means all. For all DVTRs the best guarantee of playback quality is to use digital audio outputs from the machine and to have separate D-to-A converters away from the environment of high-output oscillators, servo motors and the like.

Compressed audio represents further challenges still to the processes of editing. Within MPEG-2 (Musicam), for example, there are six backward-compatible audio sampling frequencies at 48, 44.1, 32, 24, 22.05 and 16 kHz, a veritable toolkit of responsible choices. Editing within this format? Unlikely? Don't think so! Watch the next months prove that wrong. ■

Figure 3: MPEG-2 Audio coding choices

SAMPLING FREQUENCY (kHz)	48.0	44.1	32.0	24.0	22.05	16.0
AUDIO BANDWIDTH (approx. kHz)	22.5	20.6	15.0	11.3	10.3	7.5

Video-to-audio delay can be an insidious, creeping problem. Even the innocent time-base corrector will introduce delays.

Paul McGoldrick is a technical and marketing consultant who has worked in the broadcast industry for 30 years.

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BY BLAIR JACKSON

PHOTO: PENNIE SMITH

The Stone Roses In Full Bloom

by Blair Jackson

It's been awhile since a band from the UK hit it big in the U.S. Most of the groups that are highly touted in the ever-bombastic British rock press fail, for whatever reasons, to make waves across the Atlantic. Periodically, there's a decent ripple created by a band like Suede, The Sundays or Teenage Fan Club, but so far they've made little impact outside of a few urban centers. But here's Ian Brown, singer for the Stone Roses, of Manchester, UK, talking in *Q* magazine about the group's bright future on our shores: "The reason why no British band has taken the U.S. in the last ten years is that none of them have been any good. America's there for us if we want it. It's ours."

Confident? You bet. Arrogant? Sure. Actually delusional? Possibly. But *I* wouldn't bet against him. You see, the Stone Roses really are a breed apart from so many of their trendy brethren. They're not tied to any fleeting sound or scene (though they influenced a passel of Manchester bands); their sophomore album, *Second Coming*, reveals a band that has progressed tremendously since their fine, John Leckie-produced 1989 debut album; and they possess something that masses of Americans love and that seems to be in short supply in England—a guitar hero. It may be a bit premature to mention John Squire in the same breath as Clapton, Page and Beck, but he's both a tasteful and imaginative axe-slinger, and on *Second Coming*, he gets a chance to really stretch out and show what he can do. In fact, the album as a whole probably owes more to the sort of loose, expansive aesthetic of late-'60s "guitar" records like the Bloomfield-Stills-Kooper *Super Session*, Hendrix's *Electric Ladyland* and the first Led Zeppelin album, than to any contemporary sources. Which isn't to say the Stone Roses are some sort of retro throwback—this isn't just a bunch of big studio jam sessions captured on tape. But neither have the songs been end-

—CONTINUED ON PAGE 177

PHOTO: PETE VERNON

Simon Dawson

CLASSIC TRACKS

Pink Floyd's "Money"

by Blair Jackson

Here's the thing: It's never *the band's* fault if you're "sick of" a song or album. Led Zeppelin wasn't personally responsible for me hearing "Stairway to Heaven" approximately 20,000 times on the radio in 1971 and '72 alone. FM radio and my college friends conspired against me! I can still recognize that it's a work of genius on many levels (indeed, I plan to investigate it fully in this column), even though I never need to hear it again. Likewise, I know a lot of people who are burned out on Pink Floyd's 1973 masterpiece *Dark Side of the Moon* simply because they heard it too much 20 years ago and because so much of it has been a staple of album-oriented radio ever since. Not me. Pink Floyd was one of my favorite bands from the first time I heard *Ummagumma* in 1969, and I saw each of the three U.S. tours the band played between that album and *Dark Side of the Moon*—the *Atom Heart Mother* tour, *Meddle* tour and the awe-inspiring "Eclipse" tour, the latter featuring nearly all the songs from *Dark Side* a year before it came out.

PHOTOS ADAPTED FROM 20TH ANNIVERSARY EDITION OF *DARK SIDE OF THE MOON*

Pink Floyd occupied a peculiar place in the pop music cosmos of the early '70s. Their roots were in the British psychedelic movement; indeed, their original leader, Syd Barrett, is widely regarded as one of the first casualties of the psychedelic revolution. He went mad (only in part from the injudicious imbibing of illegal substances, it should be noted), was ousted from

—CONTINUED ON PAGE 181

SHORT TAKES

Audiophile Bach With One Mic

by Blair Jackson

John Marks is an environmental attorney by day and a record producer by night, with his own label, which is quickly earning a reputation among audiophiles for its ultraclean sound. The quality of John Marks Records' CDs shows how much can be done with small budgets and first-rate equipment.

Take the company's recent two-CD set of the six Bach cello suites, performed by the internationally renowned Nathaniel Rosen. The recordings were made over the course of two two-day sessions seven months apart in the highly ambient recital hall at the State University of New York in Purchase, using just one microphone—a Schoeps KFM-6 Sphere. Engineer Jerry Bruck, who owns Posthorn Recordings in New York City, set up a makeshift control room in the recital hall's green room to capture the performances. His audio chain consisted of the mic signal passing through Canare cables and into a Sonosax FD-M4 mic preamp, Lexicon 2020 analog-to-digital converter, and on to a Nagra-D 20-bit reel-to-reel recorder. Monitoring was through Aerial Acoustics Model 5 speakers and a Sonosax FD-A100 control amp. Gabe Wiener of New York's Quintessential Sound did the digital editing and mastering using a Sonic Solutions mastering desk and Meridian 618 Digital Processor as a 20-to-16-bit converter.

Nathaniel Rosen with Schoeps microphone

Bruck and Rosen spent a lot of time finding the right spot to put the Schoeps, finally settling on a position 79 inches in front of the cello and 72 inches off the ground. "We were careful to note exactly where we placed it," Bruck says, "because we worked on it six months apart, and it had to match exactly." Typically, Rosen would go through several takes of each movement of each suite, occasionally going back to work on specific passages. Then he and Wiener pieced together the finished work using the Sonic System. ■

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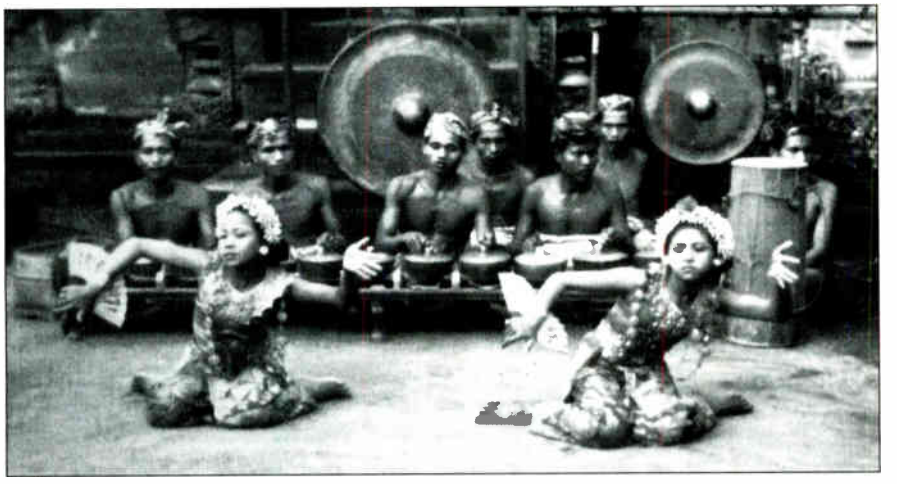
A Golden Gamelan Discovery

In the mid-1930s, brothers Bruce and Sheridan Fahnestock and a five-member crew sailed from New York to the South Pacific in a 65-foot schooner to collect birds, insects and various artifacts for Manhattan's American Museum of Natural History. During their time in the Pacific, the brothers became convinced that a steadily increasing tourist trade was starting to affect native island cultures, so in 1940 they mounted a second expedition, in a three-masted, 137-foot boat, to collect bird habitat groups *and* to record the music of the different cultures in the region.

To make the recordings, the Fahnestocks bought two top-of-the-line Presto disc cutters, which they usually left on board the schooner, linked by up to two miles of insulated cable to a mic on shore. The Presto cut instant masters on 16-inch discs made of an aluminum base and a cellulose acetate surface. The expedition traveled to the Marquesas, Samoa, Tahiti, Fiji and New Caledonia without incident, but off the coast of Australia, their ship hit a shoal in the Great Barrier Reef and sank within a matter of hours. Fortunately, the equipment and discs on board were all saved. In February 1941, the brothers met with President Roosevelt, who asked the Fahnestocks to go to the Dutch East Indies (now Indonesia) to do some undercover intelligence work while they went about collecting gamelan and other music forms. They managed to cut more than 100 discs in the island chain, and they returned from Bali the same week the Japanese bombed Pearl Harbor, plunging the South Pacific into a bloody war that lasted four years and changed the native cultures forever.

The Fahnestocks gave a lecture and played some of the recordings to a capacity crowd at New York's Town Hall in January 1942, but plans to release some of the music on records were scuttled by the war.



Balinese dancers with gamelan gong (circa 1941)

Both brothers enlisted and were sent back to the South Pacific, where their knowledge of the island chains was a boon to their commanders. In October of that year, Bruce Fahnestock was killed off Australia when the ship he was navigating on a night run was accidentally bombed by an American plane. Brother Sheridan survived the war years and lived until 1965, but never attempted to release the recordings the two had made. Ten years after his death, Sheridan's daughter, Margaret Fahnestock Lewis, donated the recordings, which had literally been in an attic for 40 years, to the Library of Congress. Though the acetate coating was starting to fall off, most of the performances were intact.

Sheridan and Bruce Fahnestock at the Presto disc-cutter (spring 1940)

The music was transferred from discs to DAT by the Library of Congress' Michael Donaldson, and then Alan Jabbour and Mickey Hart, the Grateful Dead percussionist who has been heavily involved in recording and preserving indigenous music for more than 20 years, selected some of the best examples from the Indonesian expedition for a CD called *Music For the Gods*, which is part of Rykodisc's ongoing Library of Congress Endangered Music Project series. Although the recordings were still in fairly good shape more than 50 years later, engineers Jeff Norman and Tom Flye did some cleanup work using the Sonic Solutions system at the Grateful Dead's Club Front studio in Northern California. Additionally, the Sonic was employed to raise the pitch a couple of semitones on several tracks (and lower it on one cut). Flye and Jeff Sterling also did some spatial processing at Hart's

Studio X, to give the music a little more depth and presence.

Though not as instantly accessible as, say, recordings in the Nonesuch Explorer series made in the early and mid-'60s, *Music For the Gods* is infused with life, and it offers a fascinating glimpse of a very spiritual culture before the horrors of war altered it. ■

—FROM PAGE 172, STONE ROSES

lessly tinkered with or polished, and the overwhelming feel of the album is of a very hot band playing live in the studio, colored here and there with overdubs and effects that fill out what is in essence a power-trio sound.

The great misconception floating around about *Second Coming* is that it took five years to make. In fact, for a long time after the Stone Roses' first album came out, they were embroiled in a rather bitter fight with their label, Silvertone Records. When that was settled, the group signed with Geffen Records for a whopping sum (reportedly about $4 million), but by that time, the foursome were somewhat dispersed, beginning to raise families and generally living life out of the spotlight. Simon Dawson, the primary producer/engineer on *Second Coming*, picks up the story:

"They came to Rockfield [the famous residential studio in rural Monmouth] at the beginning of August 1993. They had some things they had done over the previous year or so that they'd recorded with John [Leckie] at various places up in the north of England, bringing in outside recording equipment mainly. It was mostly pre-production stuff. John was a natural choice to carry on, since the first album was so successful. But I think the band wanted to change directions a bit. They were really taking their time, and I know John had other things to do. It was taking a bit long for him, so they parted ways and asked Paul Schroeder, who'd engineered the first album, to come up and take over. I was booked on the session as an engineer anyway, so I worked with Paul until February of '94. We did a lot of the backing tracks during that time. But then Paul had other things to do, as well, so he left, too. So in February of '94, it was time to pull things together and see what we had, possibly redo some things and take it from there. Then we made the rest of the album together, and it went very smoothly." In all, the band spent about 14 months at Rockfield.

That was fine with Dawson, a former live engineer (UB40, King Sunny Ade, Ozzy Osbourne, The Stranglers), who has worked at Rockfield extensively since the late '80s. "It's a great place," he says, "especially for projects that take a long time, because it's got such a good vibe to live and work in. The atmosphere is so special, and the studios themselves are wonderful. When you record in the city, it's very easy for a band to get distracted—friends drop by, they go out to clubs—but at Rockfield it's easy to concentrate on recording. At the same time, the vibe is very loose, and that seemed to work with the Stone Roses because that's the sort of people they are. They're very relaxed guys. They just do what they do. The aura around them is one of realness and making sure that everything is recorded for the moment rather than making everything perfect. Between their first album and this album, they'd matured a lot as players and discovered the delights of playing live. They wanted to capture some of that feeling—'Let's not worry about whether it's hi-fi. Let's think about the groove and whether it *feels* good.' "

The band spent countless hours in the studio just jamming, occasionally fleshing the jams out into songs. And according to Dawson, "I decided the best way to go was to keep everything we possibly could, whether it was guitar solos or different takes of the bass, or whatever, and then use the automation on the Neve [VR] to put the record together as we were going along, whether it was EQ-wise, or mute or fader movements. So the whole time, we were building the thing up. But it was very important to us that it all start from a very solid, live basis."

The recording setup for the band was straightforward. Squire's basic guitar sound was a '59 Les Paul Standard played through a hot-wired Fender Twin, which Dawson miked with a Sennheiser 421 and a Shure 57, treated with some compression but no EQ. Squire also played a Strat and a newer Les Paul on a couple of tracks, and an Orange amp was used for some of the more effected guitars. Vocalist Ian Brown has his own

Groove Tube mics, "and we'd use whichever sounded best that day, because valve mics have good days and bad days," Dawson says with a chuckle. For the backup vocals by drummer Alan "Reni" Wren, Dawson usually put up a Neumann 87. Bassist John "Mani" Mountfield played a Rickenbacker bass through a Mesa Boogie amp and cabinet, miked with an Electro-Voice RE-20 or an AKG C-112. For drums, Dawson put a 57 on the snare, 421s on the toms, a D-112 and a 47 FET on the kick, a 452 on the hi-hat, and for overheads "we had a pair of Neumann 56s, these little pencil valve mics that sound brilliant—you can almost record the whole drums just with those, and it's a lot of the sound we used." Dawson also hung a pair of 87s as room mics and placed a Neumann SM2 valve mic in the adjoining corridor "with the door open," he says.

"They love to play live," Dawson notes, "but one of the things that makes them so much fun to work with is they're not averse to trying other approaches. John, in particular, is very good at conceiving guitar parts [for overdubs], and all of them quite get into making up loops that have good grooves that they can play to or use, as the case may be. On 'Driving South,' we used a loop and then overdubbed drums to that but also kept a lot of the loop. On 'Begging You,' there are two or three loops, some of which are backward. They worked on some of those in their homes, and they were good enough that we kept them."

Actually, the album opens with a four-and-a-half-minute sound collage that was assembled by Leckie before he left the project. It combines some spacy guitar explorations by Squire, with various odd percussive loops and sound effects of singing birds and rippling waters, before it magically drifts into the smooth, sonorous, but still heavy "Breaking Into Heaven." "The intro was basically done before I came along," Dawson says, "but then we laid bits of [the song] 'Breaking Into Heaven' into [the collage] by putting it through a very small speaker and waving a mic in front of it. The whole idea of the intro is like you're in a boat going down a river, and we wanted it to sound like 'Breaking Into Heaven' was coming out of a radio on the riverbank. It's very subtle. It was quite a complicat-

ed crossfade when the intro ends and the song really begins."

The success of that track and several others on the album is due in large part to the skillful overdubbing of different guitar and vocal textures to flesh out the band's basic sound. Dawson says of the guitar overdubs: "John is a very artistic bloke. He would have an idea for a second or even third guitar, and he'd play it all the way through the song, and then later we'd decide if we wanted to use it on this or that section. Again, we were building the tracks using the faders." Dawson even got into the act on a few songs, too, adding some distinctive keyboard lines to various tunes. "I wouldn't dream of playing keyboards on anything, really," he says, "because before I met these guys, I hadn't played for many years. But they're people who love jamming, and they wanted me to play with them and they made it so I didn't even feel embarrassed about how well I could do it." Particularly effective is Dawson's overdubbed B-3 part on the otherwise-live jamming track "Daybreak."

It's a testament to the band, Dawson and mixer Bill Price that freeform jams sit comfortably side by side on the CD with more structured pop tunes and never sound jarring. In fact, the most conventionally appealing tune on the disc, "Ten Storey Love Song," which is replete with shimmering harmonies worthy of The Hollies (the first great Manchester band), emerges from an amorphous, nearly minute-long soundscape that has no obvious connection to the song, but which miraculously seems perfect for the track. The end of "Ten Storey Love Song" rolls right into "Daybreak" without missing a beat. Those sorts of touches are all over the record.

Generally speaking, the songs were constructed over a period of many months, with the band and Dawson returning to different songs as new ideas and approaches came up during the course of recording. Mani might spend a week or two thinking about a new bass line for one song, working it out in his room, concurrently with recording some other tune with the group. An exception to this was the lovely acoustic ballad "Your Star Will Shine," which was written on a 4-track by Squire in his room at Rockfield. Dawson says, "John liked the brightness of the guitar sound in his bathroom, so he came to me and said, 'Let's have a go at this song, just to see what it sounds like.' So I put him in a very live chamber to emulate the sound of his bathroom, and to try to get the brightness of his bathroom, I asked him to tune his acoustic into Nashville tuning, and we got Reni to play some percussion in the corridor at Rockfield. We've got a great corridor, and I made it quite ambient. Then we carried on and did the whole thing in three or four days. We built up frontward and backward acoustic [guitar] all the way through. There were some bits near the end that sounded like cellos, which was actually backward acoustic that worked really well. I put on some handclaps, which sound very atmospheric. And I played some castinets on there. It worked out really well—it's a nice little song."

After the album sessions were completed, engineer Bill Price was brought in at the suggestion of Geffen A&R rep Tom Zutaut to mix the

tapes. Comments Dawson, "I was so close to the whole thing, I thought it was a really good idea to bring in someone with fresh ears, who hadn't heard any of this stuff, to come in and do what they do." Price is one of the most respected engineers in Britain, a 30-year vet whose credits include engineering and/or mixing with such diverse acts as Paul McCartney, Mott the Hoople, Pink Floyd, Pete Townshend, The Pretenders, the Sex Pistols, The Clash, Big Audio Dynamite, Elton John, The Waterboys and the Jesus & Mary Chain. Price mixed the Stone Roses project at Rockfield and at Metropolis in London, with Dawson, the bandmembers and Zutaut all giving their input.

"We had a very good relationship with Bill," Dawson says. "He's a great guy. He didn't come in and just take over. It was a team thing, and it all worked extremely well because his way of mixing is sort of the way the record was anyway. He's a live-sounding guy; that's what he likes, too. There were some fader moves and some mutes and a couple of EQs and things that were paramount to the actual loops, and he was good about that. He used Lexicon reverbs to emulate the chambers at Rockfield in some places, but I gave him my input and the band did as well, and he listened to what everyone said. I have a lot of respect for him."

The disc was mastered by George Marino at Sterling Sound in Manhattan, and a bit more studio trickery came into play there. After the 12th and supposedly final tune on the album—the slide guitar-driven album radio track "Love Spreads"—the disc noiselessly flits to track 32, which is a very strange, scratchy, out-of-tune acoustic jam session dominated by fiddle, mandolin, piano and someone clearing his throat a lot. Then the disc glides silently to track 41. "I had nothing to do with all that," Dawson laughs. "That was done with John [Leckie] before they came to Rockfield."

When I mention to Dawson that the record as a whole seems to move back and forth between an almost effortless *cool*—reflected in the looseness of the arrangements and Brown's breezy, breathy vocals—and a certain studio-savvy slickness, he agrees: "That sort of sums up the Stone Roses. All four of them are coming from different places, but

they all tolerate that and draw the best from each other. This is a band that believes that anything goes, but at the same time making that work, and learning how that fits together, teaches you a lot.

"People ask me, 'How could you spend so much time on the same project?' But I never got bored in the slightest. We had our down times, of course, but maybe 95 percent was up. The mood in the studio was always great. It was really good fun."

The Stone Roses' next big hurdle is, of course, a U.S. tour, with Dawson returning to the FOH mixing position for the first time in many years. Ian Brown's boasts aside, Dawson acknowledges, "They really want to do well in America, and I think they will." So do I. ■

—FROM PAGE 173, PINK FLOYD

the band, but later became a lyric focal point for some of Pink Floyd's best material, notably songs from *Dark Side of the Moon* and the equally brilliant *Wish You Were Here*.

Because of their sprawling, serious instrumental music, the Floyd were also dubbed "art rock" by some; others lumped them with so-called progressive rockers like (the original) King Crimson, Yes and ELP, though for my money the Floyd didn't aspire to the sort of lofty, even pretentious, virtuosity that dominated that school. Listen to *Dark Side of the Moon* or *Wish You Were Here*, and it's clear that this band's roots are more in blues than anything else, and that remains true to this day. But one thing the Floyd and the prog rockers did share was an interest in meticulous audio, both on their records and in concert. For better or worse, Pink Floyd heartily embraced quad, and to my knowledege they were the first major band to use a quad setup as part of their live show—keyboardist Rick Wright used to have a joystick panner on top of his organ that allowed him to swirl various effects tapes to speakers placed in the rear of a hall or up in the balcony.

Like so many bands that came up in the late '60s, Pink Floyd was heavily influenced by The Beatles and their wide-open approach to both sonics and arrangement. In fact, it was around the time The Beatles were wrapping up their recording career with *Abbey Road* that Pink Floyd first hooked up with a young engineer who'd worked on that album, Alan Parsons.

Parsons did some assisting work on *Ummagumma*, he mixed the ambitious, difficult *Atom Heart Mother*, did some road work with the band as their live engineer and then was asked to stay on and record *Dark Side of the Moon* at Abbey Road Studios during the second half of 1972 and January of 1973. Twenty-two years and more than 25 million copies of *Dark Side* later, Parsons is quick to admit, "Things would have been very different for me had I not done that album. It did my career an enormous amount of good. I had no financial benefit out of it, but it gave me a great deal of credibility." And it turned Pink Floyd into one of the most popular bands in the world.

In an era when the term "concept album" was bandied about rather casually, *Dark Side of the Moon* truly was that—a multipart musical meditation on how society alienates us and in some cases drives us mad. The album's songs were all deftly tied together by a mind-bending array of sound effects ranging from thumping heartbeats and ticking clocks to machine noises, odd mutterings and cackling laughter. Of course, it wasn't

—CONTINUED ON PAGE 197

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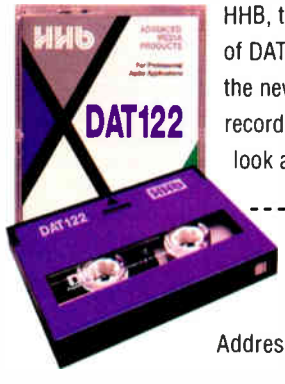

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MIX

by Philip De Lancie

TAPE & DISC NEWS

RECORD GROWTH IN PRERECORDED MUSIC SALES

The Recording Industry Association of America reports that 1994 was a banner year for the record industry. Net units shipped to wholesalers (less returns) jumped 17% over 1993 to 1.1 billion units. Valued at list price, the shipments were worth $12 billion, an unprecedented jump of 20%. The RIAA says its members account for an estimated 90% of the overall legitimate (non-pirate) market for prerecorded CDs, audio cassettes, music videos and vinyl records.

The full-length CD continued to dominate the market, with units growing 30% to 662 million ($8.5 billion). CD-single shipments rose also (19%) but still account for a mere 9.3 million units. The biggest gainer percentagewise was the LP, which shipped in quantities more than 58% greater than the previous year. But the once nearly extinct format is not out of the woods yet. The grand total for LPs shipped by RIAA members was only about 2 million. Vinyl singles, meanwhile, continued their decline, falling another 22%.

Moving from disc to tape, full-length cassettes grew 1.7% to 345 million units, while cassette singles declined 5% to 81 million, which held the overall number of cassettes shipped more or less steady. Music video grew a modest 1.8%, confounding anyone who might have thought that 1993's 45% growth was the start of a breakthrough for the format. A total of 11.2 million music videos were shipped in 1994.

FORMAT WAR BREWS IN DVD MARKET

Do they really want to fight, or are they just posturing to win concessions from their rivals? That is the big question facing the home video industry as Sony and Philips appear determined to stick with their own Digital Video Disc format rather than

The Recording Industry Association of America's 1994 Year-end Statistics

		1991	1992	1993	1994	% CHANGE 1993-1994
Units Shipped *Dollar Value* *(In Millions)*	**CDs**	333.3 4,337.7	407.5 5,326.5	495.4 6,511.4	662.1 8,464.5	**33.6%** **30.0%**
Units *Value*	**CD Singles**	5.7 35.1	7.3 45.1	7.8 45.8	9.3 56.1	**19.0%** **22.5%**
Units *Value*	**Cassettes**	360.1 3,019.6	366.4 3,116.3	339.5 2,915.8	345.4 2,976.4	**1.7%** **2.1%**
Units *Value*	**Cassette Singles**	69.0 230.4	84.6 298.8	85.6 298.5	81.1 274.9	**-5.1%** **-7.9%**
Units *Value*	**LPs/EPs**	4.8 29.4	2.3 13.5	1.2 10.6	1.9 17.8	**58.3%** **-67.9%**
Units *Value*	**Vinyl Singles**	22.0 63.9	19.8 66.4	15.1 51.2	11.7 47.2	**-22.5%** **-7.8%**
Units *Value*	**Music Videos**	6.1 118.1	7.6 157.4	11.0 213.3	11.2 231.1	**1.8%** **8.3%**
	Total Units **Total Value**	**801.0** **7,834.2**	**895.5** **9,024.0**	**955.6** **10,046.6**	**1,122.7** **12,068.0**	**17.5%** **20.1%**

joining an alternative approach championed by Toshiba and Time Warner. Based on an item in *Billboard*, it was reported here last month that Sony and Philips were "not expected to stand in the way of a developing consensus" around the Toshiba system. But the Associated Press subsequently quoted Sony Electronics (U.S.) president Carl Yankowski as saying, "We aren't joining the Toshiba format because we're not convinced it's the best format." Similar sentiments were attributed to Philips chairman Jan Timmer.

Optical Disc Corp.'s quad-density Video CD

The battle centers around the best way to construct a high-density 12cm (CD-size) videodisc using high-quality MPEG II compression to deliver full-length feature films, including multiple audio channels (multilingual and/or surround) and subtitling options. Both formats, expected to debut in 1996, are likely to feature similar video quality and allow playback of CD-Audio discs.

Sony favors a single-sided disc capable of storing 3.7 gigabytes. The company says dual-layer technology under joint development with 3M could double that to 7.4 GB. It also says that it is holding discussions with IBM, Apple, Compaq and Microsoft on extending the ISO 9660 CD-ROM format specification to encompass high-density CDs in computing applications.

Toshiba has apparently had a few discussions of its own, lining up the backing of heavyweights such as Matsushita, Thomson, Hitachi, MCA, MGM, JVC, Denon and Turner Home Entertainment. The double-sided Toshiba discs will be more expensive to produce but will hold up to about 4.5 GB, yielding 170 minutes of video vs. 135 on a single-layer Sony disc.

Can either DVD proposal be replicated without massive retooling? Both sides claim that their discs could be produced with only "minor modifications" to the conventional CD-replication chain. Glass-mastering equipment maker Optical Disc Corp., which says it is ready to support either approach, reports it has successfully demonstrated playback of quad-density CDs replicated in standard 25-ton molding presses, and expects initial production yields of 90% using five-second cycle time (in the same range as standard CDs).

Even if mass replication is feasible, the mass market for a video format that lacks record capability remains to be shown. And "the longer there is a format war," says market analyst Julie Schwerin of Infotech, "the longer drive prices will stay high, which will suppress growth... Had the two sides compromised late last year and presented a single, unified design to content owners and consumers, the prospects for sales would have been more than twice as good."

MUSIC ANNEX SELLS DUPE BIZ TO DISC MAKERS

Disc Makers has acquired the Fremont, Calif., cassette duplication operations of Music Annex. Explaining the decision to sell, Music Annex president David Porter said he has "decided to return the company to our core business—providing recording studio services to the entertainment, broadcast and advertising communities." Disc Makers president Morris Balien said the purchase complements the company's existing manufacturing operation in Pennsauken, N.J. (near Philadelphia), by allowing easier servicing of clients in California, Disc Maker's second biggest market. The company also will open a Los Angeles sales office.

DYNATEK LEADS HIGH-END CD-R CHARGE

With one-off CD-R recorders on their way to becoming a fixture in data-intensive desktop computing applications, vendors are starting to offer new systems geared to higher-volume users. DynaTek Automation Systems (Bedford, Nova Scotia) is now shipping the $8,999 CDM-4000, a 1.2GB hard drive, 4x CD-ROM reader and 4x CD-R recorder in one integrated package. The system, designed to allow easy copying of a source CD, can operate independent of a host computer and features playback emulation of various-speed CD-ROM drives for testing disc performance.

Microboards, meanwhile, reduced the price of its stand-alone CD copi-

er, which doubles as a CD-R recorder when attached to a host computer. The CopyWriter CDD80, a single-speed unit for CD-ROM, CD-ROM XA and CD-I, is now priced at $6,995.

In other CD-R news, Philips LMS teamed up with CeQuadrant to offer four CD-R hardware/software packages based on Philips' CDD522 recorder. Basic Windows and Macintosh systems start at $2,299. Ampex, meanwhile, announced that it will begin worldwide shipments of branded CD-Rs as well as DDS data storage cartridges.

SPLICES

Precision Tapes purchased a TMD high-speed video duplication system from **Otari**, including the Model 750 mirror mother master recorder and the 750-Mk II duplicator. The gear was installed at Precision's new 24,000-square-foot Minneapolis facility, which handles video post-production and duplication as well as audio premastering and duplication and multimedia design...**Gauss** (Sun Valley, CA) is now the exclusive worldwide distributor of the Audio Quality AID system, a duplication quality-control system that compares a duplicated sample to a reference source sample and measures differences in areas such as frequency response, azimuth, speed and noise floor...**BASF** (Bedford, MA) announced that increased raw materials and component costs have forced

The duplication room at Precision Tapes Inc.'s new facility in Minneapolis

price increases of up to 8% in its bulk duplicating tape products...**Emerald Technology** (Lincoln, NB) reports seven recent U.S. installations of its JC-7000 Norelco box inserter, as well as two sales of SP1000E poly box inserters and an OC3000 O-card cassette inserting system. The company also announced JC-7000 sales to Poland, Russia, Colombia, U.A.E., Indonesia and India...A new Series

1000 high-speed cassette duplication system from **Versadyne** (Campbell, CA) was installed at **Global Cassette** in Phoenix, AZ, while duplicators **Silver and Ballard** (Australia), **V-Corp** (Covina, CA) and the **American Publishing House for the Blind** (Louisville, KY) all expanded their Versadyne systems with additional slaves...**American Sound & Video** is moving its audio, video, CD and diskette duplication services from West Caldwell, NJ, to a newer, more efficient facility in Springfield, NJ...**Allied Digital Technologies** announced that it is consolidating all of its video duplication operations into its Clinton, TN, facility, allowing expansion of audio cassette and CD production at the company's plant in Happauge, NY (formerly HMG)... AAztec Recording and Tape Duplicating (Phoenix, AZ) has changed its name to **The AAztec Group Inc**... **Price Manufacturing and Engineering** (Evergreen, CO) installed its DA-324 and VR-324 video duplicating gear at **Branson Teleproductions** in Branson, MO...**SAE Mastering** in Phoenix recently added engineer Dave Shirk and has been busy with projects for labels including Flying Fish and Touch and Go...**Airshow** (Springfield,VA) installed a NoNoise system from **Sonic Solutions** and a UV-22 from **Apogee**. Recent projects include work for the Sugar Hill and Rounder labels...**M Works** (Cambridge, MA) added Dave Merullo to the mastering staff and opened a new editng suite featuring a NoNoise system. The facility has been working on projects by Aimee Mann and Letter to Cleo... **Quintessential Sound** (New York City) has been working on two new classical releases from PGM Recordngs: *Rirecar* and *The Buxtehude Project*...At San Francisco's **Rocket Lab**, Marc Senesac mastered the new album from The Soul Drivers on Bluestone Records...Kid Sensation was at **Trutone** (Hackensack, NJ) mastering his latest on Ichiban Records with engineer Phil Austin, while David Radin worked on the Railroad Jerks CD for Matador Records...**Automatic Inspection Devices** (Toledo, OH) announced two 80-disc-per-minute inspection systems for CD manufacturing. The CDiP evaluates the disc image of printed labels, while the CDiD verifies disc ID coding. ■

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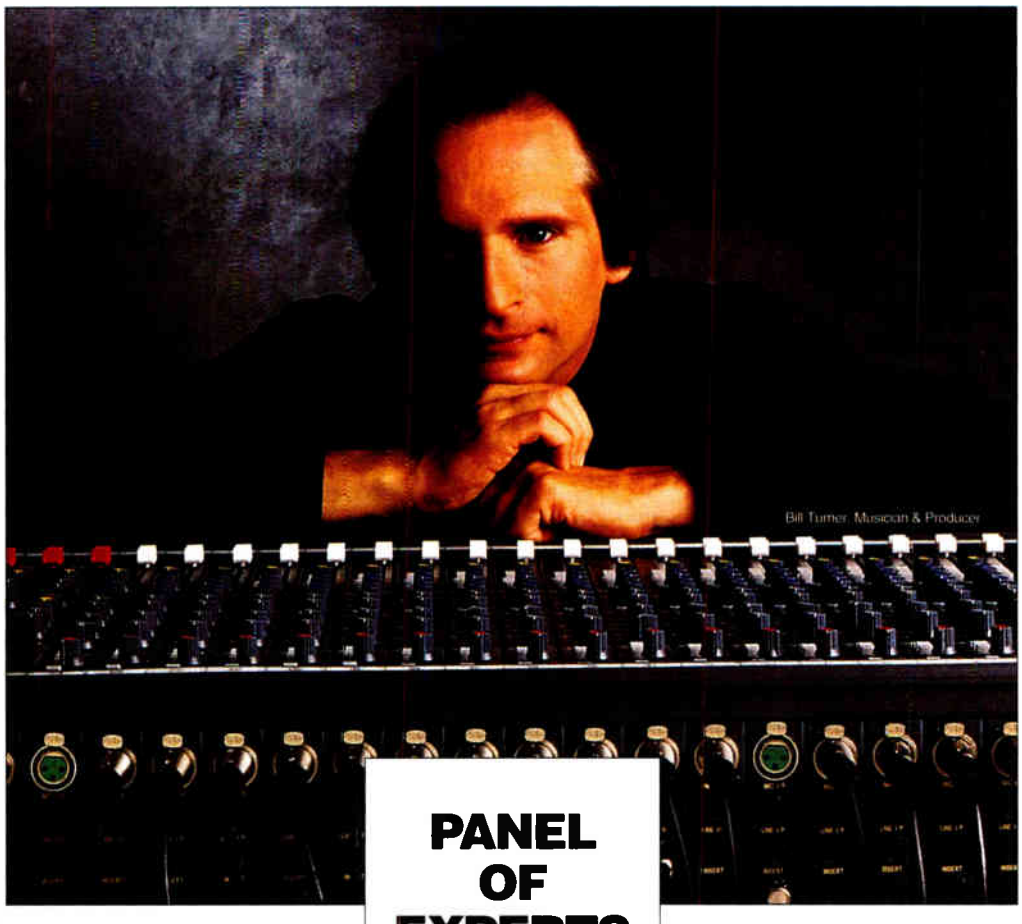
Switchcraft's patented Littel-Plugs® are ideal for use with standard 1/4" phone jacks including Switchcraft's Littel-Jax® jacks. The rugged #580 (shown at bottom of photo) is a 2-conductor plug featuring solder termination, shielded handle, cable clamp and bears the familiar Switchcraft® logo.

The 3-conductor 299 plug (middle product in photo) also features solder termination, shielded handle and larger cable clamp wings for improved strain relief on larger cables.

Shown at the top of the photo is Switchcraft's #121 2-conductor extension phone jack for standard 1/4" diameter phone plugs, featuring solder termination and a shielded, screw-on handle. Part #131 is the 3-conductor version of the extension jack.

Request Switchcraft's AVP-3 catalog for details. Call Linn Kerr at (312) 631-1234 ext. 243 for product pricing and delivery.



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COAST To

L.A. GRAPEVINE

by Maureen Droney

New consoles everywhere: There's been a lot of talk about the North Hollywood opening of **Royaltone Studios**, a division of Northern California's Alias Records. Design is by TEC Award-winners studio bau:ton, and the facility has purchased a 64-channel Solid State Logic 4000 G Plus with Ultimation. The studio will serve both in-house and outside clients—I haven't seen it yet, but it's rumored to be quite fab.

At **Sunset Sound**, Studio 2 is being upgraded with a vintage Neve 8088 equipped with Flying Faders. Although the

—CONTINUED ON PAGE 190

Inside L.A.'s G&C Remote, veteran engineer Ed Greene mixed musical acts at the 1995 Grammy Awards.

PHOTO: MAUREEN DRONEY

SESSION SPOTLIGHT

by Jeff Forlenza

Ramones Return to Their Roots

The Godfathers of punk, The Ramones, recently recorded their latest for Radioactive Records, and it's a return to their blitzkrieg punk roots. Daniel Rey, who has produced King Missile, Green Apple Quickstep and White Zombie, produced the album with engineer Bryce Goggin at Baby Monster Studios in New York City.

"We spent about a year just collecting songs and making demos," explains Rey, who also co-wrote some material with the band. "Most of the writing was done before we got in the studio. Dee Dee [Ramone], their old bass player, was involved with some of the writing on this album. Actually, Dee Dee was living in Amsterdam, and one of the verses he wrote was in German. So we wanted him to sing the German verse 'cause he's the only one who can speak it. So we recorded him over the phone. We tried different methods and then just taped a [Shure] 57 to the receiver and sent him the mix.

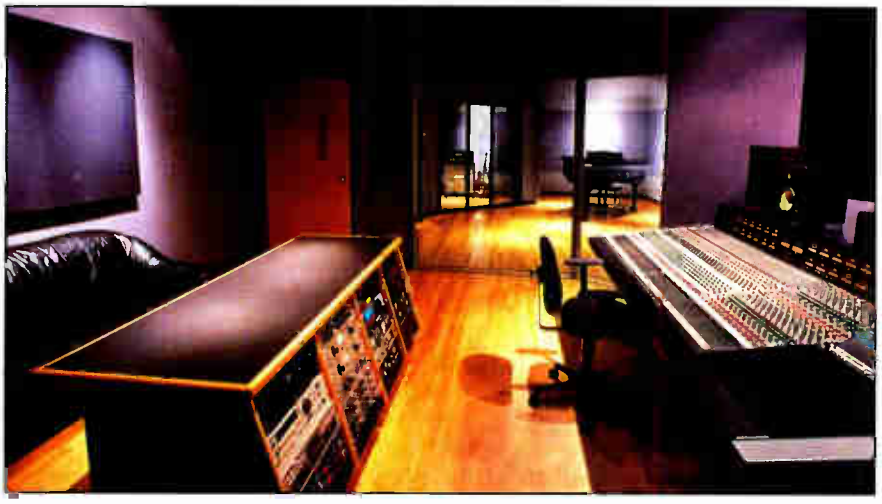
"Their whole idea was to record it as quick and as painless as possible," Rey says. "We went for the punk

—CONTINUED ON PAGE 192

PHOTO: DANIEL REY

The Ramones recorded and mixed their latest release for Radioactive Records at Baby Monster Studios in New York City. Clockwise from front: C.J., Marky, Johnny and Joey Ramone.

COAST



Smart Studios completely redesigned its Madison, Wis., facility with the help of Dallas' Russ Berger Design Group.

SESSIONS & STUDIO NEWS

by Jeff Forlenza

SOUTHEAST

Aaron Neville tracked vocals for his latest A&M release at Dinosaur Recording in New Orleans with producer Steve Lindsey and engineer Gabe Veltry. Background vocal and sax tracks were provided by brothers Cyril and Charles, respectively...Platinum rockers Collective Soul recorded their second album for Atlantic Records at Miami's Criteria Recording with producer Matt Serletic. Bandleader/songwriter Ed Roland co-produced with Serletic, while Steve Robillard and Greg Archilla engineered the sessions... Singer/songwriter Murray Attaway (formerly of Guadalcanal Diary) was at Reflection Sound Studios (Charlotte, NC) tracking his second solo release for Geffen Records with producer Don Dixon and engineer Mark Williams...Buzzy Meekins (bass player for Molly Hatchet) was at Hix Studios (Hickory, NC) tracking a song for his solo project with engineer Marcus Kearns...Indie rockers Luxury recorded their debut album for

—CONTINUED ON PAGE 192

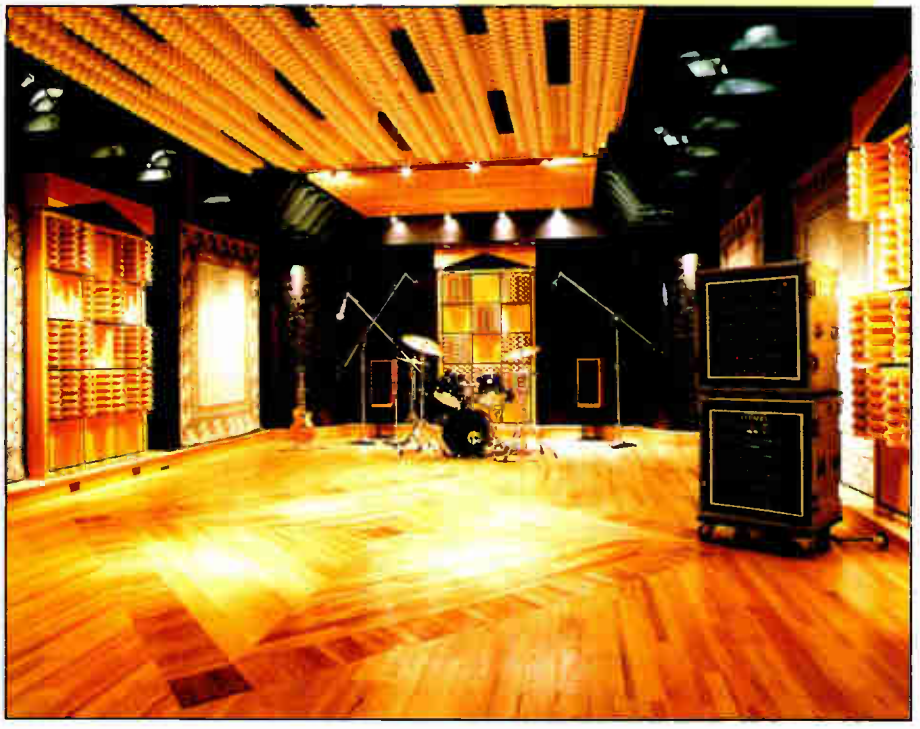
NY METRO REPORT

by Dan Daley

New York is nothing if it's not about clubs. Like restaurants, they tend to come and go in short cycles in New York, with a few making double-digit anniversaries. But that allows a look into the cycles of small-room SR in a city that's

—CONTINUED ON PAGE 195

Remote recording specialists Effanel Music recently opened a pre-production/recording room in New York City. Al D'Alessio designed the 900-square-foot space, which can be linked to Effanel's mobile control room via Monster cable snakes and closed-circuit video.



—FROM PAGE 188, L.A. GRAPEVINE

control room's custom-designed Augspurger monitoring system will be retained, a cosmetic overhaul of both the control room and performance area is under way, including construction of a second, acoustically variable iso room. The 8088 Class A console was discovered in Canada and revitalized in Nashville by "Neve guru" Fred Hill. Hill added more auxiliary sends—increased to eight per channel. If you're not familiar with the 8088, don't be alarmed; apparently there were only three of them made. Basically, they are 8068s with circuit enhancements, 48 input channels and 48 monitors. Sunset studio manager Craig Hubler reports that theirs was the last of the three to leave the factory, and the last design supervised by company-founder Rupert Neve. The new room is expected to be operational by mid-June.

Record Plant will become an (almost) all-SSL facility with the purchase of an 80-channel 9000 J Series console with a 48-track DiskTrack digital recorder/editor and an 80-channel 4000 G Plus console with Ultimation. The new consoles will be housed in two updated and self-contained suites—the 4080 in SSL 3 (Record Plant's largest live tracking room), and the 9000 in SSL 4, which also has a large recording room. Record Plant is already home to two other SSL consoles, an 8096 G Plus with Ultimation and the studio's original SSL, a 4072 G Series. The upstairs MiniPlant remains a holdout—it now features a Neve Capricorn that studio manager Rose Mann tells us is developing quite a loyal following.

Fat Planet Studio in Van Nuys used to be in Phoenix—no, I mean it *really* used to be in Phoenix! Owned by Max Norman, producer for Megadeth and Ozzy Osbourne, and his partner, Mick Landauer, the studio was built in a warehouse outside of Phoenix for the production and mix of Megadeth's platinum *Euthanasia*. Landauer, a Hollywood set-builder, constructed the live drum room, a second recording space and a control room fitted with an SSL 6064E with G computer. When *Euthanasia* was completed, the studio was de-installed and re-setup on Oxnard Street in Van Nuys, where it was scheduled to be open for business at the end of March. Says owner Norman, "It's really rather strange—I'm sitting in the exact same control room I was in Phoenix, but I'm here!"

Hollywood's Sunset Sound installed a vintage Neve 8088 console with Flying Faders automation into Studio 2. As the console frame is wheeled in, the Sunset Sound staff looks on: from left, traffic manager Lisa Haines, general assistant Scott Gerger, chief tech Mick Higgins, engineer Mike Piersante, accountant Joan Mauceri, senior engineer Mike Kloster and studio manger Craig Hubler.

The former Lion's Share complex on Beverly has become Trac Ken Place for use by producer/artist and owner Babyface (Kenny Edmonds) and Yab Yum Entertainment, the busy production company run by his wife, Tracy Edmonds. (Trac Ken, get it?) The board in Studio A is the SSL 6056E with G computer that was formerly in Atlanta, where Edmonds shared a studio with L.A. Reid, and was used for mixes on megahits by

Bobby Brown, Toni Braxton and others. Chief engineer Brad Gilderman tells us that Trac Ken Place will be a "semi-commercial" studio—plans are to have a Studio B, a (probably Neve 8108-fitted) tracking and vocal room, keeping Studio A open for mixing by Babyface and friends.

Stopped in at rehearsals for the 37th Annual Grammy Awards at the Shrine Auditorium, where sound designer Murray Allen gave us a tour of the setup. Reportedly broadcast to 1.4 billion viewers worldwide, the show used three remote trucks. All sources fed into L.A.'s G&C truck, manned by veteran Grammy mixer Ed Greene, while vehicles from the East Coast's Effanel and Remote Recording Services had mixers Randy Ezratty and John Harris "checkerboarding" the musical acts between them. Checkerboarding gave each truck about 20 minutes of setup time between acts. Except for Salt-N-Pepa, who sang to a prerecorded track, all the musicians played live, but bumpers, play-ons and underscores were all prerecorded, 72 cues' worth—with an audience full of stars and a show this big, there's no room for a live orchestra! Out in front, Patrick Baltzell mixed music on a three-piece Cadac board. The output of that Cadac fed a Gamble console, which was manned by Mark King on vocals and Evan Adelman, who covered podium mics and track feeds from the trucks. Mike Abbott mixed monitors, riding herd on four 56-in desks, while Ken DeLoria used Apogee speakers to tune the room.

Northern California's **Bob Hodas** and his Acoustic Analysis company have been busy in L.A. lately. Hodas, the engineer who first burst onto the scene with his controversial acoustical analysis of the different brands of tissue and toilet paper that could be placed over Yamaha NS-10 tweeters, has been using those golden ears to tune control rooms. His satisfied client list includes Conway, the Design FX Remote, Mad Hatter, Skip Saylor Recording and producer Nick Martinelli's MNM Studio. When we caught up with Hodas, he had just finished a diverse range of Southland projects, including Foxfire in Van Nuys, a primarily acoustic music room; Front Page, a mainly rock and alternative studio in Burbank; and the Scotti Bros.' facility, Santa Monica Sound, which plays host to a variety of musical styles.

Asked if a studio's clientele affects his analysis of a control room, Hodas replied, "Well, yes and no. Everybody wants a little of their own personality in their room, but they also want it to be accurate and to translate to the real world. Also, the speakers in each room have their own personality that needs to be addressed. So I always do acoustic improvements first, and then add tuning with EQ. But most people are using the same rules—they want to be accurate with some contour in the bass and the extreme high end, so that they can listen long hours and still have fun. They don't want to end up with it too bright or dull. The biggest difference is probably between rap rooms and everybody else. The rap people need to have the bass up enough so that the clients don't push the systems and blow them up. And in those rooms where people are pounding the systems, they need to do component replacement or re-coning more often than others."

Hodas is currently using the SIM System II for analysis. Created by Meyer Sound, the SIM System II has received many accolades—*R&D* magazine's 100 award, along with kudos from the Smithsonian in Washington and Los Alamos Labs. Says Hodas, "I enjoy doing this kind of work, because everybody's happy when I'm finished. The studios can tell right away that everything sounds better." Hodas expects to be back in town soon to do some tuning for A&M Studios.

Trickling down: And finally, we'll get to test that theory of trickle-down studio economics this year—Michael Jackson has been busy since December at two rooms of Ocean Way's valley annex, Record One. Simultaneously, he's had two rooms booked at Larrabee West on their dual SSL 4080Gs. That's four rooms, four engineers...You may remember that one well-known studio owner predicted that the health of the L.A. recording scene in any particular year depended on whether Michael Jackson was making a record here...looks like we're in for a good year! ■

Fax your L.A. news to Maureen Droney at (818) 346-3062.

—FROM PAGE 188, SESSION SPOTLIGHT

rock approach, back to The Ramones' roots. It's just drums, bass, guitar and vocals; no keyboards. It took us two days to track. We cut about 15 songs. We mixed in about five days. We did submixes to ADATs while we were printing our half-inch masters. Just to have safeties if we wanted to go back and remix, which we did actually do on a couple songs. We went back and resung a couple of vocals onto the ADATs."

Engineer Bryce Goggin mixed to an Ampex ATR 104 ½-inch, 2-track at 15 ips with no noise reduction—straight to tape through Baby Monster's vintage Neve 8036 console. "Generally, I just use the Neve for mic pre's," Goggin explains. "I don't like to use EQ when I track. We compressed like lunatics while we were mixing." The usual method was to track bass, drums and guitar together in Studio A, with minimal overdubs, and then Joey Ramone would do his vocals in an iso booth.

"It was pretty straight-ahead," Goggin says of the project. "57s on Marshalls [for guitars]. Baby Monster has tons of big, tube condenser mics, which I was using on the drums: C-12s, 67s, 47s. I used an SM98 on the snare, which was a change for me. I had my good friend Carl Plaster come in and tune the drums, and he did a spectacular job. I miked [C.J. Ramone's] Ampeg B15 [bass cabinet] with a 421. We used a Neumann U'67 on Joey's vocals."

The album was mastered by George Marino at Sterling Sound in New York City. Coming off an album of cover tunes, *Acid Eaters*, this is a new batch of Ramones originals, which producer Rey describes as "very heavy, with a huge guitar sound." Sounds like old Ramones—Gabba Gabba Hey! ■

—FROM PAGE 189, SESSIONS & STUDIO NEWS

Tooth and Nail Records at **Neverland Studio** (Nashville) with producer **Steve Hindalong** and engineer **Chris Colbert**...Female R&B vocalists **X-scape** were working with producer **Daryl Simmons** and engineer **Thom Kidd** at Atlanta's **Doppler Studios**...

NORTHEAST

The Divine Miss M, **Bette Midler**,

PHOTO: BETH BRODY

Guitarist Chieli Minucci, of the group Special EFX, did pre-production and MIDI programming for his solo release (Jewels, on JVC Music) in his project studio in New York City. Minucci produced the album with engineer Paul Wickliffe and assistant Hiro Ishihara.

was at Battery Studios New York working on overdubs and mixes with famed producer Arif Mardin and engineer Michael O'Reilly...At Red Rock Recording in Saylorsburg, PA, the Phil Woods Quintet recorded their latest jazz album with producer Bill Goodwin and engineer Kent Heckman ..The Monster Mike Welch Band tracked their debut album for Isaac Tigret's House of Blues Records label with producer David Z and engineer Dave Kirkpatrick at Boston's Sound Techniques...Singer/songwriter Loudon Wainwright III recorded his latest album at BearTracks in Suffern, NY, with producer/engineer Jeffrey Lesser and assistant Steve Regina...Thurston Moore (of Sonic Youth) was at Scar Sound (New York City) working on his solo release, entitled *Make Shit*, with engineers John Siket and Bil Emmons.. DJ/remixers Hex Hector and Darren Freedman were at Reel Tyme Recording in Floral Park, NY, remixing the Patti LaBelle single "Right Kinda Lover" for MCA Records...Alternative act Jim Crow recorded and co-produced their debut for Midnight Fantasy Records at Avalon Recording (Douglaston, NY) with engineer Bob Stander..

Recording a song for the Peter Green Tribute on Viceroy Music at L.A.'s American Recording were (from left) bassist Billy Sheehan, guitarist Roy Z, drummer Greg Bissonette and percussionist Doug Van Booven. Sheehan produced, while Bill Cooper and Matt Westfield engineered the song, "Oh Well."

SOUTHERN CALIFORNIA

Zoo Entertainment recording artists Nature tracked their debut release at Sound City Recording (Van Nuys) with co-producer Doug Bohem and assistant engineer Billy Bowers...Jive recording artist Smooth was at Mama Jo's Recording (North Hollywood) tracking with producer/engineer Ken Jordan and assistant Eric Smith...Ice Cube was at L.A.'s Skip Saylor Recording producing and mixing Mack-10's debut album for Lench Mob Records with engineer Keston Wright...Restless recording artists Beowulf mixed their latest album at L.A.'s Master Control with producer D.C. Herring and engineer Chris Fuhrman and assistant Eric Flickinger...Veteran pop stars Chicago were at Record Plant/Hollywood working on their big band album

JULY 1995

Mix Looks At

Recording Consoles

- **Live Recording Tales**
- **Signal Routing Problems & Solutions**
- **Regional Focus: Nashville**

Ad Close
May 8, 1995
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May 15, 1995

The Joy Killers tracked and mixed their latest album for Epitaph Records at NRG Recording in North Hollywood, Calif. From left, bandmembers Jack Grisham, Bill Persons (front), Ron Emory and Chris Lagerborg (back), producer/engineer Thom Wilson, Epitaph president Brett Gurwitz and assistant engineer John Ewing Jr.

with producer Bruce Fairbairn and engineer Erwin Musper...The Robb Brothers (Lemonheads, Buffalo Tom) produced One Hit Wonder's Rockworld/Sony debut EP, *Where's The World*, at Cherokee Studios in L.A...Remixers SoulShock & Karlin were at The Enterprise (Burbank) remixing a variety of songs, including TLC's "Diggin' on You," Barry White's "Come On" and Pebbles' "Like the Last Time"...

NORTHWEST

The Charlie Hunter Trio, an original, funky jazz outfit led by guitarist Hunter, mixed their Blue Note Records debut with producer Lee Townsend and engineer Judy Clapp at San Francisco's Different Fur Recording...Seattle-based Throes of Sanity recorded their new release, *The Upheaval*, at Mirror Sound Productions (Edmonds, WA) with engineer/producer Ken Fordyce...Elektra recording artists Pilot were working with producer/engineer Joe Chiccarelli (Zappa, The Bangles) and assistant Scott Benson at Seattle's Soundhouse Recording...Warner Bros. recording aritsts Mr. Bungle (featuring Mike Patton of Faith No More) were at San Francisco's Hyde Street Studios working with engineer Billy Anderson on a new album...Engineer Jeff Stewart Saltzman remixed the Boyz II Men single "U Know" at Bruce Tambling Studios in San Jose, CA...

SOUTHWEST

King's X were at Houston's Rivendell Recorders tracking new material. King's guitarist Ty Tabor produced the project with the help of engineer Brian Garcia...At The Congress House Studio in Austin, TX, High Tone recording artist Chris Gaffney was working on his latest album with producer Dave Alvin and engineer James Tuttle...Guitarist Michael Chapdelaine recorded and mixed his two-CD set for Time/Life Records with engineer Cliff Yost at C&D Spot Studios in Albuquerque, NM...Producer/engineer Otto D'Agnolo (CeCe Peniston, Sister Sledge) was mixing Wayman Tisdale's debut album for MoJazz Records at Chaton Recordings in Scottsdale, AZ...

NORTH CENTRAL

Jazz guitarist George Freeman (brother of tenor sax great and executive producer Von Freeman) tracked his Southport Records debut, *Rebellion*, at Chicago's Sparrow Sound Design. Joanie Pallatto engineered and coproduced (along with Bradley Parker-Sparrow) the direct-to-digital recordings...Cleveland-based singer/songwriter Ron O'Keefe did pre-production for his latest album project at Radio Spirits (Buffalo, IL) with engineer Craig Harding...

STUDIO NEWS

New York City's Electric Lady Studios installed an AT&T DISQ Digital Mixer Core recently. The DISQ system will be used in conjunction with Electric Lady's 64-channel SSL 4000 analog console...L.A.'s Pfeifer Stu-

dios recently added an all-digital recording, editing and mixing studio, designed by Chris Huston. New gear includes a Studer Dyaxis II workstation, a Yamaha ProMix 01 mixing console and several GML mic preamps. The new room was used to edit a series of radio and television spots promoting the Frank Sinatra *Duets II* album on Capitol...**InSight Sound Recording Studio** recently opened in the foothills northwest of Denver. Originally a personal MIDI studio in the home of owners Dan and Lisa Matthews, the new facility is located on nine acres of land near Rocky Mountain National Park in Loveland. Russ Berger was enlisted for acoustical consultation and studio design of the facility, which features a 16-channel Pro Tools system, a Tascam M3500 console, a Fostex RD-8 digital recorder, a Genelec 1038A tri-amped monitoring system and an assortment of vintage microphones...**Zippah Recording** (Brookline, MA) made some major improvements to their Boston-area facility. Changes include a larger, redesigned control room that will house a recently acquired, vintage 36-channel Neve console, two Alesis ADATs (with BRC) and an EMI TG12345 stereo module from one of the consoles that The Beatles worked on at London's Abbey Road Studios...Nashville's **Studio 19** purchased the first U.S.-bound Trident Ventura 85 console, to go along with their already-installed Trident 90 console...**Upstream Productions** (Asheville, NC) recently added a DDA Forum console. Upstream specializes in album production and soundtrack recording. ■

Send nationwide sessions and studio news to Jeff Forlenza c/o Mix, *6400 Hollis St. #12, Emeryville, CA 94608; fax (510) 653-5142.*

—FROM PAGE 189, NY METRO
loaded with it.

The **Bottom Line** is going on 22 years in operation as Manhattan's premier sit-down venue. The house P.A. has changed little over the decades. The JBL and Gauss components in the custom Chaos Audio cabinets predate the Soundcraft 24-input 500B FOH console and the Soundtracs 24-input monitor board, which feeds EAW and Turbosound wedges, powered by Crown amps.

"This system is perfectly capable for the room despite the age of some of its components," says soundman Terry Gabis, who between stints at the club has done live mixing for Buster Poindexter, The Smithereens, The Roches and the Del Lords. "The only comments, other than positive, that I get is that a lot more acts are coming expecting stereo systems and are surprised to find that ours is mono." That aspect works to the club's advantage, however, because the room is wider than it is long, Gabis points out. A lot of acts, regardless of stature, are bringing in their own monitor systems, he says. "What I am seeing in New York, though, is a lot more clubs with 24-channel Mackie consoles. Clubs like Brownies and AKA, which have them. It's like the whole project studio thing is moving out of apartments and into clubs."

Down at **Wetlands**, engineer Jon Laterza, who also did FOH at the alternate Woodstock last year in

PHOTO: JIM CARROLL

At New York City's Platinum Island Studios, Deborah Harry was working with producer/engineer Matt Stein on remixes of some of her songs.

Bethel, N.Y., supervises what he regards as a rather fashion-forward system featuring Meyer UPA-1 mains with Meyer subwoofers, a 24-input TAC Scorpion console and EV 1502 monitors with four cues. "It's a small, intimate room in which the owner actually sacrificed seats to get the audience closer to the stage," Laterza says. "The whole folk thing is coming back in a big way in New York, and you have to have a system that can play the nuances of that kind of music—and still not get blown out by the fact that you'll have a hardcore band on right after an acoustic one. That's very much a New York thing right now." Laterza, who also rents out systems of his own, says that he's also seeing more people bringing in their own monitor systems lately, not because of any deficiencies in the house systems but because the demand for better monitoring is increasing. Wetlands also recently invested in a slew of new microphones, including EV 308s and 408s, along with more condensers to address the increase in acoustic music.

Don Hill's is on Spring Street, the spiritual successor to Bleecker Street. Mixer Christiano Avigni runs a Soundtracs 24-channel console feeding six Turbosound mains and four subs, along with a pair of EV monitor wedges, all powered by Crest amps. While he also has to configure the system to accommodate both loud and soft performers, Avigni kind of sums up New York when he says that a system has to be designed to withstand "high dBs and beer." Don Hill's also has live-DJ disco four nights a week, and has installed its own turntable system and booth to minimize interface problems, something a lot of other Manhattan clubs have done for the same reason. "They just bring records and their own spare needles," he says.

Avigni also had the best New York club sound story. In the middle of a show one night, apparently, the power shut down completely. He reset the breakers in the basement, but the power kept blowing. He finally checked the stage and saw that the plug of the bass amp wasn't quite seated all the way and the drummer had knocked the edge of a cymbal onto the two millimeters or so of the plug's prongs that were exposed from the outlet. "Who would have thought to look for that?" he asks. "Even the drummer didn't know he had lost a cymbal." ■

—FROM PAGE 164, "THE LANGOLIERS"

command. So you can jump between act breaks or up to 100 specific time-code hit points with one keystroke. It's much easier than hitting a fast-forward button repeatedly."

After laying off all his sounds to 18 tracks of a Sony 3348, it was important that the effects cut through in the mix with as little noise as possible. That's where Sync Sound's new all-digital mixing room came into play. "Digitally mixed" is a label that gets slapped onto a lot of projects these days, but the benefits of high-priced digital consoles are often compromised by the use of effects that require analog patching. Along with Pacific Ocean Post (Santa Monica, Calif.), Sync Sound boasts the largest digital console in North America: The facility's AMS Logic II, which resides in Suite B, has 144 inputs, and all of the effects sends and returns are digital—and automated.

"It's really a pleasure to hear a series of effects you've struggled to perfect and make as clean a sound as possible, mixed in Studio B," Palagy says. "Nothing happens in the entire mix to diminish the clarity and immediacy of what's been developed. I've noticed that even musicians and engineers with really good ears can be surprised at just how clean a true digital mix sounds."

PHOTO: GUY D. ALEMA/ABC

Right: A scene from The Langoliers

Emmy Award-winning engineer Grant Maxwell, who mixed *The Langoliers*, explains, "Audio was constantly monitored on KRK nearfields, as well as spot-checked on a 1-inch Sony TV speaker to ensure that mixes would sound as good at home as they did in the mix room. Each evening, I would make a dub of the day's work to be referenced at home and made the appropriate changes the next day. This was easy because of the Logic II's comprehensive automation."

In this business, a wrap is never a wrap. The ghosts of mixes thought to be long gone have a way of reappearing when you least expect it, but Palagy thinks the audio work on *The Langoliers* is really over. "I think we went through 'Final Cut' prints numbered one through seven before we were done," Palagy laughs. "I'm happy to say that all of the different players on this project seemed to feel that their needs were taken into consideration, as did the other sound editors who worked on the film." ■

Gary Eskow is a writer-musician based in New Jersey, exit unknown.

—FROM PAGE 181, PINK FLOYD

just that aural thread that made the album such a great listen. The songs, written by and large by bassist and de facto leader Roger Waters, had memorable hooks and literate but accessible lyrics. And one song, in particular, seemed to strike a chord in American listeners: the cynical, acerbic "Money."

"Money" was written by Waters during a series of pre-tour songwriting sessions in West Hempstead in early 1972. He built the song around an unusual 7/4 meter and, as was his custom, wrote the lyrics after the music (which was always designed to be about money) was already worked out. It was completed in time to be included with a number of other new songs for the big "Eclipse" tour of Europe and America that spring, so by the time recording sessions for the *Eclipse* album (the title was changed to *Dark Side of the Moon* later) began at Abbey Road's Studio 3 in June, the song had been seriously road-tested, with any kinks worked out.

"It started life on the road with another version of the well-known effects loop," Parsons says. "It was slightly imperfect and didn't have such interesting sounds on it." And what do we hear on the finished version? "There's a cash register, a piece of paper being torn, a bag of money being dropped on the floor, a uniselector in a telephone exchange," Parsons notes. "It was a combination of existing effects tapes in the archives at Abbey Road, and then things like the paper being torn and the money bags being dropped we recorded live. Although many sessions were in 7/4, we put the loop together in 4/4. In those days, everything was designed for quadrophonic, so we recorded all the effects on 4-track. The idea was that the money loop would revolve around the speakers, although being a seven-in-a-bar sequence, it came to a dead stop in the third of the fourth on the second time around, but it still sounded good. There was an SQ-encoded quad mix commercially available."

Roger Waters

Because of the sonic excellence of Pink Floyd's albums and the fact that their productions usually sprawled over a period of many months, the group earned the reputation for being real sticklers in the studio, but, according to Parsons, "That's been exaggerated, I think. If you were to take almost any band by comparison, the average production today is a whole lot more picky than the Floyd were in those days. They liked to experiment, and that sometimes took a lot of time, but in terms of actual performing, they didn't play for hours on end making sure every note was absolutely perfect. They went more for a band feel a lot of the time."

—CONTINUED ON PAGE 201

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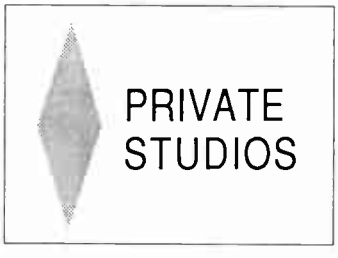

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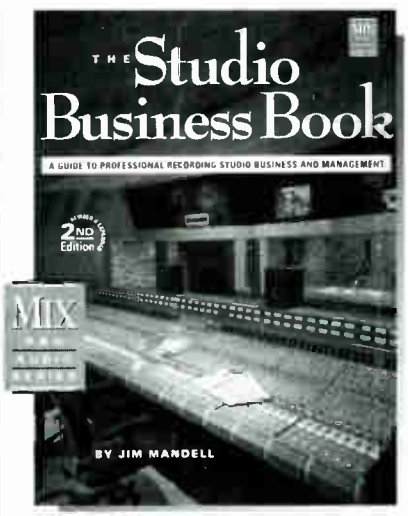

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—FROM PAGE 197, PINK FLOYD

Parsons says the basic track for "Money" was cut live with all four players—bass, guitar, drums and Wurlitzer piano. "As I remember, the loop was the first thing to go down, and then we dubbed onto that, so there was only one performance in the end. In other words, we just did it until it was right—we kept erasing over the original performance until it was right. So I'm afraid there aren't any other takes out there that nobody's heard." The only significant instrumental overdubs are two additional David Gilmour guitar lines that snake in and out of the track and a couple of Nick Mason tom fills. "Most of the guitar sounds came from him," Parsons says. "He had the main processing boxes of the age, like the EMS 'High Fly,' phasing pedals and a Binson Echorec, but there were no real tricks on the miking. The Wurlitzer was probably done direct, maybe through a DI box. Roger's bass, I think, was also direct, although sometimes I'd use a C-12 on his cabinet." As far as production went, "Roger and David were obviously the main figures, but they all had things to say. It's fair to say that Roger was sort of the sergeant-major."

Asked what other records of the era might have influenced his and the band's approach to recording *Dark Side of the Moon*, Parsons replied, "Well, certainly, The Beatles, records like *Abbey Road*. Anybody from The Beatles camp was certainly in experimental mode. I think it was a thing that Abbey Road was particularly good for, because we had a large number of rooms and a large number of [tape] machines. You have to remember that everything was generated with tape machines in those days. There were no digital delays, no Harmonizers. Basically, if you wanted an effect, it was usually achieved with a tape machine. Sometimes, particularly on Floyd sessions, we would have machines stolen from other control rooms literally littering the corridors, with wires everywhere. It was quite a sight. There was also a room with four EMT plates in it on the top floor, as well as three live chambers. On the lead vocal of 'Money,' as best as I can recall, there's a fast tape delay probably generated on a Studer A62, running at 15." (Another simple effect—the long vocal delays on "Us and Them"—was achieved by using a 3M 8-track machine running slow, and using two tracks for each repeat.)

The snippets of different conversations that emerge during the long instrumental fade (and which also crop up on other tracks on the album) are an interesting story in themselves. Toward the end of the recording, the band invited about 20 different people—ranging from band managers and roadies to Abbey Road staffers and musicians using other rooms at the studio—to sit down in the studio and respond to a series of questions that had been written down on cards: "When did you last thump someone?" "Are you frightened of dying?" "What is the dark side of the moon about?" etc. Some of the answers were then creatively edited into different parts of the album, adding immeasurably to the texture of the work. Parsons and Paul McCartney were among the interviewees whose responses were not used; the stars of those sessions ended up being the infamous Roger the Hat, who then road-managed another band, another roadie named Pete Watts, and Abbey Road's colorful doorman/janitor Jerry Driscoll, among others.

As Parsons notes, "Although everybody felt we were probably making the best Pink Floyd album to date, no one could have predicted it would still be on the charts ten years after it came out. I didn't think of the Floyd as a singles band, either, so the success of 'Money' in the U.S. took everyone by surprise." Indeed, the song wasn't released as a single in the UK. In America, "Money" made it as high as Number 13 on the pop charts in May of 1973—the band's only charting song until "Another Brick in the Wall" hit Number One seven years later. (Many U.S. radio stations bleeped the second half of the word "bullshit" from the last verse.) But Pink Floyd was—and still is—an album band first and foremost. Even at the time, the success of "Money" was a double-edged sword for the group. As David Gilmour said a few years ago, "We were used to these reverent fans who'd come and you could hear a pin drop—we'd try to get really quiet, especially at the beginning of 'Echoes' or something that had tinkling notes, trying to create a beautiful atmosphere, and all these kids would be there shouting 'Money'!" Two decades later, that's *still* happening. ■

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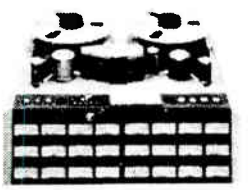

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Mix Marketplace page 202.

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—FROM PAGE 127, "SHOW BOAT"

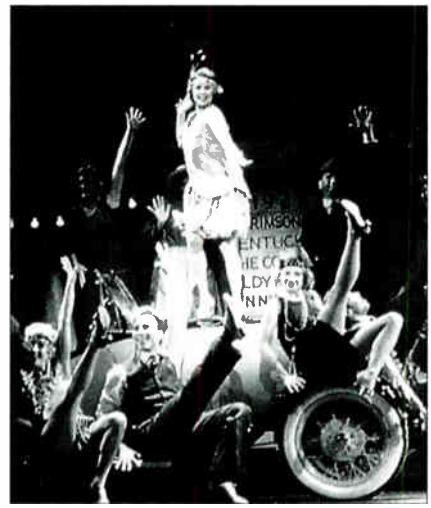
Martin," he says, "and we were thinking about doing the whole show with foot mics and no wireless. We wanted an open, naturalistic sound, and theoretically, because of the sheer numbers in the cast, you shouldn't really need wireless.

"We thought about doing stage-miking," he continues, "and in some cases, we would have had to place wireless mics on scenery instead of the actors. It got way too complicated. There's a lot of action happening simultaneously [especially in terms of the massive scenery], and as it turns out, the concept evolved into something a bit more slick, more modern and high-tech. Because of technology, you kind of get drawn into that. Hal Prince [the production's director] wanted fast scene changes, which means we had to use the automation to a greater degree than we originally talked about. We eventually decided the production would be less of an 'old-fashioned play' and more of a modern production, and wireless mics work into that equation."

Sinko recalls part of the process in creating the mix: "Every time during rehearsals when I tried to creep a little reverb in for whatever reason, Martin would come up and say, 'This doesn't feel right for this show; that's not what we want.' So we said, 'Okay, let's make it natural.' The challenge there, and from a mix standpoint, is to try to keep the focus onstage at all times. That's a very difficult thing to do when you have a lot of reinforcement, because the image starts to come from the speakers instead of the stage. If that happens, the audience gets distracted and it kills the whole illusion that you're trying to create—the illusion that it's not miked at all."

To make the illusion work, the production uses both technology and human ability to their greatest potential. Sinko explains that one of the benefits of the Cadac is automated, preprogrammed cues via MIDI to the BSS TCS 804s, Yamaha D1030 and D2040s, to change delay timings and help shift the aural focus to the actor. "All the Yamaha and BSS gear are set up with MIDI control data," he explains, "and there are many cues where the delays are changing throughout the show to push the image upstage or downstage to match the actor's position."

If technology is the first step in the illusion, a mix aesthetic is the second. "Our goal is to try to create the 1927 sound, which was without any technological aid at all," Sinko explains. "Luckily for me, I find that a very exciting challenge in terms of my mixing. It means I have to work the faders a lot, and one of the reasons that Martin and I get along—as a matter of fact, maybe it's one of the reasons why he likes working with me—is that I tend to mix very actively, almost overactively. I mix syllables, half-syllables and sibi-



lances. I basically play the lyric and the dialog like a score—every half a word I'm changing the fader position. I don't put the fader in one spot and let it sit there; I'm always trying to shape the sound, to try to make it sound as natural as possible. How I do that is basically to look at the stage and say, 'Does it sound real? Is it believable?' If I can look at the stage and say, 'Yes, I can believe that person is actually speaking without my help,' then it's working.

"I noticed a long time ago that it was the directional high end—transients and sibilance—that distracts the audience from the actor to the speaker," he continues. "So what I tried to do early on was to start ducking my S's and then ducking anything that was drawing me away from the stage. I've developed that skill over time to where now I'm creating an illusion onstage with my mix by keeping things *out* of the speakers, in terms of directionality."

Despite his active mixing, Sinko says, "I'm always suprised at how low my faders are, especially in numbers like 'Ol' Man River' that have to have so much power and a great deal of low end. [Long before the advent of sound reinforcement, the song was specifically written to be performed with a huge and powerful voice.] But that's always because [the singer is] giving me so much from the stage, and I don't need much reinforcement. It's wonderful when all the power comes from the performance. That makes my job twice as easy.

"Martin and I believe that the mixer is actually another musician," Sinko adds, "or if not that, having an elevated step above the conductor—in between the conductor and musician in terms of importance, even though you're not creating the sound yourself—you are shaping the sound as it comes out, and playing the desk like an instrument. I know that, like any musician, I've developed the chops in my fingers over the last few years to be able to perform moves I couldn't do before. You want to have that control, because you are playing it. And like a musician and conductor, I don't even think about it when I mix any more. It's just in through the ear and out through the fingers, and you do what you do to make it sound right. That's part of what I love about it: It's very cleansing. I can come in here with other things on my mind but a minute or two into the act, I'm a clean slate. It's just happening; it's a Zen thing."

"Zen and the art of musical maintenance," I muse. "That's the challenge," Sinko smiles. "The rewards are great. Like last night: Out of the blue, everything clicked. That doesn't happen often, but when it does, it's a pearl. Opening nights are like that, when suddenly things happen and sound so great, and the audience comes up to you at the end of a show, telling you you're great and doing a great job. You get instant gratification. Obviously, it's very different from working in a studio. There's something about having an older man or woman come up to you with tears in their eyes, having had a moving experience. You feel like you're actually making a difference. I really feel good that I'm helping people have a wonderful time at a show that they remember from their childhood." ■

Jim van Bergen is a New York-based sound designer working in theater, opera, film and televison.

FEEDBACK

EVEN MORE "COMPLAINTS"

I read the article, "Top Ten Technical Complaints," in the February '95 issue of *Mix*. I have experienced all the headaches described in the article. I agree with all the criticisms, and I have a few of my own to offer.

If I've seen it once, I've seen it a hundred times: circuit board-mounted connectors, which inevitably break the solder joints or circuit traces. Whoever thought a circuit board-mounted XLR connector would ever last two weeks should be shot. Same goes for circuit board-mounted TRS, DIN, RCA, phono jacks, potentiometers and switches. If these devices are going to be circuit board-mounted, please reinforce them to the chassis. Or, better yet, mount them to the chassis and run wire from them to the circuit board.

Moving across the circuit board brings up another manufacturer blunder: Those pesky circuit elements that have absolutely no cross references (at least not on this planet), and those that have no markings whatsoever. Damned annoying. I once ran across one such enigmatic device on an aging, but not yet antique, piece of gear. I had to call the semiconductor manufacturer and, eventually, got transferred to some poor guy in what must have been the back broom closet before I could get an identification and a pinout of the beast; and, no, there is no contemporary counterpart or replacement made anymore.

I wish that the publishers of IC cross references (ECG, NTE, SK, etc.) would publish an unabridged version, listing everything ever made. Then publish annual or semi-annual updates listing devices that are new, modified, discontinued, etc.

My last offering is on the issue of display lights and replacing those incandescent lamps. It seems to me that very few manufacturers design the lamp placement well at all. The lack of ease of accesibility in some instances is excruciating. Don't they realize that bulbs burn out, and that someone has to replace them? I suggest LED retrofit replacements. These are multiple LEDs mounted in every conceivable incandescent bulb configuration. They come in just about any voltage rating, numerous current ratings and in many snazzy colors, too. And did I mention they last forever? So far, I've found two companies that specialize in these LED replacements. They are: Lamp Technology Inc., 1645 Sycamore Ave., Bohemia, NY 11716, (800) 533-7548; and Lumex Opto/Components Inc., 292 E. Hellen Rd., Palatine, IL 60067, (708) 359-2790.

David S. Weller
Timonium, MD

NEWS ABOUT STANDARDS

Dave Stevens' article "Computer Control: Reality and Promise" (November '94) was excellent. In the effort of standardization, I thought that your readership ought to know about the efforts of the Audio Engineering Society Standards Committee (AESSC) SC-10 subcommittee on sound system control. The goal of SC-10 is to create a messaging standard for control systems that, at its core, is independent of the transport system. This means the bytes that issue the commands to the equipment will remain the same regardless of how they get there—which could be by a common transport such as Ethernet or on any number of proprietary systems available today. In addition, the method for placing the standard messages onto each transport will be standardized in the form of a Recommended Practice. By opening up the entire control method, we hope to encourage industrywide adoptions of popular formats.

SC-10 has tried to adopt an approach that is compatible with the real world. With a number of different network providers in business today, a standards committee would prefer to not pick winners and losers. The value of our standardization effort is that the network providers will have the opportunity to migrate to a standard messaging method that will allow for compatibility at the bridging and routing level among systems using different transports. Over time, we expect to see the network providers migrate toward common, cost-effective transports, where true compatibility will exist.

Several network providers have told us that they are following the architectural recommendations of draft AES-24ID-xxxx in their new development efforts. It is the committee's present task to quickly release this architecture as a standard in our first step toward the full standardization of control systems.

Michael Karagosian
Chairman SC-10-1

TIMECODE AND THE DA-88

Upon reading the article "Sprocketless Altman" in March '95 Mix, I discovered a rather glaring inaccuracy that could be extremely misleading to readers, and more importantly, potential DA-88 customers. On page 112, Dylan Tichenor makes reference to the fact that "we could not prestripe the DA-88s with timecode." The SY-88 sync card for the DA-88 incorporates a timecode reader/generator that enables the user to prestripe, poststripe or stripe timecode during the format process. It should also be noted that the SY-88 will convert ABS time and output it as timecode on-the-fly.

Roger Maycock
TEAC America
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Send Feedback to Mix, *6400 Hollis St. #12, Emeryville, CA 94608; fax (510) 653-5142; or 74673,3672 @ compuserve.com*

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"I can't say enough good things about the workhorse Mackie MicroSeries 1202. It is an absolutely essential audio tool in my daily work. I would be at a loss without it. The more I think about it, the MS1202 may just be one of the best audio bargains of all time." *Radio World Magazine*

"This little mixer has the same electronics as Mackie's incredibly popular CR-1604. The 1202 is billed as a 'low noise, high headroom mixer' and it certainly lives up to its word. The board has a very clear, clean, quiet sound. For home and studio recording applications, I can see the board becoming equally popular as a 'starter unit' and as an auxiliary mixer." *Recording Magazine*

"GRADE: A. One of the product wonders of the pro audio world, the MicroSeries 1202 mic/line mixer is priced so ridiculously low that audiophiles can make good use of it for home recording projects. I tried it with a CD player via the tape inputs and found its sound as clean as that of some audiophile stereo preamps costing twice the price." *Audio Magazine*

[1] Suggested retail price. Your mileage may vary. Price is slightly higher in Canada and outer reaches of the Spiral Nebulae.

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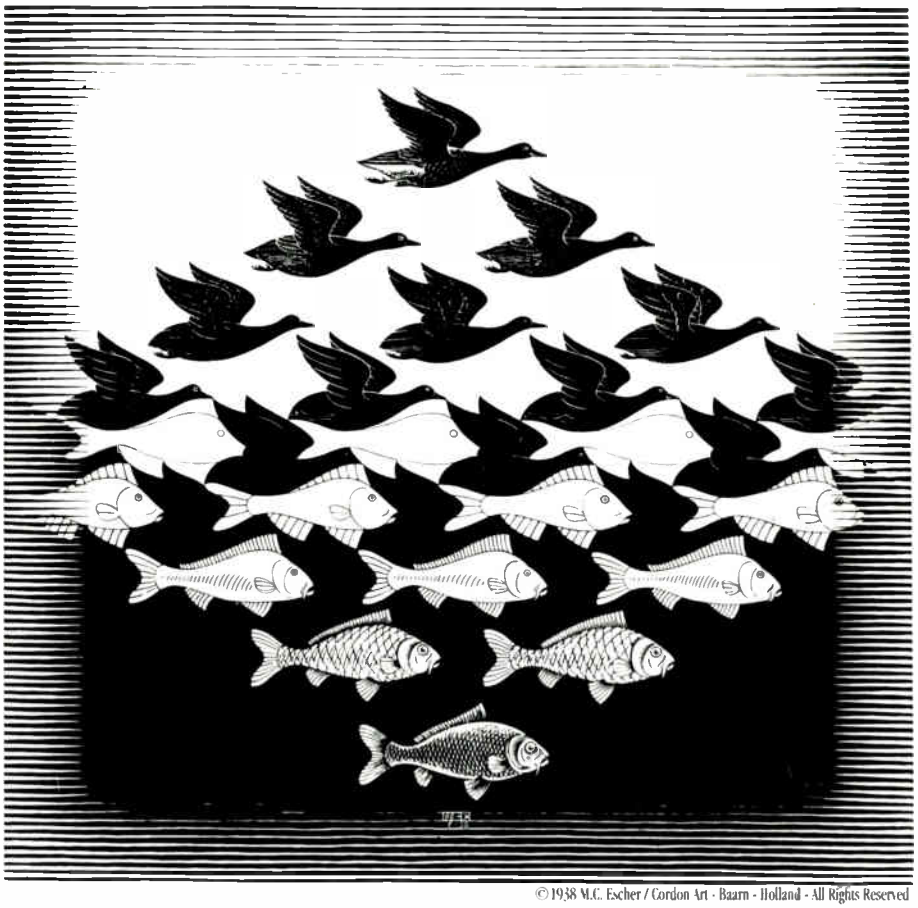

Study the illustration. Are the geese becoming fish, the fish becoming geese, or perhaps both? Seasoned recording engineers will agree that your eyes *and* your ears can play tricks on you. In the studio, sometimes what you think you hear isn't there. Other times, things you don't hear at all end up on tape. And the longer you spend listening, the more likely these aural illusions will occur.

The most critical listening devices in your studio are your own ears. They evaluate the sounds that are the basis of your work, your art. If your ears are deceived, your work may fall short of its full potential. You must hear everything, and often must listen for hours on end. If your studio monitors alter sound, even slightly, you won't get an accurate representation of your work and the potential for listener fatigue is greatly increased.

This is exactly why our engineers strive to produce studio monitors that deliver sound with unfailing accuracy. And, why they create components designed to work in perfect harmony with each other. In the laboratory, they work with quantifiable parameters that do have a definite impact on what you may or may not hear. *Distortion*, which effects clarity, articulation, imaging and, most importantly, listener fatigue. *Frequency Response*, which measures a loudspeaker's ability to uniformly reproduce sound. *Power Handling*, the ability of a loudspeaker system to handle the wide dynamic range typical of the digital domain. And, finally, *Dispersion*, which determines how the system's energy balance changes as your listening position moves off axis.

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